Using Manned Submersibles to Respond to Submerged Oil Spills

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OSPR/Chevron Oil Spill Response Technology Workshop
San Ramon, CA
February 27, 2013

Background Considerations: Non-Floating Oils

Certain heavy refined and crude oils (group V oils) may sink when spilled. Today, more of these types of oils are being extracted, handled and transported in US waters.

Oils with specific gravities higher than water (1.0) will sink.

Fresh Water @ 60 F = 1.00 SG
Sea Water @ 77 F = 1.025 SG
Example: 6 Fuel Oil @ 60 F = 0.88 – 1.08 SG

In addition to the physical properties of a given oil, other conditions that may induce an oil to sink include: temperature (of the oil and the water), physical actions (waves, currents, etc.), presence/mixture of solid materials with the oil (sand, sediments, etc.)

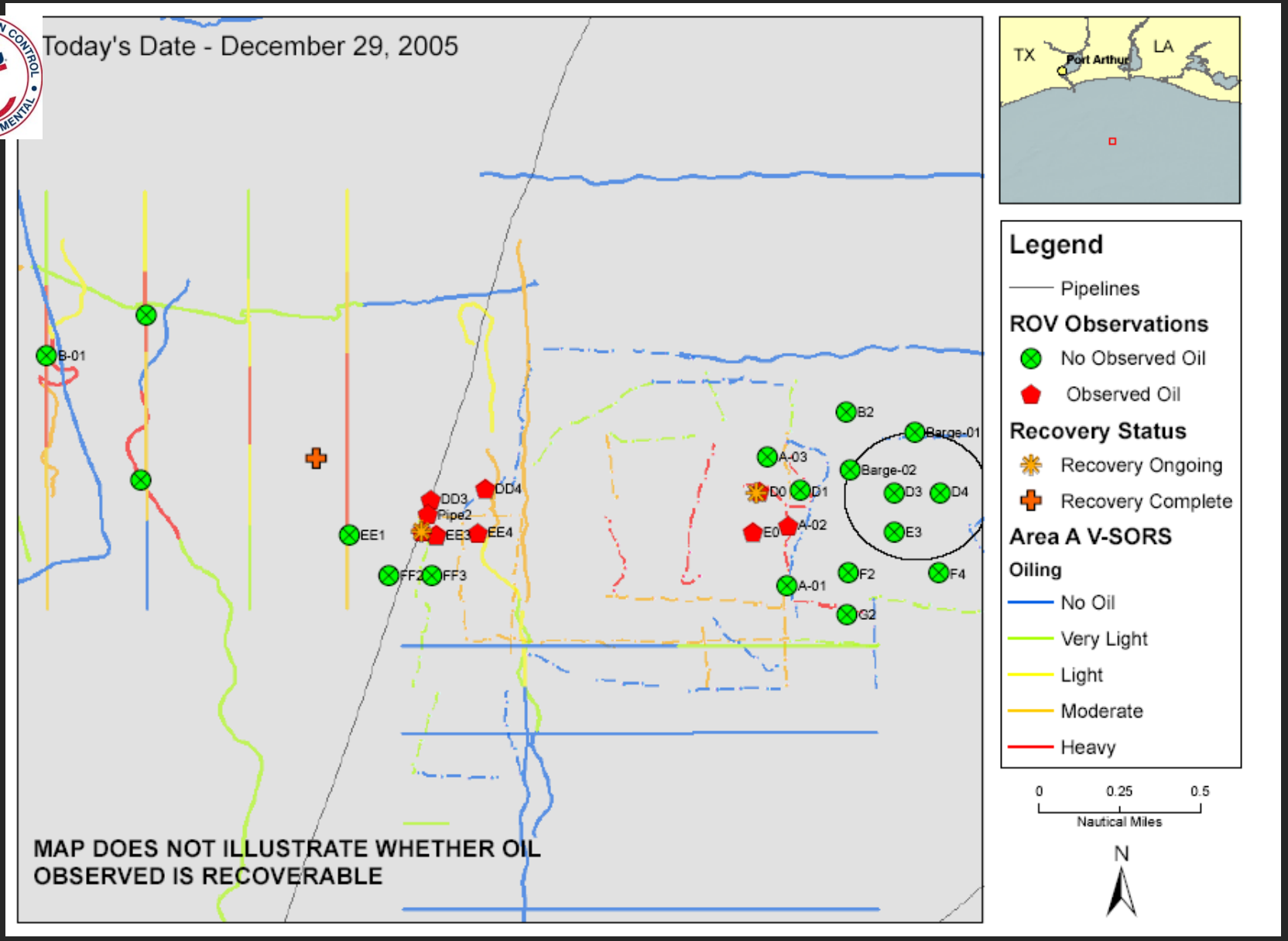
Three Fundamental Difficulties in Nonfloating Oil Response Operations:

Locating & Tracking: It can be particularly difficult to locate, track and predict the trajectory and behavior of non-floating oil; especially in the presence of currents.

Containment: Effective containment of submerged oil can be difficult to accomplish, particularly so when currents are present.

Recovery: Effectiveness depends on a wide range of conditions including the type of oil involved, depth, conditions of the marine environment, etc. Most methods are developed on scene and not ready in advance.

DBL 152 – Over 2 million gallons of Slurry Oil Spilled –
November 14, 2005 – Gulf of Mexico



Complex subsurface hydrodynamics and surface environmental conditions

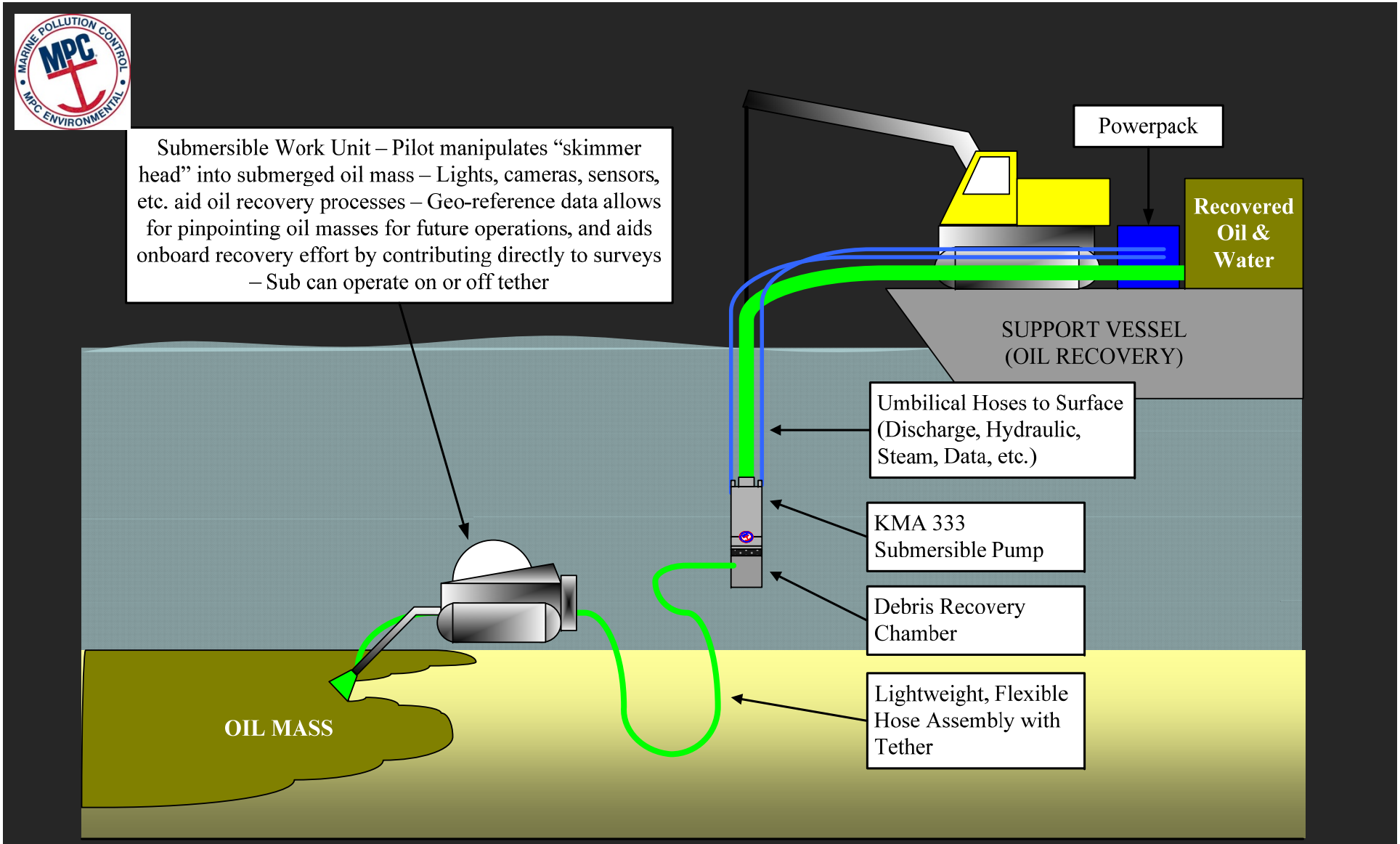


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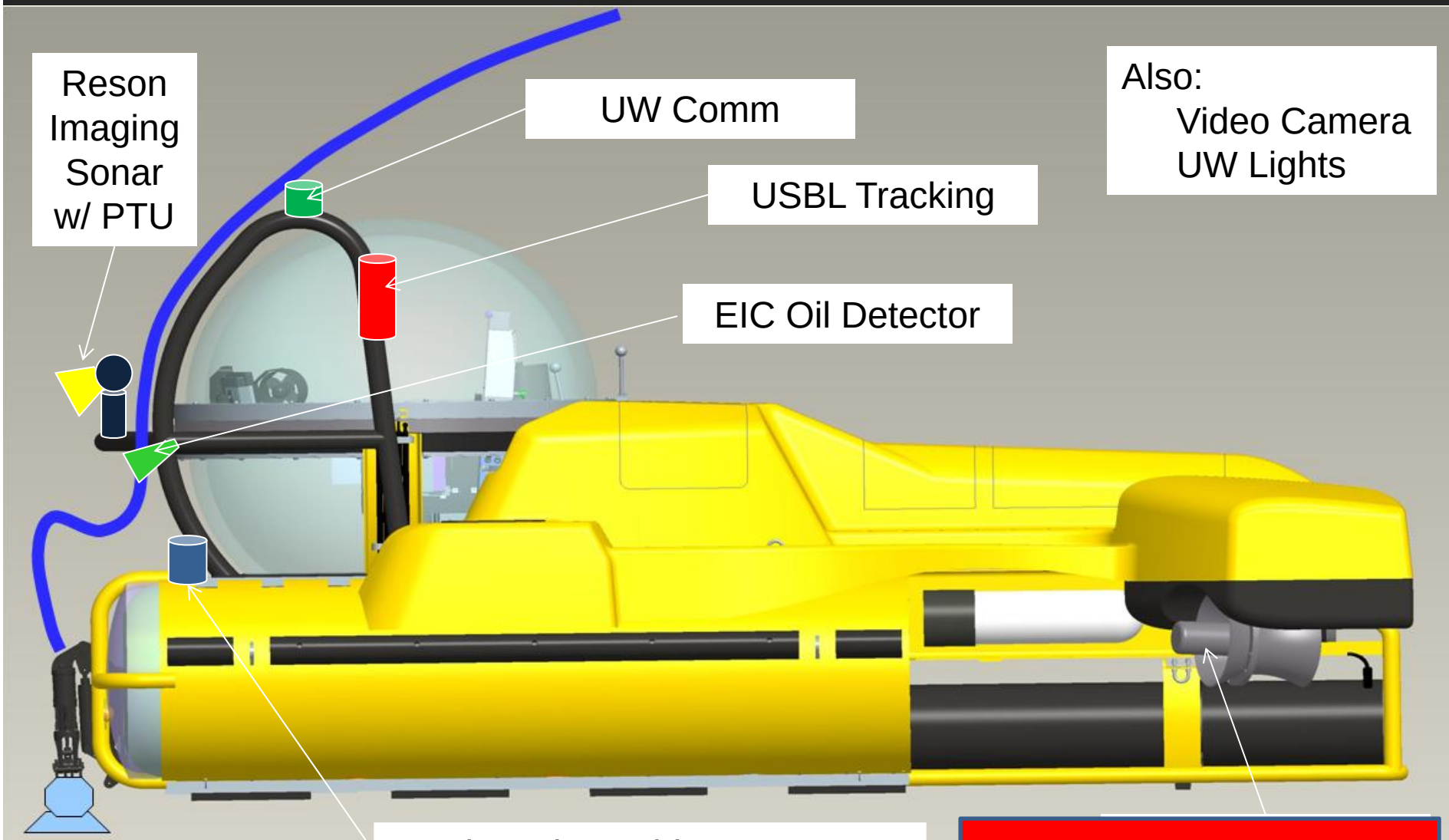
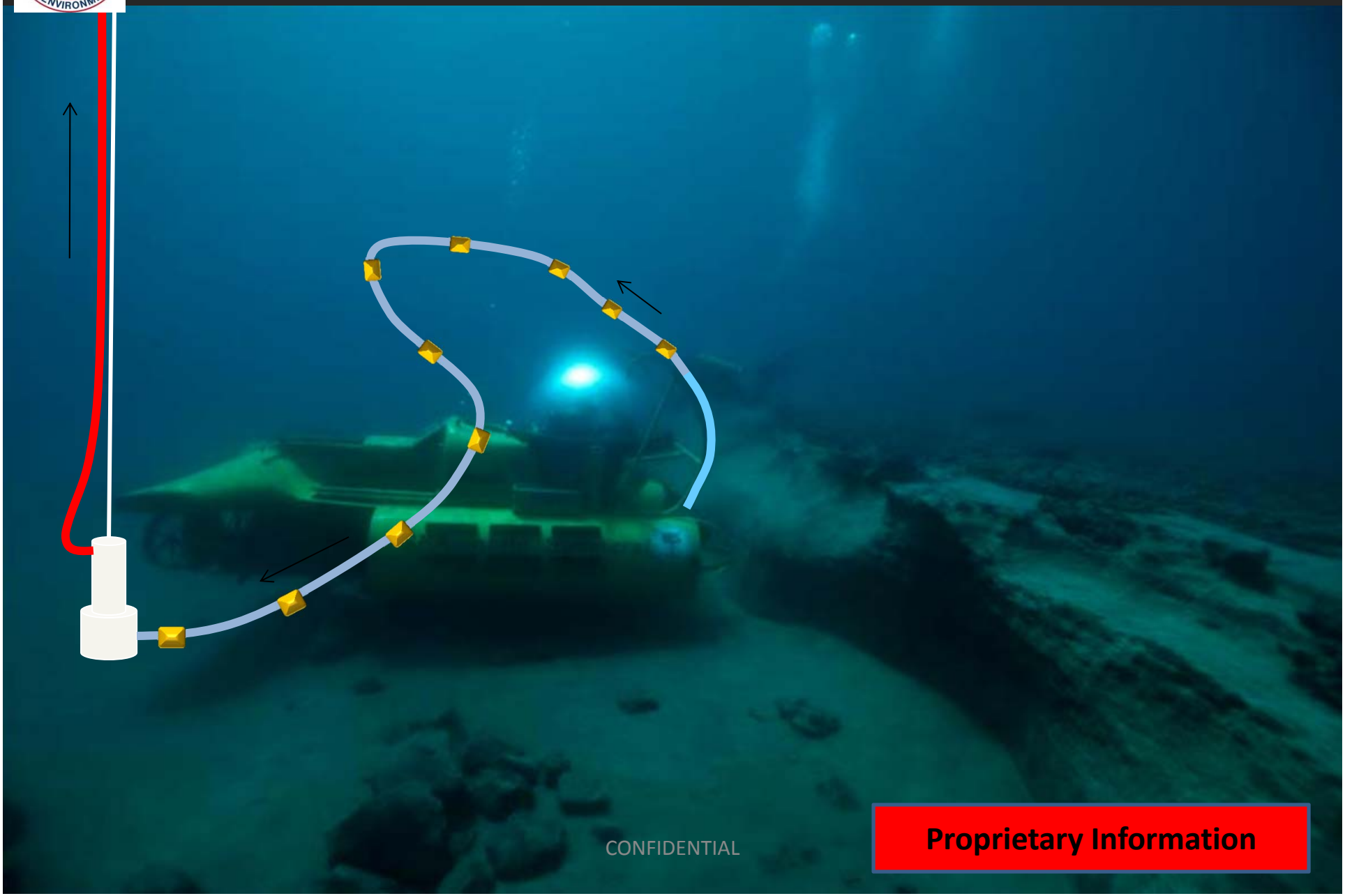
Diagram #1 - Draft General Concept Drawing:
Subsurface Oil Recovery Utilizing Manned Submersible Unit
US Patent #7,597,811 – Canadian Patent Pending

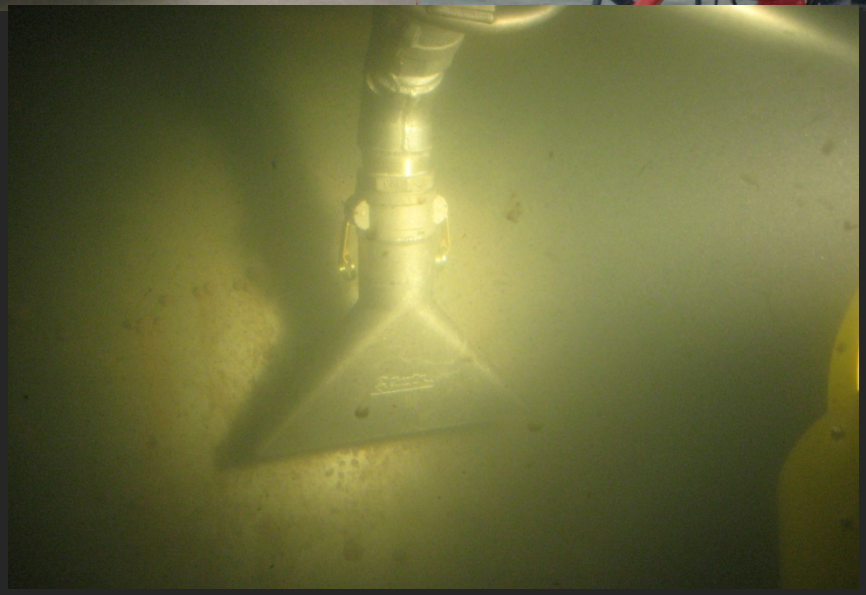
Ref: Sub Oil Recovery Sys.
Drawing: 1 of 1
Date: 08/07/09
Author: David Usher

MPC Oil Recovery Skimmer Head Concept Installation on Sub



Sub Deployed at work site with MPC Pump and recovery hose





Second Field Test – Detroit,

Proprietary Information

Prototype Display – International Oil Spill Conference – Portland, OR - 2011

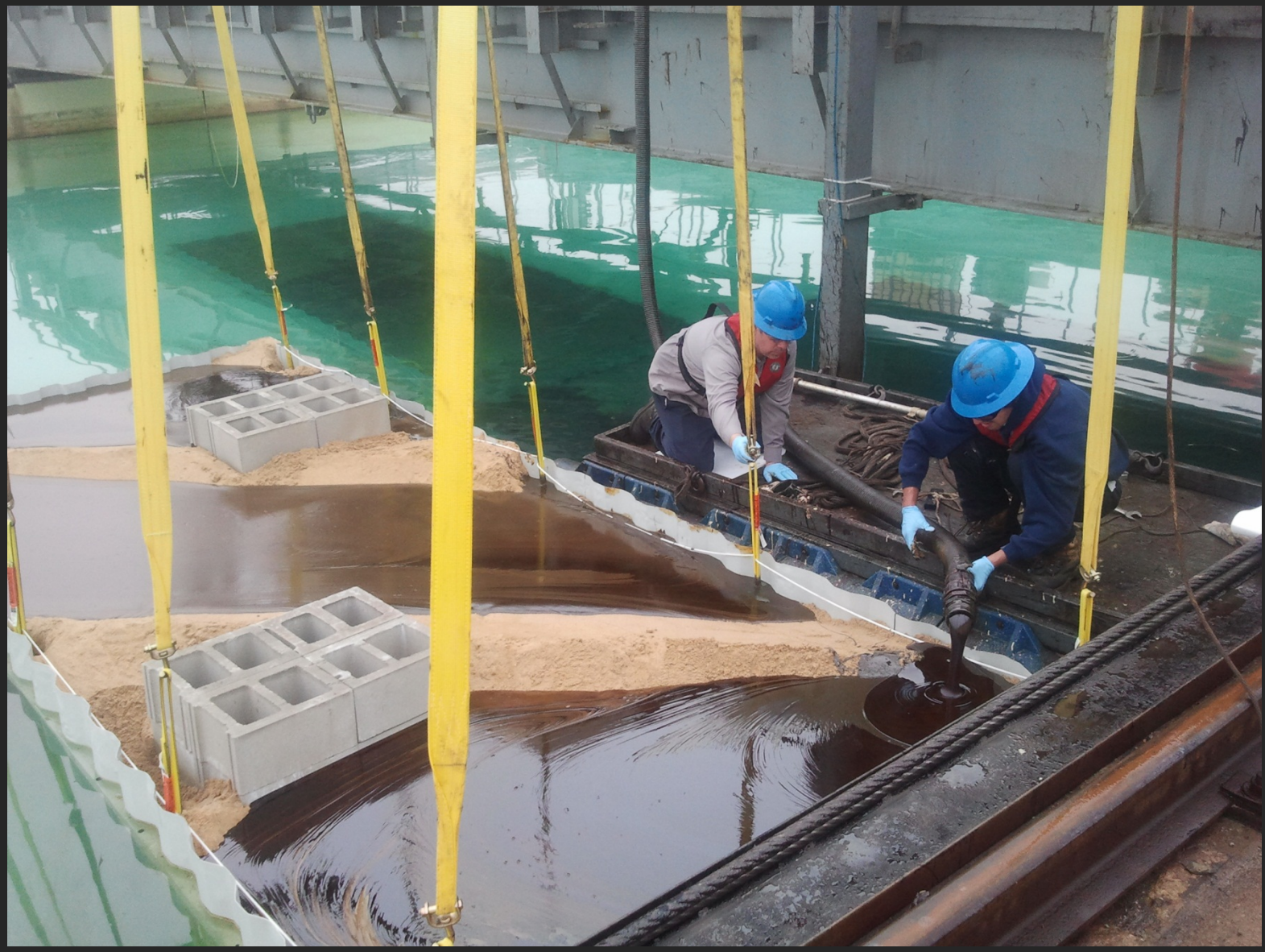
Proprietary Information

USCG Research and Development Center Contract:

Established a series of performance criteria to achieve – at operational depths to 200’

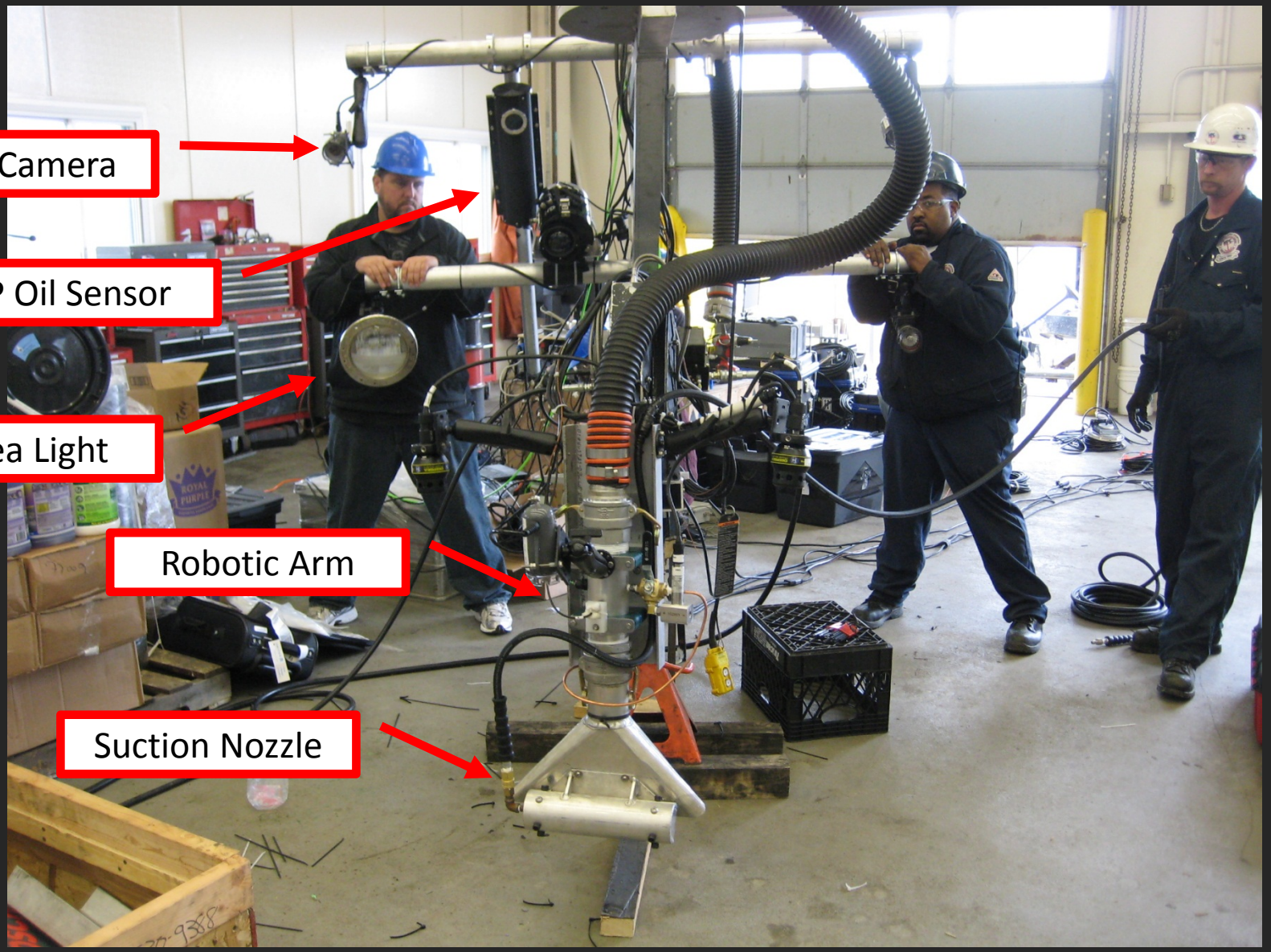
Phase 1 – delivered 2010 – Development of design concept

Phase 2 – delivered 2011 - Produce test prototype and test with oil at the OHMSETT facility – Prototype included submerged oil recovery apparatus (MPC), oil-discriminating multi-beam sonar (RESON), Florescence Polarization (FP) Oil Detection (EIC Laboratories) and oil/water decanting apparatus (MPC)



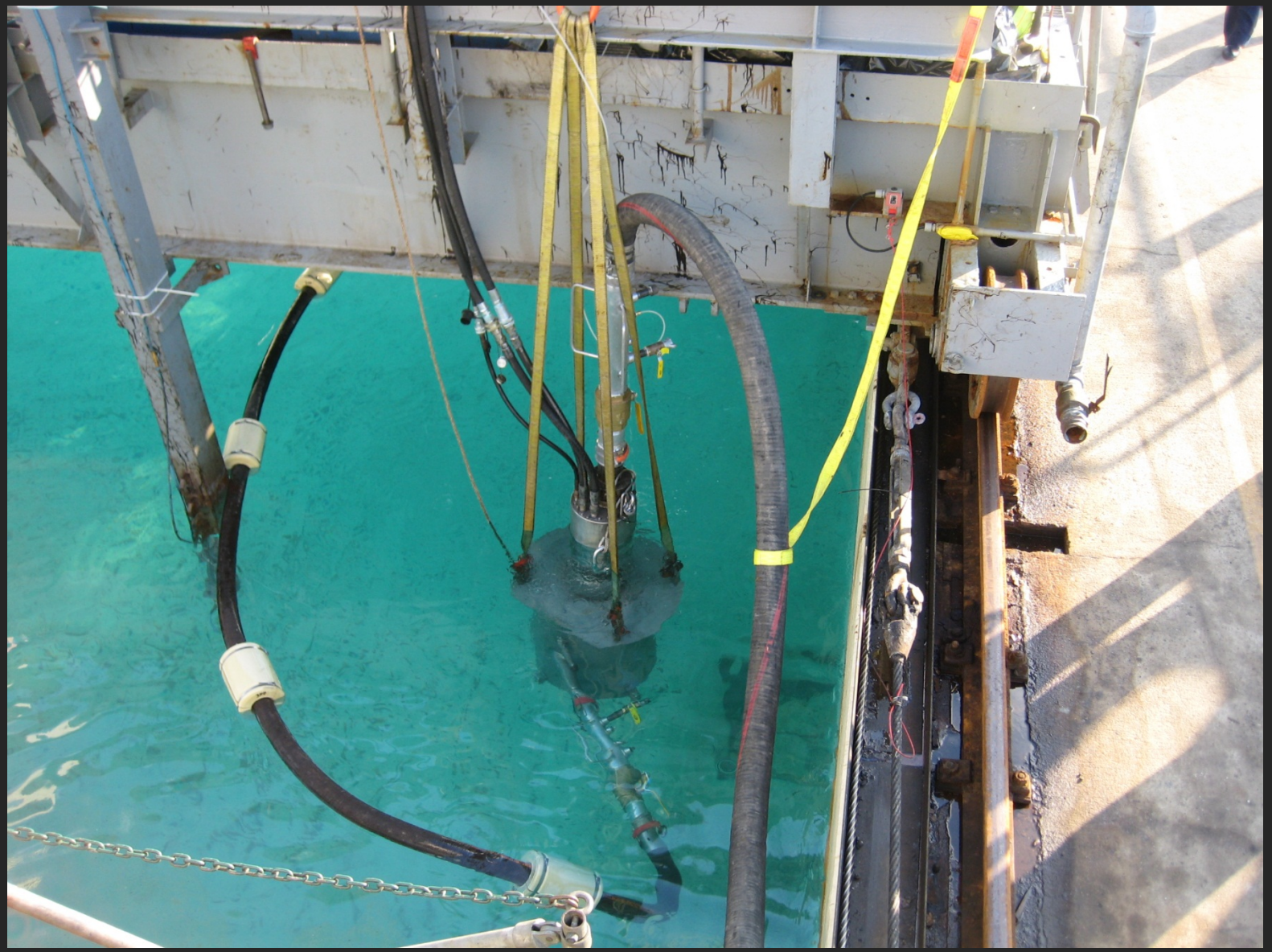
OHMSETT Tests - 150,000 Cst oil being deposited on test tray

OHMSETT Tests - Trays deployed at bottom of OHMSETT tank



OHMSETT Tests - Subsurfac

Proprietary Information



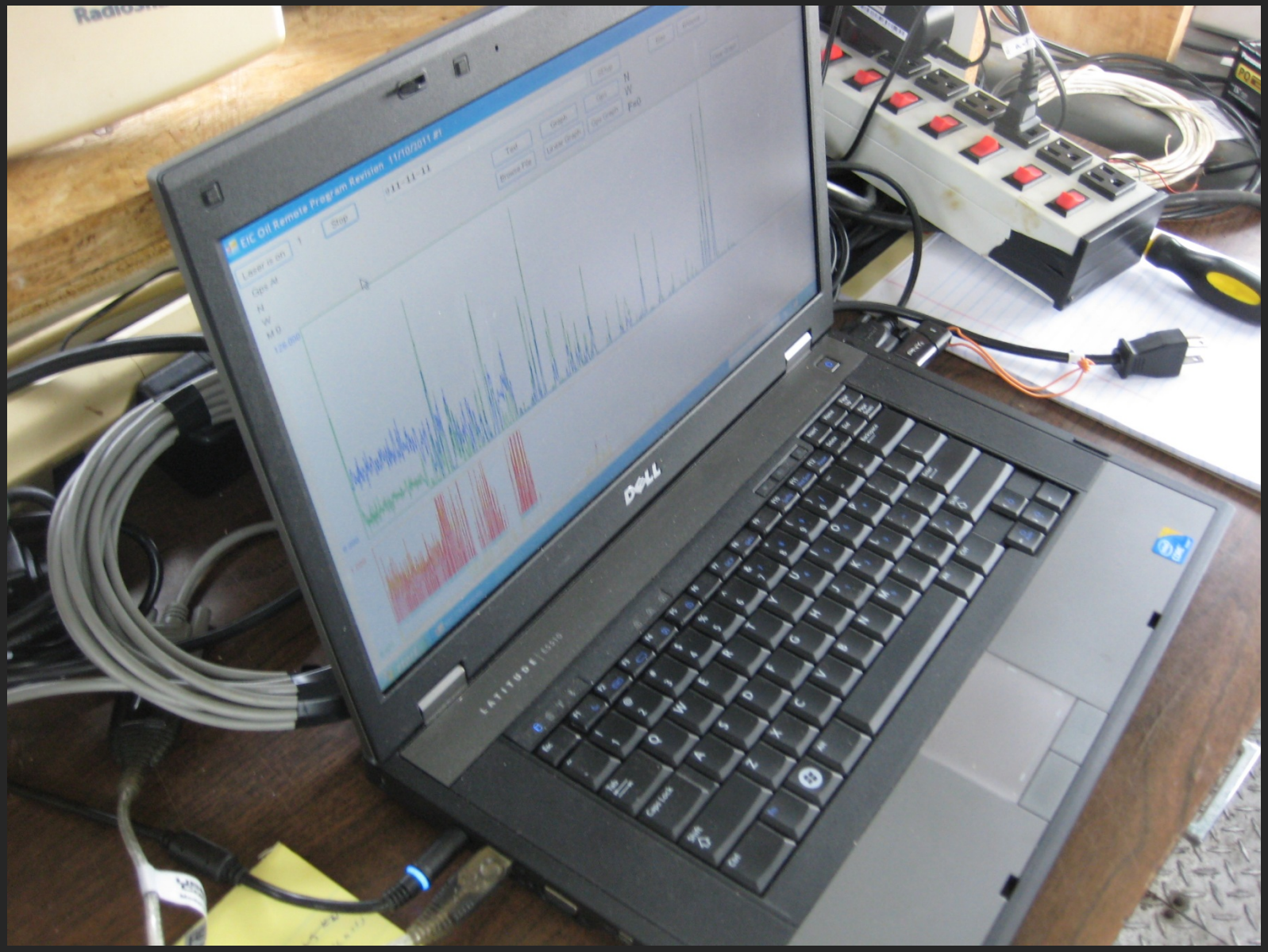
OHMSETT Tests - Pumping A

Proprietary Information

OHMSETT Tests – Subsurface Oil recovery operations of 150,000 Cst Oil

OHMSETT Tests - Video display/rob

Proprietary Information



OHMSETT Tests – FP Sensor D

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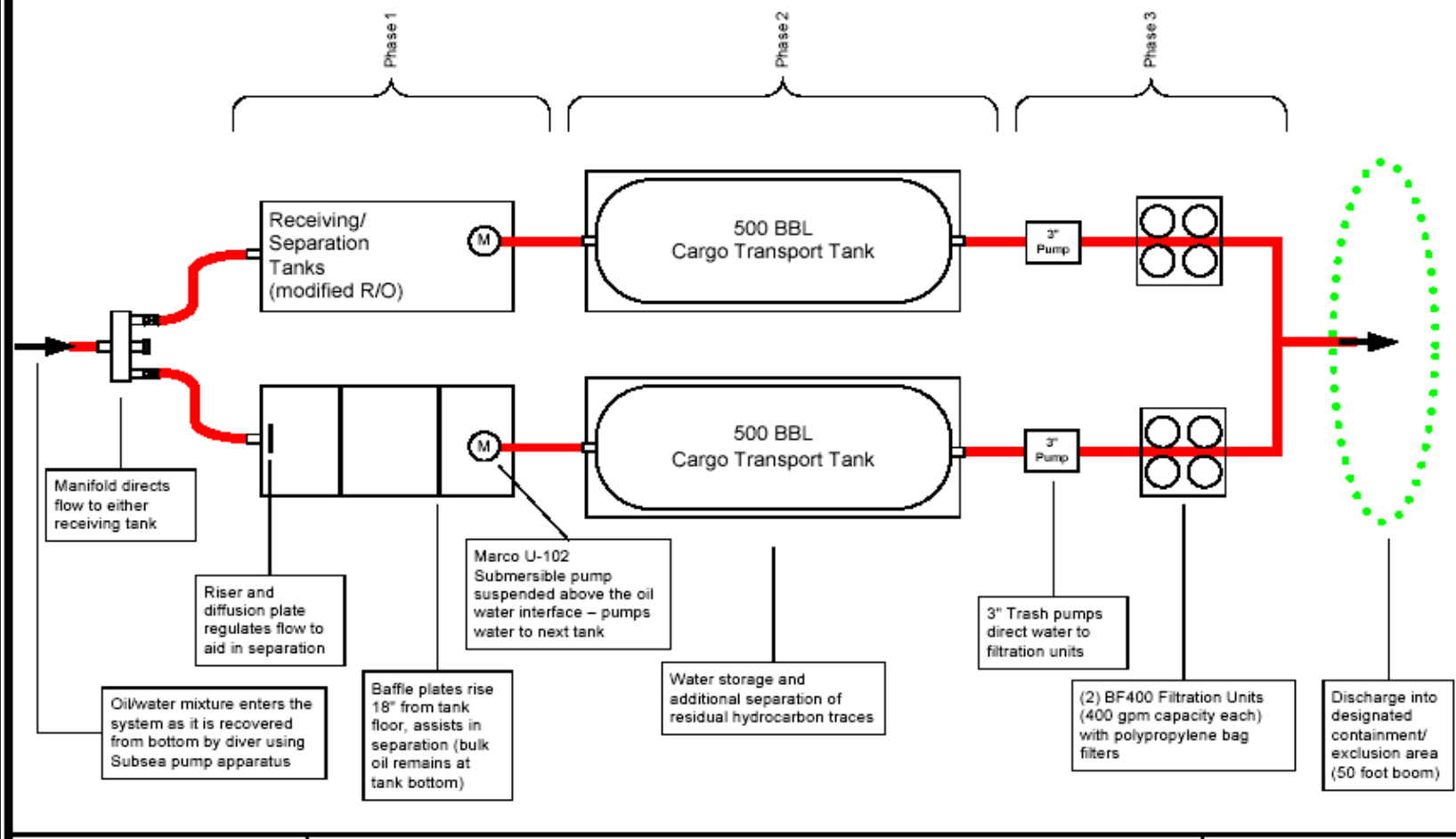

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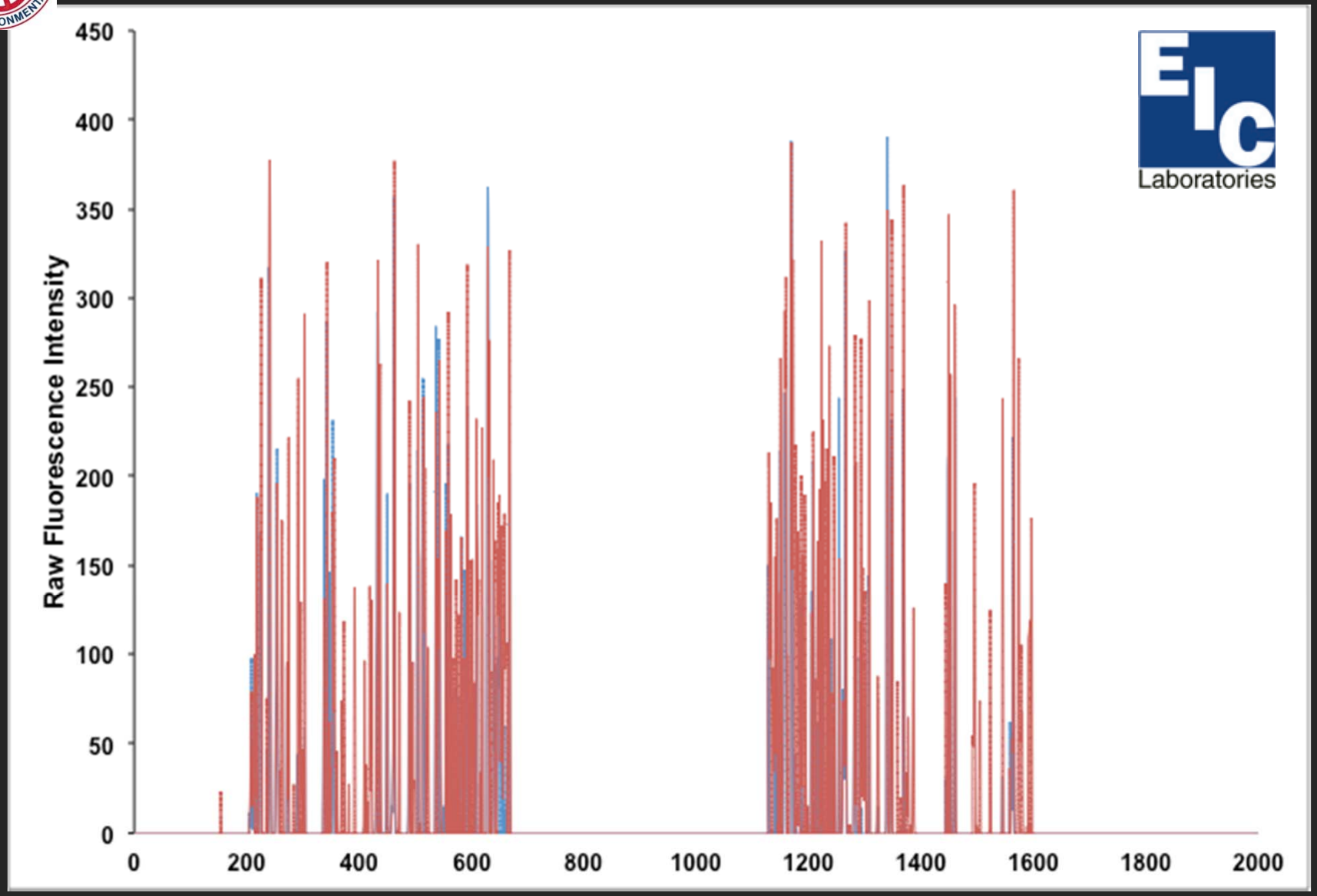
Draft General Concept Drawing:
Decanting Process for Recovered Oil/Water Mixture
(Non-scale drawing for representational purposes only)

Proprietary Information

Oil/Water Phase Separation and Effluent Filtration for Decanting Operations

Proprietary Information



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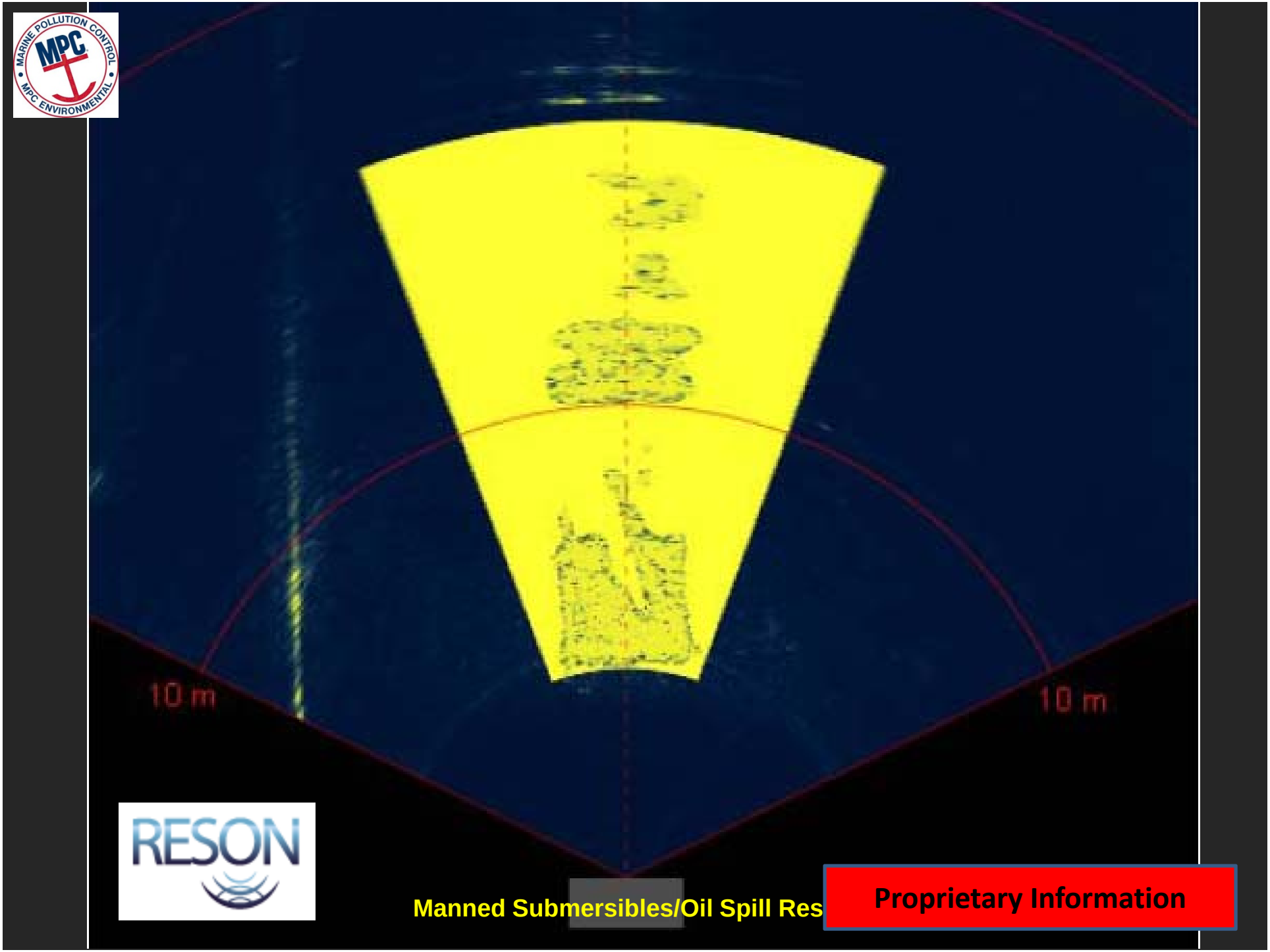
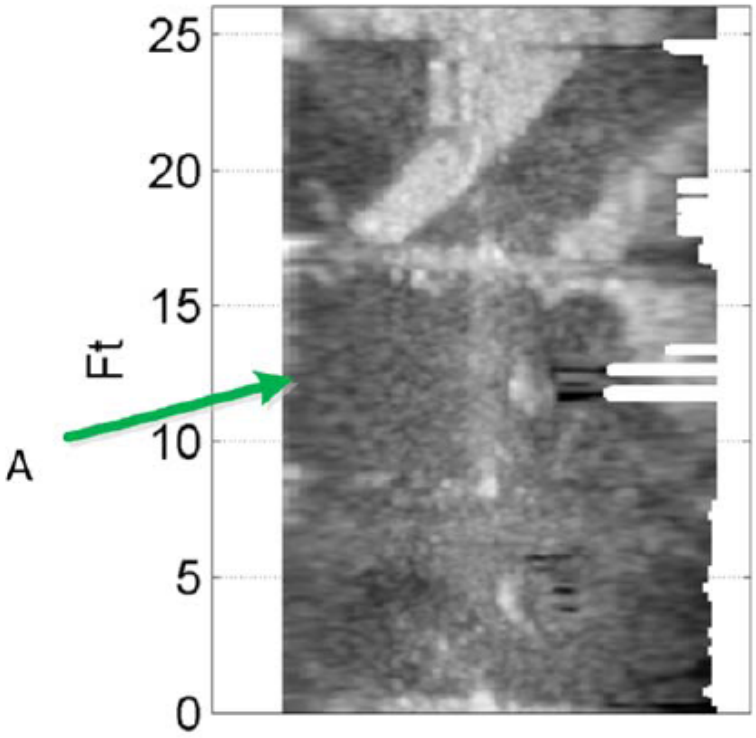


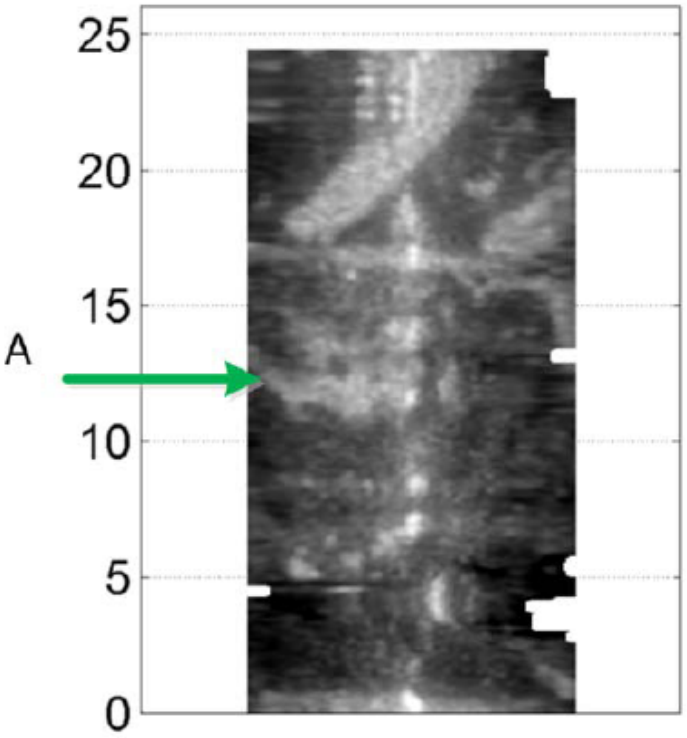
Manned Submersibles/Oil Spill Res

Proprietary Information

Position 4. Before partial oil removal



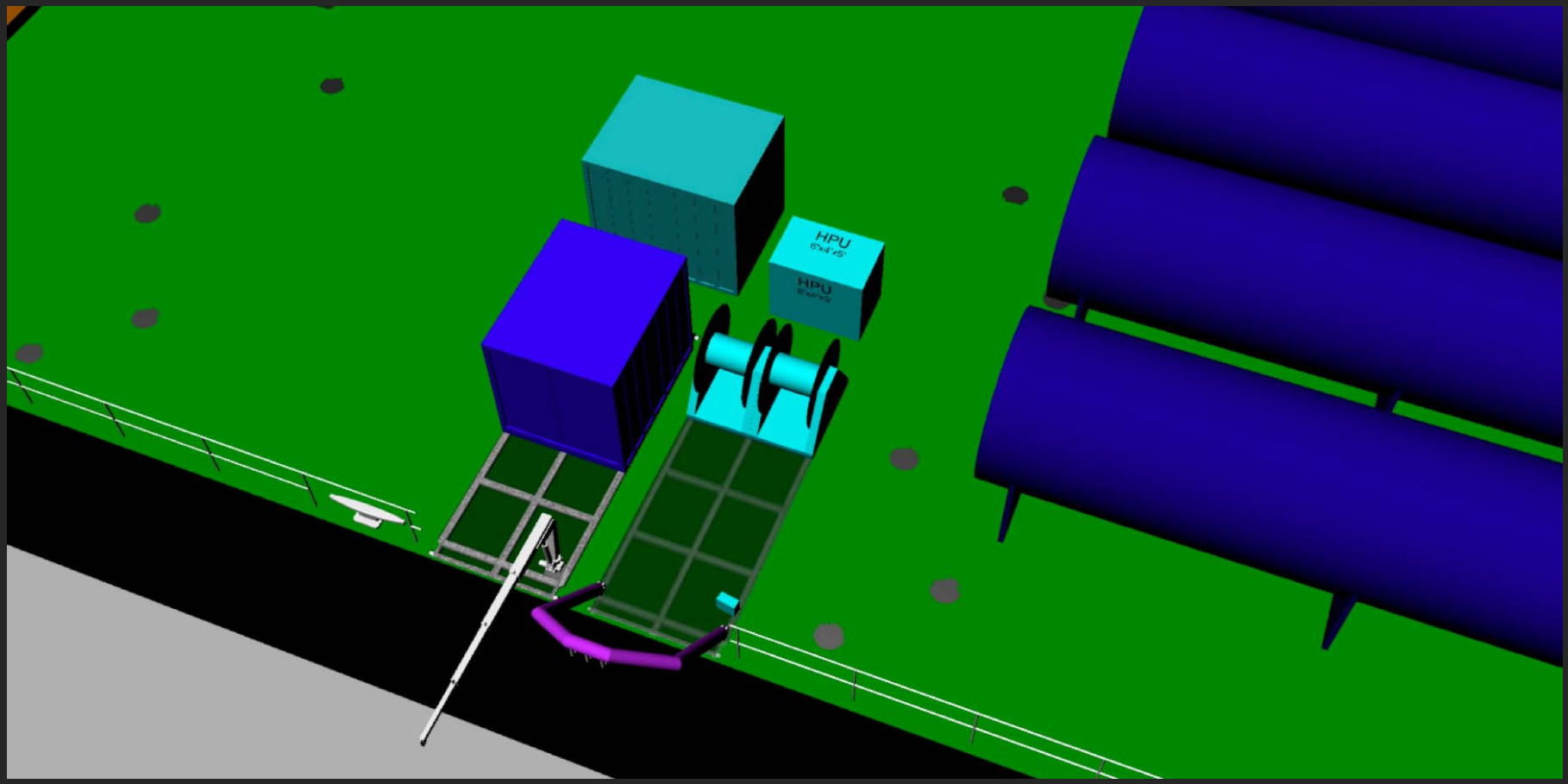
Position 4. After partial oil removal



Manned submersible unit provides optimal situational awareness to operators by placing them at the recovery site. Hazards associated with manned operations using divers are minimized while work shifts are increased.

Ability of the work craft to hover over the recovery zones ensures that the recovery technique will not disturb the bottom (low environmental impact).

Enhanced oil detection technologies incorporated in the design improves operational capacity and effectiveness.



Ready deployment kit – 2 Conex Style boxes for deployment from a vessel of o

SEAMagine Newest Generation MUV

SEAMagine Newest Generation MUV

Crossover Benefits of Manned Submersible Technology:

Arctic/Under Ice Oil Spill Response

Security Applications

Pipeline/Marine Structures Surveying

Environmental Surveying (pre- and post-incident)

Hydrographic Studies and Surveys

Low-visibility Surveys

Ship Hull Surveys and Salvage Operations

For More Information Contact:

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