High Energy Seismic Surveys Offshore of California’s Nuclear Power Plants – Permitting Challenges and Lessons Learned
Presentation Overview

• Background and Objectives
• Proposed Offshore Seismic Imaging Project
• Federal, State and Local Agency Requirements
• CEQA/NEPA Process Overview
• Key Permitting Agency Issues and Process
• Final Outcome
Legislative History

- 2006  California Assembly Bill (AB) 1632 (Blakeslee)
- 2007  Japan’s KKR earthquake; 21-month nuclear plant outage
- 2008  USGS & PG&E discover Shoreline fault near Diablo Canyon (DCPP)
- 2008  CEC recommends 3D seismic reflection mapping at DCPP & SONGS
- 2009  CPUC & CEC direct PG&E to perform studies before seeking license renewal
- 2009  AB 42 – required 3D seismic surveys; governor’s veto says bill not necessary because happening anyway
- 2010  CCC directs PG&E to submit any 3D studies that may be performed before it will process CDP & consistency certification for license renewal
- 2010  CPUC approves PG&E’s application to conduct 3D studies and creates Independent Peer Review Panel (IPRP)
- 2011  Fukushima Daiichi Nuclear Disaster
- 2011  PG&E submits application for geophysical survey permit (GSP) to State Lands Commission (SLC)
Fukushima
Project Location
Project Components

- Onshore and Offshore Low Energy Surveys
- Ocean Bottom Seismometer Array (OBS)
- Offshore High Energy Seismic Survey (HESS)
Offshore Seismic Imaging Survey

- Cambria to Point San Luis in water up to 1,400 ft.
- Specialized survey vessel approximately 235 ft in length
- Two strings of tuned air guns with a volume of 3,300 in³
- Vessel-towed hydrophone streamer array of 3.7 miles in length
- Additional scout and support vessels
- Scheduled for September through December 2012
Original Survey Track Lines

- Within 25 meter depth
- 82-days
- Actual survey duration is 42 days
Offshore Survey Racetrack - 2012

- Boxes 4 and 2 only (Box 1 in 2013)
- November – December (no seismic activity in October)
- 49-day survey operation (reduced from 68 days) of which only 23.25 day of seismic activity
Towed Air Gun Array and Acoustic Streamers
Offshore Survey Procedures

- Marine Wildlife Contingency Plan approved by NOAA Fisheries/USFWS as part of the IHA approval process
  - Procedures consistent with HESS Protocols, NSF FEIS, and NOAA Fisheries Guidance.
  - Pre-activity aerial surveys and equipment noise level testing
  - Established Safety (160 db) and Exclusion Zones (180 db) as approved by NOAA
  - Ramp-up of all air guns
  - Mitigation air gun on during all turns and temporary shut-downs
  - Passive Acoustic Monitoring (PAM)
  - Marine mammal monitors onboard all survey vessels and if necessary aircraft
  - Local commercial fishing vessels used to support operations
  - Scheduled to coincide with low marine mammal activity (late fall/early winter)

- Notification to mariners and commercial fishers
- Avoidance of sensitive resource areas to extent feasible
Anticipated Agency Approvals

- California State Lands Commission
  - Geophysical Permit (Seismic Survey)
  - California Environmental Quality Act (CEQA) Lead Agency
- NOAA Fisheries
  - Incidental Harassment Authorization (IHA)
  - Endangered Species Act (ESA) Consultation
- National Science Foundation
  - Contract Approval
  - National Environmental Policy Act (NEPA) Lead
- Army Corps of Engineers
  - Section 404 Certification (NWP 5)
- U.S. Fish and Wildlife Service (FWS)
  - Incidental Harassment Authorization (IHA) - (Sea Otter)
  - ESA Consultation
- California Coastal Commission
  - Coastal Development Permit (CDP)
  - Federal Consistency
- California Department of Fish & Game – MPA Authorization
- California Dept. of Parks and Recreation – Encroachment Permit
- County of San Luis Obispo – Encroachment Permit
- U.S. Coast Guard – Notice to Mariners
Incidental Take Authorization

- NOAA Fisheries and US Fish and Wildlife Service
  - Marine Mammal Protection Act of 1971 (MMPA)
- Endangered Species Act (ESA)
- Harassment aka “take” of Marine Mammals
- Incidental Take Authorization or Letter of Authorization
- Section 7 versus Section 10 Consultation Process
- Requires completion of NEPA Process and Federal Consistency Determination
Marine Geophysical Permit

- Issued by the California State Lands Commission
- High Energy Seismic Surveys have been prohibited in State Waters since early 1990’s
- Requires completion of an Environmental Impact Report (CEQA)
Coastal Development Permit/Federal Consistency Certification

- Issued by the California Coastal Commission
- Projects must comply with the State’s Approved Coastal Plan
- Prohibits project approvals by either State or Federal agencies without mitigation for all potential significant impacts
- Stated opposition to high energy sources in the marine environment.
### Project Approval Schedule

<table>
<thead>
<tr>
<th>Action</th>
<th>Date</th>
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<tbody>
<tr>
<td>Submission of Project Application to CSLC</td>
<td>April 29, 2011</td>
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<tr>
<td>Release of Draft EIR by CSLC</td>
<td>March 16, 2012</td>
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<tr>
<td>Draft EIR Public Workshops</td>
<td>April 19, 2012</td>
</tr>
<tr>
<td>Final EIR and CSLC Approval Hearing</td>
<td>August 20, 2012</td>
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National Environmental Policy Act (NEPA)

- Required when a project has the potential to impact the natural and manmade environment
- Lead Agency was the National Science Foundation
- Determined due to the fact they would be taking the first discretionary action on the project (approval of use of federal property)
- Environmental Assessment (EA)
- Keys on interagency consultations
  - ESA
  - Essential Fish Habitat
  - Section 106
  - Clean Air Act
  - Clean Water Act
Federal NEPA Review Timeline (2012)

- April 16 – May 31: State/Federal Agency Coordination
- June 1 – June 22: Prepare Draft Environmental Assessment (DEA) which:
  - Incorporates, and tiers from, NSF PEIS
  - Incorporates CSLC DEIR information to the extent practicable/feasible/agreeable
  - Reflects new agreements with California State agencies regarding monitoring/mitigation measures
- June 25 – July 25: Release DEA for 30 day public comment period
- July 25 – August 1: Prepare responses to public comments
- August 1: Release Final EA
- August 1 – 31: Agency 30-day cooling off period
- September 1: Record of Agency Decision (assuming coincides with IHA/ESA processes)
Monitoring Programs/Bond

- IHA/MWCP Monitoring Program
- Harbor Porpoise Monitoring Program
- Sea Otter Monitoring Program
- Aerial Surveys conducted by NMFS
- Adaptive Management Program
- Stranding Response Plan
- CSLC Mitigation Monitoring Plan
- Fish and Invertebrate Monitoring Program
- Fisheries Notifications
- $5 million Bond for Geophysical Survey Permit
Sound Level Predictions and Mitigations

- Southall vs. NMFS Methodology
- Level A vs. Level B Take
- 1.2-mile Exclusion Zone
- Undefined Safety Zone
- Aerial Surveys 10 days in advance
- Weekly Aerial Surveys
- 3 Shutdowns - Reconsultation
### Comparison of Exclusion Zones

Comparison of Distances to the 180 dB SEL (meters/statute miles)

<table>
<thead>
<tr>
<th>PG&amp;E IHA Application</th>
<th>Previous Columbia IHA Approvals</th>
<th>CSLC EIR Noise Modeling</th>
<th>EIR Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,010 / 0.6</td>
<td>852 / 0.5</td>
<td>856 / 0.5</td>
<td>1,931 / 1.2</td>
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<tr>
<td>Greeneridge Sciences, Inc. modeling for upslope transect</td>
<td>Diebold, et al. (2010) for intermediate depth water (100 to 1,000 m)</td>
<td>JASCO modeling for EIR (Range of $R_{95%}$ for Site 1)</td>
<td></td>
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Safety and Exclusion Zones
Monitoring of Impacts to Fish/Invertebrates

- Monitoring of short- and long-term impacts to fish and invertebrates
  - Short-Term Effects: ROV High definition video of demersal fishes, invertebrates, and seafloor habitat
  - Long-Term Effects: California Collaborative Fisheries Research Program
  - Before-After/Control-Impact (BACI) Study Design
Harbor Porpoise Monitoring Program

- Morro Bay Stock impacts determined to be greater than incidental
- NOAA Fisheries unable to approve IHA without significant mitigation program
- Monitoring included extensive aerial and acoustic surveys
Sea Otter

- Endangered under ESA and Protected under the MMPA
- Incidental Take Permit Required by USFWS
- No documented impacts from marine seismic operations
- Monitoring Program Required by USFWS
Denial

- On November 14, 2012 the California Coastal Commission Denied the CDP and Objected to the Federal Consistency Request
Reason for Denial

- Inability to effectively detect marine wildlife within the Exclusion and Safety Zones
- Believe a Level A Take will Result from Project
- PG&E did not effectively demonstrate a need for the project that would result in an Override of the Coastal Act Requirements
Results of the Denial

- Due to restrictive timing and availability of the RV Langseth, PG&E had initiated mobilization of vessel to survey area.
- Vessel returned to the Atlantic Coast
- Currently no available HESS vessels available on the West Coast
- PG&E suspended all HESS activities and have focused on interpretation of existing data.
Question/Answer Session