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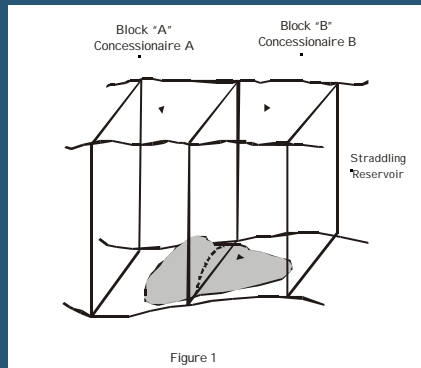
**UNITIZATION OF  
OIL AND GAS RESERVOIRS**

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## CONCEPTS

- **Reservoir or Deposit:** a geologic feature with specific properties, storing oil and natural gas, the latter associated gas or not.
- **Oil or Natural Gas Field:** an area producing oil or natural gas from a continuous reservoir or more than one reservoir, at variable depths, including equipment and facilities that aim at production.
- **Block:** a portion of a sedimentary basin, formed by a vertical prism, with an undetermined depth, and a polygonal surface defined by the coordinates of its corners, in which oil and natural gas exploration and production activities are performed.
- **Unitization:** results from or is related to a discovery or structure that extends across the dividing line between independent concession areas which limit the E&P rights and obligations of the respective concessionaires.
- **Extension of the unitization concept:** multiple independent reservoirs (and even various fields) can be developed under a joint approach. This unitization has often a voluntary nature.

## SIMPLE CASE OF UNITIZATION



## VOLUNTARY AND COMPULSORY UNITIZATION

- **Voluntary unitization** corresponds to a case in which, although technical and economically recommended (as in the situation of a reservoir shared by different concessionaires), it is not legally required.
- **Compulsory unitization** is a situation under which, whenever technical and economically recommended, one or more reservoirs must be viewed as a unit, in accordance with the legal provisions in force.
- **Another concept:**
  - voluntary = by agreement
  - compulsory = by arbitration

## UNITIZATION IN BRAZIL

- Few professionals acquainted with the meaning of this term
- The methodology adopted by the National Petroleum Agency (ANP) to define E&P blocks
- Five E&P Bid Rounds performed and 6<sup>th</sup> Bid Round in progress (Blue Blocks)

## THE BRAZILIAN LEGAL FRAMEWORK

### Constitutional Amendment - 9/95 and the New Petroleum Law - 9478/97:

- Changes article 177 of the Brazilian Constitution, end of Petrobras' monopoly;
- §1: The Union will be able to contract with companies the activities of article 177, according to the conditions established by law (Petroleum Law)
- §2: General principles of the Petroleum Law

### Brazilian Constitution, article 176:

- Transfer of property – concession. The Concessionaire is the owner of the production after the payment of Government Take and Taxes

### Petroleum Law number 9478/97:

- Article 27, states the unitization

### Presidential Decree number 2455/98:

- Created ANP

### Presidential Decree number 2705/98:

- Established the criteria relating to the governmental take

### Ordinances and Technical Regulations issued by ANP

## THE BRAZILIAN LEGAL FRAMEWORK

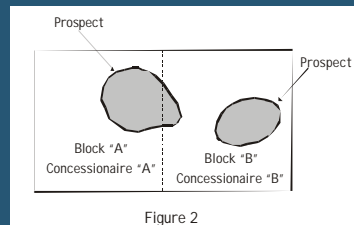
- ANP has the right to act in case the parties do not reach an agreement in a timely manner, and arbitration can be imposed, as states Article 27 of Law number 9478/97. However, this legal provision does not establish a **procedure on how to accomplish arbitration** in case it is required
- ANP may release some additional regulations and instructions because legal provisions regarding unitization matters are not yet fully developed, particularly when ANP will have to act as a concessionaire in the unitization process. In this case the existing concessionaire may bear **additional costs and investments, as well as the inherent risk** to extend the appraisal program beyond the limits of its concession area, at least until a new concessionaire replaces ANP in the unit field. On the other hand, the operator of this existing concessionaire will have a better chance to be elected as the unit operator

....continuing

- Clarification regarding item 12.2.3 of Concession Agreement and Article 27 of Law 9478/97
- **Bidding Procedure regarding the adjacent block**
- **What happen when one of the blocks in a unitization process exclusively contains another shallower or deeper reservoir?**

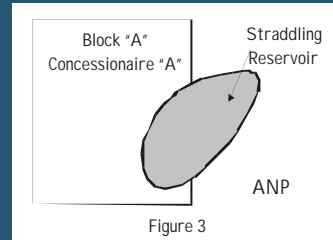
## STANDARD UNITIZATION CASE

- In case the discovery relates to another concessionaire, unitization will follow its normal procedure, being a negotiation among concessionaires



## UNITIZATION WITH ANP

- In case unitization reaches an area not yet granted to a concessionaire, ANP will play the role of a concessionaire but under a rather different set of conditions
- How will ANP proceed: items 12.1.2 x 12.2.1 of Concession Agreement (appraisal and commerciality)?



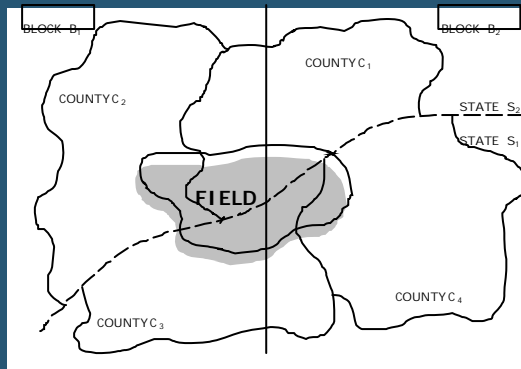
## CONTRACTUAL APPROACHES

- **Pre-unitization agreement**
- Unitization agreement
- Redetermination

## UNITIZATION AGREEMENT

- Consensus among the participating parties or other means, such as arbitration
- It must contemplate aspects of legal, economic, technical, and operational nature
- **Principle of preventing hydrocarbon waste**
- Protection of the concessionaires' rights and correlative rights
- Countries may be involved: United Kingdom X Norway, and United Kingdom X Netherlands cases

## THIRD PARTY RIGHTS



Note: In addition to landowners.

## NEGOTIATION

- Negotiations may take many years
- The negotiation of a unitization agreement requires the effort of a wide group of professionals (oil and gas lawyers, accountants, economists, geophysicists, geologists, and petroleum engineers)
- In negotiating an unitization agreement, the relevant concessionaires agree on a participation formula

## MAIN ISSUES

- **Participation Formula**
- Unit Operator
- Voting Procedure



## ISSUES OF A PARTICIPATION FORMULA

- Whether or not the previous costs incurred by the relevant concessionaires will be taken into account, and if so how they would be considered (acceptable amounts, applicable interest rates, reimbursement conditions etc)
- If additional exploration activities will be carried out
- An appraisal program
- A development plan
- **Each concessionaire's share of the costs and investments\***
- **How the concessionaires will share the field production/revenues\***
- Revisions or redeterminations

\* Same factor for both?

## IMPORTANT ASPECTS

- A consortium formed by oil companies
- Blocks resulted from different round bids
- A field may comprise more than a single reservoir and reservoirs may behave independently or not
- A reservoir may be predominantly located in one of the concession areas involved
- Reservoirs are not well-shaped and regular traps
- Reservoir rocks are not homogeneous isotropic bodies
- Fluid properties can also vary a lot within the reservoir
- Reservoir behavior may be difficult to predict
- **Occasionally one of the blocks involved in the unitization process also contains another shallower or deeper reservoir**

## IMPORTANT ASPECTS

- Maximum efficiency rate (MER)
- The data previously available and the work performed by the concessionaires are independent issues
- **Costs may be different from one block to another ;**
- Pre-agreement
- Single operator and unit JOA
- It may contemplate the costs incurred by the parties prior to the date the relevant discovery is made
- **The relationship between the allocated reserve and total amount to be invested is not the same for each concessionaire**

## RESERVOIR CHARACTERISTICS

- Difference between the allocated reserve and total amount to be invested for every concessionaire

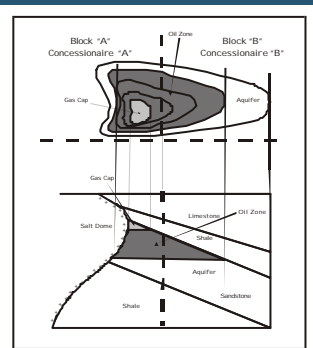


Figure 4

## FINAL COMMENTS

- **Key issue: The participation formula**
  - How to share investments/costs and revenues
- **Unitization between concessionaires**
  - By arbitration (rules and procedures)
- **Unitization between concessionaires and ANP**
  - Investments (risk capital)
  - Licitacion of adjacent area
  - Investments/costs recovery
  - Unitization agreement with ANP