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

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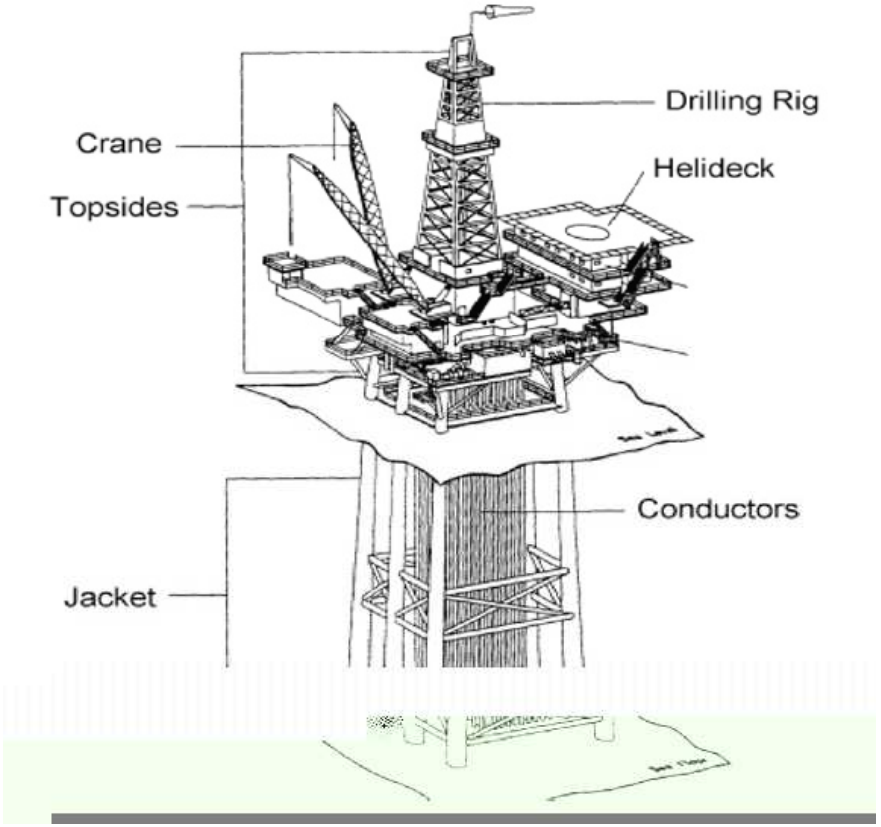
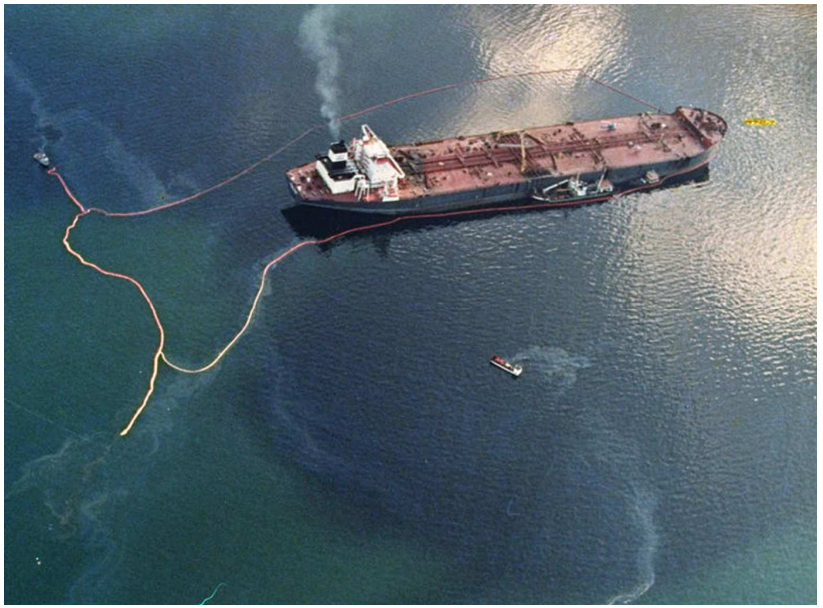
Presentation Outline

- 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



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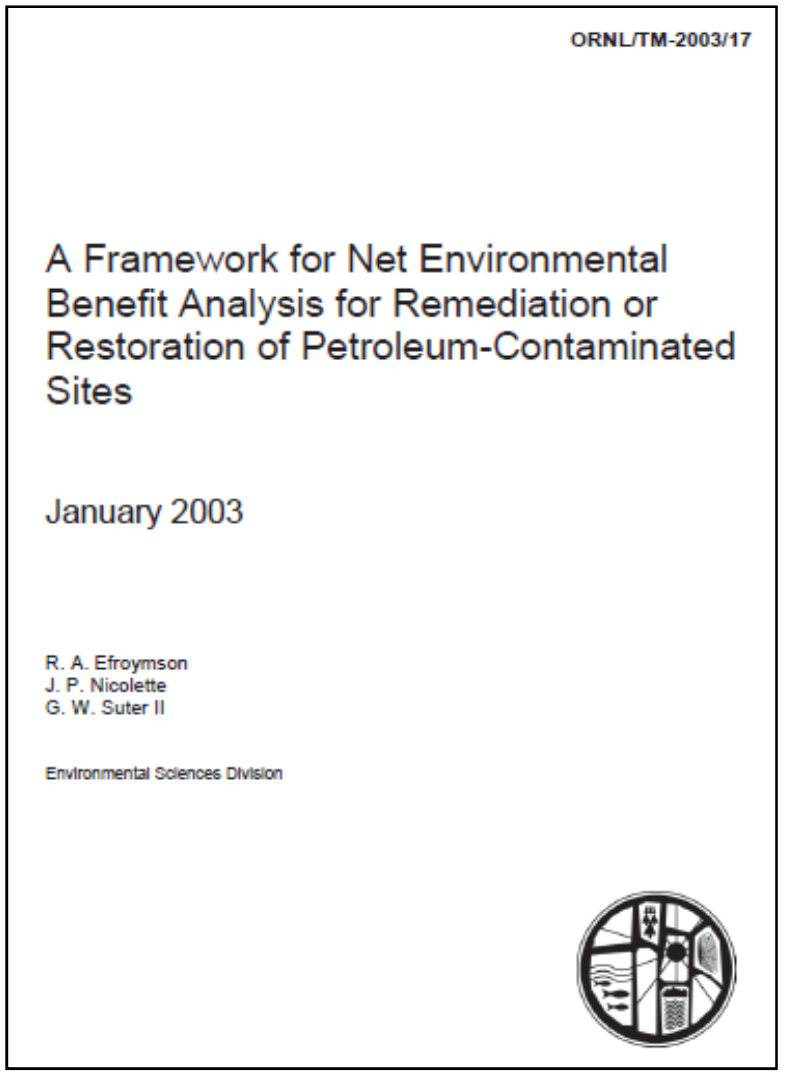
Overview of NEBA

- 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



ORNL/TM-2003/17

A Framework for Net Environmental Benefit Analysis for Remediation or Restoration of Petroleum-Contaminated Sites

January 2003

R. A. Efroymson
J. P. Nicolette
G. W. Suter II

Environmental Sciences Division

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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

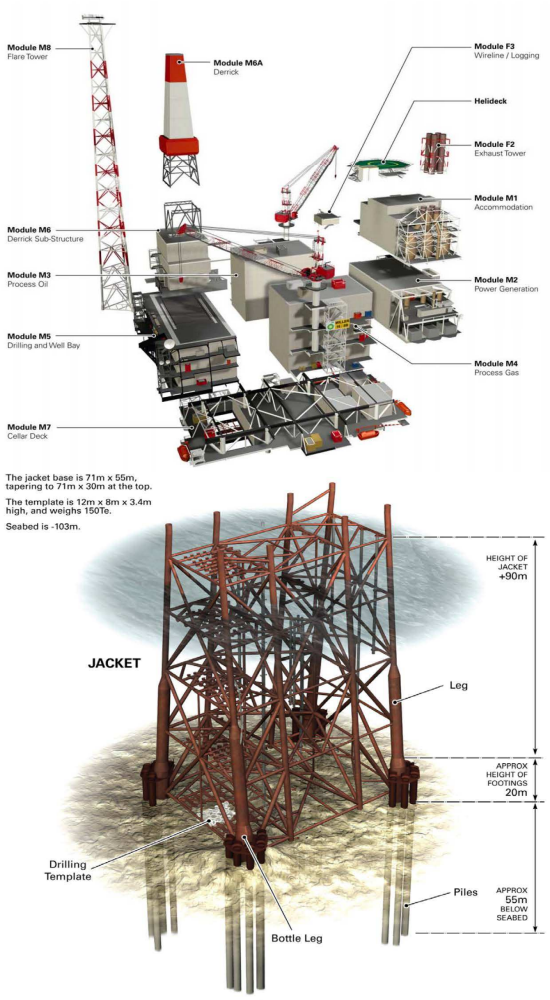
Decommissioning Process Overview

- 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

Good Use of NEBA

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

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Offshore Decommissioning Process

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

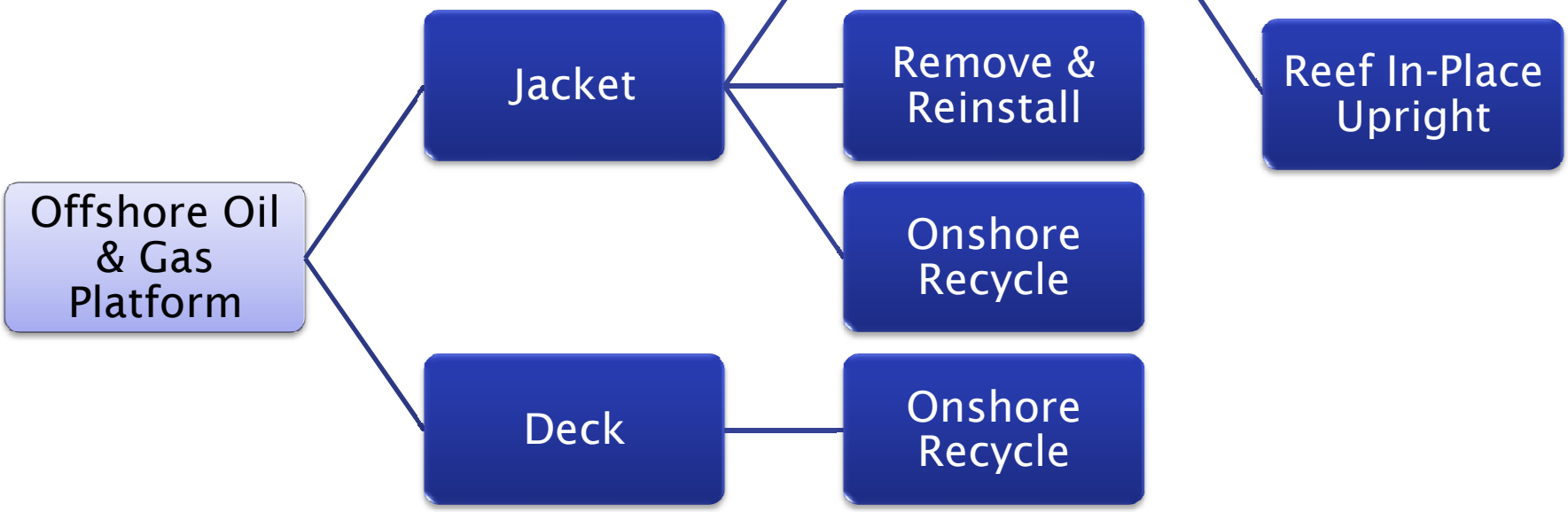
Offshore Decommissioning Process

Good Use of NEBA

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



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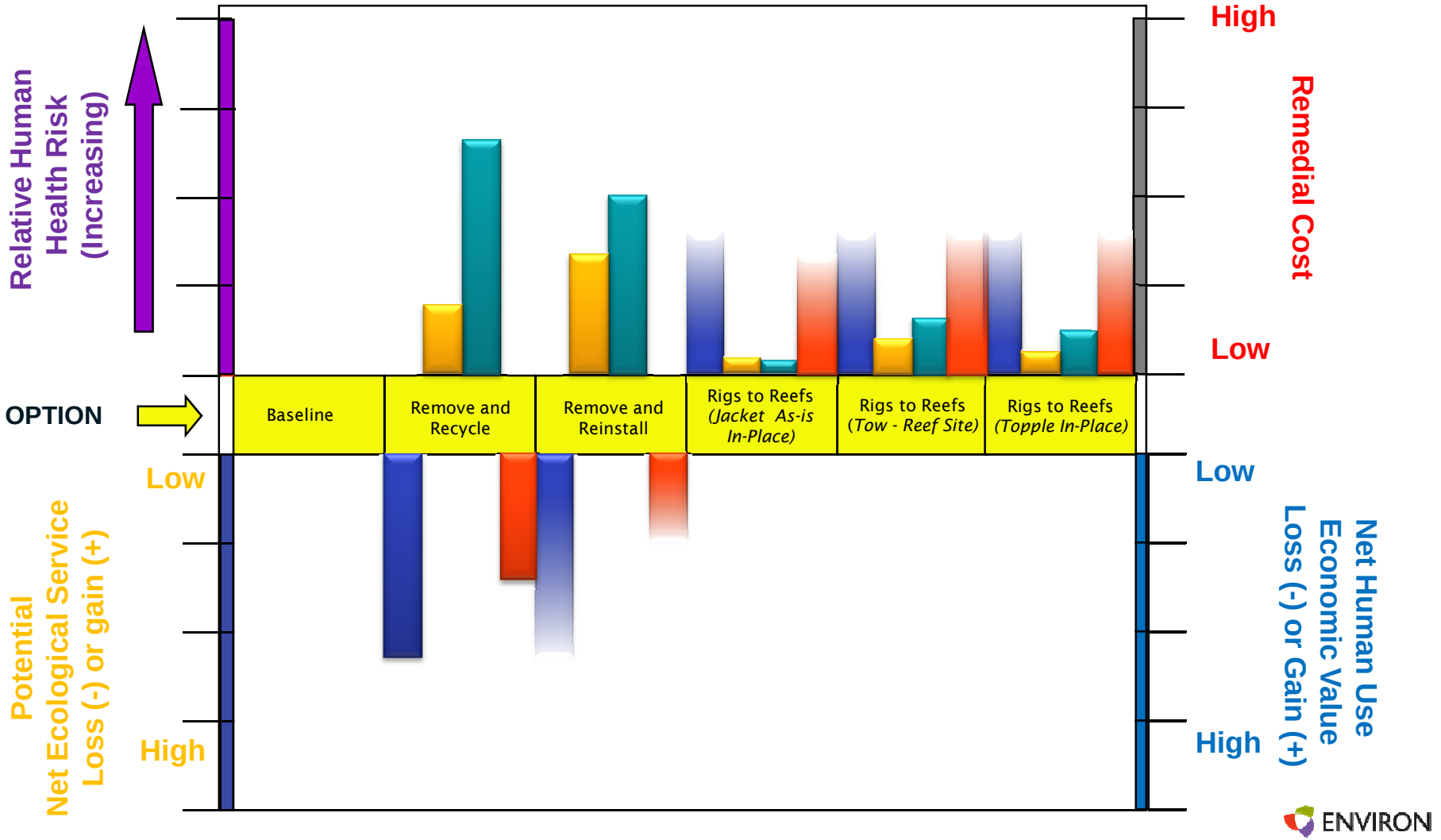
NEBA and Decommissioning

- 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

NEBA - A Comparative Analysis for Decommissioning Alternatives						
Management Actions	*Ecological Service Value*	*Human Use Economic Value*	*Social Value*	*Human Risk Profile*	*Ecological Risk Profile*	*Cost*
Removal						
Disposal at Sea						
Conversion to Other uses						
and so on ...						

Conceptual NEBA Output

Costs, benefits and risk profiles change for each alternative evaluated



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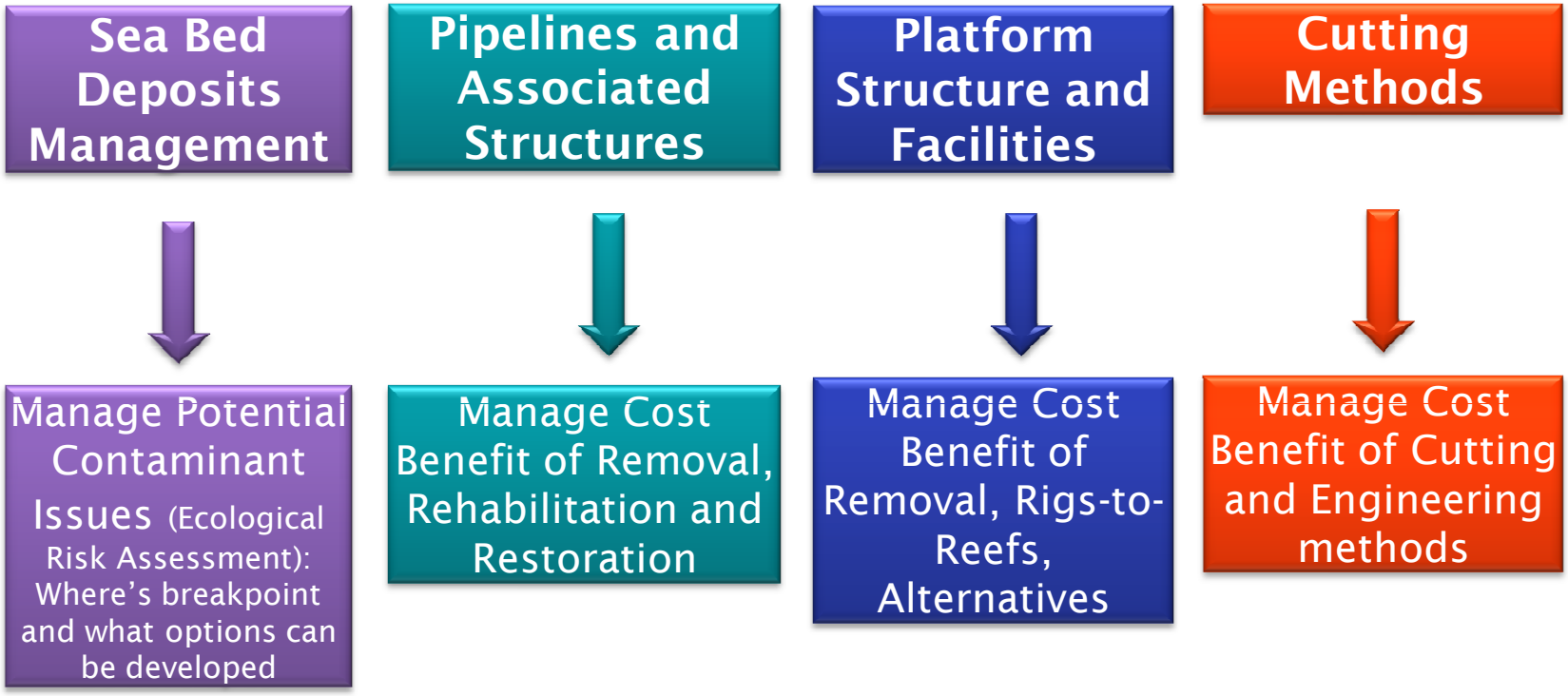
NEBA Application



Evaluate combined ecological, human use and economic values to provide information for an informed decision

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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

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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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