United States Department of the Interior

BUREAU OF OCEAN ENERGY
MANAGEMENT, REGULATION AND ENFORCEMENT

Pacific OCS Region
770 Paseo Camarillo, 2nd Floor
Camarillo, California 93010-6064

7300

Memorandum

To: Regional Supervisor, Office of Field Operations

From: Regional Supervisor, Office of Leasing and Environment

Subject: Finding of No Significant Impact (FONSI), ExxonMobil Proposal - Installation of an Impressed Current Cathodic Protection System on Platform Heritage, Lease OCS-P 0182, Santa Ynez Unit, Offshore Santa Barbara County

The Office of Leasing and Environment has reviewed ExxonMobil's proposal to install a new impressed current cathodic protection system on Platform Heritage offshore Santa Barbara County (Lease OCS-P 0182). This proposal was originally submitted in July 2010 and later amended in February and March of 2011.

Our Environmental Assessment (EA) of ExxonMobil's proposal is attached. Based on this assessment, we have determined that the installation of the impressed current cathodic protection system, as described, will not result in significant environmental impacts provided ExxonMobil fulfills the environmental commitments stated in their proposal and ExxonMobil complies with the conditions of approval we identify below.

ExxonMobil's proposal states that it or its contractors will:

- Conduct a Remotely Operated Vehicle (ROV) survey of anchoring sites and prepare an archaeological assessment (surveys conducted November 2010 and report completed December 2010);
- Evaluate soils stability to ensure anode sleds will not become buried or move on the sea floor (completed);
- Develop and implement an anchor mitigation plan (Appendix B of the EA);
- Use a catenary cable design when positioning anode sleds to minimize cable contact with the seafloor;
- Conduct ROV surveys of the touch down areas of the anode sleds prior to setting them on the seafloor to ensure that the area is relatively flat and clear of obstructions or hard bottom habitat;
- Conduct a final ROV survey to verify that no rigging or equipment used during the installation is left on the seafloor;
- Notify the Joint Oil-Fisheries Liaison Office (JOFLO) and contact the Coast Guard for publication of a Notice to Mariners; and

- Provide marine mammal awareness training to all personnel participating in the installation project, including viewing of the BOEMRE-approved Wildlife and Fisheries Training video (2009).

Additional conditions of BOEMRE approval will include:

- Night lighting on the work barge needs to be shielded and directed only towards areas where light is needed to accomplish the work at hand whenever feasible. ExxonMobil shall immediately report to BOEMRE any birds that are found injured or dead during installation operations; and,
- ExxonMobil must report to BOEMRE the Global Positioning System (GPS) locations of anchors at the time moorings are placed and again when the moorings are removed.

Background Information

ExxonMobil is proposing to install eight 500 ampere (amp) impressed current anode sleds (8 ft x 10 ft x 2.5 ft) on the seafloor just north and south of Platform Heritage. Each sled will be powered by a 1,100 kcmil single conductor submarine power cable and a single 500 amp oil-immersed rectifier located on the +43 sub-cellar platform deck. Details of the proposed installation procedures are described in the attached EA.

The proposed action will result in unavoidable benthic disturbance caused by placement of four temporary mooring buoys and setting of eight anode sleds on the seafloor. No archaeological resources and no biologically significant benthic areas are expected to be affected. Minor changes in air emissions within the confines of existing air quality permits and temporary degradation of water quality from dispersal of sediment are expected to occur. Commercial fishing rarely occurs within the immediate vicinity of Platform Heritage and is not expected to be affected by the proposed action. With the possible exception of birds, wildlife in the vicinity of Platform Heritage is not expected to be affected. Birds may be injured if they are attracted by increased lighting associated with the work barge during night operations.

Determination of Significance

Benthic Environment – Biological and Archaeological Resources:
ROV and sonar surveys confirmed that no cultural or archaeological resources are present in the areas that may be affected by installation activities. These surveys also confirmed that seafloor in the area is dominated by soft (unconsolidated) sediments and associated fauna. Soft sediments are the most common habitat type on the continental shelf in the Santa Barbara Channel and organisms are dispersed throughout. Although some hard bottom features were identified they were outside the area to be disturbed by anchoring. ExxonMobil's anchor mitigation strategy, project design, and post-construction surveys will ensure that seafloor disturbance is minimized. Reporting of the GPS locations of temporary anchors at deployment and upon retrieval will confirm that anchors were not displaced during proposed activities. Given the absence of cultural, archaeological, or unique/unusual biological resources and the measures taken to reduce impacts to the seafloor, we conclude that the proposed action will not have significant impacts on the benthic environment.

Air Emissions: All air emissions associated with ExxonMobil's proposal will fall within existing permitted levels and will be monitored as required under existing permits, rules, and regulations. We therefore conclude that air emissions resulting from the proposed action will not result in significant impacts.

Water Quality: Sediments will be temporarily disturbed by placing and retrieving moorings as well as setting anode sleds on the sea floor. This will result in the creation of clouds of sediment in the water which are expected to settle out of the water column relatively quickly with minimal changes to water quality. We have concluded water quality will not be significantly affected because of the short term and transient nature of this effect.

Commercial Fishing: Commercial fishing rarely occurs in close proximity to Platform Heritage. ExxonMobil's commitment to notify JOFLO and the Coast Guard prior to initiating activities is sufficient for us to conclude that there will be no significant impacts on commercial fishing.

Marine Mammals, Birds, and Fish: With the possible exception of birds, wildlife in the vicinity of Platform Heritage is not expected to be affected. Birds may be injured if they are attracted by increased lighting associated with the work barge during night operations. Effects to birds will be minimized if lights on the work barge are shielded and directed only towards areas where light is needed to accomplish the work at hand. Implementing these measures and requiring that ExxonMobil immediately report to BOEMRE any birds that are found injured or dead during installation operations are sufficient for us to conclude that there will be no significant impacts on birds.

Environmental Justice: Impacts on minority and low-income populations were considered in accordance with Executive Order 12898. The city of Port Hueneme is home to a significant Hispanic/Latino minority population (greater than 50 %). However, staging activities in port of Port Hueneme will not result in any adverse effects to the human health or the environment of this minority population or at the staging area or in the City of Port Hueneme.

Finding Statement

Based on our evaluation of ExxonMobil's proposal and the potential impacts assessed in the attached EA, we have determined that ExxonMobil's installation of an impressed current cathodic protection system will not significantly affect the quality of the human environment pursuant to the National Environmental Policy Act §102 (2)(C), and therefore no Environmental Impact Statement is required.

Ann Scarborough Bell.
Acting Regional Supervisor
for L. Vesco

Lynnette L. Vesco
Regional Supervisor,
Office of Leasing and Environment
Pacific OCS Region
Bureau of Ocean Energy Management, Regulation and Enforcement

May 13, 2011
Date

Attachment

Bureau of Ocean Energy Management, Regulation and Enforcement
Pacific OCS Region

Final Environmental Assessment

Platform Heritage
Impressed Current Cathodic Protection System Installation

Santa Ynez Unit
ExxonMobil

May 13, 2011

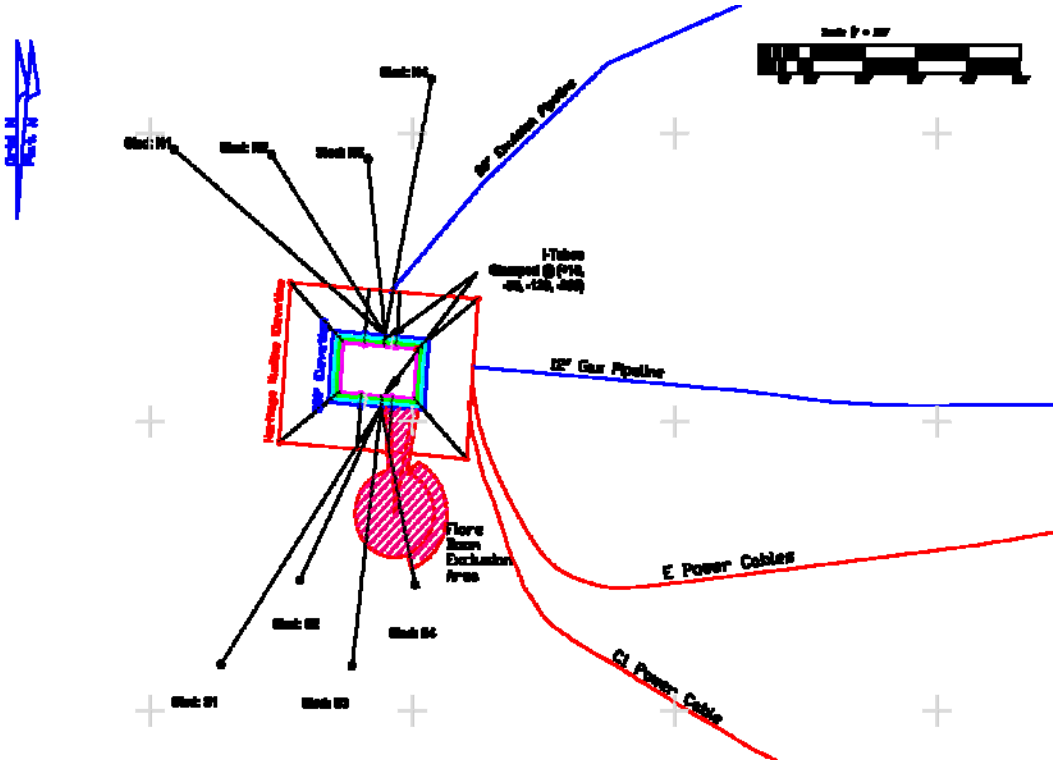


Table of Contents

Introduction

Platform Heritage is one of three ExxonMobil Santa Ynez Unit (SYU) offshore production facilities. The platform is an 8-leg conventional drilling and production platform offshore Gaviota, California in 1,075 feet of water. The structure was inspected in 2009 and found to be in good condition; however, low cathodic potentials were documented on the bottom sections of the structure from 720 feet below the sea surface to the sea floor. ExxonMobil completed an analysis of the findings and developed a plan to enhance the existing cathodic protection system with the intent of providing adequate protection of the structure from corrosion. This plan was submitted to the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) in July, 2010.[1] The plan was revised based on the BOEMRE comments and requests for information in February and March of 2011.[2]

Purpose and Need

The BOEMRE ensures that outer continental shelf facilities are operated in a safe and environmentally sound manner. Under 30 CFR §250, subpart I, offshore oil and gas operators are required to inspect, assess and maintain offshore structures. ExxonMobil has discovered low cathodic potential that could lead to excessive corrosion of the structure supporting Platform Heritage. ExxonMobil submitted a proposal to enhance the existing cathodic protection system to meet BOEMRE regulatory requirements and ensure that the structural integrity of Platform Heritage is maintained. The BOEMRE has determined that ExxonMobil's proposal will address deficiencies in the existing cathodic protection system and must decide whether implementation of the proposal can be conducted in an environmentally sound manner.

Proposed Action and Other Alternatives Considered

Proposed Action

ExxonMobil is proposing to install eight 500 ampere impressed current anode sleds (8 ft x 10 ft x 2.5 ft) on the seafloor just north and south of Platform Heritage (see Appendix A for the manufacturer's general description of the sleds). Each sled will be powered by a 1,100 kcmil single conductor submarine power cable and a single 500 amp oil-immersed rectifier located on a new deck extension on the +43 sub-cellar platform deck. Minor structural modifications to the platform, including the new deck extension, were approved by BOEMRE on July 9, 2010.

Installation will require a work barge (180 to 250 ft) and one or two supply boats to install four temporary moorings (anchors), clamp two I-tubes onto the platform below the water line to contain and guide cables, install the anode sleds and power cables, and remove temporary moorings when the installation is complete. The work barge will be mobilized up to four times from Port Hueneme, approximately 60 miles east south east of Platform Heritage.

Temporary moorings will be set at four locations prior to installation of the sleds. Each mooring will consist of a 10 to 20 ton anchor, 270 feet of chain, 1,700 feet of wire rope, and a mooring buoy (up to 8 ft x 14 ft). ExxonMobil submitted a detailed anchor mitigation plan with their proposal.[3] See Appendix B for ExxonMobil's anchor mitigation plan.

[1] July 8, 2010 – Letter and enclosure from ExxonMobil to BOEMRE
[2] February 1, 2011 and March 9, 2011 – Letters and enclosures from ExxonMobil to BOEMRE
[3] February 1, 2011 submission, Appendix A, Revision 1

After the moorings are set, the work barge will be brought on site, and will be stationed at one of two locations oriented north and south of the platform. The work barge will be tied to the platform at two places and to two of the mooring buoys. Divers will attach the clamps to the platform jacket for installation of the first I-tube. A remotely operated vehicle (ROV) will be deployed to each anode sled target location to verify the area is clear of debris. The submarine power cable for an anode sled will be pulled from the platform into the I-tube with a winch on the platform. Each anode sled will then be positioned and deployed with the work barge crane and winch. Once a sled is over the target location, the ROV will confirm the location, release the sled, and recover the rigging. This process will be repeated four times with four anode sleds deployed on one side of the platform. The barge will then be moved to the other side, moored to two temporary buoys and the platform, mount the second I-tube and deploy the other four sleds. Once the topside rectifier power cable is interfaced to the subsea anode power cables, installation will be complete and the temporary moorings removed.

The entire installation operation is expected to take approximately four weeks, with a current start date scheduled for the summer of 2011.

Other Alternatives Considered

No-Action – If no action is taken, the existing cathodic protection may be inadequate to protect the structural integrity of Platform Heritage, creating unsafe conditions at the platform resulting, in turn, in potential environmental effects to the area surrounding the platform.

Use of a Dynamically Positioned Vessel – ExxonMobil considered using a dynamically positioned vessel (DPV) to install the anode sleds. Use of a DPV would provide a minor reduction in benthic impacts because temporary moorings would not be needed. This benefit may be offset somewhat by increased air emissions that would result from the use of a DPV.

The higher cost of a DPV and the uncertainty of availability of this specialized type of vessel led ExxonMobil to drop this possibility from their proposed plan. This alternative is not considered further in this environmental assessment.

Affected Environment

Impacting Factors

The proposed action may affect the environment in several ways:

- Temporary installation of moorings and the placement of the anode sleds will result in localized disturbance of the benthic environment and may affect biological and archaeological resources in the area of installation;
- Air emissions from vessels may temporarily increase as a result of the installation activities;
- Water quality may be temporarily affected by bottom disturbance resulting from installation activities;
- Commercial fishing activities may be temporarily excluded within the immediate vicinity of the installation activities; and,
- Marine mammals, birds, and fish may be affected by installation activities and the operation of the anode sleds.

An assessment of each of these areas of the affected environment is provided below.

Benthic Environment – Biological and Archaeological Resources

Benthic disturbance from placement of temporary anchors and deployment of anode sleds on the sea floor is unavoidable for the proposed action. The BOEMRE asked ExxonMobil to conduct ROV surveys of all areas that may be affected by installation of the anode sleds. ExxonMobil and their contractor C&C Technologies conducted ROV surveys of the Areas of Potential Effect (APE) between November 10 and 21, 2010. They submitted a complete archaeological assessment report (Appendix C) and video of the surveys to BOEMRE in December 2010.

The survey team documented and investigated 21 targets within the survey area. Four of the targets were located within the APE of proposed anchor locations. None of the targets were of archaeological significance and none of the areas surveyed were considered biologically significant due to the predominance of soft or unconsolidated sediments and associated fauna. A hard bottom feature over 100 feet long was identified within 1000 feet of the proposed south west anchor location. This proposed anchor location was subsequently moved to avoid any potential impact from chain or wire sweep to this feature.

As a result of the steps described above, there is little or no risk that the proposed action will harm archaeological resources or sensitive benthic habitat. The mooring anchors will likely cause a temporary disturbance to the sea floor. Chain and wire attached to the buoys may sweep across soft sediment when the barge is not attached. Alteration of sea floor properties by the placement of the anode sleds (soft bottom to low relief hard substrate) is calculated to be a total of approximately 640 square feet (eight anode sleds covering 8 ft x 10 ft each).

Air Emissions

ExxonMobil will use existing Santa Ynez Unit supply boats and internal combustion engines (>50 hp) that have been certified under the statewide Portable Equipment Registration Program (PERP) or included under Platform Heritage's existing air permits. Equipment and personnel will be transported through existing vessel traffic corridors. Fuel consumption for the supply boats as well as equipment on the platform and work barge will be measured and recorded daily, as required under existing permits, rules, and regulations. Air emissions will be minimal due to the relatively small amount of equipment required and the relatively short duration of installation activities.

Water Quality

Sediments will be temporarily disturbed by placing and retrieving moorings as well as setting anode sleds on the sea floor. This will result in the creation of clouds of sediment in the water which are expected to settle out of the water column relatively quickly and result in no significant changes to water quality.

Commercial Fishing

Commercial fishing rarely occurs in close proximity of Platform Heritage. The installation activities may prevent some types of commercial fishing should a fisherman desire to use the area but there is no evidence that fishermen currently fish where the project will occur.

Marine Mammals, Birds, and Fish

Several species of marine mammals may occur within the vicinity of Platform Heritage including sea lions, seals, dolphins and whales. The installation activities are proposed to be conducted from a static vessel (working barge), and other vessel operations are not expected to result in a strike risk to marine mammals. Underwater sound production is expected to be minimal. ROVs may attract the attention of curious sea lions with no risk to this species. Overall, no adverse effects to marine mammals are expected as a result of the proposed activities.

Birds found within the vicinity of Platform Heritage may be affected by lighting of the work barge during night time operations. Birds may be attracted and become disoriented by additional lighting in the area. In some cases, a bird may strike a work vessel or its rigging leading to injury or death. Endangered or threatened birds are not expected to occur in the project area and it is highly unlikely that any would be affected by the proposed activities.

A potential electromagnetic field (EMF) change resulting from the operation of the new cathodic protection system was considered. Although the intent of the new system is to provide greater electric current to the structure of the platform, there is no evidence to suggest that any EMF changes associated with this project will have an effect on fish or other marine life.

Environmental Justice

Impacts on minority and low-income populations were considered in accordance with Executive Order 12898. ExxonMobil proposes to use Port Hueneme to mobilize a work barge and one or two existing Santa Ynez Unit supply boats. Using Council on Environmental Quality guidance and U.S. Census Bureau data, a significant Hispanic/Latino minority population (greater than 50%) was identified in the city of Port Hueneme. However, the proposed action will not result in any adverse effects at the staging area or in the city of Port Hueneme; therefore there will be no disproportionately high adverse human health or environmental effects to this minority population.

Cumulative Effects

With the exception of the alteration of a small amount of benthic habitat, no permanent or long-term effects of the proposed action were identified in this assessment. It is estimated that approximately 640 square feet of benthic habitat will be altered (soft bottom to low relief hard substrate) as result of anode sleds being placed on the sea floor. As such, the proposed action, when added to other activities is not expected to result in any measurable cumulative effects.

Summary of Environmental Effects

The proposed action will result in unavoidable benthic disturbance caused by placement of four temporary mooring buoys and setting of eight anode sleds on the seafloor. No archaeological resources and no biologically significant benthic areas are expected to be affected. Minor changes in air emissions within the confines of existing air quality permits and temporary degradation of water quality from dispersal of sediment is expected to occur. Commercial fishing rarely occurs within the immediate vicinity of Platform Heritage and is not expected to be affected by the proposed action. With the possible exception of birds, wildlife in the vicinity of Platform Heritage is not expected to be affected. Birds may be injured if they are attracted by increased lighting associated with the work barge during night operations.

Mitigating Measures

Components of the Project Design

To avoid or minimize disturbance of archaeological resources and benthic habitat ExxonMobil's project description states that ExxonMobil or its contractors will;

- Conduct a Remotely Operated Vehicle ROV survey of anchoring sites and prepare an archaeological assessment (surveys conducted November 2010 and report completed December 2010);
- Evaluate soils stability to ensure anode sleds will not become buried or move on the sea floor (completed);
- Develop and implement an anchor mitigation plan (Appendix B);
- Use a catenary cable design when positioning anode sleds to minimize cable contact with the seafloor;
- Conduct ROV surveys of the touch down areas of the anode sleds prior to setting them on the seafloor to ensure that the area is relatively flat and clear of obstructions or hard bottom habitat; and
- Conduct a final ROV survey to verify that no rigging or equipment used during the installation is left on the seafloor.

To ensure that commercial fishermen are aware of the construction activities and time-frame for completing of the project, ExxonMobil's project description states that ExxonMobil will:

- Notify the Joint Oil-Fisheries Liaison Office (JOFLO) and contact the Coast Guard for publication of a Notice to Mariners.

To ensure that personnel participating in the installation project are aware of wildlife that may be in the area, ExxonMobil will:

- Provide marine mammal awareness training to all personnel participating in the installation project, including viewing of the BOEMRE-approved Wildlife and Fisheries Training video (2009).

Mitigation Measures Considered and Adopted in Related Decision Documents

No additional mitigation measures have been considered or adopted for this proposal in other decision documents.

Measures Identified by BOEMRE that Must be Carried out by ExxonMobil in Support of a Mitigated Finding of No Significant Impact

- Night lighting associated with this project may affect birds. Lights on the work barge need to be shielded and directed only towards areas where light is needed to accomplish the work at hand whenever feasible. ExxonMobil shall immediately report to BOEMRE any birds that are found injured or dead during installation operations; and
- ExxonMobil must report to BOEMRE the GPS locations of anchors at the time moorings are placed and again when the moorings are removed.

Consultation and Coordination

The BOEMRE considered information from consultations from recent and larger projects in this area. No additional consultation or coordination with other agencies was conducted for this project.

List of Preparers

The primary preparers of this Environmental Assessment were:

- Greg Sanders, Wildlife Biologist, BOEMRE Pacific Region
- Lisa Gilbane, Benthic Ecologist, BOEMRE Pacific Region
- David Ball, Marine Archaeologist, BOEMRE Pacific Region

Subject matter specialists that assisted in the preparation of this Environmental Assessment included:

- Mark Eckenrode, Air Quality specialist, BOEMRE Pacific Region
- David Panzer/Susan Zaleski, Water Quality specialists, BOEMRE Pacific Region
- David Pereksta, Bird specialist, BOEMRE Pacific Region
- Donna Schroeder, Fish and Fisheries specialist, BOEMRE Pacific Region

Reviewers of this Environmental Assessment included:

- David Panzer, Chief, Environmental Analysis Section, BOEMRE Pacific Region
- Lynnette Vesco, Regional Supervisor, Office of Leasing and Environment, BOEMRE Pacific Region

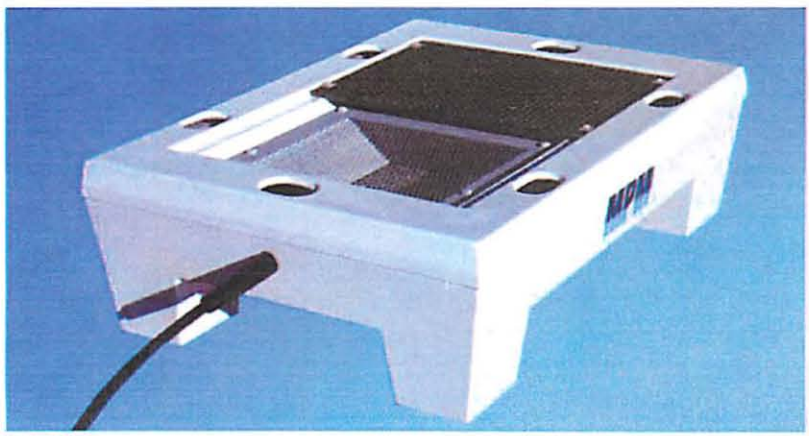
Appendix A

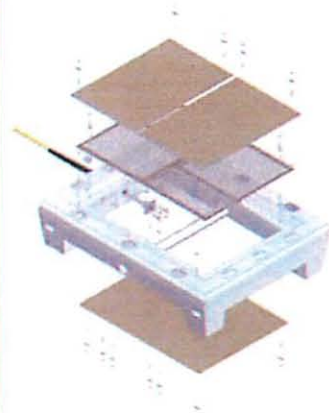
Manufacturer's Description of Anode Sleds Proposed for Platform Heritage

MPM
MARINE PROJECT
MANAGEMENT, INC.

We provide cost effective solutions.

MPM GENERATION IV HIGH OUTPUT (HO) ANODE SLED 800-AMP MAXIMUM OUTPUT, 50-YEAR DESIGN LIFE





MPM's Generation IV Impressed Current Cathodic Protection System (ICCPS) anode sleds incorporate design enhancements providing up to 800-amps output and up to a 50-year design life. MPM sleds have been utilized for corrosion protection of subsea facilities including pipelines and platform jackets in water depths to 860 feet. MPM provides complete retrofit system design, system manufacture, installation, and commissioning with existing designs to depths of 1,750 feet. We have installed our systems utilizing Remotely Operated Vehicle's (ROV's) or divers. General specifications of the Gen IV HO system are as follows:

- § MPM fiberglass sled houses the Mixed Metal Oxide (MMO) anode. Anode and cable terminations are protected from damage via the fiberglass sled structure and fiberglass grating.
- § Design life of up to 50-years, sized to provide from 350-800 amp output throughout the design life.
- § MPM's power cables are contra-helically wound / double armored in 500, 750, 1000 or 1100 kcmil.
- § MPM's proven power cable electrical connection is terminated utilizing a single connection directly to the anode. Our connection has been hydrotested to 800 psi (1800 feet of seawater). Structural connections have been torque and tension tested to 1.5 times the cable's Safe Working Load (SWL).
- § Anode sled shipping weight is approximately 1175 lbs including shipping pallet. Completed dry weight is up to 9,700 lbs dependent on concrete volume installed in sled. The sled size is 8' x 10' x 2'6".
- § MPM's existing power cable I-tube and I-tube clamp designs are based on either US West Coast or Gulf of Mexico environmental forces.

MPM understands today's project management requirements and is uniquely able to provide a single-source solution to interface with the client's process through all 5 project phases or gates.

Appendix B

ExxonMobil's Anchor Mitigation Plan

1.0 **GENERAL** – This Anchor Mitigation Plan provides the steps to ensure that the installation and removal of temporary anchors near Platform Heritage will be conducted without affecting subsea facilities, and minimizing anchor impact on the seafloor. This will be accomplished by utilizing a mooring design that incorporates accurate coordinates for all subsea facilities in the vicinity of the worksite, and through mooring system deployment and recovery procedures incorporated within this document. The mooring anchor locations were defined in the Archaeological Assessment Final Report of Findings for the ROV Survey of Temporary Mooring Anchor Locations dated December 2010 (November 2010 ROV Survey). *Enclosure 1* provides the proposed mooring anchor locations and other relevant information.

1.1 **Mooring System Design** – The mooring systems will be designed to provide ample restoring force for the work barge. The design will consider factors including work barge size, loaded and light draft and tonnage, water depth, seabed characteristics, local environmental conditions, and existing subsea facilities. The mooring will be accomplished utilizing preset temporary mooring systems with a surface mooring buoy. The work barge will be equipped with winches and rigging to allow installation and recovery of the mooring systems and for mooring to the system's surface mooring buoys.

1.2 **Project Vessels** – Work vessels and duties will be as follows:

1.2.1 Work Barge – The work barge will be outfitted with support equipment for each of the installation tasks. The temporary moorings will be installed and recovered utilizing the work barge and the SYU Dedicated Project Vessels described below. The work barge will support anchor winches, I-tube, clamp and anode sled installation equipment and personnel.

1.2.2 Santa Ynez Unit (SYU) Dedicated Project Vessels (DPV) – One to two SYU DPV Supply Boats will be utilized for work barge towing, controlling the work barge during mooring system installation and retrieval, running and releasing mooring wires between the work barge and the mooring points, transferring equipment to and from the platform, and attending the work barge in the event of inclement weather. SYU DPV Crew Boats will be utilized to transfer personnel between the SYU Platforms and the work barge.

2.0 **EQUIPMENT DESCRIPTION** – Descriptions of equipment utilized during anchoring are provided within this section.

2.1 **Preset Anchor Mooring Systems** – Four preset anchor mooring systems will be installed for the work barge's use, which will be designed based on the work barge contracted and the work barge's associated characteristics. A general description of each temporary anchor mooring system's components is provided as follows:

- Anchor – 10-20 ton, typically Danforth type
- Ground Leg Chain Pennant – Approximately 270' of 1-3/4" to 2-3/4"
- Wire Rope – Ground leg and riser 1,700' long comprised of 1¼" to 2" wire
- Mooring Buoy – 8' x 10' to 8' x 14' diameter steel can type buoy

- Surface Wire Attachment – The buoy will either be equipped with pelican hook, cross, or painter shackled into the buoy

2.2 **Navigation Equipment** – Anchors will be set in predetermined locations as defined by the coordinates in *Enclosure 1* utilizing a navigational positioning system. Prior to mooring operations, the dedicated navigator will pre-plot the mooring system sites, along with pipeline and power cable locations in accordance with the specific mooring design that will be developed based on the work barge contracted for this work. Specifications for the navigation system are as follows:

2.2.1 Positioning – Positioning of the work barge and SYU DPV Supply Boats will be accomplished through the utilization of a Differential GPS (DGPS) positioning system and integrated navigation software. The navigation software will be operated on a shipboard computer that serves as a controller for a variety of input/output devices.

2.2.1.1 Onboard the work barge, a dedicated computer will compile corrected/enhanced DGPS data with the vessel's GPS position and outputs the DGPS position to the navigation computer. This system will produce a position in the order $\pm$1.5 meter accuracy or better. Additional input data including vessel's heading information from the compass will be logged at every fix mark. The computer logged position information will be stored on disk and will also be backed up by hard copy print out.

2.2.1.2 The navigation system has the capability of interfacing DGPS positions of latitude and longitude and converting them to the appropriate California State Plane coordinates as necessary. In addition to acquisition of positioning data, the software can interface with external instruments such as gyros, echosounders, acoustic systems, side scan sonar and geophysical equipment for annotation of records.

2.2.1.3 The navigation system will include the ability to import AutoCAD generated maps and charts and have them depicted on several graphics display monitors that can be stationed throughout the work barge. Details of bathymetry, hazards, land masses or special details can be depicted in two dimensions (X & Y) in a north up orientation. The graphic monitor can display a scaled depiction of the work barge orientation to the survey lines and or subsurface targets, range and bearing from the work barge's antenna to the target. The surveyor can control the scaling of the graphics to assist the helmsman in fine tuning the work barge's position.

3.0 **PRESET TEMPORARY MOORING ANCHOR SYSTEM INSTALLATION AND RECOVERY PROCEDURES** – The ICCPS Work Barge Superintendent, dedicated navigator and SYU DPV Supply Boat Captain(s) will determine the order in which temporary moorings are installed and recovered, dependent on onsite weather conditions. The navigation personnel will observe the work barge and anchor position during deployment to ensure that the work barge and anchor are positioned safely and accurately relative to target location and subsea facilities. A summary of the general steps that will be followed is shown below.

3.1 **Mooring Anchor System Installation** – Installing the mooring system(s) in the pre-plotted position and installation testing will be performed according to the steps below to ensure that the buoy position under tension is appropriate for the work barge operations as follows:

- Pre-assemble system from anchor to dip section.
- Maneuver work barge to vicinity of anchor target area (clear of subsea facilities) and deploy anchor to within 10' of the seafloor.
- Maneuver work barge to pre-plotted anchor target location as defined by coordinates in *Enclosure 1*.
- Deploy anchor to seafloor in a vertical manner and position within the target area, deploy 90 to 150-feet of the ground leg, and immediately log anchor coordinates.
- Deploy balance of ground leg/riser, install chain stopper and transfer riser load to stopper.
- Utilize work barge crane and pre-positioned tuggers to set mooring buoy.
- Pull mooring into buoy under tension position. Release SYU DPV Supply Boat tension and allow work barge to move to buoy at rest position.
- Confirm and log coordinates of anchor and water depth in navigation system.
- Release chain stopper.
- Repeat steps above for balance of systems.

3.2 **Mooring Anchor System Recovery** – The recovering of the mooring system(s) will be performed in accordance to the steps below to assure that the recovery does not affect subsea facilities or hard bottom features. A summary of the general steps that will be followed are shown below.

- Maneuver the work barge to the mooring buoy and rig the deck equipment for the recovery operation.
- Set the winch wire on the mooring buoy hook and bring the buoy over the deck roller.
- Once the buoy is on deck, stop retrieval and secure the winch brake and safety dog.
- Attach a chain stopper to the riser wire.
- Set the riser load on the stopper.

- Move buoy and support components out of the way.
- Connect the winch wire to the riser wire. Verify that the dedicated navigator is monitoring the work barge position and in coordination with the SYU DPV Supply Boat.
- Retrieve the riser and ground leg until the anchor is within 50-feet of leaving bottom.
- Confirm that all required communication systems are functional and that all equipment is operational to retrieve the mooring and maneuver the work barge.
- Retrieve the anchor from the seabed in a vertical manner and notify the dedicated navigator when anchor is off bottom.
- Coordinate maneuvering operations with the SYU DPV Supply Boat Captain and dedicated navigator to ensure that the work barge remains in the mooring area, clear of all subsea facilities until the mooring system is completely recovered to the deck of the work barge.
- Once the anchor is on the work barge deck, the components will be moved out of the way and the deck will be re-rigged for the subsequent temporary mooring system recovery.
- Repeat steps above for balance of systems.

3.3 **Barge Mooring Procedures** – The Barge Superintendent and SYU DPV Supply Boat Captain will determine the order of wire deployment depending on weather conditions. A summary of the general steps that will be followed are shown below.

- The SYU DPV Supply Boat will pull alongside the work barge adjacent to the weather leg mooring line.
- The work barge crew will throw a heaving line to the SYU DPV Supply Boat which will be attached to the mooring wire.
- The SYU DPV Supply Boat crew will retrieve the heaving line and approximately 50' of the mooring wire to the deck of the SYU DPV Supply Boat. A chain stopper will be attached to the mooring wire, leaving some slack from the stopper to the mooring line end.
- The SYU DPV Supply Boat will transit from the work barge location to the weather leg buoy or in the case of the platform being the anchor point, the appropriate platform leg. The work barge winch operator will coordinate with the SYU DPV Supply Boat Captain and slack the mooning line as directed.
- Upon arrival at the buoy, the SYU DPV Supply Boat crew will attach the mooring wire to the buoy release hook. Once the mooring line is secured on the hook, the SYU DPV Supply Boat crew will release the chain stopper and transit back to the work barge. Should the anchor point be the platform, the SYU DPV Supply Boat crew will transfer the mooring wire to the platform crew who will connect it to a mooring line attached around the platform leg.
- The steps above will be repeated until all mooring wires are secured.

Appendix C

ExxonMobil, Archaeological Assessment ICCPS Project: ROV Survey of Temporary Mooring Anchor Locations Santa Ynez, Heritage Platform OCS-P00182, submitted by C&C Technologies, December 2010

ARCHAEOLOGICAL ASSESSMENT

ICCPS Project:

ROV SURVEY OF TEMPORARY MOORING ANCHOR LOCATIONS

SANTA YNEZ UNIT, HERITAGE PLATFORM OCS P-00182

SUBMITTED BY

C&C Technologies
SURVEY SERVICES
730 E. KALISTE SALOOM ROAD, LAFAYETTE, LA. (337) 261-0660

Project No. 100809

December 2010

Robert A. Church
Marine Archaeologist

TABLE OF CONTENTS

TABLES AND ILLUSTRATIONS

APPENDICES

ENCLOSURES

EXECUTIVE SUMMARY

- ExxonMobil Production Company and contractors conducted an Archaeological Survey near the Platform Heritage (HE) OCS P-00182 (within the Santa Ynez Unit) using a Remotely Operated Vehicle between November 10 and 21, 2010.
- Four proposed temporary mooring anchor location were surveyed to the Northwest, Northeast, Southeast, and Southwest of HE.
- The approximate water depths at the anchor locations ranged from 1,025 to 1,165 feet.
- The survey team documented 21 targets within the survey area.
- Only 4 of the 21 targets are located within the Areas of Potential Effect (APE) of the proposed anchor locations.
- The Southwest Anchor Location was adjusted to avoid a hard bottom feature.
- No areas within the APEs are recommended for avoidance based on apparent biological significance.
- No areas within the APEs are recommended for avoidance or investigation based on archaeological potential.

1.0 INTRODUCTION

ExxonMobil Production Company (ExxonMobil) and contractors conducted a survey of four anchor locations around Platform Heritage (HE) OCS P-00182 (within the Santa Ynez Unit) to support the placement of temporary moorings in support of barge operations for the ICCPS (See Illustrations 1, Regional Study Maps and See Enclosures: Proposed Anchor Location ROV Survey Map and Platform Heritage Candidate Mooring Location Detail Map). This assessment addresses the archaeological findings from that survey. A brief description of the biological findings is also included. The final coordinates and water depth of each proposed anchor location are listed below in Table 1.

Table 1 Propose Anchor Locations

Anchors	NAD 27, California Zone 6 (0406)		Approximate Water Depth
	X	Y	
Northwest Location	782,224’	820,973’	1,025 ft.
Northeast Location	786,690’	819,748’	1,110 ft.
Southeast Location	786,251’	814,757’	1,165 ft.
Southwest Location	780,762’	816,295’	1,085 ft.

The survey was conducted using a Remotely Operated Vehicle (ROV) to address the Hard Bottom and Archaeology comments put forward by the Department of Interior Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEM) regarding the Area of Potential Effect (APE) for the proposed temporary mooring anchor locations. The survey incorporated the agreed upon conditions included in the BOEM letters to Mr. Wil Porche dated August 4, 2010, October 28, 2010 and November 5, 2010 as well as the ExxonMobil letter to Mr. Rishi Tyagi dated November 4, 2010. The ROV survey followed the requirements established in the BOEM ROV_2005_1 "Remotely Operated Vehicle (ROV) Investigations of Unidentified Magnetic Anomalies and/or Sidescan Sonar Targets: Methodological Guidelines." This Report of Findings follows the report requirements specified in "NTL No. 06-P03_Pacific OCS Region “Notice to Lessees and Operators (NTL) of Federal Oil, and Gas Leases in the Pacific Outer Continental Shelf Region.”

Field operations were conducted on board the M/V *Toby Tide* between November 10 and 21, 2010. The M/V *Toby Tide* departed Port Hueneme at 2355 hours on November 10, 2010. The ROV was deployed at the survey area at 1123 hours on November 11, 2010. The ROV was recovered for repairs at 1224 hours on November 13, 2010 and the M/V *Toby Tide* arrived back at Port Hueneme at 0015 hours on November 14, 2010. The M/V *Toby Tide* departed Port Hueneme at 0830 hours on November 18, 2010 and the survey team commenced survey at 1615 hours the same day. The survey was completed at 2334 hours on November 18, 2010. During the survey, seas ranged from 1 to 3-foot chop with 4 to 6-foot ground swells, and winds varied from 10 to 20 knots. Surface conditions did not hinder launch and recovery of the ROV or effect data collection. Visibility near the seafloor was approximately 2 to 3 meters, but was periodically reduced because of sea lion activity. Good quality scanning sonar data was collected during survey allowing for adequate detection of seafloor targets. Sea lions were

periodically detected on the sonar data, but were easily discernible from real seafloor targets, because of their mobility. Sea lion activity generally increased during nighttime operations.

The primary survey grid at each location consisted of five parallel survey lines run at approximately 275-foot line spacing with the scanning sonar at 165-foot range. Each survey line was a minimum of 1,300 feet long. As requested by the BOEM, three survey lines at the Northeast Anchor Location were extended approximately 300 feet (1,600 feet long) to cover an area of possible biological interest northeast of the proposed anchor area and to aid in determining if a canyon exists at that location. The proposed transects and line spacing allowed 100 percent coverage of the APE with approximately 53 feet of overlap between survey lines.

Illustration No. 1. Regional Study Map

The survey grid for the Southwest Anchor Location was adjusted in the field to potentially avoid a hard bottom feature located less than 250 feet north of the original APE for the anchor location and to fill in a sonar date gap, which occurred during the survey. Survey Track Lines 1-4 were extended approximately 300 feet (total of 1,600 feet long) to the southwest and a sixth survey line (Track Line 0) was added (1,600 feet long) to allow this anchor location to be moved further away from the hard bottom feature. Additionally, the sonar range was inadvertently reduced to 130-feet during the survey of Track Lines 1, 2, and 3 causing a 25-foot gap in the sonar coverage between Lines 1 and 2 and between Lines 2 and 3. Two additional survey lines (Track Line 1.5 and 2.5) were run to fill in the data gap and insure overlapping coverage. The sonar was run at 98-foot range on Track Lines 1.5 and 2.5.

Data reproductions (video screen captures and scanning sonar image) and a table with a description of each target are provided in Appendix A. Appendix B contains a project personnel list, survey logs, and a complete table of each manual navigation fix taken during the survey. The survey configuration diagram and survey equipment descriptions of the Aqueos, HYSUB 20 ROV, MS1000 Scanning Sonar, and BATS Ultra Short Base Line Tracking System (USBL) are in Appendix C. Two project study maps are provided as enclosures. The geodetic datum used to generate the study maps is the North American Datum of 1927 (NAD27) on the Clarke 1866 ellipsoid, and projected using State Plane California Zone 6 (0406). The BATS USBL tracking system used during the survey provided accuracy within the required 10-meter specification for the survey based on accuracy checks conducted in the field.

2.0 HISTORIC BACKGROUND

The maritime history of the California coast dates to the early sixteenth century. In 1522, Spanish conquistadors reached the Pacific Coast and had began exploring the coast north of Mexico by the 1530s. In 1539, Francisco de Ulloa explored the Gulf of California with three small caravels under orders of Hernán Cortez. He rounded Cape San Lucas and sailed along the Pacific coast of the Baja peninsula proving that "California" was a peninsula and not an island. By the summer of 1540, his one remaining ship, *Trinidad*, had reached the vicinity of present day San Diego. By the end of August, the small caravel was moored off San Luis Rey and all of the crew went ashore with illness. While the crew was ashore, a storm apparently caused the anchor cable to part and the *Trinidad* disappeared (Gearhart et. al 1990; Wagner 1924; Marx 1971; and Berman 1972).

After 1565, Spanish ships began sailing east from Manila to the New World with Oriental goods. The eastward Pacific crossing was a grueling voyage and the ships were often in poor condition by the time they reached the west coast. Many of the Spanish Manila galleons were lost among the Pacific coast reefs and shoals, including the *Santa Marta* (1582), the *San Xavier*, (1596) the *Nuestra Señora de Ayuda* (1641) and the *San Sebastián* (1754) (Heizer 1942; Marx 1971; Horner 1990).

In 1578, Francis Drake rounded Cape Horn to the great dismay of the Spanish and he began attacking their shipping and settlements along the Pacific coast. He sailed as far north as the modern state of Washington by 1579 before turning southward again and sailing back along the

coast of Oregon and Northern California. Other British explorers and privateers followed, such as Thomas Cavendish, challenging Spanish control of the Pacific Coast. The Spanish responded with additional voyages to secure the California coast and locate suitable harbors for the incoming Manila galleons. Between 1603 and 1774, however, there were no official Spanish expeditions along the Pacific coast and still other nationalities were beginning to encroach upon their claim including the Russians in the North Pacific region. The north Pacific coast had been under mostly Spanish control for nearly three centuries, but they had failed to capitalize on it or significantly populate the region (Gearhart et. al 1990).

As a new nation was being born out of the American Revolution on the east side of the continent, Captain Cook sailed from Liverpool, England in July 1776 bound for the Pacific coast. Although Cook was killed in the Hawaiian Islands, the expedition resulted in the trade of sea otter pelts with China. Although the region had been slow to develop economically, the new lucrative fur trade quickly began to transform the Pacific region commercially. Also during this period the support for whaling vessels, mostly centered on San Francisco, developed as a secondary industry as did the lumbering industry locally supported by the sparse population (Gearhart et. al 1990).

Spain was in serious decline as a world power by the end of the eighteenth century and most of Europe was involved in revolution and war, which by the beginning of the nineteenth century left the United States of America the most powerful nation along the Pacific coast by default. By the 1820s, the sea otter trade was mostly at an end because of over hunting. Other furs such as seals, sea lions, and walrus were also hunted to near extinction. During the early nineteenth century, a thriving cattle industry and the trade in cattle hides and tallow as well as a major rise in the whaling industry sustained the California economy until the gold rush of 1848 (Gearhart et. al 1990).

The discovery of gold at Sutter' Mill on January 24 1848 dramatically changed the demographics and economy of California. Between 1848 and 1852 nearly every available seaworthy vessel flocked toward California. In 1849 alone, 775 ships filled with would-be prospectors descended on San Francisco from Eastern ports. The majority of those vessels lay abandoned in San Francisco harbor by the end of that year with their former passengers and crew scrambling inland to seek their fortune in gold (Gearhart et. al 1990).

In 1848, shortly after the beginning of the Gold Rush, the American steam barque *Edith*, loaded with passengers bound for San Francisco, ran aground at Honda. Early mariners greatly feared the name Honda. Lying 213 miles south of San Francisco and less than three miles north of Point Arguello, the dangerous twenty-five mile stretch of coastline between Purisima Point and Point Concepcion was known as a graveyard of ships, the Spaniards called this stretch of the California coastline *La Guijada del Diablo*, which translates into "The Devil's Jaw" (Gibbs 1962).

In 1850, the American clipper brig *Frolic*, 209-tons, Captain Horatio Faucon, on a voyage from China to San Francisco carrying 135 tons of Chinese merchandise, wrecked off Mendocino near Point Cabrillo approximately 144 miles north of San Francisco on the evening of July 25; the crew was saved, but the vessel and cargo were a complete loss. Recreational Scuba divers

discovered the wreck in the shallows of the north side of the cove just north of the Point Cabrillo Lighthouse in the 1950s. California's Department of Park and Recreation obtained the wreck from the California State Lands Commission for inclusion in the state park system. In 2003 and 2004, students from East Carolina University, Indiana University, Napa Valley College and Cabrillo Community College participated in an archaeological survey of the site. A television crew filmed portions of the survey work for an episode of the popular History Channel program *Deep Sea Detectives* (Smith 2005, Delgado, 1997).

In 1850, the Pacific Mail Steamship Company development the first local steamship industry at Benecia in San Francisco Bay (Gearhart et. al 1990). In 1853, the American side-wheel steamer *Winfield Scott*, 1,291-tons, Captain Simon F. Blount, owned by the Pacific Mail Steamship Company, bound from San Francisco to Panama, with a cargo of California gold valued at $1,000,000, wrecked on Anacapa Island off Santa Barbara on the night of December 3. The *Winfield Scott* now lies within the Channel Islands National Park (Konstam 1999, Delgado 2004, Mitchell 1975).

Throughout the 1850's and in the decade that followed other steamers, clipper ships, merchant brigs and barques continued to wreck off the coast of California with increased frequency. These losses include the steamers *Independence* (1853), *America* (1855) *Belle* (1856) *Sequoia* (1857) *Northerner* (1860) and *Brother Jonathan* (1865); and the clipper ships *Carrier Pigeon* (1853) *San Francisco* (1854) *Golden Fleece* (1854*) Stilwell S. Bishop* (1855) *Sperry* (1856) *Flying Dragon* (1861) *Sea Nymph* (1861) *Polynesia* (1862) *Noonday* (1863); and the merchant brig *Stirling* (1855) and the barques *Esabelita Hyne* (1856) *LaGrange* (1859) and *Dimon* (1868) (Belyk 2001, Marshall 1978, Howe and Mathews 1986).

The frequency of shipwrecks decreased somewhat towards the end of the century as lighthouses were built along the coast to warn mariners of dangerous points and shallows and more accurate charts were developed. Wrecks still continued to occur, however on into the twentieth century. In 1901, the American iron-hulled steamer *City of Rio de Janiero*, 3,500-tons, Captain William Ward, en route from Hong Kong to San Francisco carrying 89 passengers and a cargo consisting of 2,423 slabs of tin was lost while entering San Francisco Bay. The steamer was attempting to pass through the Golden Gate in heavy fog when she struck a submerged reef on the southern part of the straits and sank off Fort Point. Of the 234 passengers and crew onboard, only eighty-two survived the terrible tragedy (Belyk 2001).

During the Second World War, Japanese submarines sank fourteen allied vessels along the west coast of the United States. One of these ships was the Union Oil Company tanker *Montebello*. The 440-foot tanker was transiting from Port San Luis, California to Vancouver, British Columbia on December 23, 1942 with 73,571 barrels of crude oil when a torpedo from Japanese Submarine *I-21* ripped into the tanker's hull. All 38 crewmen escaped the attack, though several were reportedly wounded by machinegun fire. The tanker now rests in approximately 900 feet of water just south of the boundaries of the Monterey Bay National Marine Sanctuary (Berman 1972; and Montebello 2010).

3.0 HISTORIC POTENTIAL

According to Gearhart et. al (1990), at least 4,676 shipwrecks occurred along the Pacific coast of the United States (modern boundaries) between 1540 and 1946. The highest number of recorded wrecks occurred in the years following the California gold rush. Between 1801 and 1946, approximately 250 shipwrecks occurred along the coast or offshore of Santa Barbara and Ventura counties. Although there is a high potential for shipwrecks in this region, no shipwrecks are currently known to exist within the current project's boundaries.

4.0 BENTHIC COMMUNITIES POTENTIAL

Deepwater chemosynthetic communities typically exist in water depths greater than 300 meters (984 feet) and consist of assemblages of tubeworms, clams, mussels, bacterial mats, and a variety of associated organisms. They feed on a carbon source independent of photosynthesis and are therefore independent of the photosynthetic food chain (MacDonald et al., 1990). While most of these communities support low densities of organisms, high-density chemosynthetic communities have been noted where hydrocarbon-charged sediments and acoustic void zones are associated with surface faulting. Anomalous mounds or knolls and gas or oil seeps may also support high-density chemosynthetic communities. The presence of high-density chemosynthetic communities is often linked with zones of seafloor fluid vents, accumulations of hydrates, and outcrops of authigenic carbonate rock (Behrens, 1988). Hydrocarbon flow rate through the seafloor is important in sustaining healthy chemosynthetic communities (Roberts, 2001). However, not all areas of high seafloor amplitudes surrounded by other contributing features will support high-density chemosynthetic communities. Visual inspection of areas where high-amplitude seafloor reflectors exist is necessary to confirm the presence of high-density chemosynthetic communities.

Deepwater coral communities have been known to occur for several decades. Various environmental factors including availability of suitable substrate, water temperature, current speed, organic input, and seepages of hydrocarbons have been proposed to regulate deepwater corals (CSA International, Inc., 2007). Common species include the scleractinian corals *Lophelia pertusa* and *Madrepora oculata*, the gorgonian *Callogorgia americana delta*, antipatharians, sponges, anemones, and various crustaceans. *Lophelia* is typically found in water depths between 200 and 1000 meters. Deep-water coral colonization can be on scattered small solitary features or spread over larger areas. These complex communities form three-dimensional structure that create habitat for hot-spots of biodiversity.

5.0 ASSESSMENT OF FIELD DATA

During the survey the scanning sonar data was continually monitored and recorded to detect seafloor targets within the APE. The navigation track of the ROV was continually recorded at 30-second intervals. Manual position fixes were recorded at the beginning and end of each track line, at locations were the ROV intentionally left the track line, and at each notable seafloor target. The scanning sonar detected a total of 21 targets during the survey. Each target was visually investigated and documented with video and the coordinate of the target was recorded

(screen captures of each target are included as figures in Appendix A along with a Table of Seafloor Targets).

5.1 Northwest Anchor Location

One target was recorded in the Northwest Anchor Location survey area. The target was a small hard bottom area measuring 20 x 10 feet with less than a foot of relief (Fix No. 1, Figure No. 1).

5.2 Northeast Anchor Location

Five targets were recorded in the Northeast Anchor Location survey area (targets at Fix Nos. 14, 16, 24, 26, and 27). The targets recorded at Fix Nos. 14 and 16 were initially thought to be cable, but are likely just kelp (Figures 2 and 3). These targets did not show up on the sonar, which is consistent with kelp rather than cable. Both targets are located outside the APE (approximately 15 feet and 360 feet respectively). The target at Fix No 24 is a small hard bottom area measuring 5 x 3 feet with less than a foot of relief (Figure No. 4). This target may be mostly the remains of kelp holdfast (root-like mass) rather than an actual hard bottom feature. The target at Fix No 26 is small miscellaneous debris and the target at Fix No 27 is a folding ladder (Figure Nos. 5 and 6). Both targets are located outside of the APE (approximately 10 feet and 140 feet respectively). The bathymetric low area to the northeast of the APE is a low gradient seafloor depression that is approximate 30 feet lower that the ambient seafloor. No hard bottom areas were detected in association with this feature. Numerous sea urchins were observed at the bathymetric low point. The sea urchins possibly moved down slope collecting at the bottom of the depression. A 20-inch pipeline (SYU Emulsion Pipeline from HE to HA) was also imaged with the sonar and investigated during this survey. The pipeline is located over 250 feet outside and to the south of the APE.

5.3 Southeast Anchor Location

One target (Fix No. 42) was recorded in the Southeast Anchor Location survey area. The target was a circular container measuring approximately one foot in diameter and exhibiting approximately a foot of relief (Figure No. 7). This target is located outside and approximately 140 feet south of the APE.

5.4 Southwest Anchor Location

Fourteen targets were recorded in the Southwest Anchor Location survey area. Multiple fixes were taken on some large features resulting in 19 target fixes during the survey of the Southwest Anchor Location (targets at Fix Nos. 46-56, 58, 63, 66, 68, 74, 83, 86, and 88). The targets recorded at Fix Nos. 46-50 and 86 are part of a small debris field covering a 200 x 150-foot area and located just outside the northwestern portion of the APE. The target consists of metal debris such as sections of pipe and I-beam (Figure Nos. 8-12 and 31). The target recorded at Fix No. 51 is possibly wire (Figure No. 13) and is located in the northern portion of the APE. The target recorded at Fix No. 52 is a rectangular shaped container measuring approximately 3 x 1 x 1 feet

(Figure No. 14). The target recorded at Fix Nos. 53-56 and 88 is a hard bottom feature measuring 110 x 35 feet with approximately a foot of relief at the northeastern end (Figure Nos. 15-20 and 32). The feature runs southwest to northeast. The southwestern end of this feature (Fix No. 53) is located approximately 185 feet northeast of the original APE. The northeastern end of this feature (Fix No. 56) is located approximately 320 feet northeast of the original APE. The target recorded at Fix No. 58 is a pipe frame in a pyramid shape and measures 2 x 2 x 2 feet (Figure No. 21). A short amount of line is tied to the top of the frame. The targets recorded at Fix Nos. 63, 68, and 74 are miscellaneous debris (Figure Nos. 22, 29, and 30). The target at Fix No. 68 is located at the west-southwest edge of the APE and the targets at Fix Nos. 63 and 74 were located outside the original APE. The target recorded at Fix Nos. 66 and 83 is a whale skeleton measuring approximately 65 x 8 feet with 2.5 feet of relief (Figure No. 23-28). Fix No. 66 is at the end of the skull and Fix No. 83 is at the tail end of the spinal column. Only two of the 14 targets recorded near the Southwest Anchor Location were located within the original APE (Nos. 51 and 68). The proposed anchor location has been moved 146 feet to the south-southwest to insure the APE avoid the hard bottom feature at Fix No. 53 by a minimum of 250 feet. Two targets (Targets at Fix Nos. 68 and 74) are now located within the new APE. The original APE for the Southwest Anchor Location is reflected in the Fugro field map, "Proposed Anchor Location ROV Survey Map November 10th - 21st, 2010." The final APE for the Southwest Anchor Location is reflected in the "Platform Heritage Candidate Mooring Location Detail Map Detail Map Rev 3.4."

6.0 CONCLUSIONS AND RECOMMENDATIONS

The ROV survey revealed 21 targets of which only four (Targets at Fix Nos. 1, 24, 68, and 74) are located within the APE of the proposed anchor locations addressed within this report. Each target was visually investigated and 16 were found to be modern debris including one debris field, 5 were biological in nature including two hard bottom areas with a foot or less of relief, a whale skeleton, and two areas of kelp initially mistaken as cable. None of the targets are suggestive of significant submerged cultural resources. The larger hard bottom area and whale skeleton are outside of the proposed APE. No areas within the proposed APE are recommended for avoidance or further investigation based on archaeological or biological significance.

Shipwreck remains possibly could exist undetected or unidentified within the survey area. If wood beams, planking, pile of ballast stone, ceramics, or other possibly cultural materials are encountered during lease development, construction or other permitted activity; the BOEM POCSR Regional Manager should be contacted immediately for an assessment of any antiquities. In this event, no further activities should be conducted near the area of discovery until advised by the appropriate BOEM personnel (See NTL No. 06-P03, "Surveys 3. Mitigation Measures and Operational Practices:" "Discovery after Commencing Operation").

7.0 REFERENCES

Belyk, Robert C. 2001. *Great Shipwrecks of the Pacific Coast*. New York: John Wiley & Sons.

Berman, Bruce D. 1972. *Encyclopedia of American Shipwrecks*. Boston: The Mariners Press, 1972.

Delgado, James P., editor. 1997. *British Museum Encyclopedia of Underwater and Maritime Archaeology*. London: British Museum Press.

_____. 2004. *In Search of Famous Shipwrecks*. New York, MJF Books.

Gearhart, Robert, John C. Neville, and Steven D. Hoyt. 1990. *California, Oregon, and Washington archaeological resource study, Vol. IV: History*. OCS Study, MMS 90-0090. prepared by Espey, Huston & Associates, Inc.; subcontractor, Dames & Moore. Camarillo, CA : U.S. Dept. of the Interior, Minerals Management Service, Pacific OCS Region.

Gibbs, James A. 1962. *Shipwrecks of the Pacific Coast*. Portland, OR; Binford & Mort.

Heizer, Robert Fleming. 1942. *Archaeological Evidence of Sebastian Rodrigues Cermeno's California Visit in 1595*. San Francisco: California Historical Society.

Horner, Dave. 1990. *The Treasure Galleons.* Port Salerno, Florida: Florida Classics Library.

Howe, Octavius T. and Frederick C. Matthews. 1986. *American Clipper Ships: 1833-1858*, two volumes. New York: Dover Publications, reprint of 1926-27 edition.

Konstam, Angus. 1999. *The History of Shipwrecks*. New York: The Lyons Press.

Marshall, Donald B. 1978. *California Shipwrecks*. Seattle: Superior Publishing.

Marx, Robert F. 1971. *Shipwrecks of the Western Hemisphere: 1492-1825*. New York, The World Publishing Company.

Mitchell, C. Bradford, editor. 1975. *Merchant Steam Vessels of the United States: 1790-1868*. "*The Lytle-Holdcamper List*" Staten Island, New York, Steamboat Historical Society of America.

Montebello. 2010. http://www.militarymuseum.org/Montebello.html. The California State Military Museum.

NTL. 2003. NTL No. 06-P03_Pacific OCS Region "Notice to Lessees and Operators (NTL) of Federal Oil, and Gas Leases in the Pacific Outer Continental Shelf Region," Department of Interior Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE).

ROV. 2005. ROV_2005_1, "Remotely Operated Vehicle (ROV) Investigations of Unidentified Magnetic Anomalies and/or Sidescan Sonar Targets: Methodological Guidelines," Department of Interior Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE).

Wagner, Henry R. editor. 1924. *California Voyages: 1539-1541*. Translation of Original Documents, Published in December 1924 as No. 4 of Vol. III of the Quarterly of the California Historical Society.

APPENDIX A

Data Reproductions
Target Table

Figure 1. Hard Bottom feature at Fix No. 1

Figure 2. Possible Kelp at Fix No. 14

Figure 3. Possible Kelp at Fix No. 16

Figure 4. Possible Kelp Holdfast at Fix No. 24

Figure 5. Unidentified Debris at Fix No. 26

Figure 6. Folding Ladder at Fix No. 27

Figure 7. Circular Container at Fix No. 42

Figure 8. Unidentified Debris at Fix No. 46

Figure 9. Pipe at Fix No. 47 (part of a debris field)

Figure 10. Pipe at Fix No. 48 (part of a debris field)

Figure 11. I-Beam at Fix No. 49 (part of a debris field)

Figure 12. Pipe at Fix No. 50 (part of a debris field)

Figure 13. Possible Wire at Fix No. 51

Figure 14. Rectangular Container at Fix No. 52

Figure 15. Hard Bottom feature at Fix No. 53 (Southwest end of the feature)

Figure 16. Hard Bottom feature near Fix No. 54. A Sea Lion is visible in the Background.

Figure 17. Hard Bottom feature at Fix No. 55. Unidentified debris is lying on the feature.

Figure 18. Hard Bottom feature at Fix No. 56 (Northeast end of the feature)

Figure 19. Close-up of Hard Bottom feature near Fix No. 88

Figure 20. Close-up of Hard Bottom feature near Fix No. 88

Figure 21. Pyramids Shaped pipe frame at Fix No. 58

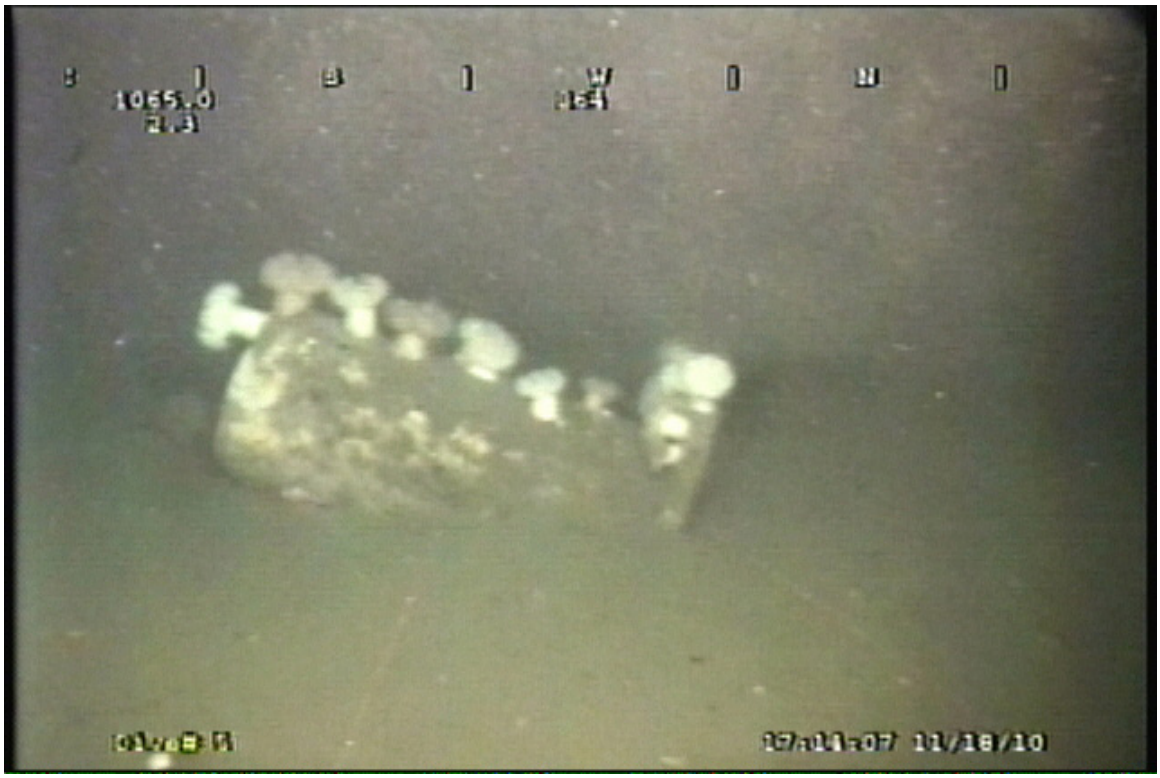


Figure 22. Unidentified Debris at Fix No. 63

Figure 23. Whale Skull at Fix No. 66 (View of Left Side)

Figure 24. Whale Skull at Fix No. 66 (View of Left Side)

Figure 25. Whale Skull (View of Right side)

Figure 25. Whale Skull (View of Right side near top of the spinal column and base of the skull)

Figure 27. End of Whale Skeleton at Fix No. 83

Figure 28. Whale Skeleton near Fix No. 83

Figure 29. Unidentified Debris at Fix No. 68

Figure 30. Unidentified Debris at Fix No. 74

Figure 31. Unidentified Debris at Fix No. 86

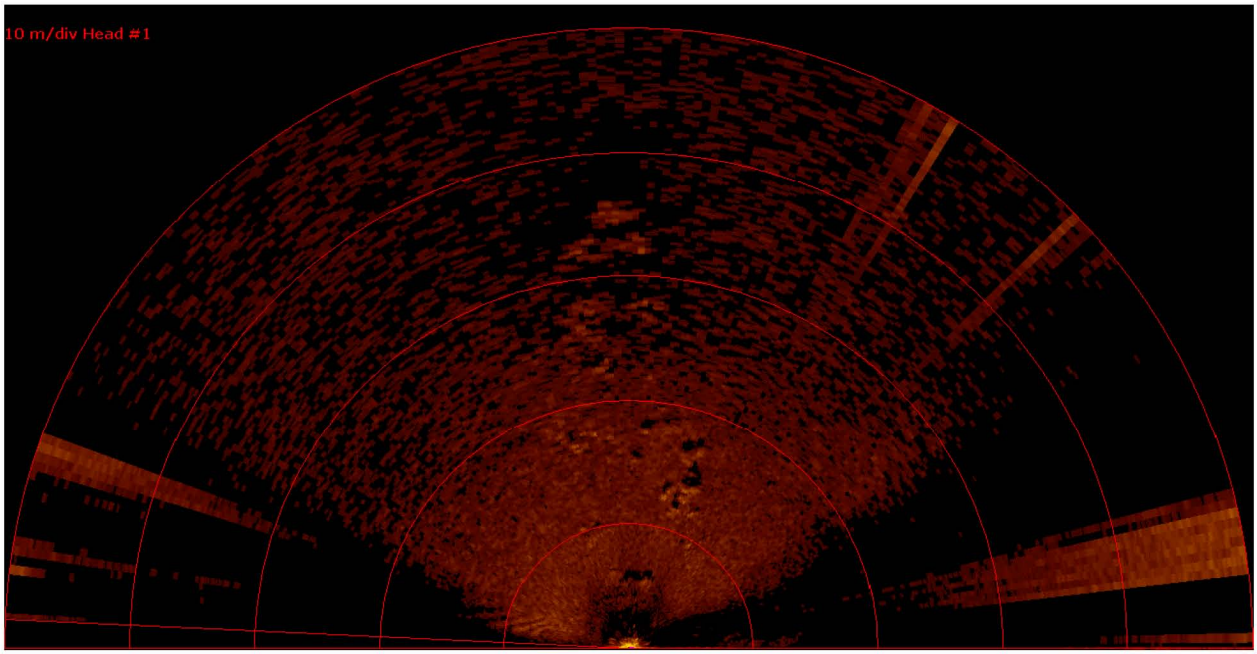


Figure 32. Scanning Sonar Image of Hard Bottom Feature near the Southwest Anchor Location APE (Near Fix No. 53). Divisions are at 10-meter scale, Total Rage is 165 feet.

Fig No.	Nav. Fix No.	Easting NAD 27 CA Zone 6 (Ft)	Northing	Latitude NAD 83	Longitude	Description	Time (PST)	Date	Dimensions (Ft)
Northwest Anchor Location									
1	1	782,331.32	820,213.47	N34.35604°	W120.28575°	Hard bottom feature	13:36:49	11/11/2010	20’ x 10'
	Northeast Anchor Location								
2	14	785,837.12	819,504.60	N34.35447°	W120.27405°	Debris (Possible Kelp)	19:22:55	11/11/2010	2.5' x 1' x 1'
3	16	787,282.73	820,121.01	N34.35632°	W120.26934°	Debris (Possible Kelp)	20:09:22	11/11/2010	2' x .15'
4	24	786,692.17	819,082.70	N34.35340°	W120.27117°	Possible Hard Bottom (Kelp holdfast)	13:16:53	11/12/2010	5' x 3'
5	26	786,324.19	818,976.38	N34.35307°	W120.27237°	Debris - Unidentified	13:30:56	11/12/2010	1.5' x .5' x 2'
6	27	786,273.26	818,856.83	N34.35274°	W120.27252°	Ladder	13:35:43	11/12/2010	10' x 2.5' x .4'
Southeast Anchor Location									
7	42	785,931.55	814,208.62	N34.33994°	W120.27306°	Circular Container	19:48:40	11/12/2010	1' diameter, 1.7' H
Southwest Anchor Location									
8	46	780,224.46	816,767.21	N34.34636°	W120.29228°	Unidentified Debris (Debris Field)	9:55:09	11/13/2010	1.5' x .3' x .3'
9	47	780,393.87	816,842.20	N34.34658°	W120.29173°	Pipe (Debris Field)	10:05:06	11/13/2010	~4' long, .3' diameter
10	48	780,366.51	816,929.50	N34.34682°	W120.29183°	Pipe (Debris Field)	10:10:13	11/13/2010	~4' long, .3' diameter
11	49	780,335.46	816,976.49	N34.34694°	W120.29194°	I-Beam (Debris Field)	10:12:33	11/13/2010	5' x 1' x 1.5'
12	50	780,375.89	816,903.67	N34.34675°	W120.29179°	Pipe (Debris Field)	10:16:20	11/13/2010	~4.5' long, .3' diameter
13	51	780,780.16	817,053.19	N34.34720°	W120.29048°	Possible Wire	10:47:52	11/13/2010	22' x .1'
14	52	781,095.03	817,234.13	N34.34773°	W120.28946°	Rectangular Container	11:00:30	11/13/2010	3' x 1' x 1'
15	53	781,307.32	817,350.64	N34.34808°	W120.28877°	Hard Bottom Feature	11:09:02	11/13/2010	See Fix No. 55
16	54	781,380.96	817,361.77	N34.34812°	W120.28853°	Hard Bottom Feature	11:14:25	11/13/2010	See Fix No. 55
17	55	781,405.70	817,416.43	N34.34827°	W120.28845°	Hard Bottom Feature (Center)	11:16:52	11/13/2010	110' x 35' x 1'
18	56	781,424.57	817,449.17	N34.34836°	W120.28839°	End of Hard Bottom Feature	11:19:39	11/13/2010	See Fix No. 55
21	58	781,344.16	817,187.31	N34.34763°	W120.28863°	Debris Metal Framing	11:31:33	11/13/2010	2' x 2' x 2'
22	63	780,220.27	816,547.22	N34.34575°	W120.29227°	Debris - Unidentified	17:13:09	11/18/2010	4.3' x 3.5' x 1.5'
23-26	66	780,267.99	816,093.88	N34.34452°	W120.29205°	Whale Skull	17:53:39	11/18/2010	65' x 8' x 2.5'
29	68	780,513.56	816,277.91	N34.34505°	W120.29126°	Debris - Unidentified	18:16:04	11/18/2010	2' x .5'
30	74	780,875.10	815,817.13	N34.34382°	W120.29000°	Debris - Unidentified	19:26:15	11/18/2010	1.8' x 1.5' x .6'
27 & 28	83	780,260.24	816,029.28	N34.34434°	W120.29207°	Debris Whale Skeleton	21:26:52	11/18/2010	See Fix No. 66
31	86	780,228.40	816,851.96	N34.34659°	W120.29228°	Unidentified Debris (Debris Field)	21:54:48	11/18/2010	~2.5' long, .3' diameter
19 & 20	88	781,390.52	817,356.37	N34.34810°	W120.28849°	Hard Bottom Survey	22:52:24	11/18/2010	See Fix No. 55

APPENDIX B

Project Personnel List
Survey logs
Table of Manual Navigation Fixes

PROJECT FIELD PERSONNEL

EXXONMOBIL PRODUCTION COMPANY
ARCHAEOLOGICAL ROV SURVEY
MOORING ANCHOR LOCATIONS
PLATFORM HERITAGE (HE) OCS P-00182
WITHIN THE SANTA YNEZ UNIT

David Gilbert – Field Project Manager, MMI (ExxonMobil Client Representative)

Dave Hankins – MPM Project Manager, Marine Project Management, Inc.

Robert A. Church – Marine Archaeologist, C & C Technologies, Inc.

Jeff Kowalishen – ROV Manager, Aqueos Corporation

Tony Perez – ROV Crew, Aqueos Corporation

Keely Hamich – ROV Crew, Aqueos Corporation

Annica Taedif – Surveyor, Fugro West Inc.

Robin Frape – Surveyor, Fugro West Inc.

David Ball – BOEM Observer

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	1
VESSEL:	Toby tide	DATE:	November 10, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif	19.5	
SURVEYOR	R. Frape	19.5	WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0800	At Fugro warehouse
0900	Transit to Port Hueneme
0930	At Port Hueneme. Start Mob
1730	Hydrophone Tested (out of Water) pole still up.
1945	Static Calibration performed
2000	Safety Videos
2150	End of Safety Orientation
2250	Beacons handed back to survey for charge
2335	Depart Port Hueneme Harbor

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	2
VESSEL:	M/V Toby Tide	DATE:	November 11, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif	12	
SURVEYOR	R. Frape	12	WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0114	Pole deployed
0216	POS MV Calibrated
0225	deployed beacon and buoy for BATS calibration
0236	Current is too strong. Recover beacon.
0240	Added weight to basket and redeployed
0302	beacon seems to have very sporadic reply. Multipath? Will check all connections
0304	will try calibration with ROV.
0310	Recover beacon
0320	Pole recovered
0324	transit to Heritage
0800	At Heritage
1006	Pole deployed
1012	Calibration check from deck
1123	Rov Deployed
1221	ROV at bottom at touchdown point
1243	Pitch calibration +1
1259	calibration Completed
1302	ROV start transiting to start point
1331	NW Anchor Line #4 NW direction 330
1336	Fix 1 Hard bottom feature 5871859.66, 1959796.97
1400	Fix 2-End of survey line 4 NW Anchor 5871308.42 1960755.95

1400	Fix 3-Start of Survey line @3 NW Anchor line 5871546.55 1960893.60
1434	Fix 4- End of survey line #3 NW Anchor 5872214.34 1959759.65
1440	Fix 5- Start of Survey line @2 NW Anchor 5872436.39 1959898.31
1510	Fix 6-End of Survey Line 2 NW Anchor 5871783.00 1961029.88
1514	Fix 7-Start of Survey line 1 NW Anchor 5872023.11 1961182.80
1545	Fix 8- End of line 1 NW Anchor 5872686.00 1960043.23
1546	start transit to line 5
1607	Fix 9 Start of Line 5 NW Anchor 5871711.34 1959484.47
1638	Fix 10 end of line 5 NW Anchor 5871066.28 1960626.88
1645	transit to NE Anchor
1830	Fix 11 Start of Survey line1NE Anchor 5876544.39 1960229.04
1912	Fix 12 End of Survey line 1 NE Anchor 5875167.57 1959407.79
1918	Fix 13 Start of Survey line 2 NE Anchor location 5875304.66 1959170.09
1925	Fix 14 Debris 5875375.89 1959144.28
2003	Fix 15 End of Survey line 2 NE Anchor 5876683.98 1959990.15
2010	Fix 16 Unidentified debris NE Anchor 5876811.28 1959783.61
2012	Fix 17 Pause in Survey line 3 NE Anchor 5876824.64 1959756.01
2114	ROV on deck
2117	Data Backup
2138	End of Survey

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	3
VESSEL:	Toby tide	DATE:	November 12, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif	16	
SURVEYOR	R. Frape	16	WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0600	Safety Meeting
0631	pre-deployment prep and transit to site
0652	Pole deployed
0654	Survey is up and running
0656	Start ROV deployment
0745	ROV near bottom moving to location
0820	Looking for unidentified debris fix 16
0905	Fix 18 Start of line 3 NE Anchor 5876816.78 1959749.26
0938	Fix 19 End of line 3 NE Anchor 5875451.28 1958946.60
0939	line 003_0539 is transit to fix 14
1002	line 003_0602 trying to find target 14
1034	Fix is for reference only not to be included in survey
1036	transit to line 4 NE Anchor
1050	Fix 20 Start of line 4 NE Anchor 5875587.46 1958695.97
1140	Jumpy signal changed beacon…paused survey and everything went off
1245	Back on survey mode where we paused
1247	004_0845 survey line is end of line 4 NE Anchor
	Fix 21 end of survey NE Anchor line 4
1258	Fix 22 Start of Survey line 5 NE Anchor 5876857.72 1959135.23
1311	Fix 23 Position Fix on line to investigate sonar hit
1317	fix 24 Hardrock bottom less than 1 foot relief 5876237.46 1958736.16

1322	Fix 25 Position Fix on line to continue survey
1332	Fix 26 Debris #2 (location) line 5 5875871.27 1958623.99
1335	fix 27 Debris Ladder 5875822.27 1958503.66
1336	Fix 28 Position Fix 5875801.18 1958508.00
1343	fix 29 Position Fix 5875859.99 1958540.45
1346	Fix 30 End of Survey line 5 NE Anchor 5875731.04 1958464.71
1418	ROV on deck
1424	Pole recovered and transit to Heritage
1450	At Platform Heritage
1545	Transit to SE Anchor (Site 3 for printing log)
1558	Pole deployed
1613	ROV in water
1651	ROV on bottom
1655	Fix 31 start of Survey line 001_0053 SE Anchor 5876542.1 1954415.6
1700	Fix 32 Position fix 5876482.37 1954499.81
1744	Fix 33 End of Survey line 1 SE Anchor
1749	Fix 34 SOL 2 SE Anchor 002_0149 5875555.30 1955280.38
1816	Fix 35 End of Survey line 2 SE Anchor 5876319.23 1954255.33
1821	Fix 36 SOL 003_0216 line 3 SE Anchor 5876099.28 1954090.37
1859	Fix 37 End of line 3 SE Anchor 5875327.12 1955122.69
1904	Fix 38 SOL 004_0258 Line 4 SE Anchor 5875100.67 1954963.05
1938	Fix 39 End of Survey line 4 SE Anchor 5875893.11 1953918.72
1944	Fix 40 SOL line 005_0338 line 5 SE Anchor
1947	Fix 41 Position Fix 5875579.16 1953868.46
1949	Fix 42 Circular Debris 5875554.92 1953851.31
2024	Fix 43 End of Survey line 5 SE Anchor 5874886.22 1954791.98
2026	001_0426 Transit to sonar reflector for accuracy test 2.3 ft
2103	Fix 44 Sonar reflector recovered 5876541.82 1954417.94
2105	start ROV recovery
2142	ROV on deck
2149	Pole recovered
2153	Data backed up
2155	End of Survey

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	4
VESSEL:	Toby tide	DATE:	November 13, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif		
SURVEYOR	R. Frape		WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0600	Safety Meeting
0637	transit to site and ROV maintenance
0836	Pole deployed
0854	transit to launch site and ROV deployment
0931	ROV on bottom (tracking with Fat B)
0941	Fix 45 Start of line 5 SW Anchor 5869769.85 1956286.87
0955	Fix 46 Debris Unknown 5869808.38 1956318.06
1005	Fix 47 Debris Unknown 5869976.55 1956395.73
1009	Fix 48 Debris Pipe Item 5869947.81 1956482.57
1012	Fix 49 Debris I Beam 5869916.01 1956529.05
1016	Fix 50 Debris Pipe Line 5869957.60 1956456.89
1045	Fix 51 Possible Wire 5870356.94 1956620.78
1059	005_1900 line 5 last part
1100	Fix 52 Debris Box 5870671.28 1956798.74
1108	Fix 53 Hard Bottom Feature 5870881.65 1956918.61
1114	Fix 54 Hard Bottom Feature 5870955.10 1956930.91
1116	Fix 55 Hard Bottom Feature and Debris I-Beam 5870978.96 1956985.95
1119	Fix 56 End of Hard Bottom Feature 5870997.30 1957018.98

1127	Fix 57 End of Line 5 SW Anchor 5870894.64 1956930.96
1128	004A1928_transit to line 4
1132	Fix 58 Debris Metal Framing 5870921.09 1956755.91
1135	Fix 59 SOL 004A_1928 Line 4 SW Anchor 5871036.52 1956690.93
1152	Fix ROV lost power here
1220	ROV at surface
1224	ROV on deck for repairs
1239	We were asked (by D. Hankins) to make lines 1 to 4 longer by 300ft. At the south end.
1433	Decision made to recover pole
1553	Transit to Port Hueneme to repair ROV
0015	At Hueneme
0030	remove POS MV bottle
0100	at Fugro
	on standby until further notice

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	4
VESSEL:	Toby tide	DATE:	November 18, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif	12	
SURVEYOR	R. Frape	12	WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0545	Meet at Fugro
0600	Transit to Hueneme
0630	POS MV Bottle Mounted
0645	All equipment has been tested + static calibration check + One line added on the south side as per D. Hankins request
0830	Leave dock for ROV deep water test
1014	At test location Hydrophone pole deployed
1025	ROV in water
1106	ROV on bottom
1115	Start ROV recovery
1139	ROV on deck
1144	Pole recovered
1146	transit to SW_Anchor site
1540	On site
1554	Pole deployed
1615	ROV in water
1619	Backup logging started
1648	ROV on bottom
1656	Fix 60 Position Fix - Paused Survey 5870381.30 1956312.71
1701	Fix 61 Resume Survey + start logging 004_0103

1711	Fix 62 Position Fix - sonar Investigation 5869853.94 1956046.53
1713	Fix 63 Debris - 5869807.71 1956098.06
1731	Fix 64 End of Line 4 SW Anchor 5869647.83 1955907.11
1732	transiting to line 5 for performance test 30 ft.
1742	Reference Fix - moving to line 3 SW_Anchor
1751	Fix 65 start of Line 3 SW_Anchor 5869782.14 1955657.45
1753	Fix 66 Whale Skull 5869862.66 1955645.61
1809	Fix 67 Resume survey line 3 5869787.42 1955664.25
1816	Fix 68 Unidentified debris SW Anchor location 5870105.23 1955833.51
1840	Fix 69 end of survey line 3 SW Anchor Location 5871171.83 1956452.45
1848	Fix 70 start of Survey line 2 SW Anchor Location 5871309.44 1956212.90
1910	Fix 71 End of Survey line 2 SW Anchor Location 5869914.93 1955419.65
1915	Fix 72 Start of Survey line 1 SW Anchor Location 5870054.21 1955183.88
1925	Fix 73 Position Fix Sonar Contact 5870436.83 1955401.60
1926	Fix 74 Unidentified Debris 1955401.60
1928	Fix 75 Continue Survey 5870445.56 1955407.57
1956	Fix 76 End of Survey line 1 SW Anchor Location 5871439.69 1955976.00
2004	Fix 77 Start of survey line 0 SW Anchor location 5871580.86 1955734.65
2024	Fix 78 End of Survey line 0 SW Anchor Location 5870190.52 1954944.05
2030	Create Additional lines 1.5 and 2.5 SW Anchor location at clients request
2034	Fix 79 Start of Survey line 1.5 SW Anchor Location 5869986.11 1955303.05
2104	Fix 80 End of Survey line 1.5 SW Anchor Location 5871371.89 1956093.60
2108	Fix 81 start of Survey line 2.5 SW Anchor Location 5871244.68 1956339.09
2127	Fix 82 Position fix sonar contact 5869883.28 1955560.69
2128	Fix 83 Whale bone debris 5869883.28 1955560.69
2131	Fix 84 position fix continue survey
2132	Fix 85 End of Survey line 2.5 SW Anchor Location 5869851.35 1955540.88
2133	Transit to fix 46 for performance test
2155	Fix 86 Unidentified Debris 5869810.97 1956402.84
2200	Fix 87 Sonar pick up 5869763.77 1956249.61
2205	Transit to Fix 53 hard bottom
2239	Arrive at hard bottom fix 53*57
2244	ROV touchdown
2252	Hardbottom survey complete and commence ROV retrieval
2334	ROV on deck
2340	Hydrophone pole up
2350	Transit to PLT Heritage for crew transfer

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	5
VESSEL:	Toby tide	DATE:	November 19, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif	12	
SURVEYOR	R. Frape	12	WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0115	Crew transfer complete
0130	Aqueos safety meeting
0300	Hydrophone pole in water
0345	ROV in the water near PLT Heritage
0353	ROV back on deck to fix compass
0358	ROV back in water compass fixed
0430	ROV at 1000feet for riser survey
0449	Fix 1 Power cable at bellmouth 5873617.68 1957606.07 and start of survey PLT Heritage to Harmony PC and PC buried
0459	Fix 2 PC exp 5873744.83 1957487.71
0507	Fix 3 Debris stainless tubing 5873908.33 1957336.84
0522	Fix 4 Position Fix 5874409.69 1957381.60
0535	Fix 5 Position Fix 5874902.16 1957459.00
0545	Fix 6 Position Fix 5875396.87 1957537.53
0554	Fix 7 Position Fix 5875833.24 1957603.72 and pause in survey
0559	Start recovering ROV
0651	ROV on deck for arm installation "THE MANIPULATOR"
0708	Project Backup
1210	Pole deployed
1216	Start Print Nov19
1229	ROV in water

1238	ROV at depth on south side of Platform Heritage
1254	PLT Heritage ICCP Survey - South Face
1916	Start ROV recovery
2030	ROV on deck
2105	ROV in the water
2135	ROV on bottom PLT Heritage to Harmony PC
2220	Fix 8 Position fix 5876349.84 1957682.17
2230	fix 9 5876814.24 1957758.40
2240	fix 10 5877327.37 1957843.02
2300	fix 11 5877886.79 1957937.00
2313	Fix 12 Position Fix 5878362.10 1958030.17
2323	Fix 13 Position Fix 5878883.92 1958180.00
2333	Fix 14 Position fix 5879366.49 1958363.47
2342	Fix 15 Position Fix 5879870.95 1958551.10
2351	Fix 16 Position fix 5880434.11 1958759.48
2359	Fix 17 Position fix 5880918.82 1958943.89
0007	Fix 18 Posiion fix 5881400.45 1959121.03

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	6
VESSEL:	Toby tide	DATE:	November 20, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif	12	
SURVEYOR	R. Frape	12	WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0016	fix 19 Position fix 5881937.58 1959317.58
0024	Fix 20 position fix 5882411.70 1959484.12
0026	Fix 21 PC Buried 5882564.73 1959538.13
0040	Fix 22 Position fix 5883218.89 1959775.19
0047	Fix 23 Position Fix 5883679.51 1959946.23
0056	Fix 24 Position fix 5884131.80 1960107.68
0059	Fix 25 PC Exposed 5884316.34 1960176.70
0108	Fix 26 PC Buried 5884914.99 1960383.75
0116	Fix 27 Position fix 5885396.61 1960568.30
0123	Fix 28 position fix 5885857.22 1960736.34
0131	Fix 29 Position fix 5886311.83 1960898.38
0138	Fix 30 Position Fix 5886797.95 1961073.92
0145	Fix 31 Position Fix 5887255.56 1961249.46
0153	Fix 32 Position Fix 5887702.67 1961437.01
0202	Fix 33 Position Fix 5888151.28 1961578.04
0211	Fix 34 Position Fix 5888682.41 1961777.59
0217	Fix 35 Position Fix 5889119.02 1961944.13
0226	Fix 36 Position fix 5889552.63 1962098.67
0228	Fix 37 PC Exposed 5889633.65 1962139.18

0229	Fix 38 PC Buried 5889692.16 1962157.19
0239	Fix 39 Position Fix 5890167.78 1962328.23
0248	Fix 40 Position fix 5890641.90 1962505.27
0305	Fix 41 Position Fix 5891165.52 1962701.82
0313	Fix 42 Position Fix 5891639.64 1962869.86
0324	Fix 43 Position Fix 5892160.26 1963056.25
0334	Fix 44 Position Fix 5892622.44 1963235.48
0341	Fix 45 Posiyion Fix 5892993.30 1963374.14
0349	Fix 46 Posiyion fix 5893421.66 1963525.19
0358	Fix 47 Position Fix 5893907.82 1963703.92
0407	Fix 48 Position Fix 5894421.49 1963898.46
0415	Fix 49 Position Fix 5894893.43 1964064.87
0425	Fix 50 Position Fix 5895383.09 1964251.73
0434	Fix 51 Position Fix 5895865.94 1964430.41
0443	Fix 52 Position Fix 5896303.77 1964598.18
0451	Fix 53 Position Fix 5896759.57 1964762.20
0503	Fix 54 Position Fix 5897278.06 1964948.66
0511	Fix 55 Position Fix 5897763.71 1965133.32
0522	Fix 56 Position Fix 5898267.48 1965326.93
0532	Fix 57 Position Fix 5898747.75 1965468.87
0542	Fix 58 Position Fix 5899310.53 1965571.19
0553	Fix 59 Position Fix 5899825.46 1965658.66
0603	Fix 60 Position Fix 5900304.08 1965729.63
0615	Fix 61 Position Fix 5900800.85 1965810.50
0638	Fix 62 Position Fix 5901292.87 1965890.45
0640	Fix 63 PC Exposed 5901376.31 1965903.12
0644	Fix 64 PC Buried 5901596.02 1965940.09
0646	Fix 65 PC Exposed 5901629.82 1965944.32
0701	Fix 66 Position Fix 5902122.03 1966025.65
0713	Fix 67 Position Fix 5902615.23 1966104.80
0718	Fix 68 Cable Buried 5902806.41 1966135.95
0719	Fix 69 Cable Exposed 5902888.37 1966148.65
0730	Fix 70 Position Fix 5903382.43 1966234.07
0741	Fix 71 Position Fix 5903881.11 1966317.19
0753	Fix 72 Position Fix 5904388.45 1966404.34
0802	Fix 73 Position Fix 5904884.82 1966489.47
0813	Fix 74 Position Fix 5905381.19 1966576.05
0822	Fix 75 Position Fix 5905893.44 1966636.65
0831	Fix 76 PC Buried 5906375.38 1966587.59
0845	Fix 77 Position Fix - Exposed 5906832.16 1966581.76
0846	Fix 78 PC Protective Covering 5906917.12 1966534.66
0856	Fix 79 PC Bell Mouths 5907145.22 1966584.53
0857	End of Survey Power Cable E between Heritage and Harmony
1004	End Printing File Nov19
1004	ROV on deck
1008	Data Backup
1010	Pole recovered transit to Heritage

1028	start Print File Nov20
1100	At location
1108	Pole deployed
1118	ROV in the water
1130	Start of North Face ICCP Survey PLT Heritage
1503	Leave North Face for sled #N4
1525	Fix 89 Debris - Timber 5873497.42 1958038.79
1541	Fix 90 Debris - Piece of Tire 5873240.50 1958057.93
1547	West Face Survey
1622	Fix 91 Debris - Tire 5873374.96 1957322.26
1729	ROV on deck
1747	2 fully charged beacons installed
1815	ROV in the water
1830	Begin cleaning and measuring operations on the south of PLT Heritage
2215	Begin recovering the ROV
2235	ROV on deck to replace cleaning tool

DAILY PROGRESS REPORT

Fugro West Inc.
4820 McGrath St., Suite 100, Ventura CA 93003
Phone: 805-658-0455 Fax: 805-658-6679

CLIENT:	Aqueos	DIVISION:	Fugro West, Inc.
JOB DESCRIPTION:	NAV + IMU + ROV Survey	REPORT No.:	7
VESSEL:	Toby tide	DATE:	November 21, 2010
LOCATION:	Platform Heritage	JOB No.:	4.064100007
HORIZONTAL DATUM/ZONE:	NAD 83 CA Zone 5	PROJ. MANAGER:	Jeff Carothers
VERTICAL DATUM:		TELEPHONE:	805.650.7000

PERSONNEL	Name	Hours	HEALTH AND SAFETY:
PARTY CHIEF			
SURVEYOR	A. Tardif	12	
SURVEYOR	R. Frape	12	WEATHER:
GEOPHYSICAL TECH			
SURVEY TECHNICIAN			GENERAL CONDITIONS:
SURVEY TECHNICIAN			

TIME	EVENT
0200	On hold due to weather
0245	Hydrophone pole out of water
1015	Return to Hueneme
1240	Beacons are returned to survey. One beacon is damaged at the head. Scratches. The beacon has been photographed and shown to J. K. of Aqueos.
1530	Arrive ar Huenemeand start demob
1830	Arrive at Fugro Warehouse

TABLE OF MANUAL NAVIGATION FIXES

Manual	Easting	Northing	Latitude	Longitude	Latitude	Longitude	Field	Time	Date
Fix No.	NAD27 CA Zone 6 (US Feet)		NAD27		NAD 83		Description	(PST)	
1	782,331.32	820,213.47	N34.35605423°	W120.28476365°	N34.35604°	W120.28575°	Hard bottom feature	13:36:49	11/11/2010
2	781,795.40	821,181.28	N34.35865431°	W120.28666174°	N34.35864°	W120.28765°	End of Line 4 NW Anchor	13:57:55	11/11/2010
3	782,035.73	821,315.13	N34.35904734°	W120.28588333°	N34.35904°	W120.28687°	Start of Line 3 NW Anchor	14:03:39	11/11/2010
4	782,685.41	820,170.48	N34.35597385°	W120.28358605°	N34.35596°	W120.28457°	End of Line 3 NW Anchor	14:33:06	11/11/2010
5	782,909.67	820,305.60	N34.35636863°	W120.28286099°	N34.35636°	W120.28384°	Start of Line 2 NW Anchor	14:39:34	11/11/2010
6	782,274.36	821,447.64	N34.35943650°	W120.28511038°	N34.35943°	W120.28609°	End of Line 2 NW Anchor	15:10:09	11/11/2010
7	782,516.92	821,596.73	N34.35987160°	W120.28432655°	N34.35986°	W120.28531°	Start of Line 1 NW Anchor	15:14:53	11/11/2010
8	783,161.60	820,446.54	N34.35678233°	W120.28204511°	N34.35677°	W120.28303°	End of Line 1 NW Anchor	15:45:06	11/11/2010
9	782,178.01	819,903.33	N34.35518647°	W120.28523140°	N34.35518°	W120.28621°	Start of Line 5 NW Anchor	16:06:38	11/11/2010
10	781,551.20	821,056.08	N34.35828459°	W120.28745407°	N34.35827°	W120.28844°	End of Line 5 NW Anchor	16:37:38	11/11/2010
11	787,022.96	820,570.72	N34.35753278°	W120.26927885°	N34.35752°	W120.27026°	Start of Line 1 NE Anchor	18:31:48	11/11/2010
12	785,633.02	819,771.44	N34.35519115°	W120.27377782°	N34.35518°	W120.27476°	End of Line 1 NE Anchor	19:11:36	11/11/2010
13	785,766.31	819,531.54	N34.35454665°	W120.27330594°	N34.35454°	W120.27429°	Start of Line 2 Ne Anchor	19:17:47	11/11/2010
14	785,837.12	819,504.60	N34.35448017°	W120.27306808°	N34.35447°	W120.27405°	Debris	19:22:55	11/11/2010
15	787,158.74	820,329.60	N34.35688515°	W120.26879863°	N34.35688°	W120.26978°	End of Line 2 NE Anchor	20:02:06	11/11/2010
16	787,282.73	820,121.01	N34.35632563°	W120.26836154°	N34.35632°	W120.26934°	Unidentified Debris	20:09:22	11/11/2010
17	787,295.65	820,093.20	N34.35625064°	W120.26831523°	N34.35624°	W120.26930°	Pause in Survey Line 3	20:12:08	11/11/2010
18	787,287.69	820,086.58	N34.35623161°	W120.26834076°	N34.35622°	W120.26932°	Start of Line 3 NE Anchor	9:04:21	11/12/2010
19	785,909.35	819,305.71	N34.35394179°	W120.27280357°	N34.35393°	W120.27379°	End of Line 3 NE Anchor	9:37:42	11/12/2010
20	786,041.53	819,052.89	N34.35326171°	W120.27233376°	N34.35325°	W120.27331°	Start of Line 4 NE Anchor	10:50:24	11/12/2010
21	787,178.88	819,707.82	N34.35518023°	W120.26865257°	N34.35517°	W120.26963°	End of Line 4 NE Anchor	12:50:06	11/12/2010
22	787,318.81	819,471.87	N34.35454727°	W120.26815927°	N34.35454°	W120.26914°	Start of Line 5 NE Anchor	12:57:47	11/12/2010
23	786,671.66	819,099.65	N34.35345684°	W120.27025393°	N34.35345°	W120.27124°	Position Fix	13:11:10	11/12/2010
24	786,692.17	819,082.70	N34.35341247°	W120.27018386°	N34.35340°	W120.27117°	Hard Rocky Bottom	13:16:53	11/12/2010

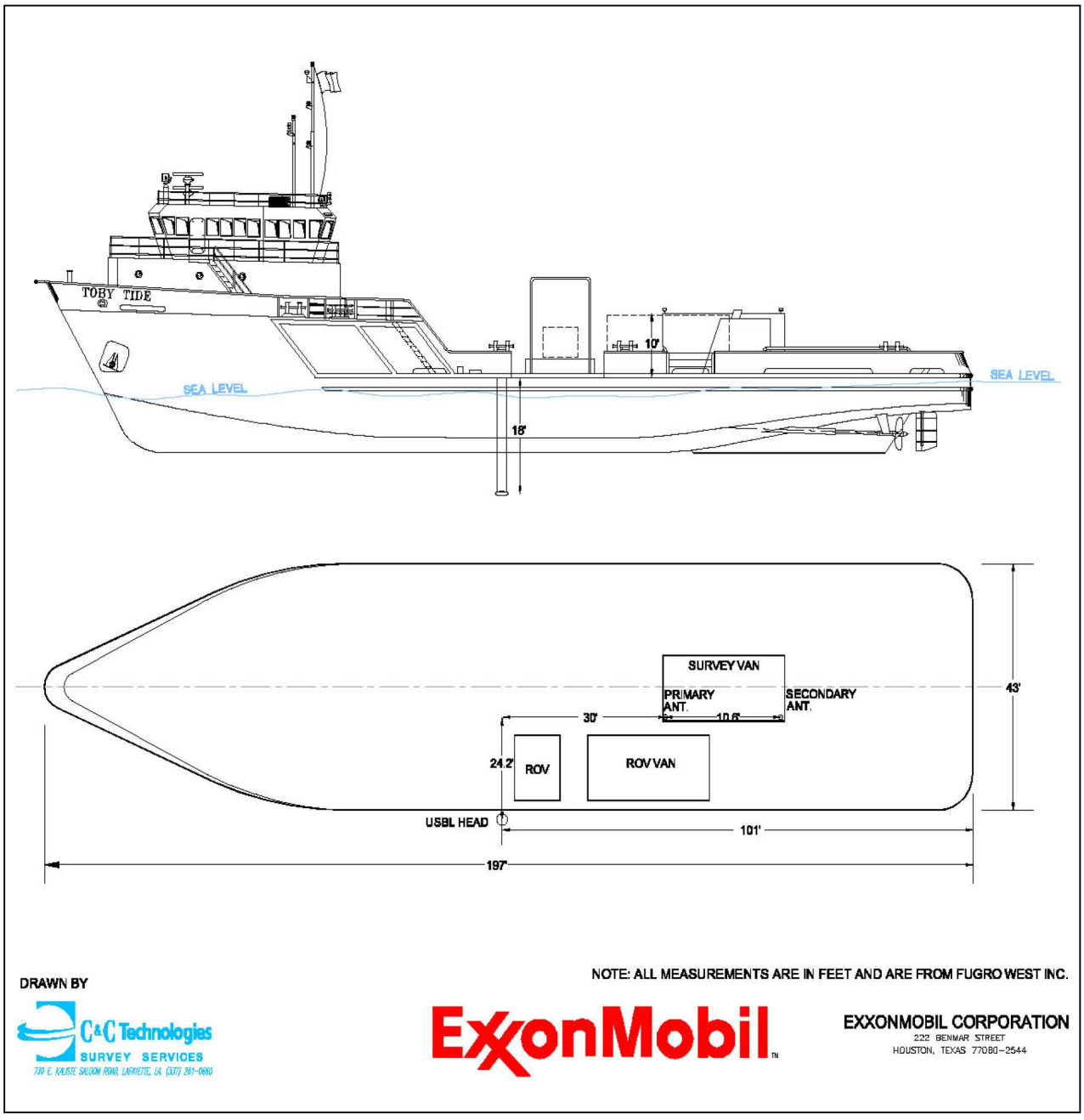
Manual	Easting	Northing	Latitude	Longitude	Latitude	Longitude	Field	Time	Date
Fix No.	NAD27 CA Zone 6 (US Feet)		NAD27		NAD 83		Description	(PST)	
25	786,695.15	819,113.67	N34.35349782°	W120.27017797°	N34.35349°	W120.27116°	Position Fix	13:21:42	11/12/2010
26	786,324.19	818,976.38	N34.35308159°	W120.27138835°	N34.35307°	W120.27237°	Debris #2	13:30:56	11/12/2010
27	786,273.26	818,856.83	N34.35274797°	W120.27154164°	N34.35274°	W120.27252°	Debris Ladder	13:35:43	11/12/2010
28	786,252.24	818,861.50	N34.35275859°	W120.27161182°	N34.35275°	W120.27260°	Position Fix	13:36:08	11/12/2010
29	786,311.57	818,893.01	N34.35285139°	W120.27141946°	N34.35284°	W120.27240°	Position Fix	13:43:24	11/12/2010
30	786,181.41	818,819.33	N34.35263530°	W120.27184089°	N34.35263°	W120.27282°	End of Line 5 NE Anchor	13:46:15	11/12/2010
31	786,927.71	814,757.20	N34.34156196°	W120.26885204°	N34.34155°	W120.26983°	Start of Line 1 of SE anchor	16:54:24	11/12/2010
32	786,869.36	814,842.32	N34.34178949°	W120.26905604°	N34.34178°	W120.27004°	Position Fix	17:00:28	11/12/2010
33	786,168.13	815,807.86	N34.34436607°	W120.27150018°	N34.34436°	W120.27248°	End of Line 1 SE Anchor	17:42:59	11/12/2010
34	785,954.77	815,637.72	N34.34387635°	W120.27218463°	N34.34387°	W120.27317°	Start of Line 2 SE Anchor	17:49:09	11/12/2010
35	786,702.31	814,600.44	N34.34110773°	W120.26957803°	N34.34110°	W120.27056°	End of Line 2 SE Anchor	18:15:28	11/12/2010
36	786,479.72	814,438.99	N34.34064090°	W120.27029410°	N34.34063°	W120.27128°	Start of Line 3 SE Anchor	18:21:13	11/12/2010
37	785,724.07	815,483.67	N34.34342897°	W120.27292851°	N34.34342°	W120.27391°	End of Line 3 SE Anchor	18:58:10	11/12/2010
38	785,495.07	815,327.65	N34.34297633°	W120.27366650°	N34.34297°	W120.27465°	Start of Line 4 SE Anchor	19:04:49	11/12/2010
39	786,270.81	814,270.63	N34.34015655°	W120.27096403°	N34.34015°	W120.27195°	End of Line 4 SE Anchor	19:37:59	11/12/2010
40	786,037.08	814,114.68	N34.33970363°	W120.27171767°	N34.33970°	W120.27270°	Start of Line 5 SE Anchor	19:43:11	11/12/2010
41	785,956.06	814,225.39	N34.33999898°	W120.27199995°	N34.33999°	W120.27298°	Position Fix	19:47:02	11/12/2010
42	785,931.55	814,208.62	N34.33995036°	W120.27207894°	N34.33994°	W120.27306°	Circular Debris	19:48:40	11/12/2010
43	785,277.89	815,160.00	N34.34249304°	W120.27436389°	N34.34248°	W120.27535°	End of Line 5 SE Anchor	20:24:22	11/12/2010
44	786,927.50	814,759.50	N34.34156826°	W120.26885304°	N34.34156°	W120.26984°	Sonar Reflector Recovered	21:02:25	11/12/2010
45	780,185.43	816,736.64	N34.34628057°	W120.29142067°	N34.34627°	W120.29241°	Start of Line 5 SW Anchor	9:40:57	11/13/2010
46	780,224.46	816,767.21	N34.34636867°	W120.29129541°	N34.34636°	W120.29228°	Debris Unknown	9:55:09	11/13/2010
47	780,393.87	816,842.20	N34.34659257°	W120.29074432°	N34.34658°	W120.29173°	Debris Unknown	10:05:06	11/13/2010
48	780,366.51	816,929.50	N34.34682934°	W120.29084605°	N34.34682°	W120.29183°	Debris Pipe Item	10:10:13	11/13/2010
49	780,335.46	816,976.49	N34.34695504°	W120.29095488°	N34.34694°	W120.29194°	I-Beam Debris	10:12:33	11/13/2010

Manual	Easting	Northing	Latitude	Longitude	Latitude	Longitude	Field	Time	Date
Fix No.	NAD27 CA Zone 6 (US Feet)		NAD27		NAD 83		Description	(PST)	
50	780,375.89	816,903.67	N34.34675941°	W120.29081169°	N34.34675°	W120.29179°	Debris Pipe Line	10:16:20	11/13/2010
51	780,780.16	817,053.19	N34.34721295°	W120.28949280°	N34.34720°	W120.29048°	Possible Wire	10:47:52	11/13/2010
52	781,095.03	817,234.13	N34.34774320°	W120.28847384°	N34.34773°	W120.28946°	Debris Box	11:00:30	11/13/2010
53	781,307.32	817,350.64	N34.34808566°	W120.28778614°	N34.34808°	W120.28877°	Hard Bottom Feature	11:09:02	11/13/2010
54	781,380.96	817,361.77	N34.34812405°	W120.28754380°	N34.34812°	W120.28853°	Hard Bottom Feature	11:14:25	11/13/2010
55	781,405.70	817,416.43	N34.34827675°	W120.28746893°	N34.34827°	W120.28845°	Hard Bottom and I-Beam Debris	11:16:52	11/13/2010
56	781,424.57	817,449.17	N34.34836863°	W120.28741068°	N34.34836°	W120.28839°	End of Hard Bottom Feature	11:19:39	11/13/2010
57	781,320.51	817,362.79	N34.34812040°	W120.28774405°	N34.34811°	W120.28873°	End of Line 5 SW Anchor	11:27:33	11/13/2010
58	781,344.16	817,187.31	N34.34764116°	W120.28764326°	N34.34763°	W120.28863°	Debris Metal Framing	11:31:33	11/13/2010
59	781,458.55	817,120.48	N34.34746986°	W120.28725607°	N34.34746°	W120.28824°	Start of Line 4 SW Anchor	11:35:22	11/13/2010
60	780,797.29	816,752.72	N34.34638983°	W120.28939757°	N34.34638°	W120.29038°	Position Fix - Paused Survey	11:52:27	11/18/2010
61	780,776.04	816,749.06	N34.34637755°	W120.28946742°	N34.34637°	W120.29045°	Resume Survey	17:03:44	11/18/2010
62	780,265.68	816,494.95	N34.34562557°	W120.29112403°	N34.34562°	W120.29211°	Position Fix - Sonar Investigation	17:11:41	11/18/2010
63	780,220.27	816,547.22	N34.34576424°	W120.29128103°	N34.34575°	W120.29227°	Debris -	17:13:09	11/18/2010
64	780,057.34	816,358.82	N34.34522965°	W120.29179611°	N34.34522°	W120.29278°	End of Line 4 SW Anchor	17:30:43	11/18/2010
65	780,187.66	816,107.01	N34.34455219°	W120.29133246°	N34.34454°	W120.29231°	Start of Line 3 SW Anchor	17:51:36	11/18/2010
66	780,267.99	816,093.88	N34.34452471°	W120.29106490°	N34.34452°	W120.29205°	Whale Skull	17:53:39	11/18/2010
67	780,193.05	816,113.72	N34.34457120°	W120.29131548°	N34.34456°	W120.29230°	Resume Survey Line 3 SW anchor	18:08:59	11/18/2010
68	780,513.56	816,277.91	N34.34505609°	W120.29027573°	N34.34505°	W120.29126°	Debris - Unidentified	18:16:04	11/18/2010
69	781,590.05	816,879.84	N34.34682317°	W120.28678997°	N34.34681°	W120.28777°	End of Survey Line 3 SW Anchor	18:39:13	11/18/2010
70	781,723.83	816,638.08	N34.34617367°	W120.28631618°	N34.34616°	W120.28730°	Start of Survey Line 2 SW Anchor	18:47:34	11/18/2010
71	780,316.65	815,867.08	N34.34390722°	W120.29087474°	N34.34390°	W120.29186°	End of Survey Line 2 SW Anchor	19:10:04	11/18/2010
72	780,452.16	815,629.08	N34.34326823°	W120.29039569°	N34.34326°	W120.29138°	Start of Survey Line 1 SW Anchor	19:14:57	11/18/2010

Manual	Easting	Northing	Latitude	Longitude	Latitude	Longitude	Field	Time	Date
Fix No.	NAD27 CA Zone 6 (US Feet)		NAD27		NAD 83		Description	(PST)	
73	780,838.26	815,840.69	N34.34389030°	W120.28914497°	N34.34388°	W120.29013°	Position Fix Sonar Contact	19:24:54	11/18/2010
74	780,875.10	815,817.13	N34.34382953°	W120.28902000°	N34.34382°	W120.29000°	Debris - Unidentified	19:26:15	11/18/2010
75	780,847.09	815,846.53	N34.34390725°	W120.28911650°	N34.34390°	W120.29010°	Position Fix Resume Survey	19:28:18	11/18/2010
76	781,850.29	816,399.10	N34.34553100°	W120.28586697°	N34.34552°	W120.28685°	End of Survey Line 1 SW Anchor	19:56:00	11/18/2010
77	781,987.61	816,155.48	N34.34487678°	W120.28538127°	N34.34487°	W120.28636°	Start of Survey Line 0 SW Anchor	20:03:50	11/18/2010
78	780,584.64	815,387.07	N34.34261790°	W120.28992618°	N34.34261°	W120.29091°	End of Survey Line 0 SW Anchor	20:23:36	11/18/2010
79	780,385.97	815,749.34	N34.34359135°	W120.29063021°	N34.34358°	W120.29161°	Start of Survey Line 1.5 SW Anchor	20:33:46	11/18/2010
80	781,784.37	816,517.78	N34.34584983°	W120.28610037°	N34.34584°	W120.28708°	End of Survey Line 1.5 SW Anchor	21:03:41	11/18/2010
81	781,661.09	816,765.31	N34.34651630°	W120.28654016°	N34.34651°	W120.28752°	Start of Survey Line 2.5 SW Anchor	21:08:21	11/18/2010
82	780,287.26	816,008.63	N34.34429271°	W120.29099020°	N34.34428°	W120.29197°	Position Fix Sonar Contact	21:26:28	11/18/2010
83	780,260.24	816,029.28	N34.34434652°	W120.29108227°	N34.34434°	W120.29207°	Debris Whale Bone	21:26:52	11/18/2010
84	780,314.19	816,019.50	N34.34432542°	W120.29090246°	N34.34432°	W120.29189°	Position Fix Resume Survey	21:31:23	11/18/2010
85	780,255.01	815,989.33	N34.34423628°	W120.29109445°	N34.34423°	W120.29208°	End of Survey Line 2.5 SW Anchor	21:32:34	11/18/2010
86	780,228.40	816,851.96	N34.34660174°	W120.29129323°	N34.34659°	W120.29228°	Debris - Unidentified	21:54:48	11/18/2010
87	780,178.75	816,699.47	N34.34617783°	W120.29143799°	N34.34617°	W120.29242°	Sonar pick up	22:00:13	11/18/2010
88	781,390.52	817,356.37	N34.34811023°	W120.28751148°	N34.34810°	W120.28849°	Hard Bottom Survey	22:52:24	11/18/2010

APPENDIX C

Survey Configuration Diagram
Survey Equipment Descriptions



DRAWN BY

C&C Technologies
SURVEY SERVICES
730 E. KALISTE SALOOM ROAD, LAFAYETTE, LA (337) 261-0660

NOTE: ALL MEASUREMENTS ARE IN FEET AND ARE FROM FUGRO WEST INC.

ExxonMobil

EXXONMOBIL CORPORATION
222 BENMAR STREET
HOUSTON, TEXAS 77060-2544

AQUEOS

EXCELLENCE IN SUBSEA SOLUTIONS

HYSUB 20 - REMOTELY OPERATED VEHICLE
LIGHT WORK CLASS ROV

Features:

- Capable of -3,000'
- 2ea. Four Function Hydraulic Manipulators
- High-Resolution Color Video Camera (CCD)
- Silicon-Intensified Tube Video Camera (SIT)
- High-Resolution Color Imaging Sonar
- Camera Pan and Tilt
- HID and Halogen Lighting
- Computer-Controlled: Depth and Heading
- 35mm Still Camera (Optional)
- Climate-Controlled Operations Van
- Rapid System Deployment
- Deployed With Complete Spares

Documentation:

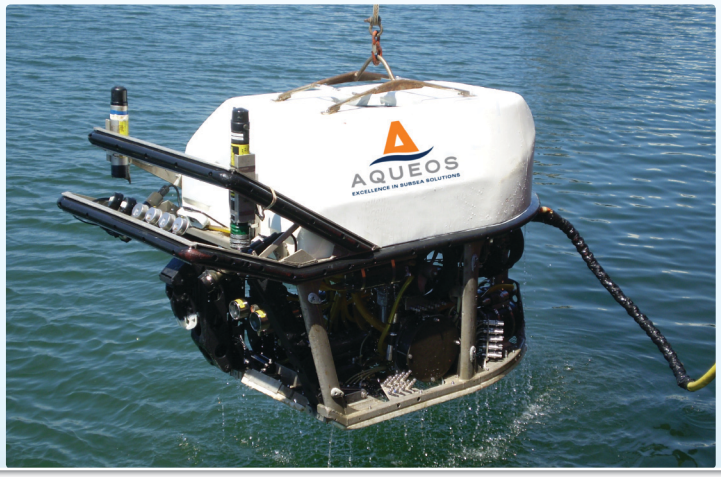
- DVD and Digital Tape Recording (Video and Sonar)
- 35mm Photographs (Optional)
- Cathodic Potential Measurements (Data Recorded on Video Tape)
- Water Temperature, Salinity and PH Measurements (Data Recorded on Video Tape)

Inspections & Surveys, Search and Recovery:

- External/Internal Pipelines
- Offshore Platforms
- Cathodic Potential
- Power & Communications Cables
- Dams
- Insurance Surveys
- Biological-Geological Surveys
- Acoustic Tracking
- Search and Recovery Operations

Optional Equipment:

- Broadcast Quality Video
- Laser Scaling and Precision Measurements
- High-Resolution Digital Imaging
- Digital Video Recording
- Grab Sampling
- Hydraulic Tooling



At Aqueos, our mission is simple — to provide our customers superior contracting services through experience, innovation, field-proven equipment, exceptional safety standards and state-of-the-art techniques.

WWW.AQUEOSSUBSEA.COM

GULF OF MEXICO OFFICE: 101 Millstone Rd. / Broussard, LA 70518 / Phone: 337-714-0033 / Fax: 337-839-8354
WEST COAST OFFICE: 1180 Eugenia Pl., Ste. 100 / Carpinteria, CA 93013 / Phone: 805-566-1462 / Fax: 805-566-1849

MS 1000 Scanning Sonar

KONGSBERG

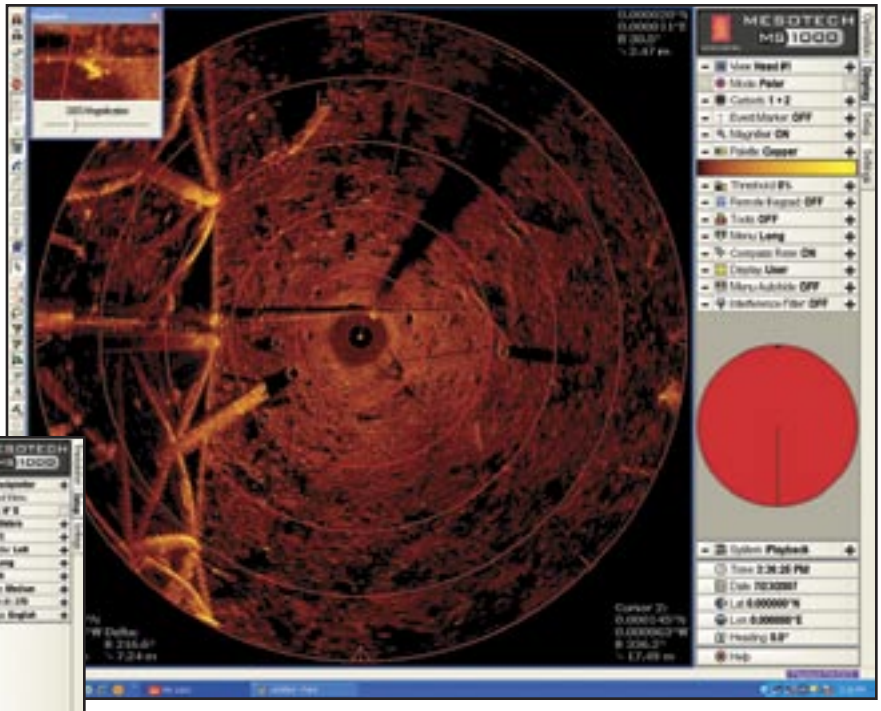
Kongsberg Mesotech Ltd. is the recognized world leader in mechanically scanned sonar systems. The MS 1000 Scanning Sonar Processor confirms our reputation as the supplier of the highest quality, highest resolution products in the market.

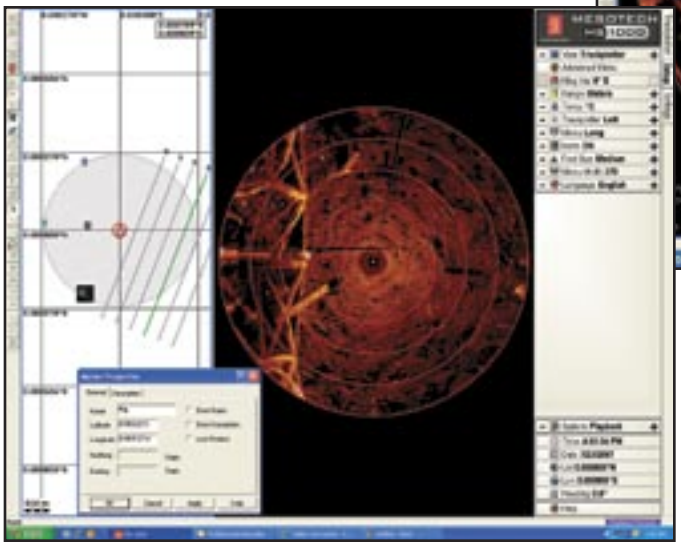
Our MS 1000 software program converts any standard PC into a full-function sonar processor *without the need for additional boards or hardware*, and is designed under ISO standards to ensure compliance to reliability, statutory and regulatory requirements.

MS 1000 is a Windows-based application and can be configured to control the complete digital line of Kongsberg Mesotech's scanning sonar, altimeter, and bathy sensor products via industry-standard telemetry protocols.

MS 1000 key features include:

- Simultaneous multiple scanning sonar head and altimeter operation, and sensor configurations
- Time-tagged recording of all sonar and sensor inputs to the PC's hard-drive or external recording device
- Advanced target measurement and annotation tools
- Track Plotter module allowing the user to pre-plot search and survey lines, and to geo-reference sonar targets
- Networking capability
- Target tracking (optional)





- Ping synchronization for multiple-head operation; fused data display for dual head profiling
- GeoTiff image format
- 3D profiling with pan device
- Plug-and-play USB keypad

Images courtesy Fugro Chance, Inc.

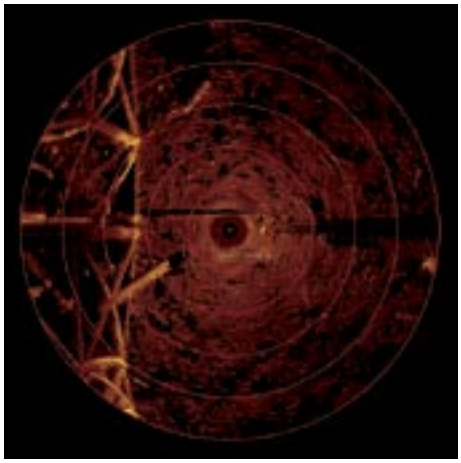


Image courtesy Fugro Chance, Inc.

Oil rig, pipeline, and diver

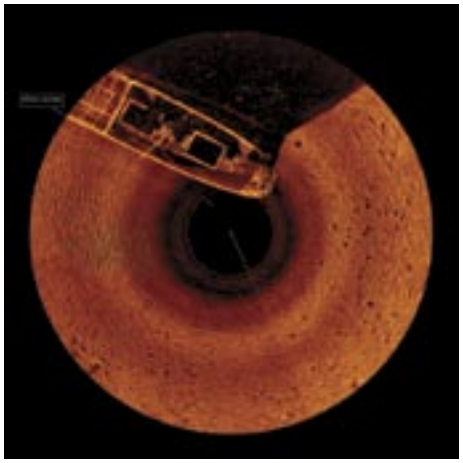
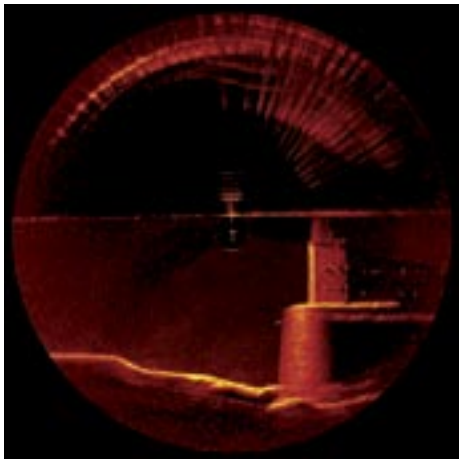


Image courtesy Tuukritööde oü Commercial Diving, Estonia

WWII shipwreck at 40m



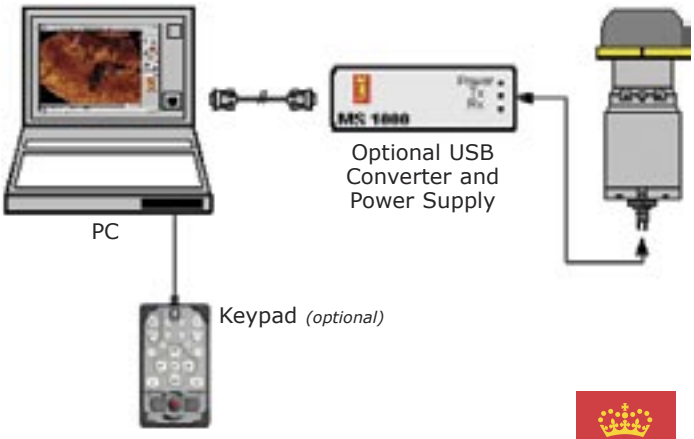
Courtesy Fenstermaker & Associates Inc.

Bridge foundation

Technical Specifications

Minimum System Requirements	1 gHz, Pentium 3, 512 mB of RAM (single head operation), Windows 2000 Pro, Windows XP Pro, or Windows Vista Business Edition
Video Format	Platform dependent; SXGA (1280x1024 or higher recommended)
Image	Dedicated image area for each sonar head; size/position configurable
Palette	Menu selectable
Sonar Control	Pull-down menus for configuring and control of sonar system
Status Readout	Alphanumeric display of cursor positions, range, gain, mode settings
Sensor Readout	Alphanumeric display of position data, sensor outputs
Gain	Menu adjustable; infinite settings
Range	Menu adjustable; customer-defined; 5–500 meters
Sector Width	Adjustable from 7.2° to 360° in 7.2° steps
Sector Center	Adjustable from 0-360° in 0.9° steps
Cursors	Selectable by pointing device; 2 general purpose
Zoom	x2, x4
Magnifier	x1 to x10
Menu Controls	Menu driven control system for display mode, scan speed, scan reverse, threshold, speed of sound, serial I/O, profile or image selection, baud rate selection
Data Recording and Playback	Imaging, profile and time-tagged sensor data storage to hard drive or other PC device; bitmap snapshots to disk; GeoTiff format support
Measurement Tools	Detailed annotation, cursors, tape measure, target area, target height
Printer	Output to any printer recognized by operating system
Telemetry	RS 232, RS 485, RS 422
Telemetry Rates	Down link: 9600 Uplink selectable: 9600, 19K, 38K, 57K, 115K bit/s, 230K, 460K with USB interface box
Power Requirement	Platform dependent
Temperature Range	Platform dependent
Navigation Input	NMEA 0183 Format (232 Levels)
Sensor Interface	RS232

Typical System Configuration



KONGSBERG MESOTECH LTD.

1598 Kebet Way, Port Coquitlam, BC Canada V3C 5M5
Tel: (604) 464-8144 Fax: (604) 941-5423
Website: **www.kongsberg-mesotech.com**
E-mail: km.sales.vancouver@kongsberg.com

KONGSBERG

ORE Offshore
An Affiliate of EdgeTech

BATS

BROADBAND ACOUSTIC TRACKING SYSTEM

FEATURES

- Ultra Short Base Line Tracking System
- Broadband Spread Spectrum and Continuous Wave Acoustic Technology
- 17 to 30 kHz Frequency for Extended Range
- Compatible with Windows 98, NT, 2000, XP, and Vista

The new BATS System consists of a Signal Interface Module housed in a standard (3.5”) rack mount chassis (19”). It can be configured for a desk top application with a PC or laptop running the ORE Trackman Windows® software or coupled with a standard (3.5”) rack mount PC and standard (3.5”) rack mount Keyboard/Display. Alternately, BATS is available in a splash-proof portable unit.

The use of Broadband Acoustic Technology provides exceptional range and tracking performance. The software is user friendly and intuitive. The system interface is Ethernet TCP/IP to a PC running a compatible Windows® operating system.

ORE Offshore
An Affiliate of EdgeTech

BATS

BROADBAND ACOUSTIC TRACKING SYSTEM

KEY SPECIFICATIONS

SYSTEM PERFORMANCE	
Transponder/Responder Absolute accuracy in horizontal position (over entire hemisphere) (does not include motion)	± 0.5% RMS of slant range
Repeatability accuracy (does not include motion)	± 0.3% RMS of slant range
Azimuth resolution	0.08 degree
Slant range accuracy	± 0.3 meters RMS (with correct sound speed)
Slant range resolution	0.05 meters
Acoustic coverage	± 90 degrees below hydrophone/projector
Signal to noise ratio	20 dB @ hydrophone (in 17-30 kHz band)
Receive frequency	17 to 30 kHz Spread Spectrum, Also, REMUS codes 1 - 4
Transmit frequency	16 to 21 kHz in 500Hz increments (400 Watt transmit output) (Plus, REMUS xmit codes 1 - 4)
Receive pulse width	Various coding schemes available
Transmit pulse width	1 to 15 milliseconds
OPERATIONAL CONTROLS VIA SUPPLIED SOFTWARE	
Up to 4 Target selection	Interrogation rate (0.6 to 20 seconds)
Tracking On/Off	Scaling (feet, meters, yards)
Target Type	Filtering Levels
Receive Threshold	Various coded waveforms
WEIGHTS AND DIMENSIONS	
Signal Interface Module (2U rack)	L 18.9 in (48.0 cm) x H 3.46 in (8.8 cm) x D 20 in (50.8 cm) 21 lbs (9.5 kg)
Hydrophone	L 20 in (50.8 cm) Dia 2.9 in (7.4 cm) 10 lbs (4.5 kg)
Cable	L 50 ft (15 meters) Dia* 0.5 in (1.3 cm) 8 lbs (3.6 kg)