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of Pakistan

CA
PAKISTAN

Exploration and Production (E&P) Industry in Pakistan

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AN OVERVIEW OF E&P INDUSTRY



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EXPLORATION AND PRODUCTION (E&P) INDUSTRY IN PAKISTAN

Introduction

Oil and gas industry is categorized into three major segments namely Upstream, Mid-Stream and Downstream. Upstream sector, also known as Exploration and Production (E&P) sector, is associated with exploring and producing hydrocarbons (crude oil and natural gas). Mid-Stream industry involves processing crude oil and natural gas into end user form, therefore, the activities of oil refineries, fertilizer plants and natural gas purification plants are included in mid-stream sector. A large part of midstream activities also includes transportation and storage of crude oil and natural gas. Oil refineries refine crude oil into various types of petroleum products such as motor spirit, diesel, kerosene oil, jet fuel, etc.; fertilizer plants convert natural gas into fertilizer and petrochemical plants convert oil and gas into various petrochemical products. Downstream sector includes marketing and distribution of refined oil and gas to industrial, commercial and residential end users such as power plants, petrol pumps, various industries and household.

Background

E&P activities in Pakistan commenced in 1866 when the first well was drilled at oil seepage Kundal in the Mianwali District of Punjab Province. The first discovery of oil was made in Khattan (Balochistan) with thirteen wells producing only 25,000 barrels during 1885 to 1892. However, the first commercial success came with the drilling of Khaur-1 well by Attock Oil Company in 1915. Oil discoveries continued with the drilling of around 400 shallow wells in the field during 1915 to 1954. This commercial success opened the era of E&P activities in Potwar Basin which led to the discovery of

three oil fields. Pakistan's first and the biggest natural gas discovery Sui gas field was discovered in 1952 and commercial exploitation began in 1955, which changed the whole picture for Pakistan's energy supply. Pakistan's first oilfield was discovered in 1964 and its commercial production began in 1967. Later in the nineties, local companies (Oil & Gas Development Company Limited (OGDCL) & Pakistan Petroleum Limited (PPL)) and several international companies (Union Texas, OMV, BHP, ENI, Premier, Petronas, Tullow Oil, etc.) discovered oil and gas fields in lower Sindh. Thereafter, OGDCL and MOL (international company) have made commercial discoveries of both oil and gas in KPK province.

It is pertinent to note that all the above mentioned successes have been made in on-shore areas and so far there has been no commercial success in off-shore areas of Pakistan i.e. Karachi, Badin and Gwadar belt. Balochistan is virtually un-explored and the country needs an urgent focus to improve the security and other relevant conditions in Balochistan for increase in E&P activities there.

Major Players in Pakistan

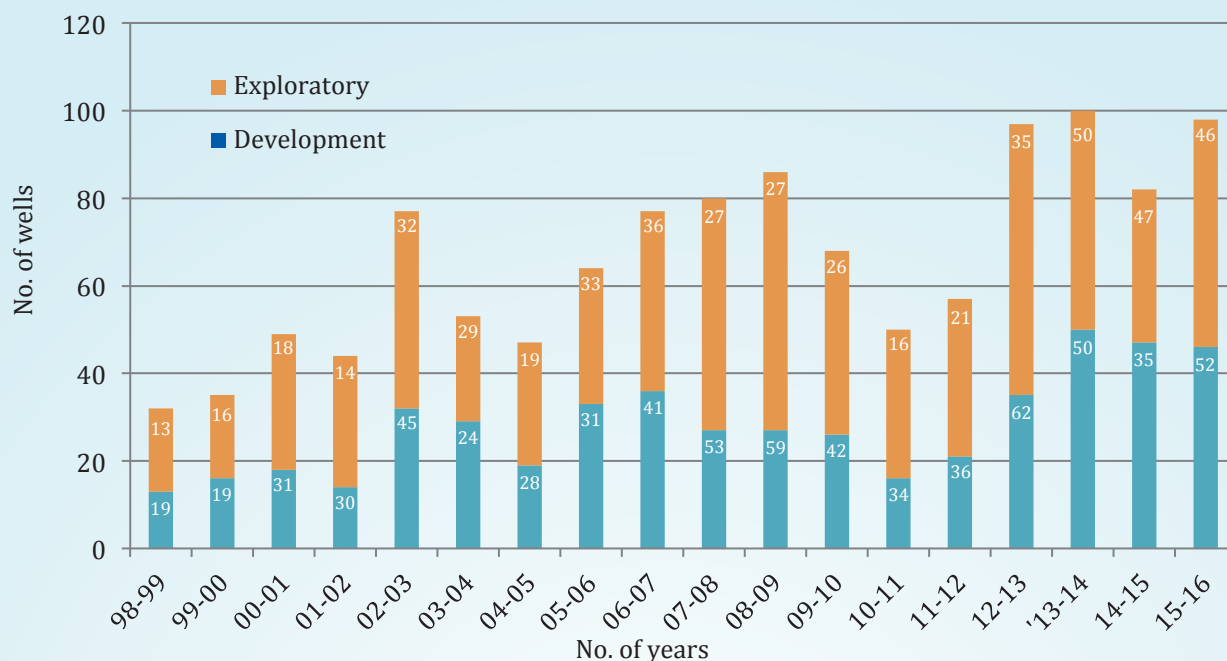
Following is the list of major players in Pakistan for Upstream/E&P segment:

1	ENI Pakistan	Foreign Company
2	Mari Petroleum Company Limited	Local Company
3	MOL Pakistan	Foreign Company
4	Ocean Pakistan Limited	Foreign Company
5	Oil & Gas Development Company Limited	Local Company
6	OMV Pakistan	Foreign Company
7	Pakistan Oilfields Limited	Local Company
8	Pakistan Petroleum Limited	Local Company
9	United Energy Pakistan Limited	Foreign Company

Source: Pakistan Energy book 2016 published in September 2017



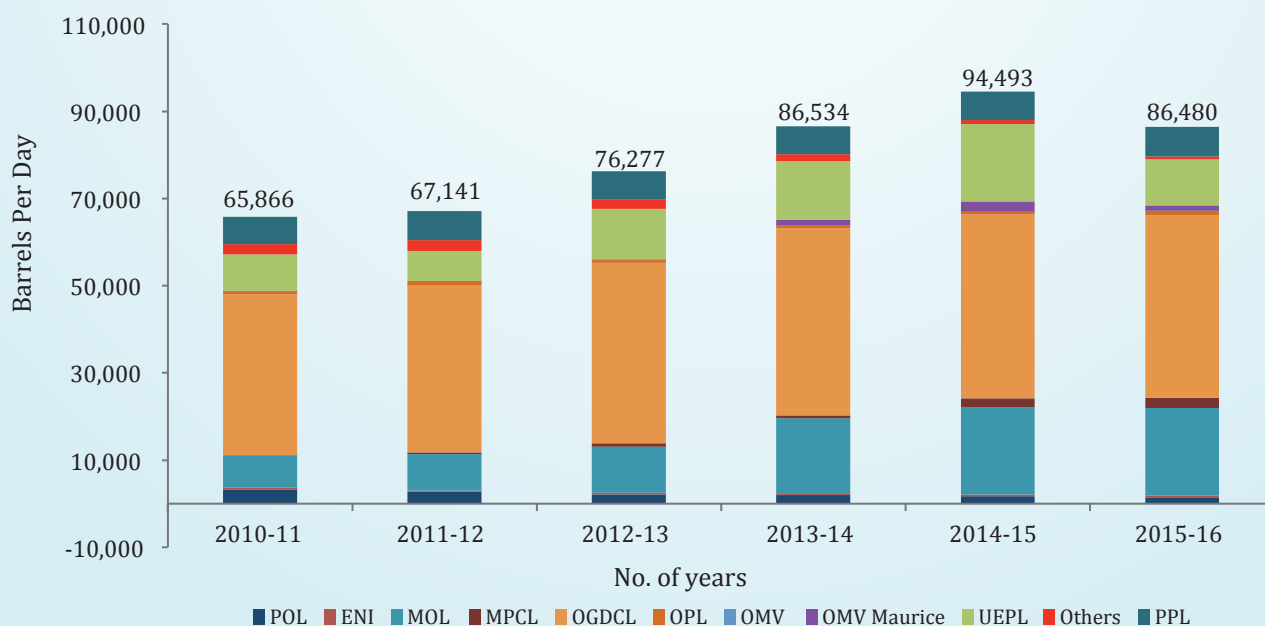
Overview of exploratory and development wells drilled in Pakistan - last two decades:



Source: Pakistan Energy book 2016 published in September 2017

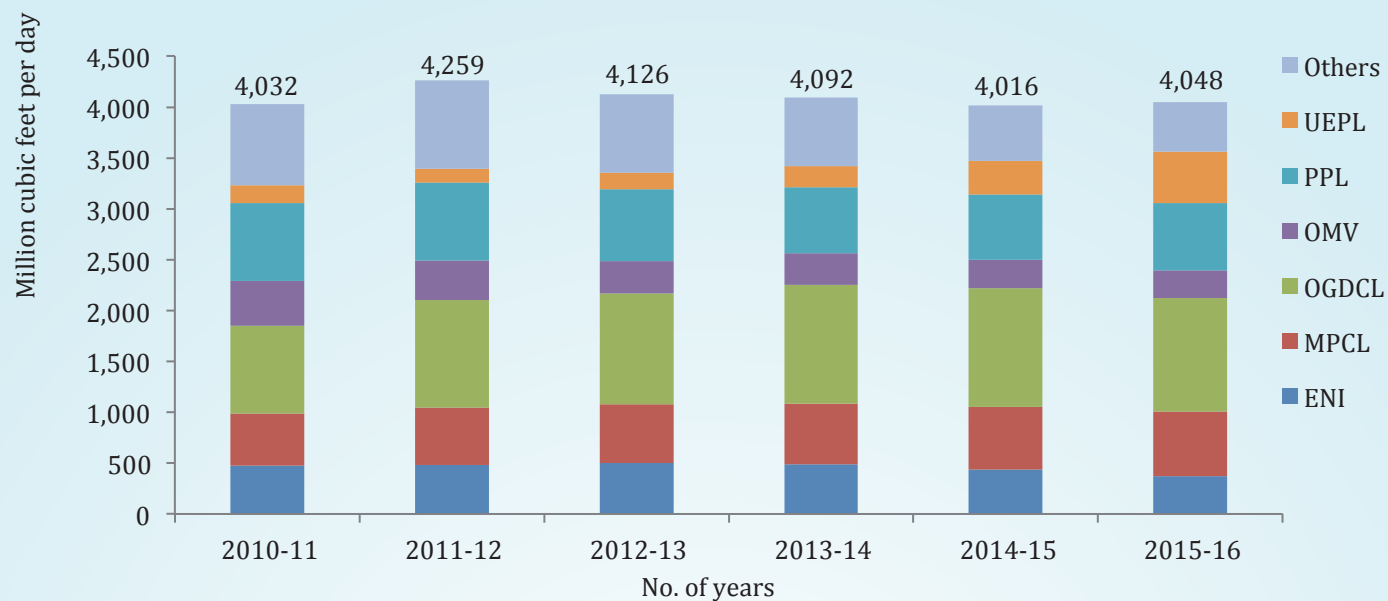
Indigenous production of oil and gas in Pakistan is much lower than the country's requirement. For example, the requirement of oil in Pakistan during 2015-16 was around 500,000 barrels per day and indigenous production was 86,480 barrels per day, therefore, the balance quantities of oil (crude as well as refined products such as furnace oil, diesel, petrol, etc.) were imported by Pakistan. In addition, Pakistan imported about 450 million cubic feet per day of gas (LPG & LNG) in 2015-16 which is a big burden on the balance of payments of the country.

Overview of oil production by E&P companies from 2010 to 2016



Source: Pakistan Energy book 2016 published in September 2017

Overview of gas production by E&P companies from 2010 to 2016



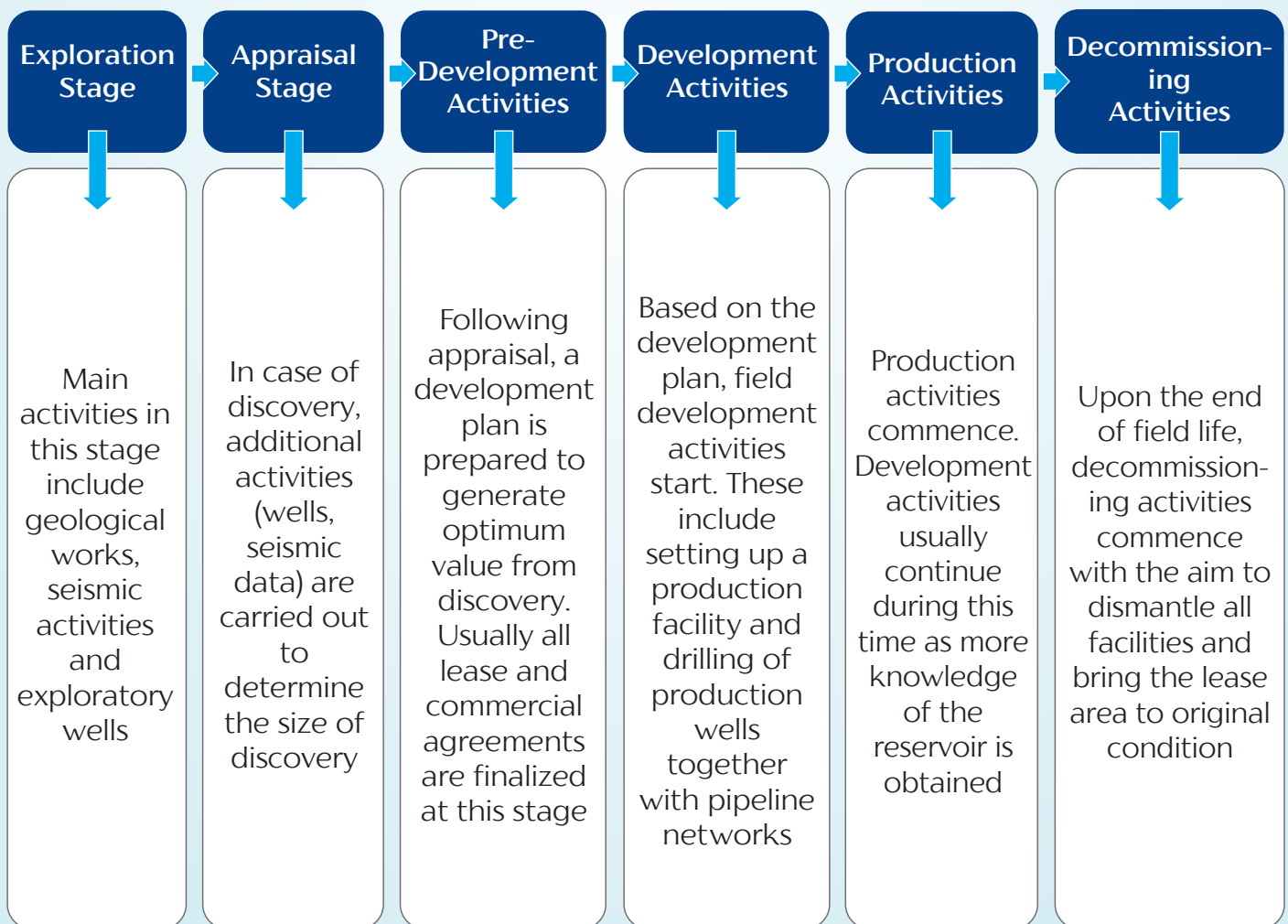
Source: Pakistan Energy book 2016 published in September 2017



VARIOUS PHASES OF E&P ACTIVITIES



Exploration & Production Life Cycle



2.1 Exploration Phase

To commence any exploration activity the first step is to acquire and enter into an exploration license with the Government of Pakistan (GoP) to carry out the E&P activities in a defined area (called Exploration Area). The exploration licenses are awarded by the Directorate General Petroleum Concessions (DGPC) - Ministry of Energy (formerly Ministry of Petroleum & Natural Resources) - GoP.

The Government, through bidding process, normally grants Exploration License. The license is awarded to the company who commits the best work program. For example, how many kilometers of seismic data will be acquired and assessed and how many wells will be drilled during the term of the exploration license. The exploration license is for specific period during which the committed work program has to be carried out otherwise the company has to pay the penalties to the Government for the unfulfilled minimum work program. As per Pakistan Petroleum Policy 2012 (PP 2012), the license period is 5 years with first phase of 3 years and second phase of 2 years, with the option to get the extension of 1 year in each phase, subject to commitment of additional work program. The License can be awarded to one company or a consortium of companies in the form of a JV (JV). Company's right to explore under License or the share of each consortium company in the JV for right to explore under License is called the working interest in the exploration license / petroleum concession. As per Petroleum Policy 2012, local E&P companies shall have working interest of 15% in Zone-I, 20% in Zone-II and 25% in Zone-III on full participation basis i.e. required minimum Pakistani working interest, whereas for Zone O the License holder is Government Company (GHPL) detailed below.

As per PP 2012 Pakistan exploration landscape has been divided into following zones based on risk and reward system:

- ▶ Zone I - West Balochistan, Pashin and Potowar Basins
- ▶ Zone II - Kirthar, East Balochistan, Punjab platform and Suleman Basins
- ▶ Zone III - Lower Indus basin
- ▶ Zone O - Offshore

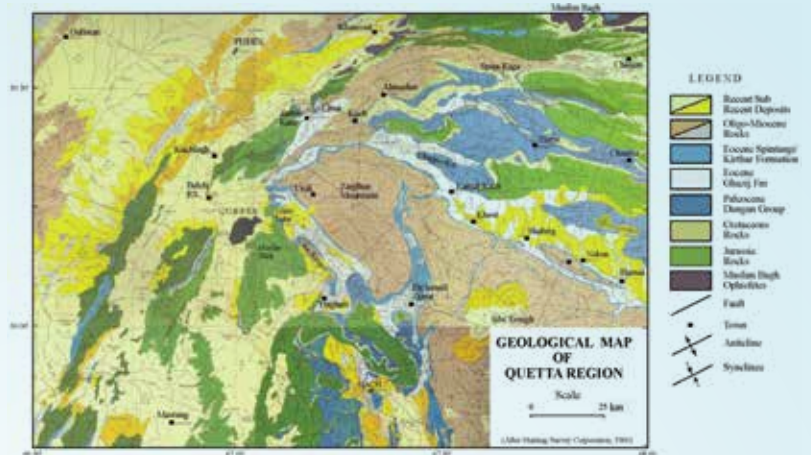
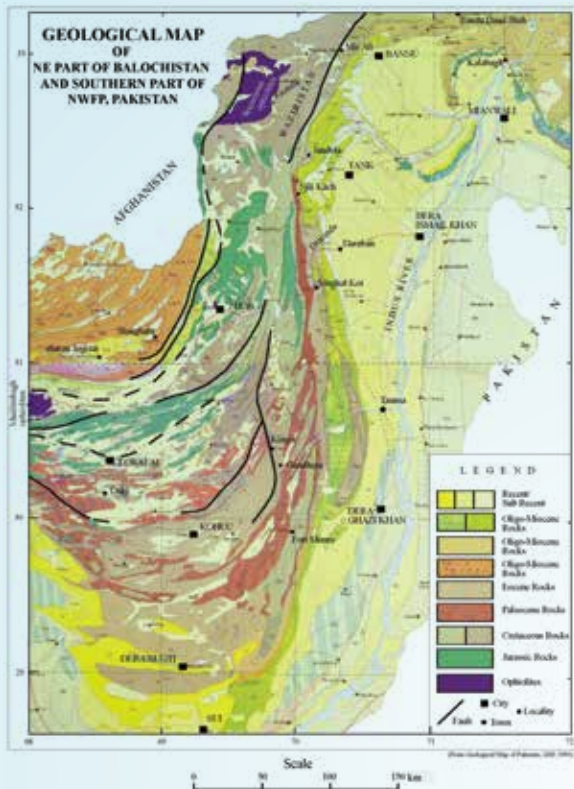
Zone Map of Pakistan is attached to this guideline as Annexure 2

Exploration activities include the following:

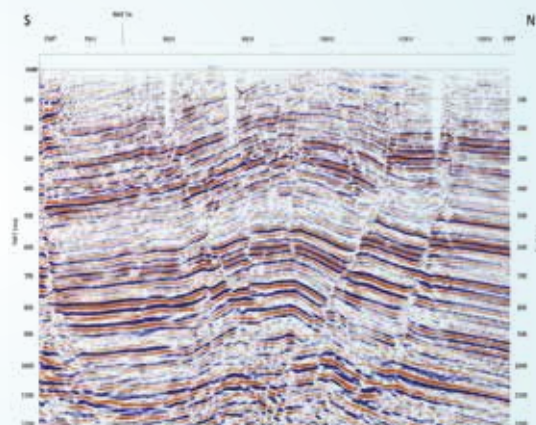
- ▶ Geological studies of the area for which exploration license has been granted
- ▶ Geophysical study which is mainly seismic data acquisition as well as the processing and interpretation of the acquired data. In some cases non-seismic surveys (gravity and magnetic etc.) are also conducted with relatively less investment, however, the information obtained from these surveys provide limited information and cannot be an alternate of seismic data.
- ▶ In addition, vintage data (geological and geophysical) available with Directorate General of Petroleum Concessions (DGPC) for reference license area is also evaluated to determine prospective of the area or to identify the best area for new seismic data.
 - In exploration phase, usually 2D reflection seismic data is acquired whereas in the appraisal and development stage 3D reflection seismic data is acquired. 2D is much less expensive as compared to 3D. 2D data is acquired over larger areas (exploration license area) whereas 3D data is usually acquired on smaller area based on the results of 2D seismic for optimizing and decision making as to the number of wells to be drilled in a discovery area.
 - Seismic data interpretation helps in determining the location where it is most appropriate to drill the well.
- ▶ Drilling of Exploration Well.

If the drilling results of exploration well confirm the presence of hydrocarbons (i.e. probable commercial discovery) then the activities move from Exploration Phase to Appraisal Phase.

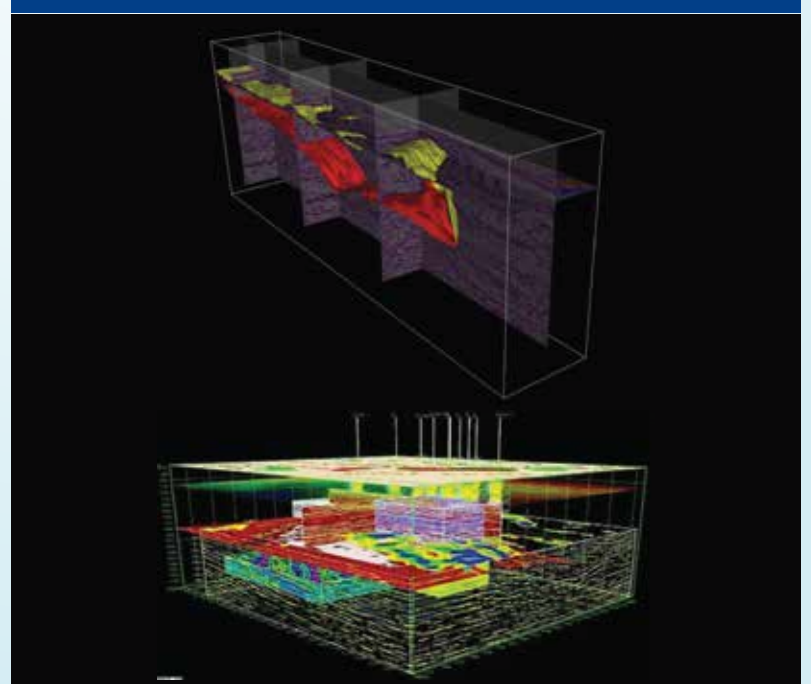
Geological Maps of Balochistan Area



2D Seismic Data



3D Seismic Data



2.2 Appraisal Phase

Objective of the appraisal activities is to determine the size, nature (i.e. gas, oil or condensate) and quality of discovered reserves, including extractable reserves and to assess if the discovery is commercially viable. Appraisal activities include the following:

- ▶ Additional 2D or 3D reflection seismic data acquisition alongside the discovery area and interpretation of this data
- ▶ Drilling of one or more additional wells to estimate the boundaries of the reservoir

Based on the drilling results of appraisal activities, the size and nature of the discovery is determined and the economic evaluation is carried out to determine whether it can be classified as a commercial discovery. Economic evaluation is worked out keeping in perspective the revenues and associated costs involved to generate these revenues. The revenues are calculated based on the estimates recoverable oil or gas and the price assumptions based on best estimates of future price of international crude oil. Whereas, the costs are calculated based on the cost of additional wells to be drilled, additional 3D seismic data to be acquired, plants/infrastructure costs i.e. storage tanks and pipelines within the field and to the nearest refinery for oil/gas infrastructure for gas to be erected and the regular field production and operating cost to be incurred. Royalties, taxes, duties, levies, production bonuses (payable to Government based on production levels to be achieved from the area), social welfare obligations (stated in the PCA/PSC) etc. are also factored in the economic calculations. If the economic net result is positive (i.e., positive NPV @ reasonable discount rate) then the company deems it a commercial discovery.

The economic evaluation process is usually the final step in the long process of technical and financial evaluation that must be done before any investment decision is made. As economic evaluation is a very sensitive

subject in the E&P industry, it is usually performed by finance professionals based on technical data obtained from the technical departments.

Keeping in view the commercial discovery economics, a Field Development Plan (FDP) is prepared and submitted to the DGPC. If the DGPC approves the FDP, along with the approval, a Development and Production Lease (D&P Lease) is granted by the DGPC for the discovery area out of the total Exploration Area for which the exploration license was awarded. D&P Lease area is usually much smaller compared to Exploration Area. The D&P Lease period depends on number of years required to produce the reserves discovered under a particular commercial discovery, subject to a cap of certain number of years. As per PP 2012, the initial cap is 25 years, with the possibility of extension for additional 5 years.

Appraisal period at times also includes Extended Well Testing (EWT) phase, whereby, for certain period, prior to submission of FDP with the DGPC, test production is obtained from appraisal wells. This is done to ensure that there is a steady flow of hydrocarbons from the discovery made and that it can be classified as commercial discovery. EWT production is also invoiced to the customer (i.e. refineries and gas distribution companies), however, it is subject to a discounted price as per PP 2012.

The process of finalizing the Gas Pricing Agreements with the Government and Gas Sales Agreements with the Government nominated buyers also commences at this stage.

2.3 Development Phase

Development activities normally commence once DGPC approves FDP and grants D&P Lease. Development activities include the following:

- ▶ Additional seismic data acquisition (usually 3D).
- ▶ Drilling of additional wells as per FDP. The wells may also include water disposal well to dispose-off the water produced along with oil or gas.
- ▶ Building of infrastructure:
 - Accessible roads.
 - Buildings, control room building, field offices, warehouses etc.
 - Plants; gas processing facility, oil and water separation facility, oil pumping station, oil storage tanks, etc.
 - Pipelines within field to connect the wells to the plants and pipelines to connect to the refineries or gas distribution network of SNGPL/SSGCL for sale of oil and gas respectively.

This is a capital-intensive phase. Usually it goes through a value assurance process to ensure that maximum value is generated by putting up the most optimal plant size and wells network.

2.4 Production Phase

Production activities include, but are not limited to the following:

- ▶ Pumping out oil and gas from the wells, in case natural flow is not there due to less pressure in reservoir.
- ▶ Separation of oil, gas and water in the processing facilities.
- ▶ Pumping oil into the pipeline to refinery or storing in tanks and transporting oil to refineries and oil export terminals in case pipeline is not feasible.
- ▶ Processing of gas at plants to produce pipeline quality consumable gas, which can be supplied to the gas distributors through pipelines.
- ▶ Disposal of produced water into water disposal wells.
- ▶ Installation of compressors to maintain the production in case the reservoir pressure drops.
- ▶ Well intervention jobs (workovers) in case any restrictions develop in the wells.

As production commences and continues, a better understanding of reservoir characteristics is established. Based on revised understandings, companies endeavor to optimize economic value through additional development activities such as drilling of infill wells to accelerate production, enhancing production facilities in case reservoir size appears bigger than original estimates, putting compression facilities if pressure from reservoir drops resulting in reduced production.

2.5 Abandonment Phase

Abandonment or decommissioning activities are carried out at the end of the D&P Lease period or if the oil & gas reserves have been extracted to the extent that it is no more commercially feasible to extract the reserves or the reserves have expired before the end of D&P Lease period. Abandonment activities include the following:

- Plugging and abandoning the wells, removing the tubing (if necessary) and other equipment on well head and putting the cement plugs in the well to secure that no flow of hydrocarbon shall happen later.
- Dismantling of the buildings, plants, tanks, pipelines and other equipments.
- Reinstating the land used for E&P activities to its original condition.



3.1 Regulations Related to E&P Activities

The Ministry of Energy, Petroleum Division (MEPD) under Regulations of Mines Act, Petroleum Policies and relevant Rules governs E&P activities in Pakistan. The Petroleum Concession Agreements (PCAs) and Production Sharing Contracts (PSCs) include additional supplemental regulations. Model PCAs and PSCs are part of the Petroleum Policies and Rules.

Internationally used Model PCA, PSC and other commonly used agreements in E&P industry such as Farm-in/Farm out Agreement, Assignment Agreement, Joint Operating Agreement, Accounting Procedures, etc. developed by Association of International Petroleum Negotiators (AIPN) are available to E&P industry at its website, which can be accessed by paying a nominal fee. AIPN is an independent not-for-profit professional membership association that supports international energy negotiators around the world and enhances their effectiveness and professionalism in the international energy community.

3.2 Regulators for E&P Activities

MEPD is mainly represented by DGPC being the primary regulator. Whereas, Directorate General of Oil (DG Oil) regulates the crude oil sales to refineries and the sale of refined products such as diesel, petrol, kerosene oil, etc. by the oil marketing companies such as PSO, Shell, Total Parco, etc. Moreover, the Directorate General of Gas (DG Gas) regulates the gas sales to Sui Northern Gas Pipelines Company Limited (SNGPL) and Sui Southern Gas Company Limited (SSGC). Oil and Gas Regulatory Authority (OGRA) regulates the pricing for both the oil and gas with the responsibility to issue the periodic price notifications.

Prior approval of DGPC is required for all major activities including, but not limited to, the following:

- ▶ Commencement of each activity i.e. seismic data acquisition, drilling, building of infrastructure, abandonment of wells and infrastructure etc.
- ▶ Extension of exploration license.
- ▶ Relinquishment or surrender of exploration license.
- ▶ Grant and extension of the D&P lease.
- ▶ Sharing of the geological/geophysical and wells data to any non-related party.
- ▶ Assignment / sale of working interest in any PCA or PSC to any other company.



04

CONTRACTS/ AGREEMENTS

WITH THE GOVERNMENT
OF PAKISTAN

Following are two types of contracts/ agreements which the companies need to enter into with the GoP related to E&P Activities:

- Petroleum Concession Agreement (PCA) - Applicable for onshore areas
- Production Sharing Contract (PSC) - Applicable for offshore areas

4.1 Petroleum Concession Agreement (PCA)

Under PCA, a company or consortium of the companies (called JV Partners) are the license holder and lease holder of Exploration License and D&P Lease respectively. Along with the PCA, the JV Partners also enter into a Joint Operating Agreement amongst themselves, which stipulates the requirements as to the joint operations, accounting and other matters amongst the JV Partners. The company or companies make the expenditure for all phases of E&P activities at their own risk and are the owners of oil and gas produced, which are invoiced to customers (i.e. refineries and gas distribution companies) in the name of respective JV Partner. Under the PCA, one of the JV Partner is appointed as the operator who is responsible for carrying out the E&P activities on behalf of the JV Partners, maintaining the books of accounts of the joint operations and dealing with the customers and regulators on their behalf. Under the PCA, the JV Partners are liable to pay the following to the Government:

- ▶ Royalty @12.5% of the gross revenues.
- ▶ Corporate income taxes @ 40% or at the rate specified in the PCA.
- ▶ Windfall levy on production of oil and gas.
- ▶ Other levies (sales tax, excise duty, etc.).
- ▶ Production bonus. Amounts and threshold of production are stated in the relevant PCA and depend on the Zone under which the area for which PCA has been awarded.

4.2 Government Holdings Rights to Working Interest under the PCAs

There is a working interest of 5% on full participation basis i.e. 2-1/2%, each of GHPL and Provincial Government Holding Company, where the area for which the exploration license / D&P lease is granted is located. GHPL/Provincial Government Holding Company have the option to accept the participating working interest on full participation basis i.e. on reimbursement of past costs.

4.3 Production Sharing Contract (PSC)

Under PSC, Government Holdings Company (GH) is the License holder of Exploration License or Leaseholder of D&P Lease and the company or consortium of companies (JV Partners) work as contractor to GH. Expenditure incurred by the companies under the Exploration and Appraisal Phase is done at their own risk as a contractor of GH. Whereas, in case of commercial discovery, companies manage and sell the petroleum produced for and on behalf of GH. Moreover, the companies recover their past costs related to exploration, appraisal, development, production and abandonment from revenues derived from sales of petroleum produced up to a certain percentage of production called cost oil/gas (e.g. 85% of revenue generated as stated in Petroleum Policy 2012) until the past cost is recovered. The remaining production, called profit oil/gas, is shared between GH and companies on an agreed percentage (e.g. stated in Article 5.6 of the Petroleum Policy 2012). The GH and companies i.e. contractor pay the following to the Government:

- ▶ Royalty at percentages of revenue as stated in Article 5.1.1 of Petroleum Policy 2012.
- ▶ Corporate Taxes @ 40%.
- ▶ Windfall levy on production of oil and gas.
- ▶ Other levies (sales tax, excise duty, etc.).
- ▶ Production Bonus. Amounts and threshold of production are stated in the PSC.

The primary difference between a PCA and a PSC is that under the PCA, the lease holders are exploration companies that are entitled to the production from the lease area in return for payment of royalty and other levies. On the other hand, in case of PSC the right to production of hydrocarbons rests with the Government Holding (as first party) whereas exploration companies, in return of their exploration activities, are entitled to recover costs incurred and part of the profits generated in the form of oil or gas produced.

4.4 Sale of Petroleum (Crude Oil, Condensate, Gas or LPG)

The first right to buy the petroleum from the producer (i.e. D&P Lease Holder / JV Partner) is with the Government. The Government exercises this right by nominating a refinery in Pakistan for purchase of crude oil/condensate and a gas distribution company (such as SSGCL, SNGPL, or both) for purchase of gas. However, LPG can be sold to LPG distribution companies, which are licensed by the Government.

Subject to considerations of internal requirements and national emergencies, E&P companies can be allowed to export their share of crude oil and condensate as well as their share of gas based on export licenses to be granted by the concerned regulator.

Subject to overall market demand, E&P companies may request and the Government will purchase 90% of their share of pipeline specification gas through a nominated buyer (i.e. SSGCL or SNGPL) to meet the internal demand of Pakistan in an economical manner, provided there are no infrastructure constraints. The E&P Companies shall have the right to sell 10% of their share of pipeline specification of gas to any buyer with the prior consent of the provincial government.

The formula for calculating the selling price of crude oil, condensate and gas is stated in the relevant contract with Government (i.e. PCA/PSC) which is linked to international crude oil price and the formulas stated in the PCA/PSC. Whereas, LPG's selling price is subject to open market competition. These prices based on the formula included in PCA / PSC are notified by OGRA on a periodic basis. The JV Partners (for PCA) or the Contractors (for PSC) have to enter into sale agreements with the refiners and the gas distribution companies, laying down the terms of the sales and payment thereof. The relevant regulator approves the terms of sales agreements and these terms are agreed before the development activities are commenced.

To incentivize the E&P industry, indigenous production of oil and gas being a substitute of imports, the payment related to indigenous production of oil and gas is made to foreign companies 100% in foreign currency (US Dollars), whereas the local companies are paid 30% in foreign currency (US Dollars) and 70% in Pak Rupees. This is also done because most of the investments such as import of machinery, equipment, material and drilling/seismic services, etc. in this sector are made in foreign currency. In case, the local E&P would require additional foreign exchange for import of goods or services then the Government provides that additionally.

4.5 Foreign Exchange and Borrowing Restrictions

As per the terms of PCAs and PSCs, foreign E&P companies are required to arrange the foreign exchange from their own sources for the expenditure to be made for E&P activities in Pakistan and also these companies under the terms of PCA / PSC cannot borrow in local currency from local banks / financial institutions in Pakistan. Due to this restriction, foreign E&P are paid for their share of production of oil & gas in foreign exchange (US Dollars) as stated above. Whereas, local E&P are required to first use their own foreign exchange earnings (30% stated above) and thereafter can request Government to provide the foreign exchange to meet their expenditure. However, there is no restriction on Pak Rupee borrowing for local E&P companies.

Local E&P companies on a case-to-case basis are entitled during the exploration phase to receive foreign exchange from Government against payment in Pakistani currency to meet their day-to-day obligations under permits, licenses and PCAs/PSAs. After commercial discovery, local E&P companies are paid up to 30% of their sale proceeds in foreign currency to meet their day-to-day operational requirements. For project financing after commercial discovery, local E&P companies will be required to make their own foreign exchange arrangements except for companies in which GOP or provincial government holds majority shareholding.

The local E&P companies, for project financing related to development activities (before commencement of commercial production), may borrow in foreign currency against future foreign currency receipt (30% stated above) from production. Currency devaluation risk hedging may not be required as the 30% revenues are going to be in foreign currency based on pricing formula stated above in sale of petroleum section.

05

OPERATOR AND CONDUCT OF E&P ACTIVITIES

Usually more than one company is the license/lease holder (under PCA) and contractor (under PSC) due to inherent risk of exploration business. Therefore, one of the companies is selected to act as an operator on behalf of the JV Partners, who conducts the E&P activities for and on behalf of all the JV Partners including GH. The JV Partners oversee the operations carried out by the operator through Operations Committee, Finance Committee and Technical Committee, where all the JV Partners are represented. The Joint Operating Agreement (JOA) includes rules governing the rights and responsibilities of the Operator and how the business shall be managed / conducted amongst the JV Partners. JOA is an important document and part of PCA and PSC.



JOA usually contains the clauses related, but not limited, to the following:

- ▶ Preparation of annual work program and budget by operator and its approval by the JV Partners.
- ▶ Authorization of Expenditure (AFE) for some specific activities or having an expenditure equal to or more than certain pre-agreed thresholds by all JV Partners.
- ▶ How the meetings of JV Partners (such as Operating Committee, Finance Committee, Technical Committee) shall be conducted as well as the minimum number of these meeting to be held in a year.
- ▶ Minimum percentage for approval of work program and budget as well as AFEs in case there is no unanimous agreement between the JV Partners. Exceptions are there for specific activities, such as agreement on commercial discovery and development plan, which would require unanimous approval of the JV Partners.
- ▶ Preparation of monthly, quarterly and annual cost statements by operator and submission thereof to other JV Partners. Accounting basis to be used for the preparation of such statements.
- ▶ Cash calling (by operator from the JV Partners) on monthly basis in advance for anticipated expenditure for the following month so that operator is cash neutral for JV activities.
- ▶ Statement of over/under advance excluding accrual to be provided to JV Partners.
- ▶ Audit of the JV operations as per JOA and annual cost statements by third party auditors as well as JV Partners.
- ▶ Reporting of production and other data to JV partners.
- ▶ Reporting of all other technical data on periodic basis required by the JV Partners.
- ▶ Management of JV assets and inventory including approval process for disposal thereof.
- ▶ Dispute resolution mechanism.



06 LAND ACQUISITION

Large areas of land are required to carry out the E&P activities.

As stated above the subsurface property rights belong to the country, however, access to the surface (land) is obtained from the owners of the land which could be private land owners or the Government. Land is acquired via either purchase or rental/lease, short term or long term. During Exploration Phase, land is usually taken on short-term rental/lease, whereas, for Development and Production Phase, it is either purchased or taken on long-term rent/lease.

Acquiring land is quite intense work as sometimes the land is used for agriculture, industrial or residential purposes. Therefore, companies usually have a separate department for this.



07

PROCUREMENT

Most of the material required for drilling and setting up processing facilities is imported. There is a concessionary import duty of 5% for the E&P Industry. The relevant custom legislation is SRO 678(1)/2004, which governs the rules applicable for the concessionary import duty. This concessionary import duty is applicable for the items not manufactured in Pakistan. The list of locally manufactured items is available in CGO No. 11/2007 which the Federal Board of Revenue (FBR) regularly updates.

The above concessionary import duty is also available to the companies providing the services to E&P Industry.

The regular duty is applicable if it is less than 5%. Further, since 2016 FBR levied an additional 1% import duty that E&P Industry challenged, but so far has not been successful in getting it removed.

No sales tax is applicable on imports falling under SRO 678(1)/2004.

For items to be imported, which do not fall under SRO 678(1)/2004 (i.e. items manufactured in Pakistan) all normal import duty, infrastructure and sales tax are applicable.

In case any item is imported temporarily (for example, an equipment/tool imported by a service company from other country to be used for a specific job and to be sent back to that country), it can be cleared by custom authorities against a corporate / bank guarantee without levying any import duty etc. Custom authorities release the corporate / bank guarantee once the temporarily imported item is exported back or is surrendered to custom authorities.

08

HEALTH, SAFETY AND ENVIRONMENT (HSE)

Being a highly technical industry dealing with inflammable/combustible products, Health, Safety and Environment (HSE) is of utmost importance for E&P company. Therefore, every company in the E&P industry has comprehensive HSE policies and procedures and exhibits a significant focus on HSE. HSE function of a company provides an integrated support for assurance and control of technical and administrative operations, work performance and asset integrity, besides inculcating health and safety awareness and adopting best operational practices in strict compliance with local statutory as well as international HSE standards.

Capacity building of the staff is done by providing regular HSE trainings such as sessions on emergency response, asset integrity and process safety etc. HSE guidelines and procedures are developed and company staff and the contractor / supplier's staff is regularly trained based on these guidelines and procedures. These guidelines and procedures are embedded into the management and operational processes. Anyone visiting the fields and office locations of E&P company are required to follow these guidelines and procedures.

HSE related data is captured in special database for monitoring HSE activities and to bring continuous improvements in that area. The database also provides support in internal as well as external reporting to various regulators.

KPIs are established using international benchmarks to monitor the performance in HSE area. Management of the company continuously monitors these KPIs and performs regular audits to monitor the HSE progress.

From local regulation perspective, Initial Environment Examination and Environment Impact Assessment studies are mandatory prior to initiating new projects/ development work.

09 TRAINING AND DEVELOPMENT

Being a highly specialized industry with continuous technological advancements, it is crucial to provide specialized training and development opportunities to staff. Most of the companies have a dedicated section within HR department or a separate training and development department for continuous training of the staff involved in the operations.

The PCA/PSC specifies a minimum annual amount for the training of company's staff as well as the government staff related to the E&P sector. As per the requirements of PCA / PSC, if the annual minimum amount or a portion thereof remains unspent, the differential is required to be deposited with the Government. However, E&P companies generally spend much more on the training activities / programs than the annual minimum amount.

Yearly training spent report is required to be submitted to DGPC.

The background is a collage of three images: a blue puzzle globe in the top right, an oil drilling rig in a desert landscape in the bottom left, and a line of trucks in the bottom right. Overlaid on these are several decorative elements: a large blue arc with a geometric pattern, and several circles in white, teal, and grey, some connected by thin white lines.

10 FINANCE, ACCOUNTING AND TAXATION

The finance function in E&P industry is similar to any other industry. However, following are additional finance activities related of E&P Industry,

10.1 Calculation of the Economic Evaluation for FDP

Since activities in E&P industry are carried out as projects, project portfolio management is an integral part of the decision making process in which finance department plays an important part. For this reason, comprehensive value assurance frameworks provide gate checks that a project needs to go through in order to be sanctioned for execution. These are based on both technical justification as well as economic studies. The economic studies are carried out for development projects as well as for exploration activities taking into account the probability of success of various initiatives and the expected costs and reservoir size involved.

The most important decision to move from Exploration Phase to Development and Production Phases is to make an assessment that whether a discovery can be classified as a commercial discovery for which economic evaluation is needed. Finance function plays a vital role in preparing the economic evaluation / model.



10.2 Finance Committee of the JV

In Finance Committee Meetings, the work program and budgets for each Exploration License/ D&P Lease are presented and approved by the JV and Government Holding (in case of PSC) on yearly and half-yearly basis. Finance executives are responsible to ensure that the budgets are prepared in accordance with provisions of the PCA/PSC as well as the JOA and to conduct the meetings to the satisfaction of the JV partners and obtain the approval of the work program and budgets. They are also responsible to provide the explanation for the variance between actual cost and previously approved budget for yearly/half-yearly period as well as for the projects' cost variance, which are spread over more than a year.

10.3 Management of JV Funds

To conduct the JV business, the operator has to ensure that the requisite funds are available on time and each JV partner is contributing according to their working interest. To realize the foregoing funds are requested by the operator in advance from each JV partner. This request of funds in the E&P industry is called as cash calls. Finance executives of Operator ensure that sufficient funds are obtained from the JV partners so that the work program is carried out by the operator in a timely manner, however, they have to ensure that surplus funds are not accumulated in the JV accounts as non-operating partners would object to that.

10.4 Financial Statements of JV

As per JOA, the operator is responsible for maintaining the books of account of the JV and to provide the periodic (monthly, half yearly and annual) financial statements related to the JV for each Exploration License/D&P Lease.

These financial statements contain the information related to the expenditure made for each phase (i.e., Exploration, Appraisal, Development, Production and Abandonment), advances received from JV partners in the form of cash calls and over/under advance position of each JV partner.

10.5 Compliance with Laws, Rules, PCAs/PSCs/JOA etc.

It is the responsibility of finance executives to ensure compliance with the provisions of all applicable Petroleum Laws (in addition to company law, tax laws) and Petroleum Rules (e.g. PP 2012). Moreover, they are also required to ensure compliance with provisions stated in the PCAs/PSCs and JOAs including its accounting and finance procedures (e.g., provisions related to cash calling adequate funds, budgeting, periodic reporting, authorization of expenditure for expenses beyond certain threshold, management of inventory, approval before award of contract beyond certain threshold, etc.).

10.6 Methods of Accounting

E&P companies can opt for any of the two methods of accounting for the exploration and development activities:

1. Successful Efforts Method
2. Full Cost Method

1. Successful Efforts Method:

This is the most commonly used method of accounting in the oil and gas industry.

Exploration Cost:

- Exploration Cost including the geological & geophysical costs, surface lease rentals etc. are expensed as and when incurred except for the exploration well cost specific to the drilling of a well and related geophysical costs, which are initially capitalized.
- If exploration well is successful and the reserves are determined to be present, then the cost remains capitalized.
- If exploration well is unsuccessful then such well cost and related expenditure is also expensed.

Appraisal Cost:

- Appraisal Cost is also expensed as and when incurred except for the appraisal well cost which is initially capitalized.
- If appraisal well is successful and it is determined that commercially viable reserves are present for which commercial discovery notification is to be applied for to the DGPC, then such well cost remains capitalized.
- If appraisal well is unsuccessful and it is determined that reserves are not commercially viable then appraisal well cost is also expensed.

Development Cost:

- All the development costs are capitalized. For unsuccessful development well, it is a common practice to keep the cost capitalized because development wells are usually part of the plan and the cost thereof is part of the economic evaluation for the preparation of the development plan. Even an unsuccessful development well provides subsurface information about the development area, which helps to optimize the location for the drilling of additional wells. Further, total capitalized cost for development activities is subject to amortization on Unit of Production (UoP) basis and impairment test. However, some companies follow a conservative approach and expense out the cost of unsuccessful development wells. Both approaches are acceptable industry practices. Development costs related to oil and gas properties are depreciated using UoP method.
- Development cost of buildings, and infrastructure are depreciated based on the determination of useful life of such assets.

Production Cost:

- ▶ All production costs are expensed as and when incurred to match the revenue generated from the sale of petroleum produced.
- ▶ In every industry, there are some cost elements that generate a debate whether the cost is to be capitalized or expensed. In E&P industry, the cost associated with interventions in producing wells after commencement of production is an element for which it needs to be assessed if this cost has to be expensed or otherwise. The well intervention in some cases is called Wells Workover. The guiding principle is that if the activity of intervention is to restore the existing production (due to some blockage in the well or obtaining data such as pressure in the reservoir etc.) then this cost is to be expensed. Whereas, activities to increase production are capitalized. For instance, additional perforation in the well bore to gain access to other formation, which was not accessed earlier, to put a cement plug in the well to stop the formation water entering into the producing hydrocarbon-bearing zone. Other such activities include installation of injection equipment to convert a producing well into an injection well, deepening the well with additional drilling to gain access to another producible formation, sidetracking, (i.e. additional drilling sideways) an existing producing well if the production is obstructed (due to any reason) from the existing well bore etc.
- ▶ An important element of production phase is to pay the production bonus to the Government. As per PP 2012, following production bonuses are payable:

■ Within 90 days of start of commercial production - USD 600,000	■ Upon reaching 160 MMBOE - USD 5,000,000
■ Upon reaching 60 MMBOE - USD 1,200,000	■ Upon reaching 200 MMBOE - USD 7,000,000
■ Upon reaching 120 MMBOE - USD 2,000,000	
- ▶ Accounting treatment for these bonuses is given below:
 - Production bonus payable at the commencement of production is expensed when due.
 - Production bonus amount payable upon reaching certain accumulated level of production (stated above) is accrued in proportion to production on periodic basis and the amount thereof is expensed in that period. Corresponding liability is settled upon reaching each threshold, when the payment is made to the Government.

Abandonment Cost:

- ▶ Estimating the abandonment cost is quite complex and finance executives also play an important role in it. It is to be noted that JV books of accounts and financial statements are based on receipt and expenditure; therefore, decommissioning costs are recorded in the JV books as and when incurred. However, the operator is responsible to provide the information related to decommissioning estimates to non-operating partners to make the accounting for decommissioning costs (stated below) in the corporate books.
- ▶ Abandonment or decommissioning cost is capitalized at the time of capitalization of the assets for which abandonment will be required (e.g. well or infrastructure) as per the legal obligation and as per company policy. The related credit is to a long-term provision.

- ▶ The long-term provision is made for the present value amount capitalized to complete the double entry and to recognize the abandonment liability.
- ▶ In future years the capitalized cost is depreciated using UOP method.
- ▶ Provision is increased every year due to unwinding of discounting made at the time of creating the provision, so that at the time of abandonment full amount (undiscounted) is available to meet the abandonment cost. The effect of unwinding and increasing the provision is charged to P&L every year as finance charges.

2. Full Cost Method:

Exploration Cost:

- ▶ All costs including the geological & geophysical costs, surface lease rentals etc. are capitalized and only expensed if ultimately it is determined that there is no discovery in the entire license area and the exploration license either expires or is surrendered earlier to DGPC.

Appraisal Cost:

- ▶ All costs are capitalized and only expensed if ultimately it is determined that there is no discovery in the entire area and the exploration license either expires or is surrendered earlier to DGPC.

Development Cost:

- ▶ Same treatment as in Successful Efforts Method

Production Cost:

- ▶ Same treatment as in Successful Efforts Method

Abandonment Cost:

- ▶ Same treatment as in Successful Efforts Method

10.7 Accounting Standards / Guidelines

For specific E&P activities, there is very little guidance available in International Financial Reporting Standards (IFRS), as **IFRS 6** only specifies some aspects of the financial reporting for costs incurred for exploration and evaluation of mineral resources.

However, guidance can be sought from FASB Accounting Standards Codification 932 (ASC 932) related to Extractive Activities of Oil and Gas.

The Financial Accounting Standards Board (FASB) is a private, non-profit organization standard setting body whose primary purpose is to establish and improve Generally Accepted Accounting Principles (GAAP) within the United States.

10.8 Taxation

Similar to specialized accounting treatment, taxation of E&P Industry also has its special dynamics. Therefore, the Income Tax Ordinance 2001 has a separate schedule (Fifth Schedule-Part 1) which contains the rules for the computation of the profits and gains from the exploration and production of petroleum.

11

SOCIAL WELFARE

E&P activities in Pakistan are generally carried out in less populated and under-developed areas, which are in need of necessities such as water, electricity, clinics, schools and colleges. Due to this reason, each PCA and PSC provides annual minimum amount (based on the Zone under which the area for which PCA has been awarded falls and the current development and production status under the PCA / PSC) for social uplift of the population in those areas.

As per the DGPC guideline on social welfare, annual minimum amount is required to be deposited in a separate bank account at the beginning of the year and then released as and when the social welfare activities are carried out in coordination with the local government officials. Companies generally spend more than the minimum specified amount through their corporate social responsibility programs.

Following are some of the areas of social welfare where E&P companies have contributed for the last many years:

- ▶ Water supply - Drilling water wells as well as supplying water through water tankers and building water storage tanks for local communities in far-flung areas.
- ▶ Primary and secondary school education - Constructing school buildings / huts for small communities in far-flung areas and either handing over these buildings to local governments or managing and operating the schools by providing teachers and administration staff as well as books and uniforms.
- ▶ Vocational institutes - Constructing buildings for vocational training and providing initial funding for buying necessary machines, tools and equipments.
- ▶ Solar energy - Installation of solar panels and related equipment to provide electricity to schools, water supply projects and vocational institutes.
- ▶ Building and managing small hospitals and dispensaries to provide health services to local communities.
- ▶ Hepatitis-B vaccination

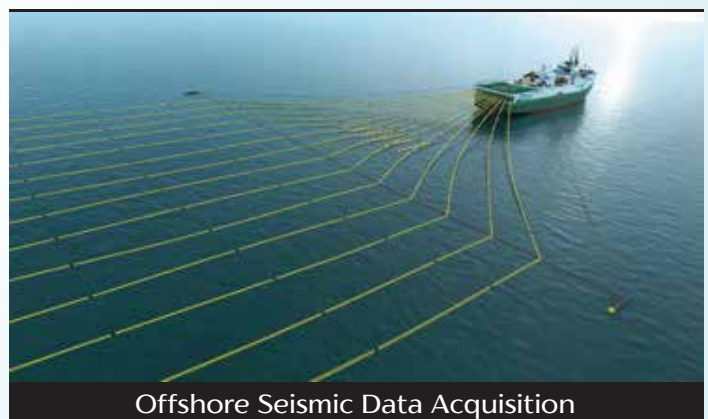
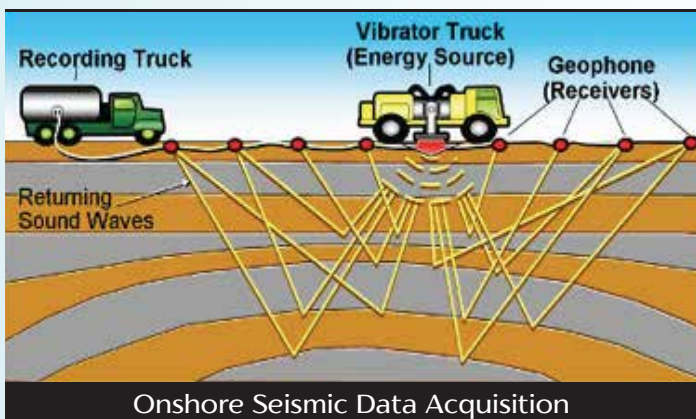


Geological Studies:

These are systematic investigation of the geology beneath ground for the purpose of creating a geological map or model. Geological field studies are carried out to prepare surface geological map of the area by defining different rocks units in terms of their significance in petroleum exploration.

Seismic Data:

Seismic data is acquired by sending the soundwaves into the ground and mapping the image of subsurface from the resonance of sound; the sound waves are sent using various methods such as Vibrates, Dynamites, etc. Seismic data is like an ECG of the earth - acquired wiggles are stacked to prepare subsurface picture in both, time and depth domains. The primary objective of seismic data interpretation is to confirm the presence of hydrocarbon trap (container).



On-Shore:

On-shore is referred to the areas which are on land.

Offshore:

Offshore is referred to the areas in sea. Sea areas usually with depths of 1,000 feet or more are called shallow Offshore areas whereas the deep water areas are called deep Off-Shore area.

Dry Well:

Dry well is the one that does not encounter hydrocarbons or not economically producible hydrocarbons.

Injection Well:

A newly drilled well or an existing production well is converted into injection well to inject the water or gas into a developed field reservoir to increase the pressure at downhole for maintaining or increasing production.

Value Assurance Process:

An important element of Development Phase is the preparation of Field Development Plan (FDP), which requires input from various experts and disciplines such as geoscientists, geophysicists, reservoir engineering, drilling, engineering, projects and finance/economics. These inputs provide information as to how much additional seismic data is to be captured, how many additional wells to be drilled, the size of the infrastructure (as detailed in 2.3) to be build, etc. It is important to note that it is not necessary to drill all the development wells and build all the infrastructure in one go. These activities may be carried out in piecemeal, as in many cases the input available with the disciplines is not conclusive therefore, drilling too many wells and building an oversized infrastructure could lead to waste of resources and erosion of economic value. Consequently, an economic evaluation is performed based on the input. Thereafter, a multi discipline team headed by an experienced manager reviews all the inputs and economic evaluation and comes up with an optimized FDP. This process is called Value Assurance Process. The Value Assurance Process is not limited for FDP preparation but is also performed at each stage of field development in later part of field production life.

Farm-in/ Farm-out Agreement:

This agreement is used when a company being the working interest owner in an Exploration License or D&P Lease would like to sell and transfer its working interest to another company. The company which is transferring its working interest is called Farming-out party and the company acquiring that working interest is called Farming-in party. The agreement used for this transaction is called Farm-in/Farm-out Agreement. It contains clauses related to selling price, rights and obligation of each party and the effective date, etc.

Assignment Agreement:

The Government grants the rights in the Exploration Licence/D&P Lease and can also grant the transfer of rights. The Farm-in/Farm-out agreement is between the seller and buyer of working interest. Therefore, to make the transfer of rights in Exploration Licence/D&P Lease, the Government and Farm-in/Farm-out parties sign an Assignment Agreement.

Joint Operating Agreement:

The Joint Operating Agreement (JOA) in oil and gas industry is an underlying contractual framework of a JV (JV). The JOA is a contract where two or more parties agree to undertake a common task to explore and exploit an area for hydrocarbons. The parties to the agreement can be broadly classified as operator and non-operator(s).

The operator is the one who is responsible for day-to-day management and operation of the field. It is usually a single party with the highest interest in the agreement. Nevertheless, it is common to have a designated operator who is a minority to the agreement. Though the operator is entitled to full control over the operations, it usually does not receive any remuneration. The main duty of the operator is to plan the activities carefully to increase profitability of the operations. However, it is not liable for any loss of production or revenues because of its decisions except in cases of gross negligence and/or willful misconduct.

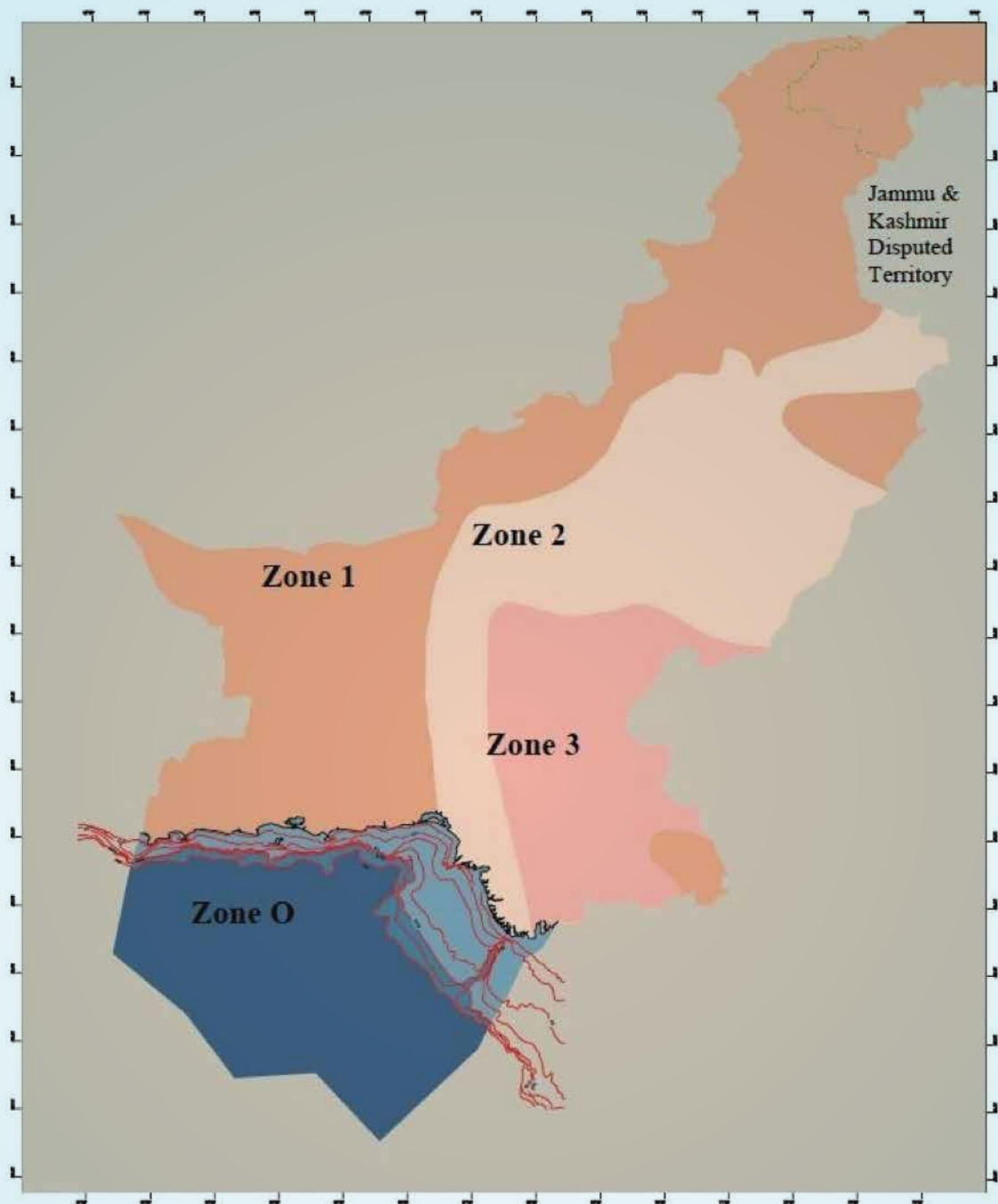
A typical JOA will include the following:

- | | |
|------------------------------------|--------------------------------------|
| 1. Duration of the agreement | 9. Hydrocarbon allocation |
| 2. Parties to the agreement | 10. Hydrocarbon lifting and disposal |
| 3. Parties participating Interests | 11. Transfer of interests |
| 4. Scope of work | 12. Withdrawal from JOA |
| 5. Exclusive operations | 13. Liabilities |
| 6. Designated operator | 14. Decommissioning |
| 7. The Joint Operating Committee | 15. Default |
| 8. Cost control and contracting | 16. Dispute resolution |
| | 17. Accounting procedure |

Accounting Procedures:

Accounting Procedures is a very important part of the JOA and is based on the principle that there shall be 'no gain, no loss' to any party to the JOA. It deals with several issues including, but not limited to, how cash will be provided to the operator by non-operators to fund joint operations (commonly known as Cash Calls) and the timing and content of settlement statements and billings. It also includes exchange rate benchmarks relating to payments in foreign currency, timing and procedures for audits and cost allocation rules and the management of materials and equipment, etc.

In general, the primary goal of accounting procedures is to detail the steps to be followed by the operator when allocating the costs relating to joint operations as well as stating the costs incurred for the non-operators.



FURTHER READINGS

1. Steps involved in the economic evaluation of oil and gas projects; <https://spe.org/en/print-article/?art=829>
2. Pakistan's Petroleum Policies, Petroleum Rules, Model PCA and PSC; <http://mpnr.gov.pk>
3. The Association of International Petroleum Negotiators; <https://www.aipn.org/>

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