

**OXY/Vintage Petroleum Intake and Discharge
Facility at Taylor Ranch**

**Bathymetric and Geophysical Survey
Field Operations Report**

**Survey Period: December 12, 2012
Report Number: 04.64120036 D0**

Prepared for:

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PROPOSED SURVEY AREA



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SUMMARY OF SURVEY RESULTS

Land Survey Locations:

NAD83 California Zone 5, U.S. Survey Feet		
ID	Easting	Northing
1	6149276	1940878
2	6148983	1940898
3	6149022	1940869
4	6149226	1940792
5	6148984	1940884
6	6149022	1940859
7	6149146	1940710
8	6149297	1940766
9	6149122	1940676
10	6149163	1940698

Magnetic Anomalies

NAD83 California Zone 5, U.S. Survey Feet			
Target ID	Easting	Northing	Gamma
M-1	6148856	1940148	273.5
M-2	6148724	1940258	544.2
M-3	6148778	1940312	941.4
M-4	6148842	1940269	118.3
M-5	6148897	1940226	629.3
M-6	6148937	1940321	249
M-7	6148900	1940339	1182.8
M-8	6148858	1940388	261.6

Side Scan Sonar Targets

NAD83 California Zone 5, U.S. Survey Feet						
ID	Easting	Northing	Length	Width	Height	Description
T-1	6148692	1940224	2.7	1.4	0.3	North Pipe End - Possible Diffuser
T-2	6148824	1940080	2.6	2.1	0.1	South Pipe End - Possible Diffuser
T-3	6148806	1940219	0.0	0.0	0.0	Middle Pipe End

Study Area: A 1,400 x 1,500 foot area centralized on the existing outfall alignment

Bathymetry: Minimum depth within survey area: 7 feet
Maximum depth within survey area: 17 feet

**Surficial
Features:** The bottom material consists of areas of hard bottom running parallel with the shoreline.



1. INTRODUCTION AND SCOPE OF WORK

1.1 General

On November 20, 2012, Fugro Consultants, Inc. (Fugro) conducted a bathymetric and geophysical survey of the OXY/Vintage Petroleum intake and discharge facility at Taylor Ranch. The survey area is located just offshore of Ventura, California.

The purpose of this survey was to determine existing seafloor and outfall conditions and location of existing pipelines which will be used for potential engineering structure assessment. The investigation measured water depths, determined the locations of any debris within the survey area, and the locations of the existing outfall and pipelines, where detected on the seafloor or by marine magnetometer.

High-resolution bathymetric, side scan sonar and magnetometer data were collected in a grid pattern covering the survey area. The geophysical survey limits extended from as near to shore as safely possible to approximately 1,500 feet from the shoreline with a survey corridor width of 1,400 feet (700 feet each side of existing outfall alignment) as shown in the key map above. The grid consisted of 24 survey lines (as seen in Figure 1-1), with 11 main lines oriented northeast to southwest and spaced 164 feet (50 meters) apart with two additional lines located on either side of the center pipeline. In addition, 13 lines were run perpendicular to the pipeline alignment.

Due to dense kelp, Fugro was unable to survey a 1,400' x 525' area in the southwest portion of the proposed survey area. Where possible, Fugro maneuvered between isolated kelp beds to collect data. Data was not collected beyond the surf zone for safety reasons. Both the kelp and surf zone have been identified on the accompanying chart (Appendix A).

Additionally Fugro conducted a Real Time Kinematic (RTK) survey to mark, map and provide coordinates for ten pre-determined locations onshore.

All coordinates in this report are based on the WGS 84 spheroid as North America Datum 83 (California State Plane, Zone 5, feet) grid coordinates. The vertical datum reference for this project is Mean Lower Low Water (MLLW). Depths were corrected for tide variations during field activities based upon predicted tidal data obtained from NOAA.

1.2 Units and Conventions

Units used on the survey are as follows:

- Linear units are feet.
- Angular units are degrees (°).
- Time was recorded as universal time, coordinated (UTC) (Time offset: -8:00 UTC) to all data files and both UTC and local time were noted in field logs.



1.3 Abbreviations

ACI	Analog Control Interface
A/D	Analog to Digital
DGPS	Differential Global Positioning System
KHz	Kilohertz
MLLW	Mean Lower Low Water
M/V	Marine Vessel
NOAA	National Oceanic and Atmospheric Administration
RTK	Real Time Kinematic
TIFF	Tagged Image File Format
TVG	Time Varied Gain
UTC	Universal Time, Coordinated

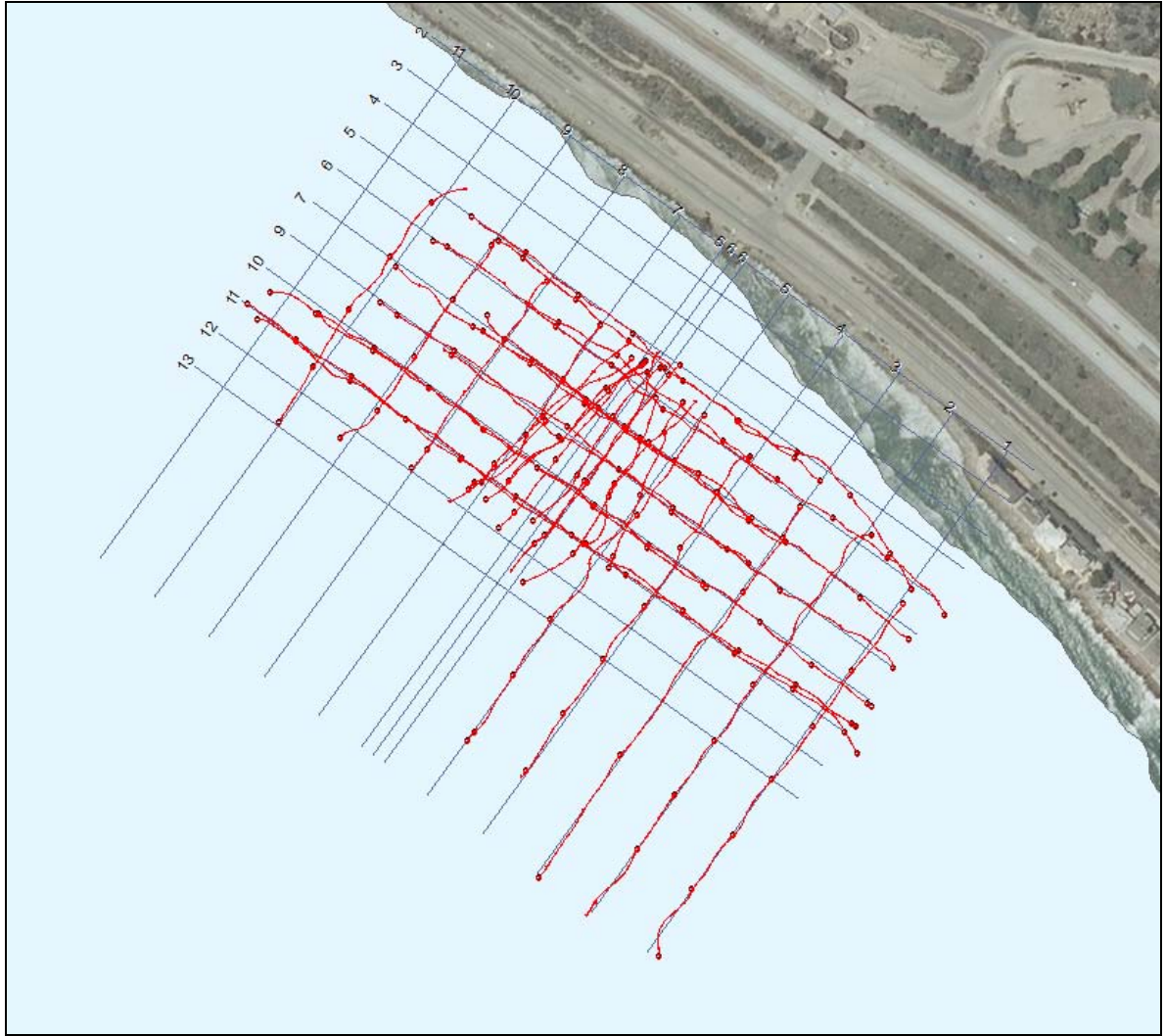


Figure 1.1: Bathymetry and Seafloor Features Survey Trackplot



2. METHODS AND RESOLUTION LIMITATIONS

2.1 Land Survey

For the land survey, Trimble R8 receivers were used to acquire locations at ten pre-determined sites, utilizing RTK corrections.

2.2 Positioning and Navigation

Wide area DGPS was used to position the survey vessel in real time. GPS is a satellite-based positioning system operated by the U.S. Department of Defense. A "wide area" application operates with correction values applied to a stand-alone GPS receiver from base stations located over large distances. DGPS corrections are supplied to the system using the STARFIX II network. This differential network is a worldwide system operated by Fugro. STARFIX II broadcasts differential corrections via a communications satellite downlink to field receivers.

The vessel information (position, heading, and GPS data) was linked to an on-board Pentium-based personal computer running Hypack navigation software. Hypack is an advanced PC-based Windows navigation system designed for both surface and subsurface vehicle positioning. A helmsman's display continually updates the true vessel position, track-lines, distances off line, and distances along line.

2.3 Bathymetric Data

An Odom CV-100 survey grade echo sounder was used to acquire single-beam bathymetric data during survey operations. The Odom CV-100 has a transducer operating at a high frequency of 200 kHz and collects digitized depth information logged directly to the navigation computer along with date, time, and position.

Prior to operations at the site a bar check calibration for speed of sound was carried out. In the bar check calibration a flat plate is suspended by a precisely marked line to a known depth below the transducer. Variations between the true bar depth and the observed depth are used to correct observed depths by adjusting the sound velocity on the echosounder until it reads correctly.

Data Processing. Using Hypack's single-beam processing suite, single-beam bathymetric data were edited to remove outliers. The soundings were reduced to MLLW based on NOAA predicted tidal information located at Rincon Point.

2.4 Marine Magnetometer

A Marine Magnetic Corporation SeaSPY magnetometer was deployed from the port quarter of the *M/V Julie Ann* to aid in mapping ferrous debris and with locating the existing pipeline. A Marine Magnetics' magnetometer measures the ambient magnetic field using a specialized branch of nuclear magnetic resonance technology applied specifically to hydrogen nuclei producing very high sensitivity and accuracy. The tow sensor was further equipped with a pressure/depth sensor and an altimeter to maintain optimum towing altitude. Total field readings were logged together with the sensor altitude and depth data to the navigation computer through the Hypack program.

Data Processing. Using Chesapeake Technologies, Inc. Sonarwiz5, the locations of observed magnetic anomalies were determined from the magnetometer data, utilizing anomaly-modeling techniques that



incorporate the anomaly duration, signature, and peak-to-peak amplitudes. The interpreted location of bipolar (dipole) anomalies is an average of the anomaly duration midpoint and the peak-to-peak midpoint. Interpreted anomaly locations were cross-checked with the side scan sonar targets to determine if exposed targets had a ferrous content. The anomalies were plotted on the post plot navigation maps and imported to the ArcView software for final mapping.

2.5 Side Scan Sonar

Surficial features have been interpreted from a digital, dual-frequency side-scan-sonar system. The system consisted of an EdgeTech Model 272-TD sonar towfish and armored tow cable that was interfaced to a data logging computer with the EdgeTech analog control interface (ACI), an A/D card, and acquisition software. Chesapeake Technology, Inc.'s SonarWiz5 software was utilized to provide real-time mosaics for quality control. The software also provided complete post processing capabilities. Features include automatic gain control, TVG, beam angle correction, integrated bottom tracking, and a navigation editor.

During the survey, the towfish was deployed from the port quarter of the *M/V Julie Ann* as the vessel traversed the survey grid. The side scan sonar was operated at a frequency of 500 kHz at a slant range of 164 feet (50 meters) for all survey lines.

Data Processing. All side scan sonar data were processed using Chesapeake Technologies, Inc. Sonarwiz5. Raw side scan files were imported into the program and corrected for layback as well as proper bottom tracking and navigation review. The files were then slant range corrected and compiled into a preliminary mosaic for target location and determination of any buried cables or pipelines. The resulting files were processed to construct a final side scan mosaic of the survey area. The complete mosaic image was geo-referenced to the local coordinate system for the final maps. The sonar mosaics are exported as geo-registered TIFF files that are imported into the ArcView system where surficial features were digitized.

3. RESULTS

The following sections discuss the features seen in the surveyed area including any anomalous features. Anomalous features may include man-made objects such as pipelines, debris, anchors, and trawl scars. Other features such as rock outcrops, coarse sediment, seafloor depressions, etc. are also noted.

Singlebeam bathymetry, side-scan-sonar, and magnetometer data were used in the compilation of Chart 1 - Bathymetry and Surficial Features map (plotted at 1"=100') located in Appendix A.

3.1 Land Survey

Table 3.1 lists the coordinates recorded for ten pre-determined locations onshore.

Table 3.1: Land Survey Coordinates

NAD83 California Zone 5, U.S. Survey Feet		
ID	Easting	Northing
1	6149276	1940878
2	6148983	1940898
3	6149022	1940869
4	6149226	1940792
5	6148984	1940884
6	6149022	1940859
7	6149146	1940710
8	6149297	1940766
9	6149122	1940676
10	6149163	1940698

3.2 Bathymetry

Bathymetric contours referenced to MLLW for the surveyed area are mapped on the accompanying Bathymetry and Surficial Features map. Water depths in the survey area were found to range from 7 feet deep along the shoreline side of the survey area and gradually drops to approximately 17 feet deep at the southwestern end of the departure route. Dense kelp growth in the southwest corner of the survey area prevented vessel entry and data collection for this portion of the survey.

The possible diffusers identified on the two outside pipelines sit in approximately 13.5 feet of water, and the last visible end of the center pipeline lies in about 12 feet of water.

3.3 Magnetic Anomalies

Eight magnetic anomalies were observed, all of which are associated with the three existing pipelines. Table 3.2 provides a listing of each anomaly with its associated Gamma value.

Table 3.1: Magnetic Anomalies

NAD83 California Zone 5, U.S. Survey Feet			
Target ID	Easting	Northing	Gamma
M-1	6148856	1940148	273.5
M-2	6148724	1940258	544.2
M-3	6148778	1940312	941.4
M-4	6148842	1940269	118.3
M-5	6148897	1940226	629.3
M-6	6148937	1940321	249
M-7	6148900	1940339	1182.8
M-8	6148858	1940388	261.6

3.4 Surficial Features

A large area of kelp prevented data from being collected in the southwestern half of the proposed survey area. The seafloor within the side scan sonar data extents is comprised of mostly hard bottom with patches of sand (as seen in the accompanying map). In addition to these geological features, all three pipelines were visible from the surf zone out to the 12-13 foot water depth.

The end of each pipe was digitized and the coordinates are tabulated below in Table 3.3.

Table 3.3: Side Scan Sonar Targets

NAD83 California Zone 5, U.S. Survey Feet						
ID	Easting	Northing	Length	Width	Height	Description
T-1	6148692	1940224	2.7	1.4	0.3	North Pipe End - Possible Diffuser
T-2	6148824	1940080	2.6	2.1	0.1	South Pipe End - Possible Diffuser
T-3	6148806	1940219	0.0	0.0	0.0	Middle Pipe End

Possible diffusers have been identified on the end of the two outside pipes, as seen in Figures 3.1 and 3.2 below.



Figure 3.1: North Pipeline End – Possible Diffuser

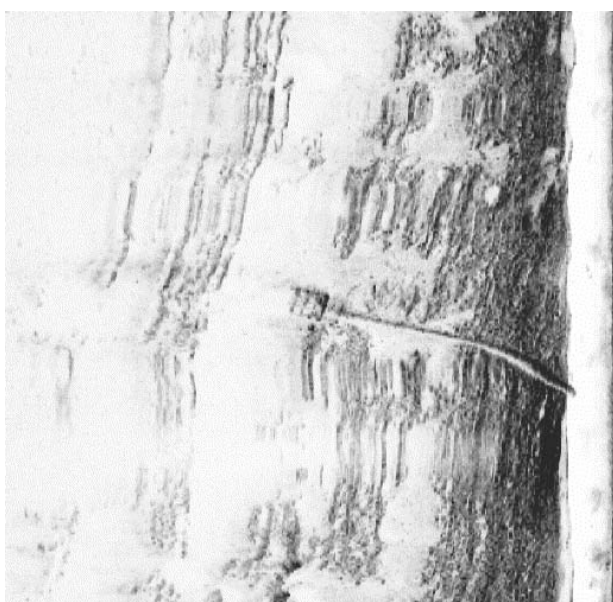


Figure 3.2: South Pipeline End – Possible Diffuser



APPENDICES

- A MARINE WILDLIFE MONITORING REPORT**
- B BATHYMETRY AND SURFICIAL FEATURES MAP**



A MARINE WILDLIFE MONITORING REPORT

November 30, 2012

Padre Project No. 1102-1851

Mr. Jeff Carothers, Survey Manager
Fugro Consultants, Inc.
4820 McGrath Street, Suite 100
Ventura, CA 93003-7778

**Subject: Marine Wildlife Monitoring Report
Bathymetric and Geophysical Survey for
OXY/Vintage Petroleum Intake and Discharge Facility at Taylor Ranch**

Dear Mr. Carothers:

In accordance with the procedures outlined in the California State Lands Commission (CSLC)-approved project-specific Marine Wildlife Contingency Plan (MWCP), Padre Associates, Inc. (Padre) is pleased to submit this monitoring report for incorporation into Fugro Consultant Inc.'s (Fugro) Field Operations Report. This report summarizes observations made by Padre's onboard marine wildlife monitor during vessel transit to and from the survey area (Figure 1), and during bathymetric and geophysical data collection (survey) on November 20, 2012. The survey was conducted during daylight hours (no nighttime operations) in water depths from approximately 1.8 to 6.7 meters (m) (6 to 22 feet [ft]) offshore of the seawater intake and discharge facility off the coast of Ventura County, California near the Grubb Oil Field.

SURVEY EQUIPMENT AND PERSONEL

The survey utilized the S/V *Julie Ann*, a 7.9 m (26 ft) vessel owned and operated by Fugro. During the observation period, geophysical equipment consisted of a single beam bathymetry system, a side scan sonar imaging system, and a marine magnetometer. The survey vessel was mobilized in Ventura Harbor, Ventura County.

Onboard Fugro personnel included Mr. Herb Tovar (Survey Chief), and Mr. Daniel Ebuna and Mr. Mark Williams (Surveyors). Onboard Padre personnel included Ms. Jennifer Klaib (Marine Wildlife Monitor).

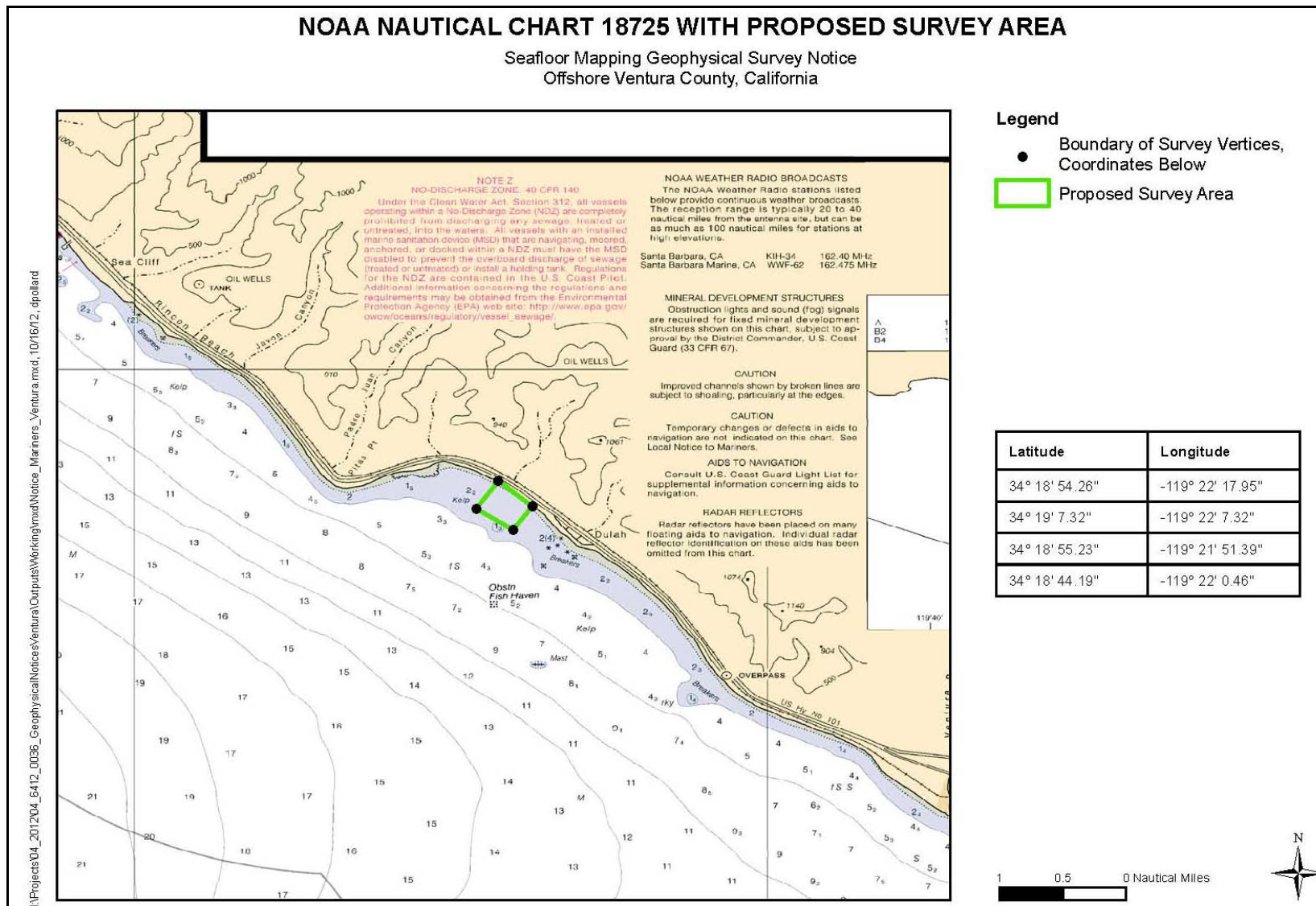


Figure 1 - Survey Area

MARINE WILDLIFE MONITORING METHODOLOGY

Transit Periods

While the survey vessel was in transit between Ventura Harbor and the project site, the onboard marine wildlife monitor was located where observations of marine wildlife could be made within an approximately 200 degree arc , centered on the direction of vessel travel. Marine wildlife observed while the vessel was transiting were noted on the monitor's reporting form and the vessel operator was informed if an animal was observed and if a collision with the animal was imminent.

Survey Periods

Once onsite and prior to initiating data collection, the onboard marine wildlife monitor was located amidships and surveyed the surrounding area while the survey crew readied the equipment for deployment. Once the survey equipment was deployed, the monitor and survey chief coordinated the startup of the equipment. The survey chief informed the monitor when the vessel was 10 minutes from the start point at which time the monitor initiated observations within the 27- m (89- ft) radius safety zone utilizing 10 X 50 reticular binoculars. One minute prior to start up of geophysical equipment, the survey chief informed the monitor and the equipment was turned on only after the monitor indicated that there was no marine wildlife (defined herein as mammals or reptiles) within the safety zone. The 27 - m (89- ft) radius safety zone was based on a previously-completed analysis of the distance between the sound source (survey equipment) and the 160 dBA re 1µPa rms sound level.

If marine wildlife was observed outside of the safety zone, the survey chief was informed and warned of possible alteration or termination of the data collection if the animals moved into the safety zone during equipment operation and displayed unusual behavior. The monitor continued observing and recording the presence and activities of marine wildlife throughout data collection. If marine wildlife approached the safety zone, the monitor notified the survey chief who informed the vessel captain and survey crew, and an alert of possible data collection termination was forwarded to all crew members. All observations were recorded on pre-printed log sheets.

Fishing Gear Clearance

In accordance with Section 4.2 of the project-specific MWCP, prior to the initiation of the data collection, the onboard monitor noted the presence of commercial fishing gear within the survey area. For each fishing buoy observed within the project site, the location, the buoy number and water depth were recorded.

RESULTS

No marine mammals were observed during transit to and from the survey site. During the pre-deployment observations, no commercial fishing gear was observed within the survey area. One harbor seal (*Phoca vitulina richardsi*) was observed outside of the safety zone during the survey period, but no marine mammals were observed within the safety zone during data collection.

SUMMARY AND CONCLUSIONS

A total of approximately 3.5 hours (1 hour in transit and 2.5 hours during data collection) of marine wildlife observations were completed during the one-day survey. A Pacific harbor seal was the only marine mammal recorded within the survey area; no marine reptiles were observed. The harbor seal did not show any detectable signs of distress and did not appear to be affected by the equipment.

In summary, the harbor seal observed during survey period is considered common within the Santa Barbara Channel, and no unusual marine mammal behavior was recorded. Based on the observations of Padre's marine wildlife monitor, and with the cooperative efforts of the Fugro survey team and vessel crew, no significant negative, survey-related effects to marine wildlife were observed.

Please feel free to contact me should you or your staff have any questions or should you require additional information.

Sincerely,
PADRE ASSOCIATES, INC.



Jennifer Klaib
Staff Marine Biologist

cc: S. Poulter (Padre, Goleta)
R. de Wit (Padre, Concord)



B BATHYMETRY AND SURFICIAL FEATURES MAP



Legend

- Magnetic Anomaly with ID
- Side Scan Sonar Target with ID
- Land Survey Points
- Side Scan Sonar Survey Extent
- Proposed Survey Boundary
- Area of Hard Bottom
- Surf Zone
- Area of Kelp
- Map Extent (in Key Map)

Infrastructure

- Exposed Pipeline

Contours

- Major Contours, Interval = 5 Feet
- Minor Contours, Interval = 1 Foot

NOTES:

- Survey was conducted onboard the M/V Julie Ann on November 20, 2012.
- Bathymetric contours are mapped at 1 foot intervals and referenced to Mean Lower Low Water (MLLW).

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GEODETTIC INFORMATION

DATUM: NAD83
PROJECTION: LAMBERT CONFORMAL CONIC CALIFORNIA COORDINATE SYSTEM
UNITS: U.S. SURVEY FEET
VERTICAL DATUM: MEAN LOWER LOW WATER (MLLW)



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padre associates, inc.

ENGINEERS, GEOLOGISTS &
ENVIRONMENTAL SCIENTISTS

PADRE ASSOCIATES, INC.
OXY/VINTAGE PETROLEUM
INTAKE & DISCHARGE FACILITY
AT TAYLOR RANCH
Bathymetry and
Surficial Features
November 2012
Offshore Ventura County, California

SCALE : 1 " = 100 '

NO.	DATE:	DESCRIPTION:	DRAWN:	CHKD:	APPR:
1	Nov 2012	Bathymetry and Surficial Features	CP	AT	DES
JOB NUMBER:			CHART NO.:		
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