INFORMATIONAL CALENDAR ITEM
51

08/11/09
Statewide
G. Scott

HEARING ON COMPARATIVE ADVANTAGES AND DISADVANTAGES OF DEVELOPING OFFSHORE OIL RESOURCES FROM OFFSHORE OR ONSHORE SITES

BACKGROUND:
At the request of the Lieutenant Governor, staff has prepared a presentation addressing offshore oil and gas development in California waters and the comparative advantages and disadvantages of developing these resources either from onshore or offshore drill sites. The presentation will discuss the current capability of extended reach drilling technology, operational limitations, risk factors, and environmental factors. Presenters will include, in addition to staff presentations, representatives from the oil and gas industry, Santa Barbara County, and the environmental community.
INFORMATIONAL HEARING

Comparative Advantages and Disadvantages of Developing Offshore Oil Resources from Offshore or Onshore Sites

California State Lands Commission
August 11, 2009
Outline

• Overview of Offshore California Oil Fields: Greg Scott, CSLC
• Statutory Framework: Mark Meier, CSLC
• Technology of Extended Reach Drilling: Steve Curran, CSLC
• Operational Consideration-Limitations: Pete Johnson, CSLC
• Environmental Factors: Eric Gilles, CSLC
• Access – Onshore Constraints: Doug Anthony, Santa Barbara County
• Environmental Advocate Perspectives:
  – Linda Krop, Environmental Defense Ctr.
  – Steve Uhring- Malibu Coastal Land Conservancy
  – Richard Charter- Defenders of Wildlife
• Industry Perspective: Bob Poole, Western States Petroleum Association
• Potential State Resource Areas: Jeff Planck, CSLC
• Staff Evaluation Methodology: Greg Scott, CSLC
• Policy Considerations: Paul Thayer, CSLC
Overview of Offshore California Oil Fields

Greg Scott, CSLC
Chief, Mineral Resources Management Division
Offshore California Oil & Gas Resources
(Los Angeles & Orange Counties)
California Offshore Platforms

State Platforms
Holly
Eva
Esther
Emmy
5 Islands (4 in Long Beach Unit, 1 at Rincon)

Federal Platforms
23 Platforms Statewide
4 in southern California
4 in Santa Maria area (north county)
15 in Santa Barbara Channel
Potential Onshore Drill Sites

Current development sites
1. Long Beach Tidelands
2. Huntington Beach
3. Montalvo
4. Rincon
5. Molino

Future possible onshore sites
6. Vandenberg Air Force Base
7. Government Point
8. Gaviota Oil Processing Facility
9. Carpinteria
10. Santa Monica Bay
Statutory Constraints

Mark Meier
Asst. Chief Counsel
Statutory Constraints

Provisions Enacted Prior to 1969 Promoting Full Development and Maximized Recovery

• PRC §§6828, 6829(b), 6829(c): Prevention of Waste – offsetting drainage and diligence in producing the resource in a safe manner
• PRC §6830: Maximize recovery – prevent waste and promote maximum economic recovery and conservation of reservoir energy
• PRC §6830.1: Legislative findings – produce the optimum quantities of oil and gas and leave a minimum of unrecovered oil and gas
Statutory Constraints

Provisions After 1969 Imposing Environmental and Land Use Constraints

• California Environmental Quality Act (CEQA) – PRC §§21000 et seq.
• California Coastal Act – PRC §§30000 et seq.
• California Coastal Sanctuary Act – PRC §§6240 et seq.
  ▪ PRC §6241: Production of offshore oil & gas in certain areas of state waters poses an unacceptably high risk of damage and disruption of the state’s marine environment.
  ▪ PRC §6242: California Coastal Sanctuary is established covering all State offshore lands not under lease in 1994 or under leases that are later terminated.
  ▪ PRC §6243: New oil & gas leasing is prohibited in the Sanctuary unless strict conditions are met and the Legislature approves exception.
  ▪ PRC §6244: New leases are permitted if oil or gas deposits are being drained by wells upon adjacent federal lands and lease is in the best interests of the State.
  ▪ PRC §6872.5: Adjustment of boundaries of existing leases are permitted to encompass all of a field to permit more efficient resource recovery providing no new platforms are required.
Current State of Technology for Extended Reach Drilling

Steve Curran, CSLC
Petroleum Drilling Engineer
Extended Reach Drilling (ERD)
Since 1999, the company has drilled 15 ERD wells at Sacate, using Platform Heritage at the adjacent Pescado Field and is the longest ERD well in North America.
Sakhalin -- World Record Extended Reach Well

ExxonMobil Sakhalin-1 on Russia’s east coast was drilled from shore at a distance of nearly 7 miles.
Offshore and Onshore Operational Considerations

Pete Johnson
Chief Operations, CSLC
OFFSHORE OPERATIONS

- Limited Space
  - Drilling rig & equipment
  - Processing facilities
- Increased costs
  - Marine transportation
  - Platform maintenance
- Increased Operational Risk
  - Ocean oil spill
  - Worker safety
  - Equipment reliability
- Platform Capacity
  - Larger, heavier drilling rig & equipment
ONSHORE BASED OPERATIONS

• Adequate space & structural flexibility
• Reduced transportation costs
• Urban sites
  – Visual cover
  – Sound attenuation
  – Operating hour restrictions
  – Sour gas (higher public risk)
EXTENDED REACH DRILLING

• Platform capacity
  – Larger, heavier drilling rig & equipment
    • Mast, draw works, mud pumps, mud pits
    • Increased weight, increased space requirements

• Increased well cost
  – More expensive to drill & equip
  – More expensive to produce
    • More energy to lift fluids
    • Downhole maintenance more difficult
# SAFETY RISKS

<table>
<thead>
<tr>
<th>RISK</th>
<th>ONSHORE</th>
<th>OFFSHORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Safety</td>
<td>fire/explosion</td>
<td>Little or no risk</td>
</tr>
<tr>
<td></td>
<td>toxic gases</td>
<td></td>
</tr>
<tr>
<td>Worker Safety</td>
<td>fire/explosion</td>
<td>Transfers to platform</td>
</tr>
<tr>
<td></td>
<td>toxic gases</td>
<td>Limited crew (response)</td>
</tr>
<tr>
<td></td>
<td>industrial environment risks</td>
<td>Limited space</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storm surge / tsunami</td>
</tr>
</tbody>
</table>
Environmental Factors Relating to Offshore Oil Development in California

Eric Gillies, CSLC
Staff Environmental Scientist
Oil and Gas Offshore Infrastructure

Santa Barbara Channel
- marine resources/habitats
- marine mammals
- coastal biological resources
- offshore biological resources
- commercial/recreational fishing
- offshore water quality
- recreation
- visual
- lighting
- oil spill risk
- air quality/GHG emissions
Generalized Impact Summary

• **OFFSHORE IMPACTS** – Risk of Oil Spill, Marine Resources, Marine Mammals, Coastal Biological Resources, Commercial & Recreational Fishing, Recreation.

• **ONSHORE IMPACTS** – Onshore Biological Resources & Water Quality, Land Use, Cultural Resources, Recreation, Noise.

• **VARIES BY PROJECT** – Risk and Public Safety, Visual/Aesthetics.

• Air Quality Impacts and GHG Emissions can be substantial regardless of location.
Construction Impacts: Offshore vs. Onshore

Onshore Construction Impacts (PXP example)

- visual
- **terrestrial biology** (threatened and endangered species)
- habitat disturbance (e.g., wetlands, coastal scrub)
- water quality
- land use
- recreation
- cultural resources
- spill risks into local waterways, but less than offshore
- noise
- transportation
- risk to public safety
- air quality/GHG emissions
Construction Impacts: Offshore vs. Onshore

Offshore Construction Impacts (Montalvo Wells example)

- visual (new structure in the ocean difficult to mitigate)
- marine biology/water quality
- marine mammals
- marine habitat disturbance (e.g., kelp)
- commercial/recreational fishing
- recreation
- oil spill risk in marine/ocean environment
- air quality/GHG emissions (increased drilling and lifting)
- lighting (new platform)
- seafloor disturbance (new platform and pipelines)
- underwater noise (due to construction)
Regional Factors
Remote vs. Existing Oil and Gas Infrastructure Regions

North and Central Coast (Offshore Platform & Pipelines)
- visual (new structure in the ocean difficult to mitigate)
- marine biology/water quality
- marine mammals
- marine habitat disturbance (e.g., kelp)
- commercial/recreational fishing
- recreation
- lighting
- seafloor disturbance (new platform and pipelines)
- oil spill risk in marine/ocean environment
- air quality/GHG emissions
Regional Factors
Remote vs. Existing Oil and Gas Infrastructure Regions

North and Central Coast (Offshore Platform Supporting Processing Facilities)
- Visual (new onshore facilities)
- Terrestrial biology (threatened and endangered species)
- habitat disturbance (e.g., wetlands, coastal habitats)
- water quality
- land use
- recreation
- cultural resources
- spill risks into local waterways, but less than offshore
- noise
- transportation
- risk to public safety (gas processing)(less in rural areas; more near communities)
- air quality/GHG emissions
Regional Factors
Remote vs. Existing Oil and Gas Infrastructure Regions

North and Central Coast (Onshore Drilling Facility)
- visual (new onshore facilities)
- terrestrial/coastal biology (threatened and endangered species)
- habitat disturbance (e.g., wetlands, coastal habitats)
- water quality
- land use
- recreation
- cultural resources
- spill risks into local waterways, but less than offshore
- noise
- transportation
- risk to public safety (gas processing)(less in rural areas; more near communities)
- air quality/GHG emissions
## Operational Impacts: Offshore vs. Onshore

<table>
<thead>
<tr>
<th></th>
<th>Torch/Platform Irene Pipeline</th>
<th>PRC 421 Pipeline</th>
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</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td>1997</td>
<td>1994</td>
</tr>
<tr>
<td><strong>Barrels of oil spilled</strong></td>
<td>163</td>
<td>170</td>
</tr>
<tr>
<td><strong>Spill type</strong></td>
<td>Offshore pipeline leak</td>
<td>Onshore pipeline leak</td>
</tr>
<tr>
<td></td>
<td>(Platform Irene to shore)</td>
<td></td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Offshore Vandenberg (Santa Barbara County)</td>
<td>Near Coastal Bluff in Goleta (Santa Barbara County)</td>
</tr>
<tr>
<td><strong>Spill extent</strong></td>
<td>17 miles of coastline</td>
<td>&lt; 1 acre on golf course green</td>
</tr>
<tr>
<td><strong>Impacted resources</strong></td>
<td>• marine biology</td>
<td>• recreation (golf course)</td>
</tr>
<tr>
<td></td>
<td>(seabirds, sandy and gravel beach habitats, rocky intertidal shoreline habitats)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• marine water quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(crude oil in ocean)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• recreation (beaches)</td>
<td></td>
</tr>
</tbody>
</table>
Operational Impacts: Offshore vs. Onshore

General Conclusions:

• Offshore oil development has more environmental disadvantages than drilling from onshore with regard to oil spills.

• Spills from an onshore facility and associated onshore pipelines can be more easily contained compared the fluid environment of the ocean currents offshore where containment is much more difficult.

• Many impacts are specific to location of the oil development (offshore vs. onshore)

• Some impacts are dependent on location but also the specifics of the project.

• Air quality impacts and GHG emissions can be substantial regardless of location.
Access – Onshore Constraints

Doug Anthony, Deputy Director
Planning & Development Dept., Energy Division
Santa Barbara County
1996 Measure “A” Voter Initiative –
  - Two Consolidated Production Sites Only w/o Voter Approval
  - Expires 2021
Vandenberg Air Force Base –

- As of 8-8-08, VAFB unwilling to commence NEPA process
- VAFB willing to conduct an Enhance Use Lease process
- If a suitable site(s) is identified, AF would initiate competitive bidding process
Point Sal Area –
- No OCS leases that could drain State resources
- No existing oil/gas leases in area
Primary Siting/Design Considerations

• Human Safety - populated vs. remote
• Biology – Construction & Operations
• Archaeology & Cultural Resources
• Visual & Noise
• Conflict with Other Uses
• Permittable Zones
  – Conditionally in rural agriculture zone, or
  – Coastal-Related Industry
Environmental Advocates
Perspective

Linda Krop
Environmental Defense Center
Offshore Oil Development

Offshore Platforms vs Onshore Drilling Sites

California State Lands Commission
August 11, 2009

Linda Krop, Chief Counsel
Environmental Defense Center
www.edcnet.org
Offshore Oil Drilling Impacts

- Oil spills
- Air and water pollution
- Biological resources
- Energy
- Climate change & ocean acidification
- Safety: hazardous materials, toxics
- Seismic
- Recreation & fishing
- Visual blight
- Land use
Onshore Oil Drilling Impacts

- Oil spills
- Air and water pollution
- Biological resources
- Energy
- Climate change & ocean acidification
- Safety: hazardous materials, toxics
- Seismic
- Recreation & fishing
- Visual blight
- Land use
Mobil Clearview

- Proposal to slant drill from onshore into the South Ellwood Field via an expanded state lease (inc. removal of Platform Holly)
- UCSB analysis: impacts from oil spills, biology, public safety, recreation, views, air and water quality, noise, toxics
Venoco Paredon

- Proposal to slant drill from onshore in Carpinteria into offshore state leases (vs. slant drilling from existing platform)
- FEIR: “Class 1” impacts: hazardous materials releases; oil spills (marine resources and mammals, onshore biology and water quality, recreation); land use; visual resources
Tranquillon Ridge

- Proposal to slant drill from Platform Irene, which produces oil from the federal Pt. Pedernales Unit, as well as Tranquillon Ridge
- Onshore alternative: slant drill from VAFB
Tranquillon Ridge

- FEIR: onshore alternative reduces, but does not eliminate risk of marine oil spills.
- Increases impacts to biology, air quality, water quality, energy, fire protection, geology, risk of upset, ag, cultural resources, noise, public facilities, transportation
Tranquillon Ridge

- Post FEIR analysis of PXP Agreement
  - Eliminated offshore impacts related to extended life of Pt. Pedernales facilities
  - “[T]he reduced-life Tranquillon Ridge Project will result in fewer significant and unavoidable impacts than a new long-term onshore drilling and production project and is preferred to the VAFB Onshore Alternative”
Tranquilllon Ridge

- Onshore drilling is not an “alternative” to offshore drilling
  - Offshore drilling would continue as Platform Irene produces from Pt. Pedernales and TR
  - As with any other project, the onshore drilling would be additional and would result in new facilities, operations & impacts
Other Environmental Perspectives

Steve Uhring
Malibu Coastal Land Conservancy
Other Environmental Perspectives

Richard Charter
Defenders of Wildlife
Oil & Gas Industry Perspective

Bob Poole
Western States Petroleum Association
California State Lands Commission

California Crude Oil Production
Bob Poole
Western States Petroleum Association
August 11, 2009
Access to domestic energy resources

- Additional offshore production can provide significant new jobs, and more revenues for state and local governments
- Petroleum industry has demonstrated it can produce needed energy supplies from offshore California safely and responsibly
- Domestic production will benefit California consumers
- Existing technology provides access to new leases with minimal impacts
- Infrastructure is in place to support additional offshore production
Expanded energy access = more jobs/economic stimulus

Estimated economic benefits of increased OCS access:¹

- More than 14,000 new jobs in California
- 10.4 billion more barrels of oil
- 18 trillion more cubic feet of natural gas
- $3 billion in new economic output
- $691 million in additional employment income
- $12 billion in new government revenue

¹As of 2030, assuming development of currently off limits California OCS resources

Source: API; Strengthening Our Economy: The Untapped U.S. Oil and Gas Resources,“ ICF International, December 5, 2008
Access to domestic energy resources

U.S. Crude Oil (Bbl) and Natural Gas (Tcf) Resources
(Undiscovered Technically Recoverable Federal Resources)*

Pacific Offshore
10.5 Bbl
18.3 Tcf

Lower 48, Onshore
11.7 Bbl
145.9 Tcf

Atlantic Offshore
3.8 Bbl
37.0 Tcf

Alaska Onshore
18.8 Bbl
85.1 Tcf

Gulf Offshore/Deepwater
44.9 Bbl
232.5 Tcf

Alaska Offshore
26.6 Bbl
132.1 Tcf

Source: MMS, BLM, and API calculations
*Figures may not add exactly to total due to rounding.

116.4 billion barrels is enough oil to power over 65 million cars for 60 years.

650.9 trillion cubic feet is enough natural gas to heat 60 million homes for 160 years.
Access to domestic energy resources - technology reduces footprint, improves safety

“Since 1970, a total of only 850 barrels of oil have been lost into the marine environment from Pacific OCS operations. This is less than the amount of oil seeping naturally into the ocean from cracks in the seafloor during any given week offshore California.”

Source: U.S. Minerals Management Service, Pacific Region
Technology reduces footprint, improves safety

- Since 1970, over 1 billion barrels of oil have been produced off California, according to the U.S. Minerals Management Service.

- During that time, only 850 barrels of oil have been accidentally released into the marine environment.

- About 55,000 barrels of crude oil are introduced from natural seeps each year into the ocean off Santa Barbara.
Technology reduces footprint, improves safety

Precision Drilling – Technology Drives a Dramatically Smaller Footprint

- **1970**: 20 acres, 0.8 square miles
- **1980**: 16 acres, 3 square miles
- **1990**: 12 acres, 28 square miles
- **Present**: 2 acres, 80 square miles

Source: American Petroleum Institute
Technology reduces footprint, improves safety

Extended Reach Drilling: Onshore to offshore

Source: ExxonMobil
Technology reduces footprint, improves safety
Technology reduces footprint, improves safety

Oil industry is constantly developing sophisticated safety processes and equipment, such as:

- Measurement-while-drilling technology
- Global positioning systems
- High resolution inspection and monitoring devices
- Remotely-operated underwater vehicles
- 3-D and 4-D Seismic Technology
Infrastructure in place to support offshore resources

Santa Barbara County oil and gas facilities

Source: Santa Barbara County
California Energy Sources

Crude Oil (2008)
- In-State: 38.1%
- Alaska: 13.41%
- Foreign: 48.5%

Electricity (2008)
- In-State: 73.2%
- Natural Gas: 46.5%
- Nuclear: 14.9%
- Large Hydro: 9.6%
- Coal*: 15.5%
- Renewable: 13.5%
- Imports: 26.8%
- PNW: 8.4%
- USSW: 18.4%

Natural Gas (2007)
- In-State: 12.9%
- Canada: 22.1%
- Rockies: 24.2%
- Southwest: 40.8%

* Intermountain and other California utility-owned coal plants, though outside California, are considered "in-state," since they are in California utilities' control areas.

Source: California Energy Commission
California is an energy island

Source: California Energy Commission
Putting future energy into perspective
The future will require multiple sources/strategies

- Despite drop in demand, the U.S. needs to improve energy security by better utilizing domestic energy supplies
- We can develop U.S. energy safely and with environmental sensitivity
- We must:
  - Add domestic supplies through greater access
  - Conserve energy
  - Use energy more efficiently
  - Develop alternative and renewable fuels and technologies
Offshore State Resource Proposals & Potential

Jeff Planck

Senior Engineer, CSLC
Potential State Resources

• There are at least 8 proven and undeveloped oil and gas fields in the offshore basins of Southern California

• The total reserve potential of the undeveloped fields and prospects in State waters may range from 500 million to 1.2 billion barrels of oil

• Other “unproven” fields could increase this estimate by 50-100%
Potential State Resource Areas

- At least 6 of the 8 undeveloped fields can be reached from available onshore drill sites to develop reserves within State waters off the Santa Barbara and Ventura coast:
  - Tranquillon Ridge (VAFB): 90-200 Million barrels of oil
  - COJO (Gov. Pt.): 110-210 Million barrels of oil
  - Manatee (Gaviota): 100 Million barrels of oil
  - Paredon (Carpinteria): 30 Million barrels of oil
  - West Montalvo (McGrath): 40-90 Million barrels of oil
  - Santa Monica Bay (LA County): 50+ Million barrels of oil
Santa Maria Basin
(“North County” Santa Barbara)

- State Resource Areas
  - Tranquillon Ridge (90-200)
  - Sudden Area (Unknown)
- State-OCS Resource Areas
  - Rocky Point (34 MBO)
- All reachable from onshore or federal offshore platforms
- New leases required
North Santa Barbara County

- COJO
  - Onshore Site Available at Government Point (previous site of Federal drilling and production)
  - 110 - 200 MBO
  - New lease required
South Santa Barbara County

- State Resource Areas
  - Manatee
    - Platform Harmony or onshore
    - 100 MBO
    - New Lease required
  - Gato Canyon
    - No current access
    - 20 MBO
    - New Lease required
  - South Elwood Field
    - Platform Holly
    - 200 MBO
    - Currently leased but requires a boundary extension
Carpinteria Area and Ventura County

- **Carpinteria Area Projects**
  - **Paredon**
    - Onshore site
    - 30 MBO
    - Current lease
  - **Carpinteria Offshore**
    - Platform Hogan
    - 20 MBO
    - Current leases

- **Ventura**
  - Montalvo (40-90 MBO) – currently leased
  - West Montalvo (gas) – would require lease boundary extension
# State Prospects and Projects

<table>
<thead>
<tr>
<th>Field</th>
<th>Offshore Platform available</th>
<th>Onshore Site available</th>
<th>Fed. Drainage Occurring</th>
<th>Published Potential (in Million bbls of oil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Ridge</td>
<td>✓ (Irene)</td>
<td>✓ (VAFB)</td>
<td>✓</td>
<td>90-200</td>
</tr>
<tr>
<td>Rocky Pt</td>
<td>✓ (Harvest, et al)</td>
<td>✓ (VAFB)</td>
<td>✓</td>
<td>34</td>
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<tr>
<td>Sudden</td>
<td>✓ (Harvest, et al)</td>
<td>✓ (VAFB)</td>
<td>?</td>
<td>Unknown</td>
</tr>
<tr>
<td>COJO</td>
<td>No</td>
<td>✓ (Gov. Pt.)</td>
<td>No</td>
<td>110-210</td>
</tr>
<tr>
<td>Manatee</td>
<td>✓ (Hondo-Heritage)</td>
<td>✓ (Gaviota)</td>
<td>?</td>
<td>100</td>
</tr>
<tr>
<td>Gato Canyon</td>
<td>(Future / Subsea)</td>
<td>? (Las Flores Cyn?)</td>
<td>No</td>
<td>20 - 30</td>
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<tr>
<td>South Elwood</td>
<td>✓ (Holly)</td>
<td>No</td>
<td>No</td>
<td>200 MBO (incr. 10KB/D)</td>
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<tr>
<td>Paredon</td>
<td>No</td>
<td>✓ (Paredon)</td>
<td>No</td>
<td>30</td>
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<tr>
<td>Carpinteria</td>
<td>✓ (Hogan)</td>
<td></td>
<td>✓</td>
<td>20</td>
</tr>
<tr>
<td>Montalvo</td>
<td>✓ (?)</td>
<td>✓</td>
<td>No</td>
<td>40-90</td>
</tr>
</tbody>
</table>
Staff Evaluation Methodology

Greg Scott, CSLC
Chief, Mineral Resources
Management Division
Staff Evaluation of Development Applications

• Consistent with CSLC Mission Statement
• Development projects are reviewed by CSLC staff and evaluated on a case by case basis
• Extensive environmental and engineering review to ensure that the highest standards of public safety and environmental protection are met
• Ensure state resources are protected from inefficient development activities or unauthorized drainage
• Development plans must conform to requirements of affected state, federal, and local jurisdictions
Policy Considerations

Paul Thayer
Executive Officer, CSLC