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Technical Guide on Internal Audit in Upstream Oil and Gas Companies

The basic draft of this publication was prepared by CA. Satyavati Berera, Delhi. The views expressed in this Technical Guide are those of the author and may not necessarily be the views of the organisation she represents.

Technical Guide on Internal Audit in Upstream Oil and Gas Companies

The Institute of Chartered Accountants of India

(Established by an Act of Parliament)

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Foreword

With the all round steady growth being witnessed by the Indian economy, a large number of challenges and opportunities for the members are also emerging as to how they can contribute their might to sustain this growth. Internal audit, which is one of the niche areas of the members of the Institute, has emerged as an important tool in the hands of the enterprises not only to maximise shareholders' value but also value to the society as a whole.

The Institute on its part has been working quite proactively to help members sharpen their skill sets in this area. I am pleased to note that the Committee on Internal Audit of the Institute is issuing yet another industry specific literature, Technical Guide on Internal Audit in Upstream Oil and Gas Companies.

I congratulate CA. Abhijit Bandyopadhyay, Chairman, Committee on Internal Audit and other Committee members on the issuance of this Technical Guide.

I am sure that this Technical Guide will be of immense help to the readers.

June 15, 2007
New Delhi

CA. Sunil H. Talati
President
ICAI

Preface

Oil, without sounding as exaggeration, exerts great economic and political influence worldwide. The environment in which the oil and gas industry functions, throws up technological, financial and other challenges almost every day. To be successful, the enterprises in the oil and gas companies need to be really responsive to not only the existing challenges but also be able to pre-empt them.

Internal audit is a service which can immensely help the industry overcome the challenges and increase value. Keeping this in mind, the Committee on Internal Audit is issuing the Technical Guide on Internal Audit in Upstream Oil & Gas Companies as a part of series of the Technical Guides on internal audit of a number of other industries identified by the Committee. This Technical Guide will help the members of the Institute as well as others working as internal auditors in the said industry to understand the basic operations undertaken in the industry and also internal audit aspects relating to the same.

With a view to providing appropriate guidance in a manner that is easily understood by all the readers, this publication is divided into the four main chapters, dealing with the very fundamental concepts in upstream oil and gas companies, sequentially as introduction, technical aspects in exploration and production industry, internal audit of joint operating agreement, internal audit of functional areas. Annexures containing flow charts regarding the cost treatment of various processes and stages of production and a glossary of the terms used in the oil and gas industry are also given in this Guide for providing valuable guidance to readers. The glossary of terms should be read before going through this Guide for better understanding the technical terms. In addition to the technical guidance provided in the Guide, general audit procedure would also be applicable.

I am grateful to CA. Satyavati Berera, New Delhi for preparing the draft of the Technical Guide. I am also thankful to Shri B. L. Ghasoliya, Executive Director (Internal Audit), ONGC Ltd. for his invaluable comments and suggestions for improving the draft Guide. I also wish to thank the members of the Committee on Internal Audit, including the co-opted members for their continuous support, to the research endeavours of the Committee. I also owe my gratitude to CA. Sunil H. Talati, President, ICAI and CA. Ved Kumar Jain, Vice President, ICAI for their continuous encouragement and support. I also want to express my thanks to Shri Vijay Kapur, Director, ICAl, CA. Puja Wadhera, Secretary, Committee on Internal Audit and CA. Arti Aggarwal, Executive Officer for their untiring efforts in bringing out this publication.

I believe that this publication would serve as a basic guide for the members and other readers interested in the subject.

June 15, 2007
Kolkata

CA. Abhijit Bandyopadhyay
Chairman
Committee on Internal Audit

Important Definitions and Terminologies

Abandon	To discontinue attempts to produce oil or gas from a mining lease area or a well and to plug the reservoir in accordance with regulatory requirements and salvage all recoverable equipments.
Appraisal Well	A well drilled as part of an appraisal drilling programme, which is carried out to determine the physical extent of oil and gas reserves and likely production rate of a field.
Artificial Lift	Any method of getting oil to the surface which is not dependent on natural pressure.
Barrel of Oil	The unit of volume measurement used for petroleum and its products. 1 barrel = 159 litres (approx).
Block	A defined area for purposes of licensing or leasing to an enterprise or enterprises for exploration, development and production rights.
Blow Out	The process where gas or oil pressure in a well overcomes the weight of the drilling fluids and blows it out of the hole.
Bottom-Hole Contract	Money or property paid to an operator for use in drilling a well on property in which the payer has no property interest. The contributions are payable when the well reaches a pre-determined depth, regardless

	of whether the well is productive or non-productive. The payer may receive proprietary information on the well's potential productivity.
Bottom-Hole Contribution	A contribution, usually by a nearby lease holder, to encourage the drilling of a well to help in evaluation of his own acreage or a payment made to ensure information about the result of a well drilled by another oil company. It is paid when a given depth is reached.
Cash Call	A request for finance made by the operator of a joint venture to the other consortium members.
Cess	A levy imposed under the Oil Industry (Development) Act, 1974 on crude oil produced and payable to the Central Government.
Christmas Tree	A term applied to a series of pipes, valves and fittings assembled at the top of a well to control the flow of the oil and which is inserted in the production pipe.
Condensate	Low vapour pressure hydrocarbons obtained from natural gas through condensation or extraction and refers solely to those hydrocarbons that are liquid at normal surface temperature and pressure conditions.
Crude Oil	Petroleum in its natural state before it has been refined or otherwise treated but from which water and foreign substances have been extracted.
Depletion, Depreciation and	Depletion relates to the reservoir, depreciation to the capitalised assets and amortisation to the cost of the license

Amortisation (DD&A)	interest.
Depletion	The exhaustion of a reservoir by extracting the oil or gas.
Developed Property	Property on which wells have been drilled and production equipment has been installed.
Development Activities	Development activities for extraction of oil and gas include, but are not limited to the purchase, shipment or storage of equipment and materials used in developing oil and gas accumulations, completion of successful exploration wells, the drilling, completion, re-completion and testing of development wells, the drilling, completion and re-completion of service wells, the laying of gathering lines, the construction of offshore platforms and installations, the installation of separators, tankages, pumps, artificial lift and other producing and injection facilities required to produce, process and transport oil or gas into main oil storage or gas processing facilities, either onshore or offshore, including laying of infield pipelines, the installation of the said storage or gas processing facilities.
Development Well	A well drilled, deepened, completed or re-completed within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive.
Drill Bit	Part of drilling tools, which actually cuts the rock away to form a well.
Drilling Rig	The superstructure and related equipment used in drilling.

Dry Gas	Natural gas with a small proportion of liquid hydrocarbons which is produced without liquids.
Dry Hole	A well, which has proved to be non-productive.
Dry Hole Contribution	A contribution made by one enterprise towards costs incurred by another enterprise that is drilling a nearby well to obtain information from the latter. The contribution is made when the well is complete and is found to be unsuccessful.
Enhanced Oil Recovery (EOR)	A range of techniques, such as water injection, gas injection, de-pressurisation, water flood designed to increase flow rates from a reservoir.
Exploitation	The drilling of an oil accumulation in order to produce it.
Exploration	The effort of searching for an oil or gas prospect. Successful exploration is followed by exploitation.
Exploratory Well	A well drilled for the purpose of searching for undiscovered oil and gas accumulations on any geological prospect. An exploratory well is a well that is not a development well, a service well, or a stratigraphic test well, as those terms are defined separately.
Farm Out	An agreement between operators whereby the owner of the lease who does not wish to drill, assigns it to another operator who does wish to drill and agrees to bear the costs of exploration and/or development of an existing licensee in exchange for a share in the licence interests. An interest is retained by the lease owner.

Field	An area consisting of a single reservoir or multiple reservoirs all grouped on or related to the same individual geological structural feature and/or stratigraphic condition. There may be two or more reservoirs in a field which are separated vertically by intervening impervious strata, or laterally by local geologic barriers, or by both. Reservoirs that are associated by being in overlapping or adjacent fields may be treated as a single or common operational field. The geological terms 'structural feature' and 'stratigraphic condition' are intended to identify localised geological features as opposed to the broader terms of basins, trends, provinces, plays, areas-of-interest, etc.
Flaring of Gas	The burning of gas when the quantity produced with oil is too small to sell or utilise.
Flowing Well	A well which produces oil or gas to the surface without artificial lift equipment.
Full Cost Accounting Method (FCM)	Under the full cost method, all costs incurred in prospecting, acquiring mineral interests, exploration, and development are accumulated in large cost centres that may not be related to geological factors. The cost centre, under this method, is not normally smaller than a country except where warranted by major difference in economic, fiscal or other factors in the country. The capitalised costs of each cost centre are depreciated as the reserves in each cost centre are produced. **(Refer Annexure I)**
Gas Lift	A technique used for providing assistance in lifting of oil through a well by introducing gas into the tubing.

Gathering Line	A pipeline used in gathering crude oil from the oil field to a point on a main pipeline.
Gathering System	A pipeline system connecting a number of wells to a central point.
Geological and Geophysical Studies	Processes which seek surface or subterranean indications of earth structure or formation where experience has shown the possibility of existence of mineral deposits.
Geological Survey	An exploratory program directed to examination of rock and sediments obtained by boring or drilling, or by inspection of surface outcroppings.
Geophysical Survey	A study of the configuration of the earth's crust in a given area, as determined by the use of seismic, gravity, magnetic and geo-chemical procedures.
Hydrocarbons	Any combination of the chemical elements, hydrogen and carbon. May occasionally contain minor quantities of other elements such as oxygen, chlorine, sulphur.
Impairment	It denotes the situation when carrying amount of asset may not be recoverable on the basis of future cash flows from the use of asset and ultimate disposal.
Injection Well	A well used for introducing extraneous fluids and/or gases to a subsurface formation in an attempt to maintain or stimulate the rate of production from nearby wells.
Integrated Oil Company	An oil company which engages in all phases of the oil industry, i.e., exploration, production, refining and marketing, i.e.,

companies involved in both the upstream and downstream activities.

Intangible Drilling Costs (IDC)

Intangible drilling costs are costs incurred which have no physical substance or are not expected to have salvage value such as:

- Costs of obtaining and negotiating a contract with a drilling contractor.
- Survey and seismic work as to the location of the well.
- Costs of road to location of well site.
- Costs of dirt work on location - cellar, pits and drilling pack.
- Costs of transporting rig to site and rig-up charges.
- Costs incurred for water, electricity and other items necessary for the operation.
- Drilling charges.
- Costs of technical services rendered during the drilling activities by engineers, geologists, fluid technicians, etc.
- Costs of logging and drill stem test services.
- Cost of swabbing, fracturing and acidizing.
- Costs of rental equipment used during drilling and well tests.
- Drill mud costs.
- Cost of setting casing.
- Cost of transportation of pipe, casing and tubing.
- Cost of rig down and site restoration.
- Various other costs.

Joint Operating Agreement

An agreement between two or more lease owners providing for the operation of a lease in which one operates the lease with all owners sharing the cost.

Joint Venture

A business association in which each

	member has a fractional undivided interest in all assets, liabilities, income and expenses with the right to separately sell, divide or mortgage his interest.
Kill a Well	To cause a flowing well to stop, usually by filling the hole with water or heavy drilling mud.
Licence	Two types of licences are: (1) Petroleum Exploration licence - An Exploration Licence is a non-exclusive right to carry out preliminary searches for petroleum. (2) Mining Lease - The licence issued for offshore and onshore properties for conducting development and production activity.
Liquified Natural Gas (LNG)	Gas, predominantly methane, from oil field sources, which is held in the liquid state by the application of pressure and low temperature to facilitate transport and storage
Liquid Petroleum Gas (LPG)	Light hydrocarbon material, gaseous at normal temperatures and pressures, which are held in the liquid state by pressure or refrigeration to facilitate storage, transport and handling. Commercial liquified petroleum gas consists essentially of propane, butane or mixtures thereof.
Logging	The recording of rock characteristics as measured by a down hole mechanical-electrical device.
Mcf	The unit to measure natural gas consisting of one thousand cubic feet of gas at 60 degrees Fahrenheit at atmospheric pressure.

Natural Gas	Natural gas means gas obtained from oil and gas wells and consisting primarily of hydrocarbons. Natural gas is usually classified as "wet" or "dry", depending on whether the proportions of liquid hydrocarbon constituents in it are large or small. It does not include LPG, carbon dioxide or other gaseous products.
Natural Gas Liquids (NGL)	Hydrocarbons (primarily ethane, propane, butane and natural gasoline) which can be extracted from wet natural gas and become liquid under various combinations of increasing pressure and lower temperature.
NELP	New Exploration Licensing Policy announced by the Government of India wherein a level playing field has been provided to all operators in the petroleum sector.
Non-Operator	A party having an interest in a lease or reservation who allows another participant to conduct the development and operation of the property in the mutual interest of all participants.
Oil and Gas Reserves	Oil and gas reserves are those quantities of oil and gas, which are anticipated to be commercially recoverable from known accumulations from a given date forward. All oil and gas reserve estimates involve some degree of uncertainty. Uncertainty depends chiefly on availability of reliable geological and engineering data at the time of the estimate and interpretation of data. Based on relative degree of uncertainty, oil and gas reserves can be classified as 'Proved Oil and Gas Reserves' and 'Unproved Oil and Gas Reserves'.

Proved oil and gas reserves are those quantities of mineral oil, natural gas and natural gas liquids which, upon analysis of geological and engineering data, demonstrate with reasonable certainty to be commercially recoverable in future from known oil and gas reservoirs under existing economic and operating conditions.

Proved oil and gas reserves can be classified as 'Proved Developed Oil and Gas Reserves' and 'Proved Undeveloped Oil and Gas Reserves'.

Proved developed oil and gas reserves are reserves that can be expected to be recovered through existing wells with existing equipment and operating methods. Additional oil and gas expected to be obtained through the application of advanced recovery techniques for supplementing the natural forces and mechanisms of primary recovery should be included as *proved developed reserves* only after testing by a pilot project or after the operation of an installed programme has confirmed through production response that increased recovery will be achieved.

Proved undeveloped oil and gas reserves are reserves that are expected to be recovered from new wells on undrilled acreage, or from existing well for which a relatively major expenditure is required for recompletion. Reserves on undrilled acreage should be limited to those drilling units offsetting productive units that are reasonably certain of production when drilled. Proved reserves for other undrilled units can be claimed only if it can be demonstrated with certainty that there is

	continuity of production from the existing productive formation. Under no circumstances should estimates for proved undeveloped reserves be attributable to any acreage for which an application of advanced recovery technique is contemplated, unless such techniques have been proved effective by actual tests in the area and in the same reservoir.
Oil Gravity	The density of oil compared to the density of water, i.e., the specific gravity of the oil. Measured in degrees A.P.I (American Petroleum Institute). Oil with a low number is less valuable than with a high number. The high number indicates a low density.
Oil in Place	Total reserves in a reservoir, including both recoverable and non-recoverable reserves.
Open Flow	The unrestricted rate of flow of a well.
Operating Costs	The amounts paid to operate the property, not including management, general or administrative overhead costs or any taxes.
Operation	The development and production of an oil or gas property; includes pumping, storing, treating of oil, maintenance of producing facilities.
Operator	The person, whether proprietor or lessee, actually operating an oil well or lease, i.e., the member of a joint venture responsible for carrying out the exploration, development and production activities on behalf of the other partners.
Primary Reserves	The oil and gas recoverable from a well without using secondary recovery methods.

Production Payment	A right to get cash or a portion of oil production from a property until an agreed amount has been received.
Production Platform	The structure used in offshore oil production to support a drilling rig which is used to drill development wells, and to house other facilities and stores.
Production Well	A well drilled from a fixed production platform to drain the oil or gas from the reservoir during the production phase.
Prospect	A geographical area which contains sedimentary rocks and structure favorable for the presence of oil or gas.
Recoverable Reserves	The portion of the reserves of oil and gas which are estimated to be capable of being extracted and produced.
Reservoir	A porous and permeable underground formation containing a natural accumulation of producible oil or gas that is confined by impermeable rock or water barriers and is individual and separate from other reservoirs.
Royalty	A levy imposed under the Petroleum and Natural Gas Rules, 1959 payable to the respective State or Central Government granting the lease (Central Government in case of offshore) on crude oil and natural gas obtained.
Seismic Survey	A method of survey used by an oil company in order to locate possible oil traps.
Service Well	A service well is a well drilled or completed for the purpose of supporting production in an existing field. Wells in this class are drilled for specific purposes such as, gas

	injection (natural gas, propane, butane, or flue gas), water injection, steam injection, air injection, polymer injection, salt-water disposal, water supply for injection, observation, or injection for combustion.
Spud	Making a hole to commence the drilling of a well.
Structure	An underground geological feature capable of forming a reservoir for oil and gas.
Stratigraphic test well	A stratigraphic test is a drilling effort, geologically directed, to obtain information pertaining to a specific geologic condition. Such wells customarily are drilled without the intention of being completed for hydrocarbon production. The classification also includes tests identified as core tests and all types of expendable holes related to hydrocarbon exploration. Stratigraphic test wells (sometimes called expendable wells) are classified as follows: ▪ Exploratory-type stratigraphic test well: A stratigraphic test well not drilled in a proved area. ▪ Development-type stratigraphic test well: A stratigraphic test well drilled in a proved area.
Successful Efforts Method (SEM)	Under the successful efforts method, generally only those costs that lead directly to the discovery, acquisition, or development of specific, discrete oil and gas reserves are capitalised and become part of the capitalised costs of the cost centre. Costs that are known at the time of incurrence to fail to meet this criterion are generally charged to expense in the period they are incurred. When the outcome of

such costs is unknown at the time they are incurred, they are recorded as capital work-in-progress and written off when the costs are determined to be non-productive. (Refer Annexure II).

Support Equipment and Facilities

Equipment and facilities of the nature of service units, camp facilities go downs (for stores and spares), workshops (for equipment repairs) transport services (trucks and helicopters), catering facilities and drilling and seismic equipment.

Tangible Costs

The cost of equipment or items having a salvage value, when the well ceases production, and their initial installing costs. These Costs include:

- Surface casing (even though the casing is permanently cemented and unsalvageable).
- Well casing and tubing.
- Stabilizers, centralizers and other down hole equipment.
- Pumping unit, treaters and separators.
- Wellhead or Christmas tree.
- Salt water disposal equipment (including cost of disposal well).
- Recycling equipment including flowlines.
- Production tank battery including labour costs to build.
- Construction of turn-around pad at tank battery with additional overflow pits.

Tangible Well and Field Equipment

Tangible well and field equipment includes subsurface equipment in successful wells (casing, tubing and subsurface valves, etc.), surface equipment (pumps, flow lines, etc.) and all other equipment serving the producing location including but not limited to separators, heaters, measurement

	devices, engines, storage tanks, buildings, pipelines or gathering lines, etc.
Ultimate Recoverable Reserves	Crude oil and gas reserves that can be produced from existing facilities plus secondary recovery methods.
Unit of Production (UoP) Method	The method of depreciation (depletion) under which depreciation (depletion) is calculated on the basis of the number of production or similar units expected to be obtained from the assets by the enterprise.
Unproven Area	An area in which no wells have been drilled.
Upstream	The exploration, development and production activities of an oil company.
Water Injection Well	A well through which water is introduced into a reservoir to increase oil production from other wells.
Wildcat	An exploration well drilled in an unproved territory, i.e., without complete knowledge of the geology of the locality.
Work Over	Remedial work to the equipment within a well, the well pipework or relating to attempts to increase the rate of flow.

Abbreviations

AFE	Authorisation For Expenditure
BS&W	Base Sediment and Water
CTF	Central Tank Farm
DD&A	Depletion, Depreciation and Amortisation
DGH	Director General of Hydrocarbons
DPR	Drilling Parameter Recorder
DGMS	Directorate General of Mines Safety
DGCA	Director General of Civil Aviation
E&P	Exploration and Production
EPS	Engineering Prototype System
ESP	Electric Submersible Pump
ETP	Effluent Treatment plant
G&G	Geological and Geophysical
GGS	Group Gathering Stations
IMR	Inspection, Maintenance and Repair
JIB	Joint Interest Billing
JOA	Joint Operating Agreement
MSV	Multi Support Vessel
OBG	Over Burden Gradient
OISD	Oil Industry Safety Directorate
OSV	Off -shore Support Vessel
NELP	New Exploration Licensing Policy
PSC	Production Sharing Contract

SRP	Sucker Rod Pump
SHP	Subsurface Hydraulic Pumping
WSS	Well Stimulation Services

Contents

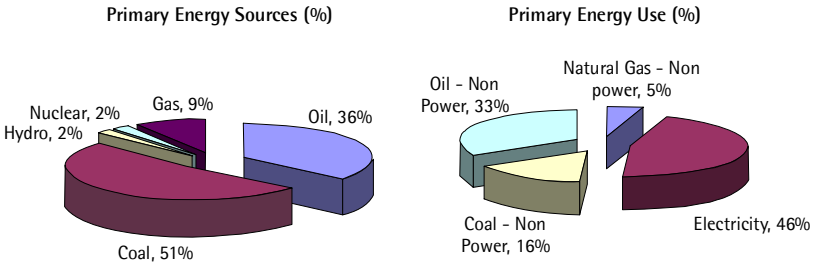
1

Introduction

IMPORTANCE OF THE PETROLEUM INDUSTRY

1.1 Petroleum Sector plays a vital role in the economic growth of the Country, as economy is more dependent on petroleum products in day-to-day life. Out of the total energy mix of oil, natural gas, coal, hydroelectric and nuclear/ others, the Petroleum component occupies a major share in the total mix.

India's Composition of Energy Sources and Usage



Source : Planning Commission of India, 2006

1.2 Petroleum has emerged as the world's most useful source of energy and a vital commodity in international market. The use of crude oil as a source of energy started around 1890 only. Till early forties, demand of petroleum products was low but with world wide growth of industry there was a sudden

shift in favour of petroleum as energy source as compared to coal. Major expansion and development in automobile industry also took place during this period. Oil dominated as a source of energy for transportation, electricity generation and heating of buildings. It has also become essential as a petrochemical feed stock.

1.3 The demand for the petroleum products is increasing year by year thereby putting pressure on exploration and production of crude oil and refining and marketing of petroleum products. The increasing trend in the population and growth in the individual consumption has put more pressure in terms of demand for petroleum products. With economic growth and modernization, the demand for petroleum products is expected to rise further.

1.4 The Oil sector has two major activities - Exploration and Production (E&P) of crude oil and gas is an upstream activity while refining, distribution and marketing are classified as downstream activities. In India, the operations of petroleum companies can be grouped into:

(i) Exploration and Production
(ii) Refining and Marketing
(iii) Pure Refining
(iv) Pure Marketing.

The share of petroleum products and natural gas in the total energy consumption has been increasing over the years. The country is heavily dependent on import of crude oil and this dependence will increase in the years to come.

Exploration and Production (E&P)

1.5 Exploration and Production refers to exploration for underground reservoirs of oil and gas, and production of the discovered oil and gas using drilled wells through which the reservoir's oil, gas, and water are brought to the surface and

separated. The E&P activities are also called upstream activities.

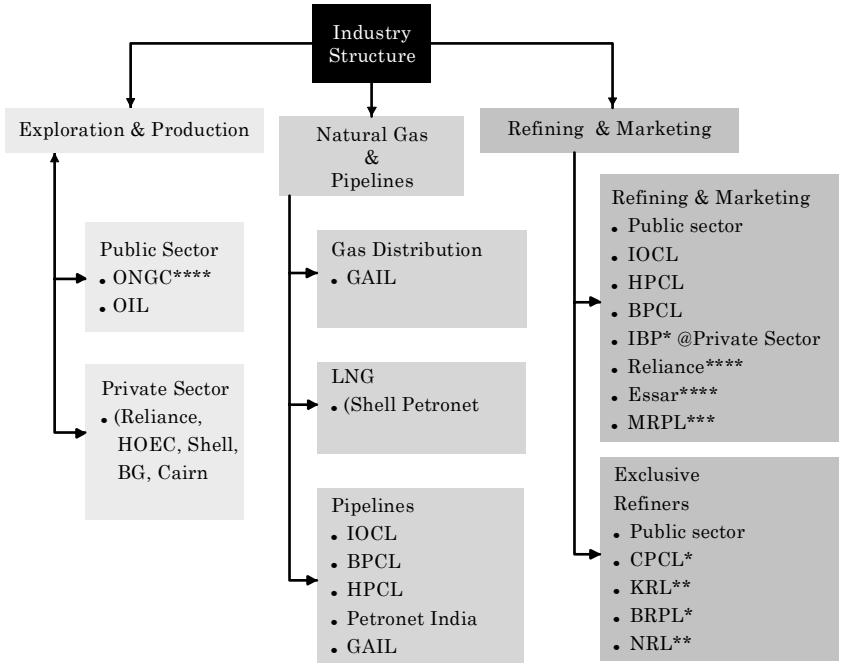
1.6 The principal activities involved in E&P are undertaking seismic surveys, drilling exploratory and appraisal wells, economic evaluation of the project, entering into agreements with the State, formulation of field development and production plan, production, sale and decommissioning of the wells and facilities.

Refining

1.7 Refining activity involves receiving the crude through pipelines/ coastal tankers from the indigenous/ import destination, for refining the crude into different products at different temperature on the basis of demand/ requirement of respective product. Refining is an important activity since the crude has to be refined into different products for the final use of products by the consumers. India can perhaps claim to have established one of the earliest refineries in the World.

Marketing

1.8 Marketing activity involves the process of receiving the finished products or refined crude oil products, through pipeline, costal tankers, rail wagons and tank trucks for storing the products in the Installation/ Terminal/ Depot for onward distribution to final consumers. The marketing activity comes as a last but not the least activity in the chain of production, refining, marketing and distribution of petroleum products. The activity involving refining of the crude oil and that involved in marketing and distribution of refined petroleum products are also called downstream activities.



* Majority stake acquired by IOCL

** Majority stake acquired by BPCL

*** Only refining company. Majority stake acquired by ONGC

**** Marketing rights available for petroleum products

@ Exclusive marketing company.

CHARACTERISTICS OF E&P INDUSTRY

1.9 The exploration, development and production of oil and gas is together also referred to as the extractive industry. The extractive industry has the following characteristics:

- Substantial Business Risks

  - Exploratory Business-including offshore leases-risks of non discovery of reserves in any one location.

- Subject to rapid market changes in supply and demand.
- Significant environmental risks.
- Companies must recoup enough products from successful ventures to recoup investment in dry holes as well as overhead.

- Capital Intensive
  - Significant upfront capital cash outlays yield recovery over long-term.
  - Capital expenditures do not always result in economically viable wells.

- Highly Regulated Operations
  - Rights for exploring mineral interests are given by the government.
  - The manner of protecting the environment is highly regulated.

- Unconventional Accounting
  - No relationship between costs and underlying assets. In most industries, at the date an asset is acquired, its value exactly equals its cost whereas in oil and gas exploration, the underlying value of the oil and gas reserves has no correlation with the cost of exploration.
  - Matching concept not adhered to.
  - Most expenditures produce no assets.
  - Value of discoveries is recognised over time as hydrocarbons are produced long after the economic event giving rise to them has taken place.

EVOLUTION OF E&P INDUSTRY IN INDIA

1.10 The E&P industry in India is more than a century old. What started off as a trickle from one small oil field in the rain forests of upper Assam has today become a major activity in several areas of on land and offshore India.

1.11 The Petroleum Exploration and Exploitation activities were carried out by the two National Oil Companies (NOCs) *viz.*, Oil and Natural Gas Corporation Ltd. (ONGC) and Oil India Ltd. (OIL). However, with the phenomenal increase in the consumption of petroleum products, the gap between domestic supply and demand has been ever increasing. To diminish this gap, the industry was partially opened to the private sector in the 1980s when some foreign oil companies were invited to augment the exploratory efforts, in the offshore areas. This was followed by the liberalisation of policies in 1991 when sedimentary basins were also opened to domestic and foreign private companies. Consequently several exploration blocks and some small and medium sized discovered fields were offered to private and joint venture companies through various bidding rounds. Due to the spurt in activities in the upstream sector, a regulatory body, Directorate General of Hydrocarbons (DGH) was set up in 1993, to oversee the exploratory and development activities of oil companies. The Government has enacted following Acts for regulation of activities of oil companies:

- The Oilfields (Regulation and Development) Act, 1948: It provides for the regulation of oilfields and development of mineral oil resources.

- The Petroleum and Natural Gas Rules, 1959: It specifies the Rules made by the Central Government for regulating the grant of exploration licenses in mining leases in respect of petroleum and natural gas which belongs to government and for conservation and development thereof.

- The Oil Industries Development Act, 1974: It provides for provisions relating to payment of cess by E&P companies.

1.12 Today, the major trends in the Indian E&P industry are towards privatisation and globalisation of resources looking at technology to improve the finding and recovery of oil. India is heavily dependent on imports to meet the rapidly growing

demand for petroleum products. It is evident that vast amounts of capital investments are necessary to substantially augment the exploration efforts. With this background, the Government formulated a New Exploration Licensing Policy (NELP) to provide a level playing field in which all parties can compete on equal terms for the award of exploration acreage. Till date, five rounds of bidding and allocation of blocks under NELP have taken place. The sixth round of bidding under NELP is in the process.

SCOPE OF THE TECHNICAL GUIDE

1.13 The Technical Guide provides an insight with regard to:

- Exploration and Production activities

- Internal audit of Exploration and Production activities.

The Technical Guide will be useful to the readers in understanding various technical aspects of the E and P industry as also the significant aspects of internal audit in this Industry. Since the size, functioning and nature of activities may vary from one company to another, the Guide cannot cover all intricacies that may be involved in all practical situations. The various aspects/ principles enunciated in the Guide, therefore, might require appropriate modification/ adjustments depending on size, function and nature of activities of a company under audit. Further, the Guide also does not cover the routine aspects of internal audit which are common to almost all types of industries, such as, payroll, sales promotions, debtors, creditors, etc.

2

Technical Aspects in Exploration and Production (E&P) Industry

EXPLORATION AND PRODUCTION (E&P) ACTIVITIES

2.1 The operations carried out by any upstream oil and gas companies can be segregated into acquisition, exploration, development and production. Costs incurred in oil and gas producing activities can accordingly be classified into the following six major categories:

- Acquisition of Property
- Exploration and appraisal
- Development
- Production
- Support facilities and equipment
- Abandonment and surrender of properties.

Acquisition of Property

Activities

2.2 Before an oil company decides to acquire a block/ acreage, it usually evaluates areas where oil and gas reservoirs might

be economically discovered and developed. After suitable areas have been identified, the oil company approaches the owner who owns the rights to oil and gas in these areas for exploration, development and production of the underground minerals on the property.

2.3 The acquisition phase involves the activities related to obtaining legal rights to explore for, develop, and produce wasting resources on a mineral property. Legal rights may be acquired by:

(a) Purchasing of minerals (outright ownership);

(b) Obtaining a lease or concession;

(c) Entering into a production sharing contract* (or Production Sharing Agreement);

(d) Entering into a joint venture or a farm-in/ farm-out arrangement; and

(e) Entering into a service contract (also called a service agreement or risk service contract).

2.4 In India, all mineral rights are owned by the Government of India. The oil companies enter into a Production Sharing Contract (PSC) with the Government of India for specified blocks. Pursuant to the PSC, an oil company wishing to undertake survey and exploration activities has to initially obtain a Petroleum Exploration License (PEL) or a Letter of Authority (LOA). PELs are usually granted for six years and can be renewed for a further period of six years. A Mining Lease (ML) is required by those enterprises that are desirous of engaging in development and production activities. Whilst the PEL/ LOA and the ML are granted by the respective State Governments for onshore E&P activities, the Central Government is the granting authority for offshore E&P activities.

* The concept of Production Sharing Contracts has been explained later.

Costs

2.5 These are the costs incurred in acquiring the right to explore, drill and produce oil and natural gas. They include lease bonus, broker's fees, legal costs and all other costs incurred in obtaining a mineral lease. They also include the cost incurred for temporary occupation of the land including crop compensations paid to the farmers.

Exploration and Appraisal

Activities

2.6 After the acquisition of land, oil companies generally perform Geological and Geophysical (G&G) works to evaluate the likelihood of those specific areas containing oil or gas reserves. This may include site surveys, seismic studies, including exploratory drilling. If the study of the seismic survey indicates that the structure will yield hydrocarbons, the exploration Company starts drilling an exploratory well in the chosen site. The results of the exploration activity could be a discovery. The reserves of oil or gas estimates at this stage may be proved or unproved. The estimates are further confirmed and the commercial quantities are determined by the appraisal activity.

2.7 Evaluation or appraisal means determining the technical feasibility and commercial viability of mineral deposits that have been found through exploration. After an exploratory well (or more than one exploratory well) has been drilled into a reservoir and has resulted in the discovery of oil and/ or gas reserves, additional wells, known as appraisal wells, may be drilled to gain information about the size and characteristics of the reservoir, to help in assessing its commercial potential, and to better estimate the recoverable reserves. In addition to the drilling of appraisal wells, the appraisal phase includes:

(a) Carrying out detailed engineering studies to determine how best the reservoir can be developed to obtain maximum recovery;

(b) Surveying transportation and infrastructure requirements;

(c) Market and finance studies; and

(d) Carrying out detailed economic evaluations to determine whether development of the reserves is commercially justified. Often the establishment of the commercially recoverable quantities of oil or gas determines the successful conclusion of an exploration programme. In other words, till the establishment of the commercial oil or gas, the exploration activity is presumed to be unsuccessful. The decision to develop a field or reservoir is taken only after the establishment of commercially recoverable reserves.

Costs

2.8 Principal types of exploration costs are:

(i) G&G costs including costs incurred to gain access to properties to conduct G&G studies, salaries and expenses of geologists, geophysical crews, etc.

(ii) Dry hole and bottom hole contribution.

(iii) Drilling and equipping exploratory and exploratory type stratigraphic wells.

(iv) Carrying and retaining costs of undeveloped property such as delay rentals, property taxes, etc.

(v) Depreciation and applicable operating cost of support equipment and facilities.

Development

Activities

2.9 Development is the establishment of access to the mineral reserves and other preparations for commercial production. In the petroleum industry, the development phase involves:

- Gaining access to and preparing well locations for drilling, clearing ground, draining, building roads, and relocating public roads, gas lines and power lines to develop reserves;

- Constructing platforms or preparing drill sites;

- Drilling wells to gain access to and produce the oil and gas reserves; and

- Installing equipment and facilities necessary for getting the oil and gas to the surface and for handling, storing and processing or treating the oil and gas to make them marketable or transportable. The equipment involved includes such items as flow lines to get the product from the well to treating equipment or to a storage area or gathering point for transportation away from the production site, heaters, treaters, separators, storage tanks and waste disposal systems.

Costs

2.10 The principal types of development costs are:

(i) Costs incurred to gain access and to prepare well locations for drilling, clearing the ground, drainage, building roads, etc.

(ii) Costs incurred for drilling and equipping development wells including; development type stratigraphic wells, cost of platforms and well equipment.

(iii) Costs incurred for acquiring, constructing and installing production facilities.

(iv) Costs incurred for providing improved recovery systems.

(v) Depreciation and applicable operating costs of support equipment and facilities.

Production

Activities

2.11 The production phase involves the extraction of the natural resources from the earth and the related processes necessary to make the produced resource marketable or transportable. These activities include lifting the oil or gas to the surface, gathering production from individual wells to a common point in the field or on the mineral property, field treating, field processing and storage of the production in field storage tanks. The production function comes to a stop when the hydrocarbons enter the delivery point, i.e., at the outlet well on the production storage tank or at the first point at which oil, gas or gas liquids are delivered to a main pipeline, a common carrier, refineries or a marine terminal.

Costs

2.12 These costs are incurred to operate and maintain the enterprise's wells and related equipment facilities and other costs and include:

(i) Labour costs to operate wells and equipment.

(ii) Repair and maintenance, work over costs.

(iii) Production taxes such as cess, royalty, etc.

(iv) Costs of materials, supplies, fuel and other services utilised in operating the wells related equipment and facilities.

(v) Insurance on property.

Support Facilities and Equipment

2.13 In order to be able to carry out the aforesaid activities, all oil producing companies require support equipment and facilities. These would be in the nature of field service units, camp facilities, godowns (for stores and spares), workshops (for equipment repairs), transport services (trucks, helicopters for offshore rigs), catering facilities, etc.

2.14 The expenses relating to the operation of such support facilities and activities are allocated to those activities receiving the benefits. Thus, costs of depreciation, taxes, repairs and operation of equipment (such as, seismic equipment, construction and grading equipment, drilling equipment, vehicles, repair shops, warehouses, supply points, camps and division, district, or field offices) may relate in whole or in part to exploration, development or production activities and would accordingly be allocated to these activities on an appropriate basis.

Abandonment and Surrender of Properties

2.15 Abandonment is the term most widely used to describe the process of plugging and abandoning wells, of dismantlement of wellheads, of production and transport

facilities and of restoration of producing areas in accordance with license requirements and the relevant legislation. Thus, abandonment relates to the discontinuation of all operations and surrendering of all interest in a property. The more significant costs incurred by oil and gas producing companies relate to offshore, remote and environmentally sensitive areas where site restoration and related costs may exceed the original cost of the producing facilities.

PRODUCTION SHARING CONTRACTS AND JOINT OPERATING AGREEMENTS

Production Sharing Contract (PSC)

2.16 In the petroleum industry today, the most common arrangement by which enterprises obtain the rights to explore, develop and produce oil and gas is the Production Sharing Contract (PSC), sometimes called a Production Sharing Agreement. Although the precise form and content of PSCs vary from country to country, and even within a single country, the following are some of the commonly found features of a PSC:

(a) The national Government retains ownership of the reserves and grants the petroleum enterprise (the "contractor") the right to explore, develop and produce the reserves.

(b) The national oil company of the host country is directly involved in management of operations. The contractor is responsible to the national oil company for carrying out operations in accordance with contract terms.

(c) The contractor may be required to pay a bonus at the time the PSC is entered into, or production bonuses as oil is produced.

(d) The contractor provides all financing and technology necessary to carry out operations and pays all of the costs specified in the PSC.

(e) The contract frequently calls for the contractor to provide infrastructure development to the host country. For example, the contractor may be required to build roads, water systems, hospitals, schools and other facilities before or during the course of operations. Additionally, the contactor is typically required to provide training to the personnel of the Government, the national oil company of the host country, and those of the venture partners. The costs associated with infrastructure development and personnel training may or may not be recoverable from future production.

(f) The contract may specify the amount of money that must be spent during the exploration phase and may set a time limit before which the work must be done. If the work is not performed, the contract may require that the unspent amount must be paid in cash to the Government.

(g) The contractor is required typically to bear all the risks related to exploration and, sometimes, to development.

(h) The equipment that is imported or acquired for development and production activities becomes the property of the national oil company of the host country, often, at the time the equipment is landed or acquired.

(i) The contractor must submit annual work programs and budgets for approval by the national oil company of the host country.

(j) A royalty may be payable to the host Government.

(k) The operating costs and specified exploration and development costs are recoverable out of a specified percentage of production revenues after the royalty

payment each year. The oil representing the costs to be recovered is referred to as C*ost Recovery Oil***.**

(l) The revenues remaining after royalty and cost recovery are called *Profit Oil*. The Profit Oil is split between the Government and the contractor on a predetermined basis.

(m) The contractor is usually subject to income tax. Income, for tax purposes, is determined in accordance with the Government's policies. In many cases, there is no income tax *per se*; rather a levy is included in the Government's share of production, much like a royalty. Still in other cases, the agreement may provide for a tax on the contractor's profits, with the tax being collected by the Government in kind.

(n) Many countries prohibit the contractor from obtaining a direct ownership interest in reserves. Contractors may have an entitlement interest, i.e., an interest in the reserves as a consequence of Cost Recovery Oil and Profit Oil.

Most of the above features form part of Production Sharing Contracts entered in India.

Joint Operating Agreement

2.17 A Joint Operating Agreement (JOA) is an agreement between two or more lease owners providing for the operation of a lease in which one operates the lease with all owners sharing the cost. Under the agreement, one of the working interest members is designated as the Operator to manage the development and operation of the joint venture's properties in an efficient manner. The JOA sets out the duties, obligations, rights and responsibilities of the working interest owners to the joint venture operations and specifies how costs and benefits are to be shared.

3

Internal Audit of the Joint Operating Agreement

OPERATOR

3.1 The members of the joint ventures collectively (referred to as "Consortium") enter into a "Production Sharing Contract" (PSC) with the host Government. The consortium members enter into an agreement among themselves to specify the terms of joint arrangement referred to as "Joint Operating Agreement" (JOA) which determines all significant matters of operating and financial policy. Under the JOA, an Operator is elected to manage the operations and all members share the costs. The Operator forwards various statements to the other members for accounting of their share of the costs incurred for managing the operations.

3.2 An Operator is a person, whether proprietor or lessee, actually operating a mine or oil well or lease, i.e., the member of a joint venture responsible for carrying out the exploration, development and production activities on behalf of the other partners. A person is designated as an Operator as per the provisions of the PSC. The duties, roles and responsibilities of the Operator are provided in the PSC as well as the Joint Operating Agreement.

Work Programme and Budgets and Approval for Expenditure

3.3 The Work Programmes and Budgets are prepared for carrying the joint operations as per the provisions and timelines stipulated in the PSC/ JOA. Each Work Programme sets out, in reasonable details, the work proposed to be carried out, principal materials to be purchased and facilities to be erected for the joint operations for the period to which such Work Program applies. It is accompanied by a Budget showing an estimate of the expenditures and funds required. The Work Programme and Budget is approved by the Operating Committee and the Management Committee.

3.4 The following should be verified for this purpose:

- Whether Work Programmes and Budgets are submitted to the Operating Committee and the Management Committee as per the timelines stipulated in the PSC/ JOA.

- Whether timely and adequate inputs are provided to the Finance Department, as per the Work Programme, for preparation of Budget and Work Programme and in line with the PSC/ Development Plan.

- Whether budgets are revised when there is a change in the planned activity and necessary approvals are taken.

- The basis of preparation of Work Programme and Budgets - its accuracy, completeness and authenticity.

- Whether the budgets are reviewed and approved at the appropriate level internally, before being forwarded for approval to the Operating Committee/ Management Committee.

- Whether the budgets *vs.* actuals are monitored on a periodic basis and corrective actions are taken wherever required.

- Whether periodic statements, e.g., Statement of Costs, Expenditures and Receipts, etc., are furnished as required by the PSC as per the timelines stipulated in the PSC.

- Whether any activity is undertaken by the Operator which is beyond the approved Work Programmes and Budgets.

- Whether the approval of the Operating Committee and the Management Committee is obtained, in case, actual expenses exceed budgeted expenses for each line item of the budget at the point of time stipulated in the PSC and the JOA.

- Whether timely replies are being submitted to the venture partners/ Directorate General of Hydrocarbons (DGH) for their queries on budgets.

Authorisation For Expenditure (AFE)

3.5 Prior to incurring any expenditure or incurring any commitment for work, the Operator prepares an Authorisation for Expenditure (AFE). The Joint Operating Agreements contains provisions for seeking approval of venture partners before undertaking certain specified activities through Authorisation for Expenditures (AFE). If the Operating Committee approves an AFE for the work, the Operator is authorized to conduct the work under the terms of the Operating Agreement. The AFE proposed by the Operator usually contains the particulars of the work with reference to the approved Work Program and Budget, best estimate of the total funds, proposed work schedule, timetable of expenditure and any other supporting information as necessary for any decision.

3.6 The following should be verified for this purpose:

- Whether AFEs are prepared for all activities as required by the Joint Operating Agreements, e.g., seismic acquisition and processing, exploration and appraisal well, development well, deepening of any well below original total depth, involving exploratory footage, platform or group of platforms, subsea pipeline/ major pipeline, activities exceeding specified monetary limits.

- Whether the AFEs are complete and correct and in line with the approved budgets.

- Whether the AFEs are reviewed and approved at the appropriate level before being forwarded for approval of the joint venture partners.

- Whether venture partners' approvals are sought on the AFEs prior to commencement of the activity.

- Whether AFEs *vs.* actual details are submitted to the venture partners as per the provisions of the JOA.

- Whether a supplementary AFE is raised when it is anticipated that an AFE will be over spent by the specified percentage as per the provisions of the JOA.

Maintenance of Working Interest

3.7 Working Interest refers to the a Party's undivided interest in certain rights and obligations under the Operating Agreement in Joint Property and certain rights and obligations as per the provisions of the PSC and JOA. The Working Interest is particularly important since the share of expenses and income are allocated on the basis of the defined percentage.

3.8 The following should be verified for this purpose:

- Whether the Working Interests are updated as per the PSC and JOA for the purpose of billing.

- Whether the Working Interests are valid and authorised.

- Whether maintenance of Working Interests is restricted in the accounting system.

- Whether the log of Working Interests is reviewed on a periodic basis.

Cash Call and Joint Interest Billing

3.9 In order to fund the operations of the joint venture, the Operator raises cash call on other venture partner(s) in accordance with their participating interest. Cash calls are raised for the expenditures (as per the approved Work Programmes, Budgets and AFEs.) and for currencies, in which the money is spent. A cash call is the Operator's estimate of the amount required from the Parties to enable the operator to make cash payments less cash receipts in the relevant period.

3.10 The following should be verified for this purpose:

- Whether cash calls have been raised on all the venture partners in accordance with the timelines stipulated in the Joint Operating Agreement for all expenditures pertaining to joint operations.

- Whether fund requirements for raising cash call have been estimated on the basis of inputs received from the concerned departments.

- Whether cash calls are raised for expenditures as per the approved work programmes and budgets.

- Whether cash call statement is accompanied by cash reconciliation statement for the previous month and excess/ shortage of the previous month has been adjusted in the current cash call.

- Whether cash call statement contains the necessary information as required by the Joint Operating Agreement, e.g., estimation of funds budget line item wise for the next month, estimate of fund requirement for subsequent two months, for information purposes.

- Whether cash call statements are reviewed and approved at the appropriate level before being forwarded for approval.

- Whether the daily bank balance are reviewed to verify that funds are not lying idle and cash calls are not excessive.

- Whether there is any commingling of joint funds with the Operator's own funds and whether a separate bank account is being maintained by the Operator and all receipts and payments related to the joint operations are made through this account.

- Whether interest is levied for delay in payments by any of the venture partners as per the Joint Operating Agreement.

- Nature of clarifications sought by the Non-Operators on the cash call statement and the reasons for the same.

Special Advance from Venture Partners

3.11 In respect of the special advance from the venture partners, the following would need to be verified:

- Whether for any unforeseen activity not covered by the cash call, special advances are being sought from the non-operators.

- Whether timely information for new activity is received from the concerned technical department to raise the special advance from the venture partners.

- Whether any unforeseen activity is within the preview of the approved Work Programme and Budget.

- Whether money from the other venture partners was received within the time stipulated in the JOA.

- Whether special advances are reviewed and approved at the appropriate level before being forwarded to the venture partners.

- Whether interest is levied for delay in payments by any venture partner as per the Joint Operating Agreement.

Revised Cash Call Statement

3.12 In respect of the revised cash call statement, the internal auditor would verify:

- Number of disputes raised by the Non-Operators on the cash calls and the reasons for the same.

- Number of times cash call has been revised pursuant to the notice received from the Non-Operator and reasons for the same.

- Whether adequate discussions have been done before revising the cash call statement and reasons for revision are documented.

- Whether cash call has been revised within the time period stipulated in the Joint Operating Agreement.

- Whether revised cash call has been approved by the appropriate authority.

Refund of Excess Cash

3.13 The internal auditor's procedures would include:

- Checking the number of times the refund of excess cash has been sought by the Non-Operators.

- Verifying the reasons for maintaining excess cash balance than the requirements and that they were used to address the same.

- Verifying whether the refund of excess cash has been approved by an appropriate authority.

Interest on Funds Lying in Joint Bank Accounts

3.14 Any interest received from interest bearing joint bank account containing funds received from the joint venture partners is credited to the joint venture partners on an

equitable basis or as per the terms of JOA, taking into consideration the date of funding by each partner to the joint accounts in proportion to the total funding into the joint account. The internal auditor should verify whether adequate details for interest allocations are submitted to the venture partners.

Default Notice and Levy of Interest

3.15 The internal auditor should verify whether:

- A default notice has been served on the partner in default of payment of cash call within the timelines stipulated in the Joint Operating Agreement.

- Along with the default notice, notices have been served on other venture partners for payment of amounts in default.

- Funds have been received from the non-defaulting venture partners within the timelines specified as per the JOA.

- Reasons for default by the venture partners should also be verified.

- The defaulting venture partner has paid the amount in default along with interest and whether interest calculations have been verified by the Finance Department.

- Funds received from defaulting venture partners along with interest have been appropriately allocated between the non-defaulting venture partners and remitted.

Joint Interest Billing (JIB) Statement

3.16 As per the provisions of the JOA, the Operator is required to send a Billing Statement to the Non-Operator for all disbursements and all receipts of the Joint Account during the month, year to date and inception to date, analysed as appropriate between each AFE. The Billing Statement should be sufficiently detailed or contain such explanation as is necessary to enable comparison with the appropriate item in the Work Programme and Budget.

3.17 The following should be verified for this purpose:

- Whether JIB Statements are prepared and forwarded to the joint venture partners within the time specified in the JOA.

- Whether JIB Statement contains the information relating to the funds advanced by the partner in each currency, details of expenses and credits, along with a reconciliation of the funds with the expenditures made.

- The accuracy and completeness of the Billing Statements from the underlying records e.g., ledgers, etc.

- Whether the Billing Statements agree with the block trial balances.

- The accuracy and completeness of the Cash Reconciliation Statements prepared along with the Billing Statements.

- Whether the Billing Statements have been reviewed and approved before being sent to the venture partners.

- Whether the timely replies have been submitted to the venture partners for their queries on the Billing Statements.

Expenses and Payables

Accounts Payable

3.18 The following aspects need to be verified:

Whether the receipt of goods/ services is supported by appropriate the documents, e.g., Goods Receipt Note (GRN) for goods, acknowledgement of receipt of services from the user department.

- A sample of invoices processed with respect to the following:

  - Purchase Order/ Contract
  - Goods Receipt Note/ Services received
  - Supporting documents
  - Appropriate approvals.

- For invoices of consultants, verify the following additional documents:

  - Day rate
  - Period
  - Nature of engagement
  - Block and activity.

- Whether foreign currency transactions have been accounted for as per the provisions of the PSC and the JOA.

- Whether the General Ledger Account Code and the allocation details of the block are correct.

- Whether deductions have been made for any delayed supply/ execution of services as per the terms of the Purchase Order.

- Whether any other deduction to be made as per the terms of the Purchase Order has been taken into consideration at the time of processing of invoice.

- Whether appropriate discounts have been avoided from the suppliers as per the terms of contract.

- Whether recoveries have been made from the suppliers for the services provided to them such as helicopter/ telecommunications/ accommodations, etc.

- Whether tax deducted at source is correct as per the provisions of the Income-tax Act, 1961 for the Indian vendors and as per the tax order obtained for the foreign vendors.

- Applicability of service tax/ work contract tax and the deduction of the same from the invoice at the time of processing.

- Whether contracts which have been executed are closed on timely basis.

In many cases, there may be a provision for the parties to the consortium to provide services/ material to the Joint Venture. In such cases, the internal auditor should examine the contract/ agreement/ MoU between the parties and the Joint Venture for supply of such services/ material.

The internal auditor should also verify the chargeability of all imported items to the Joint Venture blocks *vis-à-vis* the purposes and names and blocks for which the item were imported as mentioned in the Essentiality Certificate issued by the DGM. If the items were not imported for a particular block, the expenditure should not be changed to the block and *vice versa.*

Review of Vendor Balances

3.19 This would include verifying:

- Whether vendor balances are periodically reviewed for the following:
  - Any debit balances in the Creditors' account and the reasons for the balances.
  - Duplicate vendor codes, if any.
  - Any advances paid to the vendors pending to be adjusted.

- Whether balance confirmations are sought from the vendors on a periodic basis for reconciliation purposes.

- On a sample basis, the reconciliation obtained from the vendor and the necessary adjustment entries passed in the books of account after obtaining necessary approvals.

- Whether any disputed amount in the vendor reconciliation process has been appropriately followed with the vendor.

Allocation of Expenses to Respective Blocks

3.20 General and administrative costs are expenditures incurred on general administration and management primarily and principally relate to petroleum operations in or in connection with the contract area and usually include main office, field office, etc. The allocation of expenses become applicable in those cases where the company has multiple blocks and certain common expenses are incurred by the company for all the blocks. In such cases, guidelines are formed by the company for allocation of the expenses on a consistent basis.

3.21 The following should be verified in such cases:

- Whether expenses have been appropriately allocated on a consistent basis as per the internal guidelines of the PSA/ JOA.

- Whether all direct chargeable expenditures are identified and charged to respective blocks and that no expenditures have been charged to JV blocks which are not related to a particular JV.

- Whether the accounting entry for allocation has been authorised.

- Whether in the absence of a specific accounting policy in the JV, the guidance is drawn from the parent company's accounting policy.

- Whether the overheads of the parent company of the operator have been appropriately allocated between different blocks, in terms of JOA.

- Whether the time sheet is duly filled by each employee with the particulars of the activity performed during the month for the purpose of allocation of expenses to the respective blocks.

- Whether the time sheet filled by the employees has been authorized by the respective functional head and manhours are appropriately allocated as per time sheet.

Banking Activities

3.22 The following should be verified for this purpose:

- Whether the invoices are released for payment only by the due date of payment.

- Whether payment of invoices has been authorized by the appropriate authority.

- Whether bank reconciliation is carried out on periodic basis for all bank accounts and is appropriately reviewed.

- Whether details of the stale cheque are reviewed periodically and necessary adjustments are made.

- Whether bank guarantees received are approved and are kept in safe custody of authorized personnel.

- Whether for bank guarantees received directly from the vendor, a confirmation has been obtained from the issuing bank for the validity of the bank guarantee.

- Whether there exist(s) a review mechanism for the validity of the bank guarantees.

- Whether before issue of bank guarantee, adequate justification is provided by the user department for the need.

- Whether the issue of bank guarantee has been authorized by the appropriate authority.

- Whether the particulars of the issue of Letter of Credit, with the justification, have been provided.

- Whether issue of Letter of Credit has been authorised by the appropriate authority.

- Whether the tax deducted at source has been deposited as per the provisions of Income-tax Act, 1961.

- The calculation and accounting entry for interest on bank deposits.

- Whether cash has been physically verified on a periodic basis by the person other than the custodian of cash.

- Cash and fidelity insurance policies undertaken.

Procurement

Indent/ Purchase Requisition Process

3.23 The following should be verified for this purpose:

- Whether the material requirement estimation process is adequately defined.

- Whether there is a system of checking the position of the existing stock of a material before a requisition order is placed.

- Whether indent raised by the user is complete and includes the complete specifications.

- Whether the indent is approved by an appropriate authority.

- Whether there is any undue delay in taking the procurement action after the receipt of the approved indent from the concerned department. For this, in some cases the internal auditor should check whether goods

are received within the time specified by the indenting department and also how the indenting department keeps track of open indents.

- Whether a quotation/ tendering process is followed as per the provisions contained in the PSC/ JOA in terms of number of quotations, value of purchases, approved vendors, etc.

- Whether a list of qualified vendor is approved by the Operating Committee as per the provisions of the PSC/ JOA and maintained by the Procurement Department.

- Whether the materials are being used as per the procurement plan in respect of PEL/ ML fields for the purpose of customs duty exemption.

Request for Quotation/ Tender

3.24 Request For Quotation (RFQ) is usually prepared as per the requirements of Indent. The internal auditor should verify:

- The completeness of RFQ and its timeliness, i.e., date of receipt of indent from the user department *vis-à-vis* date of release of RFQ.

- Whether all RFQs are monitored through unique serial number.

- Whether bidder qualification criteria is clearly defined and pre-approved by the Operating Committee or the Management Committee as per the provisions of the PSC/ JOA.

- Whether a list of qualified vendor is approved by the Operating Committee as per the provisions of the PSC/ JOA and maintained by the Procurement Department.

- Whether the List of approved vendors is periodically updated and any vendor with poor performance record is deleted from that list and all deletions to the list are approved as per the provisions of the JOA.

- Adherence to the tendering procedure as per the provisions of the PSC and JOA.

Raising of Purchase Orders

3.25 For this aspect, the internal auditor should verify:

- Whether the system of raising purchase orders and contracts comply with the laid down rules and procedures. For this, the internal auditor should also check whether:

  - Purchase orders are serially numbered.
  - Serial number of Purchase Order is linked with RFQ.
  - Amendments in terms of purchase orders have been duly approved.
  - The terms and conditions regarding price, discounts, mode of payment, terms of payment, delivery, etc., are clearly specified and are in conformity with the quotations and approval of competent authority.
  - Purchase orders contain penalty clause for delay in delivery/ poor quality of materials.

- Whether Purchase Orders are authorised by an appropriate official.

- Whether access to Purchase Order and supplier processing functions/ data is restricted to authorised personnel segregated from incompatible duties.

Supplier Supplying Customized Goods/ Single Source Suppliers

3.26 The internal auditor's procedures in this regard would include:

- Carrying out an analysis to ensure that adequate reasons exist for sourcing goods from particular suppliers.

- Verifying that periodic evaluation is carried out for each supplier with respect to the following parameters:

  - Quality of goods supplied.
  - Rejection of goods.
  - Adherence to delivery schedule.
  - Price charged *vis-à-vis* that prevalent in the market for similar goods.
  - Credit period extended *vis-à-vis* that prevalent in the market.

- Verifying that adequate reasons exist for price increase and that the same have been properly documented.

- Checking that, where there is only one supplier and the requirements of the company have increased over the period, efforts are being made to develop new vendors.

Vendor Database and Performance Evaluation

3.27 The internal auditor's procedure include:

- Verifying that the vendor database, stating item wise suppliers and rates, is maintained and is kept upto date. For this, the internal auditor also needs to check whether:

  - Lists of potential suppliers for all major purchases are maintained, regularly reviewed and updated.
  - Files are maintained for all major suppliers, detailing not only the information on prices, assortment and capabilities but also details of previous experiences or related information (e.g., reliability, quality or delivery problems) and details on the financial position of the supplier.
  - The Procurement Department monitors frequency of goods returned to supplier.
  - Appropriate guidelines have been established for determining the criteria to select suppliers.

- Verifying that performance of key suppliers is monitored on a periodic basis as per the guidelines framed by the Company, and corrective action is initiated by the Procurement department against suppliers with poor performance record.

Inventory Management

Material Receipt at Shorebase Stores (including rejection of material)

3.28 The following should be verified by the internal auditor for this purpose:

- Whether the system and procedures laid down by the Company are followed at the time of receipt, inspection and issue of material.

- Whether there is maintained a stores ledger for each block showing all receipts and issues of various materials along with there values.

- Whether stores originally purchased for the block/ parent company are being used by the JV or *vice versa* are being routed through such ledgers.

- Whether Customs clearance is obtained before receipt of material at the shorebase stores.

- Whether the data generated at the time of Gate Entry is complete, accurate and timely.

- Whether, in case, any material is found to be in a damaged condition, an insurance claim was lodged with the insurance company.

- Whether the material is inspected at the time of receiving and the particulars are mentioned in the Goods Receipt Note.

- Whether the Material Tags are available with all the material stored in the warehouse.

- Whether the rejection of material is promptly and formally intimated to the Procurement department and the concerned User department.

- Whether the rejected material is stored in a separate designated warehousing location and pre-printed 'Rejected Material' tags are attached with all the rejected material.

- Reviewing and analysing the time for which rejected material is stored at Shorebase Stores before dispatching it back to the vendor.

- In case of dispatch of rejected material to the vendor, transportation/ shipment is arranged by the vendor.

- Review the inventory turnover, especially, instances of excessive and non moving inventory.

Issue of Material

3.29 Internal audit of issue of material involves, *inter alia,* the following procedures:

- Verifying that the request for issue of materials is supported with adequate documents.

- Reviewing and analysing the time taken for transferring the material from Shorebase Stores to the Rig/ Installation Stores.

- Verifying that at the time of receipt of material at the Rig Stores, Goods Receipt Note is prepared on a timely basis.

- Reviewing the accuracy of the Cargo Manifest. For this, the internal auditor would also verify whether the item and its quantity as mentioned in the Cargo Manifest, and the physical material received by the Rig Stores.

- In case of short delivery of material at Rig Stores, verifying the reconciliation of short material carried out by the Shorebase Stores and Rig Stores.

- Verifying that issue of material is charged to books of account of the particular block at the time of issue of material to the User Department at the Rig.

Scrap Generation and Disposal

3.30 The internal auditor should review the following for this aspect:

- The timeliness in identification of material as scrap material. Verify that formal approval is obtained, before classifying any material as scrap material.

- That scrap material is stored in a separate warehouse location.

- That periodic review of scrap material is carried out.

- The status of scrap material as on date to ascertain to analyse the reasons for any abnormal trend in generation of scrap material.

- That the disposal of scrap material is approved by an appropriate authority.

- The process of disposal of scrap material in order to verify whether the scrap material is disposed off at optimum price and terms.

- The compliance with the terms of the Joint Operating Agreement with respect to the disposal of material.

- That necessary Customs Clearance is obtained before physical removal of scrap material from the port area.

- Completeness, accuracy and timeliness of the accounting entries passed for generation and disposal of scrap material.

Physical Verification of Inventory

3.31 For the aspect of physical verification of inventory, the internal auditor would:

- Verify whether independent physical verification of inventory is conducted as per the frequency specified in the Production Sharing Contract/ Joint Operating Agreement.

- Verify whether results of physical verification are formally documented and initialled by the custodian of the department and by the personnel responsible for the physical verification.

- Review and analyse the difference between physical and book quantities of material.

- Verify the completeness, accuracy and timeliness of adjustment entries passed for variances in the physical and book quantities of material.

Secondment of Personnel

3.32 In certain cases, deployment of personnel on secondment is done to utilize the employees' expertise as also in terms of the policy of the Company. The secondment is governed by a contract. Based on the time sheet submitted by the employees, the Company raises the invoices to the Joint Venture Partners.

3.33 The following should be verified by the internal auditor:

- Contracts for the terms and conditions for secondment of personnel.

- Invoices raised for the secondment of personnel are as per the terms and conditions of the contract.

- Invoices with respect to the following:

  - Time sheet of the seconded employee
  - Rate per hour per day
  - Amount billed
  - Authorisation as per the Schedule of Authority

- Receivables for receipts as per the invoices.

NON-OPERATOR

3.34 Non-Operator is a party having an interest in a lease who allows another participant to conduct the development and operation of the property in the mutual interest of all the participants.

Work Programme and Budgets

3.35 The Work Programme and Budgets prepared by the Operator, are reviewed by the Non-Operator. The following should be verified by the internal auditor for this purpose:

- Whether Work Programmes and Budgets are being submitted to the Operating Committee and the Management Committee as per the timelines stipulated in the PSC/ JOA.

- The basis of preparation of Work Programme and Budgets to check the accuracy, completeness and authenticity of such basis of preparation of Work Program and Budgets and ensuring that adequate review is carried internally before the budgets are approved by Non-Operators.

- Whether the Operator has effective mechanism for monitoring progress of Work Programme and Budgets.

- Whether periodic statements are received from the Operator for Budget *vs* Actual expenditures.

- Whether timely amendments are carried out to Budgets on changes in activity plan and approval of the Operating Committee and the Management Committee is sought.

- Whether any activity is undertaken by the Operator which is beyond the approved Work Programmes and Budgets.

- The approval of the Operating Committee and the Management Committee is obtained if actual expenses exceed budgeted expenses for each line item of budget at the end of the year.

Approval For Expenditure (AFE)

3.36 AFE is raised by the Operator and forwarded to the Non-Operator for approval. For this purpose, the following should be verified:

- Whether AFE is submitted to the Joint Operating Committee and approval is obtained by the Operator before entering into any commitment or incurring any expenditure with respect to any one item in excess of the

amount specified in JOA under an approved Exploration Programme/ Development Programme/ Production Programme and Budget.

- The completeness and correctness of the AFE to verify whether AFE is in line with the approved budgets.

- Whether AFE *vs.* actual details are received from the Joint Venture partner as required by JOA.

- Whether supplementary AFE is received from the Operator, when it is anticipated that AFE will be over expanded by more than such amount/ percentage as may be stipulated in the JOA and adequate justification is provided for cost overruns.

Cash Call and Joint Interest Billing

Cash Call from Operator

3.37 Cash call means any request for payment of cash made by the Operator to the parties (Non-Operator) in connection with the Joint Operations. The following should be verified by the internal auditor for this purpose:

- That the estimated amount of Cash Calls raised by the Operator is not excessive. The internal auditor should also review the available cash balance, estimated expenses for the relevant period and the shortfall/ excess from the previous period's cash calls.

- Daily bank balance of the Operator to verify that funds are not lying idle and cash calls are not excessive.

- That there is no commingling of joint funds with Operator-owned funds and a separate bank account is

being maintained by the Operator and all receipts and payments related to the joint operations are made through this account.

- That cash calls are received on timely basis by the Operator from other joint venture partners.

- That interest is levied for delay in payments by any venture partners as per JOA.

- That wherever funds received from Non-Operators are not required immediately, excess funds are deposited in the interest bearing short term deposits by the Operator.

- That if money received against cash call from a Non-Operator exceeded its share of cash expenditures and the Non-Operator requested for refund of excess cash, whether such refund was made by the Operator within the time stipulated in the JOA.

- That Special Advance is sought by the Operator only for an unforeseen activity which was not part of the original activity plan for that month and not covered by the monthly cash call.

- That adequate details for interest allocations are submitted to venture partners.

- That in case any joint venture partner was in default for payment of its participating share of joint expenses, a written notice of default was served on such partner within the time specified in the JOA.

- The accuracy and completeness of periodic Cash Reconciliation Statements prepared by the Operator.

- That any short/ excess as per the cash reconciliation is adjusted by the Operator in the next month cash call.

Interest on Funds Lying in Joint Bank Accounts

3.38 In this respect, the internal auditor should verify that any interest received from interest bearing joint bank account, containing funds received from the joint venture partners, is credited to the joint venture partners on an equitable basis, taking into consideration the date of funding by each partner to the joint accounts in proportion to the total funding into the joint account. The internal auditor should also verify that adequate details for interest allocations are submitted to the venture partners.

Joint Interest Billing (JIB) Statement

3.39 This refers to the billing statement received from the Operator in accordance with the Joint Operating Agreement specifying the charges and credits, i.e., cost and cost adjustments relating to the joint operations. The following should be verified for this purpose:

- Whether the JIB Statement is prepared by the Operator and forwarded to the joint venture partners within the time stipulated in the JOA.

- Whether JIB Statement contains sufficient information to understand the nature of expenditure and has reference to the Budgets and AFE.

- Whether expenditure and income as per the billing statement have been appropriately incorporated in the books of account.

- Whether the Billing Statements are reviewed by the Non-Operator for accuracy.

- The process of incorporation of JIB balances as per the books.

4

Internal Audit of Functional Areas

4.1 The internal auditor of an upstream oil and gas company, in addition to the various aspects of the Joint Operating Agreement, also needs to devote attention to certain functional areas of the industry, such as, geological and geophysical activities, engineering and construction activities, revenue, fixed assets, etc. The internal auditor's procedures in each of these areas are discussed in the following paragraphs.

GEOLOGICAL AND GEOPHYSICAL (G&G) ACTIVITIES

4.2 The following constitute the important G&G activities:

- Acquisition of data
- Processing of data
- Interpretation of data.

The internal auditor's procedures in respect of these areas are discussed in the following paragraphs.

Acquisition of Data

4.3 The internal auditor needs to:

- Ensure that existing work being done within the department is backed up by a physical plan. For this, the internal auditor should:
  - Obtain the approved copy of the annual plan and compare the same to the monthly activity report of the department.
  - Verify that there is an appropriate basis for such plans with respect to:
    - Details of initial geological survey which indicate areas where geophysical and geochemical surveys need to be done.
    - An overall plan of how these areas are going to be covered and the time it shall take to do the same.
    - An estimate of the number of people available within the department to carry out the work in each area.
    - Correlation of all the above mentioned data in the form of a plan and decide the level of outsourcing.
- Ensure that a system to update such plans is there in the event that the original plans made were not achieved. For this:
  - Check the year to date physical results achieved against the budgeted results.
  - If there are large variations, ascertain the reasons for the same.

- If the variations are not controllable, inquire as to the reasons for non-revision of physical targets.

- Check if there are any controls (like monthly reporting and review) within the department to confirm that:

  - The work performed during the year is within the definition of items contained in the yearly plan.

  - The work performed under each sub-component is done within the amounts specified in the annual plan.

- Verify that for AFE, approvals that have been taken and whether there is a monitoring of actual performance of work in line with the approval.

Processing and Interpretation of Data

4.4 In respect of the aspect of processing of data, the internal auditor's procedures would include the following:

- Ensuring that there is an appropriate basis for such plans and verifying the availability of the following:

  - Details of areas where Seismic/ Gravity/ Magnetic/ Vibrosis surveys are going to be done.

  - An overall plan of how much data is going to be generated from these areas and how much time it would take to process them.

  - An estimate of the number of people available within the department to carry out the work in each area.

4.5 In addition to the above, the internal auditor also needs to focus on the following aspects of G&G activities.

Conduct of Survey and Recording of Data

4.6 The following important activities should be verified by the internal auditor for this purpose:

- That proper procedure exists and is followed while deciding the type of survey (2D, 3D or 4D survey) to be done. For this, the internal auditor would:
  - Obtain the approved report prepared for deciding type of survey to be conducted.
  - Inquire into cost benefit analysis conducted for feasibility of survey (2D, 3D or 4D), if any.
  - Also, review cost benefit analysis done for the other surveys such as Geochemical survey, Reservoir Data Acquisition.
- That proper procedure have been followed for determination of number of channels required to be used, optimum depth determination and line kilometres to be covered, etc. and also review the basis, documentation done and back up papers in respect of these.
- Those Seismic units are optimally utilised. For this, the internal auditor would:
  - Obtain the report prepared in respect of planned utilisation of seismic units.
  - Review the variations reported and the reasons for utilisation of seismic units.

- In respect of cost of line coverage the internal auditor needs to:
  - Obtain the report for analysis of cost.
  - Ensure that analysis of cost is done with respect to quantity and quality of data collected by each field party.
- That all surveys done are properly recorded. For this, the internal auditor should:
  - Enquire the observatory reports which indicate the place of survey, time of survey and the number of data tapes, etc., prepared by the field parties and given to the data processing department.
  - Select some of these and ensure that data tapes for them are available with the department.
  - Check that all recorded data is subjected to quality check and adequately reported.
- That adequate physical security exists of the recorded data, for example,
  - Are there locks on the field lab and is there a need of a guard for the same?
  - Are there fire extinguishers in the field lab?
  - Is there a possibility of rain water coming into the lab?
  - Are the tapes at the lab numbered as soon as they are recorded?

Hardware/ Software

4.7 The internal auditor should:

- Check whether the Department has any records in respect of hardware/ software under its supervision for the purpose of allocating work to different machines for processing the data.

- Check whether the equipment under supervision is physically verified every year. For this:

  - Obtain the record of physical verification of the last year and review the same for variations, if any.

  - Ascertain if all hardware/ software under supervision of the Department is adequate to meet the needs of the Department and is in working conditions. For this:

    - Ascertain if there have been time lags in the processing of data is due to shortage of processing capacity.

    - Also ascertain if any outsourcing of data processing is being done by the Department and review the reasons for the same.

    - Ascertain whether the Department is short or in excess of hardware/ software in comparison to its needs. Also ascertain if the department has kept itself updated in respect of hardware/ software technology.

    - Ascertain the need for entering into annual maintenance contract. For this, review the maintenance expenditure for the hardware/ software and the reasons for the same.

- Ascertain if the hardware/ software have been properly maintained.

- Ascertain whether the breakdown of hardware/ software is very high and find out reasons why the Department has not entered into maintenance contracts with the OEM or other agency.

Receipt of Data and its Analysis

4.8 The internal auditor should verify whether:

- There are controls over the completeness of data received from the Data Acquisition Department. For this, the internal auditor may:

  - Obtain some data tapes sent by the field parties directly from them and review the receiving records at the processing lab to ensure that the same were also received.

  - Also review correspondence records between data processing lab and field parties to ascertain if there had been any instances where the lab had reported to field party for receipt of incomplete data.

  - Review whether the data received is properly recorded in the records of the processing centre.

- Adequate records are maintained while giving the data to users within the Department for further processing by reviewing the issue records for data tapes, for example,

  - The name of person to whom the tapes are being given.

  - The number of data tapes given.

- Date on which the tapes are given.

- The location and observatory report of the survey to which the tapes relate.

- A physical verification of tapes is done on a periodical basis.

- The storage conditions in the library are appropriate and evaluate the physical security of the tapes.

In addition, ascertain what is done with spoiled tapes and review the process of their disposal. It should also be verified whether there is adequate authorisation prior to discarding/ scrapping of any tapes within the library.

Evaluation of Data and Release of Well

4.9 For this, the internal auditor should:

- Ensure that constitution of evaluation teams is as per agreed norms, i.e., each team consists of people of requisite field and experience. For this:

  - Obtain the structure of interpretation team required for the data interpretation of the surveys.

  - Obtain a list of people in the interpretation department and their qualifications.

  - Compare the two to ensure that people of all streams as required to interpret different data are present in the Interpretation Department.

- Examine whether there is any monitoring of the time taken to interpret the data given to the interpretation

team and review the records maintained in this respect to ascertain major delays, if any.

- Examine the adequacy of records maintained to document discussions and conclusions of interpretation team. Such documents should indicate:
  - Constitution of the team.
  - Processing results that were analysed by them.
  - Reasons cited for release/ non-release of well for exploratory drilling.
- Ascertain whether any database/ information is maintained about unsuccessful wells and the same is used during subsequent decisions.

Performance of Drilling Services

4.10 The internal auditor's procedures would include:

- Ensuring that existing work being done within the Department is backed up by a plan.
- Ensuring that there is an appropriate basis for such plans, for example:
  - The level of work should be based on the staff strength of the Department.
  - The future projections of work in terms of physical targets for the Department should be made on the basis of historical data of previous years as well as plans received from the Exploration Group and the

Operations Group both of whom need the services of Drilling.

- Verifying whether the cost of operations including labour, material, and overheads has been calculated on the basis of the physical targets to be achieved, planned after studying the above mentioned documents.

- Ensuring that drilling services are performed in an organised way. For this, the internal auditor should verify whether:

  - Weekly plans are made by drilling services regional head and co-ordinated with location personnel.

  - Data is kept and analysed in respect of time taken to respond and attend to any request for services.

  - Targets of drilling and time within which the same needs to be done are well defined for each drilling location.

  - There is co-ordination with other services like exploration/ basin, cementing, well logging, etc., is done well in advance to ensure availability of their personnel where required.

- Ensuring that adequate numbers of people are present in each location to provide drilling services. For this, the internal auditor should review:

  - The annual plan of drilling services which would indicate the number and depth of wells to be drilled.

  - The number of people required for performance of such operations of drilling.

  - Based on all the above, evaluate the adequacy of the number of people at the location.

- Ensuring that the requisite machinery is available at the site.

- Ensuring availability of raw material while conducting operations. For this, he should verify:

  - That adequate raw material planning is done to ensure that stocks of raw material are available when needed and also are not excessive.

  - The stores ledger to ascertain if there had been any stock outs which had affected the work over operations.

  - Ascertain if minimum, maximum, re-order levels of consumables have been fixed to ensure that adequate raw material is available at all times.

  - If any, monthly reports of raw material are taken out to review the stock position of items that could be critical.

  - Also find out the extent of inter-location transfer of material or extent of emergency purchases which had to be done only because proper raw material planning was not done.

- Acquisition of data verifying whether the raw material used in operations is of good quality and as per the need of the operation being conducted.

- Verifying whether proper quality assurance testing of all raw materials is done when it is received at the drill site.

- Verifying whether any material bought and used was rejected during the drilling services, if yes, then whether the reasons therefor were properly investigated.

- Ensuring that monitoring and evaluation of the performance of outsourced rigs for drilling operations is done to ensure maximum value addition. For this:

  - Ensure that outsourcing is being done only where internal capability is not adequate.

  - Obtain a copy of the contract entered into with them.

  - Ascertain if the performance of the external contractor is being measured in line with the agreed benchmarks set for them.

  - Ensure that any inefficiency in operations are noted and adjusted in subsequent payments through keeping a proper record of the operations.

- Ensuring that regular dry docking of vessels is undertaken for proper upkeep of the ships.

- Ensuring that proper analysis of reporting of major deviations is done regarding:

  - Breakdown and Rig maintenance procedure.

  - Waiting time.

  - Utilisation of material.

  - Consumption of Tubular, High Speed Diesel, chemicals and Bits.

  - Loss of Rig days against planned and reasons therefor.

  - Analysis of drillograph and functioning of drillometer at drill sites.

- The functioning of other equipment and their idle time and list of standby equipment.

- Time and expenditure incurred on inter-location movement.

- Optimum utilisation of different types of rigs.

- Prompt response is provided to the indentors requesting for drilling services.

- Ensure that the targets of drilling and time within which the same needs to be done are well defined for each drilling location.

- Co-ordination with other services like exploration/ basin, cementing, well logging, etc., is done well in advance to ensure availability of their personnel whenever required.

■ Ensuring that the processes to be followed for the drilling activity have been adequately documented and distributed to relevant locations. For this, the internal auditor should verify whether a drilling manual explaining the procedures for drilling operations is in place and has been distributed to the location personnel.

■ Ensuring that there is minimum waiting time for the rig to avoid non-operating costs. For this, check:

- Whether a report showing the non-operating charges paid during the period and the reasons for the same is presented to the senior official.

- Whether prompt action is taken for minimizing the cost.

- Whether the latest technology is used for constant upgradation of the processes and minimising the non-operating charges.

- Ensuring that the time lag between the development of the well and the actual production is minimal. For this, the internal auditor should, compare the date of discovery of the well, with the date of actual production and check that the reasons of the same are evaluated by an appropriate official and prompt action is taken on the reasons of the delays.

Adherence to Mining Laws

4.11 The internal auditor would need to ensure that mining; OISD and DGH norms and laws are complied during the conduct of drilling activity. For this, he should verify:

- Permissions to drill are taken and a copy is kept at the drill site prior to commencement of any activity.

- A legal official reviews these permissions and gives the go ahead to drill.

- Drilling location in charge has a copy of the applicable laws and a checklist of the same that he needs to adhere to during the drilling operations.

Performance of Cementing Services

4.12 For this, the internal auditor's procedure would include:

- Ensuring that a prompt response is provided to the indentor requesting for cementing services. For this, the internal auditor would check:

  - That weekly plans are made by the Cementing Department.

  - That adequate people and machinery are kept available for services, which may come up without prior notice.

  - That data is kept and analyzed in respect of time taken to respond and attend to any request for services.

  - The availability of consumables/ stores while conducting operations and whether adequate consumables/ stores planning is done to ensure that stocks of cement is available when needed.

  - The stores ledger to ascertain if there had been any stock outs which had affected the cementing operations.

  - That consumables/ stores used in operations are of good quality and as per the need of the operation being conducted.

  - That proper quality assurance testing of cement is done when it is received at the site.

  - That mix of cementing and related additives is decided by the cementing officers based on the need of the operations. The internal auditor should review some such mixes based on cementing process reports.

- Ensuring that monitoring and evaluation of the performance of outsourced rigs for cementing operations is done to ensure maximum value addition. For this:

- Ascertain if any outsourced parties are being used for the cementing operations.

- Obtain a copy of the contract entered into with them.

- Ascertain if the performance of the external contractors is being measured in line with the agreed benchmarks set for them.

- Ensure that any inefficiency in operations is noted and adjusted in subsequent payments by keeping a proper record of the operations.

- Ensuring that the non-operating charges such as waiting time for cement to dry during surface casing are minimized. For this, check:

  - The report showing the non-operating charges paid during the period and the reasons for the same.

  - Whether prompt action is taken for minimizing the cost.

  - Whether latest technology is used for constant upgradation of the processes and minimizing the non operating charges.

- Ensuring that proper planning is done for the consumables/ stores to minimise waiting time.

Performance of Mud Services

4.13 Internal audit of mud services would involve:

- Ensuring that a prompt response is provided to the indentor requesting for mud services. For this, verify:

- That adequate people and instruments are kept available for services, which may come up without prior notice, i.e., in case of emergency or not planning properly.

- Data is kept and analysed in respect of time taken to respond and attend to any request for services.

- Verifying whether adequate number of people is present in each location to provide mud services. For this:

  - Ascertain the level of operation planned for mud services at each location.

  - Evaluate the number of people required for performance of such operations.

  - Based on all the above evaluate the adequacy of the number of people at the location.

- Ensuring that the requisite apparatus is available at the site. For this:

  - Interview the personnel at locations and ascertain if the apparatus at their disposal is adequate for performance of services expected by them.

  - Evaluate the level of existing operations at the site and evaluate whether the apparatus available are adequate for performance of such services.

  - Also ascertain if there has been a lot of inward and outward movement of mud units and if the same was on account of non availability of apparatus.

- Ensuring availability of consumables/ stores while conducting operations. For this, verify:

- Whether adequate consumables/ stores planning is done to ensure those stocks of mud and chemicals are available when needed.

- Stores ledger to ascertain if there had been any stock outs which had affected the mud services.

- That raw material used in operations is of good quality and as per the need of the operation being conducted.

- That proper quality assurance testing of mud is done when it is received at the site.

- Mix of mud and related additives are decided by the drilling officers based on the need of the operations. Review some such mixes based on mud process reports.

- The documented procedures are followed in preparing the mud and using it into the well. Review some of the mud operations to ascertain if documented procedures, if any, have been followed.

■ Ensuring that monitoring and evaluation of the performance of outsourced rigs, if any for mud services is done to ensure maximum value addition. For this:

- Ascertain if any outsourced parties are being used for mud operations.

- Obtain a copy of the contract entered into with them.

- Ascertain if the performance of the external contractors is being measured in line with the agreed benchmarks set for them.

■ Ensuring that any inefficiency in operations are noted and adjusted in subsequent payments through keeping a proper record of the operations.

Performance of Work Over Services

4.14 Internal auditor's procedures would include:

- Whether work over activities have been delegated to Rigs with similar pug marks and whether deployment of Rigs has been planned in accordance with pug mark so that production activities as well as work over activities in nearby geographical areas can be carried out by the same Rig to save on Rig move days.

- Verifying whether a prompt response is provided to the subsurface team and others requesting for work over services (including servicing of wells, pumping of wells, stimulation of wells, testing of wells, water shut off jobs, fishing, casing repairs, layer transfers, increasing oil pressure, etc.).

- Verifying whether adequate number of people are present in each location to provide work over services. For this:

  - Ascertain the level of operation planned for work over services at each location.

  - Evaluate the number of people required for performance of such operations.

  - Compare calculations with the actual numbers present there.

  - Also ascertain by interviewing locational personnels whether there had been any delays in the performance of services and the reasons for the same.

  - Based on all the above, evaluate the adequacy of the number of people at the location.

- Verifying whether the requisite machinery is available at the site. For this:

  - Interview the location personnel at locations and ascertain if the machinery at their disposal is adequate for performance of services expected by them.

  - Evaluate the level of existing operations at the site and evaluate whether the machines available are adequate for performance of such services.

  - Also review the extent of outsourced rigs for work over services due to inadequate machinery.

- Verifying the availability of raw material while conducting operations. For this:

  - Ensure that adequate raw material planning is done to ensure that stocks of raw material are available when needed.

  - Review stores ledger to ascertain if there had been any stock outs which had affected the work over operations.

  - Ascertain if minimum, maximum and re-order levels of consumables have been fixed to ensure that adequate raw material is available at all times.

  - Also review if any, a monthly report of raw material is taken out to review the stock position of items that could be critical.

  - Find out the extent of inter-location transfer of material or extent of emergency purchases which had to be done only because proper raw material planning was not done.

- Verifying whether consumables/ stores used in operations are of good quality and as per the need of the operation being conducted.

- Verifying whether proper quality assurance testing of all consumables/ stores is done when it is received at the site/ warehouse.

- Reviewing whether any material was bought and used but was rejected during the work over services and whether reasons thereof properly investigated.

- Verifying whether monitoring and evaluation of the performance of outsourced rigs for work over operations is done to ensure maximum value addition. For this:

  - Ascertain if any, outsourced parties are being used for work over operations.

  - Obtain a copy of the contract entered into with them.

  - Ascertain if the performance of the external contractor is being measured in line with the agreed benchmarks set for them.

  - Ensure that any inefficiency in operations are noted and adjusted in subsequent payments through keeping a proper record of the operations.

- Verifying whether the non operating charges are minimised. For this:

  - Check the report showing the non-operating charges paid during the period and whether the reason for the same is presented to the competent authority.

  - Check whether prompt action is taken for minimising the cost.

- Check whether the latest technologies are used for constant upgradation of the processes and minimising the non-operating charges.

- Verifying whether proper planning is done for the consumables/ stores to minimise waiting time.

- Examining whether Rigs are being used for work over activities on account of poor operating conditions (other than due to monsoons) as well as the reasons for using jack up Rigs having a very high per day operating rate for work over activities.

ENGINEERING & CONSTRUCTION ACTIVITIES

Budget, Planning and Cost Control

4.15 The internal auditor's procedures in this regard would include:

- Verifying whether there is adequate budget provision for all works under execution during the year and whether the same is being monitored by the person in-charge for the project. For this:

  - Obtain the approved budget costs along with amendments thereafter.

  - Obtain the actual cost of construction so far.

  - Obtain the latest certificates of the architects and ascertain the percentage of work completed.

  - Compare budget and actual cost for the percentage of construction completed.

- Check if the Department does similar exercise to keep a control over cost.

- Obtain and review list for estimated cost/ approved cost/ project details name of contractor/ date of completion/ actual cost if the project is completed. Review the list on sample basis.

- Verify whether a feasibility report was prepared, rate of return calculated and the optimum size of the plant was selected.

- Verifying whether the work conducted is as per the annual work plan. For this:

  - Obtain the approved copy of the annual plan and compare the same with the monthly activity report of the department.

  - Verify whether specifications, quantum of work and other details indicated in tenders, etc., are in line with the approvals obtained.

Feasibility Analysis and Approvals

4.16 For this, the internal auditor should ensure that the Preliminary Feasibility Report (PFR) is prepared based on and after:

- All factors related to the projects like number of platforms, type of platforms, life of platform *vis-à-vis* estimated oil that is expected to be extracted, top side facilities envisaged, details of pipelines, proximity to the nearest facilities, etc., have been considered,

- Ensuring that relevant approval is obtained for the projects on the Preliminary Feasibility Report and the Detailed Feasibility Reports.

- Ensuring that if the project is considered commercially viable in the PFR then only it is pursued further.

- Carrying out an analysis of the feasibility studies conducted and projects executed out of such studies.

4.17 The internal auditor should also ascertain the reasons for non execution of other feasibility reports and the costs involved at the feasibility stage and justification of the same.

4.18 In case external agencies have been used in preparing such reports, the internal auditor should also verify whether the same has been done since the competence was not available with the Company or any other reasons thereof.

Financial Analysis and Cost Estimation

4.19 The internal auditor should verify whether detailed cost estimates have been prepared for all projects, which have been used during the bidding and tendering process and also check the validity of some of such estimates. For this:

- Ensure that the estimates prepared were detailed enough to facilitate the bidders in their bidding process. Also review the details provided by the user department including their specifications to ensure they were comprehensive enough to enable the E&C division in preparing the cost estimates.

REVENUE

Sales

4.20 The internal auditor should review and verify the following for this purpose:

- The accounting policies of the Company for accounting of sales especially take or pay, underlifts/ overlifts, contractual liabilities, etc., to ensure compliance with the Accounting Standards.

- Whether the information fed into the billing system is in accordance with the sales contracts.

- Whether the invoices are raised on customers on a timely basis and are approved by an appropriate authority.

- Whether the sales invoices are in accordance with the Gas Sales Contract/ Crude Offtake Agreement, e.g., pricing, discounts, contract quantity, etc.

- Whether the invoices sent to the customer are accompanied with appropriate documents as required by the sales contracts, e.g., daily quantity delivered report, quality testing report, etc.

- Complaints received from the customers related to invoicing and the reasons for the same.

- Whether the consideration is received on a timely basis from the customers and adequate follow up is done for delay in payments.

- Whether interest is levied on the customers as per the sales contracts for delay in payments.

- Whether a quantitative reconciliation is undertaken to identify if there are excessive process/ transportation losses.

Royalty

4.21 In respect of royalty, the internal auditor should review and verify the following:

- Whether royalty has been paid at the wellhead value, as specified in the Production Sharing Contract.

- Whether wellhead value has been calculated as per the methodology agreed with the Directorate General of Hydrocarbons.

- Verify the accuracy of the calculations of the wellhead value.

- Whether royalty has been calculated as per the rates specified in the Production Sharing Contract/ Petroleum and Natural Gas Rules.

- Whether any royalty is paid on the gas used for petroleum operations, e.g., reinjection, gas lift, etc.

- Whether royalty calculations are appropriately reviewed before payment.

- Whether royalty is paid as per the due dates of payment.

Profit Petroleum

4.22 The internal auditor should verify the following for this purpose:

- Whether investment multiple has been calculated in the manner as provided in the Production Sharing Contract.

- Whether all costs incurred have been treated as cost recoverable except for costs specifically not allowed as recoverable by Production Sharing Contract. For this, the internal auditor should review the nature of costs considered as unrecoverable.

- Whether sharing of profit petroleum is based on the investment multiple of the preceding year.

- Whether the Government share in the profit petroleum has been determined as per the percentages linked to investment multiple as specified in the Production Sharing Contract.

- Whether investment multiple and profit petroleum calculations are authorised by the appropriate authority.

- Whether the Government's share of profit petroleum is calculated on provisional basis during the year and is deposited on a timely basis.

- Whether the final calculations of profit petroleum are submitted to the Directorate General of Hydrocarbons at the end of the year and short/ excess payments have been adjusted.

Reserve Estimation

4.23 The internal auditor's procedures in this regard would include:

- Ensuring whether appropriate method for estimating reserves is used by the Reserves Estimation Department.

- Identifying the right method based upon category of reserves by:

  - Obtaining reserves estimation chart along with back up paper used for its preparation.

  - Ensuring that workings are approved and check its calculation on a test check basis.

  - Ensuring that chart is approved by the appropriate authority.

- Ensuring whether method for estimation of reserves has been followed consistently over the period for estimation of reserves.

- Ensuring whether the definition of reserves for the purposes of classification of proven and probable reserves has been followed consistently.

- Ensuring whether proper technical and commercial viability is taken for estimating the reserves.

- Ensuring whether the reserves are revised based on latest available geologic and reservoir engineering data.

- Ensuring whether the data is properly stored and kept confidential/ in safe custody.

Reservoir Management

4.24 For internal audit of reservoir management, the internal auditor would need to:

- Review the documentation, if any, made for optimal management of each reservoir. (Optimisation involves performance monitoring of individual well flow rates and total reservoir production rates). For this, he would:
  - Obtain the reservoir management plan.
  - Ensure that reservoir management plan is prepared after considering all relevant parameters.
  - Ensure that reservoir management plan is approved.
  - Ensure that data for approval of plan is authenticated.
- Review the well flow rates as per the plan *vis-à-vis* actual.
- Obtain the listing of well flow rates planned for each well from latest available plan.
- Obtain the actual well flow rates for each well from the Production Department.
- Inquire about the reasons for difference between planned and actual flow rates.
- Obtain the well maintenance report and inquire about reasons for choking, if any, of a well.
- Ensure that reservoir management plan is revised based on latest available information.

- Review the number of wells planned for ultimate recovery and the actual wells drilled.

- Obtain the number of wells planned for drilling from the field development plan.

- Review the actual activities with planned activities.

- Review the documentation and correspondence made to report on variations between planned development and actual development.

- Ensure that actual flow rates from reservoir do not exceed maximum efficiency rates. (Reservoirs in which the ultimate recovery is related to production, there is maximum efficiency rate above which there will be significant reduction in the ultimate recovery). For this, the internal auditor would:

  - Obtain the Maximum Efficiency Rates (MER) for each reservoir.

  - Ensure that data used to calculate MER is approved.

  - Inquire about the method used for computing MER and ensure that it is standardised method.

  - Check the calculation of the MER on a test check basis.

  - Ascertain, if any, producing wells were collapsed or shut in and review the reasons for the same.

Investment Multiple

4.25 The share of the Government and the Contractor respectively of Profit Petroleum from the Contract Area in any year is determined by the Investment Multiple as per the provisions of the PSC. The internal auditor's procedure with regard to the investment multiple would involve:

- Calculation of Net Cash Income which is the sum of:
  - Cost Petroleum entitlement
  - Profit petroleum entitlement
  - Incidental income *less* production costs and royalty payments.
- Calculation of investment made by the contractor as per the provisions of the PSC.
- Verification of the costs or expenditure not allowable as per the PSC.
- Actual calculation of Investment Multiple as per the above data.
- Review and authorisation by appropriate authority.

FIXED ASSET

Capitalisation and Depletion

4.26 The following should be verified by the internal auditor for this purpose:

- The accounting policy of the company for capitalization and depletion to ensure compliance with the Accounting Standards and "Guidance Note on Accounting for Oil and Gas Producing Activities", issued by the Institute of Chartered Accountants of India.

- Whether all acquisition, exploration and development costs have been accounted for as per "Guidance Note on Accounting for Oil and Gas Producing Activities".

- Whether borrowing costs have been capitalized in accordance with the requirements of the Accounting Standards.

- When a well is ready to commence commercial production, whether all costs corresponding to the proved reserves have been transferred from Capital Work in Progress to Producing Properties Account.

- Whether well work over costs have been appropriately accounted for as capital or operating costs.

- Where a drilling of a well is complete and determination of proved reserves has not been made, whether the costs pertaining to the well have been carried forward without justification.

- Whether carried costs pertaining to unproved properties have been transferred to amortization base or charged off as and when the property is determined to be dry.

- Whether information available after the Balance Sheet date but before approval of the financial statements by the Board of Directors has been considered for determining accounting treatment of ongoing projects/ wells, etc.

- Whether timely and appropriate inputs have been received from the Technical Department for capitalisation purposes.

- Whether appropriate review has been carried before capitalisation of costs.

- Whether provision for abandonment has been created wherever required as per Production Sharing Contract or the relevant legislation.

- Whether abandonment costs have been capitalised along with the facility costs and are being depleted.

- Whether provision for abandonment is revised when the estimates for costs etc., change.

- Whether assets have been capitalised on the date they are ready to be put to use.

- For this, the internal auditor should also examine, on a test basis, some Asset Completion Certificates *vis-à-vis* date of creation of fixed assets.

- Whether insurance spares have been categorised properly for tax benefits.

- Where any spare can be used only in conjunction with a particular fixed asset, whether the same has been aligned with the main asset and whether at the time of disposal, the same has been depicted separately.

- Whether the Capital Work in Progress includes any item that has been lying for a very long time and has not been categorized with the main asset/ project and the reasons for the same.

- Whether any items of revenue nature have been booked under Capital Work in Progress and *vice versa.*

- Whether depletion has been calculated as per the provisions of the "Guidance Note on Accounting for Oil and Gas Producing Activities".

- Whether timely and appropriate inputs for depletion such as reserves, future costs, etc. have been received from the Technical Department.

- Whether depreciation on support equipment and facilities is as per the written down value method and rates specified in Schedule XIV of the Companies Act, 1956.

Physical Verification of Assets

4.27 The following should be verified for the physical verification of assets:

- Whether physical verification of fixed assets has been carried out as per company policy/ PSC.

- Whether appropriate plan was drawn and instructions were issued for carrying out physical verification.

- Whether physical verification was carried out by teams which are independent of custodian of the fixed assets and person responsible for maintaining the fixed assets register.

- Whether for assets which are lying underground, e.g., pipelines, which cannot be physically verified, the relevant reports have been generated to check the existence of asset and use of the asset.

- Whether value of fixed assets in transit have been appropriality accounted for.

- Whether discrepancy reports for differences between book records and physical assets have been generated.

- Whether for shortages, appropriate explanations have been obtained from the user departments/ custodians.

- Whether appropriate approvals have been obtained for adjusting the discrepancies in the books of account. The internal auditor would also need to verify the JOA/ PSC provisions in this regard.

- Whether necessary and appropriate adjustments have been carried out for shortages, etc.

Fixed Assets and their Usage Charges

4.28 The internal auditor should verify the following in this regard:

- Whether separate memorandum records/ registers are being maintained for all such fixed assets for which the partners of the JV contribute through the JIB and whether these records are verified regularly.

- If assets are purchased for usage at more than one blocks, the internal auditor should verify the following in respect of usage charges:

    - For calculating the usage charges, life of the assets, except in case of electricals/ software, has been taken as the period equal to the contract period as per the PSC/ JOA.

- Life of such assets and the allocation of their usage charges to various blocks has been approved by all the parties to the JV and is consistent.

- Separate records are being maintained by the Operator for recording these assets and allocation to the various blocks.

- In case of assets originally belonging to the parent company but being used for JV as well, whether appropriate allocation is being made to the JV for the depreciation on those assets.

- Suitable residual value of the assets is also being considered for calculating the usage charges.

- Proper accounting is being done in respect of assets being transferred from/ to other blocks.

- The system for disposal/ condemnation of such assets.

PSC REPORTS

4.29 The internal auditor would need to check whether the PSC Reports are submitted as per the provisions and timelines of the PSC. The following statements are usually submitted either on a monthly or a quarterly basis:

- Production Statement

- Value of Production and Pricing Statement

- Statement of Costs, Expenditures and Receipts

- Cost Recovery Statements

- Profit Sharing Statement
- End of Year Statement
- Budget Statement.

The following should also be verified by the internal auditor:

- The base figures supporting the statements
- Adherence to the timelines
- Review and authorisation of the statements
- Any clarifications sought by DGH on the statements.

ON SHORE SPECIFIC

Sub Surface Area

Planning of Well Production

4.30 With respect to planning of well production, the internal auditor would need to:

- Ensure that advance planning for the whole year is done in respect of the production of each well of the region. For this, the internal auditor would verify the annual well production plans and check whether a plan has been charted out for each well in the region. This plan should be made on the basis of the total expected reservoir of the field after adjusting the amount of oil extracted in earlier years and the number of years, the well is to continue. Such annual plans should then have been converted into

weekly plans for all wells which should have been given to the Group Gathering Stations (GGS) of the project.

- Ensure that regular updation and review of the actual production against the planned production is done for each well.

- Review the analysis carried out for production details comparison *vis-à-vis* water injection, gas injection, or polymer flooding and review the documentation done to support that injection is consistent.

Monitoring of Production Levels

4.31 For monitoring of production levels, the internal auditor should ensure that regular analysis on a Central Tank Farm (CTF), GGS and well-wise basis is done for the level of oil production. It is important because without oil production monitoring, problems in the well or the pipeline will not be detected and would lead to loss of revenue. For this, the internal auditor should:

- Ascertain the data that is collected and sent to other departments.

- Evaluate whether the data collected is adequate for understanding the performance of wells or not.

- Ensure that adequate investigation is done where the production is found to be lacking against expectations.

- Ensure that required pressure and quantity of water has been injected.

- Validate the above mentioned steps after reviewing the production level reports received at various times.

Scheduled Maintenance and Work Over Operations

4.32 For this aspect, the internal auditor's procedures would include:

- Ensuring whether scheduled maintenance and work over operations for various wells have been planned in advance. For this, the internal auditor would also need to:

  - Review the production plan and interview the subsurface personnel.

  - Ascertain if the subsurface team had reviewed the extent of work over operations required to be done on each well.

  - Ascertain and evaluate the duration and timing of other maintenance operations over the wells to improve their performance which should have been planned in the beginning of the year or during the year based on the results of the data collected.

  - Ensuring whether the subsurface department regulates and plans proper water injection into the oil wells in the field. For this, the internal auditor would need to...

  - Meet with subsurface manager to enquire about the water injection plan and schemes that have been formulated for the field.

  - Ascertain the critical factors that have been considered in the preparation of the plan and the data that has been collected for the same.

- Review the plan and evaluate whether any improvement in the same is possible.

- Review the daily report received from the Main Pump House to see whether the pumping of oil is being done as per the agreed plans made at the beginning.

- Ensure that a track of total amount of water pumped into each well is being tracked and the pump house is aware of the same so that over pumping of water does not take place.

- Review the number of water injection wells drilled and actual number of wells injected.

Surface Areas

4.33 Internal audit of the Surface Areas would involve consideration of the following areas:

Collection of Oil

4.34 The internal auditor's procedures include:

- Ensuring whether appropriate records are maintained in respect of the collection of oil and gas from the wells and reviewing the daily production records of the wells to see that the same are being properly prepared

- Ensuring whether regular visits of the oil well are conducted and all oil well installations are inspected. For this, his additional procedures would include:

  - Verifying whether a plan has been formulated for coverage of all oil wells under their station to inspect

them, inspect the flow lines and ensure the smooth running of the installed equipment at the wells.

- Verifying whether the person visiting each well comes back and files a brief report of the inspection in a pre-formatted document.

- Reviewing some such reports to ascertain if any discrepancies are noted and what actions are normally taken against them.

- Examining the reviews and signs off on all such inspection reports promptly on their filing.

- Obtaining and reviewing the reports generated for capacity utilisation for GGS/ EPS.

- Inquiring into reasons for under utilisation of GGS/ EPS with reference number of wells connected and the liquid production handled by such GGS/ EPS.

■ Ensuring that production targets are communicated and monitored by the Group Gathering Stations (GGS). For this, the internal auditor would verify whether:

- A monthly, weekly and daily production plan is sent for each of the GGS for the wells.

- Ensuring that the data collected through DPR is compared against these plans and significant variations when they arise are properly investigated.

- Reviewing current status of the production against the budgeted amount and ascertain causes, if any, for the variations therein.

Testing and Maintenance of Flow Lines

4.35 Internal audit of testing and maintenance of flow lines involves ensuring that all flow lines are regularly tested and inspected for any blockage, etc. For this, the internal auditor would need to:

- Review inspection reports of flow lines to see if inspections are carried out and ensure that all lines are covered and tested.

- Ensure that records of the pressure in all flow lines are properly tested.

- Review safety audit reports of the installation and check if the recommendations made have been implemented.

Water Injection Scheme

4.36 For audit of the Water Injection Scheme, the internal auditor needs to ensure that a proper plan for the amount of water to be pumped into the water injection wells is received from the sub surface team by the pump house. For this, his procedures would include:

- Obtaining the latest pumping plan and daily pumping reports and ensuring that the water pumping is being done in line with the plan.

- Any shortfalls pumping are promptly reported to the subsurface team for their consideration and advice.

- Reviewing whether a constant flow of fresh and treated water is maintained to facilitate its pumping into the wells. For this:

- Reviewing the existing system of collecting fresh water from the river and ensure that the water station collects and sends the water to the pump house.

- Reviewing the quantity of water and pressure at the despatch end and actual quantity and pressure injected at wells to ascertain utilisation of capacity of water pumps and pilferage, if any.

- Reviewing whether collection pump house at the riverfront is aware of the amount of water to be collected. Ascertain if, a daily water collection plan is given to the collection pump house based on the pumping of water to be done at the Main Pump House.

- Reviewing whether water to be pumped into the wells is properly treated prior to the actual pumping.

Central Tank Farm (CTF) - Purification of Oil

4.37 Internal audit of this aspect includes ensuring that a proper check of the quality of oil collected is done once it collects at the tanks and that similar kind of oil is collected in one tank to facilitate demulsification. For this, the internal auditor should verify:

- That regular checking of the quality of the oil collected from the GGS is done to ascertain its chemical properties and facilitate the decision of the type of the demulsifier to use.

- That once the quality and chemical properties are checked. The pipelines should have been so arranged so that the same kind of oil is collected in the same tank.

- That gas and oil collected at the CTF are properly purified for other contents.

- That demulsifying agents being used in the process are of the right quality and have been quality checked prior to usage. Review material receipt reports of the emulsifiers to ensure the cleansing of oil.

- That demulsification process of a few days to ensure that the right demulsifiers were used and were effective.

- That for gas, separation is done effectively with no condensate and other foreign material.

- That output of gas from the CTF is in line with the input requirements at the Gas Plant and that quality checking is being done to ensure the same.

- That all oil once treated is collected together in a separate tank prior to being pumped to client.

4.38 In addition, the internal auditor should also obtain and review the study carried out for methodology of disposal of oil sludge from the CTF and revenue generated from them on annual basis, i.e., comparison done on yearly basis with reference to quantity handled.

Pumping to Customers

4.39 The internal auditor's procedures in this regard include ensuring that oil once ready is pumped to the customers as per the agreed time schedules. For this, the internal auditor would need to verify that:

- The pumping of oil schedule is received from the Customers.

- The CTF adheres to the time schedules and sends the oil during the period agreed upon. Review the pumping report for few days to validate the same.

- Oil intake certificate is promptly obtained at the time of receipt by the representative at the refinery where oil being pumped. For this...

  - Check the date of preparation to ensure that the same was made on the day of pumping of oil.

  - Check whether proper production reconciliation is done on a periodical basis. For this, check whether...

    - Flow meters at CTF are properly calibrated and the calibration is periodically checked.

    - Pumping records of the extent of oil pumped to the customer are properly kept and maintained.

    - A weekly reconciliation of oil pumped and received by the customer is done to ensure that all oil sent is received at the other end.

    - Such reconciliations to check their accuracy and compare them with the pumping records.

Logistics

Procurement of Logistic Services

4.40 Internal audit of procurement of logistic services would include:

- Ensuring whether services in respect of transportation of materials and people are outsourced only where in-house transportation is either not capable to perform the

services themselves or where it is uneconomical to do so. For this, the internal auditor would:

- Select some of the outsourced contracts for each type of vehicles like light vehicles, emergency vehicles, buses, cranes, and water tankers, specialised vehicles hired by regional office and by the projects for transportation.

- Check compliance of corporate policy in respect of hired vehicles with respect to year/ model and types of vehicles.

- Ascertain and review the reason for outsourcing the same externally to third party contractors.

- Verify whether formal contracts/ agreements are drawn up for all significant transport arrangements and are signed on behalf of the organisation by an appropriate official.

- Ensuring whether payment and utilisation of vehicle is as per the terms of contract.

- Obtaining and reviewing the reports generated for analysing frequency of utilisation of vehicles beyond certain hours.

- Reviewing fixed charges, mileage charges, OT detention charges, frequency of utilisation of vehicles beyond certain hours.

Helicopter Services

4.41 The following procedures should be adopted by the internal auditor for review of helicopter services:

- Reviewing whether a feasibility study has been done to ensure that it is more profitable to have and operate own helicopter than outsource such services.

- Obtaining and reviewing the management reports regarding the utilisation of owned helicopters, procurement of spares and expenditure on repairs and maintenance.

- Reviewing whether operations of the helicopters are handled by qualified people. For this, verify whether:

  - Proper tendering procedures have been followed and technical capability properly measured in the selection of contractor for management and operation of the helicopters.

  - Contractor complies with all statutory aviation laws and that same is his responsibility as per the contract.

  - That there are no unwanted flights and all movement of the helicopter are duly authorised.

  - That there is a suitable coordination for accommodating and clubbing people for the flights.

- Checking that appropriate billing is done on the outside agencies (such as the contractors) using the Helicopter services.

Quality Assurance

4.42 In respect of Quality Assurance aspect, the internal auditor would ensure that all logistics related tasks are measured for time taken to perform, i.e., quality of the

services *vis-à-vis* time taken to perform them. For this, his procedures would include:

- Ensuring that appropriate systems are in place to keep track of the time taken to perform various tasks in the logistics department.

- Ensuring that this time is compared against benchmarked time in respect of such tasks and steps taken to improve if there is time lag.

- Ensuring that user departments' comments are taken and analysed to see that services are as per their expectations.

- Ensuring that the same procedures are performed for outsourced services and that their contract includes clauses for ensuring completion of work in time.

OFF SHORE SPECIFIC

Horizontal drilling

4.43 The internal auditor's procedures include:

- Reviewing the cost benefit analysis for drilling horizontal well *vis-à-vis* vertical or directional well.

- Identifying the reasons other than technical (such as area not available, etc) for doing horizontal drilling.

- Ensuring that the team performing horizontal drilling has adequate experience in doing such drilling activities.

- Ensuring that producing zone is tapped as anticipated and planned.

Drain Hole Drilling

4.44 Drain hole drilling is one of specialised drilling just like horizontal drilling in which specialized equipment are used. For this purpose, the internal auditor would need to review the following:

- The cost benefit analysis for drain hole drilling.
- The team performing drain hole drilling has adequate experience in doing such drilling activities.
- Drilling is done as planned by the Drilling Department.
- Latest technology is available in respect of drain hole drilling.

Operations Offshore

Budgeting, Planning and Cost Control

4.45 The internal auditor's procedures include:

- Ensuring that existing work being done within the Department is backed up by an annual plan.
- Ensuring that there is an appropriate basis for such plans. For e.g.,
    - Details of number of wells in the region/ attached with each platform.
    - An overall plan of how much oil is likely to be extracted from these wells.

- An estimate of the number of people available within the Department to carry out the work in each area.

- Correlation of all the above mentioned data in the form of a plan.

- Ensuring that a system to update such plans is there in the event that the original plans made were not achieved. For this:

  - Check the year to date physical results achieved against the budgeted results.

  - If there are large variations ascertain the reasons for the same.

  - If the variations are not controllable, inquire as to the reasons for non revision of physical targets.

- Ensuring that an analysis for material consumption is being carried out at the platform. For this:

  - Ascertain which are the top ten raw materials consumed at the platform.

  - Review whether an analysis of the amount of raw material *vis-à-vis* production is being carried out.

  - Also ensure that this analysis is based on consumption standards benchmarked within the company.

  - Review actions taken where there are variances.

  - Also check if there are any controls (like, monthly reporting and review) within the Department to confirm that:

- The work performed during the year is within the definition of items contained in the yearly plan.

- The work performed under each sub-component is done within the amounts specified in the annual plan.

- Verifying that detailed cost estimates have been prepared for all jobs in the feasibility reports. Also check the validity of some of such estimates. For this...

  - Review details provided in the reports.

  - Ensure that all costs have been considered for feasibility based on the past experience.

  - All relevant technical factors have been considered.

Coordination with Logistics - both sea and air

4.46 The internal auditor's procedures involve:

- Ensuring that both air and sea transports are available to the platforms to meet both day to day needs and emergency needs.

- Ensuring that the vessels are being used for transport of material and stand by/ emergency duties.

- Ensuring that for supply vessels:

  - An intimation is sent by the respective Department for transportation of material.

  - A manifest is raised by logistics in two copies (one copy for master of the vessel and one for filing).

- A receipt for delivery of material is taken from the respective Rig/ Platform.

- Ensuring that the helicopters are being used for, e.g.,

  - Crew change

  - Production task

  - Medical evacuation.

- Ensuring that an employee-wise analysis of delays in reporting duties is being carried out.

- Ensuring that for helicopters:

  - Intimation is sent by the respective Department for crew change.

  - An employee-wise analysis of delays in reporting duties is being carried out.

Management of Personnel at Installations

4.47 The internal auditor's procedures would include:

- Ensuring that adequate number and of appropriately qualified personnel are available at the installations, for example,

  - Electrical engineer

  - Mechanical engineer

  - Instrumentation engineer

- Safety personnel
- Process and well head personnel
- Chemical engineer
- Medical staff
- Catering, cleaning and contract staff.

- Ensuring that adequate numbers of people are present in each location to provide services. For this:
  - Review the annual plan of operations of the Installation which would indicate the quantity of oil to be extracted.
  - Evaluate the number of people required for performance of such operations.
  - Based on all the above, evaluate the adequacy of the number of people at the location.

ENVIRONMENT, HEALTH AND SAFETY

4.48 In respect of environment, health and safety, the internal auditor's procedures should include:

- Ensuring that an appropriate plan exists for Safety and Environment Management. Such plan should include:
  - Number of safety and environment audits/ inspections to be conducted.
  - Locations where such audits are going to be conducted.

- Guidelines for frequency of audit.

- Ensure that a system of following up on the plan is in existence. In case the target is not achieved, ascertain the reasons for the same. For this:

  - Request for a copy of the annual audit programme.

  - Obtain monthly activity reports of the division.

  - Compare the above mentioned two documents.

- Verifying whether the inspection/ audit reports have been completed as per the schedule and submitted in time to the respective project managers.

- Verifying from the audit reports of a few rigs/ platforms, the random checks for implementation of outstanding audit points.

- Ensuring that there is a system of checking the implementation status of the various reports.

- Making an analysis of the number of fatal and non-fatal accidents as compared to the previous year and also ascertaining the reasons for these accidents and why they could not be averted. For this, the internal auditor should:

  - Ask the safety officer of the project to provide details of all accidents that took place at the project in the last one year.

  - Also inquire about the reasons for such accidents and why safety was compromised.

  - Verify whether all accidents are reported on the correct formats as per OISD/ DGMS.

Compliance with Statutory Guidelines

4.49 For this, the internal auditor needs to:

- Ensure that all the statutory guidelines of OISD and DGMS have been strictly adhered to. For this:
  - Obtain safety checklists from the safety officer at the project level.
  - Ensure all guidelines are covered by the checklist.
  - Ensure the safety officer is in receipt of any amendments issued by OISD and DGMS.

Others

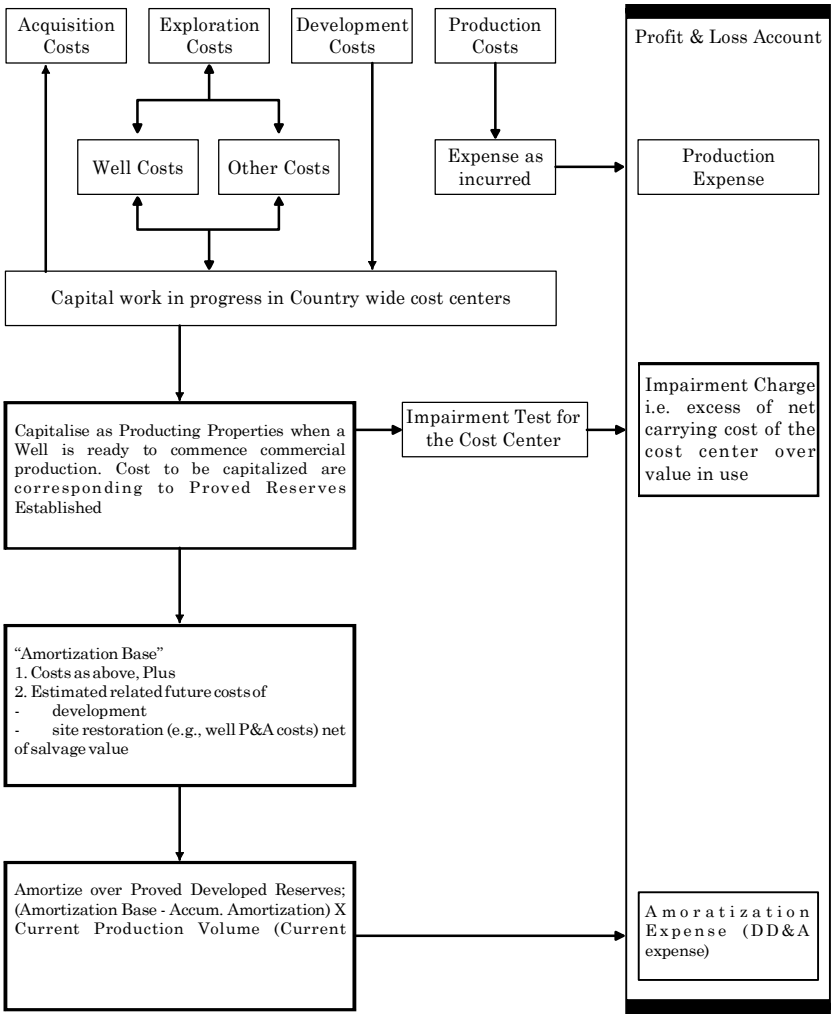
4.50 The internal auditor should:

- Verify whether environmental policies and procedures have been established and formally documented by the organization. For this...
  - Review the safety manual and the environmental policy related sub section.
  - Find out how the Department is kept aware of the latest amendments in the environmental issues. They may need to subscribe to a mail service or they may need to establish contact with the concerned authority in the environment ministry of the Government.
- Ensure that changes in environmental requirements are reported to the projects on a timely basis.

- Ascertain if environmental awareness training is provided to all appropriate personnel. For this:
  - Obtain the regional plan for safety awareness of the employees in the region.
  - Obtain year to date progress of the safety training programs.
  - Ascertain why there is a difference in the above two.
  - Find out the level of attendance at these programs to ensure that adequate importance is felt about it.
- Ascertain if the organization liaise with environmental groups, local authorities, etc., on a regular basis.

Annexure I

Full Cost Method



Annexure II

Successful Efforts Method