CHAPTER - 3

CONCEPTUAL FRAMEWORK AND PROFILE OF SELECTED REFINERIES OF IOCL

3.1 Introduction
3.2 Concepts Relating to Financial Performance
3.3 Profile of Selected Refineries of IOCL
3.4 The Products of Refineries and Their Uses
3.5 Production Process of Refineries of IOCL
3.6 Finance Department of Refineries of IOCL
3.7 Performance Appraisal System in the Refinery
3.8 The Group Companies of IOCL
3.9 Conclusion
3.1 **Introduction:**

No business can exist without the finance. Because, Finance is the heart and profit is the soul of the business. The major areas of finance are financial services and managerial finance. Financial services is concerned with the design and delivery of advice and financial products to individuals, business and governments within the areas of banking and related institutions, personal financial planning, investments, real estate, insurance and so on, and financial management is concerned with the duties of the financial managers in the business firm.

Profit has now become measurement test to measure financial efficiency of the business firm. Generally, profit is the net surplus of revenue over the expenditure. The meanings of profits are varied according to the use and purpose of the figure. Profit is the engine that drives the business enterprise. Profit is the main motto behind the establishment of a business. Basically profit is the primary motivating force for all economic activities and the report card of the past.

"If an enterprise fails to make profit, capital invested is eroded and if this situation prolongs, the enterprise ultimately ceases to exist." Thus, profit is the soul of the business without which a business becomes dull and lifeless. "In fact profit is useful intermediate beacon towards which a firm's capital should be directed." No company can survive longer without profit, for profit is the ultimate measure of its effectiveness and in capitalist society, there is no future for a private enterprise which always incurs losses.
crucial measure of the effective performance of a business is profit which really is a measure of how well a business performs economically.

The Profit of business can measure the success of a product and the development of the market. P. V. Kulkani (1981) said that “No company can survive long without profit, for profit is the ultimate measure of its effectiveness. Profit is a signal for allocation of resources and a yard-stick for judging managerial efficiency.”

Western and Brigham (1978) pointed out that “To the financial management profit is the test of efficiency and a measure of control, to the owners a measure of the worth of their investment.”

In another opinion, the word ‘profitability’ is composed of two words ‘profit’ and ‘ability’. The meaning of the word profit differs according to the use and purpose of the figure. The term ability reflects the power of the enterprise to earn the profit. The term ability means the earning power or operating performance or earning capacity of the concerned investment. Thus, the word ‘profitability’ can be defined as the ability of a given investment to earn a return from its use. It can be noted that the measurement of overall efficiency of a business concern.

The most important objectives of business is to earn profit, as much of it as possible. In assessing the overall profitability of a company different profitability ratios are studied, viz., gross profit ratio, net profit ratio, operating ratio etc. Performance means an act, an execution. To perform is used for showing the fulfillment of a function or a role. Performance is also used for evaluation. To measure the action or to interpret the execution or action the ‘performance’ word can be used.

According to Moore, “Financial analysis is a process synthesis and summarization of financial and operative data embodied in the financial statements with a view to get an insight in to the operative activities of business enterprise.”
3.2 Concepts Relating to Financial Performance:

(A) Income:

Amount received on sale of goods or service or business assets is known as income. Income is classified into (i) revenue income and (ii) capital income. Income received from the day to day transactions of the business is known as revenue income i.e. amount received on sale of goods, commission and discount received, etc. are revenue incomes.

The income received on sale of any asset or on receipt of any long-term debt is known as capital income, i.e. income from sale of furniture or amount received on issue of debentures is capital income.

(B) Expenditure:

Amount spent or paid or when the liability is created for getting any benefit or service is known as expenditure. For example, purchase of machinery and payment of salary, etc. are expenditures.

(C) Expense:

The benefit of the amount spent is available to the business for the accounting year (normally one year) only, then it is known as expense or revenue expense. If the benefit is available to the business for more than one year, then the amount spent for the future period is known as pre-paid expense. For example, salary paid is an expense, whereas, salary paid in advance is not the expense of the current accounting period, therefore, it is shown as pre-paid salary on the asset side of the balance sheet.

(D) Profit:

Many experts defined the definition of the "profit" that "profit" is one of the goals of any entrepreneur. The word profit has been defined by economists, accountants and many other competent experts. Both, the accounting profit and economic profit differs from each other. Both the
concepts of profit agree that profit is an excess of revenue over total cost but
the meaning of cost differs.

So, the various concepts of profit have been discussed below to
give a clear conception of profit.

(i) Accounting Profit:

The figure of accounting profit is the result of the application of
generally accepted accounting principle. The computation of accounting profit
is affected by the arbitrary allocation of expenditure between revenue
expenditure (expired cost) and capital expenditure (unexpired cost). The
accounting definition of profit is based on accrual principal and includes non-
cash items. The accounting profit provides the basis for computing the cash
flow. Accounting profit is known as the excess of total revenues realized
during the period of the given two dates.

In short, “The excess of profit over related costs applicable to a
transaction, a group of transactions or the transactions of an operating period
is profit.”

In accounting terminology, this profit or net income is known as
the excess of total revenue over the total cost associated with these revenues
for the period. Therefore, accounting profit may means as the residual of
income after meeting all the ‘explicit’ items of expenditure. Explicit items of
expenditure generally include raw materials consumed, direct expenses,
wages and salaries, administrative expenses, selling and distribution
expenses, depreciation and interest on capital.

In accounting profit the term “explicit and implicit items of
expenditure”, principles of matching cost, are very significant. Surplus of total
revenue over total cost has tabulated. Explicit items are the considerations of
raw materials consumed, manufacturing expenses etc. There are two types of
accounting profit viz. gross profit and net profit. Gross profit is the result of the
relationship between prices, sales volume and cost. Net profit (after interest and taxed) is a deversation of amount left over after deduction of office expenses, and selling and distribution expenses and provision for debts and advances.

In short, Gross profit is the excess of net sales over direct costs plus factory overheads while net profit means that amount which is left over after deducting the amount of administrative expenses, selling and distribution expenses and provisions.

(ii) Economic Profit:

The meaning of the economic profit is the compensation received by a firm for its managerial function. It is a reward earned by the entrepreneur for bearing the rate. The economist points out that in addition to the deduction of explicit costs, implicit costs should also be deducted. For example entrepreneur’s wages, rental income on self owned land employed in the business and interest on self owned capital. The Economic Profit is arrived at by deducting implicit costs from accounting profit. This can be called as economic profit. The term, implicit costs, is also appropriate and applicable here. They are known as opportunity costs also. It can be put in a formula as following:

Economic Profit = Accounting Profit – Implicit Costs

OR

Economic Profit = Total Revenue – (Explicit Costs + Implicit Cost)

In economics the accounting profit is termed as gross profit while the profit remaining after deducting the opportunity cost of owner’s time and capital invested is termed as ‘Pure Profit’.
Accounting Profit v/s. Economic Profit:

The accountant's concept of profit is different from that of the economist's. The distinguishing features of the concepts of 'accounting profit' and 'economic profit' are clear from the fact that economic profits, as opposed to accounting profits, necessarily include the opportunity cost of capital invested in a business and the opportunity costs of the owner's time. In accounting and 'profit is deemed to be composite result of various factors of production while in economics, it is termed as the rent facility, the wages of entrepreneur and the reward of risk bearing.

Diagrammatically the relationship of 'accounting profit' and 'economic profit' can be depicted as under:

![Diagram of Economic Profit vs Accounting Profit]

Figure – 3.1 : Economic Profit v/s Accounting Profit

(iii) Social Profit:

An increasing awareness of the social responsibilities on the part of a business firm has led to the discussion of 'social profit'. The term 'social profit' may be defined as the excess of social benefits received by the society from a business firm over the social costs borne by the society attributable to the same business firm. The social benefits made available to the society by the business firm include the creation of employment opportunities, providing jobs to the weaker section of the society on a preferential basis, getting in to certain areas which are vital to national interest such as exports, providing consumers a wide range of variety, creating good townships, offering good conditions of work, improvement of tax base for the
entire community and attract communications which would not otherwise be made available.

The social costs are the sacrifices of the society for which the business firm is responsible, like the deficiency due to bankruptcy, air pollution, water pollution, impairment of human factor of production, depletion and destruction of animal resources, premature depletion of energy sources, soil erosion and deforestation, costs associated with unemployment and idle resource, monopoly and social losses and production of dangerous and explosives.

However, it is not yet clear how these social benefits and cost can be quantified under a common denominator such as money.

(E) **Value Added Concept:**

This concept indicates the net value of wealth created by the manufacture during a given period. It is a generation of wealth without which an enterprise fails to survive. It is a modern practice in western countries that their annual reports include value added statements. The value added amount is an excess of turnover (or sales revenue) over the cost of goods and services. Value added is a consideration of income from services, cost of bought in of materials, the cost of services. Income from services includes reward for services in the form of dividends from it, rent, compensation and miscellaneous income etc.

The term ‘cost of bought in materials’ includes the raw material consumed, stores, spares and containers consumed plus purchase of finished goods. The ‘cost of services’ includes the cost of procuring services like power and fuel, repairs and maintenance of machinery, manufacture and labour charges, laboratory and research expenses etc. Employees cost include salaries, wages bonus and gratuity and contribution to provident and welfare expenses.
(F) **Profitability:**

Profitability measures over all efficiency of a business enterprise. The operating efficiency of a firm its ability to ensure adequate return to its investors depend on the profits earned by it. It also indicates public acceptance of the product and shows that the firm can produce competitively. Profitability is the relationship between profit and investment mode.

(G) **Finance:**

Finance is regarded as the life ‘blood’ of a business enterprise. This is because in the modern money – oriented economy, finance is one of basic foundations of all kinds of economic activities. It is the master key which provides access to all the sources for being employed in manufacturing and merchandizing activities. It has rightly been said that business needs money to make more money. However, it is also true that money be gets more money, only when it is properly managed. Hence, efficient management of every business enterprise is closely linked with efficient management of its finances.

Finance comes directly from the Latin word “finis”. In general, finance may be defined as the provision of money at the time it is wanted. However, as a management function it has a special meaning. Finance function may be defined as the procurement of funds and their effective utilisation. Some of the authoritative definitions are as follows:

"Business finance can broadly be defined as the activity concerned with planning, raising, controlling and administrating of the funds used in the business".

"Finance is a specialized function field found under the generation classification of business administration".

—John Hampton
From the various definitions of the term finance or business finance give above it can be concluded that finance requires overall knowledge of the environment in which it is needed considered as a whole. Finance may be said to be the circulatory system of the economic body, making possible the needed co-operation between many units of activities.

(H) **Financial Management:**

There are many kind of management requires in the business for overall objectives of the firm but finance management requires great caution and wisdom on the part of management. Finance management means money management. Finance management concerned mainly with raising funds in the most economic and suitable manner.

"Finance management is the operation activity of a business that is responsible for obtaining and effective utilizing the fund necessary for efficient operations".

– *Joseph and Massie*

"Finance management is an area of financial decision making harmonizing individual motives and enterprise goals".

– *Weston and Brigham*

"Finance management is the application of the planning of the planning and control functions to the finance function".

– *Archer and Ambrosivu*

Thus, financial management is mainly concerned with the proper management of funds.
Cash:

Cash is the most crucial component of the working capital of a firm. Its effective management is the key determinant of efficient working capital management. Cash, like blood stream in the human body, gives vitality and strength to a business enterprise. The steady and healthy circulation of cash throughout the entire business operation is the basis of business solvency. In a business enterprise, ultimately, a transaction results in either an inflow or an outflow of cash. In an efficiently managed business, static cash balance situation does not generally exist. Adequate supply of cash to meet the needs of the business is essential. Its shortage may degenerate a firm into a state of technical insolvency and even to liquidation. There was time when the financial officer's sole concern regarding cash management was how to maintain sufficient amount of cash. Though idle cash is sterile, its retention is not without cost. Holding of cash balance has an implicit cost in the form of its opportunity cost. It varies directly with the quantity of cash held. The higher the amount of idle cash, the greater is the cost of holding it in the form of loss of interest which could have been earned either by investing it in some interest bearing securities or by reducing the burden of interest charges by paying off the past loans, especially in the present era of ever increasing cost of borrowings. If the cash balance is surplus with the firm, it is obvious that the finances are mismanaged. Besides, excessive cash involves loss of credit contacts. Therefore, for smooth running of, and maximum profitability in, a business, proper and effective cash management is of utmost importance. Cash management includes management of marketable securities also, because, in modern terminology money comprises marketable securities and actual cash (in hand or in a bank).

The efficiency of cash management depends on the efforts involved in identifying cash needs, determining proper level of cash balance, intensifying cash inflows, containing cash outflows and making productive utilisation of surplus cash. In this section, we shall examine the following issues relating to cash management:
(i) What are the objectives of firms to keep cash?
(ii) How do firms determine the level of cash balance?
(iii) How do firms control cash flows?
(iv) What techniques are employed by firms to maximize the availability of cash?
(v) How do firms finance cash shortages?
(vi) How do firms utilize surplus cash?

(J) **Liabilities:**

Any amount payable by the business to any outsiders is known as liability.

Liabilities, defined very broadly, represent what the firm owes others. A liability arises when a firm receives benefits or services and, in turn, promises to pay cash or provide goods and services in future.

Most liabilities are monetary liabilities, meaning that they require payments of specific amounts of cash. If the payment is due within a year or less, the liability is shown at the amount of cash the firm is expected to pay to discharge the obligation. If the payment dates extend beyond one year, the liability is shown at the present value of the future cash outflows. The discount rate used for valuing the future cash flows in the borrower's interest rate on that liability.

Some liabilities are non-monetary, meaning that the firm expects to discharge them by delivering goods or providing services, rather than by paying cash. For example, a magazine publisher may collect cash for subscriptions and promise delivery of magazines for many months to come. While the firm receives cash currently, it discharges its obligations by delivering the magazines in future. Such non-monetary liabilities are shown at the amount of cash received, rather than the expected cost of publishing the magazines.
The format prescribed in the companies act classifies liabilities as follows:

- Share Capital
- Reserves and Surplus
- Secured Loans
- Unsecured Loans
- Current Liabilities and Provisions

(i) **Share Capital:**

Share capital includes equity (or ordinary) capital and preference capital. Equity capital represents the contribution of equity shareholders who are the owners of the firm. Equity capital, being the risk capital, carries no fixed rate of dividend. Preference capital represents the contribution of preference shareholders and the dividend rate payable on its is generally fixed.

While the final figure shown against share capital is the paid up capital, the balance sheet also provides information on authorized capital, issued capital, subscribed capital, and paid up capital. The amount of capital that a company can potentially issue, as per its memorandum, represents the authorized capital, the amount offered by the company to the investors is called the issued capital, the part of issued capital which has been subscribed to by the investors is called the subscribed capital, the actual amount paid up is called the paid up capital. Typically the issued, subscribed and paid up capital are the same.

(ii) **Reserves and Surplus:**

Reserves and surplus comprise retained earning as well as non earnings items like share premium and capital subsidy.

There are two broad kinds of reserves viz., capital reserves and revenue reserves. Capital reserves include items such as share premium account, revaluation reserve, and capital redemption reserve. A capital
reserve cannot be distributed as dividend to shareholders. Revenue reserves represent accumulated retained earnings from the profits of the business. They are held in accounts like investment allowance reserve, dividend equalization reserve, taxation reserve and general reserves.

It is a common practice for companies to transfer from the profit and loss account to various reserves accounts. This process is called appropriation.

Surplus is the balance in the profit and loss account which has not been appropriated to any particular reserve account. Note that reserves and surplus along with paid up capital represent owners' equity, which is also called shareholders equity or net worth.

(K) **Assets:**

Items having realisable value owned by the business are known as assets. Assets owned by the business are as business assets.

Assets are resources which are expected to provide a firm with future economic benefits, by way of higher cash inflows or lower cash outflows. Resources are recognized as assets in accounting when the firm acquires rights over them as a result of a past transaction and the firm can quantify future economic benefits with a fair degree of accuracy.

Assets are classified as follows under the companies act

- Fixed assets
- Investments
- Current assets, loans, and advances
- Miscellaneous expenditure and losses
(i) **Fixed Assets:**

Fixed assets also called non-current assets are assets that are expected to produce benefits for more than one year. These assets may be tangible or intangible. Tangible fixed assets include items such as land, buildings, plant, machinery, furniture, and computers. Intangible fixed assets include items such as patents, copyrights, trademarks, and goodwill.

Tangible fixed assets are reported in the balance sheet at their net book value, which is simply the gross value (the cost of acquiring the asset) less accumulated depreciation – depreciation represents the allocation of the cost of a tangible fixed asset to various accounting periods that benefit from its use. Likewise, intangible fixed assets are reported at their net book value, which is simply the gross value less accumulated amortisation – amortisation represents the allocation of the cost of intangible fixed assets to various accounting periods that benefit from its use.

(ii) **Investments:**

Investment represents financial securities owned by the firm. They are divided into two categories, viz., long-term investments and current investment.

(iii) **Current Assets, Loans and Advances:**

This category consists of cash and other assets which get converted into cash, or which result in cash savings, during the operating cycle of the firm. The major components of current assets, loans advances are inventories, sundry debtors, cash and bank balances, other current assets, and loans and advances.

(iv) **Cash and Bank Balances:**

Comprise of cash on hand and balances with scheduled banks and non-scheduled banks.
(v) **Other Current Assets:**

Comprise of items such as interest accrued on investments, dividends receivable, and fixed assets held for sale (the last item is valued at net book value or estimated net realizable value, whichever is lower).

(vi) **Loans and Advances:**

Comprise of items such as advances and loans to subsidiaries, advances recoverable in cash or in kind for value to be received, and deposits with governmental authorities. The net figure of loans and advances is arrived at after deducting a provision for doubtful advances, if any.

(vii) **Miscellaneous Expenditure and Losses:**

This category consists of two items (i) Miscellaneous expenditure and (ii) loss or debit balance of profit and loss account.

(L) **Working Capital:**

In simple terms, working capital refers to the cash a company requires in order to finance its day to day business operations or in other words, working capital refers to the amount of capital which is readily available to an organisation.

The term Working capital (WC) is more an accounting term than a management concept. There are two concepts of Working Capital for the purpose of definition – Gross Concept and Net Concept. As per Gross concept of working capital, it refers to the firm’s current assets. The firm’s total current assets are termed as gross working capital.

From the perspective of financing working capital needs, Gross concept of Working capital is – the investment in circulating assets, or in inventory and accounts receivable comprising the operating cycle of a manufacturing firm. Investment in assets comprising the gross operating cycle is termed as Current Assets (CA). Current Assets are resources which are in cash or will soon be converted into cash in the ordinary course of business or in other words, current assets are defined as assets which in normal course of
operations are meant to be converted into cash within a period not exceeding one year. Correspondingly, current liabilities (CL) are commitments which, within a short period of time usually within a year, require cash settlement in the ordinary course of business.

Net concept or Net working capital refers to current assets less current liabilities. That means, working capital is the difference between resources in cash or readily convertible into cash (current assets) and organizational commitments for which cash will soon be required (current liabilities). It is defined as the difference between the current assets and the current liabilities. Thus:

\[
\text{Working capital} = \text{Current Assets} - \text{Current Liabilities}
\]

This definition leads to the principle that the entire amount of current assets should not be financed out of current liabilities (short term debt) or the current ratio (ratio between the current assets and the current liabilities) should always be greater than one. The excess of current assets over current liabilities or the net working capital represents the liquidity or the margin of safety available to the lenders of the firm. To a large extent, liquidity strength determines the reputation of the firm in the market. The other conclusion from this concept leads to the notion that the major port of investment in working capital assets should be financed with long term sources of finance.

(M) Financial Statements:

The basis for financial planning, analysis and decision making is the financial information. Financial information is needed to predict, compare and evaluate the firm’s earning ability. The financial information of an enterprise is contained in the ‘financial statements’ or ‘accounting reports’. It may show a position at a moment of time as in case of a balance sheet or may reveal a series of activities over a given period of time as in case of an income statement.
Thus, the term "financial management" generally refers to two basic statement(s) (i) The Income Statement and (ii) The Balance Sheet.

Of course, a business may also prepare (iii) a Statement of Retained Earnings and (iv) a Statement of Changes in Financial Position in addition to the above two statements.

![Financial Statements Diagram]

Figure – 3.2 : Financial Statements

### (N) Analysis of Financial Performance:

Financial performance analysis is the process of identifying the financial strengths and weakness of the business by properly establishing relationship between the items of the Balance Sheet and the Profit and Loss Account. Financial performance analysis can be undertaken by management of the business or by parties outside the business like owners, creditors, investors and others. The nature of analysis will differ depending on the purpose of the analyst.

Financial performance analysis is a scientific evaluation of the probability, efficiency and soundness of any business concern. Financial performance analysis and financial statement analysis have the similar meaning and both are generally used as synonymous. The management decision making process or planning process starts for the analysis of financial performance. After preparation of the financial statement, the performance analysis takes place in any business concern.
The analysis of financial performance is an attempt made to help the preparation of the most profitable design of promising alternative and aid in selecting the most feasible option. The financial performance analysis looks at the projected as well as past performance.

(O) **Techniques of Financial Performance Analysis:**

It is very essential to measure the financial performance for every kind of business. So there are many techniques for financial performance analysis describes as under.

![Techniques of Financial Performance Analysis](Image)

(P) **Research:**

Research in common parlance refers to a search for knowledge. Once can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation.

The advanced learner's Dictionary of Current English lays down the meaning of research as "a careful investigation or inquiry specially through search for new facts in any branch of knowledge." Redman and Mory define research as a "systematized effort to gain new knowledge".

Some people consider research as movement, a movement from the known to the unknown. It is actually a voyage of discovery. We all possess the vital instinct of inquisitiveness for when the unknown confronts us, we wonder and our inquisitiveness makes us probe and attain full and
fuller understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method, which many employs for obtaining the knowledge of whatever the known, can be termed as research.

Research is an academic activity and as such the term should be used in a technical sense. According to Clifford Woody research comprises defining and redefining problems, formulating hypothesis or suggested solutions, collecting, organizing and evaluating data making deductions and reaching conclusions, and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.

D. Slesinger and M. Stephenson in the Encyclopaedia of Social Sciences define research as, “the manipulation of things, concepts or symbols for the purpose of generalising to extend correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.”

Research is thus, an original contribution to the existing stock of knowledge making for its advancement. It is the pursuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objective and systematic method of finding solution to a problem is research. The systematic approach concerning generalisation and the formulation of a theory is also research. As such the term ‘research’ refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solutions towards the concerned problem or in certain generalisations for some theoretical formulation.

(9) Empirical Study:

Conceptual research is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones.
On the other hand, empirical research relies on experience or observational alone, often without due regard for system and theory. It is data based research, coming up with conclusions which are capable of being verified by observation or experiment. We can also call it as experimental type of research. In such a research it is necessary to get at facts firsthand, at their source and actively to go about doing certain things to stimulate the production of desired information. In such a research the researcher must first provide himself with a working hypothesis or guess as to the probable results. He then works to get enough facts to prove or disprove his hypothesis. He then sets up experimental designs which he thinks will manipulate the persons or the materials concerned so as to bring forth the desired information. Such research is thus characterised by the experimenter’s control over the variable under study and his deliberate manipulation of one of them to study its effects. Empirical research is appropriate when proof is sought that certain variables affect other variables in some way. Evidence gathered though experiments or empirical studies are today considered to be the most powerful support possible for a given hypothesis.

(R) **Hypothesis:**

Hypothesis is usually considered as the principal instrument in research. Its main function is to suggest new experiments and observations. In fact, many experiments are carried out with the deliberate object of testing hypotheses. Decision makers often face situations wherein they are interested in testing hypotheses on the basis of available information and then take decisions on the basis of such testing. In social science, where direct knowledge of population parameter(s) is rare, hypothesis testing is the often used strategy for deciding whether a sample data offer such support for a hypothesis testing is the often used strategy for deciding whether a sample data offer such support for a hypothesis that generalization can be made. Thus hypothesis testing enables us to make probability statements about population parameters. The hypothesis may not be proved absolutely, but in practice it is accepted if it has withstood a critical testing. Before we explain how hypotheses are tested through different tests meant for the purpose. It
will be appropriate to explain clearly the meaning of a hypothesis and the related concepts for better understanding of the hypothesis testing techniques.

(S) **P — Value (Probability Value):**

"Profit value means another way to look at testing hypothesis."

The largest significance level at which we would accept the null hypothesis. It enables us to test hypothesis without first specifying a value for $\alpha$ (level of significance).

Another benefit of using probe values is that they provide more information. If we know that $H_0$ is rejected at $\alpha = 0.05$, we only know that $\overline{x}$ was at least 1.96 (S. E.) away from $\mu H_0$. However, a probe value of 0.05 tells us that $\overline{x}$ was exactly 1.96 (S. E.) away from $\mu H_0$.

(T) **f — Test:**

f-Test is depend on $F$ — distribution. $F$ — distribution is a family of distribution differentiated by two parameters (df—numerator & df—denominator) used primarily to test hypothesis regarding variance.

$F$ ratio is a ratio used in analysis of variance among other tests, to compare magnitude of two estimates of population variance to determine if two estimates are approximately equal, in ANOVA, the ratio of between column variance to within column variance is used.

(U) **Analysis of Variance (ANOVA):**

Analysis of variance is an extremely useful technique concerning researches in the fields of economics, biology, education, psychology, sociology, business / industry and in researches of several other disciplines. This technique is used when multiple samples cases are involved. As stated earlier, the significance of the difference between the means of two
samples can be judged through either z-test or the t-test, but the difficulty arises when we happen to examine the significance of the difference amongst more than two sample means at the same time. The ANOVA technique enables us to perform this simultaneous test and as such is considered to be an important tool of analysis in the hands of a researcher. Using this technique, one can draw inferences about whether the samples have been drawn from populations having the same mean.

The ANOVA technique is important in the context of all those situations where we want to compare more than two populations such as in comparing the yield of crop from several varieties of seeds, the gasoline mileage of four automobiles, the smoking habits of five groups of university students and so on. In such circumstances one generally does not want to consider all possible combination of two populations at a time for that would require a great number of tests before we would be able to arrive at a decision. This would also consume lot of time and money and even then certain relationships may be left unidentified. Therefore, one quite often utilizes the ANOVA technique and through it investigates the differences among the means of all the populations simultaneously.

Professor R. A. Fisher was the first man to use the term 'Variance' and in fact. It was he who developed a very elaborate theory concerning ANOVA, explaining its usefulness in practical field. Later on Professor Snedecor and many others contributed to the development of this technique. ANOVA is essentially a procedure for testing the difference among different groups of data for homogeneity. "The essence of ANOVA is that the total amount of variation in a set of data is broken down into two types, that amount which can be attributed to chance and that amount which can be attributed to specified causes". There may be variation between samples and also within sample items. ANOVA consists in splitting the variance for analytical purposes. Hence, it is a method of analysing the variance to which a response is subject into its various components corresponding to various sources of variation. Through this technique one can explain whether various sources of variation. Through this technique one can explain whether various
varieties of seeds or fertilizers or soils differ significantly so that a policy
decision could be taken accordingly, concerning a particular variety in the
context of agriculture researches. Similarly, the differences in various types of
feed prepared for a particular class of animal or various types of drugs
manufactured for curing a specific disease may be studied and judged to be
significant or not through the application of ANOVA technique. Likewise, a
manager of a big concern can analyse the performance of various salesmen
of his concern in order to know whether their performances differ significantly.

Thus, through ANOVA technique one can, in general, investigate any number of factors which are hypothesized or said to influence the dependent variable. One may as well investigate the differences amongst various categories within each of these factors which may have a large number of possible values. If we take only one factor and investigate the differences among its various categories having numerous possible values, we are said to use one way ANOVA and in case we investigate two factors at the same time, then we use two way ANOVA. In a two or more way ANOVA, the interaction if any, between two independent variables affecting a dependent variable can as well be studied for better decisions.

The Basic Principle of ANOVA:

The basic principle of ANOVA is to test for differences among the means of the populations by examining the amount of variation within each of these samples, relative to the amount of variation between the samples. In terms of variation within the given population, it is assumed that the values of \( X_i \) differ from the mean of this population only because of random effects i.e. there are influences on \( X_i \) which are unexplainable, whereas in examining differences between populations we assume that the difference between the mean of the jth population and the grand mean is attributable to what is called a ‘specific factor’ or what is technically described as treatment effect. Thus while using ANOVA. We assume that each of the samples is drawn from a normal population and that each of these populations has the same variance. We also assume that all factors other
than the one or more being tested are effectively controlled. This, in other words, means that we assume the absence of many factors that might affect or conclusions concerning the factors to be studied.

In short, we have to make two estimates of population variance viz., one based on between samples variance and the other based on within samples variance. Then the said two estimates of population variance are compared with F-test, wherein we work out.

\[ F = \frac{\text{Estimate of population variance based on between samples variance}}{\text{Estimate of population variance based on within samples variance}} \]

This value of F is to be compared to the F limit for given degrees of Freedom. If the F value we work out is equal or exceeds the F limit value given in we may say that there are significant differences between the sample means.

(V) \textbf{t — Test:}

If the sample size \( n \) is small \((n < 30)\) the sampling distributions of test statistics are far from normal distribution. So far small samples, exact sampling distribution of test statistics obtained. t-Test is used for small sample which follow t – distribution. It depends on following assumption.

1. The samples are drawn from normal population.
2. Samples are independent.
3. Sample size is small.
4. Population variances are unknown.

The decision of t-Test is depend on alternative hypothesis & degree of freedom.
3.3 Profile of Selected Refineries of IOCL:

3.3.1 Gujarat Refinery:

GUJARAT HYDROCRACKER COMPLEX

Gujarat Refinery situated in Vadodara, plays a very important role in the smooth running of IOCL, as it is the biggest refinery out of 17 refineries in all over India. Vadodara, the cultural capital of Gujarat has also become the industrial capital of the state and the credit for this honour goes to IndianOil's Gujarat Refinery. The Gujarat Refinery was developed after the discovery of crude oil in Ankleshwar and with its sustained good work and progress, today it enjoys a rightful pride of place as the largest one in the country. Pandit Jawaharlal Nehru laid the foundation stone of this refinery, situated about 10 Kms north of Vadodara city at Koyali on 10th May, 1963. In October 1965 the first one million tonnes capacity crude distillation unit was commissioned, followed by the second and third crude distillation unit of same capacity in 1966 and 1967, respectively. On 18th October, 1966, Dr. S.
Radhakrishnan, the President of India dedicated the Gujarat refinery to the nation.

The demand for petroleum products were rapidly growing and to meet the increasing demand Gujarat refinery planned its expansion to process Bombay high and imported Crude. Gujarat refinery expansion project was set up with indigenous know how to raise the refining capacity to 7.5 MMT/year. Gujarat Refinery has the highest crude oil refining capacity. The refinery was originally designed to process 3 MMT/year of crude oil and 3 crude oil distillation units were built up with USSR collaboration at a total investment of about Rs.31 crores. Gujarat refinery is the largest of the country with the crude processing of 955 MMT/year with its eyes on future expansion by 30 MMT/years. North Gujarat crude which yields a very large quality of heavy residue needs to be upgraded to get more of high value distillates for the achievements of this good Gujarat Refinery has set up the first hydrocrader plant of the crude at the cost of Rs.760 Crores. The expansion facilities were commissioned in October, 1978. These expansion facilities include an additional distillation unit of 3 MT/year capacity along with downstream processing units like Vacuum distillation Bitumen and Visbrakers. The entire works of process design, engineering, procurement and construction was entrusted to Engineers India Ltd. (EIL).

In short, when commissioned, the Gujarat refinery had a design capacity of 3.0 MMTPA. It was subsequently increased to 4.3 MMTPA by the revamping of three distillation units. In 1978, its processing capacity was further increased to 7.30 MMTPA by the addition of a crude distillation unit. A fluidised catalytic cracking unit was added to the refinery in 1981 to increase production of middle distillates, such as diesel and LPG. The capacity of the refinery was further increased to 9.5 MMTPA by 1990 through low cost revamping / debottlenecking and addition of a hydrocracker in 1992 for
maximisation of middle distillates. Subsequently the crude capacity was increased to 12.5 MMTPA in 1999 by addition of new Atmospheric Unit of 3 MMTPA along with revamp of FCC Unit. The capacity has since been increased to its present capacity of 13.70 MMTPA by low cost debottlenecking. The company has already commissioned the facilities for MTBE and Butene-1 production. The refinery also produces a wide range of specialty products like Benzene, Toluene, MTO, Food Grade Hexane, solvents, LABFS, etc. The Gujarat Refinery achieved the distinction of becoming the first refinery in the country to have completed the DHDS (Diesel Hydro De-sulphurisation) project in June 1999, when the refinery started production of HSD with low sulphur content of 0.25% wt (max.).

A project for production of high value LAB (Linear Alkyl Benzene -- which is one of the major raw materials used in manufacturing detergents) from kerosene streams has been implemented. In order to meet future fuel quality requirements, MS Quality improvement facilities are planned to be installed by 2006.

For Gujarat Refinery Ankleshwar & north Gujarat oil fields provide the necessary inputs for establishing an oil refinery in the state based on various techno economic considerations.

Increase in price of crude oil and petroleum products at the global level, it is necessary to maximize the products of much needed distillate products from the residue resetting to future processing. The projected increase in the N. G. crude availability in future years which has a high as 70% residue and has also made it necessary to go for secondary processing facility for residue of the refinery. The secondary processing facility includes 3 units and with the commissioning of these units of sites has also been further expanded. Gujarat Refinery processed crude oil as a raw material which incoming from north Gujarat, Ankleshwar, Bombay high
imported crude coming through pipelines and from them they make various types of products, and market them through marketing division all over India.

This refinery's facilities include five atmospheric crude distillation units. The major units include CRU, FCCU and the first Hydrocracking unit of the country. Through a product pipeline to Ahmedabad and a recently commissioned product pipeline connecting to BKPL product pipeline and also by rail wagons/trucks, the refinery primarily serves the demand for petroleum products in western and northern India.

3.3.1.1 Production:

The production function of any enterprise is concerned with the distribution of products, i.e., goods and services to the society. It is the process of providing products to the society with the help of raw materials, manpower, money and energies like water, light, electric supply, etc. In short, the production is a function of producing goods and services to the people who over need of.

Gujarat Refinery is a part of IOCL. It has various departments of which production plays a vital role among all departments. Gujarat Refinery covers about 200 acre area. It has separate production department. The production department has various sub units namely primary and secondary units.
### Primary Units:

There are five units in primary units.

- **AU-I**: Atmospheric Distillation Unit-I.
- **AU-II**: Atmospheric Distillation Unit-II.
- **AU-III**: Atmospheric Distillation Unit-III.
- **AU-IV**: Atmospheric Distillation Unit-IV.
- **AU-V**: Atmospheric Distillation Unit-V.

### Secondary Units:

There are 22 units in secondary units.

- **CRU MS**: Catalytic Reforming Unit-MS UDEX
- **CRU-ARU**: Catalytic Reforming Unit-ARU GHC-FDU
- **CRU Xylene**: Catalytic Reforming Unit -Xylene GHC-HCO
- **CRU-TOTAL**: Catalytic Reforming Unit -Total GHC-H2U
- **VBU-BIH**: Visbreaker Unit UDEX
- **VBU-FO**: Visbreaker Unit – GHCH2U
- **VBU - LSHS**: Visbreaker Unit – Total MTBE
- **VBU-TOTAL**: Visbreaker Unit -H2U-2
- **VDU-IMP**: Vacuum Distillation Unit-IMP
- **VDU-TOTAL**: Vacuum Distillation Unit-Total
- **BBU**: Bitumen Blooming Unit
- **FPU**: Feed Processing Unit
- **FCCU**: Fluid Catalytic Cracking Unit

In short, Gujarat Refinery has 22 secondary units and 5 primary units. Each unit works with the help of another unit. One unit is connected with another. The waste of one unit is feed for another.
3.3.1.4 Raw Materials:

The basic raw material of Gujarat Refinery is Crude oil. Refinery buys Crude oil from the country and outside. In India, they buy crude oil from Ankleshwar, Viramgam, Salaya, Kalol, Navagam, ONGC, Bombay high, etc. From outside, they buy it from Arabian countries North Runalies, Newzealand, Australia, Kenya, Nizeria, etc.

In India, Refinery gets raw materials by pipeline or by railway and from outside the country, refinery gets raw materials by the ship. Now a day, there is higher demand of petroleum products, so it is very necessary to import Crude oil from other countries. In imported crude oil, there are more content of Sulphur and Polymer compared to our country. Therefore Gujarat Refinery has established two more distillation units which are known as Atmospheric unit 4 and 5. It is also known as Gujarat Refinery expansion (GRE) unit.

The crude oil is separated under two parts.

**CRUDE OIL**

- **Indigenous Crude**
  - Assam
  - Bombay High
  - South Gujarat
  - North Gujarat
  - Navva
  - Kavery

- **Imported Crude**
  - Arao mix (S=1.98%)
  - Kuwait (S=2.49%)
  - Dubai (S=1.9%)
  - Iran Mix (S=1.5%)
  - Upper Zakum (S=1.74%)
  - Qua Iboe (S=0.11%)
  - Bonnylight (S=0.08%)
  - Tapis Blend (S=0.03%)
3.3.2 Guwahati Refinery:

The Guwahati Refinery in North East India -- the first Public Sector Refinery of the country -- was commissioned in 1962 with a capacity of 0.75 MMTPA which was subsequently increased to 1.0 MMTPA through debottlenecking projects.

The refinery processes only indigenous crude oil from the Assam oil fields. With its main secondary unit, a coking unit, it produces middle distillates from heavy ends and supplies petroleum products to North-Eastern India, and surplus products onward to Siliguri in West Bengal in 2003. Hydrotreater Unit for improving the quality of diesel has been commissioned in 2002.

In 2003, the refinery installed an Indmax Unit, a novel technology developed by IndianOil's R&D Centre for upgrading heavy ends into LPG, Motor Spirit and Diesel oil.

3.3.3 Barauni Refinery:

The Barauni Refinery in Eastern India was commissioned in 1964 with a capacity of 2.0 MMTPA. The refining capacity was increased to 3.0 MMTPA by 1969 and further to its current capacity of 6.0 MMTPA through low cost revamping and debottlenecking. Matching secondary processing facility such as RFCC (Resid Fluidised Catalytic Cracker) and hydrotreater facilities for diesel quality improvement have been added.

Earlier, refinery's crude input was primarily from the Assam oil fields through pipeline. With the commissioning of the 6.0
MMTPA Haldia-Barauni crude oil pipeline, the refinery now receives imported crude for processing. A CRU (Catalytic Reformer Unit) was also added to the refinery in 1997 for production of unleaded motor spirit. Projects are also planned for meeting future fuel quality requirements. Barauni Refinery supplies distillate products besides eastern India to northern India through a product pipeline to Kanpur in Uttar Pradesh.

3.3.4 Haldia Refinery:

Haldia Refinery, the fourth in the chain of seven operating refineries of IndianOil, was commissioned in January 1975. It is situated 136 km downstream of Kolkata in the district of East Midnapur, West Bengal, near the confluence of river Hoogly and river Haldi.

The refinery had an original crude oil processing capacity of 2.5 MMTPA. Petroleum products from this Refinery are supplied mainly to eastern India through two Product Pipelines as well as through Barges, Tank Wagons and Tank Trucks. Products like MS, HSD and Bitumen are exported from this refinery.

The strategic significance of this Refinery lies in its being the only coastal refinery of the Corporation and the lone lube flagship, apart from being the sole producer of Jute Batching Oil and Russian Turbine Fuel. Capacity of the Refinery was increased to 2.75 MMTPA through debottlenecking in 1989-90. Refining capacity was further increased to 3.75 MMTPA in 1997 with the installation/commissioning of second Crude Distillation Unit of 1.0 MMTPA capacity. Diesel Hydro Desulphurisation (DHDS) Unit was commissioned in 1999, for production of low Sulphur content (0.25% wt) High Speed Diesel (HSD). With augmentation of this unit, refinery is producing BS-II and Euro-III equivalent HSD (part quantity) at present.
Resid Fluidised Catalytic Cracking Unit (RFCCU) was commissioned in 2001 in order to increase the distillate yield of the refinery as well as to meet the growing demand of LPG, MS and HSD. Refinery also produces eco friendly Bitumen emulsion and Microcrystalline Wax. In addition, a Catalytic Dewaxing Unit (CIDWU) was installed and commissioned in 2003, for production of high quality Lube Oil Base Stocks (LOBS), meeting the API Gr-II standard of LOBS. This is the only refinery in the country to produce such high quality LOBS.

In order to meet the Euro-III fuel quality standards, the MS Quality Improvement Project has been incorporated for production of Euro-III equivalent MS. Currently the unit is under stabilisation. At present, the Refinery is operating at a capacity of 5.5 MMTPA. Refinery expansion to 7.5 MMTPA as well as a Hydrocracker project has been approved for Haldia Refinery, commissioning of which shall enable this Refinery to supply entire Euro III HS to the eastern region of India.

3.3.4.1 Improvement in Diesel Quality and capacity expansion at Haldia Refinery:

**Project Cost:** Rs. 2,869 Crores

**Expected Commissioning:** December 2009

**Brief Description:** The project comprises installation of facilities for improvement in Diesel quality and Disillate yiled (Hydrocracker) at Haldia and the capacity expansion of the Refinery from 6 MMTPA to 7.5 MMTPA. This involves once through Hydrocracking Unit (OHCU), Hydrogen Unit, Sulphur Recovery Units, revamp of Crude Distillation Units and related utilities & offsite facilities.
3.3.5 Mathura Refinery:

The Mathura refinery was commissioned in 1982 with an original capacity of 6.0 MMTPA. The capacity was increased to 7.5 MMTPA by debottlenecking and revamping. With its fluid catalytic cracking units, the refinery mainly produces middle distillates and supplies them to Northern India though a product pipeline to Jalandhar, Punjab via Delhi. The company commissioned a two-stage desalter in 1998 for improving the on-stream availability of the crude distillation unit and a CCRU for production of unleaded Motor Spirit. A DHDS Unit was commissioned in 1999 for production of HSD with low Sulphur content of 0.25% wt (max). A hydro-cracker for increasing middle distillates was also completed in 2000. The present capacity of the refinery is 8 MMTPA.

In order to meet future fuel requirements, facilities for improvement in quality of MS & HSD are under installation and it was completed in 2005.

3.3.5.1 Pioneering efforts in India at Mathura Refinery:

Mathura Refinery of IndianOil was the first in Asia and the third in the world to receive ISO - 14001 accreditation in the year 1996 for its environmental management systems. All the seven refineries of IndianOil now have the distinction of receiving ISO-14001 certification.

First To Set Up In India:

- Hydrocracker
- Riser FCC
- Soaker in Visbreaker
- Inferential Control Systems
3.3.6 Panipat Refinery:

Panipat Refinery has doubled its refining capacity from 6 MMT/yr to 12 MMT/yr with the commissioning of its Expansion Project. Panipat Refinery is the seventh refinery of IndianOil. It is located in the historic district of Panipat in the state of Haryana and is about 23 km from Panipat City. The original refinery with 6 MMTPA capacity was built and commissioned in 1998 at a cost of Rs. 3868 Crores (which includes Marketing & Pipelines installations).

The major secondary processing units of the Refinery include Catalytic Reforming Unit, Once Through Hydrocracker unit, Resid Fluidised Catalytic Cracking unit, Visbreaker unit, Bitumen blowing unit, Sulphur block and associated Auxiliary facilities. In order to improve diesel quality, a Diesel Hydro Desulphurisation Unit (DHDS) was subsequently commissioned in 1999.

Referred as one of India’s most modern refineries, Panipat Refinery was built using global technologies from IFP France; Haldor-Topsoe, Denmark; UNOCAL/UOP, USA; and Stone & Webster, USA. It processes a
wide range of both indigenous and imported grades of crude oil. It receives crude from Vadinar through the 1370 km long Salaya-Mathura Pipeline which also supplies crude to Koyali and Mathura Refineries of IndianOil.

Petroleum products are transported through various modes like rail, road as well as environment-friendly pipelines. The Refinery caters to the high-consumption demand centres in North-Western India including the States of Haryana, Punjab, J & K, Himachal Pradesh, Chandigarh, Uttarakhand, as well as parts of Rajasthan and Delhi.

The LPG produced from the refinery is pumped through a dedicated pipeline to IndianOil's Kohand Bottling plant where bottling and bulk dispatches are done. Panipat Refinery has also developed new products like 96 RON petrol, and sub-Zero diesel for the Indian army. It is already operating above 100% capacity for the last four years.

3.3.6.1 Expansion of Panipat Refinery:

Due to a growing deficit of petroleum products in the high demand centres of North India, it was decided to expand the capacity of Panipat Refinery from 6 million tonnes to 12 million tonnes with matching secondary processing facilities. M/s EIL was chosen as the Project Management Consultant.

Built at a cost of Rs. 4165 crore, the Refinery expansion units have been designed to process 100% high sulphur crude. This has enhanced the processing of high sulphur crude to 75% of the total refinery processing. The major secondary units envisaged in the expansion are Hydrocracking unit, Delayed Coking unit, Diesel Hydrotreating unit, Hydrogen Generation unit, Sulphur block and other associated auxiliary facilities. The technologies have been supplied by M/s Axens; France, Haldor-Topsoe; Denmark, UOP USA and Black & Veatch, USA and ABB Luumas. For supply of crude oil for the expansion units, the Kandla-Panipat product pipeline has been converted
to crude oil service. The crude oil is received from Mundra Port in Gujarat coast and supplied to the Refinery through Kandla-Panipat Pipeline.

**Panipat Refinery Expansion from 12MMTPA to 15MMTPA:**

*Project Cost:* Rs. 806 Crores  
*Expected Commissioning:* December 2008  
*Benefit:* To meet the growing deficit of petroleum products in the high demand Northwest region of India.  
*Brief Description:* The project consists of capacity revamp of Crude and Vacuum Distillation Units (CDU / VDU), Once through Hydrocracking Unit (OHCU), Delayed Coking Unit, and installation of second stage reactors in Diesel Hydrotreating Unit (DHDT).

3.3.6.2 **Products of Panipat Refinery:**

With the expansion of Panipat Refinery to 12 million tonnes, the total quantity of high speed diesel produced from entire refinery will meet BS-II and BS-III Grade required for NCR. After stabilisation of units, the high value product yield from the refinery will be further improved by reducing the production of black oil like HPS and Bitumen.

3.3.6.3 **Panipat Refinery as the Eco-Friendly Refinery:**

- Only Desulphurised Fuel Gas and Low Sulfur Fuel Oil with Sulphur content below 0.5% is used in Refinery furnaces.
- Sulfur Recovery Plant helps in reduction of Sulfur Dioxide emission. There are 4 Sulphur recovery unit: 2 no. of 115 TPD and 2 no. of 225 TPD. Two Sulphur Recovery Unit always remain in operation to keep the environment clean.
- Two state-of-the-art Effluent treatment plant.
- On line stack analysers provided to monitor and control emissions.
- Treated effluent meeting Minimal National Standards (MINAS) totally reused within Refinery making Panipat.
- Refinery a Zero Effluent Discharge Refinery.
500 acres of land around Refinery has been developed as Green Belt and Ecological Park. Around five Lakhs trees already planted.

3.3.7 **Head Office, New Delhi:**

Head Office, New Delhi is the main center of the all units of the IOCL. There is a corporate office of IOCL also. Head Office, New Delhi is situated at Scope Complex, Core-2, 7, Institutional Area, Lodhi Road, New Delhi – 110 003, operates all the divisions of the IOCL such as Refineries Division, Pipeline Division, Marketing Division and Research and Development Division of IOCL. The office controls all the units of the corporation.

This office also operates new refinery that is going to establish at Paradip in Orissa. The office also operates Kolkata, Mumbai and Assam Oil Division which are also big units of the corporation.

3.3.8 **Digboi Refinery:**

The Digboi Refinery in North Eastern India is India's oldest refinery and was commissioned in 1901. Originally, a part of Assam Oil Company, it became part of IndianOil in 1981. Its original refining capacity had been 0.5 MMTPA since 1901. Modernisation project of this refinery has been completed and the refinery now has an increased capacity of 0.65 MMTPA.

The Digboi refinery produces distillates, heavy ends and excellent quality wax from indigenous crude oil produced at the Assam oil fields. Petroleum products are supplied mainly to north-eastern India primarily through road and by rail wagons. A new Delayed Coking Unit of 1,70,000 TPA capacity was commissioned in 1999. A new Solvent Dewaxing Unit for maximizing production of micro-crystalline wax was installed and commissioned in 2003. The refinery has also installed Hydrotreater to improve the quality of diesel.
Diesel Hydro de-sulphurisation Units
Microcystalline Wax production facilities

3.3.9 Grassroots Refinery-cum-Petrochemicals Project at Paradip:

3.3.9.1 Paradip Refinery:

Paradip Refinery is going to establish in Orissas. The details of it are given below:

Project Cost: Rs. 25,646 Crores
Expected Commissioning: By end 2011-12
Benefit: The project will help in partly meeting deficit of distillates viz. LPG, Naphtha, MS, Jet / Kero, Diesel and other products, in the eastern part of the country. The complex will generate intermediate petrochemicals feedstock.

Brief Description: A 15 MMTPA grassroots refinery-cum-petrochemicals complex (along with a product pipeline to Ranchi) is planned to be constructed at Paradip in the state of Orissa. The Refinery will have, apart from a Crude and Vacuum Distillation Unit, a Hydrocracking Unit, a Delayed Coker Unit and other secondary processing facilities. It will also have an integrated gasification combined cycle plant for production of steam, power and hydrogen from petroleum coke for captive use in the refinery. This will be the most modern refinery in India with nil residue production and the products would meet stringent specifications. 3344 acre of land has been taken over by IndianOil and necessary infrastructure development jobs prior to setting up of the main refinery are progressing.

This complex envisages production of integrated petrochemicals like Paraxylene, Polypropylene, and Styrene.
3.3.9.2 Paradip- Haldia Crude Oil Pipeline:

**Project Cost:** Rs. 1178 Crores

**Expected Commissioning:** April 2007

**Brief Description:** The project consists of installation of crude oil handling facilities at Paradip Port including laying 48 inch diameter, 20 km transfer pipeline, development of a tank farm at Paradip consisting of 15 crude oil storage tanks of 60,000 kl each (Total: 9,00,000 kl), and laying 30 inch diameter, 330 km long crude oil pipeline to Haldia-Barauni Crude Oil Pipeline (HBCPL) Haldia.

**Benefit:** The pipeline will facilitate transportation of crude oil to Haldia and Barauni refineries in an efficient and cost effective manner compared to the present system of receipt of crude oil through the Haldia Dock Complex.

### 3.4 The Products of Refineries & Their Uses:

2) Diesel: Fuel for heavy vehicles.
3) Naphtha: Feed for naphtha cracker, of IPCL for Olefins production/xylene.
4) Benzene: Petrochemicals viz. caprolactum.
5) Toluene: As solvent, feed stock for other chemicals.
6) N-Heptane: Solvent for IPCL.
7) Cracked LPG: For manufacture of polypropylene.
8) Law Sulpher Heavy Stock (L.S.H.S.): Fuel for fertilizer and power plants.
9) Light Aluminium Rolling Oil (LARO) For Aluminium rolling factories.
10) Food Grade Hescane Vegetable Oil (FGH): Solvent for edible oil extraction for industry.
11) Sulphur: Manufacture of Sulphuric Acid.
12) Solvent-90: Solvent for Rubber Industries.

14) Linear Alkyl Benzene feed Stock (LABFS): Used for production of LAB. (Raw material for detergent).

15) Light Diesel Oil (LDO): For Agricultural use.

16) Furnace Oil (FO): Fuel for industries.

17) Bitumen: For carpeting the roads.

Refinery’s Overall Organogram:

Figure – 3.4
In the refinery, the Executive Director is at the top position. Under his ownership and control, General Managers and Deputy General Managers are doing their jobs. The above chart displays this situation.

Figure – 3.5

The above chart reveals that there are three categories of management. At the top level management, General Manager and Deputy General Manager are working. At the middle level management Chief Managers, Senior Managers and Managers are doing their jobs respectively. At the bottom level, Deputy Managers, Senior Engineers, Engineers and Workers are doing their jobs.
3.5 Production Process of Refineries of IOCL:

The crude oil which is raw material for the refinery has to be processed. Different types of crude received through pipelines are stored in the tank at a certain temperature for decided time or period to remove sludge and water as possible and it is feed to atmospheric units. The Hydrocarbons with different boiling points are separated through conversional process of fractional distillation.

The crude oil is heated 380°C and its fraction yields the products such as Refinery Fuel, Gasoline, LPG, Motor Spirit, ATF, HSD, Superior Kerosene etc. This is the common function of all Primary Units that is AU1, AU2, AU3, AU4, AU5.
The wastage materials of these five primary units are sent to the secondary units for further processing.

The Catalytic Reforming Units boost the octane number gasoline fraction from 60 research octane number by way of refining in process of platinum catalyst over Alumina base. In this process hydrocarbon like naphtha lessness and parafines are chemically transferred in to aromatic hydrocarbon which has higher octane number.

The UDEX plant was built up with Italian collaboration and was formally part of ONGC & its petrochemical division. It was designed to produce 49000 MT of Benzene and 19000 MT tolume per annum. Reformate of CRG is feed in to the unit for recovery of Benzene and tolune. These aromatics are extracted by a solvent, Triethylene, Glycol-B separated in to Benzene and tolune. The main function of VDU is to produce blending component for LDO and Bitumen feed stock. Atmospheric residue from imported crude oil is heated at 400° C and is distillated vacuum is distillation lower. The products coming out are light vacuum, gasoline, Heavy vacuum, gas oil and vacuum residue. These are used in blending oil and are used production of business production of bitumen. The main function of the visbreaker unit is to reduce the Viscocity of crude feed and through heat exchanger the crude is heated up to same level then it is heated in the furnace and a part of feed stock, in this process gets broken away with 1000 viscosity contents.

The last product of whole production process is Bitumen and it is used for the purpose of construction. It is produced by air blowing process at the temperature 230° C by blowing air in to reactor. For matrix unit, the third
catalysts cracking where heavy ends of crude oil and are cracked at 453°C and 483°C temperature over catalytic process. During this process big items are converted into small items by cracking process and high inducts, LPG Gases, Gasoline, Gas Oil, Naphtha is corrected out. This unit (Merox) is provided for removal conversion of mercaptan sulphur for Naphtha i.e. ATF (Aviation Turbine Fuel) to produces this one.

In short, the refinery’s production process is refined the crude oil i.e. By storing crude oil, all the mud and water is removed then by pump at 140°C, it is sent to desalters with injection of H2O +WHS, it is processed and sent to heat exchanger to higher the temperature and then the temperature is done high through furnace. In the furnace, there are three types of feed used in fire to heat the crude. They are (1) Pilot gas (2) Fuel gas and (3) Fuel Oil and then it is sent to tank i.e. distillation tower where the products and crude oil is carried out. The products are separated stored. The rest crude is processed further to secondary units and further process is done and the last outcome is carried out as Bitumen.

Organogram of Production Department of Refineries of IOCL:

![Organogram](image-url)
Above chart shows that Chief Production Manager-I is at the top level. Under his control, Chief Production Manager-II and Production Manager are working. Deputy Production Managers are doing their jobs under the guidance and control of Chief Production Manager-II and Production Manager. Deputy Production Managers takes care of Accountants and clerks.

### Table – 3.1 : Products of Refineries of IOCL

<table>
<thead>
<tr>
<th>LIGHT DISTILLATES</th>
<th>MIDDLE DISTILLATES</th>
<th>HEAVY ENDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPG(NET)</td>
<td>MTO</td>
<td>SULPHUR</td>
</tr>
<tr>
<td>LPG</td>
<td>ATF</td>
<td>FO</td>
</tr>
<tr>
<td>PPFS</td>
<td>SKO</td>
<td>LSHS</td>
</tr>
<tr>
<td>BUTENE-II</td>
<td>LABFS-IPCL</td>
<td>BITUMEN</td>
</tr>
<tr>
<td>BENZENE</td>
<td>LABFS-NIRMA</td>
<td></td>
</tr>
<tr>
<td>TOLUENE</td>
<td>LARO</td>
<td></td>
</tr>
<tr>
<td>GEN NAPHTHA</td>
<td>PD-OIL</td>
<td></td>
</tr>
<tr>
<td>GOP NEPHTHA</td>
<td>IOC RESIDUE96</td>
<td></td>
</tr>
<tr>
<td>GAP NAPHTHA</td>
<td>NORMAL HSD</td>
<td></td>
</tr>
<tr>
<td>XYL REFORMATE</td>
<td>HSD(NAVY)</td>
<td></td>
</tr>
<tr>
<td>MTBE</td>
<td>UL-HSD</td>
<td></td>
</tr>
<tr>
<td>GENMS</td>
<td>LDO</td>
<td></td>
</tr>
<tr>
<td>UL MS</td>
<td>LESS LAB R/S</td>
<td></td>
</tr>
<tr>
<td>IOC_SOL_90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLYMEDIUM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-HEPTANE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XYL R/S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESS GAS R/S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESS GOP R/S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESS PP R/S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

106
3.6 **Finance Department of Refineries of IOCL:**

Finance is the life blood of business. Finance is the life of every business enterprise. The funds raised from various sources are utilized for acquiring fixed assets needed for the production of goods and services, inventories that facilitate production and sales, accounts receivables owed by customers, cash and marketable securities used for liquidity purposes and business transactions. The pool of funds at a given point of time is static but over a period it changes. The change in the funds position of a company is known as funds flow. In an on going business enterprise the funds flow through out the enterprise continually. The object of the subject financial management is to direct the flow of these funds in a fire as per as given plan. Thus, financial department concerns itself with the management of funds of an enterprise. Finance department is also concerned with planning and controlling cash in flows and outflows adequately.

IOC's all refineries have also an intelligent and efficient finance staff at its finance department.
3.7 **Performance Appraisal System in the Refinery:**

The management body of Gujarat Refinery regularly appraises the performance of officers, employees and non-officer's, which helping the management in placement, transfer, promotion, and deciding about his training needs. PDA Performance and Development Appraisal, APA – Annual Performance Appraisal and CR- Confidential report are recorded annually for assessment of performance in the forms prescribed for respective grades of employees as under.

3) CR (Confidential Report) form to employees in grade VIII and below.
As per practice of leading organization performance appraisal in respect of employees on deputation to IOC shall be made. The forms are filled up by the concerned Supervisors. These forms are internal part of the assessment process of all employees considered for promotion and transfer.

The method of calculating marks for evaluation of performance appraisal report for the last 3 years of performance is given below.

- Outstanding: 45
- Very Good: 40
- Good / Satisfactory: 35

The marking system for giving promotion is as follows:

- Appraisal Report: 45
- Seniority: 50
- Education Qualification: 30

3.8 **The Group Companies of IOCL:**

3.8.1 **Lanka IOC Limited (LIOC):**

Lanka IOC, IndianOil's subsidiary in Sri Lanka, is the only private oil company other than the state-owned Ceylon Petroleum Corporation (CPC) that operates retail petrol / diesel stations in Sri Lanka.

It has been incorporated to carry out retail marketing of petroleum products, bulk supply to industrial consumers, building and operating storage facilities at the Trincomalee Tank farm, etc., thereby not only providing energy security and supply stability for Sri Lanka but also upgrading the overall standards of service, particularly in the retail sector in the nation.
Lanka IOC is making phased investments to the tune of about INR 450 crores to provide world-class quality petroleum products and services at the most competitive prices to the Sri Lankan customers. It took over 100 CPC-owned petrol / diesel stations in February 2003 and commenced retailing products to customers. Subsequently, it took over 59 dealer-owned franchisee retail outlets.

The outlets are being refurbished with world-class, state-of-the-art facilities and services at par with international standards. Lanka IOC, through its retail chain, is also making available non-fuel facilities like convenience stores, 24-hour ATMs, automatic carwash, food marts, etc. This will not only give value-for-money to the motorists but would give altogether a new refueling experience. The refurbished stations of Lanka IOC have brought praise from all sections of the Sri Lankan society.

Lanka IOC has also acquired the China Bay Tankfarm of World War II vintage, which is of historic and strategic significance, being the largest tankfarm located between the Middle East and Singapore. The tankfarm connects to the Trincomalee harbour, which is the 5th largest all-weather, non-tidal natural harbour in the world, with a 56 km shoreline, making this tankfarm most effective for fuel receipt, storage and supply. The tankfarm, formerly owned and operated by CPC, has a total of 99 tanks, each with a capacity of 12000 kilolitres. Currently, only 15 of these tanks are operational. Lanka IOC intends to develop the tankage on need basis, as the volume of its downstream marketing operations in Sri Lanka grows.

An 18,000 tonnes state-of-the-art lube blending plant is also being constructed at a cost of INR 22 crores for commissioning by June 2007 at Trincomalee Tank farm. Progressively, Lanka IOC will also look at introducing Auto LPG (Autogas), Aviation Fuel and INDANE LPGas in Sri Lanka, besides its world-class lubricants SERVO, which is already an established brand there.
IndianOil's entry into Sri Lanka is in line with its Corporate Vision of becoming a transnational energy major. While expanding its market base to convert the surplus avails of petroleum products into more wealth for stakeholders, IndianOil is also committed to being a good strategic partner to Sri Lanka. IndianOil's vast experience in downstream petroleum operations in India will help create a healthy and competitive petroleum industry in Sri Lanka for the larger benefit of the island nation.

At present, the Sri Lankan petroleum market has a demand of 3.5 million metric tonnes per annum (MMTPA) and a refining capacity of 2.2 MMTPA. CPC, the other important player in the petroleum sector has about 1,070 retail outlets in Sri Lanka.

The surplus refining capacity in India will be used to bridge the existing gap between demand and supply in Sri Lanka. Lanka IOC intends to harness the advantages of geographical proximity between India and Sri Lanka, resulting in low freight rates in transportation and IndianOil's superior R&D capabilities, to provide petroleum products at the most competitive price to the Sri Lankan market. A term contract valued at US$ 120 million between CPC and IndianOil is already in place for supply of 0.5 MMT products to CPC and supplies have commenced since September 2002. In addition, Lanka IOC's retail volumes are also being replenished by IndianOil from Indian refineries, the first such supply have commenced in March 2003.

3.8.2 IndianOil (Mauritius) Ltd (IOML):

IndianOil Mauritius Ltd. (IOML) is IndianOil's wholly owned subsidiary in Mauritius. IndianOil is investing US$ 36 million in Mauritius to set up a range of marketing infrastructure.

A state-of-the-art petroleum storage terminal with 15,500 metric tonnes capacity has already been commissioned at Mer Rouge to serve as the supply base of petroleum products. This microprocessor-controlled facility is the first-of-its-kind in Mauritius with automated product level monitoring,
truck loading and computerised access control. As part of this project, separate import lines for Motor Gasoline (petrol), Gas Oil (Diesel), Jet Fuel (Aviation Fuel) and Fuel Oil have also been laid.

IOML has also strengthened the bunkering facilities with new lines to various quays in the port, which is fast emerging as the region's busiest port.

Soon, IOML would be setting up a network of 25 world-class petrol stations in Mauritius, equipped with a range of value-added services. These outlets would provide the discerning Mauritian customers with auto fuels and lubricants of international quality with care beyond compare.

IOML has also joined a consortium of four existing oil companies to operate aviation fuel storage, hydrant lines and aircraft fuelling facilities in Mauritius. The consortium would soon build a new Aviation Fuel Terminal at Sir Seewoosagar Ramgoolam International Airport.

IOML plans to build infrastructure for INDANE LPGas storage, bottling and distribution and also to market the world-class SERVO lubricants in the country.

IOML is leveraging the strengths of its parent company – IndianOil – and its extensive knowledge of the Mauritian market to build a world-class business reputation and deliver a delightful experience to the people of Mauritius.

IOML stands for commitment and service to the people of Mauritius.
3.8.3 IBP Co. Limited (IBP):

IBP Co. Limited, a subsidiary of IndianOil, is a stand-alone petroleum marketing company with exclusive Business Groups for Petroleum, Explosives and Cryogenics.

Business Group (Petroleum) - During the financial year 2005-2006, the revenue from BG (Petroleum) witnessed an increase of 16%. IBP's marketing efforts are fully focused on improving its sales of petrol and diesel. During the period April - Dec 2006 the company achieved a sales volume of 798,559 KL of petrol and 2,959,018 KL of diesel resulting in a sales growth of 2.8% in petrol and 6.4% in diesel as compared to same period last year.

As part of synergy with the parent company IndianOil, the Company has begun marketing branded fuels, viz., 'XTRAPREMIUM' petrol and 'XTRAMILE' diesel at select retail outlets of the Company.

IBP has been a pioneer in introducing quality and quantity assurance of all products and services at its retail outlets. The branding activities are being further strengthened through an initiative called "Project Horizon" in which IBP's 422 select top of the line high-volume outlets are being specially branded with upgraded retail visual identity. These 422 retail outlets are not only being automated but also undergo a third party audit by reputed agencies for house keeping and customer service standards, besides quality and quantity assurance. Independent agencies are also being appointed to collect samples from these retail outlets for testing them on monthly basis to ensure that products meeting specified standards are available to customers.

IBP has also introduced IndianOil's Xtra Fleet Card Programme in its network. This programme is designed to help transporters in efficient management of their fleets besides rewarding them for their loyalty to the Company.
In order to curb malpractices and as a part of anti-adulteration drive, the Company, under the guidance of the Ministry of Petroleum & Natural Gas is implementing “Marker” system in SKO supplies and Vehicle Tracking System under the SKO Janpariyojana Scheme. Vehicle Tracking System (VTS) will be implemented for the entire MS/HSD supply by 2007-08.

Business Group (Explosives) – During 2005-06, this Business Group marked an impressive 53% growth compared to the turnover of Rs.92.30 crores achieved in the previous year. The Business Group came out of the red ending the year with a profit of Rs.7.65 crores as against a loss of Rs.13.96 crores.

Business Group (Cryogenics) – During 2005-06, this Business Group recorded a sales turnover of Rs.28.18 crore as against Rs.22.59 crore in the previous year, posting an impressive growth of 25%. The Business Group ended the year with a profit of Rs.2.27 crore as against a loss of Rs.1.05 crore in 2004-05.

3.8.4 IndianOil Technologies Limited (ITL):

IndianOil Technologies Limited (ITL) is a wholly owned subsidiary of IndianOil Corporation Limited. ITL is the technology-marketing arm for the entire range of technologies developed at IndianOil’s R&D Centre at Faridabad. The Centre, which was set up over three decades ago, has developed several technologies and technical expertise both in refining and lubricant sector.

IndianOil has nurtured technology by nurturing human talent. This approach has worked well since the hydrocarbon sector is both technology and knowledge intensive. As a result, the Corporation is now in a position to offer a bouquet of technologies, products, processes and solutions that are aimed at improving performance and profitability.
The R&D activities in refining technology are targeted in the areas of fluid catalytic cracking (FCC), hydro processing, catalysis, residue upgradation, distillation, simulation and modeling, lube processing, crude oil evaluation, process optimisation, material failure analysis, remaining life assessment and other technical services.

ITL also offers state-of-the-art sludge disposal technology based on biotechnology which is widely accepted in the hydrocarbon sector. ITL also markets the R&D developed lubricants technology, which possesses USPs, established through wide market acceptance.

ITL also conducts / imparts training in the areas of FCC, Hydroprocessing, Catalytic Reforming, Delayed coking, Simulation and Modeling, Bio-remediation, Crude Assay, Material Failure Analysis, Remaining Life Assessment, Analytical techniques, Lubricants & grease etc. covering the basics, plant trouble shooting and technical solutions. In the recent past ITL carried out such trainings in Kuwait, Iran etc.

3.8.5 Chennai Petroleum Corporation Limited (CPCL):

Chennai Petroleum Corporation Limited (CPCL), formerly known as Madras Refineries Limited (MRL) was formed as a joint venture in 1965 between the Government of India (GOI), AMOCO and National Iranian Oil Company (NIOC) with an installed capacity of 2.5 Million Metric Tonnes Per Annum (MMTPA).

In 1985, AMOCO disinvested in favour of GOI. Subsequent disinvestments by GOI, and the Public Issue by CPCL in 1994, which was, oversubscribed a record 27 times; GOI reduced its stake to 51.88%. As a part of the restructuring steps taken up by the Government of India, IndianOil acquired equity from GOI in 2000-01 Currently IOC holds 51.88% and NIOC holds 15.40%. Subsequent to this, CPCL has become a group company of IndianOil.
CPCL has two refineries with a combined refining capacity of 10.5 Million Tonnes Per Annum (MMTPA). The Manali Refinery has a capacity of 9.5 MMTPA and is one of the most complex refineries in India with Fuel, Lube, Wax and Petrochemical feedstocks production facilities. CPCL's second refinery is located at Cauvery Basin at Nagapattinam. The initial unit was set up in Nagapattinam with a capacity of 0.5 MMTPA in 1993 and later on its capacity was enhanced to 1.0 MMTPA. The commissioning of the 3 MMTPA expansion cum modernization project at Manali enabled CPCL to meet the auto fuel quality norms of Bharat Stage II & Euro III equivalent.

The main products of the company are LPG, Motor Spirit, Superior Kerosene, Aviation Turbine Fuel, High Speed Diesel, Naphtha, Bitumen, Lube Base Stocks, Paraffin Wax, Fuel Oil, Hexane and Petrochemical feedstocks.

3.8.6 Bongaigaon Refinery and Petrochemicals Limited (BRPL):

Bongaigaon Refinery & Petrochemicals Ltd. (BRPL) was incorporated on 20th February, 1974 as a Govt. Company fully owned by the Central Government.

The Company was registered with an authorised equity share capital of Rs. 50 crores, which was subsequently increased to Rs. 200 crores by December 1983. As on 31.03.2005, the total paid up capital of the company stood at Rs. 199.82 crores.

The Government of India was holding the entire paid-up capital of the Company till 1990-91. The Government disinvested 25.54% of its share-holding in BRPL to UTI and other Financial Institutions and employees of the Company during 1991-92 to 1993-94. The last tranche of disinvestments of 74.46% was made in favour of IndianOil Corporation Ltd. on 29th March 2001. As a result BRPL is a subsidiary of IndianOil Corporation Ltd, which is a Govt. of India Undertaking.
The Company has its Registered Office and production units at Dhaligaon in Bongaigaon District (now under recently constituted Chirang District) of Assam. In addition, the Company has Marketing/Regional offices at Guwahati, Kolkata, Mumbai, and Delhi.

3.9 **Conclusion:**

IndianOil, has envisioned to become a major, diversified, transnational, integrated energy company and has continuously improved upon it's technology and aligning it's resource for creating wealth for the nation.

In order to meet the emerging challenges of post deregulated era of the oil sector, IndianOil has, in 1995, setup the IndianOil Institute of Petroleum Management (IIPM), as an apex center for learning, the only of its kind in the petroleum sector, to create a vibrant brigade of knowledge managers to lead Indian Energy companies. Since last eleven years, IIPM has been conducting management development programmes of global standard. The institute with its sprawling campus of 16 acres and lush green landscape of natural surrounding, has excellent facilities to accommodate over 100 participants at a time. It also has a 10 executive suits block earmarked to accommodate the visiting faculty. The institute is centrally air-conditioned with 100% power back up and all allied modern infrastructure like state-of art library, a well equipped computer center, playground and gym.

IndianOil Institute of Petroleum Management, an ISO 9001:2000 certified institute, was awarded the Golden Peacock National Training Award by Institute of Directors for excellence in training in the year 1998, 2000 and 2005, and the Best innovation in Teaching Award by the Association of Indian Management Schools in the year 1998-99.
With a mission to align the human resource with corporate business goals, the institute catalyzes organisational initiatives towards business growth and development by offering training programmes in the areas of Strategic & General Management, Operations & Technology Management, Marketing Management, Information Technology, Human Resource Management and Finance Management. IIPM conducts more than fifty programmes every year for over 1200 senior executives. The institute's programmes have been developed and designed based on the industry experience and inputs.

IndianOil has also been entrusted with training of officials from various Iraqi oil companies by Ministry of Petroleum & Natural Gas (MOP & NG) / Ministry of External Affairs. Two batches of 22 officials from Iraqi Oil industry have already completed their training at IIPM on various aspects of Oil Industry.

IndianOil is also deputing its experts as faculty for imparting training to reputed overseas business organisations like Petronas (Malaysia), ORC (Oman Refinery Company-Oman), ADNOC (Abu Dhabi National Oil Company), QRC (Qatar Refinery Company-Qatar), NNPC (Nigerian National Petroleum Company, Nigeria) etc. Recently IndianOil has started training executives of various Sudanese oil companies on Pipelines operations and maintenance.

During last eleven years of carrying intensive Training, Development, Research and Consultancy Activities, IIPM has sharpened it's skills of imparting international standard Management Development Programmes for Executives performing in highly competitive businesses. Institute has long lasting academic partnership with premium Management Institutes like Indian Institute of Management-Ahmedabad, Calcutta, Bangalore, Management Development Institute-Gurgaon, International Management Institute-Delhi, FMS Delhi and Indian School of Petroleum-Dehradun, for sourcing of faculty and designing of programmes.
IIPM has also developed a vast faculty data bank which enables in designing and delivering highly focused market oriented programmes through the best available faculty in such specialisation. The vast bank of case-studies, reading material and video films related to real life business world makes us a unique institution for effective imparting of Management Education to the working executives of Industry in general and Energy sector in particular.
REFERENCES:

10. www.gujaratrefinery.com
11. www.iocl.com
12. www.panipatrefinery.com