Utilizing a Net Environmental Benefit Analysis Approach to Support the Selection of Offshore Decommissioning Alternatives

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Joseph Nicolette, Global Director - Ecosystem Services
Mark Travers, Corporate Vice-President
Dan Price, Principal Consultant
Presentation Outline

- Overview of Net Environmental Benefit Analysis (NEBA)
- Overview of the Offshore Decommissioning Process
- Applications of NEBA
- Rigs-to-Reefs – Benefits and Obstacles
What is a Net Environmental Benefit Analysis (NEBA)?

• An analytical approach to balance the risks, benefits and tradeoffs associated with competing alternatives
  – Incorporates environmental, economic and social factors
Overview of NEBA

- Provides a non-arbitrary, transparent and quantitative approach to compare between alternative actions using litigation-tested technical and scientific methodologies
- Helps stakeholders manage costs while managing site risks, creating environmental, social and economic value and providing a demonstrable net benefit to the public (e.g. documenting environmental sustainability and stewardship)
- Methodologies are consistent with state and federal policy and guidance
NEBA Framework

First formalized framework

- Efroymson, Nicolette and Suter (2003)
  - Extension of ecological risk assessment
  - Key difference – Considers environmental benefits, which traditional risk assessment does not

- Framework recognized by:
  - National Oceanic and Atmospheric Association (NOAA)
  - United States Environmental Protection Agency (USEPA)
  - USEPA Science Advisory Board
Decommissioning Process Overview

- Decommissioning an offshore platform in the Gulf of Mexico generally entails:
  - Plugging all wells supported by the platform and severing the well casings 15 feet below the mudline
  - Cleaning and removing all production and pipeline risers supported by the platform
  - Removing the platform from its foundation by severing all bottom-founded components at least 15 feet below the mudline
  - Disposing the platform in a scrap yard or fabrication yard, or placing the platform at an artificial reef site
  - Performing site clearance verification at the platform location to ensure that no debris or potential obstructions remain
Decommissioning Process Overview

• Must be decommissioned according to the terms of the Department of the Interior (DOI) lease

• DOI regulations include a disposal option that allows keeping a biologically valuable structure in the marine environment as an artificial reef through a process called “rigs-to-reefs”

• Louisiana, Texas, Mississippi and California have passed specific legislation to establish programs for building artificial reefs from oil and gas platforms
Offshore Decommissioning Process

Platform and Jacket

Structures and Facilities

- Platform (topsides) must be cleaned and decontaminated before removal for re-use, recycling and/or disposal

- Substructures can be
  - Re-used
  - Removed
  - Left in place

- Removal involving cutting and explosives are issues that need to be addressed

Good Use of NEBA
Seabed Deposits Management (e.g. drill cuttings and muds)

• Management options
  – Leave *in-situ*
  – Cap *in-situ*
  – Remove and re-inject
  – Remove and dispose onshore

• Requires data on physical, chemical and biological aspects and impacts

• *In-situ* options require appropriate monitoring program
Pipelines and Associated Structures

- Management options for pipelines and subsea equipment include:
  - Leave *in-situ*
  - Remove and re-use
  - Remove and dispose

- If *in-situ*, verification of decontamination is required

- Structures protruding above seabed pose hazards to fishing, navigation and other users and must be removed and disposed onshore
Decommissioning Decision Tree

Offshore Oil & Gas Platform

Jacket
- Tow to Reef Site (one or multiple pieces)
- Topple In-Place
- Reef In-Place Upright
- Convert to Artificial Reef
  - Remove & Reinstall
  - Onshore Recycle

Deck
- Onshore Recycle
NEBA and Decommissioning

- Decommissioning alternatives generally fall under three categories: (1) Removal, (2) Disposal at sea and (3) Conversion to other uses.

- NEBA approach quantifies the change in ecological habitat value (e.g. fisheries habitat and associated stock changes), social value (e.g. recreational opportunities - diving and sport fishing) and economic value (e.g. enhancement to fish stocks affecting subsistence fishing, commercial fishing and tourism) associated with each alternative.

<table>
<thead>
<tr>
<th>Management Actions</th>
<th>Ecological Service Value</th>
<th>Human Use Economic Value</th>
<th>Social Value</th>
<th>Human Risk Profile</th>
<th>Ecological Risk Profile</th>
<th>Cost</th>
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Conceptual NEBA Output

Costs, benefits and risk profiles change for each alternative evaluated.
Evaluate combined ecological, human use and economic values to provide information for an informed decision.
Reefing Economics

- Rigs-to-Reef projects are feasible when
  - Cost to leave the jacket in place or transferred to new location is significantly less expensive than complete removal
  - Generally only occurs for heavy jackets that can’t be moved by a derrick barge to a transport barge in a single lift (i.e. too large and heavy)
  - Addressing damaged platforms
Reefing Economics

• Incremental Costs to Reef a Jacket
  – Cutting a jacket down to provide minimum 85 feet of clearance can cost US$0.5 MM to US$1.0 MM
  – Moving a jacket to a new location can cost US$1.0 MM to US$1.75 MM

• Conventional Projects in the Gulf of Mexico
  – For rigs in less than 300 feet of water, typically cost US$70 MM to US$140 MM depending on the amount of jacket structure that remains
Benefits of the Rigs-to-Reefs Program

• Environment - Aquatic Life Habitat
  – Fish biomass at offshore platforms is ten times greater than protected coral reefs and artificial reefs

• Public - Recreational Fishing and Diving

• Industry
  – Commercial fishing
  – Charter fishing
  – Oil and Gas – Decommissioning cost savings and solution for technical challenges
Obstacles to Reefing

- **Water Clearance Requirement (USCG)**
  - 85 feet or 50 feet with lighted buoy

- **Ban on Deck Reefing (MMS)**
  - Fear of pollution even after cleaning

- **Cost to Move Platforms/Jackets to Existing Reef Sites**
  - Fear that artificial reef locations will become waste disposal sites

- **Interference with future shipping lanes and the freedom and safety of navigation**
Questions

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