

# ***MMS Resource Evaluation Process***



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# Presentation Outline

- ❖ MMS Resource Evaluation Program
- ❖ Resource Evaluation Process
- ❖ Pre Lease Assessments
  - Regional Assessments, Fair Market Value
- ❖ Post Lease Assessments
  - Reserve Estimates, Geo-hazards, Unitization, Conservation
- ❖ Gas Hydrates

# Resource Evaluation Program

- ❖ Regulation of geological and geophysical (G&G) data acquisition
- ❖ G&G data acquisition and analysis
- ❖ Resource Assessment
- ❖ Tract Evaluation / Fair Market Value
- ❖ Reserves Estimation

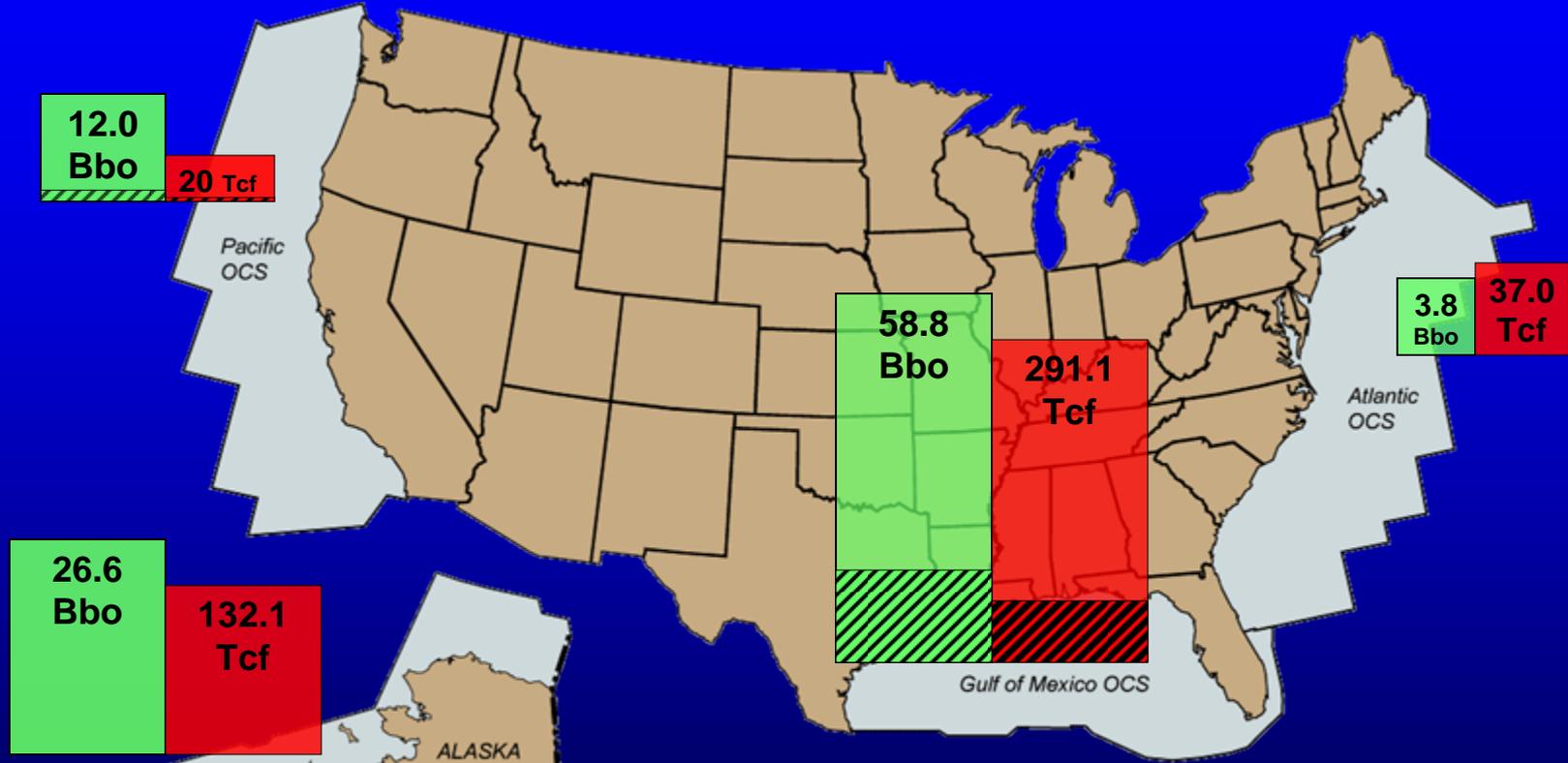
# Federal OCS Areas



# OCS Hydrocarbon Potential

16 Bbo and 170 Tcf of gas produced since 1954.

Significant potential remains as reserves (in known fields) or resources in yet-to-be discovered fields



Resource Category*		Alaska OCS	Pacific OCS	Atlantic OCS	Gulf of Mexico OCS	Total OCS
Oil - Billion Barrels (Bbo)						
Natural Gas - Trillion Cubic Feet (Tcf)						
Reserves	Oil	.03	1.5	0	13.9	15.4
	Gas	0	1.6	0	58.6	60.2
Resources	Oil	26.6	10.5	3.8	44.9	85.8
	Gas	132.1	18.3	37.0	232.5	419.9

# Resource Evaluation Process

- ❖ Data and Information Available to MMS for Resource Evaluation
- ❖ Overview of Methodology
- ❖ Uses for Resource Estimates

# Exploration and Production Data and Information

- ❖ MMS does not physically acquire E&P data and information
- ❖ MMS regulations are designed to assure that MMS has access to all relevant data and information (and analyses thereof) acquired by permittees or operators
- ❖ This is accomplished by
  - application and issuance of permits
  - notification requirements
  - various approvals during drilling and production operations

# Overview of Methodology

- ❖ Assessment of hydrocarbon resources is a statistical analysis of geologic and geophysical data
  - Geological/geophysical analysis of area of interest
  - Play definition and analysis
  - Resource Assessment
- ❖ Results are estimates of undiscovered technically recoverable resources of the identified geologic plays

# Overview of Methodology contd.

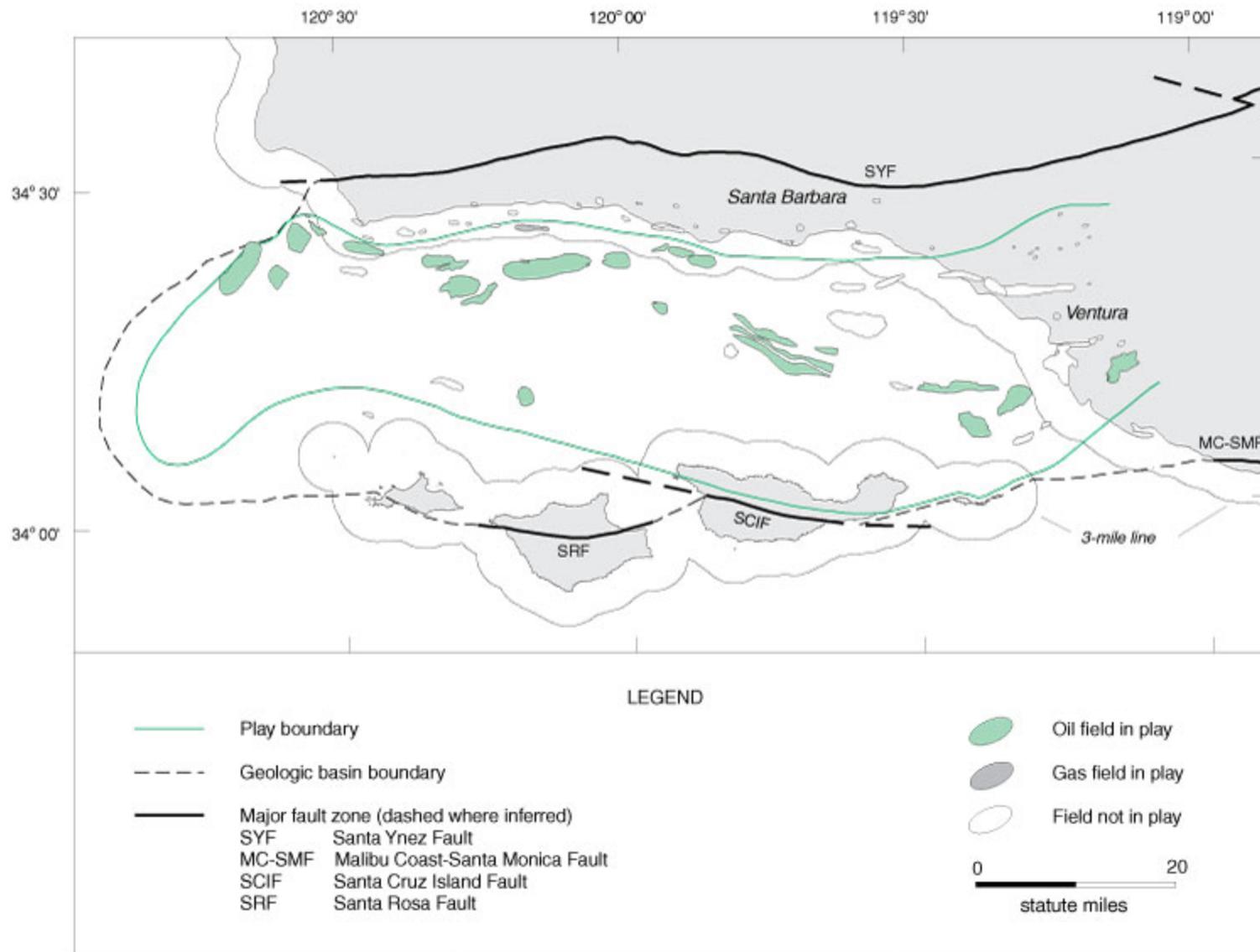
- ❖ These results are subject to a separate economic and engineering analysis to estimate the undiscovered economically recoverable resources for the assessment area.

# Resource Assessment

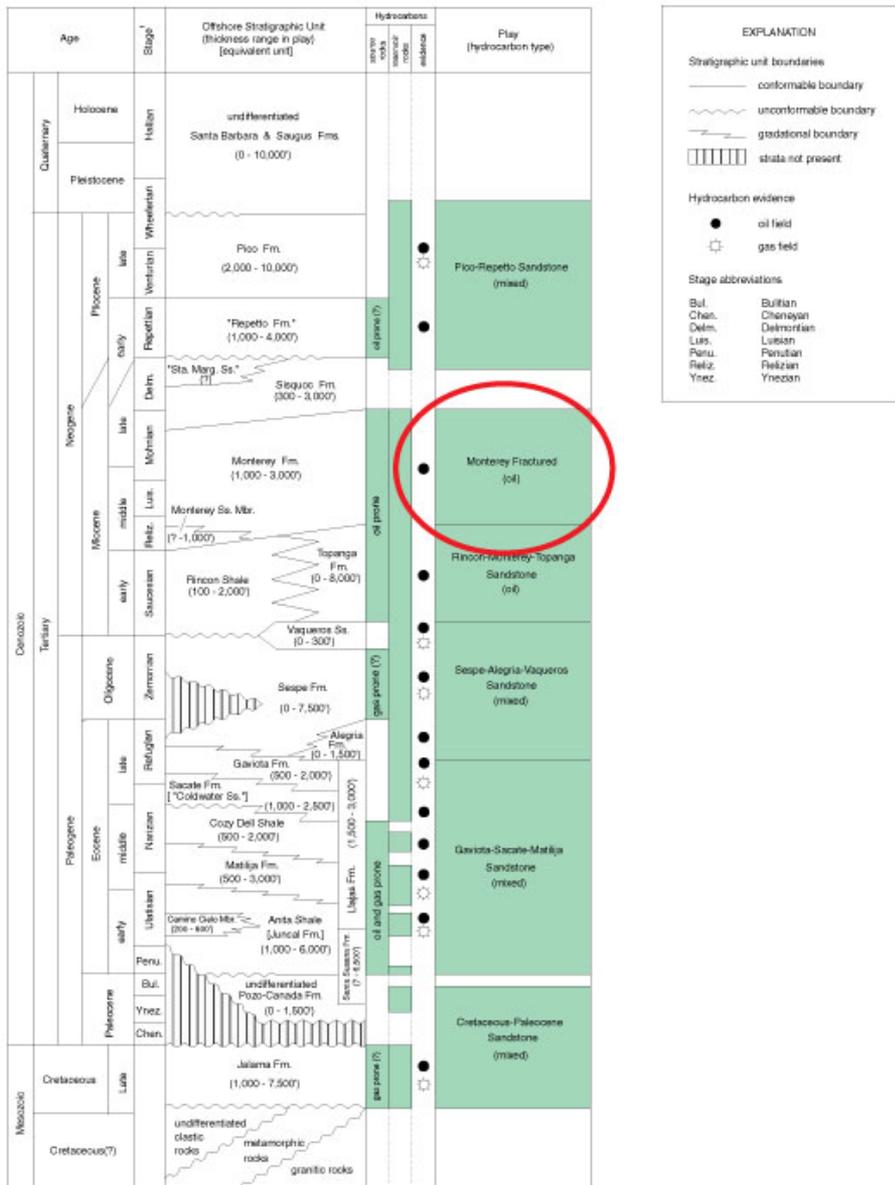
- ❖ Based on the geological information developed in the Geology and Play Analyses
  - A two step process – Technically and Economically Recoverable resources
  - Uses Probabilistic Methodology handles uncertainties
  - Uses computer model and based on assumption that within a properly designed play the size distribution of the entire population of accumulations (both discovered and undiscovered) will be lognormal

# Santa Barbara - Ventura Basin Province

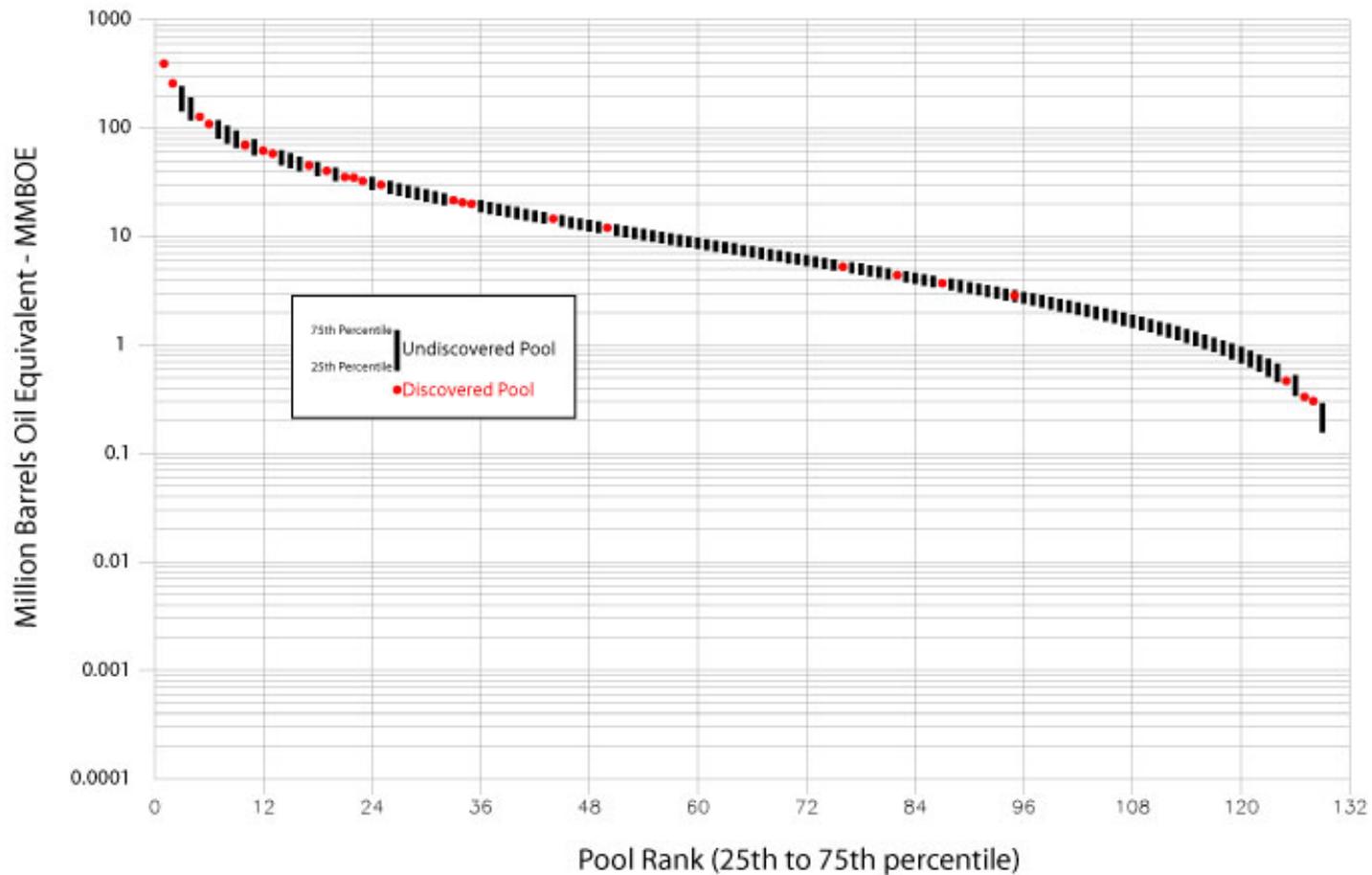
## Monterey Fractured Play



# Santa Barbara - Ventura Basin Province Stratigraphic Column



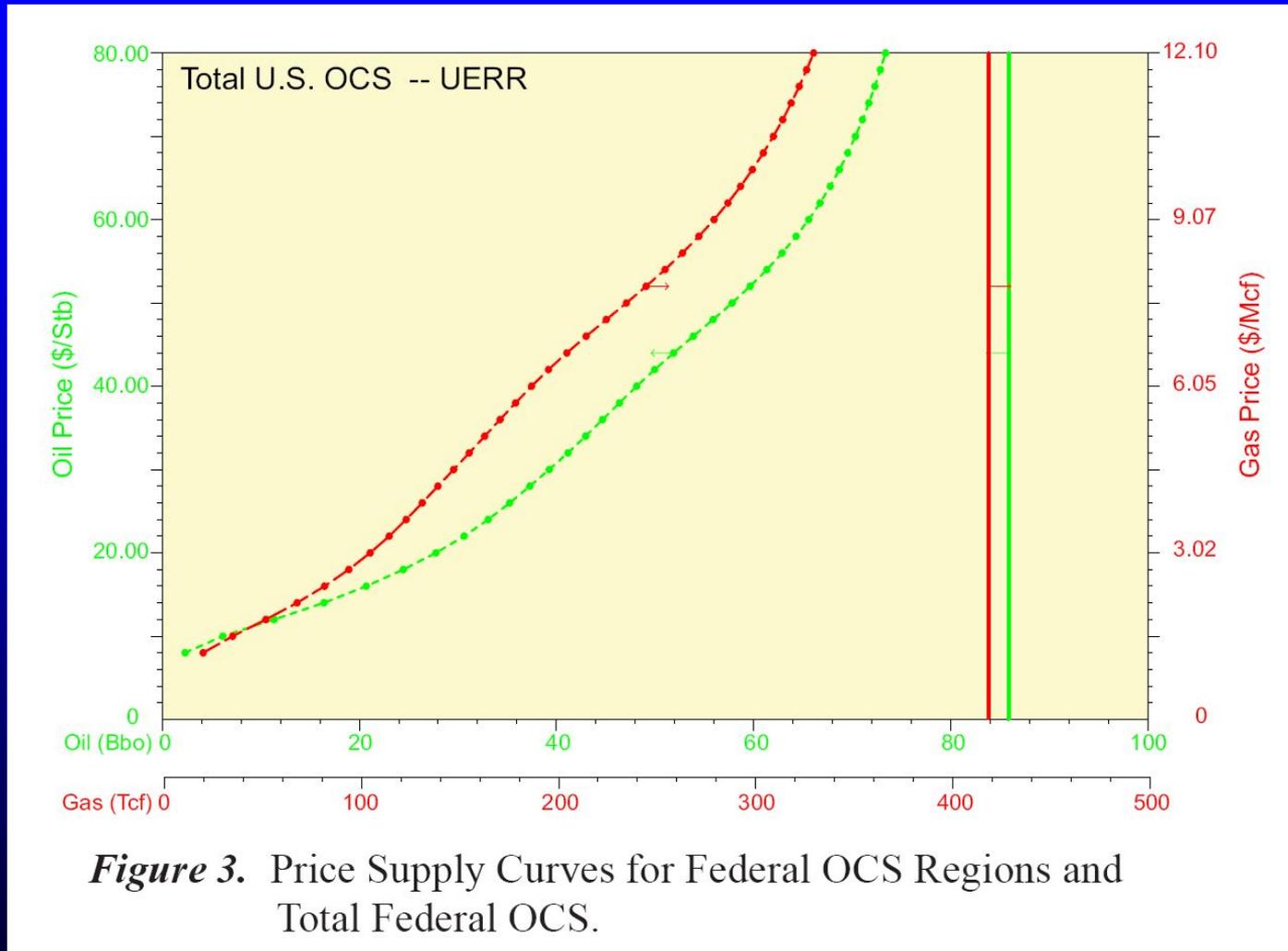
# Fractured Monterey Play Santa Barbara - Ventura Basin Province BOE Pool Rank Plot



# Economic Analysis

- ❖ Estimates portion of resources that could be profitably extracted over a range of commodity prices at the current level of technology
- ❖ Probabilistic based discount-cash flow model that simulates exploration, development, production, and delivery of the field resources in each assessment area
- ❖ Uncertainties in oil and gas prices is handled by developing continuous series of estimates over a wide range of prices – expressed as price-supply curve

# Total OCS Price-Supply Curve



# Uses for Resource Estimates

## ❖ Basis for Most MMS-OMM Activities

- Selection of Favorable Areas
- Estimation of Revenue
- Basis for Environmental Analysis
- Oil Supply Planning

## Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2006

*Using a play-based assessment methodology, the Minerals Management Service estimated a mean of 85.9 billion barrels of undiscovered recoverable oil and a mean of 419.9 trillion cubic feet of undiscovered recoverable natural gas in the Federal Outer Continental Shelf of the United States.*

### Introduction

This report summarizes the results of the Minerals Management Service (MMS) 2006 assessment of the technically recoverable oil and gas resources for the U.S. Outer Continental Shelf (OCS) (see figure 1). The OCS comprises the portion of the submerged seabed whose mineral estate is subject to Federal jurisdiction. The 2006 assessment represents a comprehensive appraisal that considered relevant data and information available as of January 1, 2003, incorporated advances in petroleum exploration and development technologies, and employed new methods of resource assessment.

This assessment provides estimates of the undiscovered, technically and economically recoverable oil and natural gas resources located outside of known oil and gas fields on the OCS. It considers recent geophysical, geological, technological, and economic information and utilizes a probabilistic play-based approach to estimate the undiscovered technically recoverable resources (UTRR) of oil and gas for individual plays. This methodology is suitable for both conceptual plays where there is little or no specific information available, and for developed plays where there are discovered oil and gas fields and considerable information is available. After estimation, individual play results are aggregated to larger areas such as basins and regions. Estimates of the quantities of historical production, reserves, and future reserves appreciation are presented to provide a frame of reference for analyzing the estimates of UTRR.



Figure 1. Federal OCS Areas of the United States.

More detailed information about the geology, assessment methodology, and economics will be published in separate regional assessment reports.

### Commodities Assessed

The petroleum commodities assessed in this inventory are crude oil, natural gas liquids (condensate), and natural gas that exist in conventional reservoirs and are producible with conventional recovery techniques. Crude oil and condensate are reported jointly as oil; associated and nonassociated gas are reported as gas. Oil volumes are reported as stock tank barrels and gas as standard cubic feet. Oil-equivalent gas is a volume of gas (associated and/or nonassociated) expressed in terms of its energy equivalence to oil (i.e., 5,620 cubic feet of gas per barrel of oil) and is reported in barrels. The combined volume of oil and oil-equivalent gas resources is referred to as barrel of oil-equivalent (BOE) and is reported in barrels.

This assessment does not include potentially large quantities of hydrocarbon resources that could be recovered from known and future fields by enhanced recovery techniques, gas in

# Fair Market Value Determination

- ❖ Federal law requires that MMS insure that the government receives fair market value.
- ❖ MMS uses a computer model to determine risked net present value.

# Government Revenues for Offshore Activities

- ❖ Bonus bids - pays for right to explore & develop a tract
- ❖ Rental - fixed annual payment until production starts
- ❖ Royalty - paid on volumes produced (12.5% to 18.75%)
- ❖ Taxes - paid on profit

# MMS Lease Sale

- ❖ Rentals, royalties, lease terms, and stipulations are set
- ❖ Bonus bids are offered by companies
- ❖ MMS evaluates the bids to determine if the \$ offered are acceptable

# MONTCAR Model

- ❖ MONTCAR - MMS's customized development simulation model
- ❖ MONTCAR model designed specifically to evaluate individual prospects & tracts
- ❖ Develops values for tracts
- ❖ Provides basis for accepting or rejecting bids (\$) received at lease sales
- ❖ Uses net present value (NPV) concepts & discounted cash flow analysis

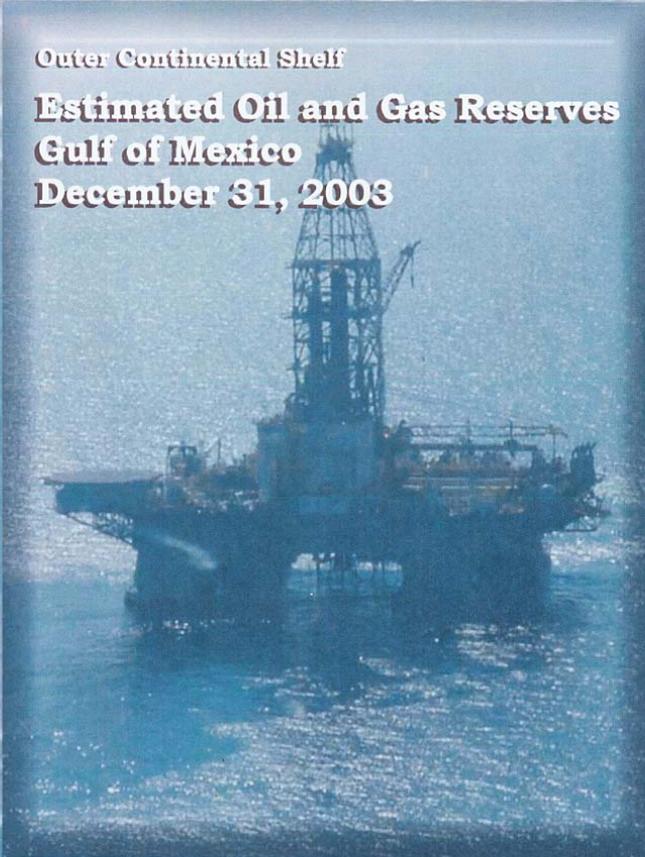
# Post Sale Evaluations

- ❖ Reserve Estimation
- ❖ Geo-Hazards
- ❖ Unitization / Conservation

# Uses for Reserves Estimates

- ❖ Provides detailed data used in resource evaluation models
- ❖ Planning - Energy Supply Forecasting
- ❖ Public Policy Decisions
- ❖ Independent Assessment / Verification

**Outer Continental Shelf  
Estimated Oil and Gas Reserves  
Gulf of Mexico  
December 31, 2003**



**MMS** U.S. Department of the Interior  
Minerals Management Service  
Gulf of Mexico OCS Region

**Estimated Oil and Gas Reserves  
Pacific Outer Continental Shelf**

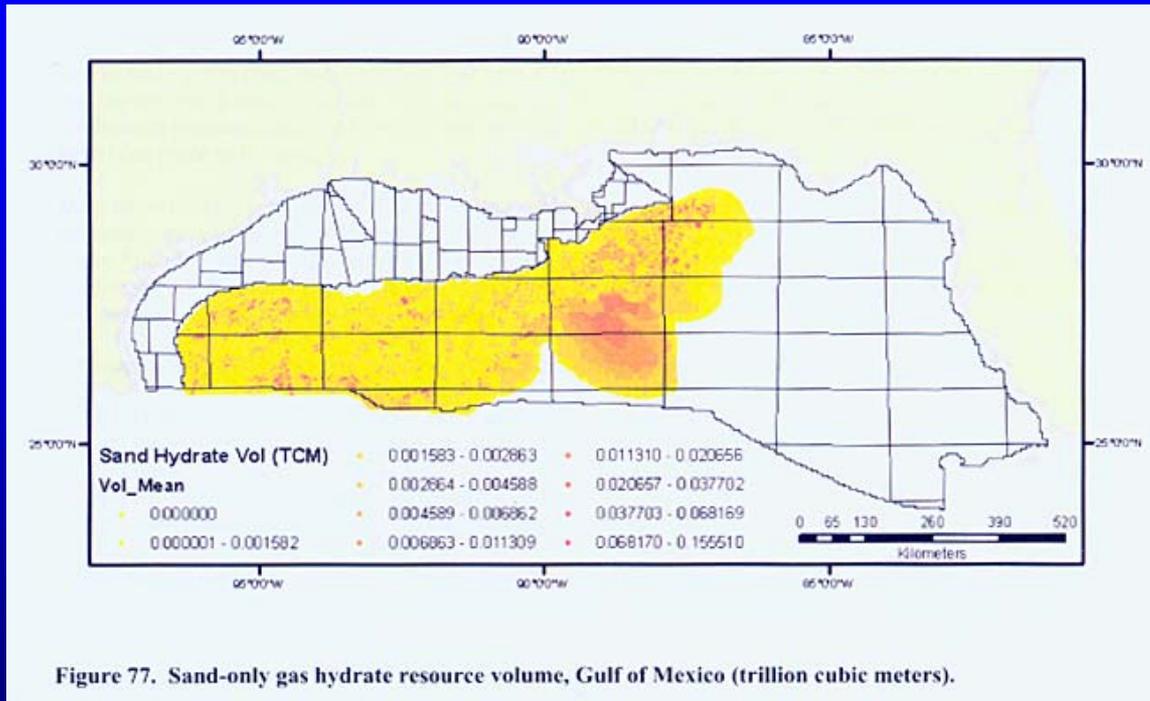
(January 1, 1999 through December 31, 2003)



**MMS** Securing Ocean Energy &  
Economic Value For America

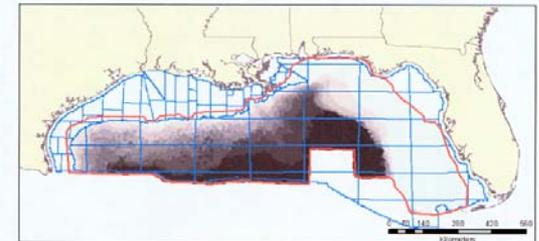
Available at [www.mms.gov](http://www.mms.gov)

# Gas Hydrates



OCS Report  
MMS 2008-004

## Preliminary Evaluation of In-Place Gas Hydrate Resources: Gulf of Mexico Outer Continental Shelf



U.S. Department of the Interior  
Minerals Management Service  
Resource Evaluation Division  
February 1, 2008

**MMS** Gas Hydrate  
Resource Evaluation

Available at [www.mms.gov](http://www.mms.gov)