MARS POST-LAY INSPECTION

AND BURIAL REPORT

Volume One

Report and Appendices



Monterey Bay Aquarium Research Institute

List of Appendices

Appendix 1	Main Lay and Burial Installation Report submitted by Tyco.
Appendix 2	Notice to Mariners published by the US Coast Guard
Appendix 3	Final as-built documentation for Horizontal Directional Drilling
Appendix 4	Daily reports submitted by Aspen Environmental Monitor Jennifer Slaughter
Appendix 5	Daily reports submitted by marine mammal monitors
Appendix 6	Copy of logbook maintained onboard during installation operations to track debris
Appendix 7	Reported interactions from guard vessels during installation activities
Appendix 8	Information on the theory of operation and data sheet for the TSS 350 cable tracker
Appendix 9	Terms used to describe conditions on video annotations
Appendix 10	Post lay observations of the MARS cable from video footage
Appendix 11	Final as-laid route position list for the MARS cable

I. Introduction

The Monterey Accelerated Research System (MARS) cable was installed offshore Moss Landing, California in March 2007. The Monterey Bay Aquarium Research Institute (MBARI) contracted with Alcatel Submarine Networks (ASN) to perform cable installation activities. ASN contracted with Tyco Telecommunications (Tyco) to provide a cable vessel and installation services. The cable vessel *Global Sentinel* was used to install the system. Specification information for the vessel, cable laying and burial equipment, and navigational and slack control equipment can be found in Chapters 3 and 4 of Appendix 1.

The *Global Sentinel* left the dock facilities in Portland, Oregon on March 7th. In addition to the ship's crew, onboard were representatives from ASN and MBARI, as well as marine mammal monitors and an environmental monitor for the agencies, who was employed by Aspen Environmental Group. Several meetings occurred over the days preceding departure between the ship's captain, other high-ranking crew, the representatives, and the monitors to discuss permitting requirements, plan of operations, safety issues, and any other logistics or relevant information that needed to be discussed. These meetings continued, as needed, after leaving port while en route to Monterey Bay. Plow tests were also conducted shortly after departure (see Chapter 1 of Appendix 1).

Additional individuals joined the vessel en route, including a pilot from San Francisco as required by navigational law, and representatives from National Response Corporation Environmental Services (NRCES), the oil spill response contractor hired to handle any oil spills should they occur. In addition to the onboard representatives and equipment, NRCES stationed supplementary personnel and gear onshore in Moss Landing.

The *Global Sentinel* arrived in Monterey Bay on the morning of March 10th. MBARI hired a rotating group of guard vessels (all local commercial fishermen) to watch for and alert any vessel traffic that operated in the vicinity of the cable ship. As per navigational law, all vessels must provide cable ships with a one-nautical-mile buffer zone due to the cable vessel's inability to maneuver quickly. The first guard vessel was alerted and on station at the time of the *Sentinel*'s arrival.

In addition to the guard vessels, a Notice to Mariner's was published by the U.S. Coast Guard (see Appendix 2), and daily radio broadcasts were made to alert other vessels in the area of the current location and daily plan for the cable ship.

The remainder of the cable installation involved three categories of tasks: pre-installation activities, installation, and post-lay inspections. These items are discussed below and in the attached appendices as referenced.

II. Pre-Installation Activities

A number of pre-installation activities were completed in preparation for the actual cable installation.

In March 2006, a 5-inch diameter steel pipe was installed approximately 50 feet below the ocean floor via horizontal directional drilling (HDD) by Environmental Crossings, Inc. This pipe would later serve as the conduit to bring the MARS cable onshore.

The ocean end of this pipe was cut and affixed with a flange and tide-check valve for use when the cable installation occurred. A guide wire was installed through the pipe and terminated onshore, also to be used later during cable installation to pull the cable ashore. Please see Appendix 3 for the final documentation for the HDD pipe installation.

Once the *Sentinel* arrived in Monterey Bay, a pre-lay grapnel run (PLGR) was conducted to attempt to clear the cable route of any potential debris that could cause issues during cable installation. Snagged debris was recovered, if possible, and stowed on board for later disposal. The PLGR ran from the shore end out to the deployment location for the trawl resistant frame (TRF), which will later house the MARS node.

After completion of the PLGR on March 12th, a survey was conducted using the *Sentinel*'s remotely operated vehicle (ROV) in the vicinity of the TRF deployment site to ensure there were no unforeseen problems in the area.

The final pre-installation activity involved accessing and preparing the HDD pipe for cable installation. Divers were used for this operation, which commenced on March 14th. Once pipe preparation was complete, the cable was attached to a messenger line, which was passed from the cable vessel, through the pipe, and on to shore at the shore landing location. Cable installation commenced from this point forward.

Chapter 1 of Appendix 1 describes the pre-installation activities in additional detail.

III. Installation

Actual cable installation commenced on March 14th with the passing of the cable through the HDD pipe and onto shore. The remainder of the installation process is described in Chapter 1 of Appendix 1. A daily event log is included in Chapter 2 of the same appendix. Additionally, daily reports were generated by the Sentinel personnel and are included in Chapter 10. Cable tension and burial were monitored throughout operations.

In addition to ship reports, Jennifer Slaughter, the Aspen environmental monitor, submitted daily reports to the agencies on activities and environmental compliance. These

reports can be found in Appendix 4. Marine mammal monitors were also on duty during all operations and submitted daily reports. These are included in Appendix 5.

During all operations, the *Sentinel* kept a log of any debris that fell overboard. On March 21st, two floats broke away from the plow umbilical line. These floats were recovered by the guard vessels on duty at the time. No other debris was reported (see Appendix 6).

As discussed above, guard vessels were employed to watch for vessel traffic in the vicinity of cable installation activities. Any vessels approaching the cable vessel were alerted by the guard vessel on duty via radio. Please see Appendix 7 for reported interactions.

Personnel were also advised to monitor for any potential archaeological resources. Thorough surveys conducted prior to installation did not reveal any potential issues, and no archaeological resources were encountered or disturbed at any time during installation activities.

IV. Post-Lay Inspections

MBARI conducted post-cable lay surveys to assess the position and placement of the MARS fiber optic cable (Table 1). The R/V *Point Lobos* surveyed the majority of the 50.65 km route using the remotely operated vehicle (ROV) *Ventana*. A portion of Smooth Ridge was surveyed by the *Global Sentinel* using a *Triton T-200* ROV (Figure 1). The R/V *Point Lobos* and *Global Sentinel* overlapped their surveys in two areas: (a) a portion of *Ventana* Dive V2987 with a portion of the *Triton T-200* Dive KP 36.481-36.021, and (b) a portion of *Ventana* Dive V2988 with a portion of *Triton T-200* Dive KP 42.923-40.324. Visual surveys were recorded. DVDs showing the post-laid cable are supplied with this report to agencies as required per permits.

Table 1. Details of MARS post-cable lay surveys conducted by MBARI/Alcatel.

Survey Date	Dive Number	Vessel/ROV
3/16/2007	V2984	R/V *Point Lobos*/*Ventana*
3/17/2007	V2985	R/V *Point Lobos*/*Ventana*
3/19/2007	V2986	R/V *Point Lobos*/*Ventana*
3/20/2007	V2987	R/V *Point Lobos*/*Ventana*
3/22/2007	KP 36.481-36.021 KP 40.324-36.481 KP 42.923-40.324	*Global Sentinel/Triton T-200*
3/22/2007	V2988	R/V *Point Lobos*/*Ventana*
6/7/2007	V3016	R/V *Point Lobos*/*Ventana*

Additionally, the ROV *Ventana* was equipped with a TSS 350 cable tracker system to follow the cable and independently determine burial depth. The TSS 350 cable tracker

system locates a target by detecting the alternating magnetic fields associated with tone currents injected onto the cable, isolating the tone frequency from the background noise and calculating the position of the target cable from the relative strength of signals on each sense coil.

The tracker's sense coils and altimeter were mounted on the front skid of the ROV. The two arrays of coils provide a distance and position to the cable and the altimeter provides a distance to bottom. The software subtracts the altimeter distance data from the cable distance data to display cable position and depth of burial. The tracker system provided a survey output string with the above data items, which were combined with ROV position (lat, long), time stamp, ROV depth, ROV heading, and additional ROV altitude data and logged to a file.

For more detail about the tracker's operation, a subset of the manual describing the theory of operation is included in Appendix 8 along with a specification sheet.

MBARI viewed video of the route while annotating the placement of the cable, debris, and changes in substrate type. A description of each observation can be found in Appendix 9 and detailed annotations for the entire route are shown in Appendix 10. Figures 2 through 19 illustrate representative locations depicting each observation category.

Seven general substrates ranging from sand and mud to rocky habitat were encountered. More than 70% of the route was composed of sand and sandy mud (Table 2, Figure 20). Substrates were as expected based on earlier geological surveys conducted by Fugro and previously submitted with MARS permit application packets.

Table 2. Composition of substrate on the MARS cable route, reported as total distance and as a percent of the total distance.

Substrate	Distance (km)	Percent of route
mixed substrate (mud interspersed with hard substrate)	0.67	1.3
mud	3.37	6.6
mud over clay	7.60	15.0
rippled sand	0.64	1.3
rocky habitat	2.24	4.4
sand	23.49	46.4
sandy mud	12.64	25.0
Total	50.65	100.0

Most of the cable is buried (79 %), 19 % is unburied and 2 % is partially buried (Figure 21). There are areas where the cable was trenched in and lies below the surrounding sediment surface. The cable was visible within the trench and was not yet covered with

sediment (Figure 16). It is important to note that burial depths are underestimated where the trench is not completely filled with sediment (Figures 5, 6, 13, 16, 17).

There were no major suspensions or spans in the cable (Tables 3a and 3b). In some areas the cable is unburied and is 0.5 to 2 inches above the seafloor (Figure 3). This occurred because the cable is pulled taut in places where the seafloor is slightly irregular due to rocks or topographic changes in soft sediment (Figure 22). These irregularities also caused minor spans in 12 places (over a total of an estimated 441 m). Most spans were less than 6 inches (0.15 m) and none are more than 12 inches (0.30 m) above the seafloor (Table 3a, Figure 7). There were 68 minor "point suspensions." These are areas where the cable is suspended above the seafloor for a distance of <1 m each (Figure 9). Nearly all of the suspensions (62 of 68) were less than 4 inches above the seafloor (0.1 m). None were higher than 8 inches (0.2 m, Table 3b, Figure 8). Tyco/Alcatel found it necessary to lay the cable with this level of tension in order to ensure that they installed the surface laid cable sections within the tight corridor specified in the MBNMS permit and to avoid cable loops.

There are a few areas along the route that are generally composed of hard substrate or clay but have short segments of deeper soft sediment deposition. The distance of these sections is on the order of 10s of meters. The surface laid cable is sinking into this thin veneer of sediment (Figure 19).

Table 3. Number and extent of minor spans of the MARS cable along the neck of Smooth Ridge. No major spans occurred (none were more than 20 inches (0.50 m) above the seafloor and most were under 6 inches high (0.15 m)).

Height above seafloor, Distance (m)	Number of Occurrences
0.08, 128	1
0.08, 13	1
0.08, 159	1
0.08, 8	1
0.08, 12	1
0.09, 10	1
0.15, 16	1
0.15, 18	1
0.15, 27	1
0.15, 9	1
0.20, 16	1
0.50, 25	1
Total 441 m	12

Table 3b. Number and extent of minor suspensions of the MARS cable along the 51 km route. No major suspensions occurred, all suspensions were less than a meter in distance, and almost all were less than 4 inches high (0.1 m).

Height above seafloor, Distance (m)	Number of Occurrences
<0.1, <1	62
0.1, <1	2
0.15, <1	1
0.17, <1	1
0.2, <1	2
Total	68

Portions of the cable route were inspected by the *Sentinel*, and, where possible, post lay burial was performed via jetting using the ROV onboard. During inspection, it was discovered that the MARS cable had been surface laid over an abandoned wire rope (see item 1 below). This rope had been snagged on the plow on March 19th, and the *Sentinel* attempted to retrieve it at that time. One section was retrieved. However, they were unable to dislodge the other section without endangering the personnel and equipment on board the *Sentinel*. At the end of operations, the *Sentinel* returned to this site and moved the wire rope away from the cable to ensure it would not damage the cable.

Including this cable, two man-made items were found on the seafloor as detailed here:

1.
   - Type of debris: Short section of unused cable; lies underneath the MARS cable (see Figure 14)
   - Date/time: 3/20/2007 8:39:14 PM GMT
   - Location: 36.8403–122.14960
   - Disposition: At the end of the installation project, they went back and cut the discarded cable and moved the pieces away from the MARS cable. We were unable to recover the discarded cable.

2.
   - Type of debris: Trap (see Figure 15)
   - Date/time: 3/19/2007 7:14:38 PM GMT
   - Location: 36.8857–122.002482
   - Disposition: Remains on seafloor

All data gathered has been compiled and packaged into a variety of formats. Alignment charts were created and are included in Chapter 9 of Appendix 1. Electronic versions of these charts are included on the enclosed CD.

The cable route has also been overlaid on NOAA chart 18680. The route has been color-coded to indicate areas where the cable was surface laid, partially buried, and fully buried (see Figure 21). This enlarged image, along with the final as-laid route position list (RPL), has been distributed to fishermen in the area to assist them with avoidance of the vulnerable sections of the cable.

The final as-laid RPL can be found in Appendix 11. Please note that Chapter 7 of Appendix 1 includes the RPL as determined by Tyco based on their data at the time of installation. The final as-laid RPL was determined based on the data collected during the post lay inspection of the actual location of the installed cable using the cable tracker and video. Further cable burial information is included in Chapter 5 of Appendix 1.

Video of the entire cable route has been copied to DVDs and is provided to agencies with this report as required. Appendix 10 includes references to time codes to assist the viewer in locating objects of interest. The location for each of the dives is shown in Figure 1 to further assist in identifying specific sections of the cable route covered in the videos. A GIS layer of the cable route is included on the enclosed CD as well.

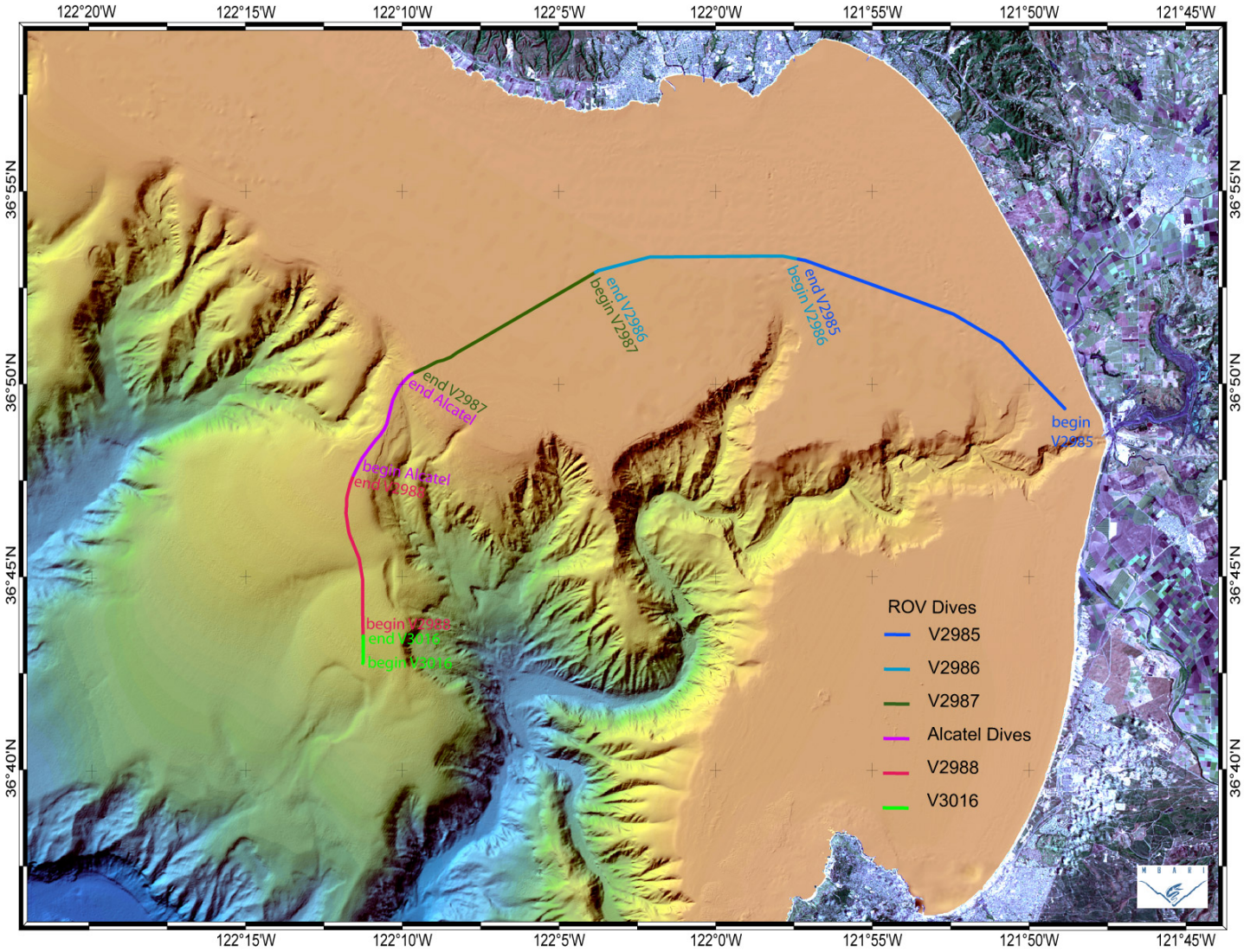


Figure 1. MARS cable route indicating where each video dive begins and ends.



Figure 2. The MARS cable is buried except for a specific short section of the cable which is visible on the seafloor. The substrate in this photo is mud.

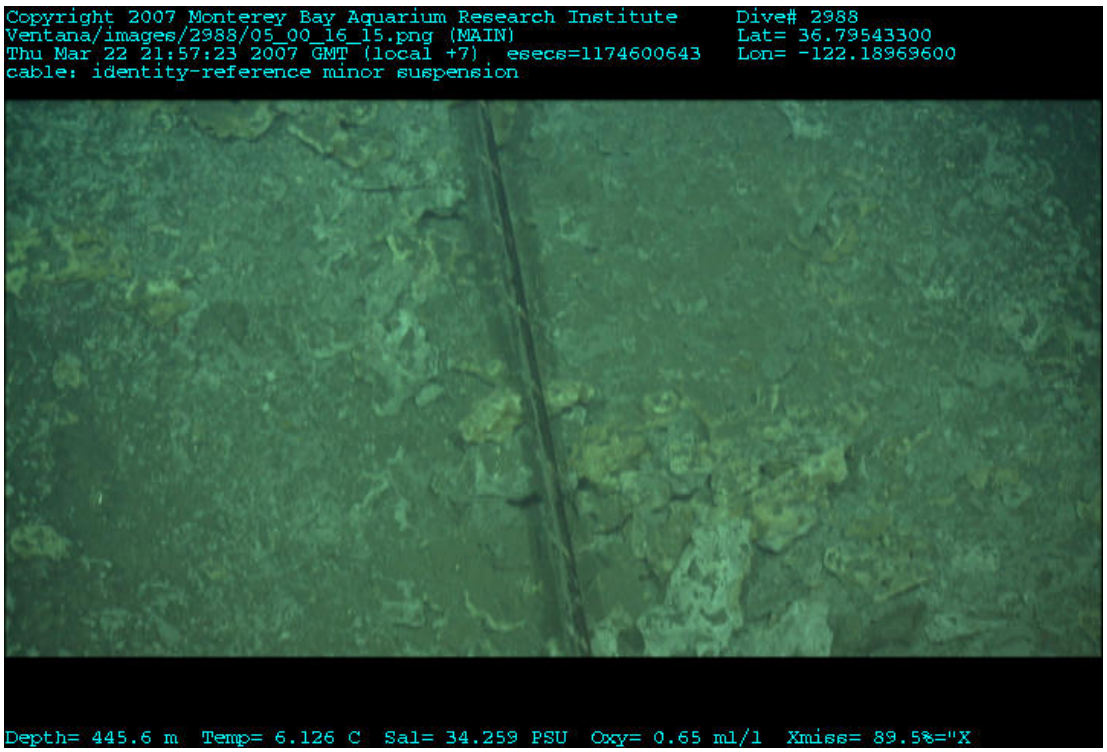


Figure 3. The cable is laying directly on the seafloor, except occasionally where it is pulled tight and is 0.5-2 inches above the seafloor.



Figure 4. The substrate type is eroded mixed substrate (mud interspersed with hard substrate).



Figure 5. The cable is alternately buried and unburied every few meters. The surrounding substrate is rippled sand.



Figure 6. The cable is suspended within the trench and is not covered with sediment.



Figure 7. No major spans occurred along the cable route. There were 12 locations with minor spans. The highest of them is shown here at < 20 inches (0.5 m) at the highest point. The span occurs for an estimated 25 m.



Figure 8. No major suspensions occurred. The highest, shown here, was an estimated 12 inches (0.3 m) above the seafloor for a short distance (<1 m).



Figure 9. There were 68 minor suspensions less than 1 m in distance. This photo shows a typical suspension.



Figure 10. We encountered areas with alternating substrates. Muddy areas were interspersed with rocky habitat as shown in this photo.

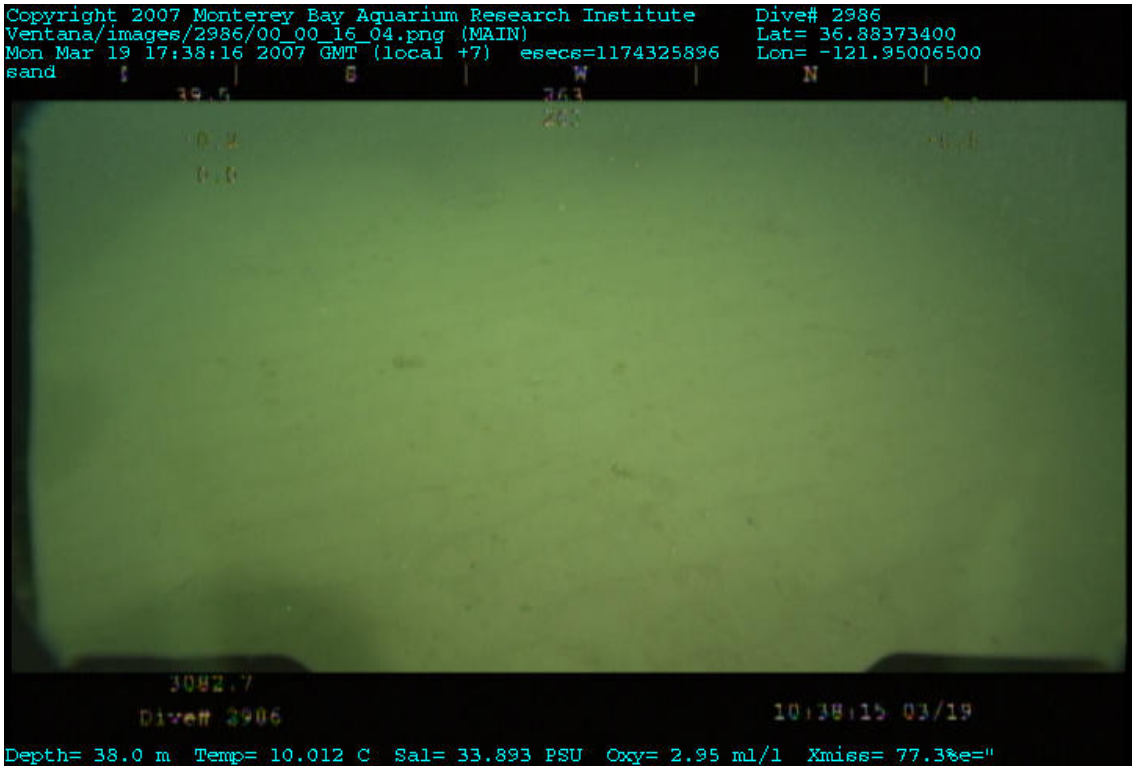


Figure 11. The cable is buried and is not visible. The substrate is rippled sand.



Figure 12. The MARS cable is surface-laid and is lying directly on the seafloor. A splice box can also be seen at this juncture.



Figure 13. A rippled sand substrate; the cable is buried within the trench.

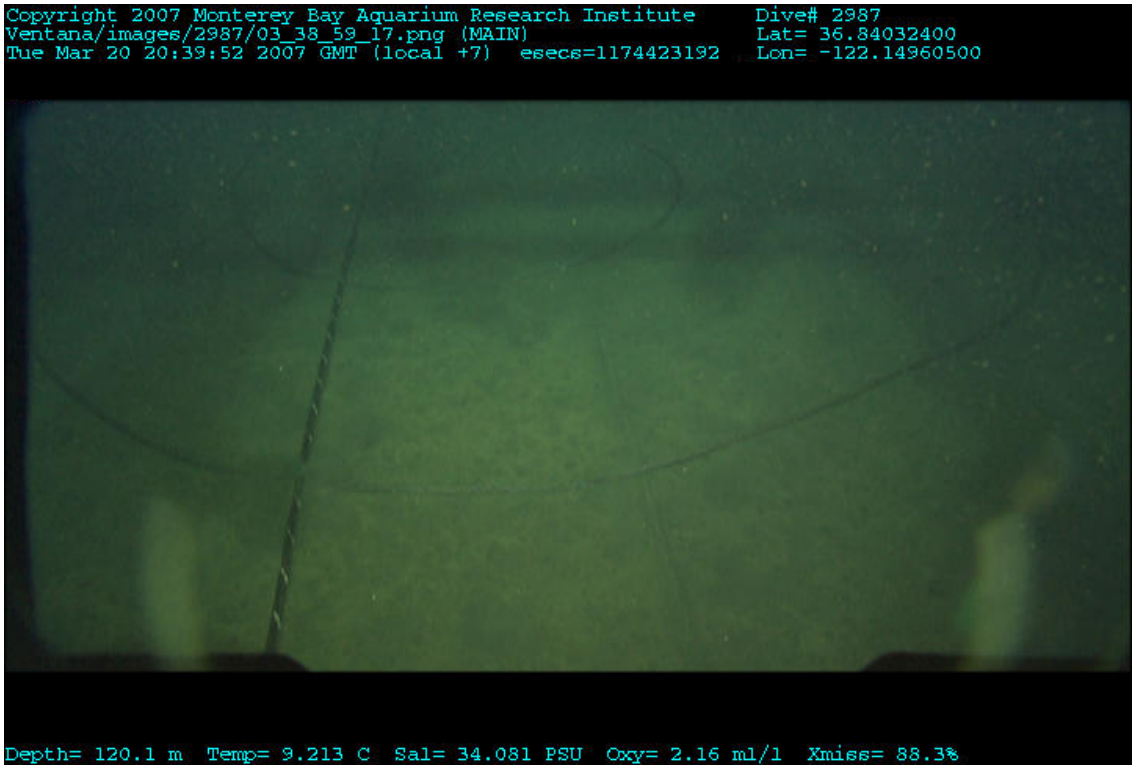


Figure 14. A section of unused cable lying underneath the MARS cable. We removed this from the seafloor. The substrate is sandy mud.



Figure 15. This trap was encountered on the seafloor at a depth of 45 m.

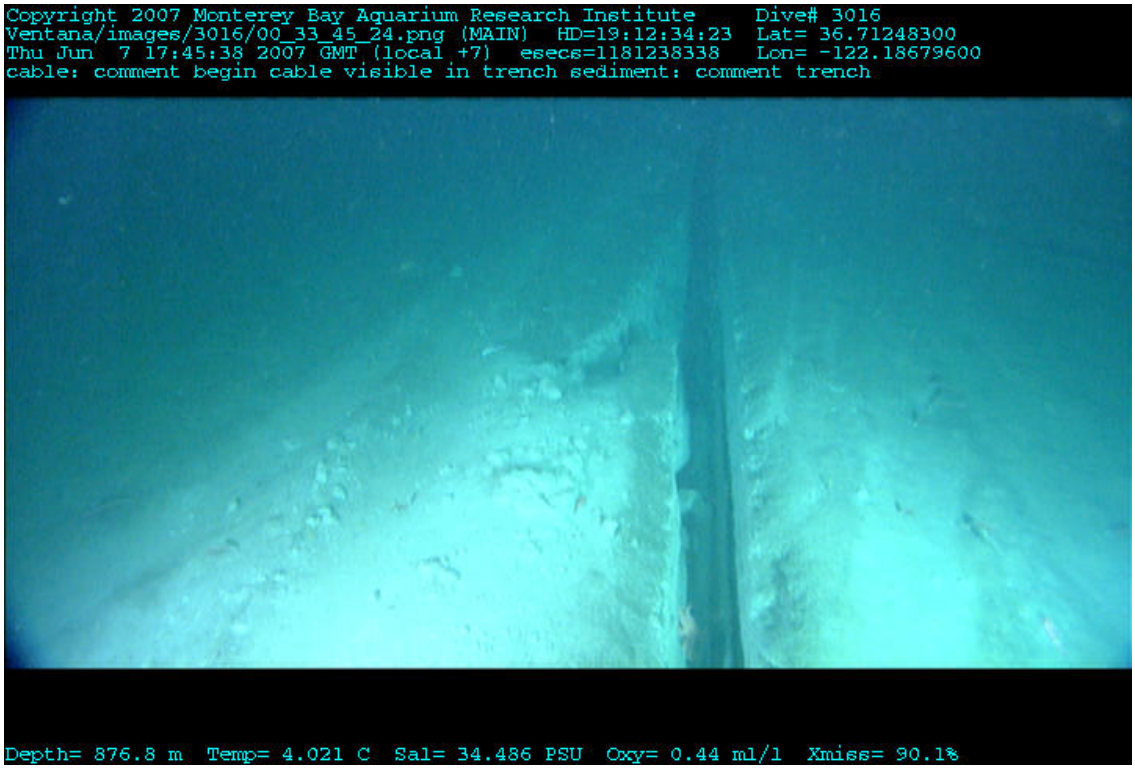


Figure 16. The cable is suspended 1-2 inches above the bottom of the trench. The cable is not above the seafloor, and is not covered with sediment.

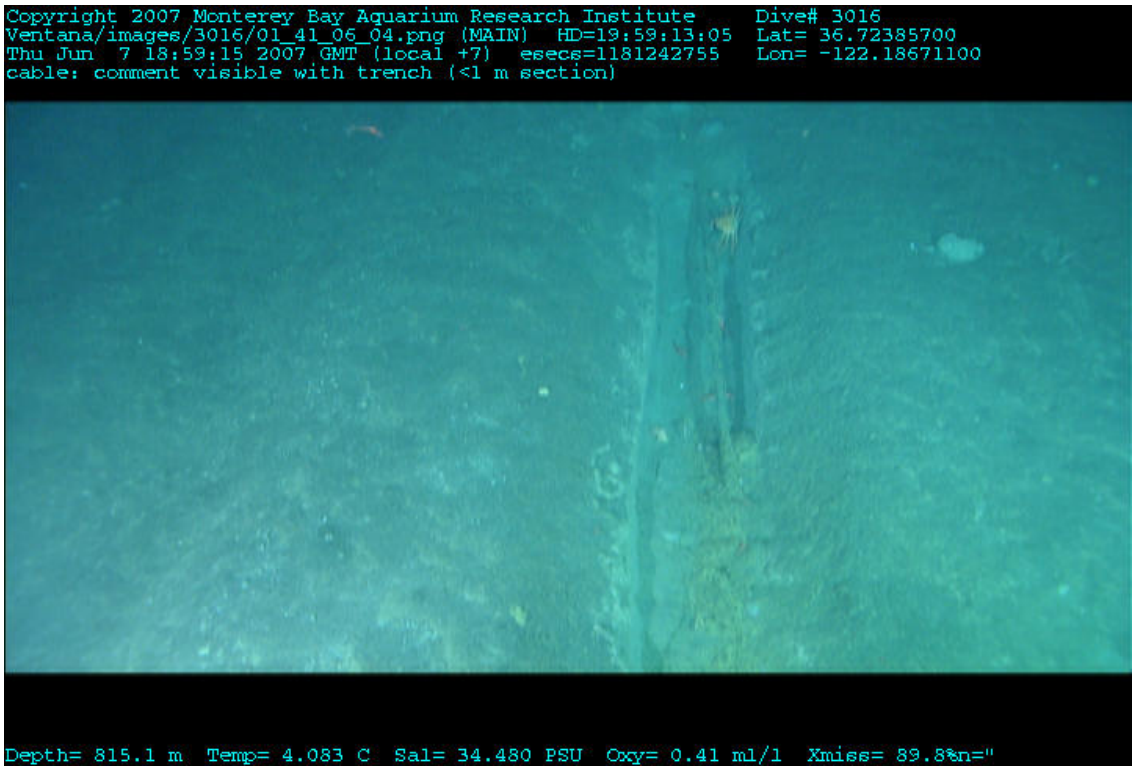


Figure 17. The cable is buried within the trench except in short (<1 m) sections.



Figure 18. The cable is lying flat in bottom of the trench; the cable is not above the seafloor, but is not covered with sediment. The substrate is mud over clay.



Figure 19. The cable is partially buried.

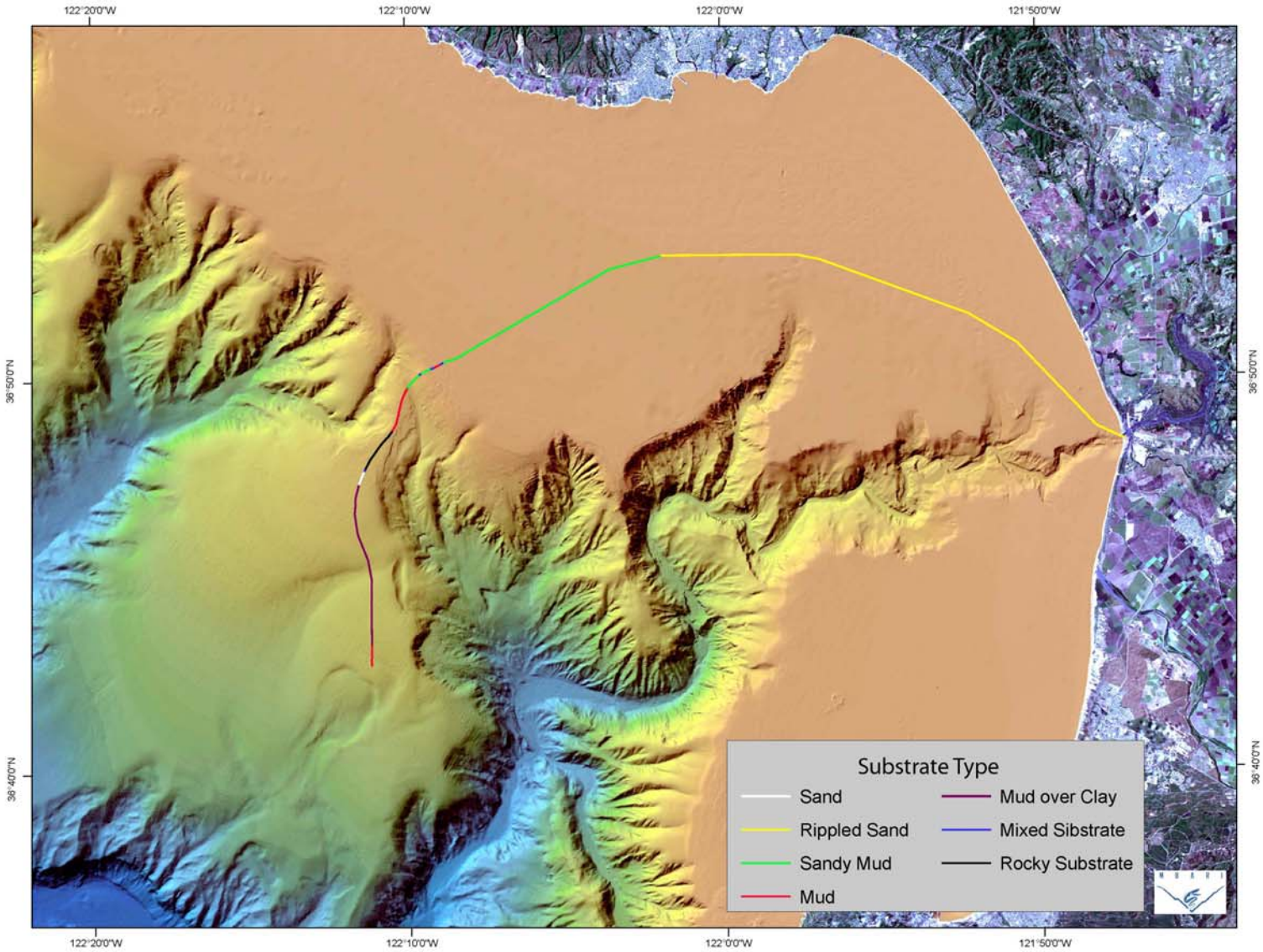


Figure 20. General substrates encountered along cable route.

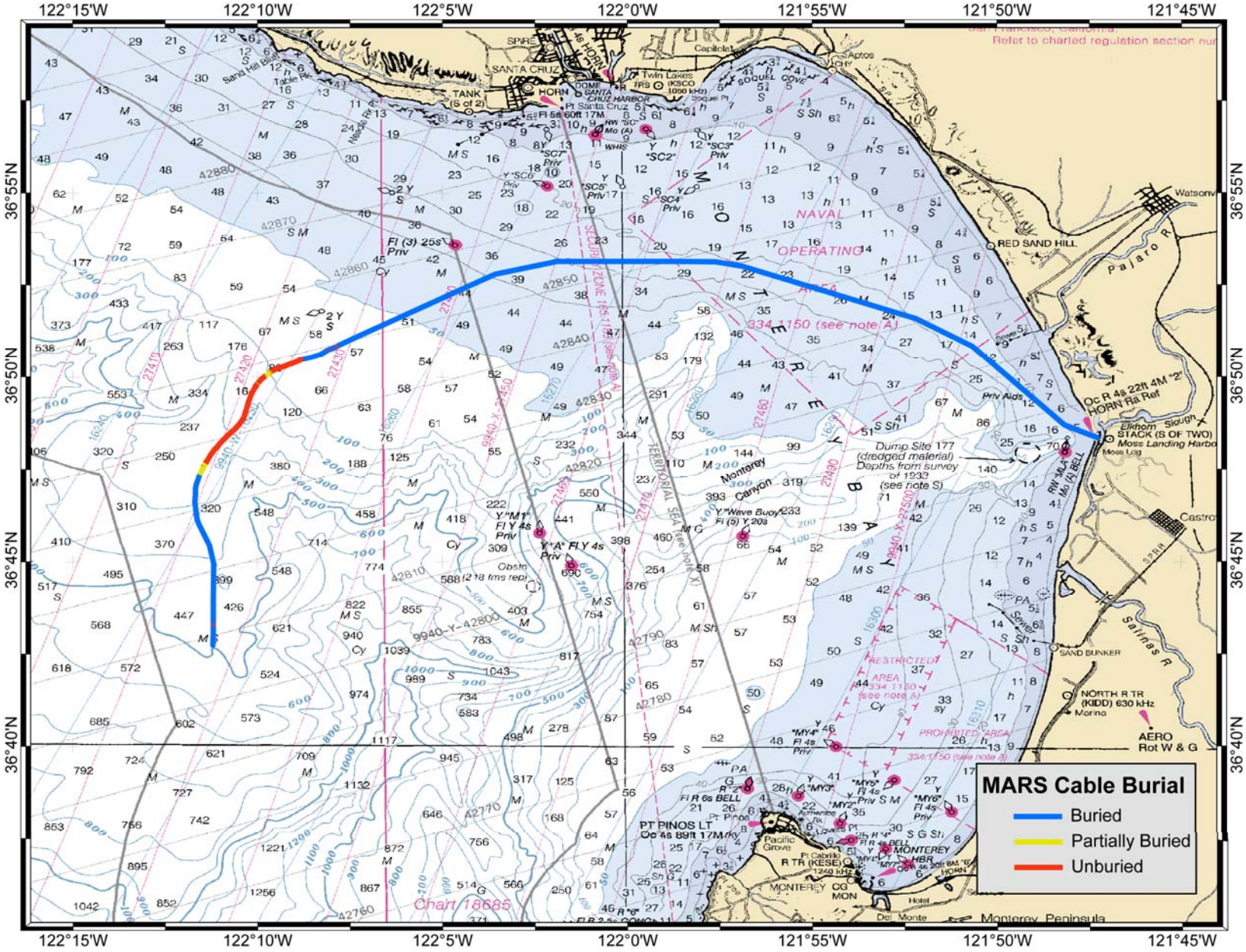


Figure 21. Buried, partially buried, and unburied cable are highlighted along the route.

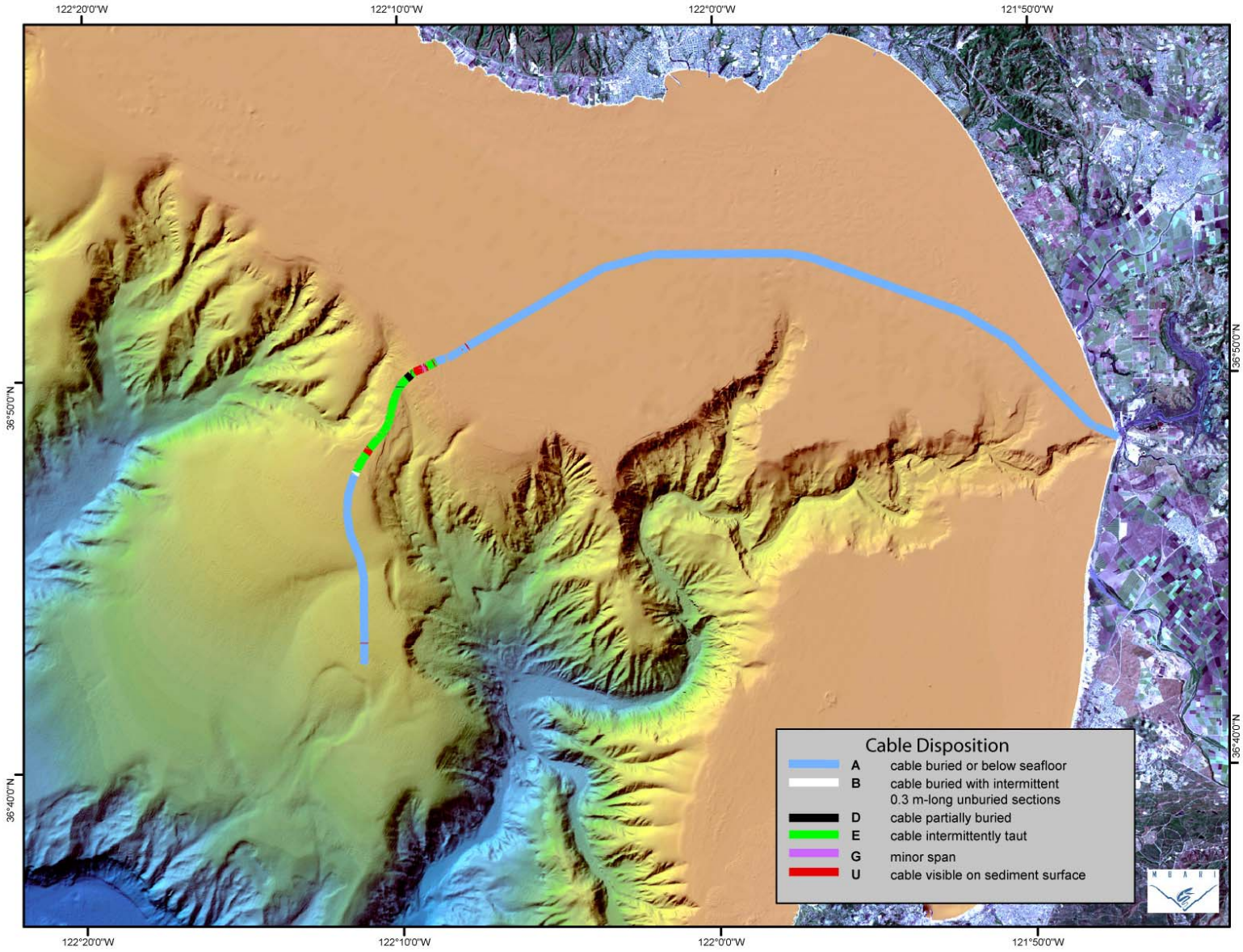


Figure 22. Disposition of the cable along the route. Minor suspensions along the cable route could not be depicted here. Each is < 0.2 m in height above the seafloor and <1 m in distance (see Table 3b.)

MARS

Main Lay and Burial Installation
April 2007

Tyco Telecommunications (US) Inc.
60 Columbia Road
Morristown NJ 07960

ISSUE STATUS AND DOCUMENT HISTORY RECORD

Current Issue:

Issue	Issue Date	Prepared	Reviewed	Approved
PRELIMINARY		D. Brawn	I. Puente	J. Porto
Explanation of Re-Issue:	Preliminary Issue			

Revision History:

Issue	Issue Date	Prepared	Reviewed	Approved
PRELIMINARY		D. Brawn	I. Puente	J. Porto

Amendment/additions/deletions etc:

Section	Change	Page #	Issue #
1 – Operational History	No Change		Prelim
2 – Daily Event Diary	No Change		Prelim
3 – Vessel Specifications	No Change		Prelim
4 – Burial Tool Specification	No Change		Prelim
Sea Plow VII	No Change		Prelim
ST-217	No Change		Prelim
5 – Burial Data	No Change		Prelim
Burial Plots	No Change		Prelim
PLIB	No Change		Prelim
6 – Wet Plant Spare Inventory	No Change		Prelim
Cable	No Change		Prelim
Splice Kits	No Change		Prelim
7 – RPL	No Change		Prelim
8 – SLD	No Change		Prelim
9 – Charts	No Change		Prelim
10 – Daily Reports	No Change		Prelim

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

DISTRIBUTION LIST

Soft Copy:

Name / Company	No. of Copies
Sasha O'Bow-Hove / Alcatel Submarine Networks	1

Notification List:

Name / Company	Notification via
Jorge Porto – Tyco Telecommunications	email
Douglas Brawn – Tyco Telecommunications	email
Walter Price – Tyco Telecommunications	email

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

ABBREVIATION LIST

Remember to include the acronym for the System name into this table.

Abbreviation	Meaning
AC	Alter Course
AFT	Stern
AOO	Area of Operation
ASL	Assembly Ship Load
BMH	Beach Manhole
BRH	Bight Release Hook
BU	Branching Unit
CC	Cable Counter
CDE	Cable Drum Engine
COTDR	Coherent Optical Time Domain Reflectometer
CR	Conductor Resistance
CS	Cable Ship
CTE	Cable Termination Equipment
DA	Double Armor
DC	Direct Current
DGPS	Differential Global Positioning System
DP	Differential Positioning
EIC	Engineer in Charge
EOC	End Of Cable
FP	Fiber Pairs
FS	Final Splice
FWD	Bow
GB	Optical Termination Box
GPS	Global Positioning System
HDD	Horizontal Directional Drill
HDPE	High Density Polyethylene
HH	Hand Hole
HPR	Hydroacoustic Position Reference
HV	High Voltage
ICPC	International Cable Protection Committee
IMO	International Maritime Organization
IR	Incident Report
IR	Insulation Resistance
IS	Initial Splice
JB	Joint Box
KP	Kilometer Post
KV	Kilo Volt
Lat.	Navigational Latitude position in Degrees and Minutes
LCE	Linear Cable Engine
LJ	Land Joint
Long.	Navigational Longitude position in Degrees and Minutes
LP	Landing Point
LW	Lightweight cable
LWA	Light Wire Armor cable
LWP	Lightweight Protected cable
mA	milli Ampere
MH	Manhole

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Abbreviation	Meaning
MJ	Millennia Joint
MOP	Method of Procedure
OGB	Ocean Ground Bed
OOS	Out of Service
OSA	Optical Spectrum Analyzer
OSP	Outside Plant
OTDR	Optical Time Domain Reflectometer
P	Port
PFE	Power Feed Equipment
PLB	Post Lay Burial
PLDN	Plow Down
PLGR	Pre Lay Grapnel Run
PLI	Post Lay Inspection
PLIB	Post Lay Inspection & Burial
PLSE	Pre Lay Shore End
PLUP	Plow Up
POW	Plan of Work
PTU	Power Termination Unit
PVC	PolyVinyl Chloride
R	Repeater
RC	Route Clearance
ROV	Remotely Operated Vehicle
RPL	Route Position List
S	Starboard
SA	Single Armor
SB	Splice Box
SEQ	Shape Equalizer
SL	Slim Line
SLD	Straight Line Diagram
SLLI	System Load and Lay Instruction
SPA	Special Purpose Application Cable
SPO	Start PayOut
STBD	Starboard
TEQ	Tilt Equalizer
TICS	Tyco Integrated Cable Systems
UTC time	Universal Time Coordinated
Vs	Vessel
WD	Water Depth
WP	Way Point

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

TABLE OF CONTENTS

ISSUE STATUS AND DOCUMENT HISTORY RECORD *2*
DISTRIBUTION LIST *3*
ABBREVIATION LIST *4*
TABLE OF CONTENTS *6*
1 Operational History *7*
2 Daily Event Diary *16*
3 Vessel Specifications *41*
4 Burial Tool Specification *46*
4.1 Sea Plow VII 47
4.2 ST-217 49
5 Burial Data *52*
5.1 Burial Plots 53
5.2 PLIB 59
6 Wet Plant Spare Inventory *62*
6.1 Cable 64
6.2 Splice Kits 65
7 RPL *67*
8 SLD *69*
9 Charts *71*
10 Daily Reports *86*

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1 Operational History

1

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

OPERATIONAL HISTORY

CS GLOBAL SENTINEL departed Portland, OR at 1042 UTC on 7 March 2007. The vessel was enroute to Monterey Bay, CA to install the MARS cable system. The system is approximately 52.5 kilometers of Alcatel OALC4 17mm armor cable. The system is a buried system with a landing in Moss Landing, CA ending at a TRF (Trawler Resistant Frame) location offshore in Monterey Bay.

A pre-lay coordination meeting was held on board the vessel after departure with all interested parties attending. Representatives from ASN, MBARI, MBNMS, and marine mammal watchers were aboard and attended the meeting. It was determined that one of the planned splices on the system, SJ2, could be accomplished prior to installation rather than causing a delay during the installation.

While enroute to Monterey Bay, the vessel arrived at a pre-determined location to conduct a sea trial of Sea Plow VII, the burial tool to be used for the installation. Arrival on the trial site occurred at 0951, 8 March 2007. Sea Plow VII was launched in approximately 155m of water and pulled for approximately 2.5 kilometers. During the trial, the plow was pulled around several alter courses to verify positioning. The installation requires burying the cable with a corridor 40m wide, and the trial demonstrated the ability to maintain that corridor. The plow was recovered after the successful trial and was on deck at 2019. A 3 km piece of OALC4 scrap cable was used for the trial and that cable was recovered at 2332. The ship resumed transit to Monterey Bay. End preparation and linking was completed for joint SJ2 at 2100.

Transit continued through 9 March 2007. Fusion, coiling, molding and x-ray were completed on joint SJ2 during the day. OTDR testing was completed with satisfactory results. At 1950, the vessel embarked a pilot at the San Francisco pilot station. The pilot is necessary for operations in Monterey Bay.

At 0700, 10 March 2007, the vessel arrived at the cable grounds in Monterey Bay and maneuvered toward the initial plow down position to commence PLGR operations. The start position was blocked by the dive support boat. The boat was anchored over the bore pipe making necessary adjustments to the pipe end. GLOBAL SENTINEL moved down track to the west and commenced PLGR operations approximately 350m from the initial plow down position. PLGR operations commenced with the grapnel hooks recovered and checked periodically (10 kilometer intervals). PLGR operations continued through the day.

MBARI was providing three local fishing vessels, on a rotating basis, to act as guard vessels during GLOBAL SENTINEL operations.

Joint SJ2 was completed at 1200, 10 March 2007.

At approximately 0940, 11 March 2007, a tension spike, from the average observed tension of 2500lb, to 7000lb was observed. Recovery of the grapnels for inspection commenced. The hooks were at the water's edge at 1026. Debris wire rope was engaged in the hooks. The hooks were brought to deck to clear the debris. The wire rope was cleared; approximately 162m of the wire rope was recovered and stowed in the buoy hold. At 1432, the grapnel was back in the water, and PLGR resumed.

On 11 March 2007, at 1500, a meeting was held to coordinate the upcoming ROV operations. At completion of the PLGR, the ROV was scheduled be deployed to survey the TRF landing site, and to deploy 3 beacons. The TRF is to be deployed within 50m of the planned location. The beacons were

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

to be placed on the periphery of the deployment area to provide assistance in the placement of the TRF.

By 2336 on the 11th, the grapnel hooks were at the plow up position where the surface lay area began. The hooks were recovered so the vessel could move to the end of the surface lay area to resume PLGR to the end of the installation.

On 12 March 2007, at 0030, the vessel arrived at the plow down position where plow burial would resume. The hooks were deployed and the vessel continued the PLGR, coming to the end of the run at the TRF site at 1038. The grapnels were recovered and ROV operations commenced.

The ROV as launched at 1244 on the 12th, and was on bottom for deployment of the beacons at 1320. The ROV team designed ROV friendly stands to deploy and hold the beacons. The first of these was deployed in position at 1421. The deployment of all three went without incident, and the final beacon was in position at 1459.

At the completion of the beacon deployment, the ROV performed a SONAR survey of the TRF landing site to ensure there were no unknown impediments to TRF positioning. The survey found no obstructions, and the ROV moved north along the trackline to survey the area to the last plow up position. No obstructions were observed, and the PLGR scar was found and followed briefly. At the end of this successful operation, the ROV was recovered and was back on deck at 1815, 12 March 2007.

At 1830, 12 March, a meeting was held to coordinate the surface lay portion of the installation. The capabilities of the vessel were discussed, and a surface lay plan was formulated.

It had been earlier determined that a calibration of the USBL/HPR within the WINFROG navigation system was necessary. After ROV operations, the vessel returned to the TRF location and commenced the calibration procedure, utilizing one of the beacons previously placed on the seabed. The testing was completed at the TRF site.

On 13 March 2007, the vessel moved inshore to conduct a pre-landing coordination meeting. By 1030, GLOBAL SENTINEL was standing by off Moss Landing. Embarkation of shore personnel commenced at 1045 for the meeting. The meeting commenced on board and all aspects of the shore landing were discussed. Shore personnel disembarked at the conclusion of the coordination meeting.

At 1230, after arrival of parts for the cable end seal, installation of the end seal began. The end seal was necessary to ensure passage of the cable end through the bore pipe. The end seal was completed and pull tested to 2T.

At first light, 14 March 2007, the vessel was maneuvering in fog to be in position for the shore landing.

Landing operations commenced at 0812, with the passing of a messenger line to a dive support boat. The bore pipe haul in wire was attached to the messenger and the messenger was hauled in. Tension was higher than expected at the start, and the messenger parted during the haul in. Uniline was substituted for the original messenger, passed to the support boat, and the haul in resumed. The pipe wire rope was aboard at 1006, attached to the cable end, and the beach commenced hauling the cable ashore at 1033.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

The remainder of the bore pipe shore landing went without incident. The cable end was ashore, and the beach crew was securing the cable before noon. The divers applied stoppers and attached the cable to pre positioned anchors. The cable was fully tested with satisfactory results.

Plow launch operations began at 1308, 14 March 2007, and the plow was moving on the seabed at 1457. High tensions were encountered immediately and vessel speeds were lowered. At 1721, the plow experienced problems with its hydraulic system, and its computer system was rebooted. This did not solve the problem, and the decision was made to recover and repair the plow. Only about 430m of plowing was completed.

As recovery began, it was determined that the tow winch was experiencing difficulties picking up tow wire. Recovery operations were suspended pending resolution of the tow winch difficulties.

It was determined that a safety coupling in the tow winch failed. Repairs took approximately 9 hours, and the winch was repaired using ship's spare. At 0350, 15 March, the winch was again operational and recovery of the plow resumed. Due to the plow problems, dead plow recovery procedures were utilized.

During recovery, a wire rope was discovered to be engaged on the plow share. The plow was recovered to a point where the share was flush with the back deck. Due to numerous safety considerations, we were unable to recover any of the wire rope on the share, and it was cut away. Plow recovery resumed and the dead plow was on deck at 0633.

The cable was unloaded from the plow after the plow team was able to regain some plow functionality. We recovered 100m of system cable to check for any visible damage. After cable recovery, the cable was fully tested. There was no damage to wet plant as a result of this event.

During plow repairs, the customer requested that the vessel recover the buried cable, moving back to the ship landing position. Restarting the burial at the beginning would alleviate some concerns they had regarding observed tensions, and eliminate a PLIB site at the plow recovery location.

The vessel moved back towards the start position, recovering the cable. At 1312, 15 March, the vessel reached the vicinity of the dive vessel moored over the bore pipe. GLOBAL SENTINEL suspended recovery operations in the vicinity of the dive boat until it completed operations. At 1824, the dive vessel departed the area, and we resumed the last 40m of cable recovery, and positioned ourselves for plow launch upon completion of plow repairs.

Plow repairs were completed and plow launch operations began at 2206 on the 15th. The cable was loaded into the plow, and the plow was on the seabed by 2235. The plow immediately encountered an intermittent electrical problem, and recovery operations were necessary. By 2346, the plow was back on deck to effect repairs. We recovered cable the short distance back to the plow launch position.

During these operations, a plowing protocol was agreed to that provided maximum burial depths while preserving the need to maintain reasonable tensions and speeds. This protocol was adopted for all plow operations.

Repairs were completed, and the plow launch operations commenced at 0242, 16 March.
The plow was on the bottom, and burial operations commenced an hour later.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Burial continued without incident throughout the day. Speeds varied as seabed conditions and tow tensions varied. All personnel were cognizant of the need to conform to the agreed burial protocol.

A tension spike was observed at 1459, 16 March. There was a surge in vessel speed during high tensions, and the LCE could not keep up with these changes. The cable tension spike was of short duration, and no damage to the wet plant was observed. Additional alarms to warn of over tension situations were installed on the bridge and in the cable control room.

Burial continued with speeds generally slow due to high tensions. In the early morning hours of 17 March, softer seabed conditions were encountered, and the vessel was able to plow at 0.75 knots, achieving 140cm burial with low tensions. Later in the morning hard bottom was again experienced, and tensions went up, and speed came down. Speeds below 0.2 kts were not uncommon.

During the daylight hours of the 16th and 17th, an MBARI hired boat with an ROV arrived over the burial site. Tone was put on the cable from the beach, and the ROV was able to inspect the installation, including burial depth. The reports received of the installation were all positive. The cable is positioned correctly and to the correct burial depth where that depth was attainable. The plow trench was filling in nicely, and the customer was very pleased with the installation so far.

The bottom conditions moderated considerably after midnight and into the early morning hours on the 18th. Speeds of 0.75 kts accompanied by lower tensions and 140cm burial depths were again achieved. Conditions deteriorated as the morning progressed, and high tensions, slow speeds with shallow burial resumed.

At 1241, 18 March, the plow arrived at the previously determined position for planned splicing operations. The plow remained in position on the bottom for the duration of the operation, while the vessel moved ahead 100m, paying out cable and tow wire, to provide a safety margin for maneuvering.

At 1315, the cable was cut on the highway, and jointing operations began. The initial cable section was trimmed, and cable was transferred from tank 2 to tank 3 as planned during the splicing.

The splicing team was able to successfully complete the joint in approximately 19 hours, and by 0815, 19 March, the joint was complete, and we resumed plow burial operations.

Plow burial continued without incident through very hard seabed conditions. Speed and burial depth was adjusted as per the burial protocol to achieve best results. The joint, SJ1, was launched and went through the plow at 1054, 19 March. Plowing continued slowly until the plow reached the engineered plow recovery position. Plow recovery commenced at 1840.

When the plow reached the surface, a section of wire rope was found to be engaged on the plow share. The wire rope was cut off the share. One end of the wire rope was recovered, but the other portion fell away and was unrecoverable. After the plow was on deck and secured, surface lay commenced at 2133, 19 March.

The surface lay portion of the installation went well. The vessel followed a plan engineered by ASN, adjusting vessel speed, cable tensions, and vessel track as necessary. All parameters were followed as engineered, and the surface lay was completed in approximately 9 hours. During the surface lay, joint SJ2 was launched, and a tank to tank transfer of payout cable took place.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

At 0703, 20 March, after reaching the plow launch position, launch operations commenced. At a depth of about 30m, the plow experienced electrical difficulties, and was recovered for troubleshooting and repair. The plow team completed repairs, and the plow launch operations commenced at 1455, 20 March.

At 1624, the plow was on the bottom and burial operations resumed. Bottom conditions were initially hard, but soon moderated and full burial depths were achieved. Weather conditions deteriorated and force 6 winds and rough seas were encountered. At 2016, 20 March, the vessel came to a stop. Cable in the bellmouth of the plow was tending far over to starboard, to the point that it was leading over the plow skid. The plow team verified that the cable was not hung up on anything in the column or on the plow. Local knowledge from MBARI indicated that very strong currents were not uncommon in this area. ASN was notified, and agreed, that cable tension at the LCE would have to be increased to keep the cable in the proper orientation in the bellmouth of the plow. All parties understood that this would lead to a corresponding rise in readings for as laid tension from the plow. Cable tension was increased, and the plow team lowered tensions whenever environmental conditions allowed. Plow movement resumed at about 2041, 20 March.

About 1 hour later, the transition from SAL to SA cable went through the plow. No cable markings were observed to allow accurate positioning of the transition. Plowing in the heavy weather continued.

At 0121, 21 March, the depth of burial sensor failed on the plow and burial depths were no longer being received. All other sensors on the plow (skid height, tension, and stabilizer height) were indicating that there was no change in burial depths. Average burial depths in excess of 115cm were being recorded prior to the sensor failure. ASN agreed that plow burial should continue, and that an ROV pass to confirm burial depths should be undertaken as part of the PLIB program.

Earlier, final testing of the cable end had been completed, and the cable end was turned over to the jointing team for final end preparation. The jointers installed a LFES (Looped Fiber End Seal), and the end was available for ground rope attachment at 0454.

Plow burial was completed at 0755, 21 March, when the plow reached the final plow recovery position. Weather moderated sufficiently to allow for a safe plow recovery, and recovery operations began. During recovery, the cable end went over the stern and recovery continued on the ground rope.

The plow was on deck being secured by 1246, and ground rope payout continued. At 1407, 21 March, the ground rope end was secured to a length of chain used for weight, and the chain was cut away. Cable installation operations were complete.

A PLIB program was created with 5 sites for inspection and/or burial. Three sites were to be completed prior to the vessel going into port to receive the TRF, and the remaining 2 sites would be completed after installation of the TRF. PLIB would include approximately 1.908km of jetting burial, and 9.646km of inspection. Wind and sea conditions precluded launching the ROV offshore, so the vessel proceeded inshore to the end of the HDD borepipe to complete burial from the end of diver burial to the plow down position.

At 1728, 21 March, the vessel was in position and the ROV was launched at the start of lay position. Three jetting passes and one inspection pass were completed, with the ROV attaining an average burial depth of about 150cm over the entire PLIB site. The ROV was recovered at 2146, 21 March, and the vessel proceeded back offshore to continue PLIB.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

At 0000, 22 March, the vessel arrived on PLIB site 3. The weather had abated sufficiently to allow PLIB operations to commence. PLIB site 3 was completed with 3 jetting passes and one final inspection pass. Very had bottom was encountered at one end, but conditions moderated as the ROV got to the actual plow on bottom position.

Upon completion of this short burial site, inspection of the adjacent Smooth Ridge area began. This was the area that had been surface laid, and the cable appeared to be lying on the seabed as expected. At approximately KP36.252, a section of wire rope was found under the cable. Although the wire rope appeared to be no danger to the installed cable, it was decided to make a survey of the wire rope to determine if further action was necessary. The ROV completed the inspection of the surface laid cable and returned to the wire rope location.

A survey of the wire rope found 3 places where the rope was in place under the cable. A decision was made to cut the wire rope at those points and pull the wire rope from underneath the cable. The ROV was recovered, and at 1826, 22 March it was on back deck to install the cutting tool. By 1913, the ROV was returned to the seabed at the wire rope site. A successful test cut was made in the wire rope. Unfortunately, weather conditions were again deteriorating, to the point where recovery of the ROV became necessary. The wire rope cutting operation was aborted and the ROV was recovered to deck.

With the deteriorating weather conditions, it was determined that the best course of action was for the vessel to proceed to San Francisco, where trials of TRF operations were planned. The wire rope removal would be completed when the vessel returned to PLIB operations. GLOBAL SENTINEL commenced transit to San Francisco shortly after 2000, 22 March 2007.

GLOBAL SENTINEL spent several days in San Francisco. During this time, extensive trials were undertaken, using a full scale mock up of the TRF. Handling procedures were tested thoroughly prior to the arrival of the actual device. The remainder of the port time was spent rigging the vessel for the transport and installation of the TRF, along with some further handling trials using the TRF itself. The vessel departed San Francisco at 1658, 28 March 2007.

During the short transit back to the Monterey Bay cable site, the end preparation was completed on the cable tail integrated into the TRF. The vessel arrived on site to recover the MARS cable end at 0312, 29 March, when ROV operations for the end recovery commenced.

The ROV first located the cable end, at which time a line was lowered to the seabed by the ship. The ROV connected the recovery line to the end of the ground rope, and recovery of the cable end commenced. The cable end was on board the vessel at 1539, 29 March. An IR test was immediately completed to ensure the integrity of the recovered cable.

Since the location of the TRF on the seabed was more critical than the actual length, it was determined that the recovered cable end must be trimmed to ensure that the TRF would be placed in the engineered location. Approximately 365m of cable were trimmed from the cable end. The cut end was brought to the jointing area, and splicing commence for SJ3, MARS cable to the TRF tail.

A final coordination meeting was held onboard the evening of the 29th, to ensure all necessary procedures were in place for the launching of the TRF.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Joint SJ3 was complete and turned over to the deck department at 1212, 30 March 2007. Although there would be no final bight on the seabed, a bight must be passed over the bow to the TRF. Payout of this final bight began. Previously coordinated procedures to payout the final bight were followed, and the bight was over the bow at 1519. TRF launch operations commenced, and went without major incident.

The tug DELTA CAPTAIN was present for support, and it had been planned for her to cut the tag lines off the frame after the TRF was lowered to the water. Unfortunately, the tug was unable to get close enough to perform this action. The tag lines were cut and tied to the main lowering rig. This allowed the tag lines to be recovered when the main bridle was recovered. The remainder of the TRF launch operation went as planned, and the lowering of the device to the seabed commenced at 1626.

The ROV was launched at 1728, 30 March, to support the placing of the TRF on the bottom. By 1846, the ROV and the TRF were approaching the bottom. The ROV had the TRF visible on SONAR, and commenced swimming to the TRF to provide visual assistance with the final placement. At 1943, the ROV gained visual contact, and reported the TRF to be orientated properly, about 14m above the seabed.

It had been thought that the TRF was still higher off the seabed, and when the actual position was reported, it was decided to continue lowering, and set the TRF on the seabed. The frame was gently set down on the bottom at 1955, 30 March 2007. The customer was pleased with the TRF placement operation and final location.

The ROV proceeded to cut lines at all predetermined locations to free up the bridle for recovery. The bridle assembly was lifted off the bottom and on deck at 0204, 31 March. The ROV was recovered to deck to place tracks back on the vehicle to allow fro the required PLIB operations.

The ROV was launched briefly, but was immediately recovered to reconfigure the TSS for cable acquisition. There was no longer any way that tone could be put on the cable for tracking. The ROV was on the bottom on the proper configuration at 0600, 31 March. The ROV completed an initial inspection pass and one jetting pass of the unburied cable.

During the second jetting pass, the weather deteriorated rapidly and the wind and seas were outside the safe operating parameters of the vehicle. The vehicle was recovered to deck until the weather moderated sufficiently to resume ROV operations. After a weather delay of approximately 4.5 hours, the ROV was back on the bottom for burial operations at 2105, 31 March. Three jetting passes were completed and a final inspection run began. At the completion of the inspection pass, the ROV continued inspecting the adjacent PLIB site. This area had been buried by the plow, but burial data was not available. The inspection of both areas was completed at 0703, 01 April, and the ROV was recovered to deck.

The next iteration for the vessel was to recover the three beacons placed on the seabed to assist in the positioning of the TRF. The vessel was on site and the ROV in the water at 0932. The beacons were quickly recovered, and all three returned to the vessel on the ROV at 1201, 01 April.

During the final plow recovery, the electronics package on the front of the plow was jarred loose, and fell to the seabed. The ROV was sent down to the bottom at 1355 to retrieve the cage holding the electronics. At the same time, a hook was lowered over the bow. The ROV recovered the hook and attached it to the plow cage. The electronics were recovered to deck with the starboard cable drum.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

The ROV was recovered and on deck at 1703, 01 April. The recovery of the electronics was completed about a half hour later.

The vessel then proceeded to the final work location. This was to complete the cutting and moving of the wire rope under the cable. This work had begun prior to loading the TRF and its completion was required by the customer. The ship was on site and the ROV down on the seabed by 2027. The ROV proceeded to make three cuts in the wire rope, and pull it from under the cable. A final inspection of the area was completed, and the ROV recovered.

All project work being concluded, GLOBAL SENTINEL departed the cable grounds about 2345, 01 April 2007, and commenced transit to San Francisco to disembark personnel.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

2 Daily Event Diary

2

© Copyright 2007 All rights reserved.

DAILY EVENT DIARY

All times are displayed as local. Distances are in km, depth meters.
Positions are WGS 84

07 March 2007

Time	
1042	River Pilot on board. Last line. Commence transit.
1300	Pre-Lay coordination held with all onboard parties.
1701	Columbia bar pilot aboard. River pilot disembarked.
1824	Departure Columbia River.
2400	Vessel in transit to sea plow trial site.

08 March 2007

Time	
0951	Arrive at plow trial site N42 28.9940 W124 45.4450 WD 139m KP -92.863 Vs 0.49 kts
1006	Commence end prep for joint SJ2.
1109	Anchor on bottom N42 29.0130 W124 45.4480 WD 140m KP 0.000 Vs 0.28 kts
1359	Plow off deck N42 28.1681 W124 45.5208 WD 155m KP 1.567 Vs 0.38 kts PLOW: N42 28.1693 W124 45.5202 KP 0.000
1420	Plow in the water N42 28.1240 W124 45.5240 WD 154m KP 27.021 Vs 0.29 kts PLOW: N42 28.1290 W124 45.5227 KP 0.000
1441	Plow on bottom. Setting scopes. N42 28.0180 W124 45.5320 WD 155m KP 27.021 Vs 0.30 kts PLOW: N42 28.0413 W124 45.5300 KP 0.000
1530	Complete end prep 1st end for joint SJ2.
1619	Plow at AC N42 27.5536 W124 45.5435 WD 167m KP 2.705 Vs 0.69 kts PLOW: N42 27.7511 W124 45.5469 KP 2.344
1730	Complete end prep 2nd end for joint SJ2.
1810	Trial complete. Commence plow recovery N42 27.4745 W124 45.4541 WD 166m KP 2.843 Vs 0.12 kts PLOW: N42 27.6334 W124 45.5169 KP 2.567

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1851	Plow off bottom N42 27.6340 W124 45.5160 WD 163m KP 27.021 Vs 0.06 kts PLOW: N42 27.6334 W124 45.5169 KP 0.000
1916	Plow on surface. Apply stopper on cable N42 27.6140 W124 45.5070 WD 163m KP 27.021 Vs 0.05 kts PLOW: N42 27.6151 W124 45.5064 KP 0.000
1933	Plow out of water N42 27.6000 W124 45.4990 WD 163m KP 27.021 Vs 0.07 kts PLOW: N42 27.6009 W124 45.4997 KP 0.000
2019	Plow on Deck N42 27.6000 W124 45.5020 WD 163m KP 27.021 Vs 0.03 kts
2050	Commence recovery of trial cable N42 27.6000 W124 45.4990 WD 163m KP 27.021 Vs 0.09 kts
2100	Ends linked for joint SJ2.
2308	Anchor off the bottom N42 28.7027 W124 45.5236 WD 150m KP 0.000 Vs 0.22 kts
2316	Anchor at waters edge N42 28.7000 W124 45.5250 WD 149m KP 27.021 Vs 0.03 kts
2332	Recovery complete, vessel resuming transit to cable grounds N42 28.7110 W124 45.5190 WD 150m KP 27.021 Vs 0.78 kts

09 March 2007

Time	
0800	Commence fusion for joint SJ2.
1030	Commence coiling for joint SJ2.
1130	Complete fusion and coiling for joint SJ2.
1400	Commence mold ops for joint SJ2.
1800	Mold complete for joint SJ2.
1840	X-rays SJ2 completed with satisfactory results.
1950	Embarked pilot at San Francisco Pilot Station.

10 March 2007

Time	
0700	Arrive Monterey Bay. Maneuver to plow down location for PLGR operations.
0900	Start operations delayed at initial position due to anchored dive boat. PLGR to commence west of plow down position.
0915	PLGR Hooks at waters edge.
0946	Commence PLGR. N36 48.6950 W121 48.1350 WD 21m KP 1.411 Vs 0.02 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1003	Hooks moving on seabed. N36 48.7290 W121 48.1880 WD 21m KP 1.513 Vs 0.18 kts
1054	Vessel stop for grapnel recovery and inspection N36 48.8860 W121 48.3750 WD 21m KP 1.915 Vs 0.09 kts
1121	Grapnel hooks clear. Resume PLGR. N36 48.8720 W121 48.3370 WD 20m KP 1.858 Vs 0.39 kts
1200	Joint SJ2 complete.
1825	Vessel stop for grapnel recovery and inspection N36 51.6020 W121 52.2150 WD 37m KP 9.580 Vs 0.04 kts
1850	Grapnel hooks clear. Resume PLGR. N36 51.6030 W121 52.2150 WD 37m KP 9.580 Vs 0.02 kts
2348	Vessel passing AC6. Continuing PLGR. N36 53.0110 W121 56.9010 WD 41m KP 17.014 Vs 0.65 kts

11 March 2007

Time	
0046	Passing AC7 N36 53.1310 W121 57.6150 WD 40m KP 18.098 Vs 0.70 kts
0156	Exiting Naval Ops area N36 53.1330 W121 58.6190 WD 43m KP 19.589 Vs 0.58 kts
0310	Vessel stop for periodic grapnel recovery and inspection N36 53.1330 W121 58.7820 WD 44m KP 19.832 Vs 0.05 kts
0338	Grapnel hooks clear. Resume PLGR. N36 53.1296 W121 58.6118 WD 44m KP 19.578 Vs 0.26 kts
0905	Passing AC9 N36 52.7990 W122 03.5710 WD 72m KP 27.028 Vs 0.83 kts
0945	Tension spike to 7000lb. Stop for grapnel inspection. N36 52.5344 W122 04.1444 WD 79m KP 28.010 Vs 0.80 kts Approximate hook position at tension spike N36 52.663 W122 03.8658 WD 78m KP 27.533
1026	Grapnel out of water. Scrap wire engaged on hook. N36 52.6260 W122 03.9630 WD 77m KP 27.691 Vs 0.03 kts
1130	Scrap wire ends secured. Cut scrap wire on foredeck. N36 52.6266 W122 03.9619 WD 77m KP 27.690 Vs 0.05 kts
1147	Commence pickup of scrap wire on port drum. N36 52.6266 W122 03.9618 WD 77m KP 27.690 Vs 0.26 kts
1215	End of scrap on port drum. Approx 50 meters recovered. Commence recovery of second scrap end. N36 52.6266 W122 03.9619 WD 77m KP 27.690 Vs 0.05 kts
1321	End of scrap wire on deck. Approx 162m total wire recovered. N36 52.6477 W122 03.9840 WD 77m KP 27.700 Vs 0.25 kts
1401	Preparing to resume PLGR. N36 52.6578 W122 03.8786 WD 77m KP 27.554 Vs 0.04 kts
1432	Grapnel hooks a waters edge. Resume PLGR. N36 52.6640 W122 03.8749 WD 76m KP 27.544 Vs 0.11 kts
1825	Tension spike to 6000lb. Stop for grapnel inspection. N36 51.2420 W122 06.9770 WD 99m KP 32.851 Vs 0.03 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1915	Grapnel hooks clear. Resume PLGR. N36 51.3310 W122 06.7675 WD 98m KP 32.499 Vs 0.12 kts
2128	Passing A/C 10 N36 50.7210 W122 08.1180 WD 110m KP 34.802 Vs 0.82 kts
2142	Passing A/C 11 N36 50.6280 W122 08.3260 WD 112m KP 35.163 Vs 0.83 kts
2158	Passing A/C 12 N36 50.4900 W122 08.5250 WD 114m KP 35.533 Vs 0.80 kts
2211	Passing A/C 13 N36 50.4750 W122 08.7400 WD 119m KP 35.847 Vs 0.83 kts
2236	Passing A/C 14 N36 50.3580 W122 09.0940 WD 127m KP 36.416 Vs 0.86 kts
2242	Vessel stop at plow up position. Recover grapnel. N36 50.3310 W122 09.1730 WD 130m KP 36.543 Vs 0.06 kts
2326	Grapnel out of water N36 50.4290 W122 08.9220 WD 122m KP 36.128 Vs 0.04 kts
2330	Proceeding to plow down position to resume PLGR. N36 50.4291 W122 08.9217 WD 123m KP 36.128 Vs 0.05 kts

12 March 2007

Time	
0030	Arrival at plow down location. Resume PLGR operations. N36 47.6813 W122 11.4308 WD 7m KP 42.721 Vs 0.26 kts
0110	Grapnel on bottom N36 47.7490 W122 11.3980 WD 457m KP 42.587 Vs 0.39 kts
0210	Passing AC 26. N36 47.3070 W122 11.6010 WD 482m KP 43.457 Vs 0.64 kts
0318	Passing AC 27 N36 46.7080 W122 11.8310 WD 534m KP 44.597 Vs 0.61 kts
0434	Passing AC 28 N36 46.1000 W122 11.7580 WD 609m KP 45.649 Vs 0.51 kts
0614	Passing AC 29 N36 45.4090 W122 11.4090 WD 717m KP 47.035 Vs 0.55 kts
0711	Passing AC 30 N36 44.9130 W122 11.0220 WD 758m KP 48.031 Vs 0.72 kts
1000	Passing TRF position. N36 42.6700 W122 11.2100 WD 894m KP 52.149 Vs 0.98 kts
1038	Grapnel at TRF location. PLGR complete. Commence grapnel recovery. N36 42.0470 W122 11.2140 WD 1017m KP 53.302 Vs 0.21 kts
1119	Grapnel off bottom. N36 42.2393 W122 11.2854 WD 969m KP 52.948 Vs 0.09 kts
1203	Grapnel at surface. N36 42.3934 W122 11.2661 WD 942m KP 52.663 Vs 0.35 kts
1244	ROV off deck. N36 42.6779 W122 11.2672 WD 900m KP 52.137 Vs 0.04 kts ROV: N36 48.6605 W121 48.0593 KP 1.282
1248	ROV in the water N36 42.6780 W122 11.2670 WD 899m KP 52.137 Vs 0.00 kts ROV: N36 48.6605 W121 48.0593 KP 1.282

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1320	ROV on bottom for beacon deployment and survey. N36 42.6778 W122 11.2668 WD 900m KP 52.137 Vs 0.03 kts ROV: N36 43.3008 W122 11.1024 KP 50.981
1421	Beacon 'B' deployed. N36 42.6570 W122 11.2275 WD 900m KP 52.175 Vs 0.12 kts ROV: N36 42.6591 W122 11.2255 KP 52.171
1442	Beacon 'A' deployed. N36 42.6828 W122 11.1769 WD 897m KP 52.126 Vs 0.25 kts ROV: N36 42.6806 W122 11.1755 KP 52.130
1459	Beacon 'C' deployed. N36 42.7057 W122 11.2203 WD 896m KP 52.084 Vs 0.03 kts ROV: N36 42.7066 W122 11.2285 KP 52.083
1512	Commence SONAR survey of TRF landing site. N36 42.7055 W122 11.2202 WD 896m KP 52.085 Vs 0.06 kts ROV: N36 42.7036 W122 11.2248 KP 52.088
1523	No obstructions observed on SONAR. N36 42.6870 W122 11.2081 WD 897m KP 52.119 Vs 0.01 kts ROV: N36 42.6806 W122 11.2077 KP 52.131
1525	Commencing survey northward along track. N36 42.6871 W122 11.2083 WD 897m KP 52.119 Vs 0.19 kts ROV: N36 42.6878 W122 11.2107 KP 52.117
1730	Tracking PLGR grapnel scar. N36 43.4251 W122 11.1828 WD 829m KP 50.753 Vs 0.29 kts ROV: N36 43.4251 W122 11.1996 KP 50.754
1747	Survey complete. Commence ROV Recovery. N36 43.4357 W122 11.2425 WD 832m KP 50.735 Vs 0.21 kts ROV: N36 43.4453 W122 11.2421 KP 50.717
1750	ROV off bottom N36 43.4348 W122 11.2435 WD 832m KP 50.737 Vs 0.03 kts ROV: N36 43.4454 W122 11.2425 KP 50.717
1815	ROV on deck N36 43.4364 W122 11.2440 WD 832m KP 50.734 Vs 0.07 kts
1906	Commence USBL/HPR calibration. N36 43.4107 W122 10.9780 WD 821m KP 0.000 Vs 0.21 kts

13 March 2007

Time	
0650	USBL/HPR calibration completed.
0706	Departed TRF site. Moving inshore for coordination meeting.
1030	Standing by off Moss Landing.
1045	Commenced embarkation of shore personnel.
1215	Conducted pre-landing coordination meeting.
1230	Commenced installation of end seal on cable for bore pipe insertion.
1520	Shore personnel disembarked.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1630	Completed end seal installation.
1800	End seal pull tested to 2T.
2359	Standing by for shore landing operations at first light.

14 March 2007

Time	
0716	Maneuvering to landing position. N36 48.7124 W121 48.8749 WD 31m KP 2.191 Vs 2.69 kts
0810	In position for landing operations. N36 48.6292 W121 47.9716 WD 22m KP 1.139 Vs 0.03 kts
0812	Messenger line passed to support boat. N36 48.6303 W121 47.9711 WD 21m KP 1.139 Vs 0.01 kts
0837	Hauling in messenger line. N36 48.6302 W121 47.9713 WD 21m KP 1.140 Vs 0.02 kts
0856	Messenger line parted. N36 48.6298 W121 47.9710 WD 21m KP 1.139 Vs 0.07 kts
0934	Uniline passed to support boat as messenger. N36 48.6299 W121 47.9711 WD 21m KP 1.139 Vs 0.04 kts
0955	Haling in uniline. N36 48.6292 W121 47.9708 WD 21m KP 1.138 Vs 0.03 kts
1006	Bore pipe pulling wire aboard. N36 48.6292 W121 47.9693 WD 21m KP 1.136 Vs 0.11 kts
1018	Pulling wire connected to cable. N36 48.6285 W121 47.9680 WD 21m KP 1.134 Vs 0.05 kts
1033	Beach hauling in cable. N36 48.6293 W121 47.9683 WD 21m KP 1.135 Vs 0.11 kts
1044	Cable end in bore pipe bellmouth. N36 48.6286 W121 47.9678 WD 21m KP 1.133 Vs 0.02 kts
1149	Cable end bore pipe shore end. N36 48.6291 W121 47.9681 WD 20m KP 1.134 Vs 0.00 kts
1155	Beach securing cable. N36 48.6294 W121 47.9679 WD 20m KP 1.134 Vs 0.13 kts
1308	Stoppers applied to sea anchors by divers. N36 48.6289 W121 47.9682 WD 20m KP 1.134 Vs 0.02 kts
1352	Commence plow launch operations. N36 48.6288 W121 47.9678 WD 20m KP 1.134 Vs 0.04 kts
1416	Cable loaded in plow. N36 48.6337 W121 47.9798 WD 20m KP 1.154 Vs 0.04 kts
1423	Plow off deck. N36 48.6340 W121 47.9803 WD 20m KP 1.155 Vs 0.03 kts
1437	Plow in the water N36 48.6455 W121 48.0084 WD 20m KP 1.201 Vs 0.18 kts
1438	Plow on bottom N36 48.6466 W121 48.0115 WD 20m KP 1.207 Vs 0.18 kts
1457	Plow moving on seabed. N36 48.6670 W121 48.0649 WD 21m KP 1.295 Vs 0.05 kts Plow: N36 48.6470 W121 48.0115 KP 1.207

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1539	Plow passing AC 01. N36 48.7141 W121 48.1834 WD 21m KP 1.489 Vs 0.16 kts Plow: N36 48.6784 W121 48.0991 KP 1.349
1552	Tow tensions to 50T. N36 48.7388 W121 48.2260 WD 21m KP 1.565 Vs 0.17 kts Plow: N36 48.6994 W121 48.1453 KP 1.428
1557	Plow passing AC 02. N36 48.7503 W121 48.2373 WD 21m KP 1.592 Vs 0.23 kts Plow: N36 48.7064 W121 48.1587 KP 1.453
1622	Plow passing AC 03. N36 48.7960 W121 48.2763 WD 20m KP 1.693 Vs 0.12 kts Plow: N36 48.7404 W121 48.2070 KP 1.548
1644	Vessel investigate A-frame roller problem. N36 48.8353 W121 48.3168 WD 20m KP 1.788 Vs 0.61 kts Plow: N36 48.7623 W121 48.2325 KP 1.603
1708	Resume plow operations. N36 48.8460 W121 48.3328 WD 21m KP 1.818 Vs 0.22 kts Plow: N36 48.7646 W121 48.2351 KP 1.609
1709	Vs to 0.1 kts_ Tow winch render set 45 T N36 48.8503 W121 48.3370 WD 21m KP 1.828 Vs 0.38 kts Plow: N36 48.7646 W121 48.2352 KP 0.000
1719	Vessel stop_ awaiting plow evaluation N36 48.8593 W121 48.3476 WD 21m KP 1.851 Vs 0.14 kts Plow: N36 48.7712 W121 48.2429 KP 1.626
1721	Vessel stop. Problem with plow hydraulic motor. Plow to reboot system. N36 48.8609 W121 48.3494 WD 20m KP 1.855 Vs 0.11 kts Plow: N36 48.7729 W121 48.2449 KP 0.000
1750	Commence preparations to recover plow. N36 48.8616 W121 48.3504 WD 20m KP 1.857 Vs 0.08 kts
1811	LCE pick up at 1500LBS tow winch set to haul in. N36 48.8615 W121 48.3505 WD 21m KP 1.857 Vs 0.05 kts Plow: N36 48.7733 W121 48.2454 KP 0.000
1812	Commence plow recovery. N36 48.8618 W121 48.3499 WD 20m KP 1.857 Vs 0.14 kts Plow: N36 48.7733 W121 48.2454 KP 1.631
1845	Plow recovery stopped. Investigate tow winch problem. N36 48.8586 W121 48.3467 WD 21m KP 1.850 Vs 0.12 kts Plow: N36 48.7743 W121 48.2466 KP 1.634
2359	Vessel holding position. Tow winch repair underway. N36 48.9365 W121 48.4360 WD 21m KP 2.045 Vs 0.24 kts

15 March 2007

Time	
0350	Tow winch repairs completed. Commence dead plow recovery. N36 48.9360 W121 48.4366 WD 21m KP 2.045 Vs 0.05 kts
0514	Plow off bottom N36 48.7963 W121 48.2599 WD 22m KP 1.677 Vs 0.30 kts
0516	Plow at waters edge. N36 48.8007 W121 48.2656 WD 19m KP 1.689 Vs 0.18 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0539	Observed wire rope engaged on plow share. N36 48.7998 W121 48.2652 WD 21m KP 1.687 Vs 0.03 kts
0601	Plow at vessel stern. Unable to safely remove engaged wire rope. N36 48.8129 W121 48.2818 WD 20m KP 1.722 Vs 0.03 kts
0614	Wire rope cut off plow share. N36 48.8104 W121 48.2840 WD 20m KP 1.721 Vs 0.08 kts
0617	Resume plow recovery. N36 48.8092 W121 48.2854 WD 20m KP 1.720 Vs 0.01 kts
0633	Plow on deck. N36 48.8090 W121 48.2858 WD 20m KP 1.721 Vs 0.02 kts
0747	Plow repairs underway. N36 48.8093 W121 48.2854 WD 22m KP 1.721 Vs 0.04 kts
0808	Cable unloaded from plow. N36 48.8091 W121 48.2857 WD 22m KP 1.721 Vs 0.04 kts
0823	Commence recovery of 100m of cable for inspection. N36 48.8092 W121 48.2856 WD 22m KP 1.721 Vs 0.01 kts
0913	100m of cable recovered No damage observed. N36 48.7662 W121 48.2303 WD 22m KP 1.606 Vs 0.02 kts
0953	IR testing completed with satisfactory results. N36 48.7656 W121 48.2300 WD 22m KP 1.605 Vs 0.07 kts
1134	Decision made recover all cable back to bore pipe and re-bury. Commence recovery of cable. N36 48.7661 W121 48.2300 WD 21m KP 1.606 Vs 0.06 kts
1312	Cable recovery complete. Vessel holding station. N36 48.6372 W121 47.9921 WD 20m KP 1.173 Vs 0.18 kts
1824	Dive vessel departs vicinity of borepipe. Resume cable recovery to ship landing position. N36 48.6376 W121 47.9925 WD 21m KP 1.174 Vs 0.02 kts
1837	Vessel standing by in position. N36 48.6302 W121 47.9715 WD 20m KP 1.140 Vs 0.08 kts
2206	Plow repairs completed. Commence plow launch operations. N36 48.6313 W121 47.9752 WD 21m KP 1.146 Vs 0.03 kts
2211	Cable loaded in plow. N36 48.6359 W121 47.9871 WD 21m KP 1.165 Vs 0.02 kts
2218	Plow off deck N36 48.6372 W121 47.9889 WD 21m KP 1.169 Vs 0.34 kts
2233	Plow in water N36 48.6454 W121 48.0132 WD 22m KP 1.208 Vs 0.20 kts
2235	Plow on bottom N36 48.6493 W121 48.0222 WD 22m KP 1.223 Vs 0.21 kts
2246	Plow experiencing electrical problems. Commence plow recovery. N36 48.6554 W121 48.0379 WD 22m KP 1.249 Vs 0.02 kts
2302	Plow off bottom N36 48.6485 W121 48.0207 WD 22m KP 1.220 Vs 0.13 kts
2304	Plow at water's edge. N36 48.6509 W121 48.0258 WD 22m KP 1.229 Vs 0.26 kts
2346	Plow on deck N36 48.6600 W121 48.0520 WD 21m KP 1.272 Vs 0.02 kts
2356	Vessel recovering cable back to landing position. N36 48.6601 W121 48.0516 WD 22m KP 1.271 Vs 0.00 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

16 March 2007

Time	
0104	IR test completed with satisfactory results. N36 48.6518 W121 48.0308 WD 22m KP 1.237 Vs 0.01 kts
0220	Commence recovery to start position. N36 48.6519 W121 48.0307 WD 22m KP 1.237 Vs 0.08 kts
0242	Recovery complete. Commence plow launch. N36 48.6328 W121 47.9774 WD 21m KP 1.150 Vs 0.10 kts
0257	Plow off deck N36 48.6367 W121 47.9897 WD 21m KP 1.169 Vs 0.01 kts
0314	Plow on bottom N36 48.6501 W121 48.0259 WD 22m KP 1.229 Vs 0.25 kts Plow: N36 48.6496 W121 48.0246 KP 1.227
0342	Plow moving on seabed. N36 48.6854 W121 48.1244 WD 21m KP 1.389 Vs 0.18 kts Plow: N36 48.6569 W121 48.0420 KP 1.256
0402	Plow passing AC 01. N36 48.7144 W121 48.1830 WD 22m KP 1.489 Vs 0.18 kts Plow: N36 48.6796 W121 48.1007 KP 1.353
0422	Plow passing AC02. N36 48.7518 W121 48.2371 WD 22m KP 1.594 Vs 0.32 kts Plow: N36 48.7060 W121 48.1585 KP 1.451
0440	Plow passing AC03. N36 48.7942 W121 48.2742 WD 21m KP 1.689 Vs 0.15 kts Plow: N36 48.7387 W121 48.2039 KP 1.542
0553	IR test completed with satisfactory results. N36 48.8878 W121 48.3785 WD 21m KP 1.921 Vs 0.24 kts Plow: N36 48.8336 W121 48.3160 KP 1.785
1459	LCE Tension spike observed to 4.5T N36 49.8314 W121 49.4850 WD 25m KP 4.581 Vs 0.49 kts
2056	Vessel entering Naval Ops Area. N36 50.7703 W121 50.5864 WD 27m KP 6.707 Vs 0.23 kts Plow: N36 50.7095 W121 50.5143 KP 6.551
2145	Plow passing AC04. N36 50.8931 W121 50.7328 WD 27m KP 7.016 Vs 0.34 kts Plow: N36 50.8323 W121 50.6592 KP 6.864
2359	Plow burying on track. Plow: W121 51.1152 N36 51.0575 KP 7.660

17 March 2007

Time	
0357	Plow passing AC05 N36 51.6206 W121 52.2733 WD 38m KP 9.672 Vs 0.33 kts Plow: N36 51.5852 W121 52.1805 KP 9.520
1039	Plow passing AC06. N36 53.0378 W121 57.0102 WD 34m KP 17.183 Vs 0.15 kts Plow: N36 53.0090 W121 56.9003 KP 17.012

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1341	Plow passing AC07. N36 53.1388 W121 57.7380 WD 34m KP 18.280 Vs 0.24 kts Plow: N36 53.1275 W121 57.6115 KP 18.091
1419	KM 48 at stern. N36 53.1304 W121 57.8889 WD 34m KP 18.504 Vs 0.21 kts Plow: N36 53.1308 W121 57.7704 KP 18.328
1748	Plow exiting Naval Operations Area. N36 53.1349 W121 58.7667 WD 43m KP 19.808 Vs 0.27 kts Plow: N36 53.1344 W121 58.6201 KP 19.590
2237	KM45 at stern. N36 53.1385 W121 59.9097 WD 48m KP 21.506 Vs 0.26 kts Plow: N36 53.1389 W121 59.7602 KP 21.284
2359	Plow burying on track. Plow: N36 53.1406 W122 00.0990 KP 21.788

18 March 2007

Time	
0037	KM 44 at stern N36 53.1436 W122 00.5851 WD 51m KP 22.510 Vs 0.80 kts Plow: N36 53.1424 W122 00.4235 KP 22.270
0119	KM 43 at stern N36 53.1465 W122 01.2612 WD 54m KP 23.515 Vs 0.75 kts Plow: N36 53.1451 W122 01.1018 KP 23.278
0205	KM 42 at stern N36 53.1483 W122 01.9381 WD 58m KP 24.518 Vs 0.56 kts Plow: N36 53.1482 W122 01.7766 KP 24.280
0217	Plow passing AC08 N36 53.1202 W122 02.0603 WD 60m KP 24.707 Vs 0.52 kts Plow: N36 53.1435 W122 01.9006 KP 24.467
0254	KM 41 at stern N36 53.0038 W122 02.5886 WD 64m KP 25.521 Vs 0.76 kts
0335	KM 40 at stern N36 52.8659 W122 03.2382 WD 70m KP 26.519 Vs 0.90 kts
0416	Plow passing AC09 N36 52.7409 W122 03.7422 WD 75m KP 27.302 Vs 0.50 kts Plow: N36 52.7980 W122 03.5650 KP 27.021
0510	Plow passing MB 3 NM limit N36 52.3962 W122 04.4507 WD 83m KP 28.532 Vs 0.83 kts Plow: N36 52.4794 W122 04.2634 KP 28.214
1241	Plow stop at splicing position N36 51.1759 W122 07.1118 WD 102m KP 33.086 Vs 0.08 kts Plow: N36 51.2637 W122 06.9270 KP 32.767
1244	Vessel move 100 meters ahead safety margin N36 51.1743 W122 07.1147 WD 102m KP 33.091 Vs 0.11 kts Plow: N36 51.2646 W122 06.9251 KP 32.764
1305	Vessel stopped in splicing position N36 51.1503 W122 07.1701 WD 101m KP 33.185 Vs 0.01 kts Plow: N36 51.2647 W122 06.9251 KP 32.764

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1315	Cable cut on highway N36 51.1499 W122 07.1696 WD 102m KP 33.184 Vs 0.03 kts Plow: N36 51.2647 W122 06.9251 KP 32.764
1330	Commence transfer of cable from tank2 to tank3 N36 51.1509 W122 07.1704 WD 101m KP 33.185 Vs 0.05 kts
1425	OTDR test complete with satisfactory results. 33.514 km N36 51.1443 W122 07.1672 WD 101m KP 33.186 Vs 0.02 kts
1710	Complete cable transfer N36 51.1201 W122 07.1459 WD 101m KP 33.181 Vs 0.01 kts
1715	End of transferred cable to jointing area. N36 51.1233 W122 07.1480 WD 101m KP 33.181 Vs 0.02 kts
1716	Cable end preparation complete N36 51.1498 W122 07.1680 WD 101m KP 33.182 Vs 0.10 kts
2000	Cable ends linked N36 51.1468 W122 07.1694 WD 102m KP 33.187 Vs 0.03 kts
2135	Commence fusing fibers N36 51.1461 W122 07.1705 WD 101m KP 33.189 Vs 0.02 kts
2320	Fiber fusion complete N36 51.1475 W122 07.1698 WD 102m KP 33.187 Vs 0.02 kts

19 March 2007

Time	
0046	Fiber coiling completed. N36 51.1475 W122 07.1698 WD 101m KP 33.187 Vs 0.02 kts
0101	Commence mold operation. N36 51.1479 W122 07.1700 WD 102m KP 33.187 Vs 0.09 kts
0434	Commence X-ray. N36 51.1477 W122 07.1700 WD 101m KP 33.187 Vs 0.03 kts
0612	OTDR testing complete with satisfactory results. Commence armoring. N36 51.1477 W122 07.1699 WD 101m KP 33.187 Vs 0.03 kts
0810	Joint complete. Prepare to resume plow operations. N36 51.1479 W122 07.1702 WD 101m KP 33.187 Vs 0.03 kts
0842	Commence setting scopes. N36 51.1561 W122 07.1636 WD 101m KP 33.171 Vs 0.18 kts
0906	Plow moving on seabed. N36 51.1823 W122 07.1081 WD 101m KP 33.075 Vs 0.13 kts Plow: N36 51.2666 W122 06.9208 KP 32.756
0952	Joint SJ1 at stern. N36 51.1087 W122 07.2652 WD 103m KP 33.346 Vs 0.27 kts
1011	IR test performed with satisfactory results N36 51.0790 W122 07.3311 WD 104m KP 33.458 Vs 0.17 kts
1054	SJ1 at plow N36 51.0067 W122 07.4920 WD 106m KP 33.732 Vs 0.28 kts Plow: N36 51.0929 W122 07.3018 KP 33.407
1450	Plow passing AC10. N36 50.6269 W122 08.2988 WD 113m KP 35.122 Vs 0.23 kts Plow: N36 50.7201 W122 08.1173 KP 34.802
1556	Plow passing AC11. N36 50.5237 W122 08.4980 WD 116m KP 35.473 Vs 0.37 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

	Plow: N36 50.6088 W122 08.3126 KP 35.158
1704	Plow passing AC12. N36 50.4875 W122 08.7563 WD 118m KP 35.859 Vs 0.24 kts Plow: N36 50.5311 W122 08.5472 KP 35.536
1756	Plow passing AC13 N36 50.4409 W122 08.9475 WD 123m KP 36.153 Vs 0.16 kts Plow: N36 50.4943 W122 08.7463 KP 35.840
1840	Vessel stop. Plow at plow up position. Commence plow recovery. N36 50.3637 W122 09.0883 WD 130m KP 36.403 Vs 0.06 kts
1939	Plow off bottom N36 50.4424 W122 08.8989 WD 123m KP 36.087 Vs 0.01 kts Plow: N36 50.4430 W122 08.8977 KP 36.084
2002	Plow at surface N36 50.4118 W122 08.9796 WD 125m KP 36.219 Vs 0.06 kts Plow: N36 50.4125 W122 08.9783 KP 36.217
2006	Wire rope engaged in plow share. N36 50.4125 W122 08.9787 WD 126m KP 36.217 Vs 0.03 kts
2053	Engaged wire rope cut away from plow share. N36 50.4046 W122 08.9940 WD 126m KP 36.244 Vs 0.01 kts
2055	Plow on deck N36 50.4004 W122 08.9906 WD 126m KP 36.243 Vs 0.03 kts
2133	Commence surface lay operations. N36 50.4112 W122 08.9578 WD 125m KP 36.190 Vs 0.08 kts
2152	Vessel passing AC14. N36 50.3596 W122 09.0974 WD 131m KP 36.419 Vs 0.40 kts
2228	Tank 3 to Tank 2 transfer complete. N36 50.2628 W122 09.3731 WD 156m KP 36.866 Vs 0.45 kts
2235	Joint SJ2 at stern. N36 50.2438 W122 09.4287 WD 164m KP 36.956 Vs 0.39 kts
2238	Vessel passing AC15. N36 50.2358 W122 09.4512 WD 171m KP 36.992 Vs 0.42 kts
2249	Vessel passing AC16. N36 50.2072 W122 09.5312 WD 191m KP 37.122 Vs 0.40 kts
2305	Vessel passing AC17. N36 50.1570 W122 09.6380 WD 214m KP 37.122 Vs 0.40 kts
2352	Vessel passing AC18 N36 49.9516 W122 09.9110 WD 303m KP 37.864 Vs 0.40 kts

20 March 2007

Time	
0008	KM 28 over stern. N36 49.8756 W122 10.0107 WD 309m KP 38.064 Vs 0.44 kts
0030	Vessel passing AC19 N36 49.7481 W122 10.0872 WD 310m KP 38.323 Vs 0.41 kts
0032	Plow in water and vessel moving ahead N36 47.8159 W122 11.3609 WD 455m KP 42.451 Vs 0.09 kts
0117	Vessel passing AC 20 N36 49.4617 W122 10.2205 WD 332m KP 38.888 Vs 0.39 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0245	Vessel passing AC 21 N36 48.8927 W122 10.3824 WD 370m KP 39.967 Vs 0.41 kts
0309	Vessel passing AC22 N36 48.7372 W122 10.4402 WD 383m KP 40.265 Vs 0.42 kts
0334	Vessel passing AC23 N36 48.6061 W122 10.5598 WD 390m KP 40.556 Vs 0.42 kts
0434	Vessel passing AC24 N36 48.3417 W122 10.9199 WD 429m KP 41.276 Vs 0.38 kts
0615	Vessel passing AC25 N36 47.8513 W122 11.3472 WD 452m KP 42.383 Vs 0.20 kts
0629	Vessel stop. In position for plow launch N36 47.8434 W122 11.3498 WD 452m KP 42.398 Vs 0.19 kts
0703	Commence plow launch operations. N36 47.8425 W122 11.3472 WD 453m KP 42.398 Vs 0.02 kts
0719	Plow off deck. N36 47.8322 W122 11.3516 WD 453m KP 42.418 Vs 0.04 kts
0733	Plow in water N36 47.8131 W122 11.3612 WD 455m KP 42.457 Vs 0.08 kts PLOW: N36 47.8142 W122 11.3606 KP 42.454
0740	Plow electrical failure. Commence recovery. N36 47.8055 W122 11.3628 WD 454m KP 42.470 Vs 0.04 kts PLOW: N36 47.8064 W122 11.3621 KP 42.468
0755	Recovery suspended for troubleshooting. N36 47.8119 W122 11.3615 WD 455m KP 42.458 Vs 0.02 kts PLOW: N36 47.8129 W122 11.3609 KP 42.456
0846	Resume plow recovery. N36 47.8123 W122 11.3615 WD 456m KP 42.458 Vs 0.04 kts PLOW: N36 47.8134 W122 11.3609 KP 42.456
0936	Plow on deck N36 47.8402 W122 11.3482 WD 454m KP 42.402 Vs 0.00 kts PLOW: N36 47.8412 W122 11.3476 KP 42.400
1012	IR test completed with satisfactory results. N36 47.8827 W122 11.3274 WD 450m KP 42.319 Vs 0.02 kts PLOW: N36 47.8837 W122 11.3269 KP 42.317
1450	Repairs complete. Commence plow launch operations. N36 47.8854 W122 11.3386 WD 450m KP 42.325 Vs 0.06 kts PLOW: N36 47.8866 W122 11.3383 KP 42.323
1459	Plow off deck N36 47.8754 W122 11.3441 WD 450m KP 42.344 Vs 0.05 kts PLOW: N36 47.8764 W122 11.3437 KP 42.342
1519	Plow in water N36 47.8548 W122 11.3545 WD 452m KP 42.383 Vs 0.29 kts PLOW: N36 47.8560 W122 11.3542 KP 42.383
1624	Plow on bottom N36 47.5774 W122 11.4743 WD 465m KP 42.923 Vs 0.23 kts PLOW: N36 47.5821 W122 11.4733 KP 42.915
1757	Scopes set. N36 47.0190 W122 11.7373 WD 510m KP 44.009 Vs 0.20 kts PLOW: N36 47.5821 W122 11.4733 KP 42.915

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1815	Plow moving on seabed N36 46.9618 W122 11.7772 WD 515m KP 44.121 Vs 0.31 kts PLOW: N36 47.5762 W122 11.4762 KP 42.927
1839	KM 5 over stern N36 46.8473 W122 11.8057 WD 527m KP 44.336 Vs 0.34 kts PLOW: N36 47.4727 W122 11.5247 KP 43.131
1848	Cable end to jointing shop for end seal installation. N36 46.8032 W122 11.8230 WD 532m KP 44.421 Vs 0.32 kts PLOW: N36 47.4314 W122 11.5431 KP 43.213
1918	Plow passing AC26 N36 46.6478 W122 11.7675 WD 546m KP 44.666 Vs 0.54 kts PLOW: N36 47.3060 W122 11.5917 KP 43.455
2016	High currents pushing cable to west. Vessel stop to ensure cable correctly positioned. N36 46.3409 W122 11.7422 WD 585m KP 45.233 Vs 0.18 kts PLOW: N36 47.0340 W122 11.6433 KP 43.966
2041	Resume burial. High cable tensions must be maintained to keep cable positioned in plow bellmouth due to currents. ASN rep advised. N36 46.3484 W122 11.7390 WD 584m KP 45.220 Vs 0.12 kts PLOW: N36 47.0367 W122 11.6429 KP 43.961
2055	Plow moving on seabed. N36 46.3134 W122 11.7311 WD 588m KP 45.286 Vs 0.37 kts PLOW: N36 47.0360 W122 11.6430 KP 43.963
2149	Plow passing Transition SAL/SA waypoint. No cable markings observed. N36 45.9970 W122 11.7615 WD 637m KP 45.782 Vs 0.38 kts PLOW: N36 46.7356 W122 11.6702 KP 44.519
2158	Plow passing AC27. N36 45.9356 W122 11.7812 WD 645m KP 45.877 Vs 0.34 kts PLOW: N36 46.6835 W122 11.6770 KP 44.619
2320	Plow passing AC28 N36 45.3838 W122 11.3024 WD 739m KP 47.108 Vs 1.36 kts PLOW: N36 46.1114 W122 11.5753 KP 45.690

21 March 2007

Time	
0032	Plow passing AC29 N36 44.7698 W122 11.0873 WD 760m KP 48.264 Vs 0.63 kts Plow: N36 45.5103 W122 11.2964 KP 46.879
0117	KM17 at stern N36 44.4138 W122 11.0642 WD 772m KP 48.922 Vs 0.50 kts Plow: N36 45.1687 W122 11.2225 KP 47.521
0121	Plow DOB sensors malfunctions. Continue burial. Burial depth will be verified by ROV. N36 44.3843 W122 11.0571 WD 773m KP 48.976 Vs 0.46 kts Plow: N36 45.1396 W122 11.2164 KP 47.575
0144	KM56 at stern N36 44.2398 W122 11.0233 WD 780m KP 49.243 Vs 0.23 kts Plow: N36 44.9983 W122 11.1865 KP 47.841

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0210	Plow passing AC30 N36 44.1224 W122 11.0675 WD 787m KP 49.460 Vs 0.53 kts Plow: N36 44.8935 W122 11.1664 KP 48.037
0336	KM16 at stern N36 43.9279 W122 11.1899 WD 800m KP 49.823 Vs 0.17 kts Plow: N36 44.6778 W122 11.1624 KP 48.436
0454	Cable end seal completed. N36 43.7978 W122 11.1906 WD 806m KP 50.064 Vs 0.19 kts
0501	Vessel speed increased to 0.2 kts N36 43.7872 W122 11.1915 WD 807m KP 50.083 Vs 0.17 kts Plow: N36 44.5359 W122 11.1674 KP 48.698
0636	KM15 at stern N36 43.3124 W122 11.1988 WD 840m KP 50.962 Vs 0.79 kts Plow: N36 44.0425 W122 11.1812 KP 49.611
0755	Plow burial complete. Commence plow recovery. N36 42.8545 W122 11.2106 WD 885m KP 51.809 Vs 0.38 kts Plow: N36 43.4482 W122 11.1950 KP 50.711
0922	Plow off bottom N36 43.1720 W122 11.2001 WD 853m KP 51.222 Vs 0.17 kts Plow: N36 43.4424 W122 11.1952 KP 50.721
1020	Cable end at stern. CC 52279. Commence ground rope payout. N36 42.9134 W122 11.1998 WD 0m KP 51.699 Vs 0.23 kts Plow: N36 42.9146 W122 11.2004 KP 51.697
1240	Plow at water's edge. N36 42.3365 W122 11.2075 WD 947m KP 52.767 Vs 0.11 kts Plow: N36 42.3377 W122 11.2078 KP 52.765
1246	Plow on deck N36 42.3367 W122 11.2041 WD 955m KP 52.766 Vs 0.09 kts
1407	Ground rope weight cut away on stern N36 42.1813 W122 11.2185 WD 1002m KP 53.054 Vs 0.28 kts
1410	Enroute HDD site for PLIB. N36 42.1690 W122 11.2204 WD 0m KP 53.077 Vs 0.39 kts Plow: N36 42.3371 W122 11.2095 KP 52.766
1728	Vessel in position for PLIB N36 48.6424 W121 48.0946 WD 16m KP 1.315 Vs 0.14 kts
1730	ROV off deck N36 48.6423 W121 48.0947 WD 16m KP 1.315 Vs 0.20 kts
1736	ROV in water N36 48.6424 W121 48.0944 WD 23m KP 1.315 Vs 0.21 kts ROV: N36 42.4644 W122 11.2817 KP 52.532
1739	ROV on the bottom N36 48.6434 W121 48.0945 WD 16m KP 1.316 Vs 0.19 kts ROV: N36 48.6511 W121 48.0960 KP 46.917
1829	ROV on cable N36 48.6405 W121 48.0330 WD 14m KP 1.231 Vs 0.20 kts ROV: N36 48.6474 W121 48.0267 KP 46.941
1840	ROV on Cable N36 48.6488 W121 48.0024 WD 21m KP 1.203 Vs 0.25 kts ROV: N36 48.6488 W121 48.0024 KP 1.226

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1907	Commence jetting passes N36 48.6445 W121 48.0252 WD 14m KP 1.223 Vs 0.20 kts ROV: N36 48.6598 W121 48.0330 KP 1.246
2027	Completed jetting pass 2 N36 48.6437 W121 48.0198 WD 15m KP 1.215 Vs 0.24 kts ROV: N36 48.6560 W121 48.0228 KP 1.229
2103	Completed jetting pass 3 N36 48.6019 W121 47.9111 WD 19m KP 1.036 Vs 0.10 kts ROV: N36 48.6120 W121 47.9188 KP 1.055
2115	Commence inspection pas N36 48.6014 W121 47.9102 WD 19m KP 1.035 Vs 0.23 kts ROV: N36 48.6148 W121 47.9168 KP 1.054
2141	Inspection complete. Commence ROV recovery N36 48.6376 W121 48.0139 WD 21m KP 1.203 Vs 0.08 kts ROV: N36 48.6452 W121 48.0219 KP 1.219
2141	ROV out of water N36 48.6376 W121 48.0140 WD 14m KP 1.203 Vs 0.12 kts ROV: N36 48.6454 W121 48.0216 KP 1.219
2146	ROV on Deck N36 48.6375 W121 48.0358 WD 23m KP 1.232 Vs 0.51 kts ROV: N36 48.6456 W121 48.0421 KP 1.247
2224	Depart site for PLIB site 3. N36 48.6363 W121 48.9625 WD 26m KP 2.178 Vs 11.24 kts ROV: N36 48.6337 W121 48.9440 KP 2.156

22 March 2007

Time	
0000	Arrival PLIB site 3. Prepare for ROV launch. N36 47.5333 W122 11.5583 WD 461m KP 43.044 Vs 0.17 kts
0105	ROV off deck N36 47.5750 W122 11.4876 WD 457m KP 42.935 Vs 0.07 kts
0110	ROV in water N36 47.5753 W122 11.4875 WD 456m KP 42.934 Vs 0.13 kts ROV: N36 47.5859 W122 11.4866 KP 42.916
0127	ROV on Bottom N36 47.5747 W122 11.4876 WD 457m KP 42.936 Vs 0.12 kts ROV: N36 47.5649 W122 11.4884 KP 42.953
0139	ROV positioning on plow trench and cable N36 47.5830 W122 11.4821 WD 457m KP 42.918 Vs 0.11 kts ROV: N36 47.5743 W122 11.4601 KP 42.921
0140	ROV on cable track N36 47.5853 W122 11.4791 WD 456m KP 42.913 Vs 0.14 kts ROV: N36 47.5777 W122 11.4634 KP 42.918
0147	Start jetting pass 1 N36 47.5901 W122 11.4768 WD 455m KP 42.903 Vs 0.11 kts ROV: N36 47.5767 W122 11.4615 KP 42.918
0254	Start jetting pass 2 N36 47.7483 W122 11.3802 WD 449m KP 42.578 Vs 0.20 kts ROV: N36 47.7474 W122 11.3748 KP 42.577

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0403	Start jetting pass 3 N36 47.5825 W122 11.4626 WD 454m KP 42.909 Vs 0.03 kts ROV: N36 47.5732 W122 11.4659 KP 42.926
0544	End of jetting pass 3 N36 47.7589 W122 11.3654 WD 447m KP 42.552 Vs 0.05 kts ROV: N36 47.7478 W122 11.3689 KP 42.573
0652	Commence inspection pass site 3. N36 47.5718 W122 11.4550 WD 453m KP 42.924 Vs 0.09 kts ROV: N36 47.5735 W122 11.4633 KP 42.925
0738	Inspection complete. Commence Inspection site 2 (Smooth Ridge) N36 47.7482 W122 11.3706 WD 446m KP 42.574 Vs 0.33 kts ROV: N36 47.7474 W122 11.3637 KP 42.571
1431	Joint SJ2 visible. N36 50.2209 W122 09.4562 WD 153m KP 37.009 Vs 0.81 kts ROV: N36 50.2258 W122 09.4592 KP 37.010
1507	Wire rope under cable. N36 50.3950 W122 08.9923 WD 117m KP 36.250 Vs 0.07 kts ROV: N36 50.3941 W122 08.9939 KP 36.252
1529	Cable into 1m plow burial. N36 50.4517 W122 08.8540 WD 0m KP 36.019 Vs 0.31 kts ROV: N36 50.4571 W122 08.8490 KP 36.008
1543	ROV returning to wire rope crossing for further inspection. N36 50.4443 W122 08.8737 WD 114m KP 36.051 Vs 0.37 kts ROV: N36 50.4431 W122 08.8843 KP 36.066
1810	Survey complete. Recover ROV and install cutting tool. N36 50.3988 W122 08.9913 WD 118m KP 36.245 Vs 0.06 kts ROV: N36 50.3944 W122 08.9911 KP 36.248
1817	ROV off seabed N36 50.3996 W122 08.9836 WD 117m KP 36.234 Vs 0.07 kts ROV: N36 50.3930 W122 08.9823 KP 36.238
1826	ROV on deck N36 50.4007 W122 08.9841 WD 117m KP 36.234 Vs 0.10 kts ROV: N36 50.3949 W122 08.9720 KP 36.222
1902	Cutting tool installed. ROV off deck. N36 50.3983 W122 08.9905 WD 118m KP 36.244 Vs 0.06 kts ROV: N36 50.3926 W122 08.9785 KP 36.233
1913	ROV on Bottom N36 50.3971 W122 08.9979 WD 118m KP 36.255 Vs 0.08 kts ROV: N36 50.3939 W122 08.9947 KP 36.254
1927	1st cut wire rope made. N36 50.3984 W122 08.9920 WD 118m KP 36.246 Vs 0.03 kts ROV: N36 50.3923 W122 09.0004 KP 36.263
1927	Preparing for ROV recovery due to deteriorating weather N36 50.3980 W122 08.9913 WD 117m KP 36.246 Vs 0.12 kts ROV: N36 50.3926 W122 09.0004 KP 36.262
1930	ROV on surface N36 50.3981 W122 08.9892 WD 118m KP 36.243 Vs 0.05 kts ROV: N36 50.3887 W122 08.9826 KP 36.242
1930	Guard boat released N36 50.3987 W122 08.9885 WD 117m KP 36.241 Vs 0.06 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

	ROV: N36 50.3879 W122 08.9855 KP 36.246
1940	ROV out of water N36 50.3987 W122 08.9889 WD 117m KP 36.242 Vs 0.12 kts ROV: N36 50.3879 W122 08.9855 KP 36.246
1945	ROV on deck N36 50.3986 W122 08.9886 WD 117m KP 36.242 Vs 0.08 kts ROV: N36 50.3879 W122 08.9855 KP 36.246
1946	Commence preparation to get underway. N36 50.3986 W122 08.9883 WD 117m KP 36.241 Vs 0.05 kts
2007	Commence transit San Francisco. N36 50.5226 W122 09.2689 WD 123m KP 36.532 Vs 5.24 kts

28 March 2007

Time	
1610	Commenced end prep TRF tail.
1658	Departed San Francisco.
2150	TRF tail end preparation complete.
2359	Enroute TRF location to resume operations.

29 March 2007

Time	
0312	Arrive Monterey Bay cable grounds. Commence ROV launch preparations.
0357	ROV off deck. N36 42.2436 W122 11.1645 WD 959m Vs 0.18 kts ROV: N36 42.2431 W122 11.1639
0405	ROV in water. N36 42.2435 W122 11.1641 WD 959m Vs 0.13 kts ROV: N36 42.2432 W122 11.1637
0451	ROV on bottom. N36 42.2439 W122 11.1510 WD 960m Vs 0.09 kts ROV: N36 42.2400 W122 11.1310
0719	ROV on ground rope. N36 42.2188 W122 11.2590 WD 990m Vs 0.22 kts ROV: N36 42.2117 W122 11.2157
0929	Recovery rope deployed. N36 42.2733 W122 11.1889 WD 956m Vs 0.12 kts ROV: N36 42.2576 W122 11.1983
1133	ROV Hooks recovery rope to ground rope. ROV moving off for recovery. N36 42.2559 W122 11.2050 WD 964m Vs 0.06 kts ROV: N36 42.2194 W122 11.2275
1219	ROV on deck. Commence rope recovery. N36 42.2563 W122 11.2051 WD 970m Vs 0.15 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1314	Ground rope end on bow. N36 42.2633 W122 11.2087 WD 962m Vs 0.10 kts
1539	Cable end seal on bow. N36 42.8427 W122 11.1738 WD 877m KP 51.829 Vs 0.13 kts
1620	Cable end seal cut off on highway. N36 42.8931 W122 11.1761 WD 875m KP 51.736 Vs 0.09 kts
1639	IR test completed with satisfactory result. N36 42.9124 W122 11.1789 WD 874m KP 51.701 Vs 0.02 kts
1710	Cable marked for trimming. N36 43.0738 W122 11.2020 WD 857m KP 51.403 Vs 0.24 kts
1735	Cable trimmed on highway to ensure proper placement of TRF on seabed. 365m removed.
1743	Cable end to jointers. Commence jointing SJ3.
2240	Cable end preparation complete. Commence fiber fusion.

30 March 2007

Time	
0238	Fusion and coiling complete - joint SJ3.
0434	Testing completed with satisfactory results.
0750	Mold complete - joint SJ3.
0930	X-rays completed with satisfactory results - joint SJ3.
1212	Joint SJ3 complete.
1237	Preparing for TRF launch. Paying out cable bight. N36 43.0750 W122 11.1987 WD 858m KP 51.401 Vs 0.10 kts
1327	Cable removed from port drum. Tension on hack line. N36 43.0698 W122 11.1979 WD 858m KP 51.411 Vs 0.04 kts
1343	TRF outboard hold downs released. N36 43.0699 W122 11.1979 WD 858m KP 51.410 Vs 0.08 kts
1407	Joint SJ3 on bow. N36 43.0625 W122 11.1976 WD 859m KP 51.424 Vs 0.14 kts
1432	Cable tension on slip line. N36 43.0458 W122 11.1990 WD 861m KP 51.455 Vs 0.10 kts
1519	Cable bight over bow. N36 43.0366 W122 11.1979 WD 862m KP 51.471 Vs 0.09 kts
1533	TRF released from hold downs. Commence lowering. N36 43.0360 W122 11.1988 WD 862m KP 51.473 Vs 0.15 kts
1537	TRF in water. N36 43.0362 W122 11.1987 WD 862m KP 51.473 Vs 0.12 kts
1608	Tug DELTA CAPTAIN alongside TRF to remove steadying lines. N36 43.0208 W122 11.1982 WD 864m KP 51.501 Vs 0.10 kts
1621	Tug DELTA CAPTAIN unable to remove lines. Lines will be married to lowering bridle and recovered by ROV. N36 43.0212 W122 11.1990 WD 864m KP 51.500 Vs 0.09 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1626	Commence move down track and payout of TRF. N36 43.0212 W122 11.1981 WD 864m KP 51.500 Vs 0.06 kts ROV: N36 43.0643 W122 11.2013 KP 0.000
1728	ROV off deck for TRF landing. N36 42.8342 W122 11.2043 WD 880m KP 51.846 Vs 0.25 kts ROV: N36 42.8095 W122 11.2208 KP 51.892
1733	ROV in the water N36 42.8174 W122 11.2052 WD 881m KP 51.877 Vs 0.16 kts ROV: N36 42.8176 W122 11.2118 KP 51.877
1846	TRF visible on ROV sonar. N36 42.6548 W122 11.2093 WD 896m KP 52.178 Vs 0.10 kts ROV: N36 42.7207 W122 11.2605
1943	ROV at TRF. TRF 14m from seabed. N36 42.6686 W122 11.2092 WD 895m KP 52.153 Vs 0.06 kts ROV: N36 42.7412 W122 11.2253
1955	TRF on seabed. N36 42.6705 W122 11.2090 WD 895m KP 52.149 Vs 0.14 kts ROV: N36 42.7400 W122 11.2216 KP 52.020
2118	ROV cutting tag line. N36 42.7115 W122 11.2085 WD 890m KP 52.073 Vs 0.03 kts ROV: N36 42.7422 W122 11.2123 KP 0.000
2250	ROV makes first bridle cut. N36 42.7335 W122 11.2083 WD 888m KP 52.033 Vs 0.06 kts ROV: N36 42.7409 W122 11.2142
2317	ROV makes bridle cut. N36 42.7332 W122 11.2080 WD 889m KP 52.033 Vs 0.01 kts ROV: N36 42.7452 W122 11.2133
2350	ROV makes bridle cut. N36 42.7332 W122 11.2085 WD 889m KP 52.033 Vs 0.05 kts ROV: N36 42.7415 W122 11.2103

31 March 2007

Time	
0026	Last bridle cut completed. N36 42.7335 W122 11.2082 WD 888m KP 52.033 Vs 0.05 kts ROV: N36 42.7427 W122 11.2065
0054	Final cut. Lowering rigging cut away. N36 42.7333 W122 11.2071 WD 888m KP 52.033 Vs 0.09 kts ROV: N36 42.7512 W122 11.2116
0059	Commence recovery of cut away rigging and ROV recovery. N36 42.7333 W122 11.2077 WD 888m KP 52.033 Vs 0.10 kts ROV: N36 42.7487 W122 11.2121
0106	ROV off bottom N36 42.7294 W122 11.1983 WD 889m KP 52.040 Vs 0.32 kts ROV: N36 42.7095 W122 11.2462
0122	ROV out of water N36 42.6971 W122 11.1615 WD 890m KP 52.099 Vs 0.09 kts ROV: N36 42.6618 W122 11.1989

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0127	ROV on deck N36 42.6859 W122 11.1460 WD 890m KP 52.119 Vs 0.06 kts
0152	Lowering rigging at bow. N36 42.6682 W122 11.2490 WD 895m KP 52.154 Vs 0.32 kts
0204	Lowering rigging onboard. N36 42.6364 W122 11.3116 WD 902m KP 52.215 Vs 0.07 kts
0244	Vessel in position for PLIB. ROV tracks being installed. N36 42.7407 W122 11.2149 WD 886m KP 52.020 Vs 0.04 kts
0358	ROV off deck for PLIB N36 42.7418 W122 11.2161 WD 886m KP 52.018 Vs 0.15 kts
0415	Commence ROV recovery to reconfigure TSS. N36 42.7421 W122 11.2157 WD 886m KP 52.017 Vs 0.01 kts
0425	ROV on deck N36 42.7422 W122 11.2161 WD 886m KP 52.017 Vs 0.03 kts
0535	ROV off deck for PLIB. N36 42.7505 W122 11.2179 WD 886m KP 52.002 Vs 0.23 kts
0540	ROV in the water. N36 42.7548 W122 11.2183 WD 886m KP 51.993 Vs 0.04 kts
0600	ROV on bottom. N36 42.7600 W122 11.2186 WD 886m KP 51.984 Vs 0.07 kts ROV: N36 42.7689 W122 11.2110 KP 51.967
0617	Commence first inspection pass. N36 42.7455 W122 11.2021 WD 886m KP 52.010 Vs 0.02 kts ROV: N36 42.7505 W122 11.1937 KP 52.001
0631	ROV at joint SJ3. N36 42.7922 W122 11.2008 WD 882m KP 51.924 Vs 0.23 kts ROV: N36 42.7941 W122 11.1934 KP 51.920
0821	ROV on plow trench N36 43.4644 W122 11.1928 WD 821m KP 50.681 Vs 0.42 kts ROV: N36 43.4643 W122 11.1919 KP 50.681
0825	Commence jetting pass 1. N36 43.4684 W122 11.1947 WD 819m KP 50.673 Vs 0.01 kts ROV: N36 43.4695 W122 11.1953 KP 50.671
1205	ROV at TRF. End jetting pass 1. N36 42.7316 W122 11.2114 WD 886m KP 52.036 Vs 0.05 kts ROV: N36 42.7489 W122 11.2015 KP 52.004
1212	Commence jetting pass 2. N36 42.7319 W122 11.2124 WD 885m KP 52.036 Vs 0.06 kts ROV: N36 42.7553 W122 11.2046 KP 51.992
1631	Weather conditions deteriorating rapidly. Abort jetting pass. Commence ROV recovery. N36 43.4131 W122 11.1930 WD 823m KP 50.776 Vs 0.13 kts ROV: N36 43.4283 W122 11.1870 KP 50.747
1635	ROV off bottom N36 43.4123 W122 11.1931 WD 822m KP 50.777 Vs 0.10 kts ROV: N36 43.4207 W122 11.1843 KP 50.761
2041	Weather improved. ROV off deck for resumption of jetting. N36 43.4143 W122 11.2101 WD 823m KP 50.773 Vs 0.12 kts ROV: N36 43.4370 W122 11.1902 KP 50.731

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

2047	ROV in water N36 43.4144 W122 11.2108 WD 824m KP 50.774 Vs 0.14 kts ROV: N36 43.4370 W122 11.1902 KP 50.731
2105	ROV on bottom N36 43.4146 W122 11.2121 WD 824m KP 50.773 Vs 0.14 kts ROV: N36 43.4320 W122 11.2005 KP 50.741
2112	ROV lining up on cable N36 43.4135 W122 11.2011 WD 824m KP 50.774 Vs 0.03 kts ROV: N36 43.4340 W122 11.1854 KP 50.736
2115	Resume jetting pass 2. N36 43.4138 W122 11.2017 WD 822m KP 50.775 Vs 0.19 kts ROV: N36 43.4428 W122 11.1874 KP 50.720
2121	End jetting pass 2. N36 43.4340 W122 11.2025 WD 822m KP 50.737 Vs 0.28 kts ROV: N36 43.4646 W122 11.1850 KP 50.680
2141	Commence jetting pass 3. N36 43.4424 W122 11.2048 WD 820m KP 50.722 Vs 0.07 kts ROV: N36 43.4735 W122 11.1851 KP 50.664
2359	ROV jetting on pass 3. N36 42.9763 W122 11.2072 WD 866m KP 51.584 Vs 0.24 kts ROV: N36 42.9921 W122 11.1910 KP 51.554

01 April 2007

Time	
0103	End jetting pass 3. N36 42.7401 W122 11.2092 WD 884m KP 52.020 Vs 0.15 kts ROV: N36 42.7548 W122 11.1933 KP 51.993
0136	Commence final inspection pass. N36 42.7444 W122 11.2027 WD 885m KP 52.012 Vs 0.33 kts ROV: N36 42.7626 W122 11.1967 KP 51.978
0703	Inspection pass complete. Commence ROV recovery. N36 45.1255 W122 11.2363 WD 770m KP 47.596 Vs 0.21 kts ROV: N36 45.1438 W122 11.2234 KP 47.566
0706	ROV off bottom N36 45.1260 W122 11.2366 WD 769m KP 47.595 Vs 0.16 kts ROV: N36 45.1424 W122 11.2231 KP 47.569
0727	ROV on deck N36 45.1257 W122 11.2367 WD 770m KP 47.596 Vs 0.05 kts
0929	ROV off deck to retrieve marker beacons from seabed. N36 42.6717 W122 11.1926 WD 891m KP 52.147 Vs 0.07 kts
0932	ROV in water N36 42.6708 W122 11.1918 WD 890m KP 52.148 Vs 0.02 kts ROV: N36 42.6833 W122 11.1683 KP 52.125
0948	ROV on bottom N36 42.6709 W122 11.1910 WD 891m KP 52.148 Vs 0.10 kts ROV: N36 42.6933 W122 11.1680 KP 52.106
1008	ROV retrieves first beacon N36 42.6714 W122 11.1915 WD 890m KP 52.147 Vs 0.02 kts ROV: N36 42.6740 W122 11.1612 KP 52.142

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1103	ROV retrieves second beacon N36 42.6540 W122 11.2211 WD 893m KP 52.180 Vs 0.06 kts ROV: N36 42.6504 W122 11.2097 KP 52.186
1131	All beacons recovered. Commence ROV recovery. N36 42.6774 W122 11.2368 WD 891m KP 52.137 Vs 0.05 kts ROV: N36 42.6948 W122 11.2107 KP 52.104
1135	ROV off bottom N36 42.6773 W122 11.2358 WD 892m KP 52.137 Vs 0.09 kts ROV: N36 42.6943 W122 11.2115 KP 52.105
1156	ROV out of water N36 42.6774 W122 11.2363 WD 892m KP 52.137 Vs 0.05 kts ROV: N36 42.6881 W122 11.2123 KP 52.117
1201	ROV on deck N36 42.6771 W122 11.2364 WD 891m KP 52.138 Vs 0.11 kts
1355	Commence ROV launch to recover plow electronics N36 42.9652 W122 11.1969 WD 866m KP 51.604 Vs 0.13 kts
1402	ROV in the water. Recovery line lowered from bow. N36 42.9651 W122 11.1962 WD 867m KP 51.604 Vs 0.06 kts
1402	ROV in water N36 42.9650 W122 11.1971 WD 867m KP 51.604 Vs 0.03 kts ROV: N36 42.6882 W122 11.2139 KP 52.117
1429	ROV on bottom. N36 42.9651 W122 11.1966 WD 866m KP 51.604 Vs 0.07 kts ROV: N36 42.9940 W122 11.1967 KP 51.551
1607	ROV hooks recovery line plow cage N36 42.9172 W122 11.1906 WD 870m KP 51.692 Vs 0.06 kts ROV: N36 42.9402 W122 11.1773 KP 51.649
1609	Commence recovery of electronics. N36 42.9168 W122 11.1920 WD 871m KP 51.693 Vs 0.23 kts ROV: N36 42.9362 W122 11.1881 KP 51.657
1637	Commence ROV recovery N36 42.9168 W122 11.1910 WD 871m KP 51.693 Vs 0.11 kts ROV: N36 42.9308 W122 11.1892 KP 51.667
1638	ROV off bottom N36 42.9175 W122 11.1906 WD 871m KP 51.691 Vs 0.19 kts ROV: N36 42.9366 W122 11.1861 KP 51.656
1658	ROV out of the water N36 42.9170 W122 11.1906 WD 871m KP 51.693 Vs 0.11 kts ROV: N36 42.9359 W122 11.1848 KP 51.658
1703	ROV on deck N36 42.9170 W122 11.1897 WD 871m KP 51.692 Vs 0.06 kts
1726	Plow electronics on deck N36 42.9270 W122 11.1591 WD 868m KP 51.674 Vs 0.11 kts
1958	ROV off deck to clear wire rope under cable. N36 50.4222 W122 08.9729 WD 118m KP 36.202 Vs 0.05 kts
2002	ROV in the water N36 50.4240 W122 08.9731 WD 118m KP 36.201 Vs 0.06 kts ROV: N36 42.9452 W122 11.1529 KP 51.639
2027	ROV on bottom N36 50.4250 W122 08.9721 WD 118m KP 36.198 Vs 0.14 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

	ROV: N36 50.4017 W122 08.9707 KP 36.215
2054	ROV at wire rope location. First cut complete. N36 50.4231 W122 08.9793 WD 118m KP 36.210 Vs 0.12 kts ROV: N36 50.4074 W122 08.9942 KP 36.242
2112	Second cut complete. N36 50.4213 W122 08.9847 WD 118m KP 36.218 Vs 0.13 kts ROV: N36 50.4037 W122 09.0024 KP 36.256
2303	Wire rope cleared from under cable. N36 50.4135 W122 08.9810 WD 118m KP 36.220 Vs 0.11 kts ROV: N36 50.3911 W122 08.9941 KP 36.255
2316	Inspection of location complete. Commence ROV recovery. N36 50.4199 W122 08.9651 WD 118m KP 36.193 Vs 0.02 kts ROV: N36 50.4110 W122 08.9820 KP 36.223
2326	ROV off bottom N36 50.4287 W122 08.9914 WD 118m KP 36.221 Vs 0.07 kts ROV: N36 50.4128 W122 08.9848 KP 36.225
2330	ROV at surface N36 50.4284 W122 08.9913 WD 119m KP 36.221 Vs 0.04 kts ROV: N36 50.4162 W122 08.9925 KP 36.233
2335	ROV on deck N36 50.4285 W122 08.9914 WD 119m KP 36.222 Vs 0.16 kts ROV: N36 50.4282 W122 08.9917 KP 36.222
2345	Commence transit to San Francisco. N36 50.4288 W122 08.9911 WD 119m KP 36.221 Vs 0.14 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

3 Vessel Specifications

3

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

VESSEL SPECIFICATIONS



Built in 1991, Global Sentinel was designed from the keel up as a no compromise cableship, equally capable as both a maintenance or construction vessel. As a result, Global Sentinel is one of the few modern cableships to retain a bow working capability. With an overall length of more than 145 m (130.7 m length between perpendiculars) Global Sentinel is one of the largest and most capable maintenance and installation ships in the world. With 4 thrusters (2 azimuthing and 2 fixed) and 1 center line propeller, totaling more than 12,250 kW and a recently up graded dynamic positioning system, Global Sentinel clearly possesses the station keeping capabilities required for winter time operations anywhere in the world. In addition, Global Sentinel is equipped with an A frame and has a long and successful history of burying cable.

General

Operator:	Transoceanic Cable Ship Co.
Flag:	Republic of the Marshall Islands
Port of Registry:	Majuro
Year Built:	1991
Range:	10,000 nautical miles or 60 days
Accommodations:	138 personnel
Service Speed:	15 knots
Length Overall:	477.89 ft (145.66 m)
Length between Perpendiculars:	429.40 ft (130.88 m)
Molded Beam:	70.87 ft (21.6 m)
Depth:	37.07 ft (11.3 m)
Design Draft:	26.51 ft (8.08 m)
Displacement:	16,118 LT (16,375 MT)
Net Registered Tonnage:	3960
Gross Registered Tonnage:	13,201
Deadweight:	7,770 LT (7,900 MT)

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Classifications:	(ABS) Unrestricted Ocean Service +A 1 (E), +AMS, +ACCU
Official Number:	2665
Call Letters:	V7KR4
IMO #:	8900866
INMARSAT-B #1:	353832235V, 353832237F, 353832238T
INMARSAT-B #2:	353832230V, 353832231V, 353832232F, 353832233T
INMARSAT-C #1:	453832330T
INMARSAT-C #2:	453832230T
MMSI:	538002665

Propulsion & Maneuvering Equipment

Type:	Diesel Electric
Main Engines:	3 ea: Wartsila VASA 12V32D 5,950 BHP
Propulsion Motors:	2 ea: General Electric 4,700 BHP Geared to one centreline shaft
Propeller:	1 ea: 4.5 m dia, fixed pitch @ 3.824 m, 4 blade, left turning
Bow Thrusters:	2 ea: 1970 BHP tunnel, Controllable Pitch Propellers
Stern Thrusters:	2 ea: Independent x 1750 BHP, shrouded, 360° azimuthing, Fixed Pitch, 5 blade, right turning
Steering Gear:	1 x Electro-hydraulic Rotary Vane
Dynamic Positioning:	Simrad SDP21
Anchors:	Port Side 10 Shots Starboard Side 11 Shots

Generators

Main Propulsion:	3 ea: 3,750 kW (4160 VAC Diesel Driven)
Auxiliary: 2 ea:	900 kW (450 VAC 3 phase 60 cycle Diesel Driven)
Emergency:	1 ea: 300 kW (450 VAC 3 phase 60 cycle Diesel Driven)
Fuel type:	MGO, Low Sulphur MGO as required

Capacities

Cable Tanks, Main: 3 ea:	38,400 ft3 total (3 x 1,086 m3)
Cable Tanks, Auxiliary: 4 ea:	1,450 ft3 total (4 x 41 m3)
Cable Deadweight:	6,000 LT (6,098 MT)
Fresh Water:	432 LT (439 MT)
Fuel Oil:	1,878 LT (1,908 MT)
Water Ballast:	3,665 LT (3,724 MT)

Cable Handling Equipment

Stern Linear Cable Engine:	1 x Dowty 21-pair rubber tire type, electro-hydraulic
Bow Drum Cable Engine:	2 x Dowty 12 ft (3.7m) dia., 3.5 ft (1.1 m) drum width with fleeting ring and knives

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Dynamometers:	3 x WAMAC roller type
Draw Off/Hold Back:	2 x Caley tracked type
Bow Sheaves:	2 x 10 ft (3 m) dia.
Stern Cable Fairlead:	1 x trough/chute type
Deck Cranes:	2 x 10 ton, 65 ft (20 m) outreach forward,
	2 x 5 ton, 45 ft (13.7 m) outreach aft

ROV Support

ROV:	Perry Triton® ST-217 / suitable for other ROV suites
SEAPLOW:	SMD SEAPLOW VII / suitable for other PLOW suites

Navigation Aids

Gyro Compass/Autopilot:	2 ea: Anschutz Standard 4
Radar:	1 ea: Furuno FAR 2827 X-band ARPA
1 ea:	Furuno FAR 2837S S-band ARPA
AIS: 1 ea:	Furuno FA-100
SSAS:	1 ea WNI /Skywave DMR200D (Safetytrax D)
GPS:	1 ea: Furuno GPS Navigator GP 90
1 ea:	Trimble 4000 DLII GPS/DGPS
1 ea:	Trimble 4000 DS GPS/DGPS
1 ea:	Trimble DSM132 GPS/DGPS
2 ea:	Fugro / Pelagos SkyFix Receivers (90938)
NAVBEACONS 2 ea:	Trimble NavBeacon XL Terrestrial Receivers
NAVTEX:	1 ea: JRC NCR-300A
Weather Fax:	1 ea: Furuno DFAX FAX-207
Vertical Taut Wire Systems:	SIMRAD Dynamic Positioning System
Vertical:	1 x Bandak Mk 8 (300 m)
Depth Sounder:	1 ea: Honeywell ELAC LAZ 4400
	(15 & 150 kHz transducer)
Doppler Speed Log: 1 ea:	Furuno DS-50 (440khz)
Integrated Navigation System: 2 ea:	Independent Fugro WinFrog Suites
3 ea:	Supplementary Smart Remotes for Fugro WinFrog
Sonar Bottom Profiling System: 1 ea:	Simrad EA-600 (12, 38, 200; Khz)

Communication Equipment

GMDSS Station A3 Equipped

VHF:	2 ea:	Sailor RT146multi-remote
	2 ea:	Furuno FM-8800
UHF:	20 ea Motorola GP-350	
MF/HF:	1 ea:	Furuno FS-1570
INMARSAT-B:	1 ea:	Furuno Felcom 82 A
INMARSAT-B:	1 ea:	Furuno Felcom 81 A
INMARSAT-C:	2ea:	Furuno Felcom 15
Email:	2 ea:	Compaq Proliant DL 380G4 Servers
EPIRB:	1 ea:	Alden Marine SATFIND-406 S-1010
	2 ea:	JOTRON Tron 40S
SART:	2 ea:	ACR Pathfinder I
	1 ea:	Plessey TELLUSART MK II

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Lifeboat Radios:	4 ea:	Portable VHF Navico Axis 250
Other:		Portable UHF and VHF Radios

Power & Test (TTR) Equipment

Power Feed Equipment:	1 x AT&T J86927
DC Test Set:	1 x Tinsley type 5901C
Analog Cable Test Equipment:	1 x Complete suite for all repair operations
Lightguide Cable Test Equipment:	1 x Complete suite for repair/lay operations

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

4 Burial Tool Specification

4

© Copyright 2007 All rights reserved.

BURIAL TOOL SPECIFICATION

4.1 Sea Plow VII



General Particulars

Owner	Tyco, Morristown, NJ, USA
Builder	Soil Machine Dynamics, Newcastle, U.K.
Maximum Operating Depth	1500 meters
Trench Depth	0-1.5 meters
Cable Size	Up to 150mm diameter (Bodies up to 400mm)
Operating Modes	Diverless simultaneous lay and burial
Weight	14.0 metric tons in air, 11.2 metric tons in water
Dimensions	Length 8.0 m
	Width 4.0 m
	Height 4.3 m
Tow Method	Surface vessel (10-50 metric tons tow force)
Soil Types	5 kPa mud to soft rock

Major System Components

Main Control Equipment	Sea Plow VII Vehicle
	1 X Control Van
	1 X Maintenance Van
	1 X Spare Van
Launch & Recovery System	"A" Frame (35 tons SWL)
	Tow Winch (65 tons SWL) with take up reel
	Tow Wire
	Stern Roller Assembly
Umblicals	1 X 4,000 meters
	1 spare X 4,000 meters
Hydraulic System	15 kW electro-hydraulic power pack (35 functions)

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Vehicle Accessories

Instrumentation	1 inclinometers, 21 transducers 10 contact closures, 5 moisture detectors 3 echo sounders, 1 heading sensor compass 3 temperature sensors
Surveillance	Obstacle avoidance sonar, hydrophone 3 B&W SIT cameras, pan and tilt units 4 lighting units
Emergency Systems	Sonar triggered cable release 2 emergency lift ropes

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

4.2 ST-217



Depth Capability (MSW) 2500 *(Deeper options on request)*

Thruster Configuration
- Four horizontal thrusters in quad arrangement
- Four vertical thrusters
- Two optional forward boost thrusters

Maximum Speed (Free-flying)

Forward (with optional boost thrusters) (knots)	2.3	
Lateral (knots)		1.8

Maximum Speed (Tracked)

Forward (knots)	1.15	

Dimensions (Free-flying)

Width excluding tracks (mm)		2000
Length (mm)		3100
Height (mm)		2200

Vehicle Weight

Free Fly configuration (kg)		6300
Tracked Mode configuration (kg)	7000	

Propulsion System
- 100 HP electrohydraulic power units 3000 VAC, 3- phase, 60 Hz, 1800 rpm. Variable pressure controlled pumps (2)
- Horizontal thrusters (4)
- Vertical thrusters (4)

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Hydraulic Manifolds
- 4 function thruster manifolds (proportional valves) (2)
- 10 function solenoid valve manifolds (3)
- 9 function proportional/solenoid valve manifold (1)
- Pump control manifold (2)

Heading Control ±2° Automatic or manual

Depth Control ±150mm Automatic or manual

Altitude Control ±150mm Automatic or manual

Automatic Cable Tracking
- Pre-burial survey
- Burial mode
- Post-burial survey

Lighting System (3000 watts total)
- 250 watt lights, 2 per dimming circuit (12)

Control Systems
- Surface control - Pentium PC based, database driven software and real-time operating system
- Subsea control - Pentium PC based, 32 bit STD bus

Spare Data Transmission
- Real-time video channels available (8)
- Spare fibre optic interface card slot (1)
- Customer solenoid valve drivers (pre-wired) (9)
- Customer digital out (8)
- Customer digital in (8)
- Customer analogue out (4)
- Customer analogue in (8)
- Full duplex RS232 @ 115 kpbs data channels (4)
- Full/half duplex RS485/422/232 @ 115 kpbs channels (4)

Jetting System
- 90HP Hydraulic Direct Water Pumps (2)
- 2650 lpm per pump (at 125 PSI at maximum power)

Note: Variable output control provided with each pump.

Burial Capabilities

Cable Types - Lightweight and Armoured
Jetter separation - Variable to 360mm
Cohesive Soil - Up to 45 kPa
Non-Cohesive Soil - Sand, Silt and Gravel to 30mm
Minimum Bearing Strengths - 7 kPa

Additional Sensor and Tool Equipment
- Scanning Sonar
- Radio Beacon

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

- Master/Slave or Rate Manipulators
- Cable Cutter
- Cable Gripper
- Cable Location System
- Navigation System
- Dredge Pump
- Strobe Flasher
- Control/Work/Storage Vans
- Umbilical Winch
- Launch & Recovery System
- Penetrometer

Features

TRITON® ST 200 features many proven principles of cable burial ROV design, including

- Lightweight, compact system
- Single Mode Fibre Optic data transmission system
- Retractable nozzle jetting system adjustable to 1.00m depth burial
- Position sensing of jetting system & independent cable depressor

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

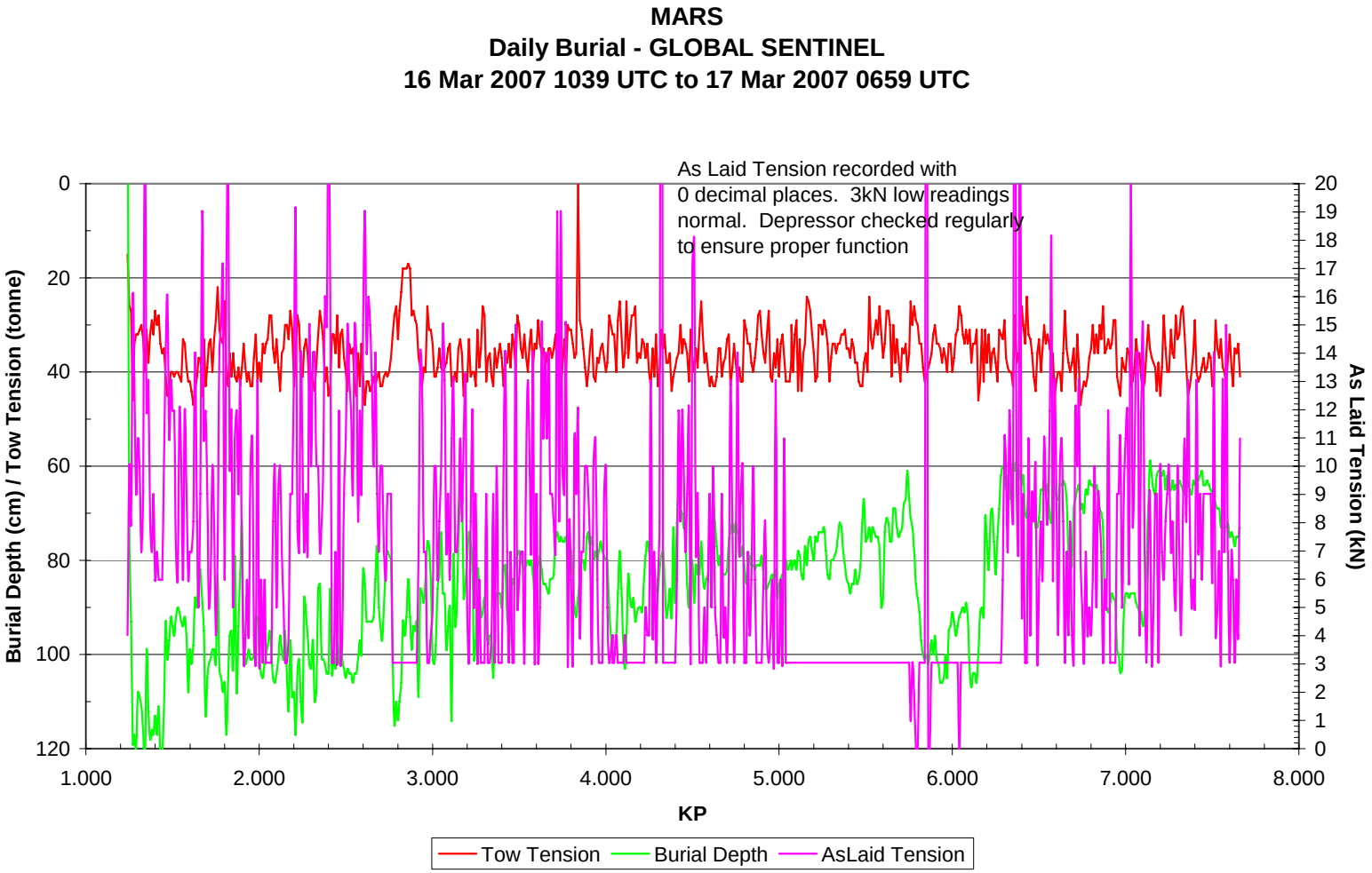
5 Burial Data

5

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

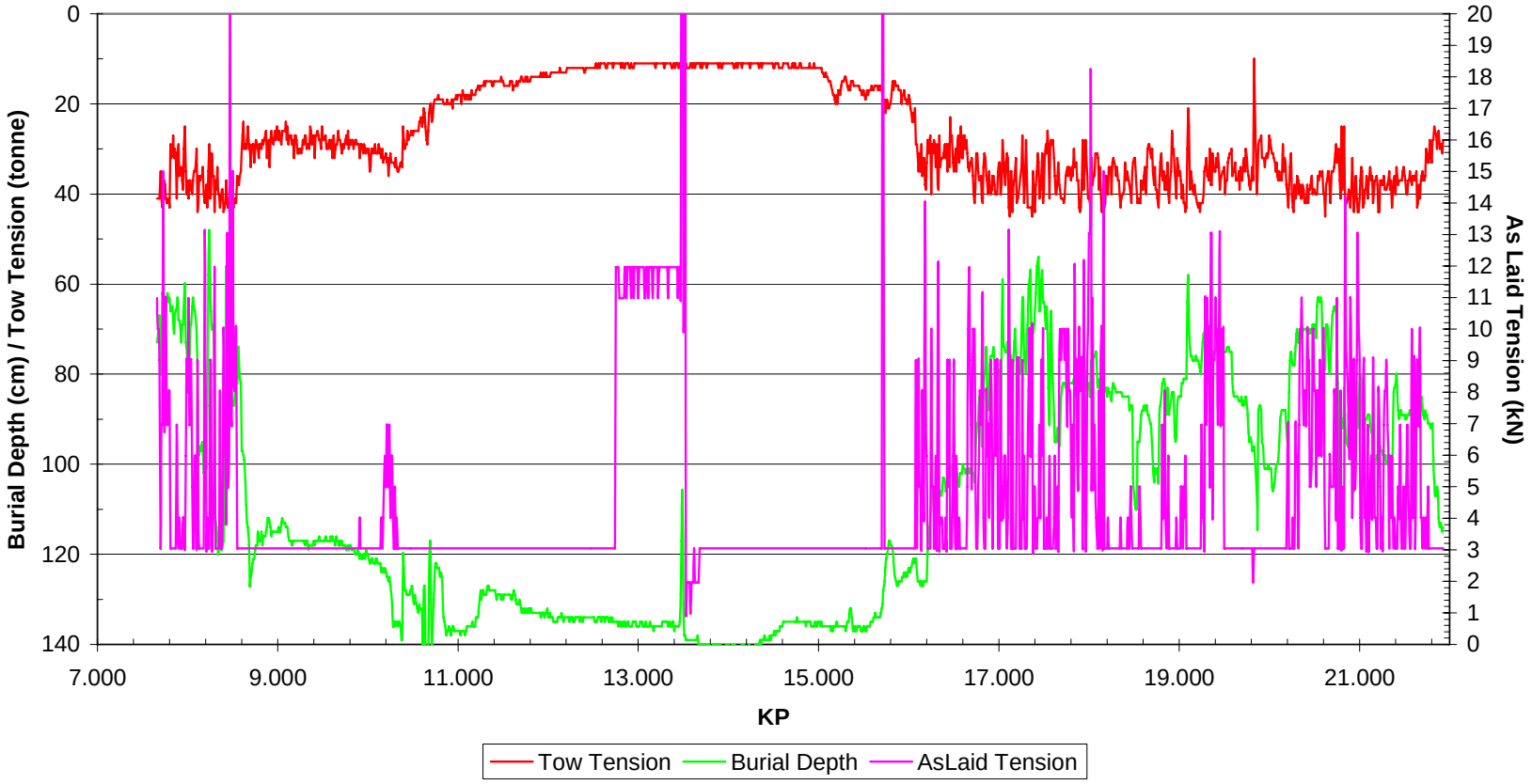
BURIAL DATA

5.1 Burial Plots



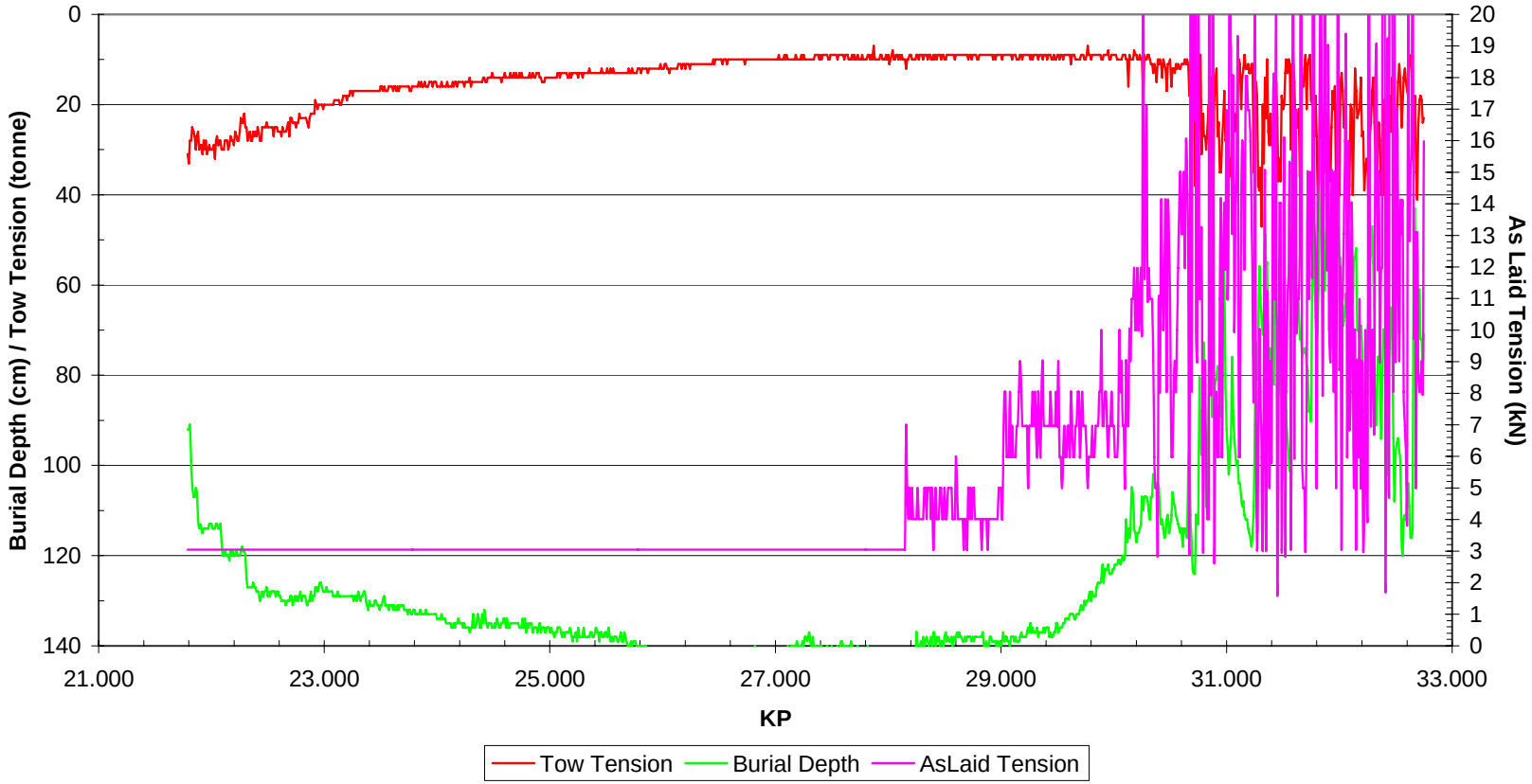
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
17 Mar 2007 0659 UTC to 18 Mar 2007 0716 UTC



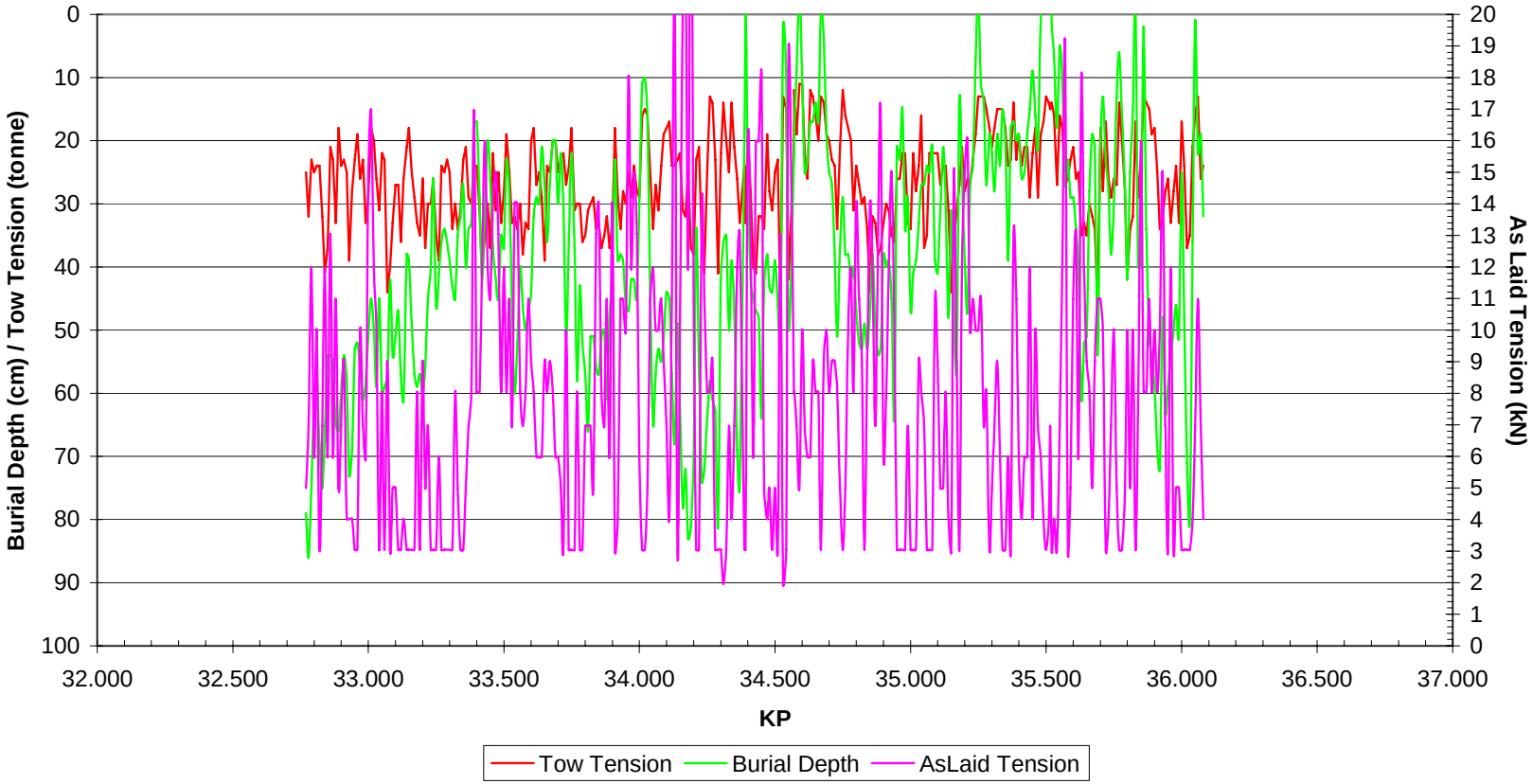
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
18 Mar 2007 0700 UTC to 18 Mar 2007 1932 UTC



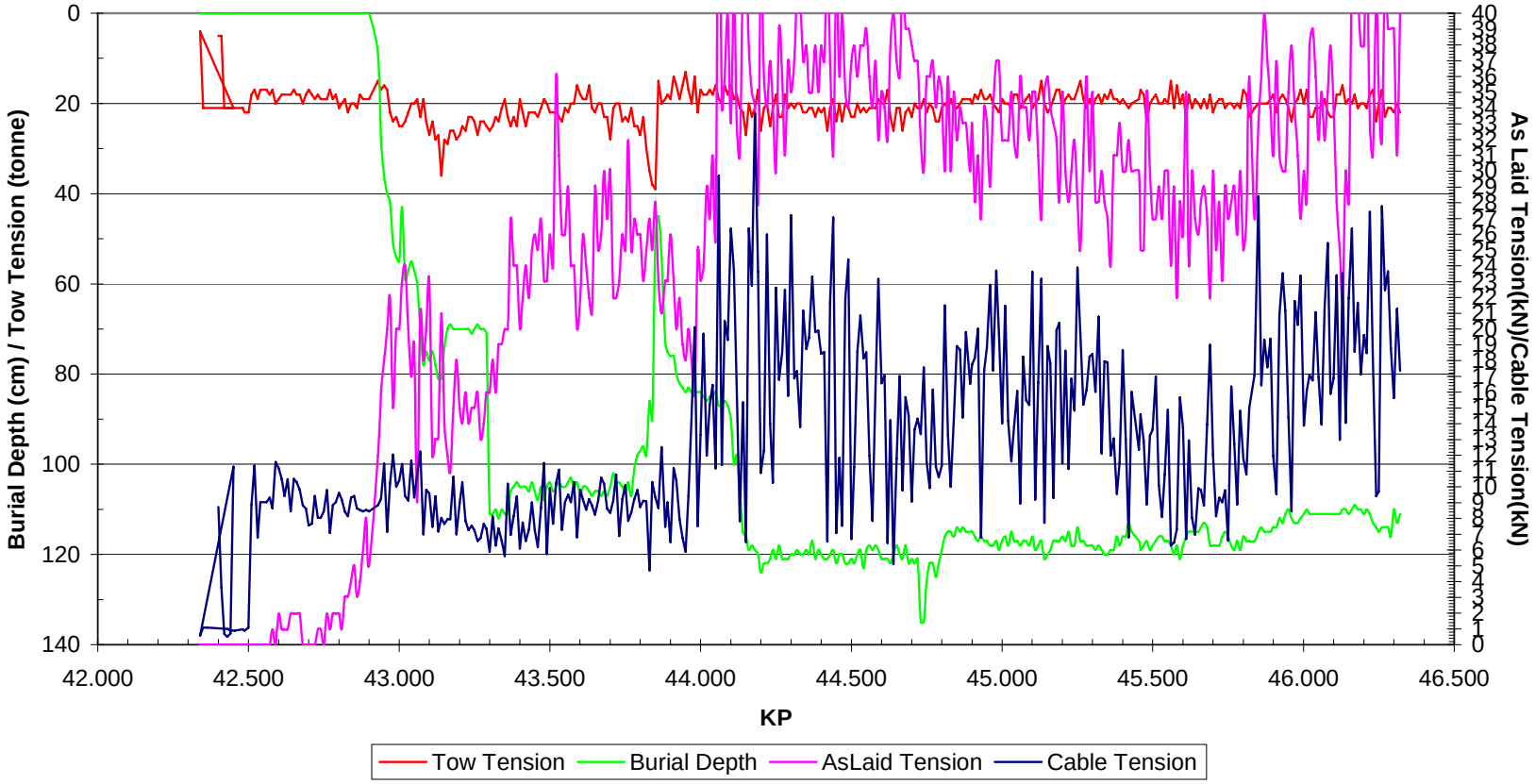
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
19 Mar 2007 1609 UTC to 20 Mar 2007 0138 UTC



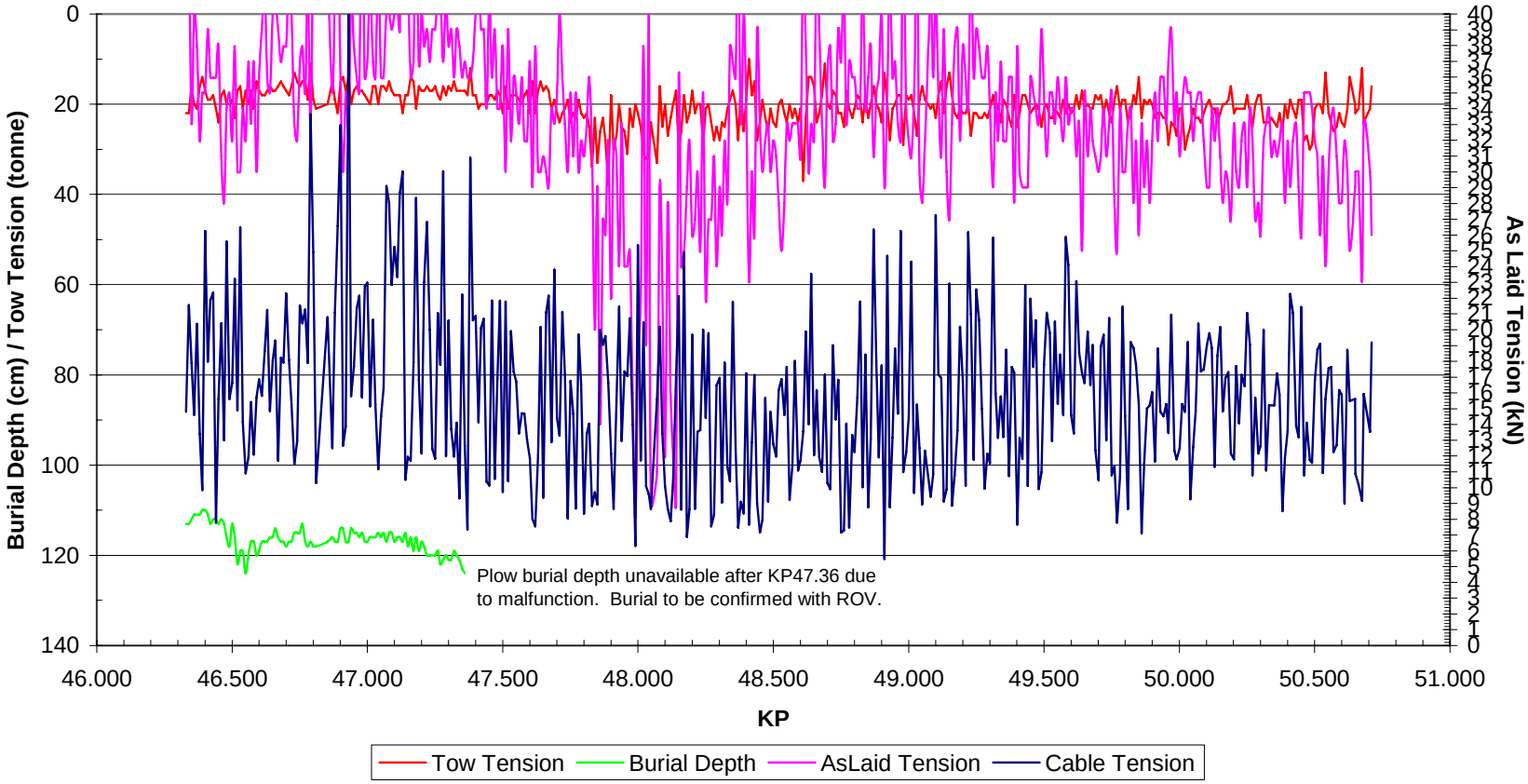
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
20 Mar 2007 1409 UTC to 21 Mar 2007 0659 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

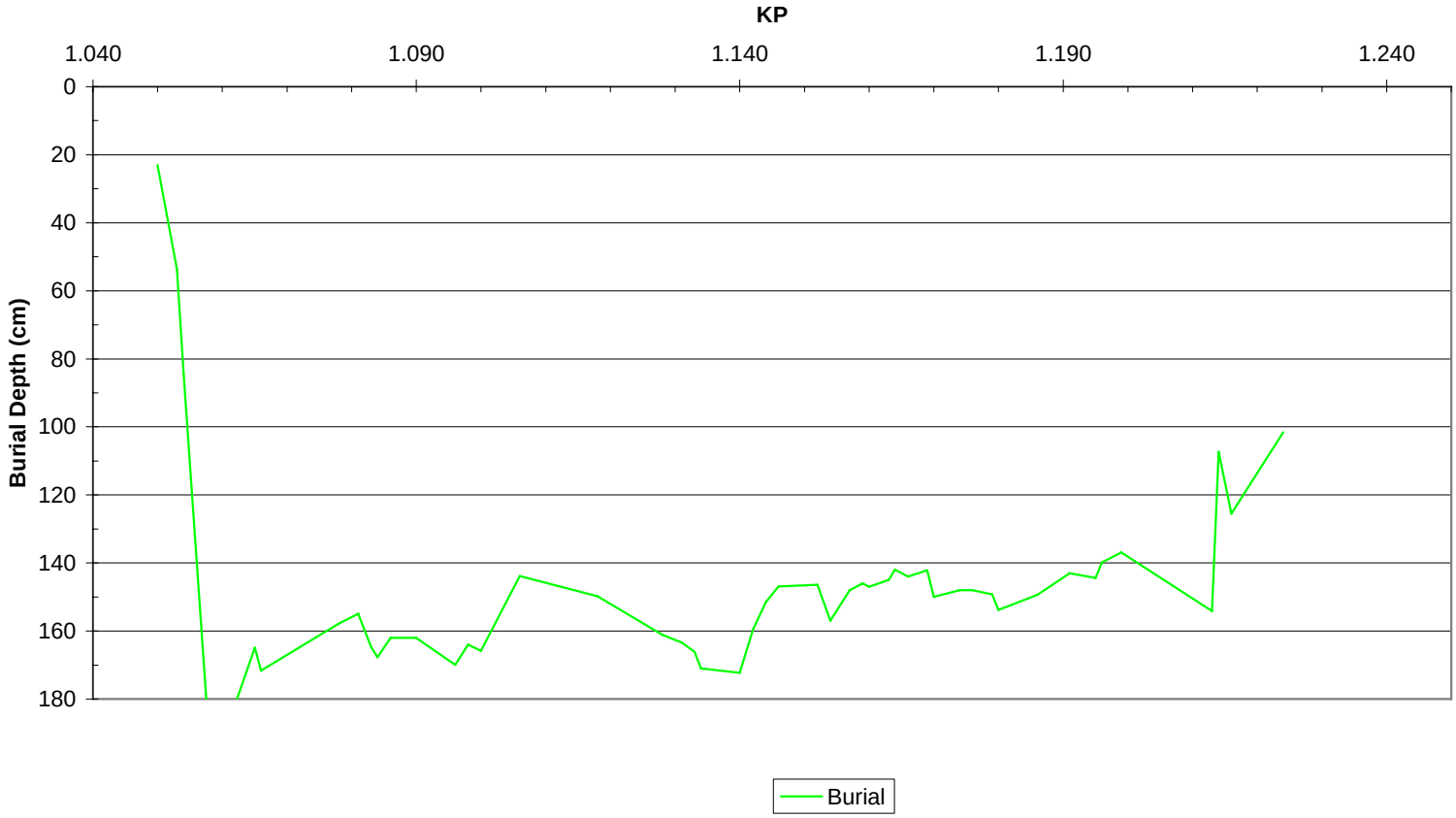
MARS
Daily Burial - GLOBAL SENTINEL
21 Mar 2007 0700 UTC to 21 Mar 2007 1455 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

5.2 PLIB

MARS
PLIB Site 1 - GLOBAL SENTINEL
22 Mar 2007 0415 UTC to 22 Mar 2007 0438 UTC



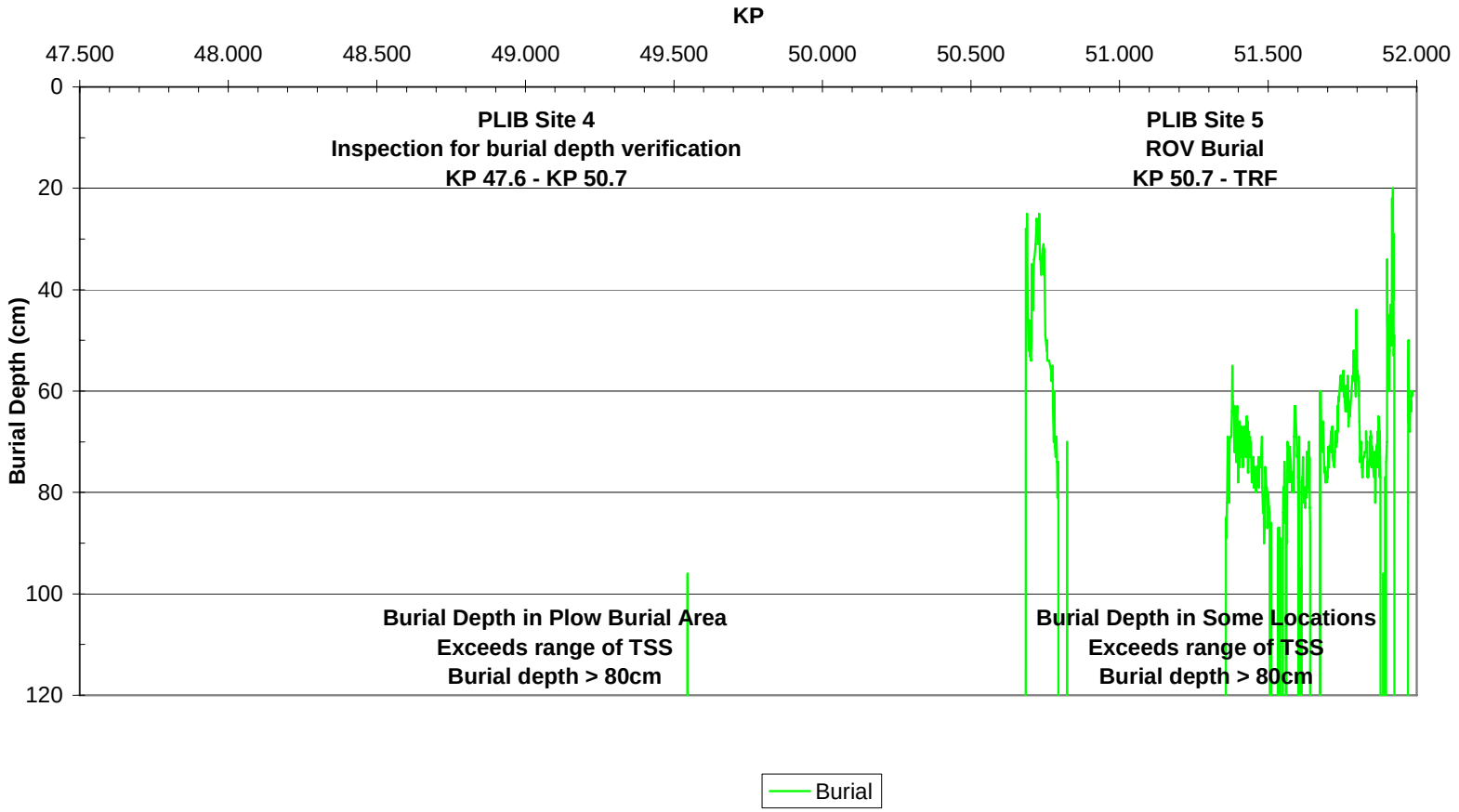
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
PLIB Site 3 - GLOBAL SENTINEL
22 Mar 2007 1352 UTC to 22 Mar 2007 1500 UTC



© Copyright 2007 All rights reserved.

MARS
PLIB Site 4 & 5 - GLOBAL SENTINEL
01 Apr 2007 0835 UTC to 01 Apr 2007 1405 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

6 Wet Plant Spare Inventory

6

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

WET PLANT SPARE INVENTORY

No wet plant spare cable was delivered to the Customer at the completion of this main lay operation. Cable listed in this inventory remained aboard CS GLOBAL SENTINEL. In addition, the listed LFES was retained on board for the MARS system owner

Splice kits and tools are owned by Alcatel and were to be offloaded prior to vessel departure from San Francisco.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

6.1 Cable

Project:	MARS	**Date of Load:**	Mar-07
Segment:		**Location of Load:**	Portland, OR
Vessel:	Global Sentinel	**Date of Discharge:**	TBD
Load EIC:	D Hoard	**Location of Discharge:**	TBD
Lay EIC:	D Brawn	**Depot Manager:**	
Repair EIC:	TBD		

CABLE TYPE	Fiber Types	NUMBER OF FIBERS	AS LOADED LENGTH (km)	FINAL LENGTH OFFLOADED (km)	PORT OF DISCHARGE	COMMENTS	Vessel
OALC4 SA		8	1.896		TBD	MARS SPARE	GlobalSentinel
OALC4 SAL		8	10.896		TBD	MARS SPARE	GlobalSentinel
OALC4 SAL		8	4.005		TBD	MARS SPARE	GlobalSentinel
OALC4 SAL		8	3.000		TBD	MARS TRIAL/SCRAP	GlobalSentinel

NOTE: Listed cable lengths are based on corrected OTDR measurements.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

6.2 Splice Kits

Qty.	Serial #	Kit	Description	Location	Owner
1	U3505	KIT 9002	UJ/UC Common component kit		
1	U3926	KIT 9002	UJ/UC Common component kit		
1	U3831	KIT 9002	UJ/UC Common component kit		
3	**Total**	**KIT 9002**	**UJ/UC Common component kit**		**MARS**

Qty.	Serial #	Kit	Description	Location	Owner
1	U5014	KIT 10020 A	UJ Armored protection kit		
1	U5052	KIT 10020 A	UJ Armored protection kit		
1	U5057	KIT 10020 A	UJ Armored protection kit		
3	**Total**	**KIT 10020 A**	**UJ Armored protection kit**		**MARS**

Qty.	Serial #	Kit	Description	Location	Owner
1	U5014	KIT 10020 B	UJ Armored protection kit		
1	U5057	KIT 10020 B	UJ Armored protection kit		
1	U5045	KIT 10020 B	UJ Armored protection kit		
3	**Total**	**KIT 10020 B**	**UJ Armored protection kit**		**MARS**

Qty.	Serial #	Kit	Description	Location	Owner
1	U0619	KIT 14110	UJ Looped fibre end seal		
1	**Total**	**KIT 14110**	**UJ Looped fibre end seal**		**MARS**

Qty.	Serial #	Kit	Description	Location	Owner
1	U0101	KIT 25021	ASN OALC4 SAL end specific kit		
1	U0098	KIT 25021	ASN OALC4 SAL end specific kit		
1	U0086	KIT 25021	ASN OALC4 SAL end specific kit		
1	U0084	KIT 25021	ASN OALC4 SAL end specific kit		

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1	U0078	KIT 25021	ASN OALC4 SAL end specific kit		
5	**Total**	**KIT 25021**	**ASN OALC4 SAL end specific kit**		**MARS**
Qty.	**Serial #**	**Kit**	**Description**	**Location**	**Owner**
1	203	KIT 25030	ASN OALC4 SA end specific kit		
1	200	KIT 25030	ASN OALC4 SA end specific kit		
1	374	KIT 25030	ASN OALC4 SA end specific kit		
3	**Total**	**KIT 25030**	**ASN OALC4 SA end specific kit**		**MARS**
Qty.	**Serial #**	**Kit**	**Description**	**Location**	**Owner**
1	U0024	KIT 26130	ASN OALC7 SAH end specific kit		
1	U0028	KIT 26130	ASN OALC7 SAH end specific kit		
2	**Total**	**KIT 26130**	**ASN OALC7 SAH end specific kit**		**MARS**
Qty.	**Serial #**	**Kit**	**Description**	**Location**	**Owner**
1	107617	KIT 17010	Remould kit		
1	**Total**	**KIT 17010**	**Remould kit**		**Alcatel**
Qty.	**Serial #**	**Kit**	**Description**	**Location**	**Owner**
1	U0010	N/A	Hydraulic press and ferrules		
1	**Total**	**N/A**	**End Seal Tool Kit**		**Alcatel**
Qty.	**Serial #**	**Kit**	**Description**	**Location**	**Owner**
1	U0010	KIT085AA	OALC7 Core Tool Kit		
1	**Total**	**KIT085AA**	**OALC7 Core Tool Kit**		**Alcatel**

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

7 RPL

7

The original RPLs files are located into the CD provided with this report.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

RPL

tyco Telecommunications

SYSTEM: MARS
GEODETIC SYSTEM: WGS-84
NAVIGATION SYSTEM: DIFFERENTIAL GPS

AS LAID ROUTE POSITION LIST (Final)

ISSUE: 1
DATE: 03 Apr 07

LINE NO.	VESSEL NAME	OPERATION DATE	POSITION		REMARKS SPLICES, ALTER COURSE, CABLE CROSSINGS ETC.	REPEATER SPLICE BOX ETC.	CABLE TYPE	CABLE ID #	CABLE LENGTH (KM)			ROUTE DISTANCE (KM)		SLACK BETWEEN RPTRS(%)	BURIAL DEPTH (cm)	WATER DEPTH (m)	COMMENTS
			LATITUDE	LONGITUDE					EACH EVENT	EACH REPEATER	CUMM.	EACH EVENT	CUMM.				
1,	Global Sentinel	14 mar 07	36° 48.369' N	121° 47.277' W	HDD Start		SAL									0	
2,	Global Sentinel	14 mar 07	36° 48.369' N	121° 47.277' W	Cable allowance		SAL		0,064		0,064	0,000	0,000			0	64m cable retained at beach manhole
3,	Global Sentinel	14 mar 07	36° 48.607' N	121° 47.912' W	HDD End		SAL					1,042	1,042			20	
4,	Global Sentinel	16 mar 07	36° 48.650' N	121° 48.025' W	Plow Down		SAL					0,186	1,228		151	22	PLIB completed 21 Mar 07
5,	Global Sentinel	16 mar 07	36° 48.680' N	121° 48.101' W	A/C		SAL					0,126	1,354		79	22	
6,	Global Sentinel	16 mar 07	36° 48.706' N	121° 48.159' W	A/C		SAL					0,099	1,453		70	22	
7,	Global Sentinel	16 mar 07	36° 48.739' N	121° 48.204' W	A/C		SAL					0,091	1,543		110	21	
8,	Global Sentinel	17 mar 07	36° 50.769' N	121° 50.585' W	Enter Naval Ops Area		SAL					5,160	6,704		116	27	
9,	Global Sentinel	17 mar 07	36° 50.832' N	121° 50.659' W	A/C		SAL					0,160	6,864		69	27	
10,	Global Sentinel	19 mar 07	36° 51.585' N	121° 52.181' W	A/C		SAL					2,657	9,520		69	38	
11,	Global Sentinel	17 mar 07	36° 53.009' N	121° 56.900' W	A/C		SAL					7,491	17,011		116	34	
12,	Global Sentinel	17 mar 07	36° 53.127' N	121° 57.611' W	A/C		SAL					1,079	18,090		81	34	
13,	Global Sentinel	19 mar 07	36° 53.134' N	121° 58.619' W	Exit Naval Ops Area		SAL					1,498	19,588		83	43	
14,	Global Sentinel	18 mar 07	36° 53.144' N	122° 01.901' W	A/C		SAL					4,876	24,464		81	60	
15,	Global Sentinel	18 mar 07	36° 52.798' N	122° 03.565' W	A/C		SAL					2,554	27,018		135	75	
16,	Global Sentinel	18 mar 07	36° 52.479' N	122° 04.263' W	Exit 3NM LIMIT		SAL					1,193	28,211		141	83	
17,	Global Sentinel	19 mar 07	36° 51.093' N	122° 07.302' W	Splice Box	SJ1	SAL		33,450		33,514	5,193	33,404	0,14%	145	106	
18,	Global Sentinel	19 mar 07	36° 50.720' N	122° 08.117' W	A/C		SA					1,394	34,798		96	113	
19,	Global Sentinel	19 mar 07	36° 50.609' N	122° 08.313' W	A/C		SA					0,356	35,155		57	116	
20,	Global Sentinel	20 mar 07	36° 50.531' N	122° 08.547' W	A/C		SA					0,377	35,531		93	118	
21,	Global Sentinel	20 mar 07	36° 50.494' N	122° 08.746' W	A/C		SA					0,304	35,835		68	123	
22,	Global Sentinel	20 mar 07	36° 50.435' N	122° 08.900' W	Plow Up		SA					0,254	36,089		63	123	
23,	Global Sentinel	20 mar 07	36° 50.356' N	122° 09.095' W	A/C		SA					0,325	36,413			131	
24,	Global Sentinel	20 mar 07	36° 50.231' N	122° 09.450' W	A/C		SA					0,576	36,990			171	
25,	Global Sentinel	20 mar 07	36° 50.221' N	122° 09.482' W	Splice Box	SJ2	SA		3,642		37,156	0,051	37,041	0,16%		171	
26,	Global Sentinel	20 mar 07	36° 50.203' N	122° 09.530' W	A/C		SA					0,079	37,119			191	
27,	Global Sentinel	20 mar 07	36° 50.149' N	122° 09.631' W	A/C		SA					0,180	37,300			214	
28,	Global Sentinel	20 mar 07	36° 49.945' N	122° 09.902' W	A/C		SA					0,552	37,852			303	
29,	Global Sentinel	21 mar 07	36° 49.743' N	122° 10.076' W	A/C		SA					0,454	38,306			310	
30,	Global Sentinel	21 mar 07	36° 49.459' N	122° 10.210' W	A/C		SA					0,562	38,868			332	
31,	Global Sentinel	21 mar 07	36° 48.892' N	122° 10.382' W	A/C		SA					1,079	39,947			370	
32,	Global Sentinel	21 mar 07	36° 48.750' N	122° 10.471' W	A/C		SA					0,294	40,241			383	
33,	Global Sentinel	21 mar 07	36° 48.623' N	122° 10.587' W	A/C		SA					0,291	40,533			390	
34,	Global Sentinel	21 mar 07	36° 48.337' N	122° 10.912' W	A/C		SA					0,717	41,249			429	
35,	Global Sentinel	21 mar 07	36° 47.846' N	122° 11.335' W	A/C		SA					1,105	42,354			452	
36,	Global Sentinel	21 mar 07	36° 47.579' N	122° 11.465' W	Plow Down		SA					0,530	42,885			465	
37,	Global Sentinel	21 mar 07	36° 47.306' N	122° 11.592' W	A/C		SA					0,539	43,424		105	546	
38,	Global Sentinel	21 mar 07	36° 46.695' N	122° 11.678' W	A/C		SA					1,137	44,561		122	630	
39,	Global Sentinel	21 mar 07	36° 46.662' N	122° 11.672' W	Transition	SA/SAL	SA		7,624		44,780	0,062	44,623	0,55%	118	645	
40,	Global Sentinel	21 mar 07	36° 46.111' N	122° 11.575' W	A/C		SAL					1,029	45,652		117	739	
41,	Global Sentinel	21 mar 07	36° 46.063' N	122° 11.553' W	Exit USA Territorial Waters		SAL					0,095	45,747		118	739	
42,	Global Sentinel	21 mar 07	36° 45.574' N	122° 11.318' W	A/C		SAL					0,970	46,716		117	760	
43,	Global Sentinel	21 mar 07	36° 44.893' N	122° 11.166' W	A/C		SAL					1,280	47,996		>80	787	PLIB completed 01 Apr 07
44,	Global Sentinel	21 mar 07	36° 43.442' N	122° 11.195' W	Plow Up		SAL					2,684	50,680		44	853	PLIB completed 01 Apr 07
45,	Global Sentinel	30 mar 07	36° 42.801' N	122° 11.206' W	Splice Box	SJ3	SAL		7,246		52,026	1,186	51,866	0,04%	75	880	PLIB completed 01 Apr 07
46,	Global Sentinel	30 mar 07	36° 42.740' N	122° 11.210' W	TRF	TRF	SAH		0,113		52,139	0,113	51,979	0,02%		880	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

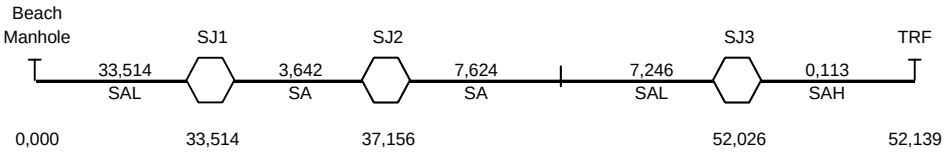
8 SLD

8

The original SLDs files are located into the CD provided with this report.

© Copyright 2007 All rights reserved.

SLD



Cable Type Summary	
SAL	40,760
SA	11,266
SAH	0,113
Total	**52,139**

tyco Telecommunications	As Laid SLD		
MARS			
Issue: 1	Date: 03 abr 2007	Engineer: DB	Page: 1

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

9 Charts

9

The original Autocad Charts files are located into the CD provided with this report.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

CHARTS

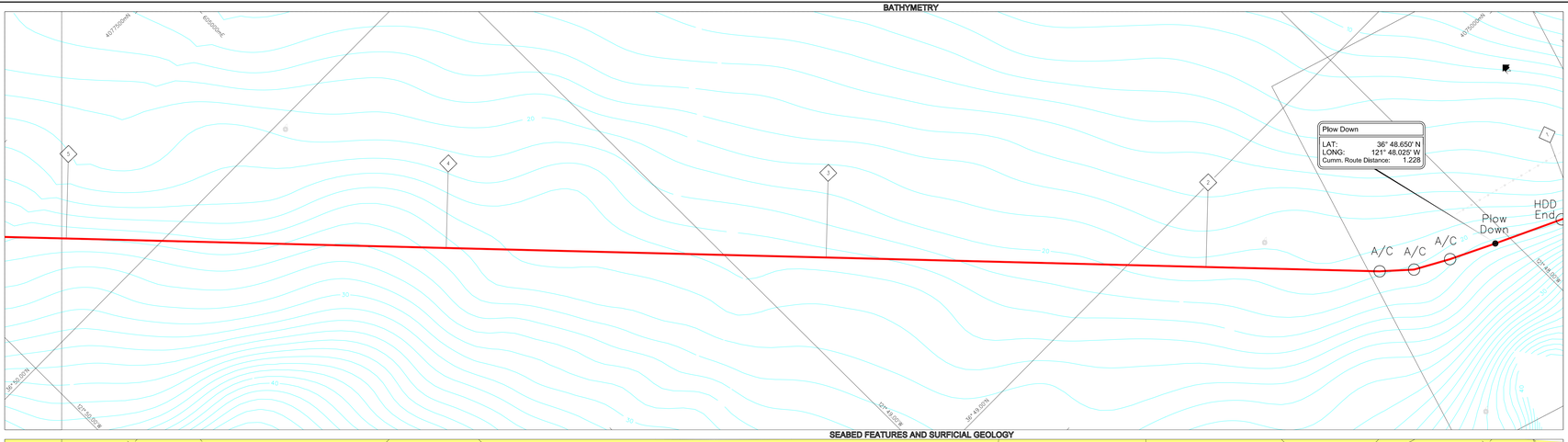
The table below gives details of all charts produced during the installation of MARS.

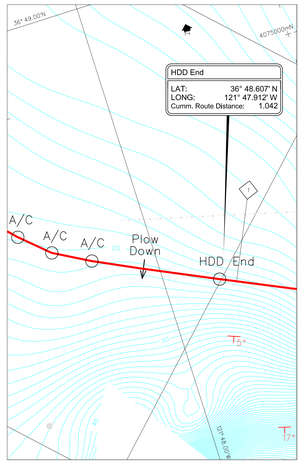
Chart name	*Scale*	*KP Range*
MARS_A_aslaid_001.dwg	1:5000	HDD End to KP 5.1
MARS_A_aslaid_002.dwg	1:5000	KP 5.01 to KP 8.9
MARS_A_aslaid_003.dwg	1:5000	KP 8.8 to KP 13.4
MARS_A_aslaid_004.dwg	1:5000	KP 13.3 to KP 17.8
MARS_A_aslaid_005.dwg	1:5000	KP 17.7 to KP 22.5
MARS_A_aslaid_006.dwg	1:5000	KP 22.4 to KP 26.6
MARS_A_aslaid_007.dwg	1:5000	KP 26.5 to KP 31.3
MARS_A_aslaid_008.dwg	1:5000	KP 31.2 to KP 35.7
MARS_A_aslaid_009.dwg	1:5000	KP 35.6 to KP 39.1
MARS_A_aslaid_010.dwg	1:5000	KP 39.01 to KP 42.9
MARS_A_aslaid_011.dwg	1:5000	KP 42.8 to KP 46.9
MARS_A_aslaid_012.dwg	1:5000	KP 46.7 to KP 51.5
MARS_A_aslaid_013.dwg	1:5000	KP 51.4 to TRF

Note: Aslaid charts are based in the survey charts provided by Alcatel Lucent. However, the Survey Route displayed in the base panels (black line) are based on the latest Route Planned List issued prior to the installation, that defers from the original Engineering Route which the survey charts are based in. Therefore, the depth profile and side information does not correspond to the Survey Route displayed but to the original Engineering Route, which has been placed in a hidden layer in AutoCAD.

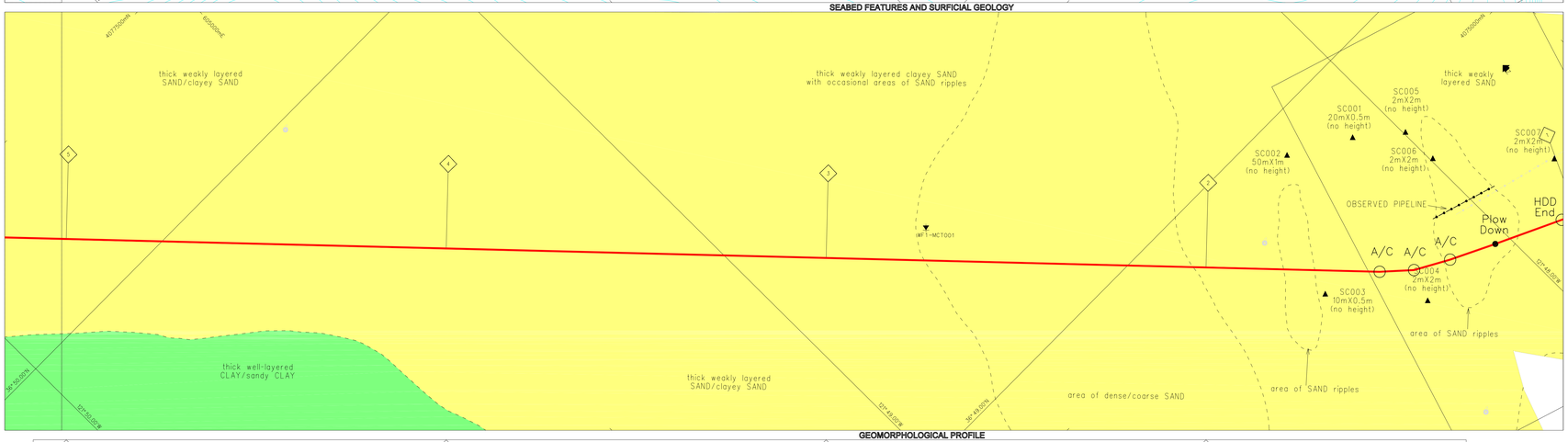
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

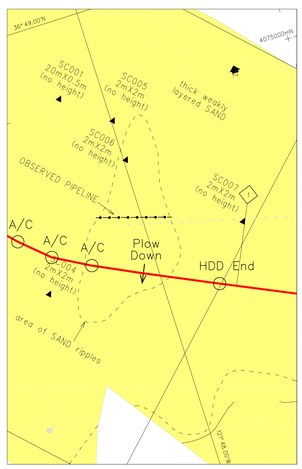
BATHYMETRY



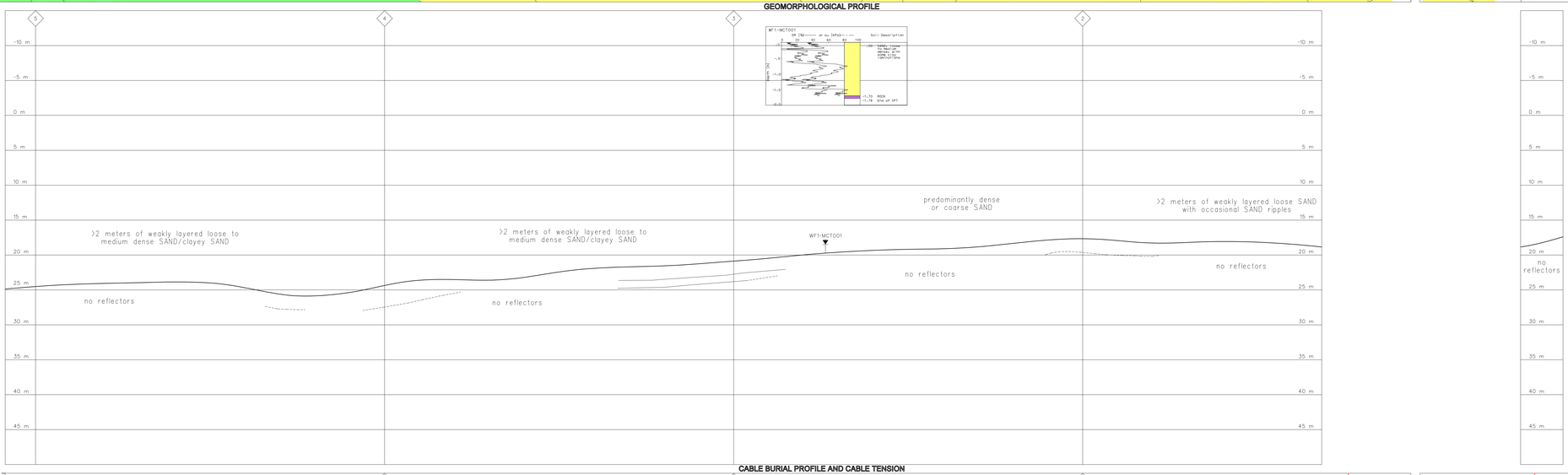


SEABED FEATURES AND SURFICIAL GEOLOGY

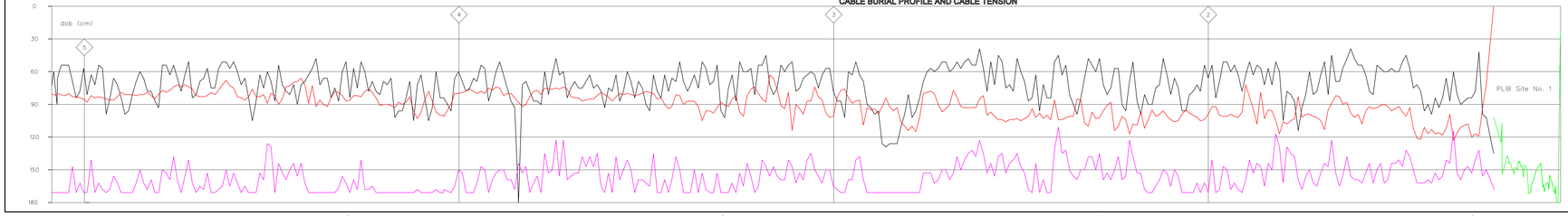


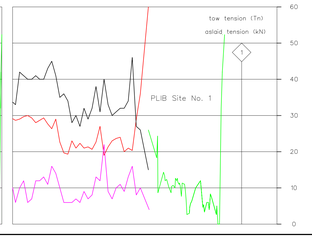


GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION





LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- LX001 (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MBR CONE PENETROMETER LOCATION
- MCI-CPT026/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- WRECK, AS FOUND POSITION LX001 (metres)
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION
- SAL SA
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHERIOD AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123e 00.00' W
LATITUDE OF ORIGIN	00e 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

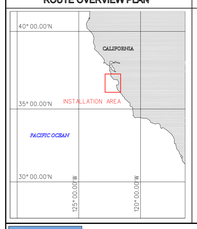
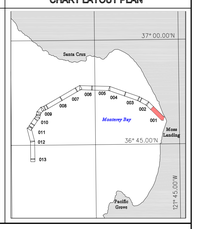


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA, 98121-1107
Tel: 206 441 9305
Fax: 206 441 9306

MARS

Monterey Accelerated Research System
As-Laid Cable Route

ALIGNMENT SHEET

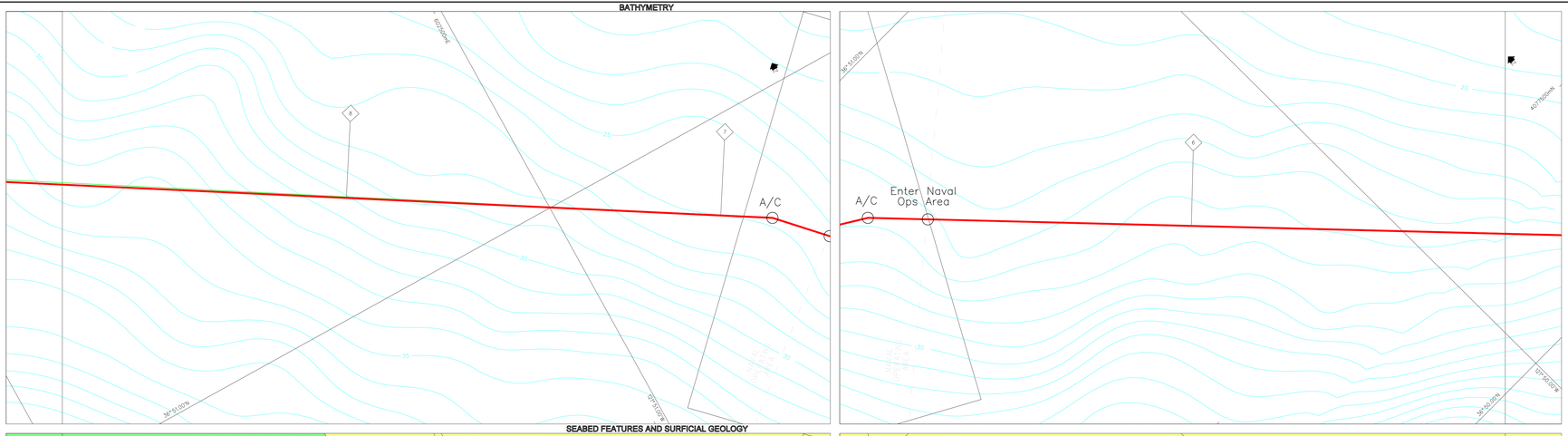
HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

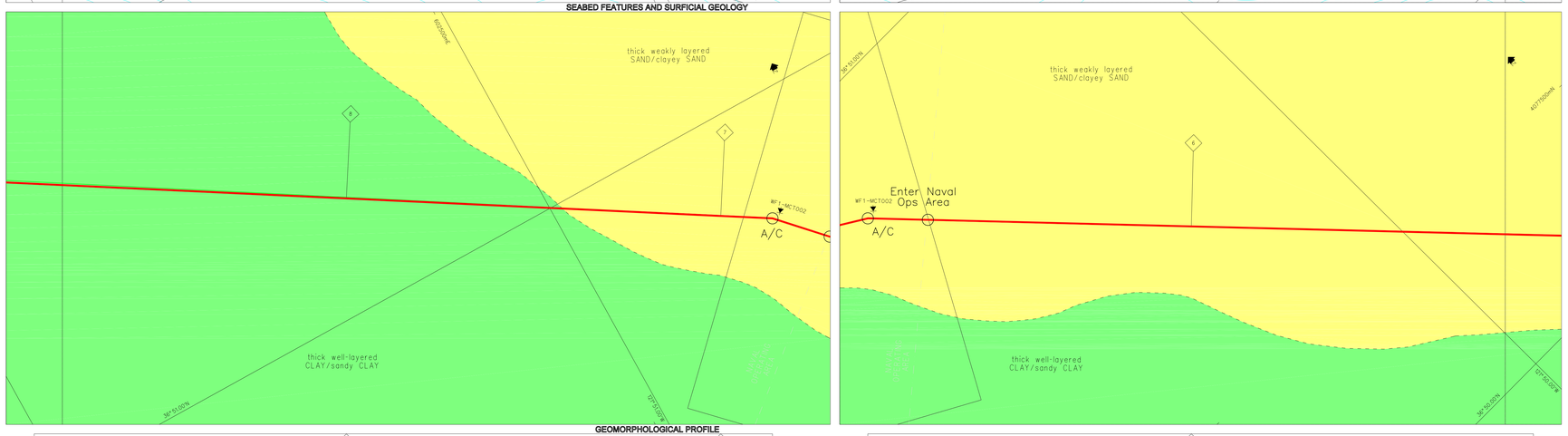
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_001.dwg | Chart Number: 001

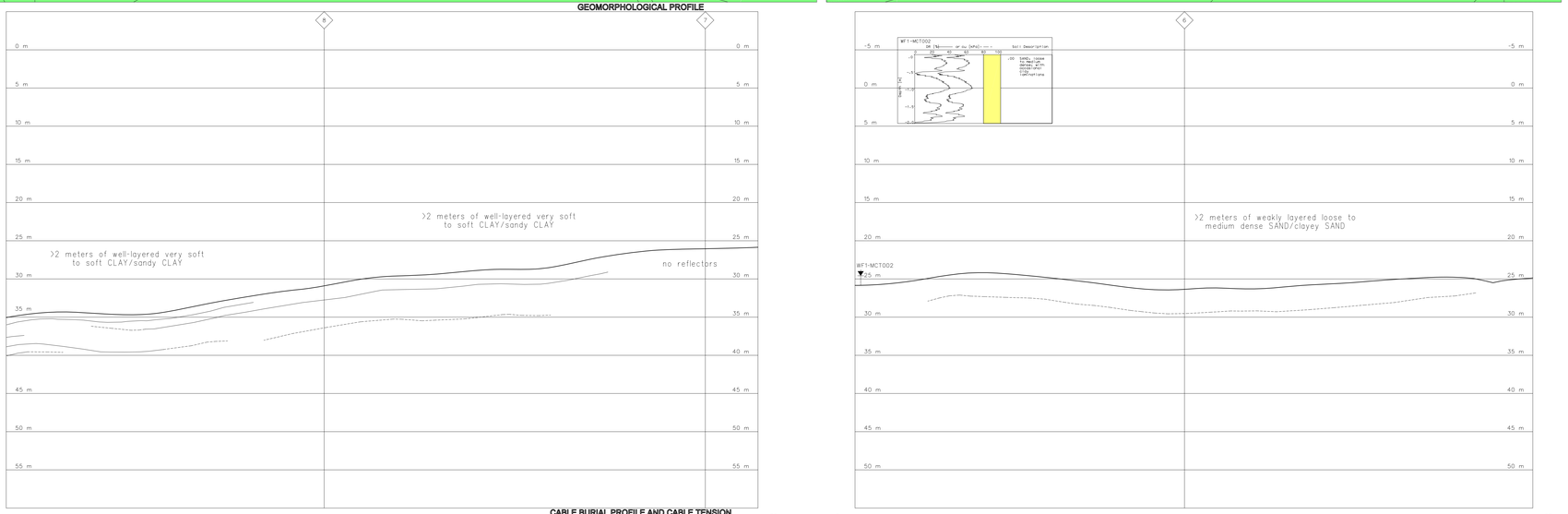
BATHYMETRY



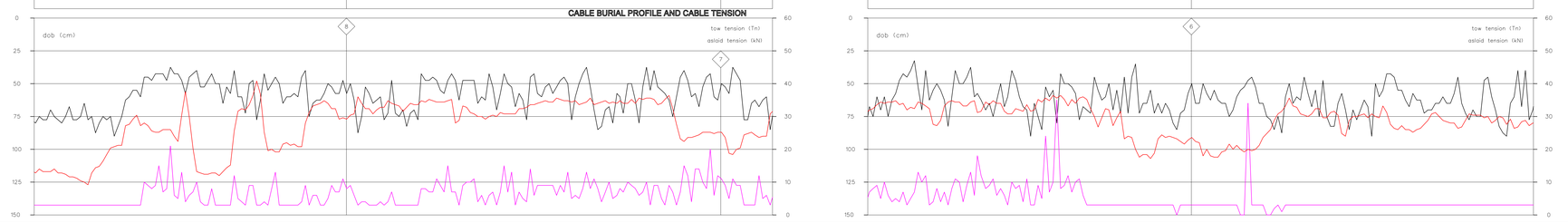
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- LX0001 (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MINI CONE PENETROMETER LOCATION
- WRECK, AS FOUND POSITION LX0001 (metres)
- MCI-CPT029/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (AC)
- SPLICE BOX
- TRANSITION (SAL / SA)
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL issue dated on February 26th 2007.

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Data: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123st 00.00' W
LATITUDE OF ORIGIN	00st 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

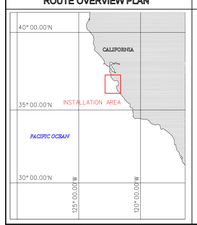
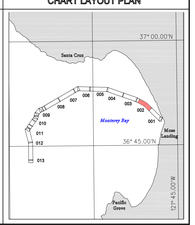


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System
As-Laid Cable Route

ALIGNMENT SHEET

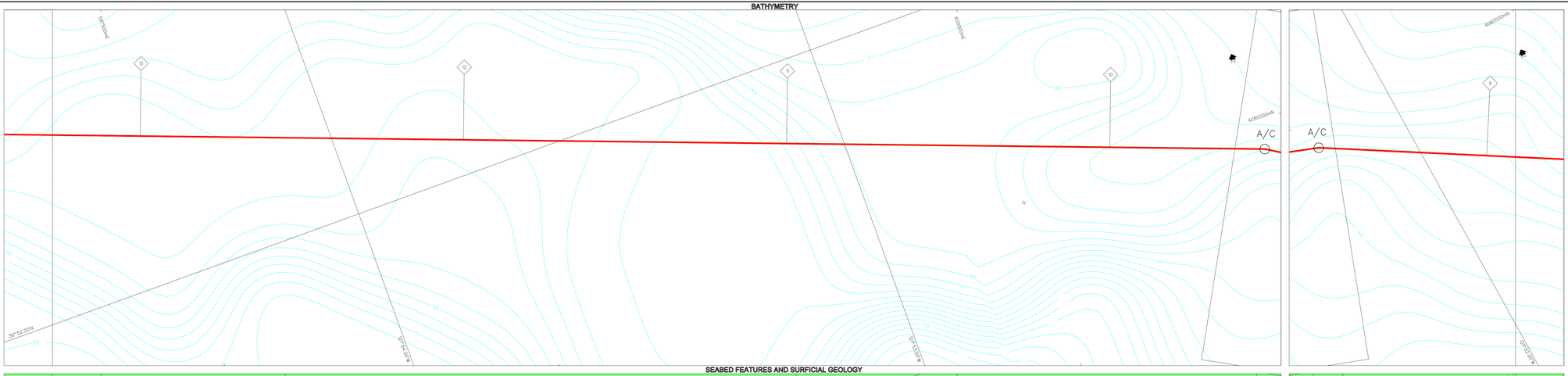
HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Data: March 2007 | Drawing Size: A0

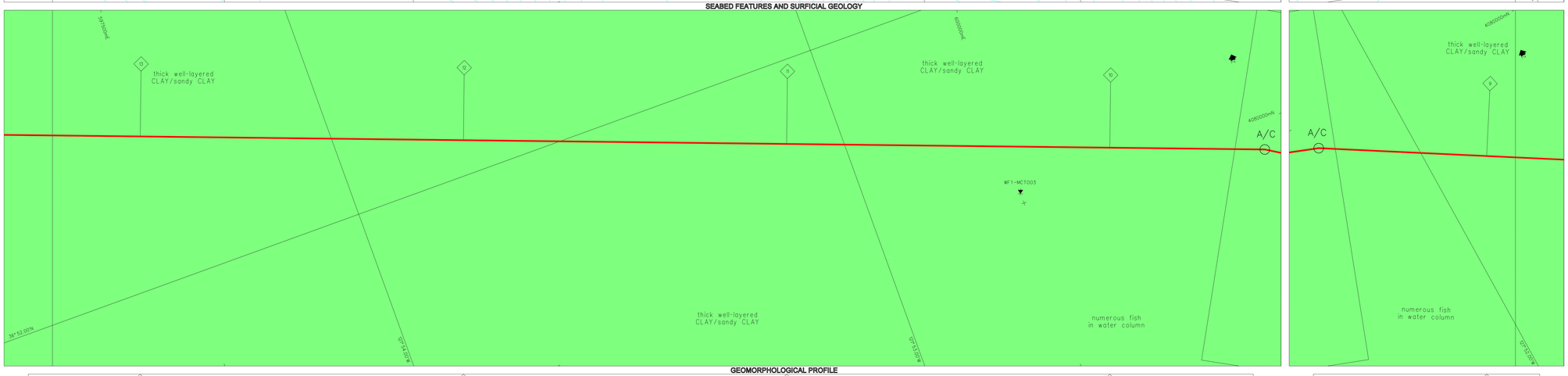
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_002.dwg | Chart Number: 002

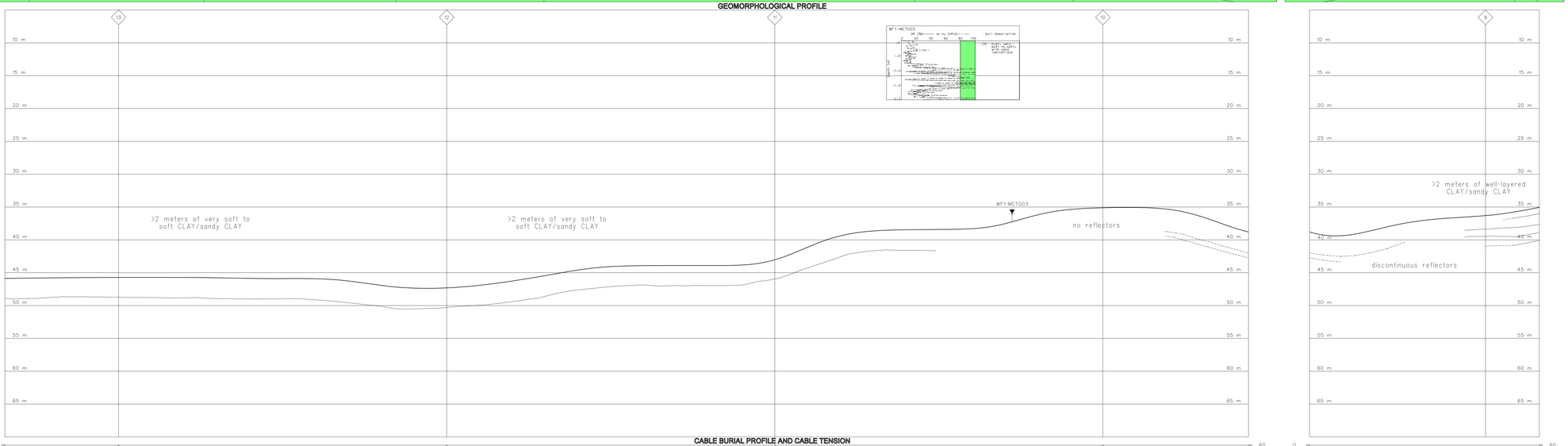
BATHYMETRY



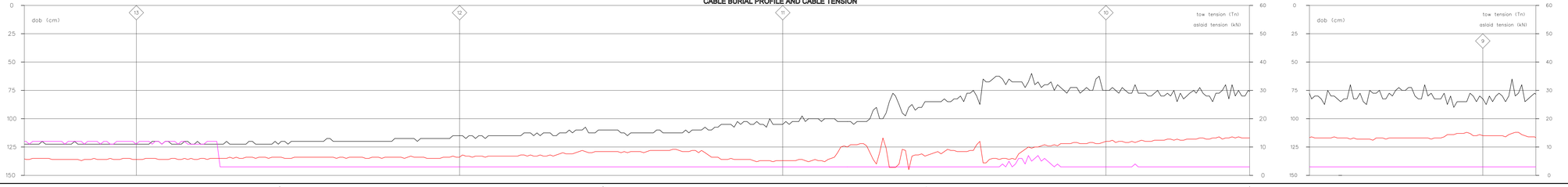
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- L4X6X1 (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MINI CONE PENETROMETER LOCATION
- MCI-CPT029/P1006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- L2X0X1 (metres) — WRECK, AS FOUND POSITION
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL Issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION (SAL / SA)
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   - PLOW: SMD Seaplow VII
   - ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHERIOD AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123e 00.00' W
LATITUDE OF ORIGIN	00e 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

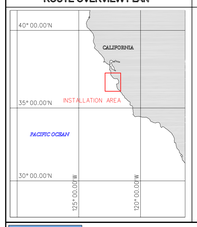
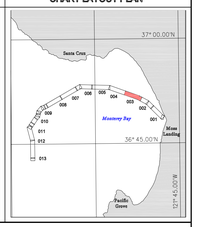


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA, 98121-1107
Tel: 206 441 9305
Fax: 206 441 9306

MARS

Monterey Accelerated Research System

As-Laid Cable Route

ALIGNMENT SHEET

HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m

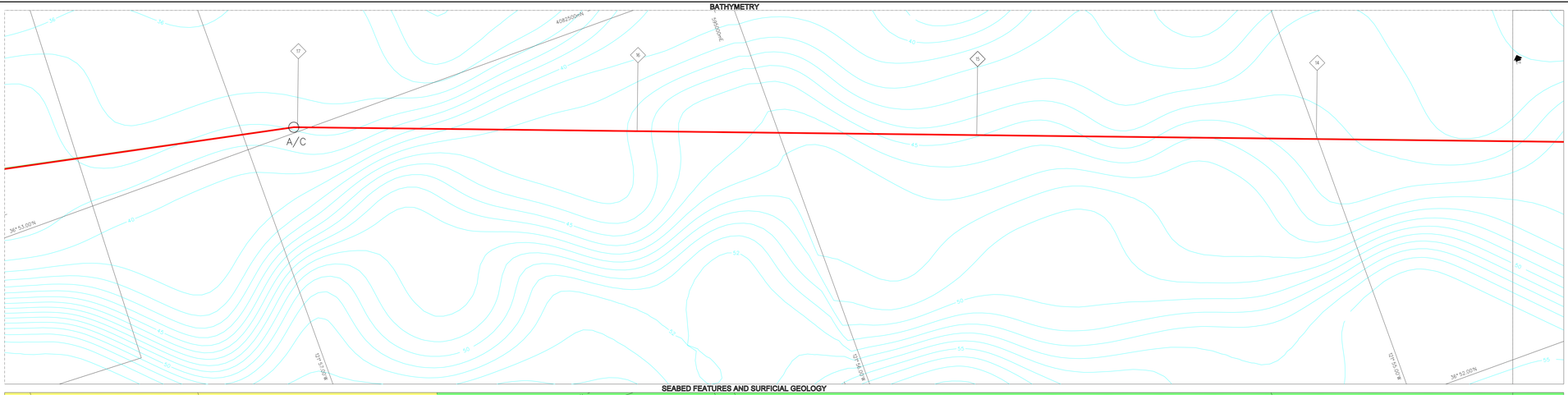
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

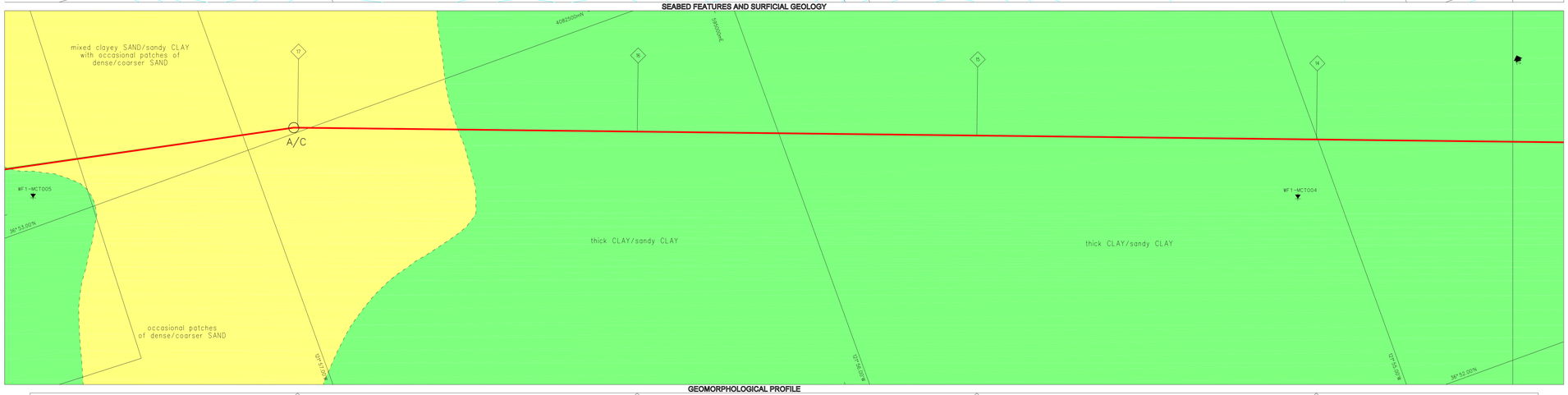
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_003.dwg | Chart Number: 003

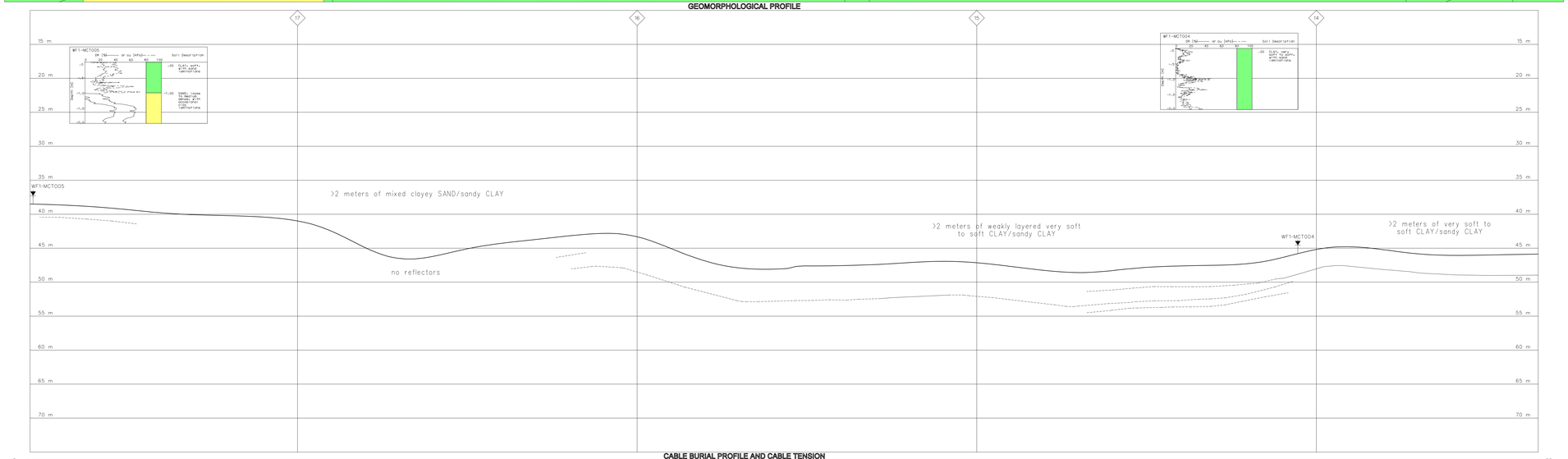
BATHYMETRY



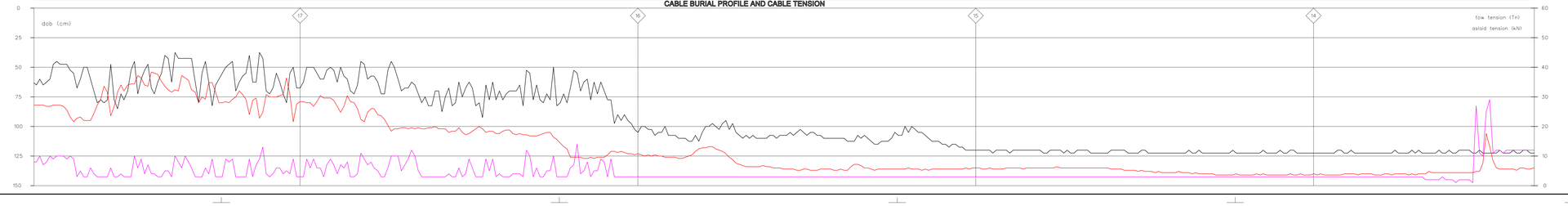
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MBR CONE PENETROMETER LOCATION
- MCI-CPT029/P0006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- WRECK, AS FOUND POSITION
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL Issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION (SAL / SA)
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123e 00.00' W
LATITUDE OF ORIGIN	00e 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

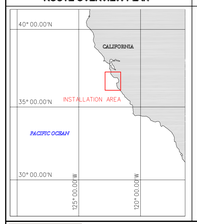


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System

As-Laid Cable Route

ALIGNMENT SHEET

HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m

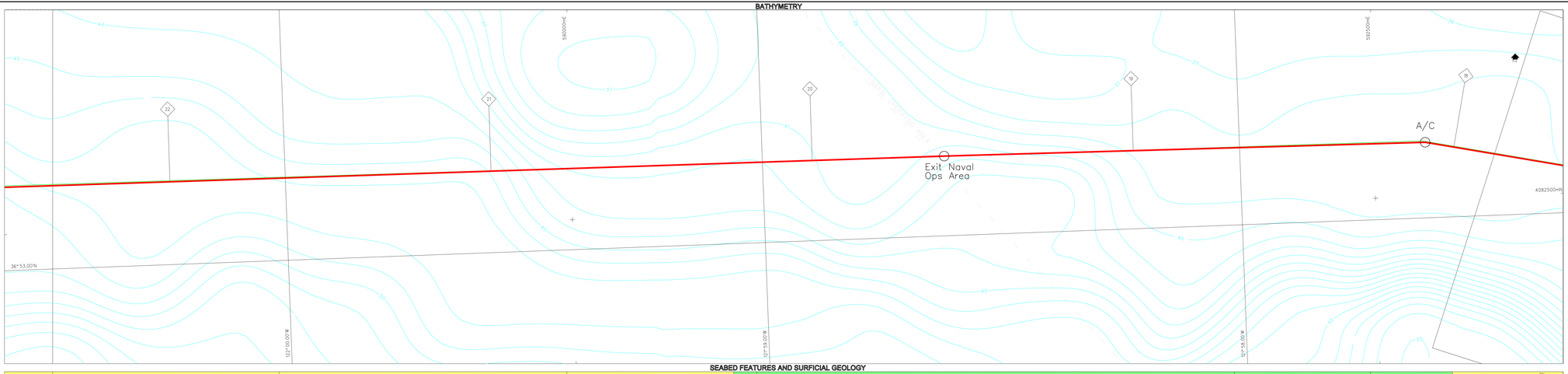
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL	Installation Date: March 2007	Drawing Size: A0	

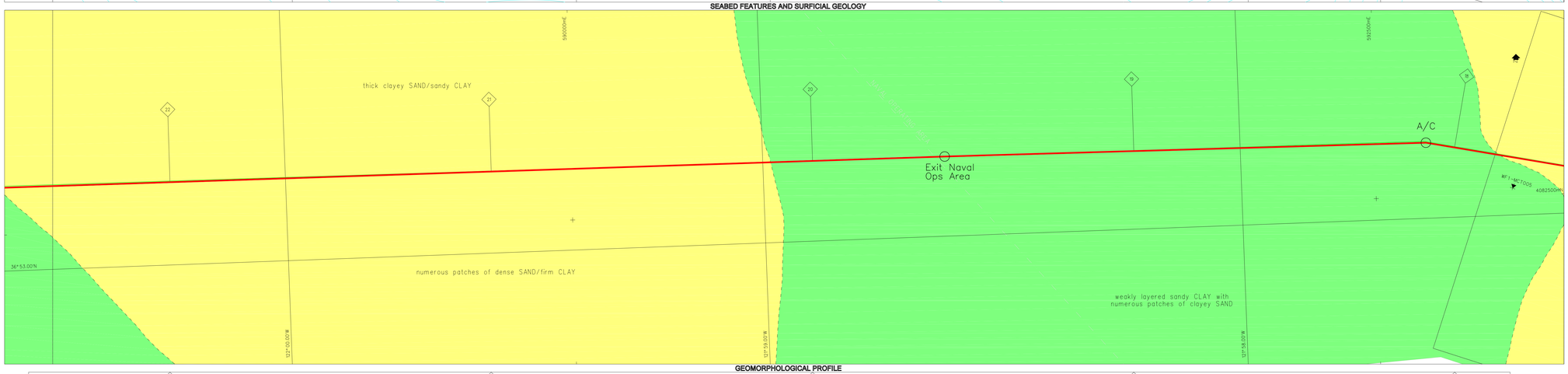
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007	File name: MARS_A_aslaid_004.dwg	Chart Number: 004

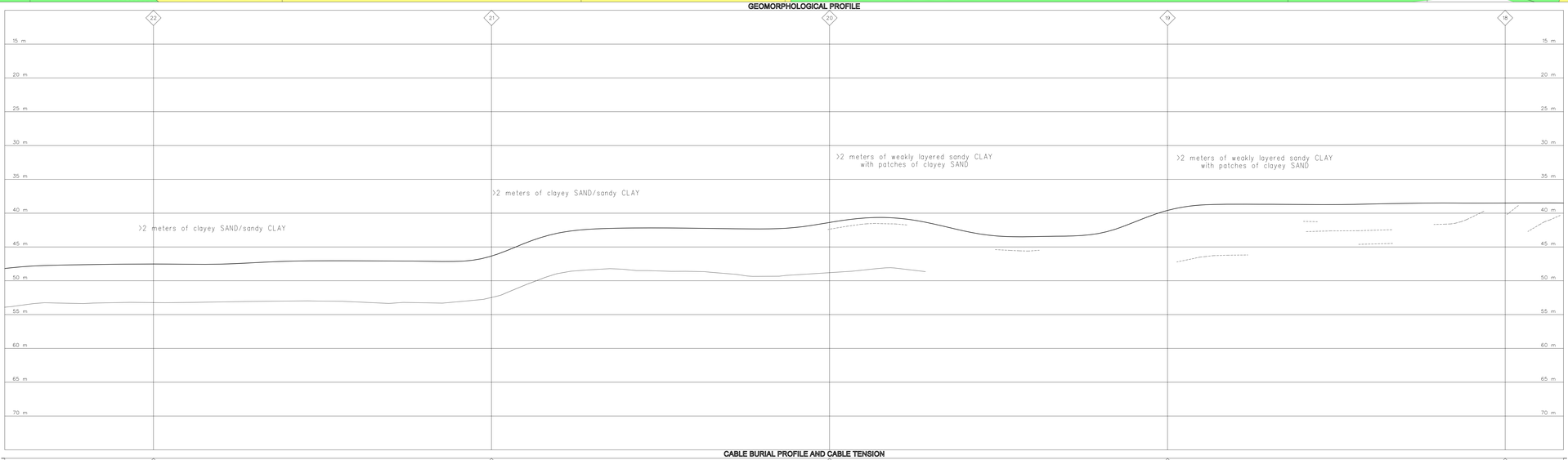
BATHYMETRY



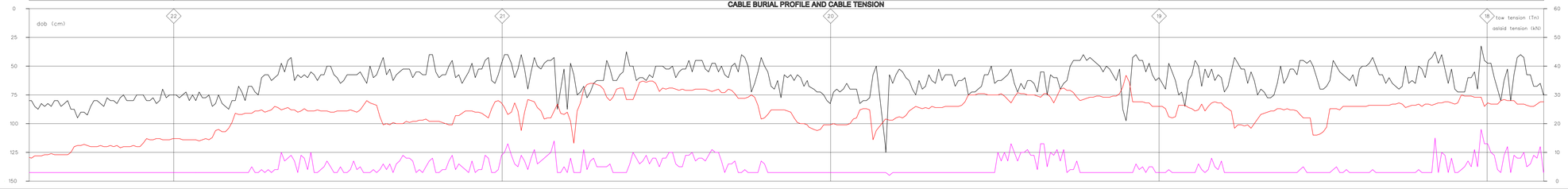
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- LARGE1 (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MINI CONE PENETROMETER LOCATION
- MCI-CPT025/P1006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- WRECK, AS FOUND POSITION LARGE1 (metres)
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- 6° — INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL Issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (AC)
- SPLICE BOX
- TRANSITION — SAL / SA
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123e 00.00' W
LATITUDE OF ORIGIIN	00e 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

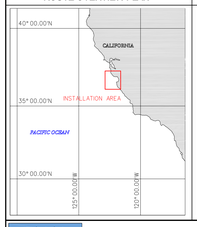


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System

As-Laid Cable Route

ALIGNMENT SHEET

HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

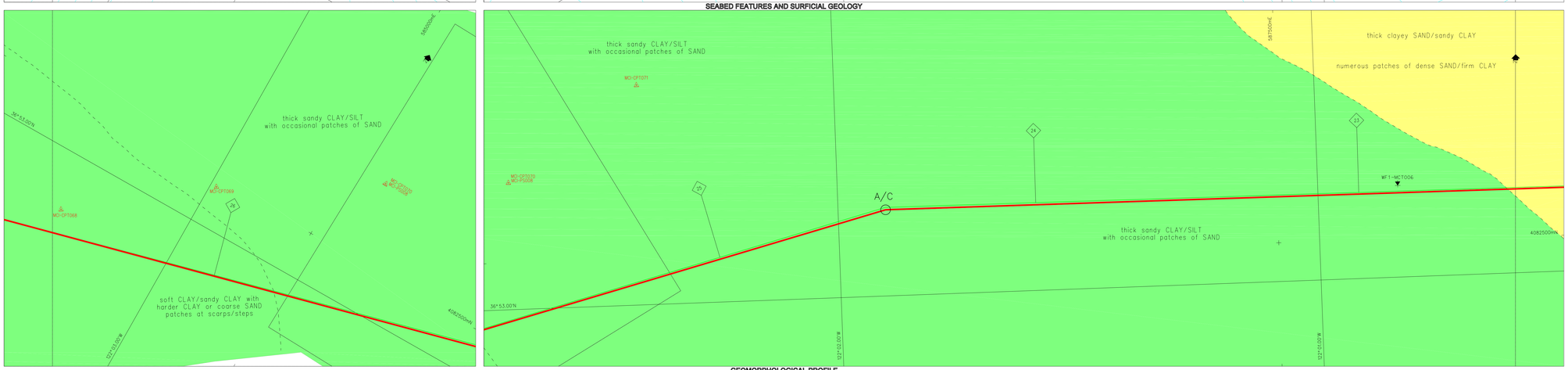
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_005.dwg | Chart Number: 005

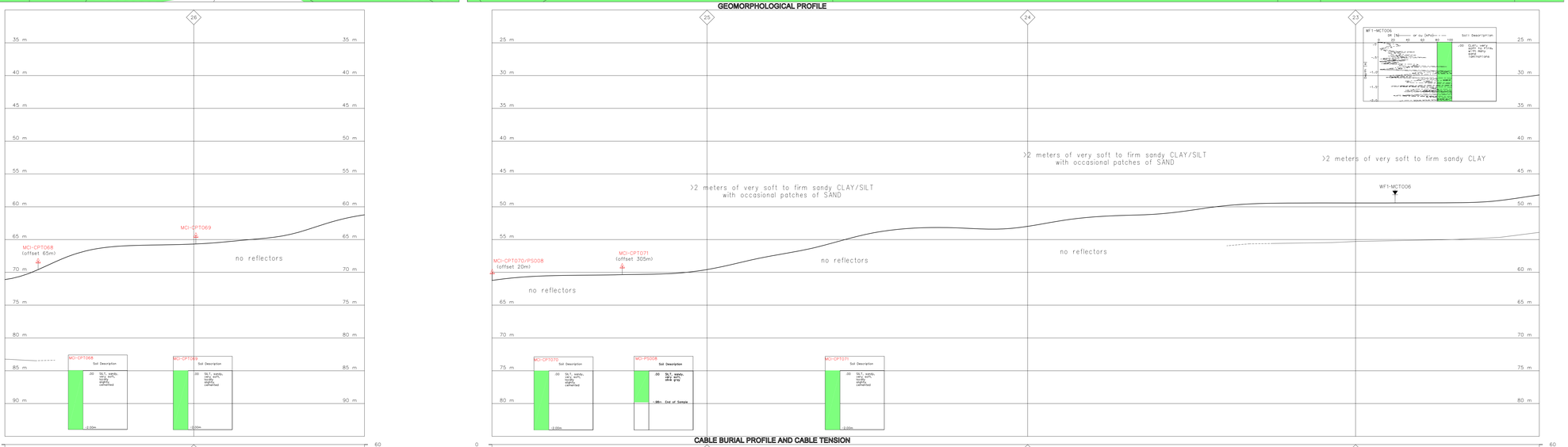
BATHYMETRY



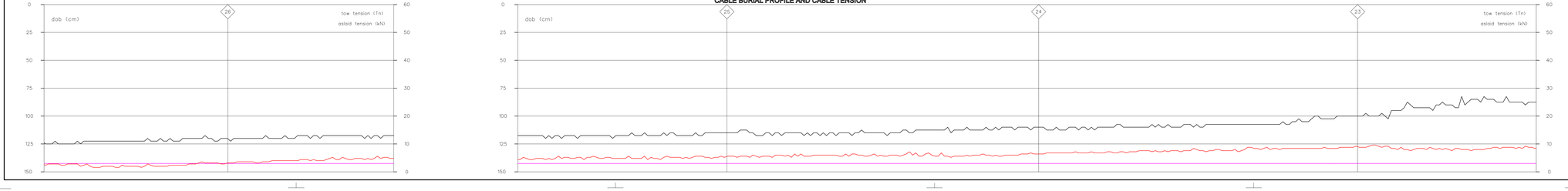
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- LX/WX1 (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MGR CONE PENETROMETER LOCATION
- MCI-CPT035/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- LX/WX1 (metres) — WRECK, AS FOUND POSITION
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- 6° — INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION — SAL / SA
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123æ 00.00' W
LATITUDE OF ORIGIN	00æ 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

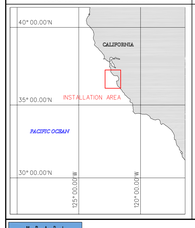
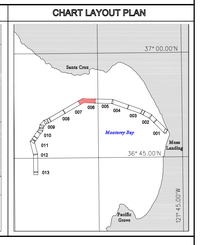


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System
As-Laid Cable Route

ALIGNMENT SHEET

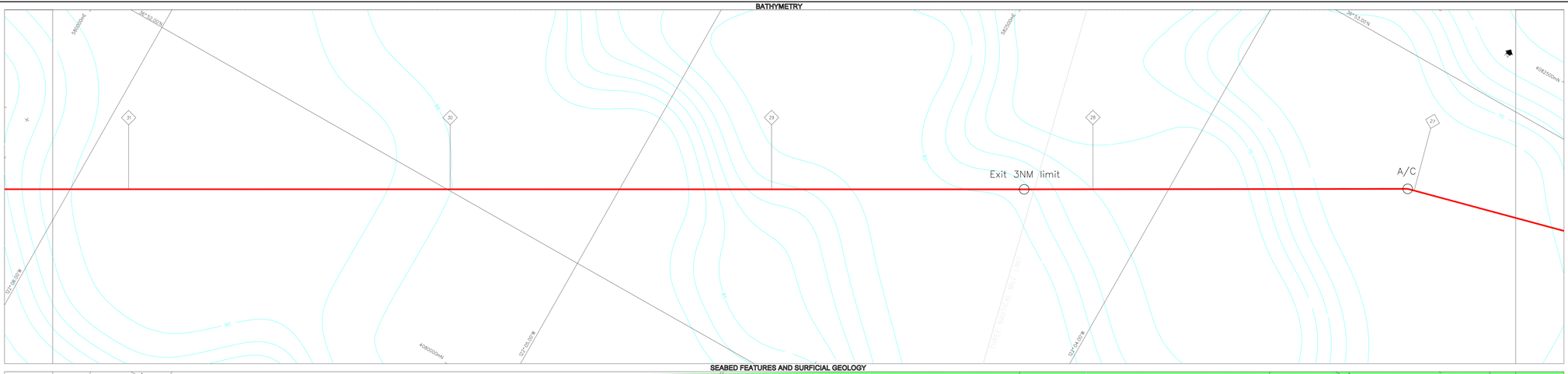
HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

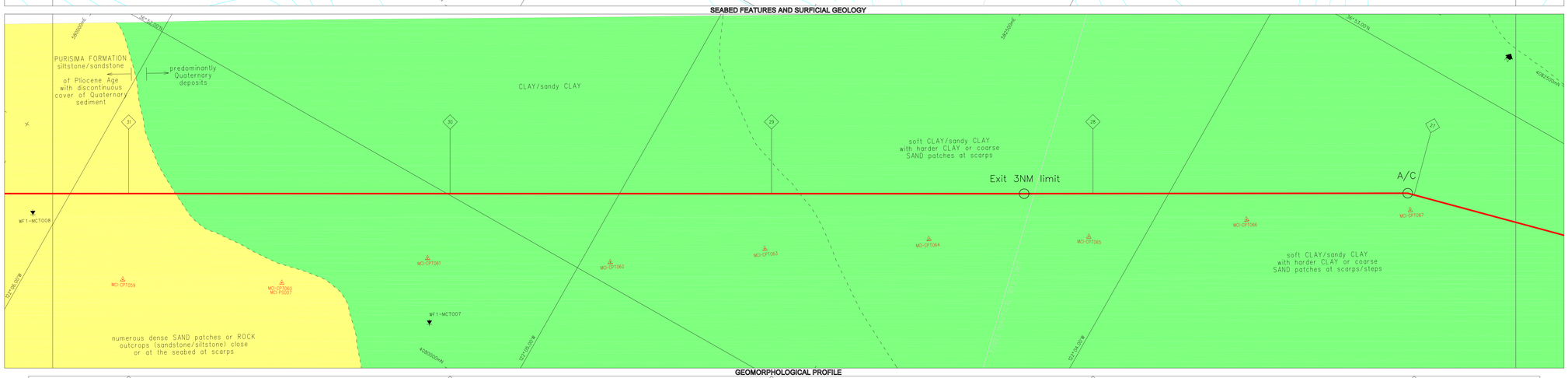
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_006.dwg | Chart Number: 006

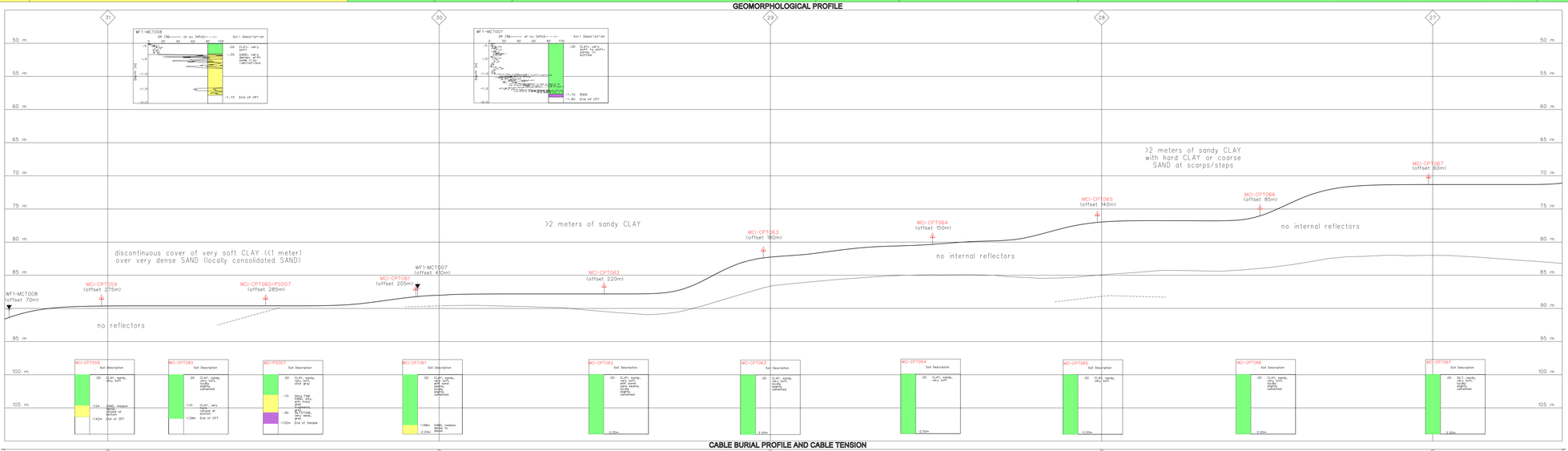
BATHYMETRY



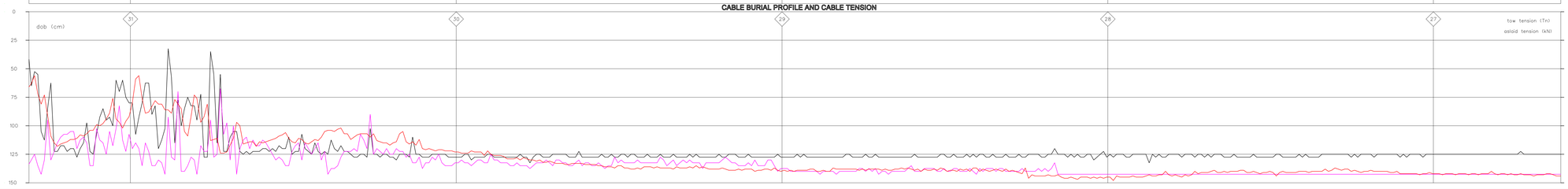
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- L(65)x1 (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MDR CONE PENETROMETER LOCATION
- MCI-CPT059/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- WRECK, AS FOUND POSITION L(65)x1 (metres)
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- 6° — INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route): RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION (SAL / SA)
- PLOW UP
- PLOW DOWN
- TRF

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   - PLOW: SMD Seaplow VII
   - ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123ø 00.00' W
LATITUDE OF ORIGIN	00ø 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

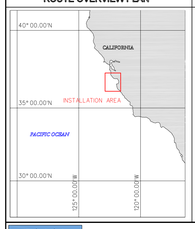
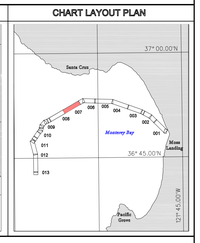


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9306

MARS

Monterey Accelerated Research System
As-Laid Cable Route

ALIGNMENT SHEET

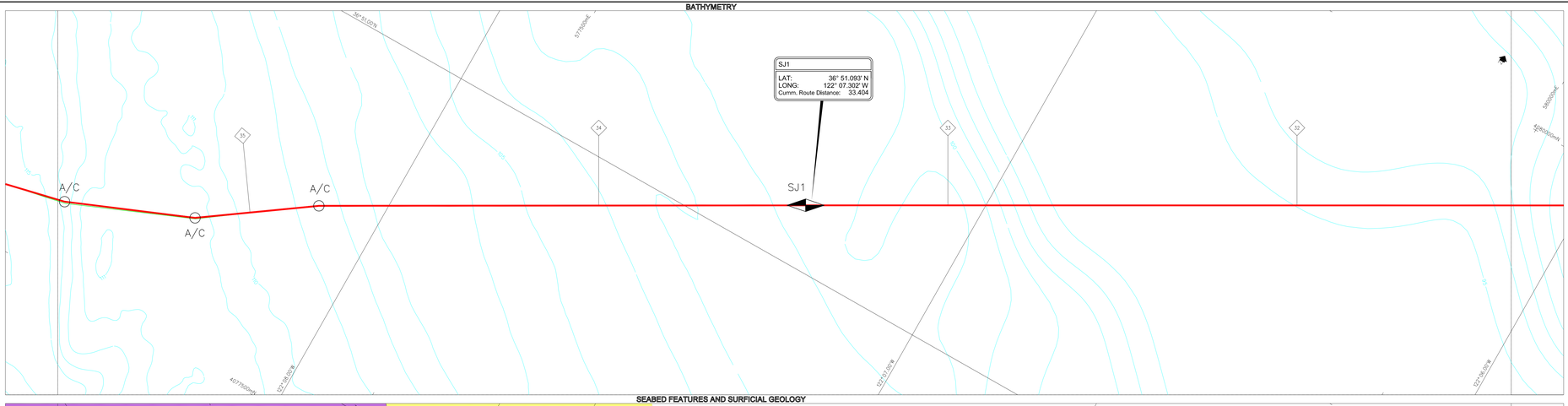
HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

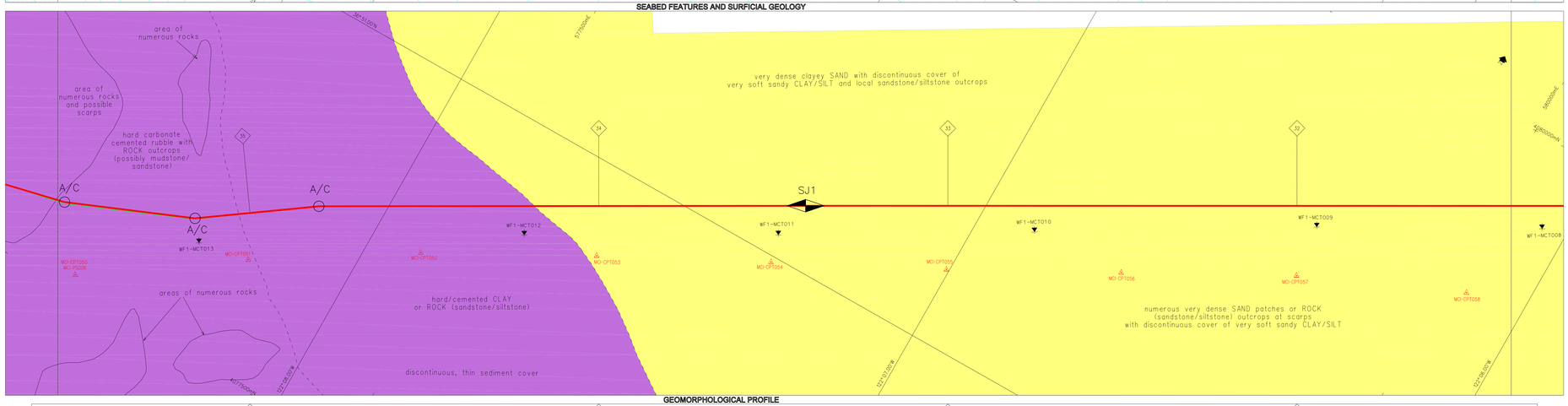
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_007.dwg | Chart Number: 007

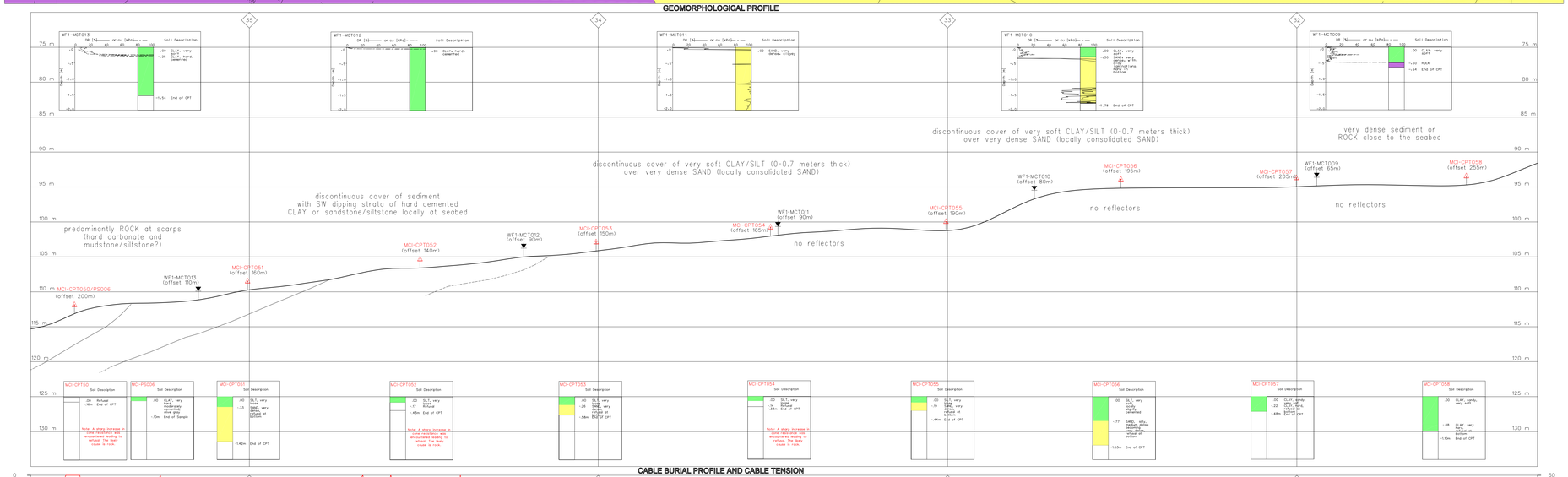
BATHYMETRY



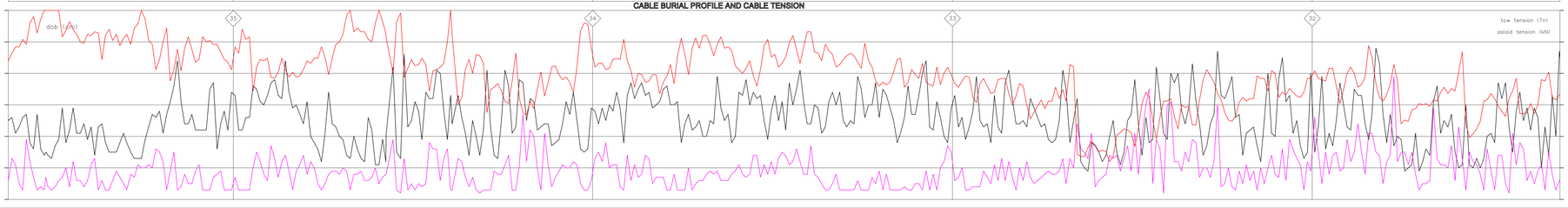
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- SONAR CONTACT WITH DIMENSIONS IF KNOWN (Length (metres))
- WF1-MCT001 — MINI CONE PENETROMETER LOCATION
- WRECK, AS FOUND POSITION (Length (metres))
- MCI-CPT029/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL Issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION (SAL / SA)
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Te)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123w 00.00' W
LATITUDE OF ORIGIN	00w 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

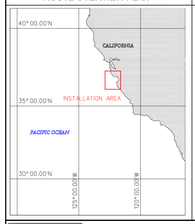
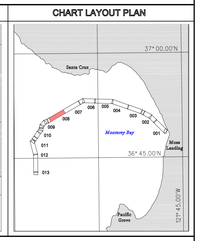


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System

As-Laid Cable Route

ALIGNMENT SHEET

HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m

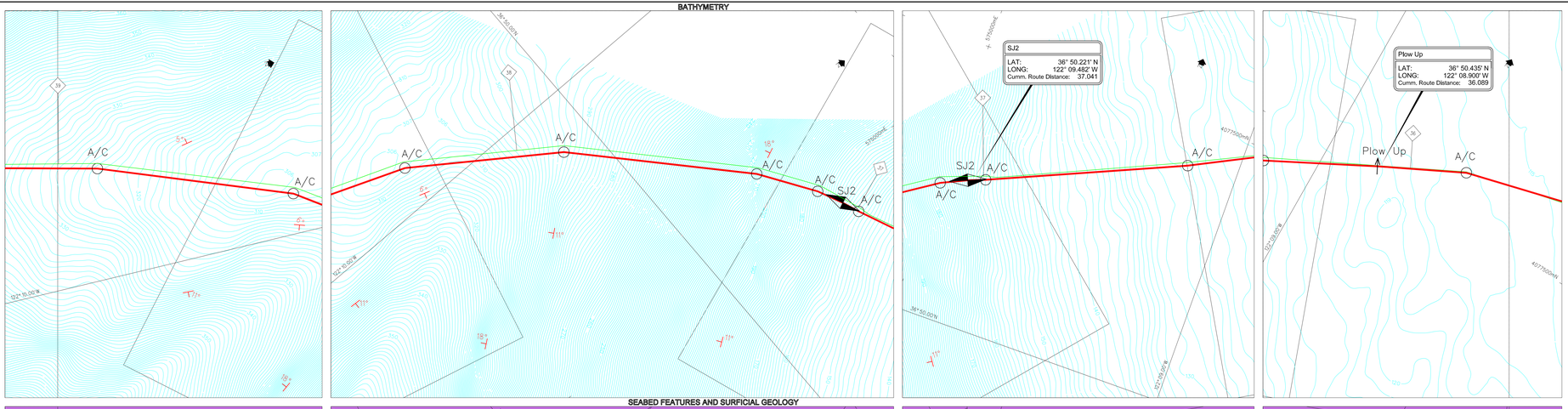
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

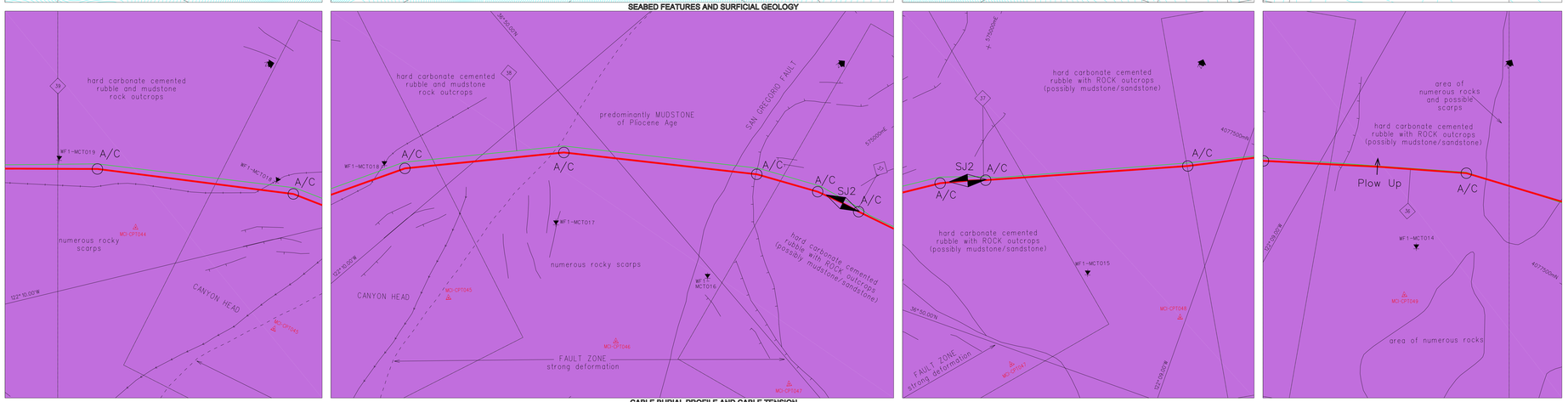
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information Included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_008.dwg | Chart Number: 008

BATHYMETRY



SEABED FEATURES AND SURFICIAL GEOLOGY



CABLE BURIAL PROFILE AND CABLE TENSION

LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- LATEST (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MINI CONE PENETROMETER LOCATION
- MCI-CPT020/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- WRECK, AS FOUND POSITION LATEST (metres)
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE = 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route): RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION — SAL | SA
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123æ 00.00' W
LATITUDE OF ORIGIN	00æ 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

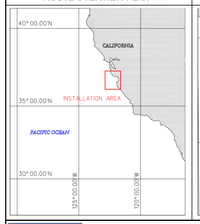
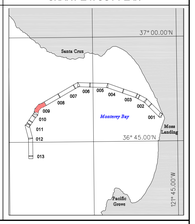


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System

As-Laid Cable Route

ALIGNMENT SHEET

HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m

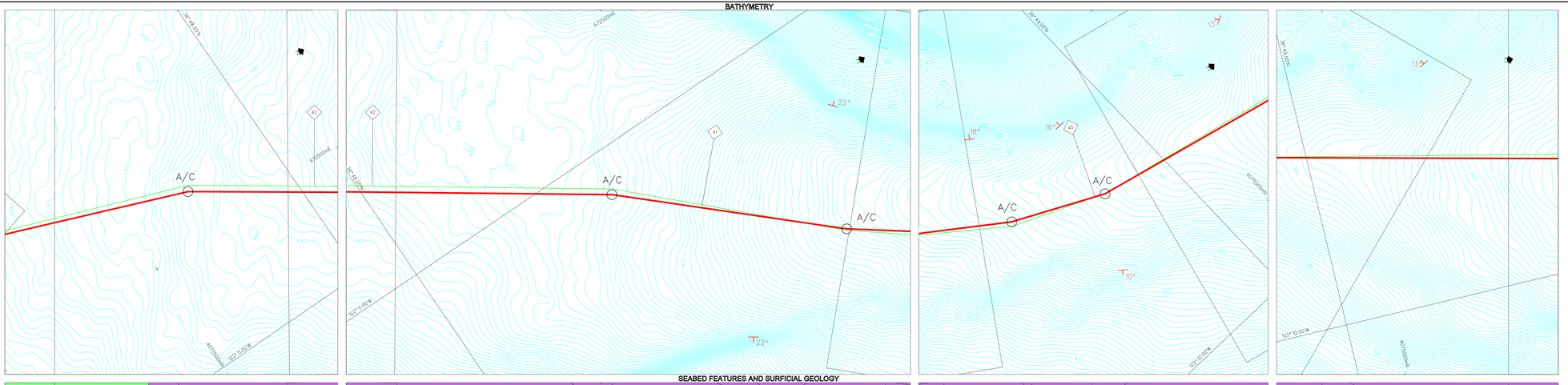
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

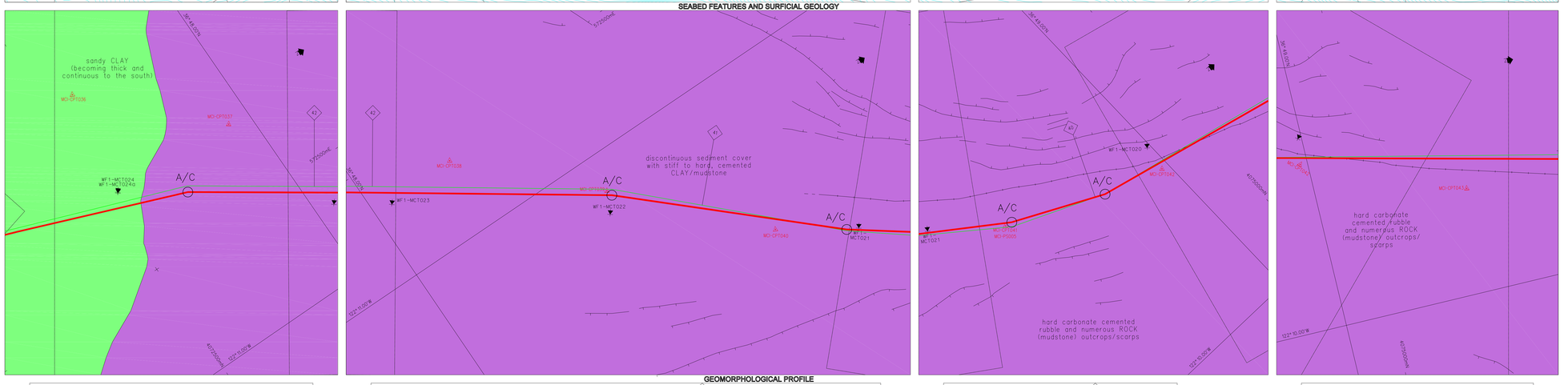
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information Included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_009.dwg | Chart Number: 009

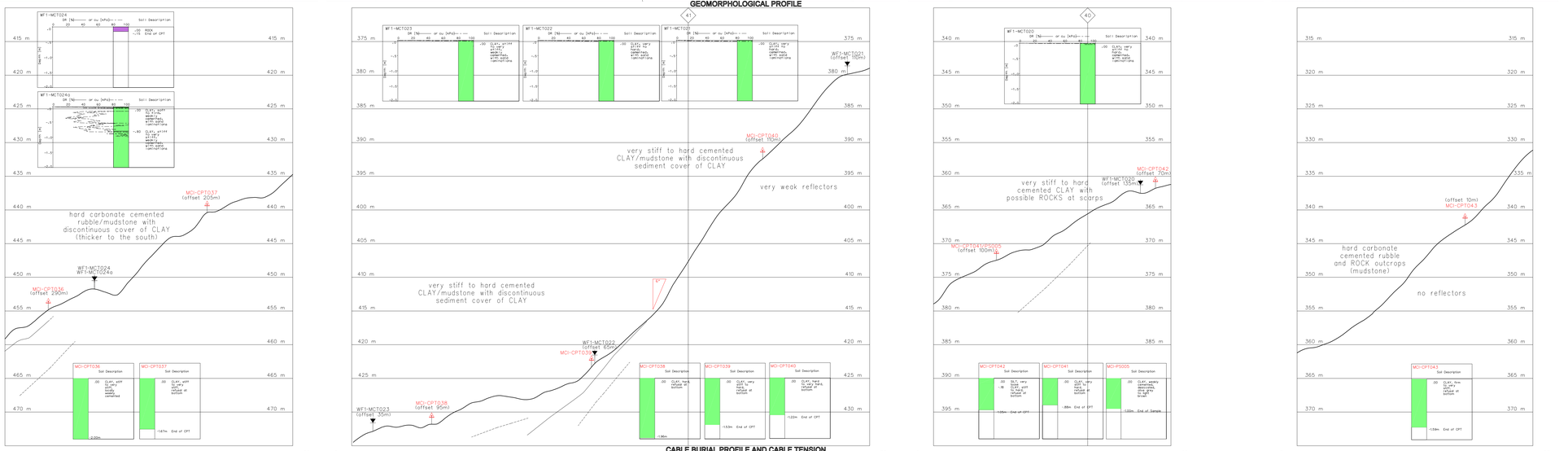
BATHYMETRY



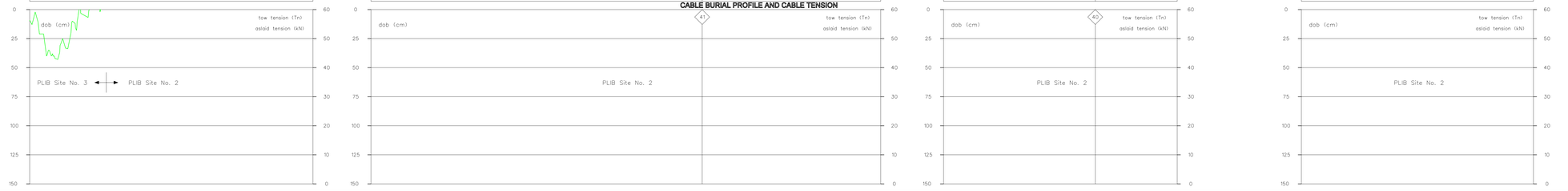
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- SONAR CONTACT WITH DIMENSIONS IF KNOWN (Length (metres))
- WF1-MCT001 — MINI CONE PENETROMETER LOCATION
- WRECK, AS FOUND POSITION (Length (metres))
- MCI-CPT029/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL Issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (AC)
- SPLICE BOX
- TRANSITION (SAL / SA)
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123w 00.00' W
LATITUDE OF ORIGIN	00w 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

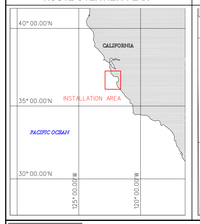
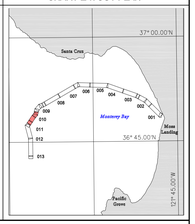


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System

As-Laid Cable Route

ALIGNMENT SHEET

HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m

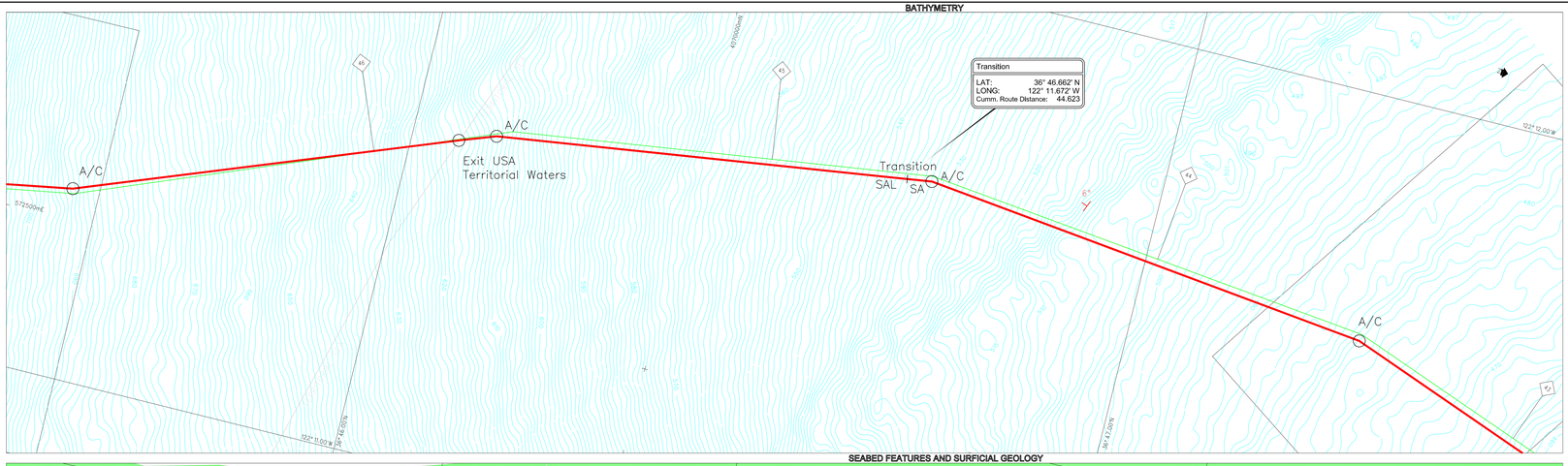
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

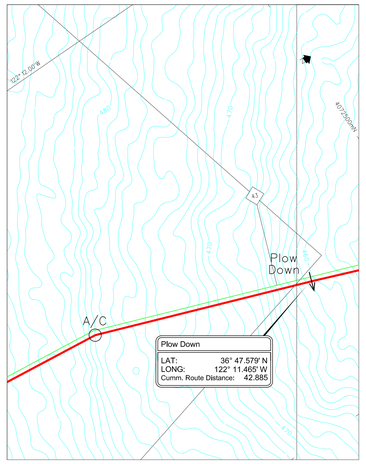
Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information Included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

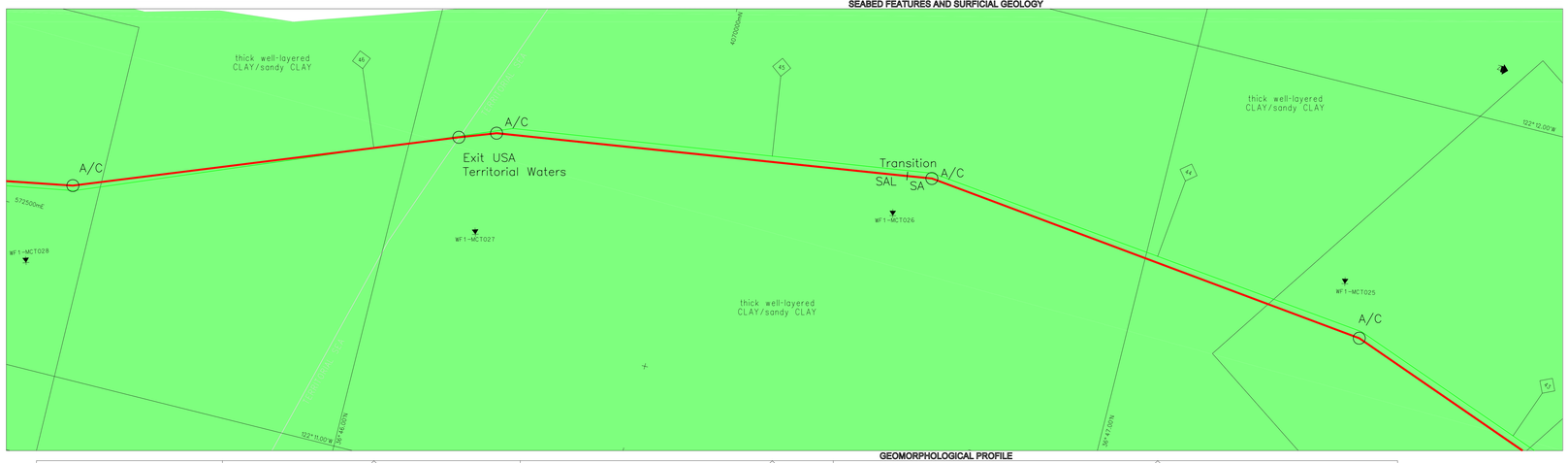
As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_010.dwg | Chart Number: 010

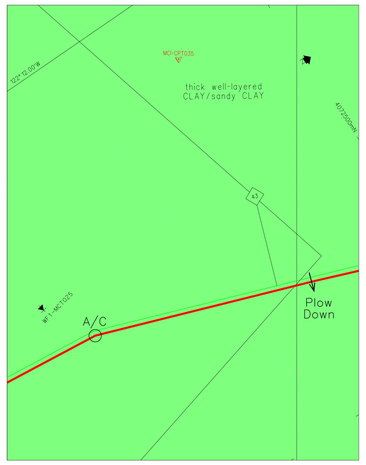
BATHYMETRY



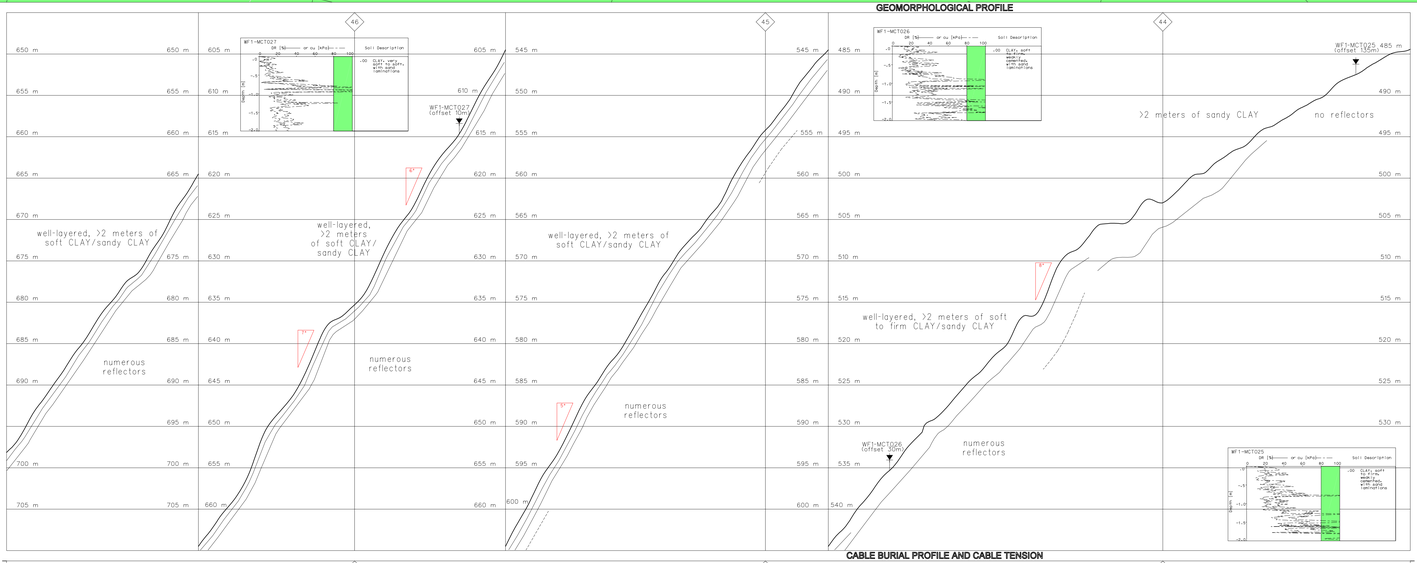


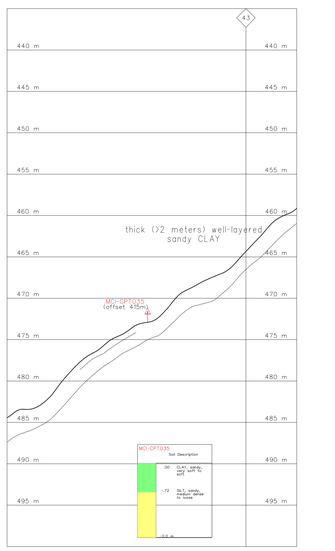
SEABED FEATURES AND SURFICIAL GEOLOGY



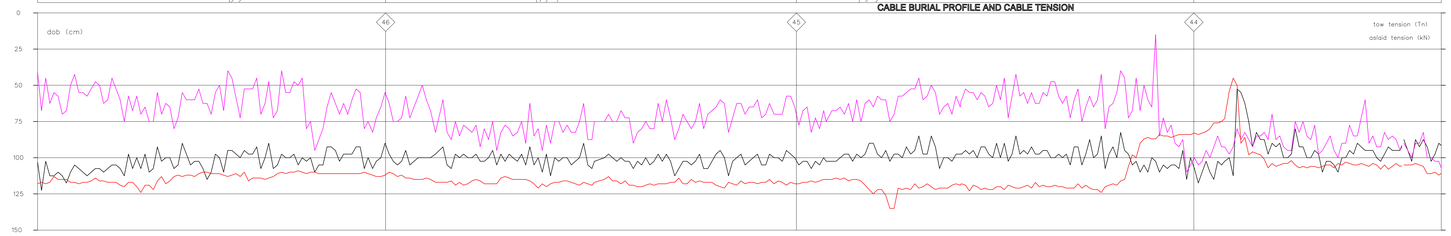


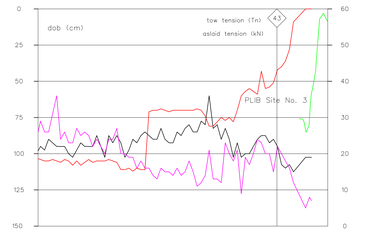
GEOMORPHOLOGICAL PROFILE





CABLE BURIAL PROFILE AND CABLE TENSION





LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- LATEST (metres) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MSR CONE PENETROMETER LOCATION
- MCI-CPT035/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- WRECK, AS FOUND POSITION LATEST (metres)
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL Issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- SAL | SA — TRANSITION
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th – March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123d 00.00' W
LATITUDE OF ORIGIN	00d 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

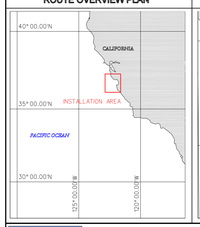
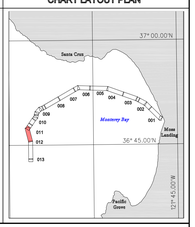


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9306

MARS
Monterey Accelerated Research System
As-Laid Cable Route
ALIGNMENT SHEET

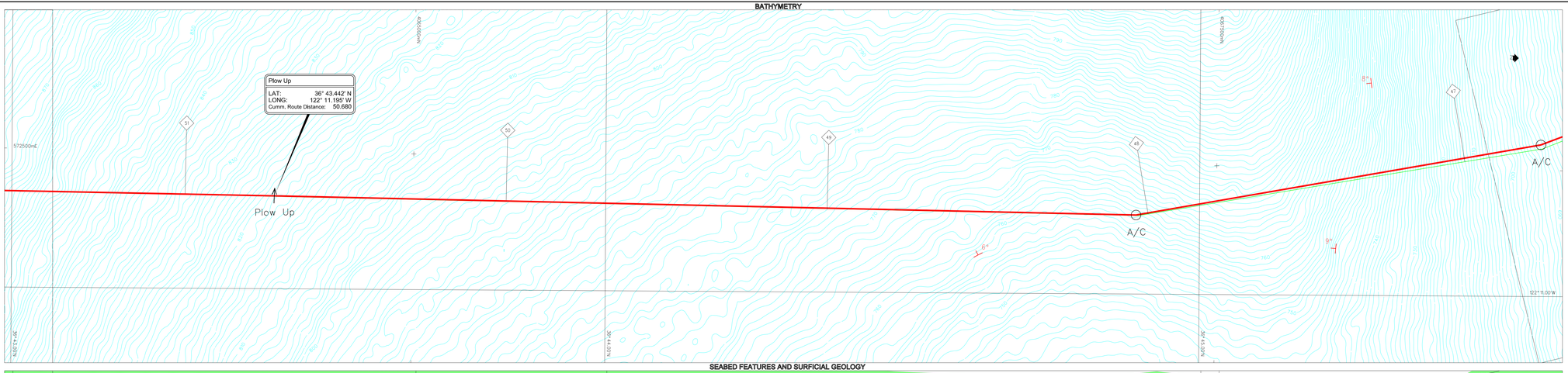
HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL	Installation Date: March 2007	Drawing Size: A0

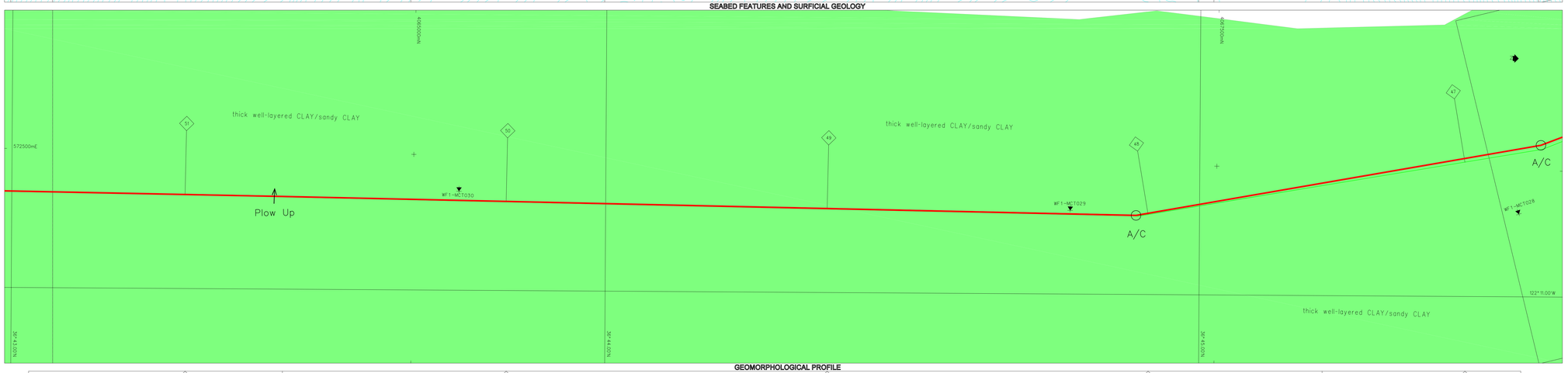
Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL:	File name:	Chart Number:
Issue 1 Date: April 03rd 2007	MARS_A_aslaid_011.dwg	011

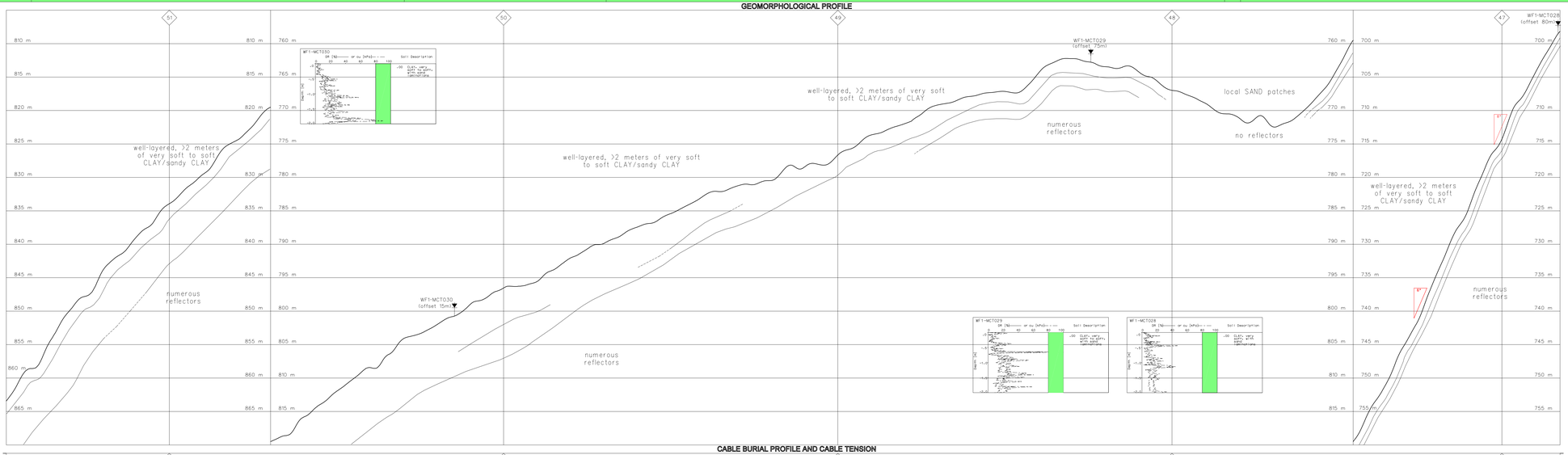
BATHYMETRY



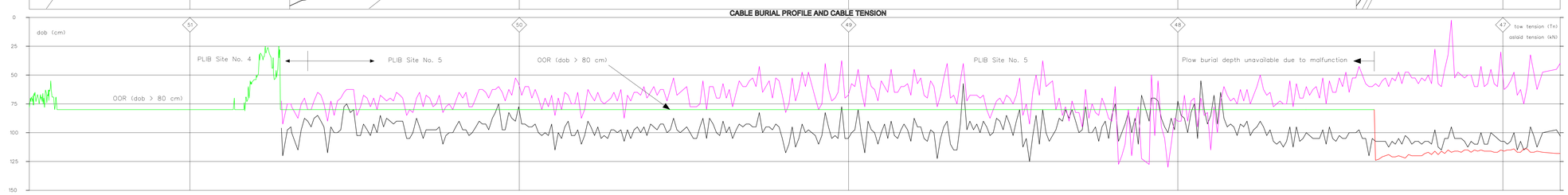
SEABED FEATURES AND SURFICIAL GEOLOGY



GEOMORPHOLOGICAL PROFILE



CABLE BURIAL PROFILE AND CABLE TENSION



LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- L≥100ft (=30m) — SONAR CONTACT WITH DIMENSIONS IF KNOWN
- WF1-MCT001 — MSR CONE PENETROMETER LOCATION
- MCI-CPT029/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- WRECK, AS FOUND POSITION L≥50ft (=15m)
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- INDICATED WHEN SLOPE > 5° ONLY

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route): RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL Issue dated on February 26th 2007.

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (ACP)
- SPLICE BOX
- TRANSITION (SAL / SA)
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123e 00.00' W
LATITUDE OF ORIGIN	00e 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

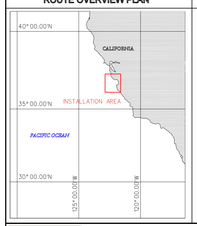
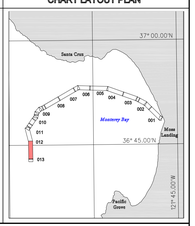


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS
Monterey Accelerated Research System
As-Laid Cable Route
ALIGNMENT SHEET

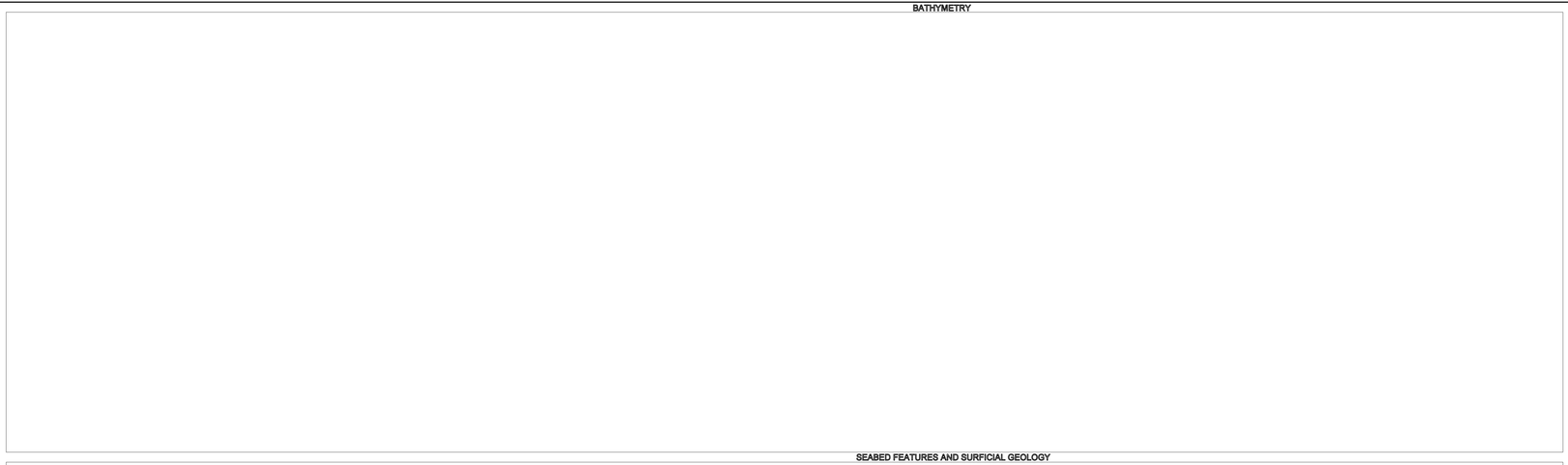
HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m
VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

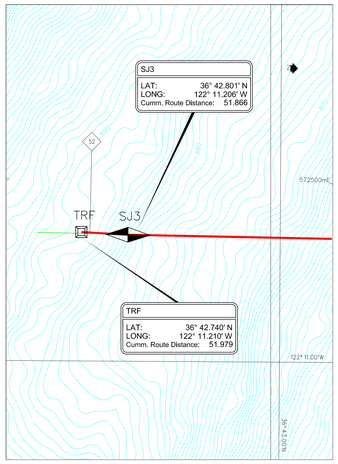
Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

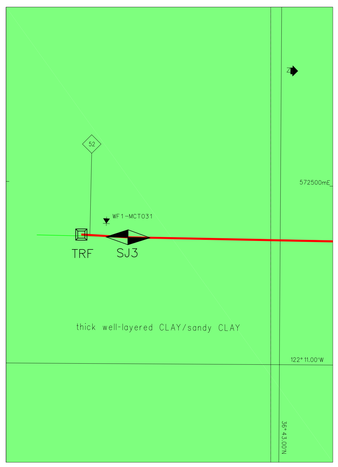
As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_012.dwg | Chart Number: 012

BATHYMETRY



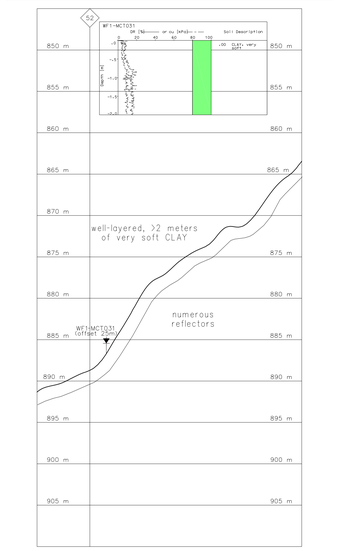


SEABED FEATURES AND SURFICIAL GEOLOGY

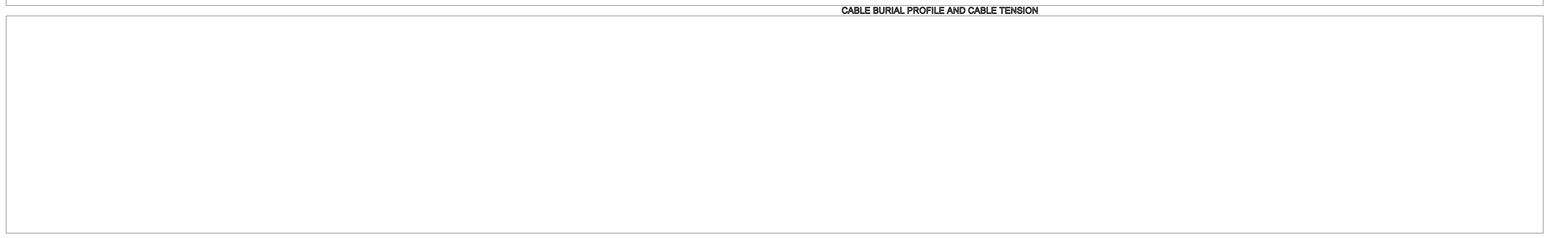


GEOMORPHOLOGICAL PROFILE





CABLE BURIAL PROFILE AND CABLE TENSION





LEGEND:

ROUTE SURVEY

- PLANNED CABLE ROUTE, SHOWING KILOMETER POST (KP) BASED ON RPL ISSUE DATED ON FEBRUARY 26th 2007.
- SIDE-SCAN SWATH COVERAGE
- LIMIT OF CHART OVERLAP
- EXPOSED PIPELINES AND SEWERS
- BURIED PIPELINES
- RESTRICTED AREA
- MARINE CONSERVATION AREA
- EXERCISE AREA
- MARITIME BOUNDARIES
- BUOYS/BEACONS/FADS (FISH AGGREGATING DEVICES)
- OBSTRUCTION
- SHIPWRECK

BATHYMETRY

- 100 — NOTE: CONTOUR INTERVAL 1 METER UNLESS SPECIFIED OTHERWISE ON CHART
- 6° — SLOPE AND SLOPE DIRECTION

SEABED FEATURES AND SURFICIAL GEOLOGY

- PIPELINE (AS OBSERVED)
- LINEAR SONAR CONTACT
- CHANNEL OR CANYON AXIS
- RIDGE
- SEDIMENT BOUNDARY
- INDISTINCT BOUNDARY
- FAULT OR SCARP
- INDISTINCT FAULT
- SONAR CONTACT WITH DIMENSIONS IF KNOWN (Lat/lon) (metres)
- WF1-MCT001 — MINI CONE PENETROMETER LOCATION
- WRECK, AS FOUND POSITION (Lat/lon) (metres)
- MCI-CPT029/PS006 — MCI CONE PENETROMETER/ PUSH SAMPLE LOCATION
- SILT OR CLAY
- SAND/silty or clayey SAND
- ROCK/CARBONATE/ CEMENTED MATERIAL

BATHYMETRIC PROFILE

- SEABED
- SEISMIC REFLECTOR
- INFERRED SEISMIC REFLECTOR
- 6° — INDICATED WHEN SLOPE = 5° ONLY

AS-LAID ROUTE

- AS-LAID CABLE ROUTE, SHOWING ALTER COURSE POINT (AC)
- SPLICE BOX
- TRANSITION (SAL / SA)
- TRF
- PLOW UP
- PLOW DOWN

CABLE BURIAL DATA

- PLOW DOB (cm)
- PLIB DOB (cm)
- TOW TENSION (Tn)
- AS LAID TENSION (kN)

SURVEY NOTES:

1) Sidescan and Subbottom data acquired using GeoAcoustics towfish.
2) Bathymetry data acquired from MBARI
3) Vertical Profile: Horizontal scale equals chart scale, vertical exaggeration 20x.
4) Depth Profile shown based on Post-Survey Cable Route (Engineered Route); RPL Rev. D 02-20-04
5) Data digitized from nautical charts displayed as grey. Data observed during survey depicted in black.
6) Planned Cable Route based on RPL issue dated on February 26th 2007.

INSTALLATION NOTES:

1) Vessel Name: CS GLOBAL SENTINEL
2) Burial Tool Specification:
   PLOW: SMD Seaplow VII
   ROV: PERRY Triton ST-217
3) Navigation Positioning: Differential GPS
4) Installation Date: March 14th - March 30th 2007
5) As-laid RPL: Issue 1 (April 03rd 2007)

GEODETIC PARAMETERS:

PROJECTION	UTM ZONE 10
SPHEROID AND DATUM	WGS84
HEMISPHERE	NORTHERN
FALSE EASTING	500,000 m
FALSE NORTHING	0 m
CENTRAL MERIDIAN	123ø 00.00' W
LATITUDE OF ORIGIN	00ø 00.00' N

Alcatel·Lucent

tyco Telecommunications

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED AND IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORIZED USE OF THIS DOCUMENT IN ANY FORM WHATSOEVER IS PROHIBITED.

ROUTE OVERVIEW PLAN

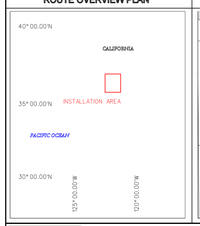
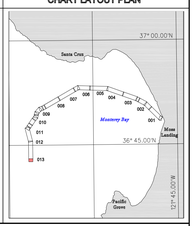


CHART LAYOUT PLAN



Monterey Bay Aquarium Research Institute

FUGRO SEAFLOOR SURVEYS, INC.
2727 Alaskan Way, Pier 69
Seattle, WA 98121-1107
Tel: 206 441 9305
Fax: 206 441 9308

MARS

Monterey Accelerated Research System
As-Laid Cable Route

ALIGNMENT SHEET

HORIZONTAL SCALE 1:5,000 — 100m 0m 100m 200m 300m 400m 500m

VERTICAL SCALE 1:250 — 5m 0m 5m 10m 15m 20m 25m

Vessel: CS GLOBAL SENTINEL | Installation Date: March 2007 | Drawing Size: A0

Issue:	Date:	Description:	Interpr:	Drawn:	Chkd:	Appr:
3	18-Apr-07	As-laid Information Included		MJ	JMS	IP
2	27-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
1	11-Feb-04	Final (Survey)	CD	AA, ER	DJ	DP
0	31-Dec-03	Draft Final (Survey)	CD	AA, ER	DJ	DP

As-Laid RPL: Issue 1 Date: April 03rd 2007 | File name: MARS_A_aslaid_013.dwg | Chart Number: 013

10 Daily Reports

10

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

DAILY REPORTS

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 1 Date: 03/08/07 Local Time: 0800 GMT -8 Prepared by: DB Page 1 of 3

A. VESSEL LOCATION

Latitude	44° 50.000' N	Longitude	124° 35.000' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		21	9		18

X	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000			
0600			
1200			
1800			
WEATHER FORECAST:	Wind 0-25 Kts through Thursday. Winds will ease to 15-20 Kts turning N/NWly Friday morning.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	0.000	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**0.000**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/23/2007

E. ESTIMATED DATE OF COMPLETION: 3/23/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Time (0000-2400)	Activity
1042	River Pilot on board. Last line. Commence transit.
1300	Pre-Lay coordination held with all onboard parties.
1701	Columbia bar pilot aboard. River pilot disembarked.
1824	Departure Columbia River.
2400	Vessel in transit to sea plow trial site.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete sea trial of Sea Plow VII. Resume transit to cable grounds.
Commence splicing operations for joint SJ2.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	0.00	0.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	0.00	0.00
Surface Lay Operations	0.00	0.00	0.00
Transit	13.50	0.00	13.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	0.00	0.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
TOTALS	**13.50**	**0.00**	**13.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/11/2007	Shore Landing
3/15/2007	Complete Surface Lay
3/21/2007	Install TRF

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: ETA Sea Plow trial site approximately 0930 local, 08 March.

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS:

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**

_____
K Brekke
MBARI Representative

© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 2 Date: 03/09/07 Local Time: 0800 GMT -8 Prepared by: DB Page 1 of 5

A. VESSEL LOCATION

Latitude	40° 38.700' N	Longitude	124° 42.300' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		21	9		18

X	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000			
0600			
1200			
1800			

WEATHER FORECAST:	CONDITIONS FOR MONTEREY BAY TO 20NM OFFSHORE: MODERATE NW/W-LIES TURN SW-LY ON FRIDAY NIGHT AND SATURDAY, THEN WINDS SHIFT TO THE NW ON SUNDAY AND CONTINUE OVER THE REMAIND OVER THE FORECAST PERIOD. COMBINED SEAS/SWELLS ARE EXPECTED TO BE NEAR 1.5-2.0M THROUGH TONIGHT, THEN RISE TO 2.5M ON FRIDAY. SEAS/SWELLS SUBSIDE OVER THE REMAINDER OF THE OUTLOOK.

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	0.000	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**0.000**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/23/2007

E. ESTIMATED DATE OF COMPLETION: 3/23/2007

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0951	Arrive at plow trial site N42 28.9940 W124 45.4450 WD 139m KP -92.863 Vs 0.49 kts
1006	Commence end prep for joint SJ2.
1109	Anchor on bottom N42 29.0130 W124 45.4480 WD 140m KP 0.000 Vs 0.28 kts
1359	Plow off deck N42 28.1681 W124 45.5208 WD 155m KP 1.567 Vs 0.38 kts SP7: N42 28.1693 W124 45.5202 KP 0.000
1420	Plow in the water N42 28.1240 W124 45.5240 WD 154m KP 27.021 Vs 0.29 kts SP7: N42 28.1290 W124 45.5227 KP 0.000
1441	Plow on bottom. Setting scopes. N42 28.0180 W124 45.5320 WD 155m KP 27.021 Vs 0.30 kts SP7: N42 28.0413 W124 45.5300 KP 0.000
1530	Complete end prep 1st end for joint SJ2.
1619	Plow at AC N42 27.5536 W124 45.5435 WD 167m KP 2.705 Vs 0.69 kts SP7: N42 27.7511 W124 45.5469 KP 2.344
1730	Complete end prep 2nd end for joint SJ2.
1810	Trial complete. Commence plow recovery N42 27.4745 W124 45.4541 WD 166m KP 2.843 Vs 0.12 kts SP7: N42 27.6334 W124 45.5169 KP 2.567
1851	Plow off bottom N42 27.6340 W124 45.5160 WD 163m KP 27.021 Vs 0.06 kts SP7: N42 27.6334 W124 45.5169 KP 0.000
1916	Plow on surface. Apply stopper on cable N42 27.6140 W124 45.5070 WD 163m KP 27.021 Vs 0.05 kts SP7: N42 27.6151 W124 45.5064 KP 0.000
1933	Plow out of water N42 27.6000 W124 45.4990 WD 163m KP 27.021 Vs 0.07 kts SP7: N42 27.6009 W124 45.4997 KP 0.000
2019	Plow on Deck N42 27.6000 W124 45.5020 WD 163m KP 27.021 Vs 0.03 kts
2050	Commence recovery of trial cable N42 27.6000 W124 45.4990 WD 163m KP 27.021 Vs 0.09 kts
2100	Ends linked for joint SJ2.
2308	Anchor off the bottom N42 28.7027 W124 45.5236 WD 150m KP 0.000 Vs 0.22 kts
2316	Anchor at waters edge N42 28.7000 W124 45.5250 WD 149m KP 27.021 Vs 0.03 kts
2332	Recovery complete, vessel resuming transit to cable grounds N42 28.7110 W124 45.5190 WD 150m KP 27.021 Vs 0.78 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Continue transit.
Complete splicing operations for joint SJ2.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	0.00	0.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	0.00	0.00
Surface Lay Operations	0.00	0.00	0.00
Transit	10.50	13.50	24.00
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	0.00	0.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	13.50	0.00	13.50
TOTALS	**24.00**	**13.50**	**37.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/11/2007	Shore Landing
3/15/2007	Complete Surface Lay
3/21/2007	Install TRF

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: ETA San Francisco Pilot Station approximately 2000 local, 09 March.

N. TYCO REPRESENTATIVE COMMENTS:

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

O. VESSEL REPRESENTATIVE COMMENTS:

P. PURCHASER REPRESENTATIVE COMMENTS:

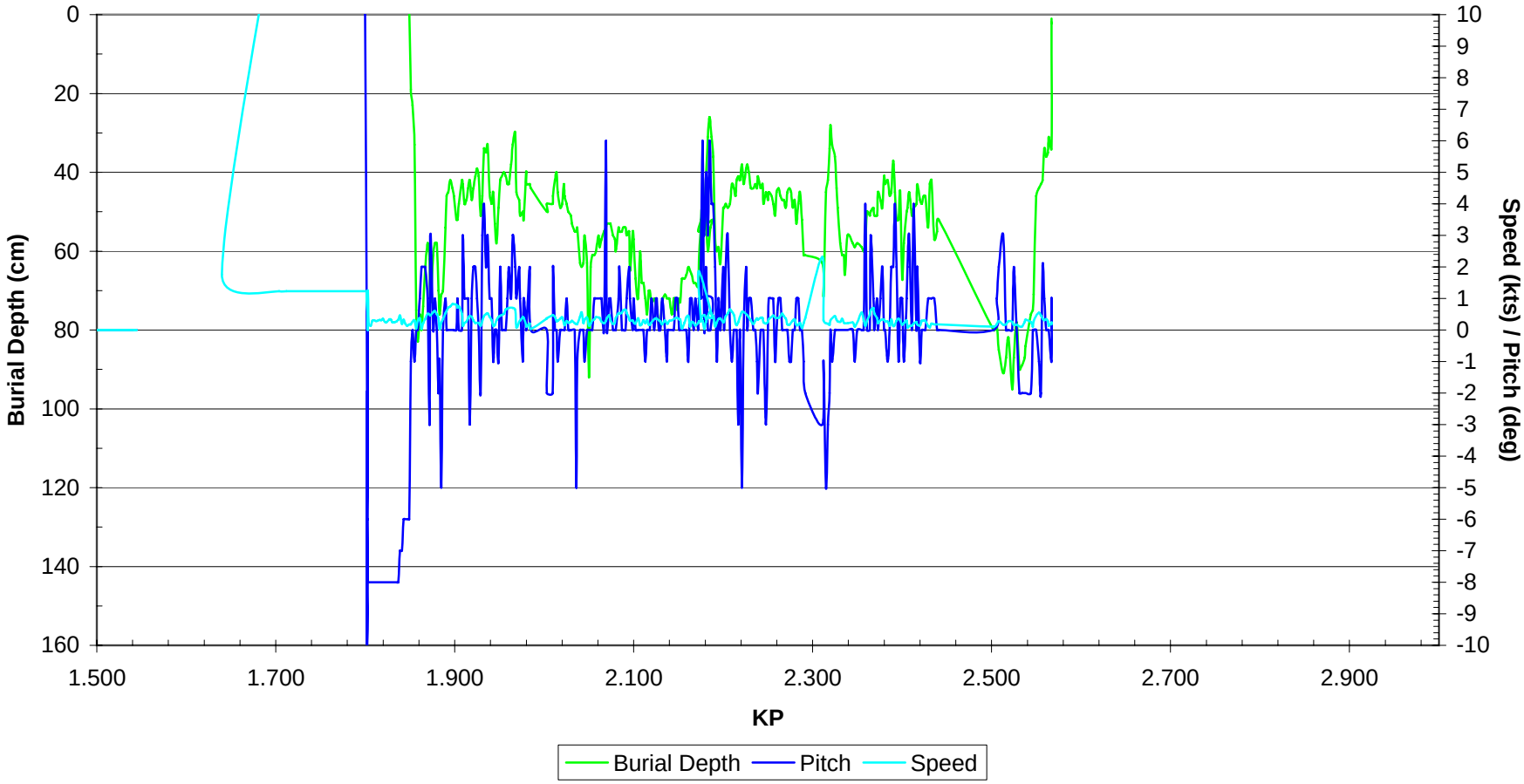
Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**

_____
K Brekke
MBARI Representative

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
08 Mar 2007 1929 UTC to 09 Mar 2007 0058 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 3 Date: 03/10/07 Local Time: 0800 GMT -8 Prepared by: DB Page 1 of 3

A. VESSEL LOCATION

Latitude	36° 44.500' N	Longitude	122° 02.000' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		18

X	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000			
0600			
1200			
1800			
WEATHER FORECAST:	MODERATE TO FRESH W/NNW WINDS ARE EXPECTED OVER MONTEREY BAY THROUGH THE REMAINDER OF THE FORECAST PERIOD. SEAS/SWELLS ARE EXPECTED TO BE NEAR 1.5M TO 2.5M BY THE END OF THE PERIOD.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	0.000	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**0.000**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0800	Commence fusion for joint SJ2.
1030	Commence coiling for joint SJ2.
1130	Complete fusion and coiling for joint SJ2.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1400	Commence mold ops for joint SJ2.
1800	Mold complete for joint SJ2.
1840	X-rays SJ2 completed with satisfactory results.
1950	Embarked pilot at San Francisco Pilot Station.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Arrive cable grounds. Embark Oil Spill Reps. Hold Pre-landing coordination meeting.
Commence PLGR operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	0.00	0.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	0.00	0.00
Surface Lay Operations	0.00	0.00	0.00
Transit	24.00	24.00	48.00
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	0.00	0.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
TOTALS	**24.00**	**37.50**	**61.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/13/2007	Shore Landing
3/17/2007	Complete Surface Lay
3/26/2007	Install TRF
3/28/2007	Disembark Personnel

J. TRANSMISSION: OTDR testing of joint SJ2 completed. Results satisfactory.

K. SUPPORT VESSEL STATUS

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

M. GENERAL REMARKS/COMMENTS: ETA Monterey Bay for personnel embarkation approximately 0700 local, 10 March.

N. TYCO REPRESENTATIVE COMMENTS: Estimated planning dates updated based on ASN schedule revised 5 Mar 2007.

O. VESSEL REPRESENTATIVE COMMENTS:

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 4 Date: 03/11/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 3

A. VESSEL LOCATION

Latitude	36° 53.100' N	Longitude	122° 01.600' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1021	3	NW force 3
0600	1021.5	2	ENE force 2
1200	1021.5	2	NW force 3
1800	1019.5	3	SE force 4
WEATHER FORECAST:	HIGH PRESSURE CONTINUES TO PROVIDE MODERATE TO FRESH N/NNW-LIES OVER THE FORECAST PERIOD WITH SEAS/SWELLS SUBSIDING OVER THE PERIOD.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	0.000	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**0.000**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0700	Arrive Monterey Bay. Maneuver to plow down location for PLGR operations.
0900	Start operations delayed at initial position due to anchored dive boat. PLGR to commence west of plow down position.
0915	PLGR Hooks at waters edge.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0946	Commence PLGR. N36 48.6950 W121 48.1350 WD 21m KP 1.411 Vs 0.02 kts
1003	Hooks moving on seabed. N36 48.7290 W121 48.1880 WD 21m KP 1.513 Vs 0.18 kts
1054	Vessel stop for grapnel recovery and inspection N36 48.8860 W121 48.3750 WD 21m KP 1.915 Vs 0.09 kts
1121	Grapnel hooks clear. Resume PLGR. N36 48.8720 W121 48.3370 WD 20m KP 1.858 Vs 0.39 kts
1200	Joint SJ2 complete.
1825	Vessel stop for grapnel recovery and inspection N36 51.6020 W121 52.2150 WD 37m KP 9.580 Vs 0.04 kts
1850	Grapnel hooks clear. Resume PLGR. N36 51.6030 W121 52.2150 WD 37m KP 9.580 Vs 0.02 kts
2348	Vessel passing AC6. Continuing PLGR. N36 53.0110 W121 56.9010 WD 41m KP 17.014 Vs 0.65 kts

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Continue PLGR operations along cable route.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	0.00	0.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	0.00	0.00
Surface Lay Operations	0.00	0.00	0.00
Transit	9.50	48.00	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	0.00	0.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	14.50	0.00	14.50
TOTALS	**24.00**	**61.50**	**85.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/13/2007	Shore Landing
3/17/2007	Complete Surface Lay
3/26/2007	Install TRF
3/28/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS

MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: Grapnel hooks recovered for inspection approximately every 10 km.

N. TYCO REPRESENTATIVE COMMENTS: Vessel experiencing intermittent gyro failure on one main gyro. Continuing operations offshore pending arrangements for repairs.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 5 Date: 03/12/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 4

A. VESSEL LOCATION

Latitude	36° 45.800' N	Longitude	122° 11.400' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:	Unlicensed:		Tyco Staff:	Others:	
18	27		9	20	

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1020.5	1	SE force 2
0600	1020.2	1	NE force 2
1200	1021	1	Lt. Airs
1800	1019.5	3	SE force 4
WEATHER FORECAST:	MON...W WINDS 5 TO 15 KT. WIND WAVES 1 TO 2 FT. NW SWELL 3 TO 6 FT AT 11 SECONDS. MON NIGHT...W WINDS 5 TO 10 KT BECOMING NE 5 KT. WIND WAVES 1 FT. W SWELL 3 TO 6 FT.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	0.000	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**0.000**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0046	Passing AC7 N36 53.1310 W121 57.6150 WD 40m KP 18.098 Vs 0.70 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0156	Exiting Naval Ops area N36 53.1330 W121 58.6190 WD 43m KP 19.589 Vs 0.58 kts
0310	Vessel stop for periodic grapnel recovery and inspection N36 53.1330 W121 58.7820 WD 44m KP 19.832 Vs 0.05 kts
0338	Grapnel hooks clear. Resume PLGR. N36 53.1296 W121 58.6118 WD 44m KP 19.578 Vs 0.26 kts
0905	Passing AC9 N36 52.7990 W122 03.5710 WD 72m KP 27.028 Vs 0.83 kts
0945	Tension spike to 7000lb. Stop for grapnel inspection. N36 52.5344 W122 04.1444 WD 79m KP 28.010 Vs 0.80 kts Approximate hook position at tension spike N36 52.663 W122 03.8658 WD 78m KP 27.533
1026	Grapnel out of water. Scrap wire engaged on hook. N36 52.6260 W122 03.9630 WD 77m KP 27.691 Vs 0.03 kts
1130	Scrap wire ends secured. Cut scrap wire on foredeck. N36 52.6266 W122 03.9619 WD 77m KP 27.690 Vs 0.05 kts
1147	Commence pickup of scrap wire on port drum. N36 52.6266 W122 03.9618 WD 77m KP 27.690 Vs 0.26 kts
1215	End of scrap on port drum. Approx 50 meters recovered. Commence recovery of second scrap end. N36 52.6266 W122 03.9619 WD 77m KP 27.690 Vs 0.05 kts
1321	End of scrap wire on deck. Approx 162m total wire recovered. N36 52.6477 W122 03.9840 WD 77m KP 27.700 Vs 0.25 kts
1401	Preparing to resume PLGR. N36 52.6578 W122 03.8786 WD 77m KP 27.554 Vs 0.04 kts
1432	Grapnel hooks a waters edge. Resume PLGR. N36 52.6640 W122 03.8749 WD 76m KP 27.544 Vs 0.11 kts
1825	Tension spike to 6000lb. Stop for grapnel inspection. N36 51.2420 W122 06.9770 WD 99m KP 32.851 Vs 0.03 kts
1915	Grapnel hooks clear. Resume PLGR. N36 51.3310 W122 06.7675 WD 98m KP 32.499 Vs 0.12 kts
2128	Passing A/C 10 N36 50.7210 W122 08.1180 WD 110m KP 34.802 Vs 0.82 kts
2142	Passing A/C 11 N36 50.6280 W122 08.3260 WD 112m KP 35.163 Vs 0.83 kts
2158	Passing A/C 12 N36 50.4900 W122 08.5250 WD 114m KP 35.533 Vs 0.80 kts
2211	Passing A/C 13 N36 50.4750 W122 08.7400 WD 119m KP 35.847 Vs 0.83 kts
2236	Passing A/C 14 N36 50.3580 W122 09.0940 WD 127m KP 36.416 Vs 0.86 kts
2242	Vessel stop at plow up position. Recover grapnel. N36 50.3310 W122 09.1730 WD 130m KP 36.543 Vs 0.06 kts
2326	Grapnel out of water N36 50.4290 W122 08.9220 WD 122m KP 36.128 Vs 0.04 kts
2330	Proceeding to plow down position to resume PLGR. N36 50.4291 W122 08.9217 WD 123m KP 36.128 Vs 0.05 kts

G. PLANNED ACTIVITIES NEXT 24 HOURS:

Complete PLGR operations. Complete ROV survey of TRF landing area. Calibrate USBL/HPR.

© Copyright 2007 All rights reserved.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	0.00	0.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	0.00	0.00
Surface Lay Operations	0.00	0.00	0.00
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	0.00	0.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	23.00	14.50	37.50
TOTALS	**23.00**	**85.50**	**108.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/18/2007	Complete Surface Lay
3/26/2007	Install TRF
3/28/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: Grapnel hooks raised for inspection approximately every 10 km. Ships clocks advanced 1 hour to conform to PDT (UTC -7).

N. TYCO REPRESENTATIVE COMMENTS: Vessel experienced intermittent gyro failure on one main gyro. Continuing operations offshore pending arrangement for repairs.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 6 Date: 03/13/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 4

A. VESSEL LOCATION

Latitude	36° 42.200' N	Longitude	122° 11.200' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1019	3	NW force 4
0600	1016.5	3	NE force 4
1200	1017.5	3	NW force 4
1800	1014.2	4	NW force 5
WEATHER FORECAST:	MODERATE N/NW-LIES NOW EXPECTED TO FRESHEN TUESDAY AFTERNOON AS A NEW AREA OF HIGH PRESSURE BEGINS STRENGTHENING TO THE WEST. 2-2.5M COMBINED SEAS/SWELLS EXPECTED OVER MUCH OF THE PERIOD. VISIBILITY: MODERATE, WITH AREAS OF POOR VISIBILITY AND FOG POSSIBLE OVERNIGHT INTO TUESDAY MORNING.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	0.000	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**0.000**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Local Time (0000-2400)	Activity
0030	Arrival at plow down location. Resume PLGR operations. N36 47.6813 W122 11.4308 WD 7m KP 42.721 Vs 0.26 kts
0110	Grapnel on bottom N36 47.7490 W122 11.3980 WD 457m KP 42.587 Vs 0.39 kts
0210	Passing AC 26. N36 47.3070 W122 11.6010 WD 482m KP 43.457 Vs 0.64 kts
0318	Passing AC 27 N36 46.7080 W122 11.8310 WD 534m KP 44.597 Vs 0.61 kts
0434	Passing AC 28 N36 46.1000 W122 11.7580 WD 609m KP 45.649 Vs 0.51 kts
0614	Passing AC 29 N36 45.4090 W122 11.4090 WD 717m KP 47.035 Vs 0.55 kts
0711	Passing AC 30 N36 44.9130 W122 11.0220 WD 758m KP 48.031 Vs 0.72 kts
1000	Passing TRF position. N36 42.6700 W122 11.2100 WD 894m KP 52.149 Vs 0.98 kts
1038	Grapnel at TRF location. PLGR complete. Commence grapnel recovery. N36 42.0470 W122 11.2140 WD 1017m KP 53.302 Vs 0.21 kts
1119	Grapnel off bottom. N36 42.2393 W122 11.2854 WD 969m KP 52.948 Vs 0.09 kts
1203	Grapnel at surface. N36 42.3934 W122 11.2661 WD 942m KP 52.663 Vs 0.35 kts
1244	ROV off deck. N36 42.6779 W122 11.2672 WD 900m KP 52.137 Vs 0.04 kts ROV: N36 48.6605 W121 48.0593 KP 1.282
1248	ROV in the water N36 42.6780 W122 11.2670 WD 899m KP 52.137 Vs 0.00 kts ROV: N36 48.6605 W121 48.0593 KP 1.282
1320	ROV on bottom for beacon deployment and survey. N36 42.6778 W122 11.2668 WD 900m KP 52.137 Vs 0.03 kts ROV: N36 43.3008 W122 11.1024 KP 50.981
1421	Beacon 'B' deployed. N36 42.6570 W122 11.2275 WD 900m KP 52.175 Vs 0.12 kts ROV: N36 42.6591 W122 11.2255 KP 52.171
1442	Beacon 'A' deployed. N36 42.6828 W122 11.1769 WD 897m KP 52.126 Vs 0.25 kts ROV: N36 42.6806 W122 11.1755 KP 52.130
1459	Beacon 'C' deployed. N36 42.7057 W122 11.2203 WD 896m KP 52.084 Vs 0.03 kts ROV: N36 42.7066 W122 11.2285 KP 52.083
1512	Commence SONAR survey of TRF landing site. N36 42.7055 W122 11.2202 WD 896m KP 52.085 Vs 0.06 kts ROV: N36 42.7036 W122 11.2248 KP 52.088
1523	No obstructions observed on SONAR. N36 42.6870 W122 11.2081 WD 897m KP 52.119 Vs 0.01 kts ROV: N36 42.6806 W122 11.2077 KP 52.131
1525	Commencing survey northward along track. N36 42.6871 W122 11.2083 WD 897m KP 52.119 Vs 0.19 kts ROV: N36 42.6878 W122 11.2107 KP 52.117
1730	Tracking PLGR grapnel scar. N36 43.4251 W122 11.1828 WD 829m KP 50.753 Vs 0.29 kts ROV: N36 43.4251 W122 11.1996 KP 50.754
1747	Survey complete. Commence ROV Recovery.

© Copyright 2007 All rights reserved.

	N36 43.4357 W122 11.2425 WD 832m KP 50.735 Vs 0.21 kts ROV: N36 43.4453 W122 11.2421 KP 50.717
1750	ROV off bottom N36 43.4348 W122 11.2435 WD 832m KP 50.737 Vs 0.03 kts ROV: N36 43.4454 W122 11.2425 KP 50.717
1815	ROV on deck N36 43.4364 W122 11.2440 WD 832m KP 50.734 Vs 0.07 kts
1906	Commence USBL/HPR calibration. N36 43.4107 W122 10.9780 WD 821m KP 0.000 Vs 0.21 kts

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete USBL/HPR calibration. Conduct pre-landing coordination meeting.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	0.00	0.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	0.00	0.00
Surface Lay Operations	0.00	0.00	0.00
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	0.00	0.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	12.50	37.50	51.00
ROV Operations	6.00	0.00	6.00
Calibration	5.50	0.00	5.50
TOTALS	**24.00**	**108.50**	**132.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/18/2007	Complete Surface Lay
3/26/2007	Install TRF
3/28/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS

MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:
MBNMS representative has expressed a concern regarding interpretation and implementation of marine mammal monitoring plan.

Q. SIGNATURES:

D Brawn **Tyco Representative**	**G Thomas** **Vessel Master**	**M Wilson** **ASN Representative**
K Brekke **MBARI Representative**	**J Slaughter** **MBNMS Representative**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 7 Date: 03/14/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 3

A. VESSEL LOCATION

Latitude	36° 49.400' N	Longitude	121° 52.700' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:	Unlicensed:		Tyco Staff:	Others:	
18	27		9	20	

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1015	4	NW force 6
0600	1014.9	3	NW force 4
1200	1016.5	3	WNW force 4
1800	1015.5	2	WSW force 3
WEATHER FORECAST:	MODERATE TO FRESH N/NW-LIES EXPECTED OVER THE PERIOD IN ASSOCIATION WITH PACIFIC HIGH PRESSURE. VISIBILITY MODERATE TO POOR, WITH AREAS OF FOG POSSIBLE DURING THE MORNING HOURS.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	0.000	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**0.000**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0650	USBL/HPR calibration completed.
0706	Departed TRF site. Moving inshore for coordination meeting.
1030	Standing by off Moss Landing.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1045	Commenced embarkation of shore personnel.
1215	Conducted pre-landing coordination meeting.
1230	Commenced installation of end seal on cable for bore pipe insertion.
1520	Shore personnel disembarked.
1630	Completed end seal installation.
1800	End seal pull tested to 2T.
2359	Standing by for shore landing operations at first light.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Conduct shore landing operations. Commence plow burial operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
Standby	17.00	0.00	17.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	0.00	0.00
Surface Lay Operations	0.00	0.00	0.00
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	0.00	0.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	7.00	5.50	12.50
TOTALS	**24.00**	**132.50**	**156.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/18/2007	Complete Surface Lay
3/26/2007	Install TRF
3/28/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 8 Date: 03/15/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 5

A. VESSEL LOCATION

Latitude	36° 48.800' N	Longitude	121° 48.300' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1017.8	2	NW force 3
0600	1019.2	1	ESE force 2
1200	1020.5	1	SE force 2
1800	1018.3	1	W force 2
WEATHER FORECAST:	MODERATE TO FRESH N/NW-LIES EXPECTED OVER THE PERIOD IN ASSOCIATION WITH PACIFIC HIGH PRESSURE. VISIBILITY MODERATE TO POOR, WITH AREAS OF FOG POSSIBLE DURING THE MORNING HOURS.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.167	1.364	0.167	1.364
TOTALS	**9.107**	**43.339**	**0.167**	**1.364**	**0.167**	**1.364**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0716	Maneuvering to landing position. N36 48.7124 W121 48.8749 WD 31m KP 2.191 Vs 2.69 kts
0810	In position for landing operations. N36 48.6292 W121 47.9716 WD 22m KP 1.139 Vs 0.03 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0812	Messenger line passed to support boat. N36 48.6303 W121 47.9711 WD 21m KP 1.139 Vs 0.01 kts
0837	Hauling in messenger line. N36 48.6302 W121 47.9713 WD 21m KP 1.140 Vs 0.02 kts
0856	Messenger line parted. N36 48.6298 W121 47.9710 WD 21m KP 1.139 Vs 0.07 kts
0934	Uniline passed to support boat as messenger. N36 48.6299 W121 47.9711 WD 21m KP 1.139 Vs 0.04 kts
0955	Hauling in uniline. N36 48.6292 W121 47.9708 WD 21m KP 1.138 Vs 0.03 kts
1006	Bore pipe pulling wire aboard. N36 48.6292 W121 47.9693 WD 21m KP 1.136 Vs 0.11 kts
1018	Pulling wire connected to cable. N36 48.6285 W121 47.9680 WD 21m KP 1.134 Vs 0.05 kts
1033	Beach hauling in cable. N36 48.6293 W121 47.9683 WD 21m KP 1.135 Vs 0.11 kts
1044	Cable end in bore pipe bellmouth. N36 48.6286 W121 47.9678 WD 21m KP 1.133 Vs 0.02 kts
1149	Cable end bore pipe shore end. N36 48.6291 W121 47.9681 WD 20m KP 1.134 Vs 0.00 kts
1155	Beach securing cable. N36 48.6294 W121 47.9679 WD 20m KP 1.134 Vs 0.13 kts
1308	Stoppers applied to sea anchors by divers. N36 48.6289 W121 47.9682 WD 20m KP 1.134 Vs 0.02 kts
1352	Commence plow launch operations. N36 48.6288 W121 47.9678 WD 20m KP 1.134 Vs 0.04 kts
1416	Cable loaded in plow. N36 48.6337 W121 47.9798 WD 20m KP 1.154 Vs 0.04 kts
1423	Plow off deck. N36 48.6340 W121 47.9803 WD 20m KP 1.155 Vs 0.03 kts
1437	Plough in the water N36 48.6455 W121 48.0084 WD 20m KP 1.201 Vs 0.18 kts
1438	Plow on bottom N36 48.6466 W121 48.0115 WD 20m KP 1.207 Vs 0.18 kts
1457	Plow moving on seabed. N36 48.6670 W121 48.0649 WD 21m KP 1.295 Vs 0.05 kts Plow: N36 48.6470 W121 48.0115 KP 1.207
1539	Plow passing AC 01. N36 48.7141 W121 48.1834 WD 21m KP 1.489 Vs 0.16 kts Plow: N36 48.6784 W121 48.0991 KP 1.349
1552	Tow tensions to 50T. N36 48.7388 W121 48.2260 WD 21m KP 1.565 Vs 0.17 kts Plow: N36 48.6994 W121 48.1453 KP 1.428
1557	Plow passing AC 02. N36 48.7503 W121 48.2373 WD 21m KP 1.592 Vs 0.23 kts Plow: N36 48.7064 W121 48.1587 KP 1.453
1622	Plow passing AC 03. N36 48.7960 W121 48.2763 WD 20m KP 1.693 Vs 0.12 kts Plow: N36 48.7404 W121 48.2070 KP 1.548
1644	Vessel investigate A-frame roller problem. N36 48.8353 W121 48.3168 WD 20m KP 1.788 Vs 0.61 kts Plow: N36 48.7623 W121 48.2325 KP 1.603
1708	Resume plow operations. N36 48.8460 W121 48.3328 WD 21m KP 1.818 Vs 0.22 kts Plow: N36 48.7646 W121 48.2351 KP 1.609

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1709	Vs to 0.1 kts_ Tow winch render set 45 T N36 48.8503 W121 48.3370 WD 21m KP 1.828 Vs 0.38 kts Plow: N36 48.7646 W121 48.2352 KP 0.000
1719	Vessel stop_ awaiting plough evaluation N36 48.8593 W121 48.3476 WD 21m KP 1.851 Vs 0.14 kts Plow: N36 48.7712 W121 48.2429 KP 1.626
1721	Vessel stop. Problem with plow hydraulic motor. Plow to reboot system. N36 48.8609 W121 48.3494 WD 20m KP 1.855 Vs 0.11 kts Plow: N36 48.7729 W121 48.2449 KP 0.000
1750	Commence preparations to recover plow. N36 48.8616 W121 48.3504 WD 20m KP 1.857 Vs 0.08 kts
1811	LCE pick up at 1500LBS tow winch set to haul in. N36 48.8615 W121 48.3505 WD 21m KP 1.857 Vs 0.05 kts Plow: N36 48.7733 W121 48.2454 KP 0.000
1812	Commence plow recovery. N36 48.8618 W121 48.3499 WD 20m KP 1.857 Vs 0.14 kts Plow: N36 48.7733 W121 48.2454 KP 1.631
1845	Plow recovery stopped. Investigate tow winch problem. N36 48.8586 W121 48.3467 WD 21m KP 1.850 Vs 0.12 kts Plow: N36 48.7743 W121 48.2466 KP 1.634
2359	Vessel holding position. Tow winch repair underway. N36 48.9365 W121 48.4360 WD 21m KP 2.045 Vs 0.24 kts

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete tow winch and plow repairs. Resume burial operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	7.00	17.00	24.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	3.50	0.00	3.50
Surface Lay Operations	7.50	0.00	7.50
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	6.00	0.00	6.00
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	0.00	0.00
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
TOTALS	**24.00**	**156.50**	**180.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing

© Copyright 2007 All rights reserved.

3/18/2007	Complete Surface Lay
3/26/2007	Install TRF
3/28/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

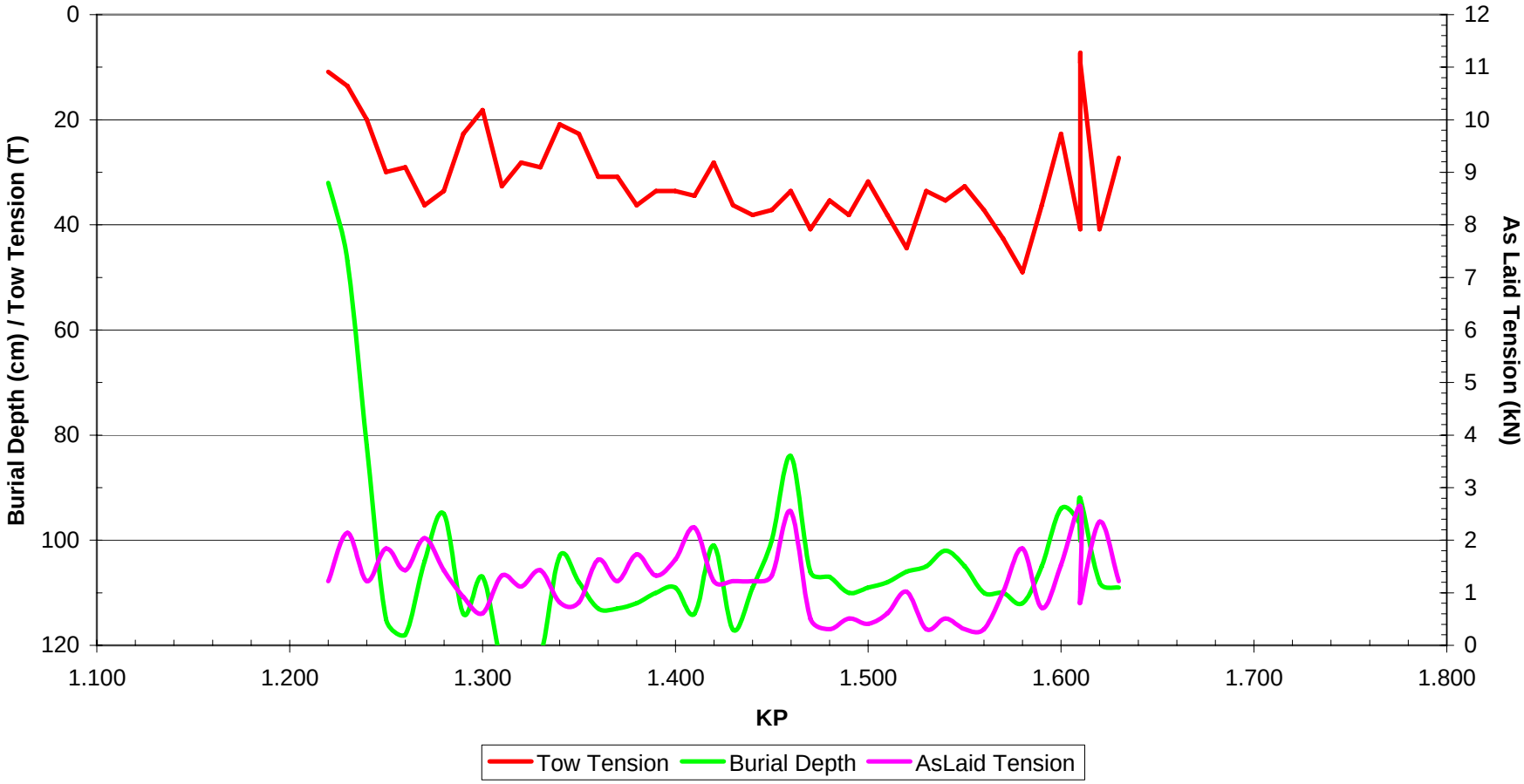
P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
14 Mar 2007 2207 UTC to 15 Mar 2007 0020 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 9 Date: 03/16/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 4

A. VESSEL LOCATION

Latitude	36° 49.000' N	Longitude	121° 48.500' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:	Unlicensed:		Tyco Staff:	Others:	
18	27		9	20	

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1018.5	2	E force 3
0600	1018	1	E force 2
1200	1018	2	NW force 4
1800	1015.3	2	S force 2
WEATHER FORECAST:	MODERATE TO FRESH NNW/NW-LIES ARE EXPECTED OVER THE FORECAST PERIOD AS A HEAT TROUGH OVER THE BAJA INTERACTS WITH A RIDGE IN THE PACIFIC. MODERATE TO POOR, WITH AREAS OF FOG POSSIBLE DURING THE MORNING HOURS		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	0.000	1.141	0.000
TOTALS	**9.107**	**43.339**	**0.000**	**0.000**	**1.141**	**0.000**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0350	Tow winch repairs completed. Commence dead plow recovery. N36 48.9360 W121 48.4366 WD 21m KP 2.045 Vs 0.05 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0514	Plow off bottom N36 48.7963 W121 48.2599 WD 22m KP 1.677 Vs 0.30 kts
0516	Plow at waters edge. N36 48.8007 W121 48.2656 WD 19m KP 1.689 Vs 0.18 kts
0539	Observed wire rope engaged on plow share. N36 48.7998 W121 48.2652 WD 21m KP 1.687 Vs 0.03 kts
0601	Plow at vessel stern. Unable to safely remove engaged wire rope. N36 48.8129 W121 48.2818 WD 20m KP 1.722 Vs 0.03 kts
0614	Wire rope cut off plow share. N36 48.8104 W121 48.2840 WD 20m KP 1.721 Vs 0.08 kts
0617	Resume plow recovery. N36 48.8092 W121 48.2854 WD 20m KP 1.720 Vs 0.01 kts
0633	Plow on deck. N36 48.8090 W121 48.2858 WD 20m KP 1.721 Vs 0.02 kts
0747	Plow repairs underway. N36 48.8093 W121 48.2854 WD 22m KP 1.721 Vs 0.04 kts
0808	Cable unloaded from plow. N36 48.8091 W121 48.2857 WD 22m KP 1.721 Vs 0.04 kts
0823	Commence recovery of 100m of cable for inspection. N36 48.8092 W121 48.2856 WD 22m KP 1.721 Vs 0.01 kts
0913	100m of cable recovered. No damage observed. N36 48.7662 W121 48.2303 WD 22m KP 1.606 Vs 0.02 kts
0953	IR testing completed with satisfactory results. N36 48.7656 W121 48.2300 WD 22m KP 1.605 Vs 0.07 kts
1134	Decision made recover all cable back to bore pipe and re-bury. Commence recovery of cable. N36 48.7661 W121 48.2300 WD 21m KP 1.606 Vs 0.06 kts
1312	Cable recovery complete. Vessel holding station. N36 48.6372 W121 47.9921 WD 20m KP 1.173 Vs 0.18 kts
1824	Dive vessel departs vicinity of bore pipe. Resume cable recovery to ship landing position. N36 48.6376 W121 47.9925 WD 21m KP 1.174 Vs 0.02 kts
1837	Vessel standing by in position. N36 48.6302 W121 47.9715 WD 20m KP 1.140 Vs 0.08 kts
2206	Plow repairs completed. Commence plow launch operations. N36 48.6313 W121 47.9752 WD 21m KP 1.146 Vs 0.03 kts
2211	Cable loaded in plow. N36 48.6359 W121 47.9871 WD 21m KP 1.165 Vs 0.02 kts
2218	Plow off deck N36 48.6372 W121 47.9889 WD 21m KP 1.169 Vs 0.34 kts
2233	Plough in water N36 48.6454 W121 48.0132 WD 22m KP 1.208 Vs 0.20 kts
2235	Plow on bottom N36 48.6493 W121 48.0222 WD 22m KP 1.223 Vs 0.21 kts
2246	Plow experiencing electrical problems. Commence plow recovery. N36 48.6554 W121 48.0379 WD 22m KP 1.249 Vs 0.02 kts
2302	Plow off bottom N36 48.6485 W121 48.0207 WD 22m KP 1.220 Vs 0.13 kts
2304	Plow at water's edge. N36 48.6509 W121 48.0258 WD 22m KP 1.229 Vs 0.26 kts
2346	Plow on deck N36 48.6600 W121 48.0520 WD 21m KP 1.272 Vs 0.02 kts
2356	Vessel recovering cable back to landing position. N36 48.6601 W121 48.0516 WD 22m KP 1.271 Vs 0.00 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete plow repairs. Resume burial operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	0.00	3.50	3.50
Surface Lay Operations	0.00	7.50	7.50
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	3.75	6.00	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	20.25	0.00	20.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
TOTALS	**24.00**	**180.50**	**204.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/26/2007	Install TRF
3/28/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: Cable Laid/Buried totals changed to reflect recovery of cable back to ship landing position.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

N. TYCO REPRESENTATIVE COMMENTS: As of 0700 local time, 16 March, vessel is underway performing plow burial.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 10 Date: 03/17/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 5

A. VESSEL LOCATION

Latitude	36° 52.300' N	Longitude	121° 54.500' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1015.5	1	Lt. Airs
0600	1015.6	1	N force 1
1200	1016.5	3	SW force 4
1800	1015.3	2	SW force 2
WEATHER FORECAST:	HIGH PRESSURE OVER REGION ALLOWS FOR MODERATE NW/NNW-LIES FOR THE NEXT 3 DAYS. ISOLATED SHOWERS AND THUNDERSTORMS ARE POSSIBLE. VISIBILITY MODERATE TO POOR, WITH AREAS OF FOG POSSIBLE.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.086	6.431	1.227	6.431
TOTALS	**9.107**	**43.339**	**0.086**	**6.431**	**1.227**	**6.431**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0104	IR test completed with satisfactory results. N36 48.6518 W121 48.0308 WD 22m KP 1.237 Vs 0.01 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

0220	Commence recovery to start position. N36 48.6519 W121 48.0307 WD 22m KP 1.237 Vs 0.08 kts
0242	Recovery complete. Commence plow launch. N36 48.6328 W121 47.9774 WD 21m KP 1.150 Vs 0.10 kts
0257	Plow off deck N36 48.6367 W121 47.9897 WD 21m KP 1.169 Vs 0.01 kts
0314	Plow on bottom N36 48.6501 W121 48.0259 WD 22m KP 1.229 Vs 0.25 kts Plow: N36 48.6496 W121 48.0246 KP 1.227
0342	Plow moving on seabed. N36 48.6854 W121 48.1244 WD 21m KP 1.389 Vs 0.18 kts Plow: N36 48.6569 W121 48.0420 KP 1.256
0402	Plow passing AC 01. N36 48.7144 W121 48.1830 WD 22m KP 1.489 Vs 0.18 kts Plow: N36 48.6796 W121 48.1007 KP 1.353
0422	Plow passing AC02. N36 48.7518 W121 48.2371 WD 22m KP 1.594 Vs 0.32 kts Plow: N36 48.7060 W121 48.1585 KP 1.451
0440	Plow passing AC03. N36 48.7942 W121 48.2742 WD 21m KP 1.689 Vs 0.15 kts Plow: N36 48.7387 W121 48.2039 KP 1.542
0553	IR test completed with satisfactory results. N36 48.8878 W121 48.3785 WD 21m KP 1.921 Vs 0.24 kts Plow: N36 48.8336 W121 48.3160 KP 1.785
1459	LCE Tension spike observed to 4.5T N36 49.8314 W121 49.4850 WD 25m KP 4.319 Vs 0.49 kts
2056	Vessel entering Naval Ops Area. N36 50.7703 W121 50.5864 WD 27m KP 6.707 Vs 0.23 kts Plow: N36 50.7095 W121 50.5143 KP 6.551
2145	Plow passing AC04. N36 50.8931 W121 50.7328 WD 27m KP 7.016 Vs 0.34 kts Plow: N36 50.8323 W121 50.6592 KP 6.864
2359	Plow burying on track. Plow: W121 51.1152 N36 51.0575 KP 7.660

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Continue burial operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	21.00	3.50	24.50
Surface Lay Operations	0.00	7.50	7.50
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	3.00	20.25	23.25

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
TOTALS	**24.00**	**204.50**	**228.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	**Activity**
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/28/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: Estimated planning dates updated to conform to MARS PoW dated 16 Mar 07.

N. TYCO REPRESENTATIVE COMMENTS: Corrective measures taken to prevent reoccurrence of tension spike observed at 1459 local.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

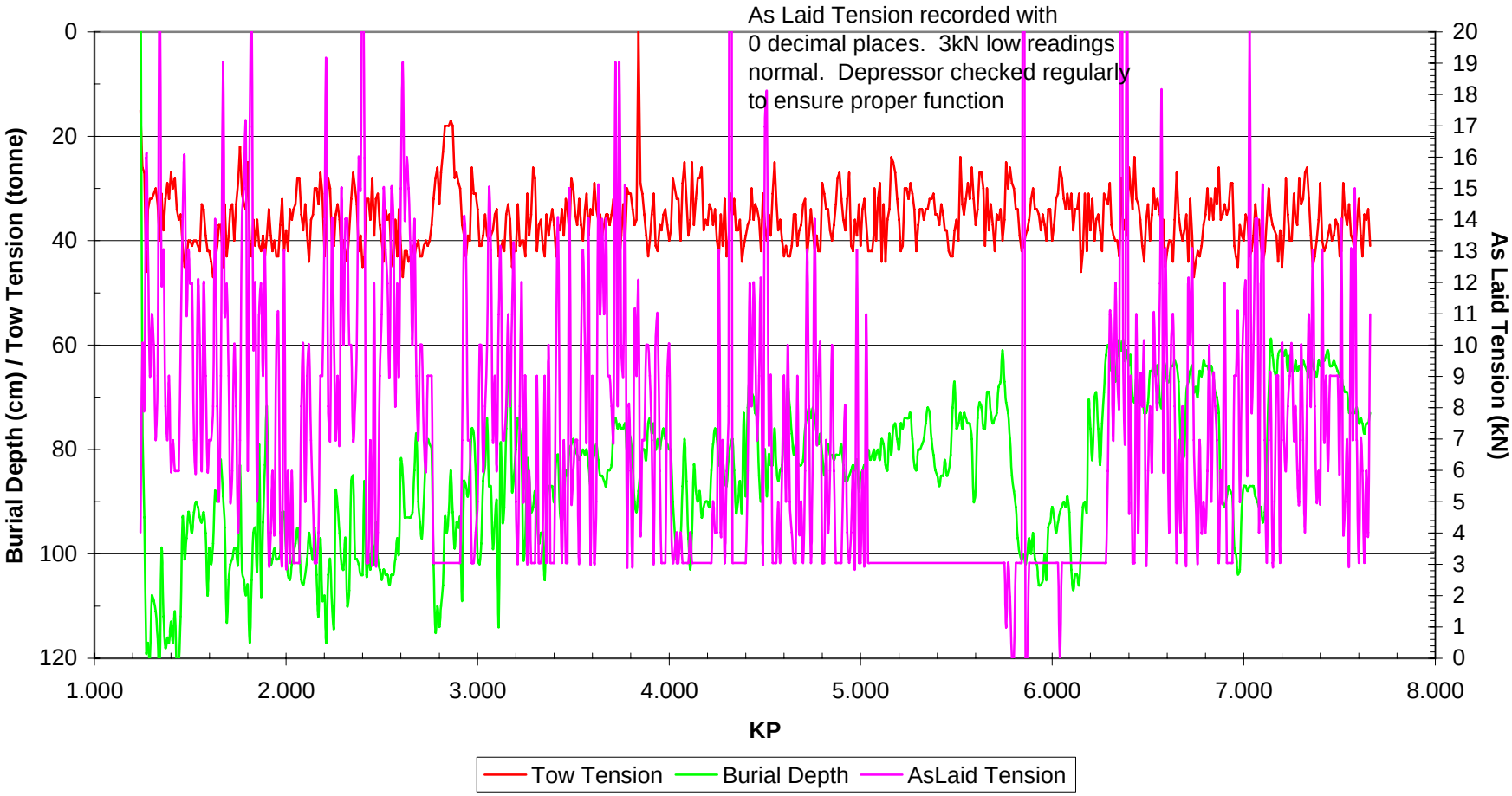
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
16 Mar 2007 1039 UTC to 17 Mar 2007 0659 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 11 Date: 03/18/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 4

A. VESSEL LOCATION

Latitude	36° 51.700' N	Longitude	122° 05.900' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1016	1	WNW force 2
0600	1015.3	1	E force 1
1200	1016.8	2	W force 3
1800	1015.2	2	NW force 3
WEATHER FORECAST:	HIGH PRESSURE OVER REGION ALLOWS FOR MODERATE NW/NNW-LIES FOR THE NEXT 3 DAYS. ISOLATED SHOWERS AND THUNDERSTORMS ARE POSSIBLE. VISIBILITY MODERATE TO POOR, WITH AREAS OF FOG POSSIBLE.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	14.270	1.227	20.701
TOTALS	**9.107**	**43.339**	**0.000**	**14.270**	**1.227**	**20.701**

D. SCHEDULED DATE OF COMPLETION: 3/28/2007

E. ESTIMATED DATE OF COMPLETION: 3/28/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0357	Plow passing AC05 N36 51.6206 W121 52.2733 WD 38m KP 9.672 Vs 0.33 kts Plow: N36 51.5852 W121 52.1805 KP 9.520

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1039	Plow passing AC06. N36 53.0378 W121 57.0102 WD 34m KP 17.183 Vs 0.15 kts Plow: N36 53.0090 W121 56.9003 KP 17.012
1341	Plow passing AC07. N36 53.1388 W121 57.7380 WD 34m KP 18.280 Vs 0.24 kts Plow: N36 53.1275 W121 57.6115 KP 18.091
1419	KM 48 at stern. N36 53.1304 W121 57.8889 WD 34m KP 18.504 Vs 0.21 kts Plow: N36 53.1308 W121 57.7704 KP 18.328
1748	Plow exiting Naval Operations Area. N36 53.1349 W121 58.7667 WD 43m KP 19.808 Vs 0.27 kts Plow: N36 53.1344 W121 58.6201 KP 19.590
2237	KM45 at stern. N36 53.1385 W121 59.9097 WD 48m KP 21.506 Vs 0.26 kts Plow: N36 53.1389 W121 59.7602 KP 21.284
2359	Plow burying on track. Plow: N36 53.1406 W122 00.0990 KP 21.788

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Commence jointing operations for joint SJ1.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	0.00	0.00	0.00
Burial Operations	24.00	24.50	48.50
Surface Lay Operations	0.00	7.50	7.50
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	23.25	23.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
TOTALS	**24.00**	**228.50**	**252.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/28/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

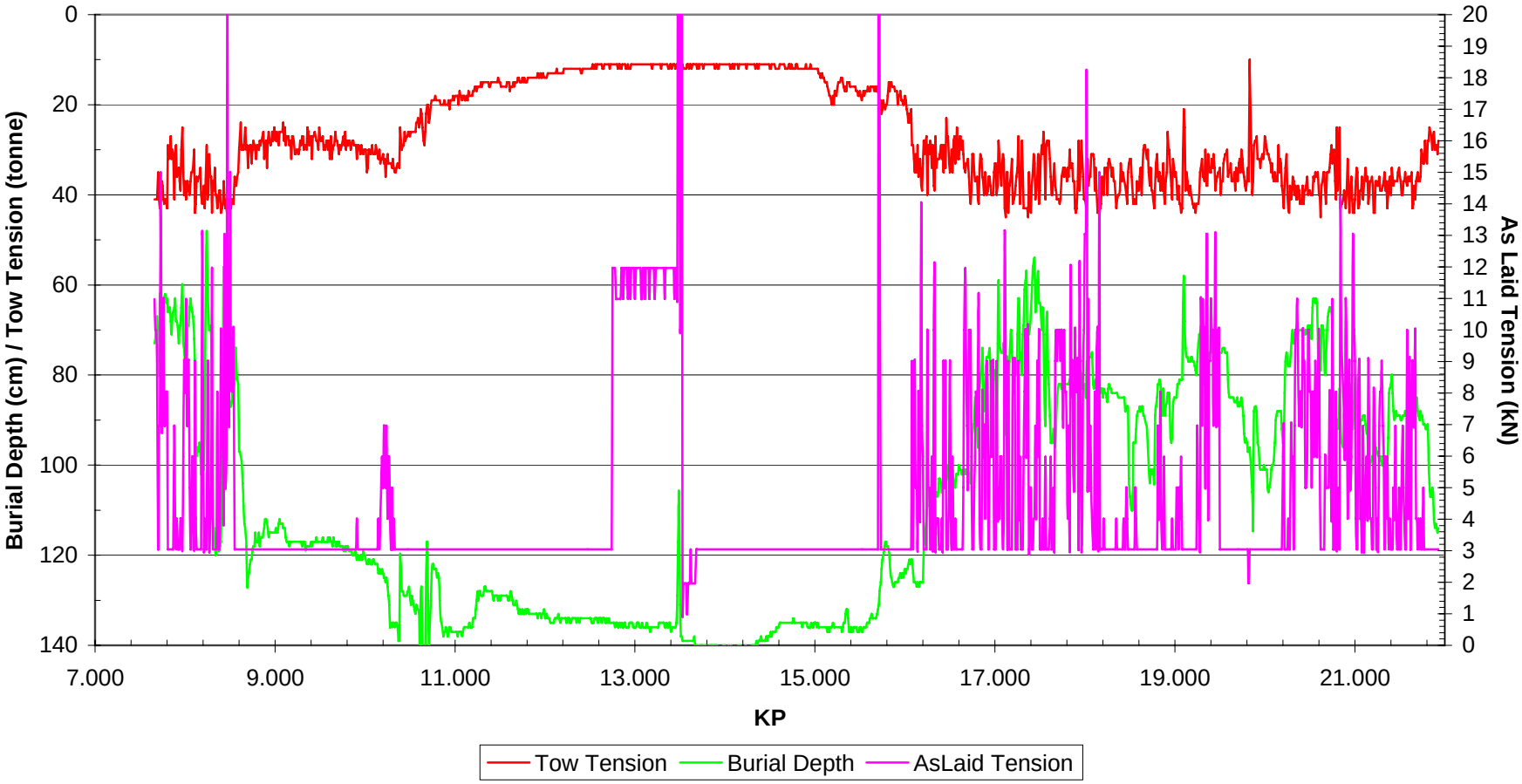
P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
17 Mar 2007 0659 UTC to 18 Mar 2007 0716 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 12 Date: 03/19/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 5

A. VESSEL LOCATION

Latitude	36° 51.100' N	Longitude	122° 07.200' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1016.5	1	Lt Airs
0600	1016.2	3	NW force 4
1200	1017	2	NNW force 3
1800	1014.9	5	NW force 6
WEATHER FORECAST:	FRESH N/NW-LIES MODERATE MONDAY MORNING AS A LOW AND FRONT MOVING BY TO THE NORTH WEAKENS HIGH PRESSURE OVERHEAD. ON TUESDAY A NEW AND BROADER HIGH BEGINS MOVING INTO THE E-ERN PACIFIC ALLOWING WINDS TO FRESHEN, THEN BECOME STRONG WEDNESDAY. COMBINED SEAS/SWELLS RISE TO 3-4M WEDNESDAY. VISIBILITY MODERATE, WITH AREAS OF PATCHY FOG.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0.000	10.877	1.227	31.578
TOTALS	**9.107**	**43.339**	**0.000**	**10.877**	**1.227**	**31.578**

D. SCHEDULED DATE OF COMPLETION: 3/30/2007

E. ESTIMATED DATE OF COMPLETION: 3/30/2007

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0037	KM 44 at stern N36 53.1436 W122 00.5851 WD 51m KP 22.510 Vs 0.80 kts Plow: N36 53.1424 W122 00.4235 KP 22.270
0119	KM 43 at stern N36 53.1465 W122 01.2612 WD 54m KP 23.515 Vs 0.75 kts Plow: N36 53.1451 W122 01.1018 KP 23.278
0205	KM 42 at stern N36 53.1483 W122 01.9381 WD 58m KP 24.518 Vs 0.56 kts Plow: N36 53.1482 W122 01.7766 KP 24.280
0217	Plow passing AC08 N36 53.1202 W122 02.0603 WD 60m KP 24.707 Vs 0.52 kts Plow: N36 53.1435 W122 01.9006 KP 24.467
0254	KM 41 at stern N36 53.0038 W122 02.5886 WD 64m KP 25.521 Vs 0.76 kts
0335	KM 40 at stern N36 52.8659 W122 03.2382 WD 70m KP 26.519 Vs 0.90 kts
0416	Plow passing AC09 N36 52.7409 W122 03.7422 WD 75m KP 27.302 Vs 0.50 kts Plow: N36 52.7980 W122 03.5650 KP 27.021
0510	Plow passing MB 3 NM limit N36 52.3962 W122 04.4507 WD 83m KP 28.532 Vs 0.83 kts Plow: N36 52.4794 W122 04.2634 KP 28.214
1241	Plow stop at splicing position N36 51.1759 W122 07.1118 WD 102m KP 33.086 Vs 0.08 kts Plow: N36 51.2637 W122 06.9270 KP 32.767
1244	Vessel move 100 meters ahead for safety margin N36 51.1743 W122 07.1147 WD 102m KP 33.091 Vs 0.11 kts Plow: N36 51.2646 W122 06.9251 KP 32.764
1305	Vessel stopped in splicing position N36 51.1503 W122 07.1701 WD 101m KP 33.185 Vs 0.01 kts Plow: N36 51.2647 W122 06.9251 KP 32.764
1315	Cable cut on highway N36 51.1499 W122 07.1696 WD 102m KP 33.184 Vs 0.03 kts Plow: N36 51.2647 W122 06.9251 KP 32.764
1330	Commence transfer of cable from tank2 to tank3 N36 51.1509 W122 07.1704 WD 101m KP 33.185 Vs 0.05 kts
1425	OTDR test complete with satisfactory results. 33.514 km N36 51.1443 W122 07.1672 WD 101m KP 33.186 Vs 0.02 kts
1710	Complete cable transfer N36 51.1201 W122 07.1459 WD 101m KP 33.181 Vs 0.01 kts
1715	End of transferred cable to jointing area. N36 51.1233 W122 07.1480 WD 101m KP 33.181 Vs 0.02 kts
1716	Cable end preparation complete N36 51.1498 W122 07.1680 WD 101m KP 33.182 Vs 0.10 kts
2000	Cable ends linked N36 51.1468 W122 07.1694 WD 102m KP 33.187 Vs 0.03 kts
2135	Commence fusing fibers N36 51.1461 W122 07.1705 WD 101m KP 33.189 Vs 0.02 kts
2320	Fiber fusion complete N36 51.1475 W122 07.1698 WD 102m KP 33.187 Vs 0.02 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete jointing operations for joint SJ1. Resume plow burial operations. Commence surface lay.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	10.75	0.00	10.75
Burial Operations	13.25	48.50	61.75
Surface Lay Operations	0.00	7.50	7.50
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	23.25	23.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
TOTALS	**24.00**	**252.50**	**276.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/28/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

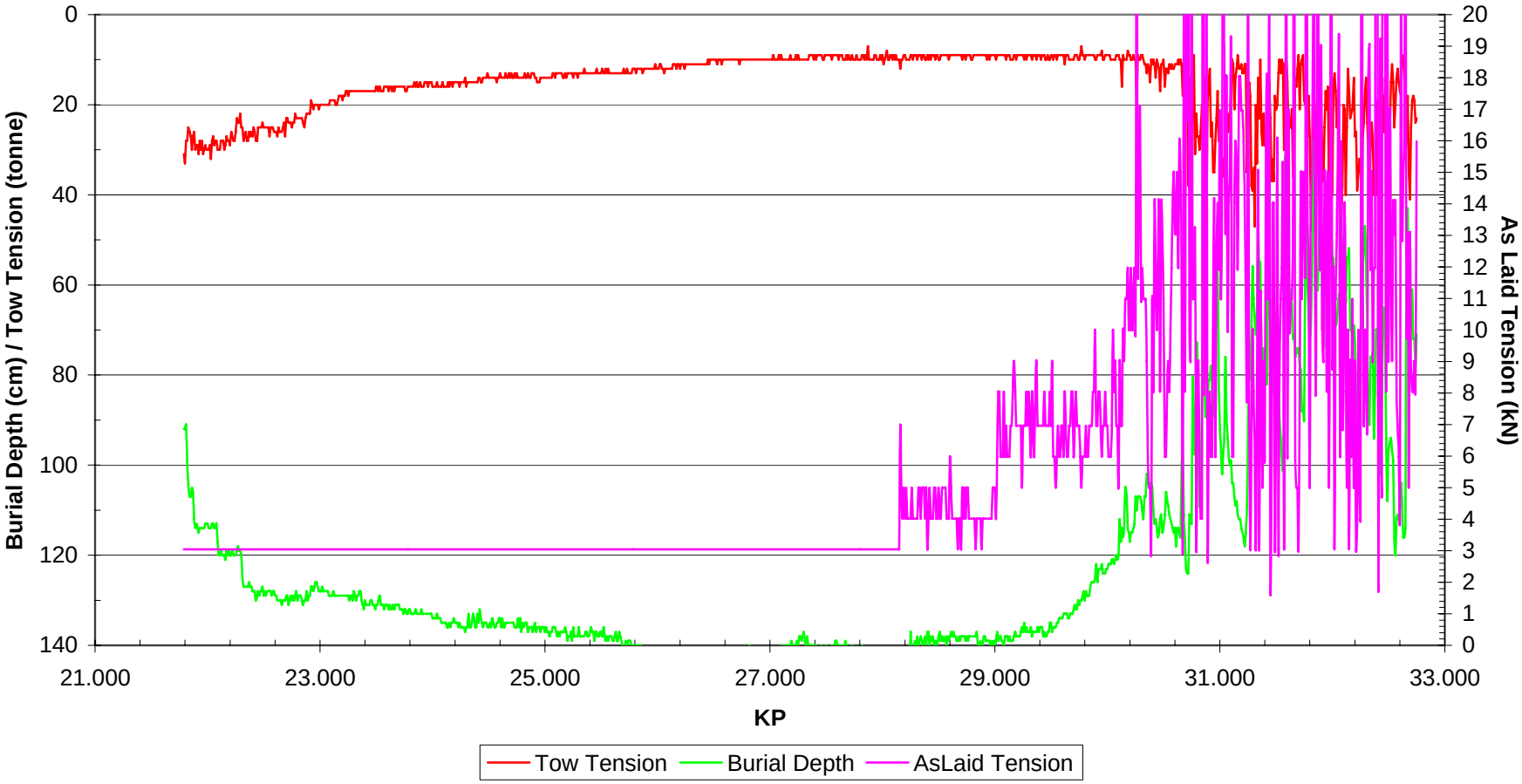
P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
18 Mar 2007 0700 UTC to 18 Mar 2007 1932 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 13 Date: 03/20/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 5

A. VESSEL LOCATION

Latitude	36° 47.800' N	Longitude	122° 11.400' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:	Unlicensed:	Tyco Staff:	Others:		
18	27	9	20		

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1016	3	NW force 4
0600	1015.8	2	NW force 3
1200	1016	1	E force 2
1800	1015.6	2	WNW force 4

WEATHER FORECAST:	HIGH PRESSURE MOVING IN FROM THE WEST ALLOWS MODERATE WNW-LIES TO SHIFT N/NW-LY WHILE FRESHENING TUESDAY MORNING. LOW EXPECTED TO REMAIN OVER THE EAST PACIFIC THROUGH THE REST OF THE PERIOD WITH A BRIEF PERIOD OF STRONG WINDS POSSIBLE WEDNESDAY. COMBINED SEAS/SWELLS RISE TO 3-4M WEDNESDAY MORNING. ISOLATED TO WIDELY SCATTERED SHOWERS/THUNDERSTORMS POSSIBLE TUESDAY. VISIBILITY MODERATE, WITH AREAS OF POOR VISIBILITY POSSIBLE.

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	1.806	2.965	3.033	34.945
TOTALS	**9.107**	**43.339**	**1.806**	**2.965**	**3.033**	**34.945**

D. SCHEDULED DATE OF COMPLETION: 3/30/2007

E. ESTIMATED DATE OF COMPLETION: 4/2/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Local Time (0000-2400)	Activity
0046	Fiber coiling completed. N36 51.1475 W122 07.1698 WD 101m KP 33.187 Vs 0.02 kts
0101	Commence mold operation. N36 51.1479 W122 07.1700 WD 102m KP 33.187 Vs 0.09 kts
0434	Commence X-ray. N36 51.1477 W122 07.1700 WD 101m KP 33.187 Vs 0.03 kts
0612	OTDR testing complete with satisfactory results. Commence armoring. N36 51.1477 W122 07.1699 WD 101m KP 33.187 Vs 0.03 kts
0810	Joint complete. Prepare to resume plow operations. N36 51.1479 W122 07.1702 WD 101m KP 33.187 Vs 0.03 kts
0842	Commence setting scopes. N36 51.1561 W122 07.1636 WD 101m KP 33.171 Vs 0.18 kts
0906	Plow moving on seabed. N36 51.1823 W122 07.1081 WD 101m KP 33.075 Vs 0.13 kts Plow: N36 51.2666 W122 06.9208 KP 32.756
0952	Joint SJ1 at stern. N36 51.1087 W122 07.2652 WD 103m KP 33.346 Vs 0.27 kts
1011	IR test performed with satisfactory results N36 51.0790 W122 07.3311 WD 104m KP 33.458 Vs 0.17 kts
1054	SJ1 at plow N36 51.0067 W122 07.4920 WD 106m KP 33.732 Vs 0.28 kts Plow: N36 51.0929 W122 07.3018 KP 33.407
1450	Plow passing AC10. N36 50.6269 W122 08.2988 WD 113m KP 35.122 Vs 0.23 kts Plow: N36 50.7201 W122 08.1173 KP 34.802
1556	Plow passing AC11. N36 50.5237 W122 08.4980 WD 116m KP 35.473 Vs 0.37 kts Plow: N36 50.6088 W122 08.3126 KP 35.158
1704	Plow passing AC12. N36 50.4875 W122 08.7563 WD 118m KP 35.859 Vs 0.24 kts Plow: N36 50.5311 W122 08.5472 KP 35.536
1756	Plow passing AC13 N36 50.4409 W122 08.9475 WD 123m KP 36.153 Vs 0.16 kts Plow: N36 50.4943 W122 08.7463 KP 35.840
1840	Vessel stop. Plow at plow up position. Commence plow recovery. N36 50.3637 W122 09.0883 WD 130m KP 36.403 Vs 0.06 kts
1939	Plow off bottom N36 50.4424 W122 08.8989 WD 123m KP 36.087 Vs 0.01 kts Plow: N36 50.4430 W122 08.8977 KP 36.084
2002	Plow at surface N36 50.4118 W122 08.9796 WD 125m KP 36.219 Vs 0.06 kts Plow: N36 50.4125 W122 08.9783 KP 36.217
2006	Wire rope engaged in plow share. N36 50.4125 W122 08.9787 WD 126m KP 36.217 Vs 0.03 kts
2053	Engaged wire rope cut away from plow share. N36 50.4046 W122 08.9940 WD 126m KP 36.244 Vs 0.01 kts
2055	Plow on deck N36 50.4004 W122 08.9906 WD 126m KP 36.243 Vs 0.03 kts
2133	Commence surface lay operations. N36 50.4112 W122 08.9578 WD 125m KP 36.190 Vs 0.08 kts
2152	Vessel passing AC14. N36 50.3596 W122 09.0974 WD 131m KP 36.419 Vs 0.40 kts
2228	Tank 3 to Tank 2 transfer complete.

© Copyright 2007 All rights reserved.

	N36 50.2628 W122 09.3731 WD 156m KP 36.866 Vs 0.45 kts
2235	Joint SJ2 at stern. N36 50.2438 W122 09.4287 WD 164m KP 36.956 Vs 0.39 kts
2238	Vessel passing AC15. N36 50.2358 W122 09.4512 WD 171m KP 36.992 Vs 0.42 kts
2249	Vessel passing AC16. N36 50.2072 W122 09.5312 WD 191m KP 37.122 Vs 0.40 kts
2305	Vessel passing AC17. N36 50.1570 W122 09.6380 WD 214m KP 37.122 Vs 0.40 kts
2352	Vessel passing AC18 N36 49.9516 W122 09.9110 WD 303m KP 37.864 Vs 0.40 kts

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete surface lay. Commence plow burial operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	8.25	10.75	19.00
Burial Operations	13.25	61.75	75.00
Surface Lay Operations	2.50	7.50	10.00
Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	23.25	23.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
TOTALS	**24.00**	**276.50**	**300.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/28/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

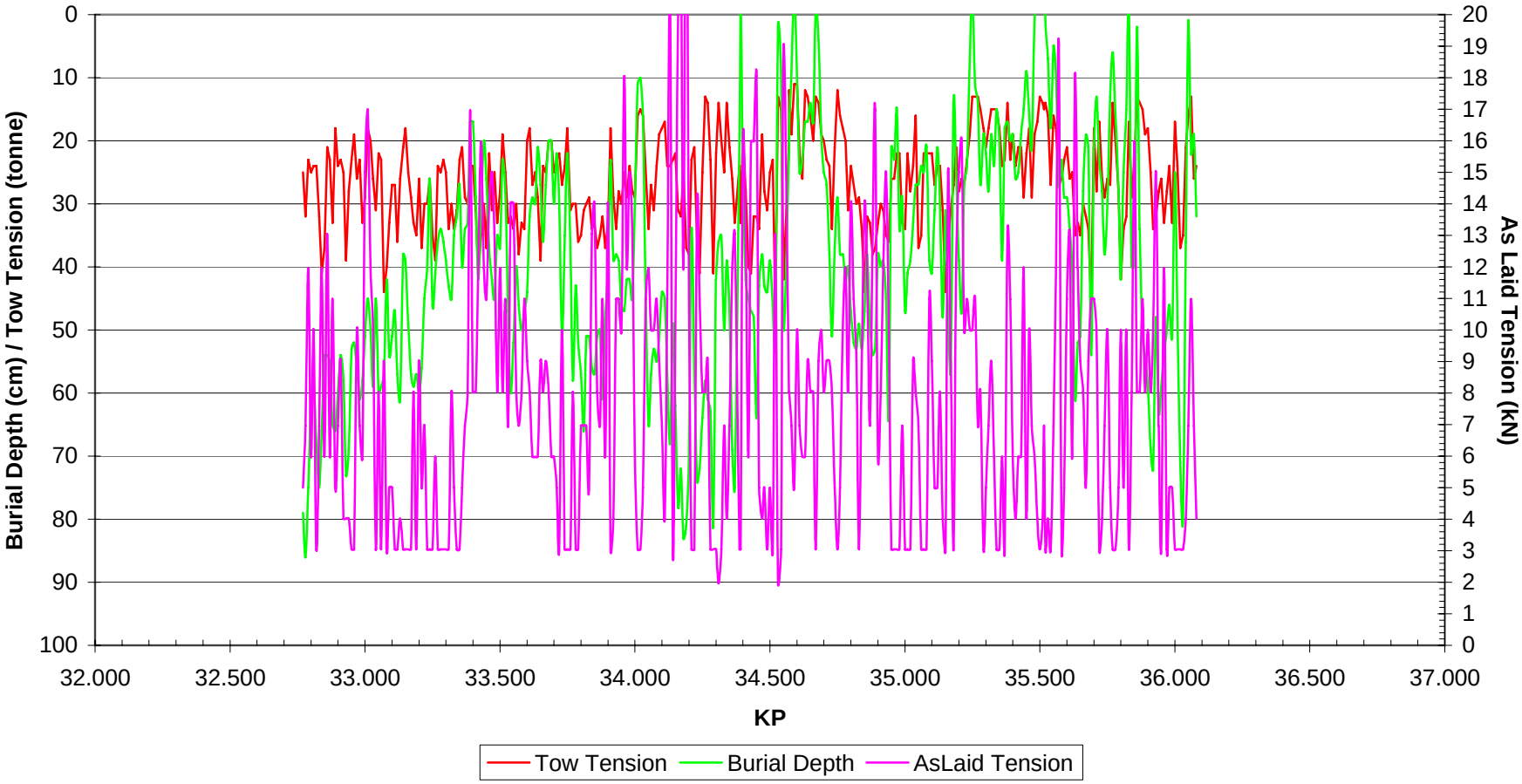
P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
19 Mar 2007 1609 UTC to 20 Mar 2007 0138 UTC



© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 14 Date: 03/21/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 6

A. VESSEL LOCATION

Latitude	36° 43.200' N	Longitude	122° 11.200' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1015.5	1	NW force 2
0600	1016	2	S force 3
1200	1016.5	4	W force 5
1800	1015.6	5	WNW force 6

WEATHER FORECAST:	BROAD HIGH TO THE WEST CONTINUES WHILE LOW TROUGHING DEVELOPS OVER S-ERN CALIFORNIA BY WEDNESDAY AFTERNOON. HIGH EVENTUALLY BUILDS FURTHER TOWARDS THE COAST NEAR PERIOD'S END AS THE LOW MOVES INTO THE SW U.S. LOOK FOR STRONG N/NW-LIES FRESHENING THURSDAY. 3-3.5M COMBINED SEAS/SWELLS POSSIBLE WEDNESDAY INTO THURSDAY MORNING THEN AGAIN FRIDAY MORNING. SCATTERED SHOWERS/THUNDERSTORMS EXPECTED TO CONTINUE OVER THE NEXT 12 HOURS. VISIBILITY MODERATE, WITH AREAS OF POOR VISIBILITY POSSIBLE IN THE HEAVIEST SHOWERS/THUNDERSTORMS

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	4.975	2.862	8.008	37.807
TOTALS	**9.107**	**43.339**	**4.975**	**2.862**	**8.008**	**37.807**

D. SCHEDULED DATE OF COMPLETION: 3/30/2007

E. ESTIMATED DATE OF COMPLETION: 4/2/2007

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0008	KM 28 over stern. N36 49.8756 W122 10.0107 WD 309m KP 38.064 Vs 0.44 kts
0030	Vessel passing AC19 N36 49.7481 W122 10.0872 WD 310m KP 38.323 Vs 0.41 kts
0032	Plow in water and vessel moving ahead N36 47.8159 W122 11.3609 WD 455m KP 42.451 Vs 0.09 kts
0117	Vessel passing AC 20 N36 49.4617 W122 10.2205 WD 332m KP 38.888 Vs 0.39 kts
0245	Vessel passing AC 21 N36 48.8927 W122 10.3824 WD 370m KP 39.967 Vs 0.41 kts
0309	Vessel passing AC22 N36 48.7372 W122 10.4402 WD 383m KP 40.265 Vs 0.42 kts
0334	Vessel passing AC23 N36 48.6061 W122 10.5598 WD 390m KP 40.556 Vs 0.42 kts
0434	Vessel passing AC24 N36 48.3417 W122 10.9199 WD 429m KP 41.276 Vs 0.38 kts
0615	Vessel passing AC25 N36 47.8513 W122 11.3472 WD 452m KP 42.383 Vs 0.20 kts
0629	Vessel stop. In position for plow launch N36 47.8434 W122 11.3498 WD 452m KP 42.398 Vs 0.19 kts
0703	Commence plow launch operations. N36 47.8425 W122 11.3472 WD 453m KP 42.398 Vs 0.02 kts
0719	Plow off deck. N36 47.8322 W122 11.3516 WD 453m KP 42.418 Vs 0.04 kts
0733	Plow in water N36 47.8131 W122 11.3612 WD 455m KP 42.457 Vs 0.08 kts SP7: N36 47.8142 W122 11.3606 KP 42.454
0740	Plow electrical failure. Commence recovery. N36 47.8055 W122 11.3628 WD 454m KP 42.470 Vs 0.04 kts SP7: N36 47.8064 W122 11.3621 KP 42.468
0755	Recovery suspended for troubleshooting. N36 47.8119 W122 11.3615 WD 455m KP 42.458 Vs 0.02 kts SP7: N36 47.8129 W122 11.3609 KP 42.456
0846	Resume plow recovery. N36 47.8123 W122 11.3615 WD 456m KP 42.458 Vs 0.04 kts SP7: N36 47.8134 W122 11.3609 KP 42.456
0936	Plow on deck N36 47.8402 W122 11.3482 WD 454m KP 42.402 Vs 0.00 kts SP7: N36 47.8412 W122 11.3476 KP 42.400
1012	IR test completed with satisfactory results. N36 47.8827 W122 11.3274 WD 450m KP 42.319 Vs 0.02 kts SP7: N36 47.8837 W122 11.3269 KP 42.317
1450	Repairs complete. Commence plow launch operations. N36 47.8854 W122 11.3386 WD 450m KP 42.325 Vs 0.06 kts SP7: N36 47.8866 W122 11.3383 KP 42.323
1459	Plow off deck N36 47.8754 W122 11.3441 WD 450m KP 42.344 Vs 0.05 kts SP7: N36 47.8764 W122 11.3437 KP 42.342
1519	Plow in water N36 47.8548 W122 11.3545 WD 452m KP 42.383 Vs 0.29 kts SP7: N36 47.8560 W122 11.3542 KP 42.383

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1624	Plow on bottom N36 47.5774 W122 11.4743 WD 465m KP 42.923 Vs 0.23 kts SP7: N36 47.5821 W122 11.4733 KP 42.915
1757	Scopes set. N36 47.0190 W122 11.7373 WD 510m KP 44.009 Vs 0.20 kts SP7: N36 47.5821 W122 11.4733 KP 42.915
1815	Plow moving on seabed N36 46.9618 W122 11.7772 WD 515m KP 44.121 Vs 0.31 kts SP7: N36 47.5762 W122 11.4762 KP 42.927
1839	KM 5 over stern N36 46.8473 W122 11.8057 WD 527m KP 44.336 Vs 0.34 kts SP7: N36 47.4727 W122 11.5247 KP 43.131
1848	Cable end to jointing shop for end seal installation. N36 46.8032 W122 11.8230 WD 532m KP 44.421 Vs 0.32 kts SP7: N36 47.4314 W122 11.5431 KP 43.213
1918	Plow passing AC26 N36 46.6478 W122 11.7675 WD 546m KP 44.666 Vs 0.54 kts SP7: N36 47.3060 W122 11.5917 KP 43.455
2016	High currents pushing cable to west. Vessel stop to ensure cable correctly positioned. N36 46.3409 W122 11.7422 WD 585m KP 45.233 Vs 0.18 kts SP7: N36 47.0340 W122 11.6433 KP 43.966
2041	Resume burial. High cable tensions must be maintained to keep cable positioned in plow bellmouth due to currents. ASN rep advised. N36 46.3484 W122 11.7390 WD 584m KP 45.220 Vs 0.12 kts SP7: N36 47.0367 W122 11.6429 KP 43.961
2055	Plow moving on seabed. N36 46.3134 W122 11.7311 WD 588m KP 45.286 Vs 0.37 kts SP7: N36 47.0360 W122 11.6430 KP 43.963
2149	Plow passing Transition SAL/SA waypoint. No cable markings observed. N36 45.9970 W122 11.7615 WD 637m KP 45.782 Vs 0.38 kts SP7: N36 46.7356 W122 11.6702 KP 44.519
2158	Plow passing AC27. N36 45.9356 W122 11.7812 WD 645m KP 45.877 Vs 0.34 kts SP7: N36 46.6835 W122 11.6770 KP 44.619
2320	Plow passing AC28 N36 45.3838 W122 11.3024 WD 739m KP 47.108 Vs 1.36 kts SP7: N36 46.1114 W122 11.5753 KP 45.690

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete cable installation. Commence PLIB operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	0.00	19.00	19.00
Burial Operations	9.00	75.00	84.00
Surface Lay Operations	7.00	10.00	17.00

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Transit	0.00	57.50	57.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	8.00	23.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
TOTALS	**24.00**	**300.50**	**324.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	**Activity**
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/28/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS: Very strong currents forced the increase of cable tensions in order to ensure proper orientation of cable entering plow. High tensions being reduced when environmental conditions allow.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

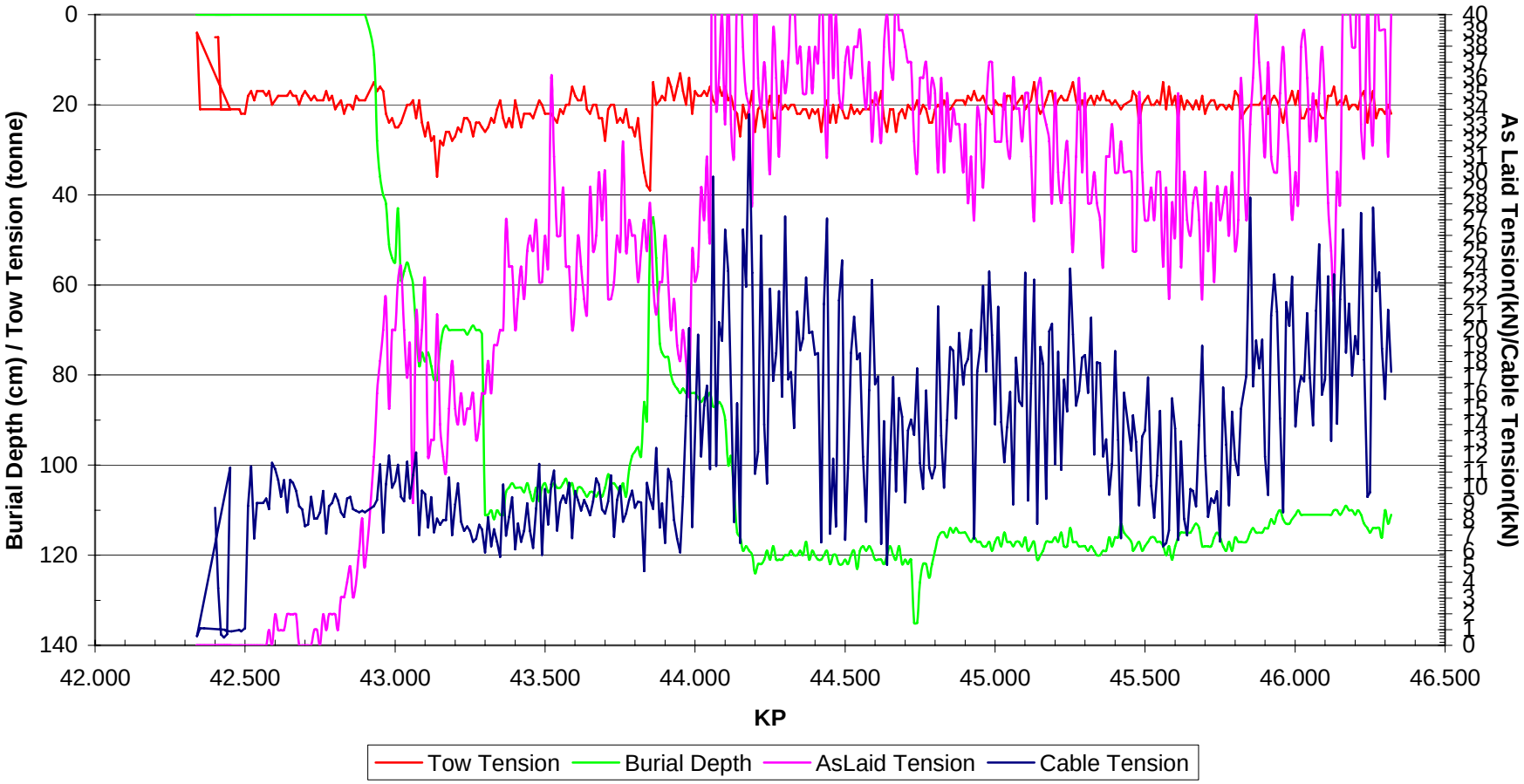
TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
20 Mar 2007 1409 UTC to 21 Mar 2007 0659 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 15 Date: 03/22/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 7

A. VESSEL LOCATION

Latitude	36° 47.600' N	Longitude	122° 11.500' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1015.5	5	NW force 6
0600	1013.9	4	NW force 4
1200	1015.5	4	NW force 5
1800	1013.6	2	SW force 2
WEATHER FORECAST:	WINDS FRESH, TO AT TIMES STRONG, N/NW-LIES CONTINUE THROUGH MUCH OF THE OUTLOOK AS HIGH PRESSURE INFLUENCES THE REGION.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	1.220	5.282	9.228	43.089
TOTALS	**9.107**	**43.339**	**1.220**	**5.282**	**9.228**	**43.089**

PLIB Site (KP)	Est. Amt. to Bury (Km)	Est. Amt. to Inspect (Km)	# of Jetting Passes Last 24	Total Burial Completed (Km)	Remaining (Km)
1.04-1.23	0.186	0	3	0.186	0
36.09-42.6	0	6.513	0	0	6.513
42.6-42.92	0.315	0	0	0	0
50.72-52.13	1.407	0	0	0	1.407
47.6-50.72	0	3.133	0	0	3.133

D. SCHEDULED DATE OF COMPLETION: 3/30/2007

E. ESTIMATED DATE OF COMPLETION: 4/2/2007

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0032	Plow passing AC29 N36 44.7698 W122 11.0873 WD 760m KP 48.264 Vs 0.63 kts Plow: N36 45.5103 W122 11.2964 KP 46.879
0117	KM17 at stern N36 44.4138 W122 11.0642 WD 772m KP 48.922 Vs 0.50 kts Plow: N36 45.1687 W122 11.2225 KP 47.521
0121	Plow DOB sensors malfunctions. Continue burial. Burial depth will be verified by ROV. N36 44.3843 W122 11.0571 WD 773m KP 48.976 Vs 0.46 kts Plow: N36 45.1396 W122 11.2164 KP 47.575
0144	KM56 at stern N36 44.2398 W122 11.0233 WD 780m KP 49.243 Vs 0.23 kts Plow: N36 44.9983 W122 11.1865 KP 47.841
0210	Plow passing AC30 N36 44.1224 W122 11.0675 WD 787m KP 49.460 Vs 0.53 kts Plow: N36 44.8935 W122 11.1664 KP 48.037
0336	KM16 at stern N36 43.9279 W122 11.1899 WD 800m KP 49.823 Vs 0.17 kts Plow: N36 44.6778 W122 11.1624 KP 48.436
0454	Cable end seal completed. N36 43.7978 W122 11.1906 WD 806m KP 50.064 Vs 0.19 kts
0501	Vessel speed increased to 0.2 kts N36 43.7872 W122 11.1915 WD 807m KP 50.083 Vs 0.17 kts Plow: N36 44.5359 W122 11.1674 KP 48.698
0636	KM15 at stern N36 43.3124 W122 11.1988 WD 840m KP 50.962 Vs 0.79 kts Plow: N36 44.0425 W122 11.1812 KP 49.611
0755	Plow burial complete. Commence plow recovery. N36 42.8545 W122 11.2106 WD 885m KP 51.809 Vs 0.38 kts Plow: N36 43.4482 W122 11.1950 KP 50.711
0922	Plow off bottom N36 43.1720 W122 11.2001 WD 853m KP 51.222 Vs 0.17 kts Plow: N36 43.4424 W122 11.1952 KP 50.721
1020	Cable end at stern. CC 52279. Commence ground rope payout. N36 42.9134 W122 11.1998 WD 0m KP 51.699 Vs 0.23 kts Plow: N36 42.9146 W122 11.2004 KP 51.697
1240	Plough at water's edge. N36 42.3365 W122 11.2075 WD 947m KP 52.767 Vs 0.11 kts Plow: N36 42.3377 W122 11.2078 KP 52.765
1246	Plow on deck N36 42.3367 W122 11.2041 WD 955m KP 52.766 Vs 0.09 kts
1407	Ground rope weight cut away on stern N36 42.1813 W122 11.2185 WD 1002m KP 53.054 Vs 0.28 kts
1410	Enroute HDD site for PLIB. N36 42.1690 W122 11.2204 WD 0m KP 53.077 Vs 0.39 kts Plow: N36 42.3371 W122 11.2095 KP 52.766
1728	Vessel in position for PLIB N36 48.6424 W121 48.0946 WD 16m KP 1.315 Vs 0.14 kts
1730	ROV off deck N36 48.6423 W121 48.0947 WD 16m KP 1.315 Vs 0.20 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1736	ROV in water N36 48.6424 W121 48.0944 WD 23m KP 1.315 Vs 0.21 kts ROV: N36 42.4644 W122 11.2817 KP 52.532
1739	ROV on the bottom N36 48.6434 W121 48.0945 WD 16m KP 1.316 Vs 0.19 kts ROV: N36 48.6511 W121 48.0960 KP 46.917
1829	ROV on cable N36 48.6405 W121 48.0330 WD 14m KP 1.231 Vs 0.20 kts ROV: N36 48.6474 W121 48.0267 KP 46.941
1840	ROV on Cable N36 48.6488 W121 48.0024 WD 21m KP 1.203 Vs 0.25 kts ROV: N36 48.6488 W121 48.0024 KP 1.226
1907	Commence jetting passes N36 48.6445 W121 48.0252 WD 14m KP 1.223 Vs 0.20 kts ROV: N36 48.6598 W121 48.0330 KP 1.246
2027	Completed jetting pass 2 N36 48.6437 W121 48.0198 WD 15m KP 1.215 Vs 0.24 kts ROV: N36 48.6560 W121 48.0228 KP 1.229
2103	Completed jetting pass 3 N36 48.6019 W121 47.9111 WD 19m KP 1.036 Vs 0.10 kts ROV: N36 48.6120 W121 47.9188 KP 1.055
2115	Commence inspection pas N36 48.6014 W121 47.9102 WD 19m KP 1.035 Vs 0.23 kts ROV: N36 48.6148 W121 47.9168 KP 1.054
2141	Inspection complete. Commence ROV recovery N36 48.6376 W121 48.0139 WD 21m KP 1.203 Vs 0.08 kts ROV: N36 48.6452 W121 48.0219 KP 1.219
2141	ROV out of water N36 48.6376 W121 48.0140 WD 14m KP 1.203 Vs 0.12 kts ROV: N36 48.6454 W121 48.0216 KP 1.219
2146	ROV on Deck N36 48.6375 W121 48.0358 WD 23m KP 1.232 Vs 0.51 kts ROV: N36 48.6456 W121 48.0421 KP 1.247
2224	Depart site for PLIB site 3. N36 48.6363 W121 48.9625 WD 26m KP 2.178 Vs 11.24 kts ROV: N36 48.6337 W121 48.9440 KP 2.156

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete current PLIB operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	0.00	19.00	19.00
Burial Operations	12.75	84.00	96.75
Surface Lay Operations	1.50	17.00	18.50

© Copyright 2007 All rights reserved.

Transit	5.50	57.50	63.00
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	31.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
PLIB Operations	4.25	0.00	4.25
TOTALS	**24.00**	**324.50**	**348.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/28/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION: OTDR and IR test results satisfactory. Testing conducted IAW ASN protocol.

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS: Plow Depth of Burial sensor stopped providing burial depth at about 0121 local. All other sensors (skid height, tensions, etc.) indicate good burial. Continue plow operations, ROV will inspect area to confirm burial depth.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

© Copyright 2007 All rights reserved.

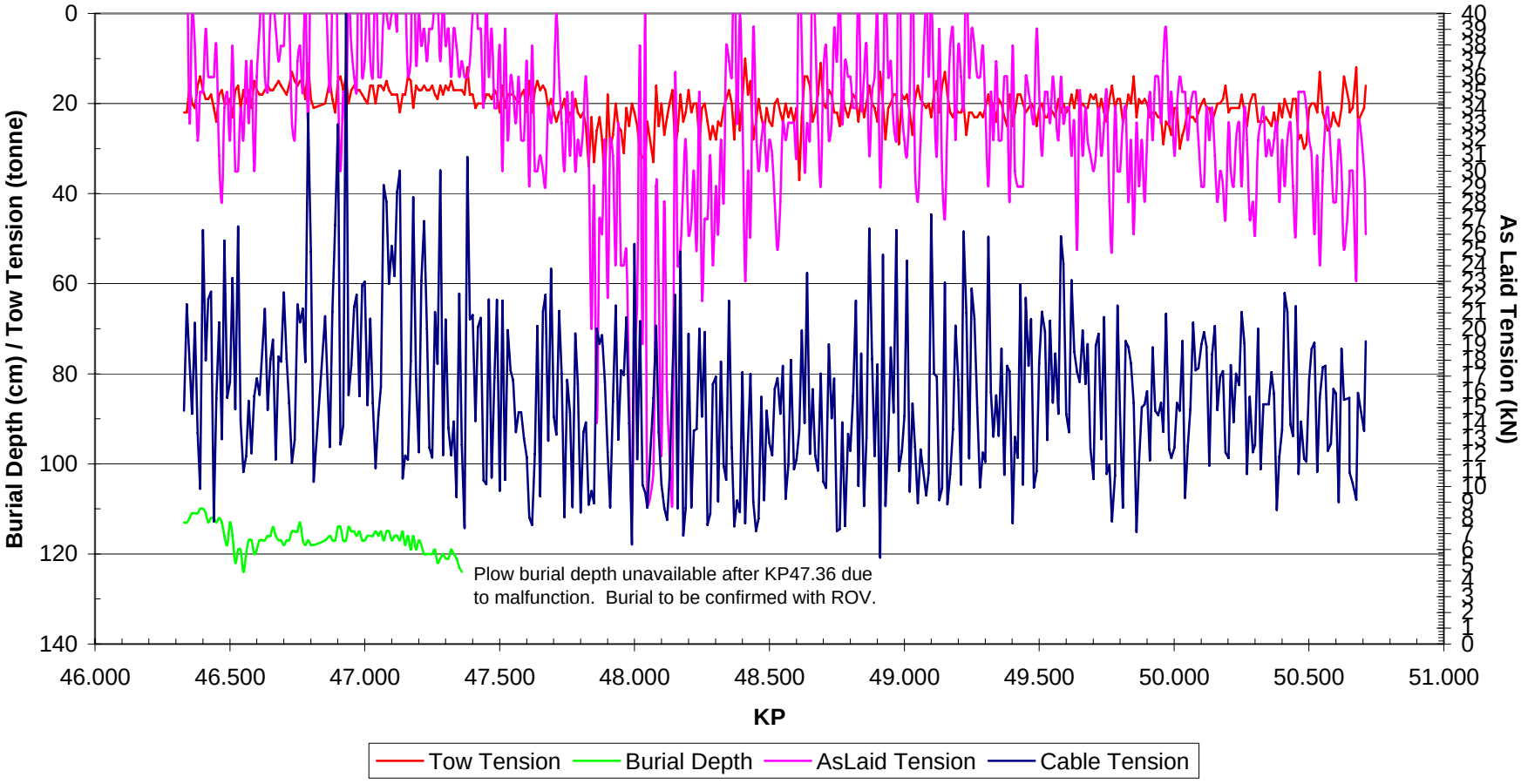
P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

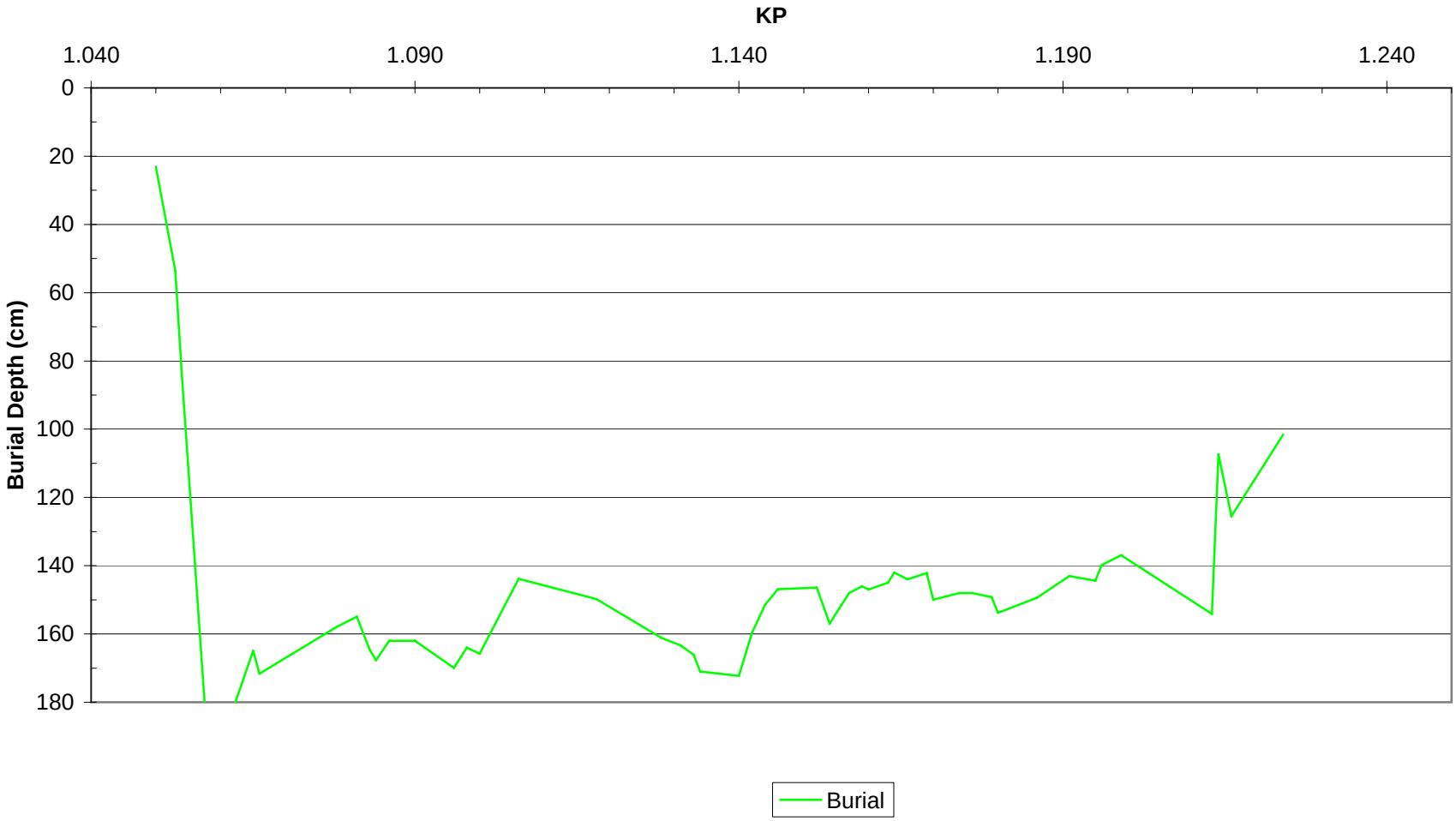
© Copyright 2007 All rights reserved.

MARS
Daily Burial - GLOBAL SENTINEL
21 Mar 2007 0700 UTC to 21 Mar 2007 1455 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

MARS
PLIB Site 1 - GLOBAL SENTINEL
22 Mar 2007 0415 UTC to 22 Mar 2007 0438 UTC



© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 16 Date: 03/23/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 6

A. VESSEL LOCATION

Latitude	37° 34.500' N	Longitude	122° 39.600' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
18		27	9		20

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1014.2	3	WNW force 4
0600	1013.2	2	ENE force 2
1200	1015	2	NNE force 2
1800	1011.5	4	NW force 6
WEATHER FORECAST:	WINDS FRESH, TO AT TIMES STRONG, N/NW-LIES CONTINUE THROUGH MUCH OF THE OUTLOOK AS HIGH PRESSURE INFLUENCES THE REGION.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	1.220	5.282	9.228	43.089
TOTALS	**9.107**	**43.339**	**1.220**	**5.282**	**9.228**	**43.089**

PLIB Site (KP)	Est. Amt. to Bury (Km)	Est. Amt. to Inspect (Km)	# of Jetting Passes Last 24	Total Burial Completed (Km)	Remaining (Km)
1.04-1.23	0.186	0	0	0.186	0
36.09-42.6	0	6.513	0	6.513	0
42.6-42.92	0.315	0	3	0.315	0
50.72-52.13	1.407	0	0	0	1.407
47.6-50.72	0	3.133	0	0	3.133

D. SCHEDULED DATE OF COMPLETION: 3/30/2007

E. ESTIMATED DATE OF COMPLETION: 4/2/2007

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0000	Arrival PLIB site 3. Prepare for ROV launch. N36 47.5333 W122 11.5583 WD 461m KP 43.044 Vs 0.17 kts
0105	ROV off deck N36 47.5750 W122 11.4876 WD 457m KP 42.935 Vs 0.07 kts
0110	ROV in water N36 47.5753 W122 11.4875 WD 456m KP 42.934 Vs 0.13 kts ST217: N36 47.5859 W122 11.4866 KP 42.916
0127	ROV on Bottom N36 47.5747 W122 11.4876 WD 457m KP 42.936 Vs 0.12 kts ST217: N36 47.5649 W122 11.4884 KP 42.953
0139	ROV positioning on plow trench and cable N36 47.5830 W122 11.4821 WD 457m KP 42.918 Vs 0.11 kts ST217: N36 47.5743 W122 11.4601 KP 42.921
0140	ROV on cable track N36 47.5853 W122 11.4791 WD 456m KP 42.913 Vs 0.14 kts ST217: N36 47.5777 W122 11.4634 KP 42.918
0147	Start jetting pass 1 N36 47.5901 W122 11.4768 WD 455m KP 42.903 Vs 0.11 kts ST217: N36 47.5767 W122 11.4615 KP 42.918
0254	Start jetting pass 2 N36 47.7483 W122 11.3802 WD 449m KP 42.578 Vs 0.20 kts ST217: N36 47.7474 W122 11.3748 KP 42.577
0403	Start jetting pass 3 N36 47.5825 W122 11.4626 WD 454m KP 42.909 Vs 0.03 kts ST217: N36 47.5732 W122 11.4659 KP 42.926
0544	End of jetting pass 3 N36 47.7589 W122 11.3654 WD 447m KP 42.552 Vs 0.05 kts ST217: N36 47.7478 W122 11.3689 KP 42.573
0652	Commence inspection pass site 3. N36 47.5718 W122 11.4550 WD 453m KP 42.924 Vs 0.09 kts ST217: N36 47.5735 W122 11.4633 KP 42.925
0738	Inspection complete. Commence Inspection site 2 (Smooth Ridge) N36 47.7482 W122 11.3706 WD 446m KP 42.574 Vs 0.33 kts ST217: N36 47.7474 W122 11.3637 KP 42.571
1431	Joint SJ2 visible. N36 50.2209 W122 09.4562 WD 153m KP 37.009 Vs 0.81 kts ST217: N36 50.2258 W122 09.4592 KP 37.010
1507	Wire rope visible under cable. N36 50.3950 W122 08.9923 WD 117m KP 36.250 Vs 0.07 kts ST217: N36 50.3941 W122 08.9939 KP 36.252
1529	Cable into 1m plow burial. N36 50.4517 W122 08.8540 WD 0m KP 36.019 Vs 0.31 kts ST217: N36 50.4571 W122 08.8490 KP 36.008
1543	ROV returning to wire rope crossing for further inspection. N36 50.4443 W122 08.8737 WD 114m KP 36.051 Vs 0.37 kts ST217: N36 50.4431 W122 08.8843 KP 36.066
1810	Survey complete. Recover ROV and install cutting tool. N36 50.3988 W122 08.9913 WD 118m KP 36.245 Vs 0.06 kts ST217: N36 50.3944 W122 08.9911 KP 36.248
1817	ROV off seabed

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

	N36 50.3996 W122 08.9836 WD 117m KP 36.234 Vs 0.07 kts ST217: N36 50.3930 W122 08.9823 KP 36.238
1826	ROV on deck N36 50.4007 W122 08.9841 WD 117m KP 36.234 Vs 0.10 kts ST217: N36 50.3949 W122 08.9720 KP 36.222
1902	Cutting tool installed. ROV off deck. N36 50.3983 W122 08.9905 WD 118m KP 36.244 Vs 0.06 kts ST217: N36 50.3926 W122 08.9785 KP 36.233
1913	ROV on Bottom N36 50.3971 W122 08.9979 WD 118m KP 36.255 Vs 0.08 kts ST217: N36 50.3939 W122 08.9947 KP 36.254
1927	1st cut wire rope made. N36 50.3984 W122 08.9920 WD 118m KP 36.246 Vs 0.03 kts ST217: N36 50.3923 W122 09.0004 KP 36.263
1927	Preparing for ROV recovery due to deteriorating weather N36 50.3980 W122 08.9913 WD 117m KP 36.246 Vs 0.12 kts ST217: N36 50.3926 W122 09.0004 KP 36.262
1930	ROV on surface N36 50.3981 W122 08.9892 WD 118m KP 36.243 Vs 0.05 kts ST217: N36 50.3887 W122 08.9826 KP 36.242
1930	Guard boat released N36 50.3987 W122 08.9885 WD 117m KP 36.241 Vs 0.06 kts ST217: N36 50.3879 W122 08.9855 KP 36.246
1940	ROV out of water N36 50.3987 W122 08.9889 WD 117m KP 36.242 Vs 0.12 kts ST217: N36 50.3879 W122 08.9855 KP 36.246
1945	ROV on deck N36 50.3986 W122 08.9886 WD 117m KP 36.242 Vs 0.08 kts ST217: N36 50.3879 W122 08.9855 KP 36.246
1946	Commence preparation to get underway. N36 50.3986 W122 08.9883 WD 117m KP 36.241 Vs 0.05 kts
2007	Commence transit San Francisco. N36 50.5226 W122 09.2689 WD 123m KP 36.532 Vs 5.24 kts

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Vessel arrive San Francisco to test and load Trawler Resistant Frame.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	0.00	0.00
In Port Standby	0.00	24.00	24.00
Splicing Operations	0.00	19.00	19.00
Burial Operations	0.00	96.75	96.75
Surface Lay Operations	0.00	18.50	18.50
Transit	4.25	63.00	67.25
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	31.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
PLIB Operations	19.75	4.25	24.00
TOTALS	**24.00**	**348.50**	**372.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/19/2007	Complete Surface Lay
3/28/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: Wire rope observed under cable at KP36.26. Decision made to cut wire rope and pull from under cable. One of three cuts completed. ROV dive aborted due to deteriorating weather. Wire rope will be removed upon return to PLIB ops.

N. TYCO REPRESENTATIVE COMMENTS: Installation daily reports will be suspended during vessel port call. Daily reports will resume on vessel departure for TRF installation.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

MARS
PLIB Site 3 - GLOBAL SENTINEL
22 Mar 2007 1352 UTC to 22 Mar 2007 1500 UTC



© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 17 Date: 03/29/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 3

A. VESSEL LOCATION

Latitude	36° 42.300' N	Longitude	122° 11.300' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
15		27	6		19

x	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000			
0600			
1200			
1800	1021.5	4	W force 5
WEATHER FORECAST:	20-25KTS N/NW-LIES EASE TO MODERATE THROUGH THE 30TH AND THEN INCREASE TO 15-20KTS THROUGH THE REST OF THE PERIOD AS HIGH PRESSURE WEAKENS AND THEN STRENGTHENS AGAIN ACROSS THE EAST PACIFIC. EXPECT ISOLATED TO WIDELY SCATTERED SHOWERS AND THUNDERSTORMS IN YOUR VICINITY DURING THE NEXT 24-48 HOURS.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0	0	9.228	43.089
TOTALS	**9.107**	**43.339**	**0**	**0**	**9.228**	**43.089**

PLIB Site (KP)	Est. Amt. to Bury (Km)	Est. Amt. to Inspect (Km)	# of Jetting Passes Last 24	Total Burial Completed (Km)	Remaining (Km)
1.04-1.23	0.186	0	0	0.186	0
36.09-42.6	0	6.513	0	6.513	0
42.6-42.92	0.315	0	0	0.315	0
50.72-52.13	1.407	0	0	0	1.407
47.6-50.72	0	3.133	0	0	3.133

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

D. SCHEDULED DATE OF COMPLETION: 4/1/2007

E. ESTIMATED DATE OF COMPLETION: 4/1/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
1610	Commenced end prep TRF tail.
1658	Departed San Francisco.
2150	TRF tail end preparation complete.
2359	Enroute TRF location to resume operations.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Arrive TRF location and recover cable end. Commence jointing operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	17.00	109.00	126.00
Standby	0.00	24.00	24.00
Splicing Operations	0.00	19.00	19.00
Burial Operations	0.00	96.75	96.75
Surface Lay Operations	0.00	18.50	18.50
Transit	7.00	78.25	85.25
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	31.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	0.00	6.00	6.00
Calibration	0.00	12.50	12.50
PLIB Operations	0.00	24.00	24.00
TOTALS	**24.00**	**492.50**	**516.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/20/2007	Complete Surface Lay
3/30/2007	Install TRF
4/2/2007	Disembark Personnel

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS: While in port San Francisco, vessel performed trials using TRF mock up, and completed rigging for transit and launch of TRF from bow. Operational summary hours updated to reflect working time in port. Estimated dates for planning updated based on MARS POW dated 27 Mar 07.

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 18 Date: 03/30/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 4

A. VESSEL LOCATION

Latitude	36° 43.100' N	Longitude	122° 11.200' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
15		27	6		19

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1022	3	W force 4
0600	1021	1	N force 2
1200	1022	1	Lt. Airs
1800	1019.5	3	W force 4
WEATHER FORECAST:	HIGH PRESSURE RIDGE REMAINS TO THE WEST OF YOUR WORKSITE DURING THE NEXT 3 DAYS. MODERATE NW/NNW-LY CONDITIONS ANTICIPATED THROUGH FRIDAY NIGHT AS RELAXED PRESSURE GRADIENT REMAINS OVER YOUR SITE. CONDITIONS FRESHEN SATURDAY BECOMING STRONG BY PERIODS END AS THE RIDGE INTERACTS WITH A LOW PRESSURE SYSTEM THAT DEVELOPS OVER THE SW UNITED STATES. SEAS/SWELLS BUILD ABOVE 3.0M SUNDAY INTO MONDAY.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0	0	9.228	43.089
TOTALS	**9.107**	**43.339**	**0**	**0**	**9.228**	**43.089**

PLIB Site (KP)	Est. Amt. to Bury (Km)	Est. Amt. to Inspect (Km)	# of Jetting Passes Last 24	Total Burial Completed (Km)	Remaining (Km)
1.04-1.23	0.186	0	0	0.186	0
36.09-42.6	0	6.513	0	6.513	0
42.6-42.92	0.315	0	0	0.315	0
50.72-52.13	1.407	0	0	0	1.407
47.6-50.72	0	3.133	0	0	3.133

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

D. SCHEDULED DATE OF COMPLETION: 4/1/2007

E. ESTIMATED DATE OF COMPLETION: 4/1/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0312	Arrive Monterey Bay cable grounds. Commence ROV launch preparations.
0357	ROV off deck. N36 42.2436 W122 11.1645 WD 959m Vs 0.18 kts ROV: N36 42.2431 W122 11.1639
0405	ROV in water. N36 42.2435 W122 11.1641 WD 959m Vs 0.13 kts ROV: N36 42.2432 W122 11.1637
0451	ROV on bottom. N36 42.2439 W122 11.1510 WD 960m Vs 0.09 kts ROV: N36 42.2400 W122 11.1310
0719	ROV on ground rope. N36 42.2188 W122 11.2590 WD 990m Vs 0.22 kts ROV: N36 42.2117 W122 11.2157
0929	Recovery rope deployed. N36 42.2733 W122 11.1889 WD 956m Vs 0.12 kts ROV: N36 42.2576 W122 11.1983
1133	ROV Hooks recovery rope to ground rope. ROV moving off for recovery. N36 42.2559 W122 11.2050 WD 964m Vs 0.06 kts ROV: N36 42.2194 W122 11.2275
1219	ROV on deck. Commence rope recovery. N36 42.2563 W122 11.2051 WD 970m Vs 0.15 kts
1314	Ground rope end on bow. N36 42.2633 W122 11.2087 WD 962m Vs 0.10 kts
1539	Cable end seal on bow. N36 42.8427 W122 11.1738 WD 877m KP 51.829 Vs 0.13 kts
1620	Cable end seal cut off on highway. N36 42.8931 W122 11.1761 WD 875m KP 51.736 Vs 0.09 kts
1639	IR test completed with satisfactory result. N36 42.9124 W122 11.1789 WD 874m KP 51.701 Vs 0.02 kts
1710	Cable marked for trimming. N36 43.0738 W122 11.2020 WD 857m KP 51.403 Vs 0.24 kts
1735	Cable trimmed on highway to ensure proper placement of TRF on seabed. 365m removed.
1743	Cable end to jointers. Commence jointing SJ3.
2240	Cable end preparation complete. Commence fiber fusion.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete jointing operations. Launch and place TRF. Commence PLIB operations.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	126.00	126.00
Standby	0.00	24.00	24.00
Splicing Operations	6.25	19.00	25.25
Burial Operations	0.00	96.75	96.75
Surface Lay Operations	5.50	18.50	24.00
Transit	3.25	85.25	88.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	31.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	9.00	6.00	15.00
Calibration	0.00	12.50	12.50
PLIB Operations	0.00	24.00	24.00
TOTALS	**24.00**	**516.50**	**540.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/20/2007	Complete Surface Lay
3/30/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS

MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 19 Date: 03/31/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 4

A. VESSEL LOCATION

Latitude	36° 42.900' N	Longitude	122° 11.200' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
15		27	5		19

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1020	3	WNW force 4
0600	1019	3	NW force 4
1200	1020.5	2	WNW force 3
1800	1019.6	2	S force 3
WEATHER FORECAST:	LOW PRESSURE MOVING INLAND TONIGHT IS FOLLOWED BY HIGH PRESSURE BUILDING OVER THE NORTHEASTERN PACIFIC. THE HIGH CENTER TO YOUR WEST WEAKENS OVER THE NEXT TWO DAYS, BUT INTERACTS WITH LOW PRESSURE INLAND TO PRODUCE STRONG NNW-LIES TOMORROW AFTERNOON. THIS HIGH IS ABSORBED INTO THE BROADER HIGH TO THE NORTHWEST ON SUNDAY, BRINGING ANOTHER BATCH OF REINVIGORATED NNW-LIES. VISIBILITY GOOD.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0	0	9.228	43.089
TOTALS	**9.107**	**43.339**	**0**	**0**	**9.228**	**43.089**

PLIB Site (KP)	Est. Amt. to Bury (Km)	Est. Amt. to Inspect (Km)	# of Jetting Passes Last 24	Total Burial Completed (Km)	Remaining (Km)
1.04-1.23	0.186	0	0	0.186	0
36.09-42.6	0	6.513	0	6.513	0
42.6-42.92	0.315	0	0	0.315	0
50.72-52.13	1.407	0	0	0	1.407
47.6-50.72	0	3.133	0	0	3.133

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

D. SCHEDULED DATE OF COMPLETION: 4/1/2007

E. ESTIMATED DATE OF COMPLETION: 4/1/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0238	Fusion and coiling complete - joint SJ3.
0434	Testing completed with satisfactory results.
0750	Mold complete - joint SJ3.
0930	X-rays completed with satisfactory results - joint SJ3.
1212	Joint SJ3 complete.
1237	Preparing for TRF launch. Paying out cable bight. N36 43.0750 W122 11.1987 WD 858m KP 51.401 Vs 0.10 kts
1327	Cable removed from port drum. Tension on hack line. N36 43.0698 W122 11.1979 WD 858m KP 51.411 Vs 0.04 kts
1343	TRF outboard hold downs released. N36 43.0699 W122 11.1979 WD 858m KP 51.410 Vs 0.08 kts
1407	Joint SJ3 on bow. N36 43.0625 W122 11.1976 WD 859m KP 51.424 Vs 0.14 kts
1432	Cable tension on slip line. N36 43.0458 W122 11.1990 WD 861m KP 51.455 Vs 0.10 kts
1519	Cable bight over bow. N36 43.0366 W122 11.1979 WD 862m KP 51.471 Vs 0.09 kts
1533	TRF released from hold downs. Commence lowering. N36 43.0360 W122 11.1988 WD 862m KP 51.473 Vs 0.15 kts
1537	TRF in water. N36 43.0362 W122 11.1987 WD 862m KP 51.473 Vs 0.12 kts
1608	Tug DELTA CAPTAIN alongside TRF to remove steadying lines. N36 43.0208 W122 11.1982 WD 864m KP 51.501 Vs 0.10 kts
1621	Tug DELTA CAPTAIN unable to remove lines. Lines will be married to lowering bridle and recovered by ROV. N36 43.0212 W122 11.1990 WD 864m KP 51.500 Vs 0.09 kts
1626	Commence move down track and payout of TRF. N36 43.0212 W122 11.1981 WD 864m KP 51.500 Vs 0.06 kts ROV: N36 43.0643 W122 11.2013 KP 0.000
1728	ROV off deck for TRF landing. N36 42.8342 W122 11.2043 WD 880m KP 51.846 Vs 0.25 kts ROV: N36 42.8095 W122 11.2208 KP 51.892
1733	ROV in the water N36 42.8174 W122 11.2052 WD 881m KP 51.877 Vs 0.16 kts ROV: N36 42.8176 W122 11.2118 KP 51.877
1846	TRF visible on ROV sonar. N36 42.6548 W122 11.2093 WD 896m KP 52.178 Vs 0.10 kts ROV: N36 42.7207 W122 11.2605
1943	ROV at TRF. TRF 14m from seabed. N36 42.6686 W122 11.2092 WD 895m KP 52.153 Vs 0.06 kts ROV: N36 42.7412 W122 11.2253
1955	TRF on seabed. N36 42.6705 W122 11.2090 WD 895m KP 52.149 Vs 0.14 kts ROV: N36 42.7400 W122 11.2216 KP 52.020

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

2118	ROV cutting tag line. N36 42.7115 W122 11.2085 WD 890m KP 52.073 Vs 0.03 kts ROV: N36 42.7422 W122 11.2123 KP 0.000
2250	ROV makes first bridle cut. N36 42.7335 W122 11.2083 WD 888m KP 52.033 Vs 0.06 kts ROV: N36 42.7409 W122 11.2142
2317	ROV makes bridle cut. N36 42.7332 W122 11.2080 WD 889m KP 52.033 Vs 0.01 kts ROV: N36 42.7452 W122 11.2133
2350	ROV makes bridle cut. N36 42.7332 W122 11.2085 WD 889m KP 52.033 Vs 0.05 kts ROV: N36 42.7415 W122 11.2103

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Continue PLIB operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	126.00	126.00
Standby	0.00	24.00	24.00
Splicing Operations	12.25	25.25	37.50
Burial Operations	0.00	96.75	96.75
Surface Lay Operations	7.75	24.00	31.75
Transit	0.00	88.50	88.50
Weather Downtime	0.00	0.00	0.00
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	31.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	4.00	15.00	19.00
Calibration	0.00	12.50	12.50
PLIB Operations	0.00	24.00	24.00
TOTALS	**24.00**	**540.50**	**564.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/20/2007	Complete Surface Lay
3/30/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis. Tug DELTA CAPTAIN providing support for TRF launch operations.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 20 Date: 04/01/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 5

A. VESSEL LOCATION

Latitude	36° 44.900' N	Longitude	122° 11.200' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:	Unlicensed:	Tyco Staff:	Others:		
15	27	5	19		

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1020	3	WNW force 4
0600	1018.4	4	NW force 5
1200	1019	4	NW force 4
1800	1014.8	5	NW force 7
WEATHER FORECAST:	PERIODS OF FRESH TO STRONG NW/NNW-LIES ARE STILL FORECAST AS HIGH PRESSURE TO THE WEST BECOMES ABSORBED INTO A STRONGER HIGH BUILDING WEST OF THE PACIFIC NORTHWEST. WINDS RELAX TUESDAY AS THE HIGH MOVES INLAND. VISIBILITY MODERATE, POOR IN THE MORNING.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0	0	9.228	43.089
TOTALS	**9.107**	**43.339**	**0**	**0**	**9.228**	**43.089**

PLIB Site (KP)	Est. Amt. to Bury (Km)	Est. Amt. to Inspect (Km)	# of Jetting Passes Last 24 Hours	Total Burial /Inspection Completed (Km)	Remaining (Km)
1.04-1.23	0.186	0	0	0.186	0
36.09-42.6	0	6.513	0	6.513	0
42.6-42.92	0.315	0	0	0.315	0
50.67-TRF	1.530	0	2	0	1.530
47.6-50.72	0	3.133	0	0	3.133

D. SCHEDULED DATE OF COMPLETION: 4/1/2007

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

E. ESTIMATED DATE OF COMPLETION: 4/1/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0026	Last bridle cut completed. N36 42.7335 W122 11.2082 WD 888m KP 52.033 Vs 0.05 kts ROV: N36 42.7427 W122 11.2065
0054	Final cut. Lowering rigging cut away. N36 42.7333 W122 11.2071 WD 888m KP 52.033 Vs 0.09 kts ROV: N36 42.7512 W122 11.2116
0059	Commence recovery of cut away rigging and ROV recovery. N36 42.7333 W122 11.2077 WD 888m KP 52.033 Vs 0.10 kts ROV: N36 42.7487 W122 11.2121
0106	ROV off bottom N36 42.7294 W122 11.1983 WD 889m KP 52.040 Vs 0.32 kts ROV: N36 42.7095 W122 11.2462
0127	ROV on deck N36 42.6859 W122 11.1460 WD 890m KP 52.119 Vs 0.06 kts
0152	Lowering rigging at bow. N36 42.6682 W122 11.2490 WD 895m KP 52.154 Vs 0.32 kts
0204	Lowering rigging onboard. N36 42.6364 W122 11.3116 WD 902m KP 52.215 Vs 0.07 kts
0244	Vessel in position for PLIB. ROV tracks being installed. N36 42.7407 W122 11.2149 WD 886m KP 52.020 Vs 0.04 kts
0358	ROV off deck for PLIB N36 42.7418 W122 11.2161 WD 886m KP 52.018 Vs 0.15 kts
0415	Commence ROV recovery to reconfigure TSS. N36 42.7421 W122 11.2157 WD 886m KP 52.017 Vs 0.01 kts
0425	ROV on deck N36 42.7422 W122 11.2161 WD 886m KP 52.017 Vs 0.03 kts
0535	ROV off deck for PLIB. N36 42.7505 W122 11.2179 WD 886m KP 52.002 Vs 0.23 kts
0540	ROV in the water. N36 42.7548 W122 11.2183 WD 886m KP 51.993 Vs 0.04 kts
0600	ROV on bottom. N36 42.7600 W122 11.2186 WD 886m KP 51.984 Vs 0.07 kts ROV: N36 42.7689 W122 11.2110 KP 51.967
0617	Commence first inspection pass. N36 42.7455 W122 11.2021 WD 886m KP 52.010 Vs 0.02 kts ROV: N36 42.7505 W122 11.1937 KP 52.001
0631	ROV at joint SJ3. N36 42.7922 W122 11.2008 WD 882m KP 51.924 Vs 0.23 kts ROV: N36 42.7941 W122 11.1934 KP 51.920
0821	ROV on plow trench N36 43.4644 W122 11.1928 WD 821m KP 50.681 Vs 0.42 kts ROV: N36 43.4643 W122 11.1919 KP 50.681
0825	Commence jetting pass 1. N36 43.4684 W122 11.1947 WD 819m KP 50.673 Vs 0.01 kts ROV: N36 43.4695 W122 11.1953 KP 50.671

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1205	ROV at TRF. End jetting pass 1. N36 42.7316 W122 11.2114 WD 886m KP 52.036 Vs 0.05 kts ROV: N36 42.7489 W122 11.2015 KP 52.004
1212	Commence jetting pass 2. N36 42.7319 W122 11.2124 WD 885m KP 52.036 Vs 0.06 kts ROV: N36 42.7553 W122 11.2046 KP 51.992
1631	Weather conditions deteriorating rapidly. Abort jetting pass. Commence ROV recovery. N36 43.4131 W122 11.1930 WD 823m KP 50.776 Vs 0.13 kts ROV: N36 43.4283 W122 11.1870 KP 50.747
1635	ROV off bottom N36 43.4123 W122 11.1931 WD 822m KP 50.777 Vs 0.10 kts ROV: N36 43.4207 W122 11.1843 KP 50.761
2041	Weather improved. ROV off deck for resumption of jetting. N36 43.4143 W122 11.2101 WD 823m KP 50.773 Vs 0.12 kts ROV: N36 43.4370 W122 11.1902 KP 50.731
2047	ROV in water N36 43.4144 W122 11.2108 WD 824m KP 50.774 Vs 0.14 kts ROV: N36 43.4370 W122 11.1902 KP 50.731
2105	ROV on bottom N36 43.4146 W122 11.2121 WD 824m KP 50.773 Vs 0.14 kts ROV: N36 43.4320 W122 11.2005 KP 50.741
2112	ROV lining up on cable N36 43.4135 W122 11.2011 WD 824m KP 50.774 Vs 0.03 kts ROV: N36 43.4340 W122 11.1854 KP 50.736
2115	Resume jetting pass 2. N36 43.4138 W122 11.2017 WD 822m KP 50.775 Vs 0.19 kts ROV: N36 43.4428 W122 11.1874 KP 50.720
2121	End jetting pass 2. N36 43.4340 W122 11.2025 WD 822m KP 50.737 Vs 0.28 kts ROV: N36 43.4646 W122 11.1850 KP 50.680
2141	Commence jetting pass 3. N36 43.4424 W122 11.2048 WD 820m KP 50.722 Vs 0.07 kts ROV: N36 43.4735 W122 11.1851 KP 50.664
2359	ROV jetting on pass 3. N36 42.9763 W122 11.2072 WD 866m KP 51.584 Vs 0.24 kts ROV: N36 42.9921 W122 11.1910 KP 51.554

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Complete PLIB operations.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	126.00	126.00
Standby	0.00	24.00	24.00
Splicing Operations	0.00	37.50	37.50
Burial Operations	0.00	96.75	96.75
Surface Lay Operations	0.00	31.75	31.75
Transit	0.00	88.50	88.50
Weather Downtime	4.50	0.00	4.50
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00

© Copyright 2007 All rights reserved.

Plow Downtime	0.00	31.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	5.50	19.00	24.50
Calibration	0.00	12.50	12.50
PLIB Operations	14.00	24.00	38.00
TOTALS	**24.00**	**564.50**	**588.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/20/2007	Complete Surface Lay
3/30/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS
MBARI providing three local fishing vessels to perform guard boat duties on a rotating basis.

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS:

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

Tyco	MARS Monterey Bay CS Global Sentinel Deep Sea Installation Daily Project Status Report	Report No. 21 Date: 04/02/07 Local Time: 0800 GMT -7 Prepared by: DB Page 1 of 6

A. VESSEL LOCATION

Latitude	37° 25.900' N	Longitude	122° 39.800' W	Datum	WGS84
SHIPBOARD PERSONNEL					
Officers:		Unlicensed:	Tyco Staff:		Others:
15		27	5		19

	In Transit

B. WEATHER

Time	Barometer	Sea State	Winds
0000	1015	4	NW force 5
0600	1014.4	5	NW force 6
1200	1015.5	4	NW force 4
1800	1012.5	6	W force 8
WEATHER FORECAST:	PERIODS OF FRESH TO STRONG NW/NNW-LIES ARE STILL FORECAST AS HIGH PRESSURE TO THE WEST BECOMES ABSORBED INTO A STRONGER HIGH BUILDING WEST OF THE PACIFIC NORTHWEST. WINDS RELAX TUESDAY AS THE HIGH MOVES INLAND. VISIBILITY MODERATE, POOR IN THE MORNING.		

C. CABLE LAID/BURIED

Segment	Total Length To Lay	Total Length To Bury	Laid Last 24 Hours	Buried Last 24 Hours	Total Laid To Date	Total Buried To Date
1	9.107	43.339	0	0	9.228	43.089
TOTALS	**9.107**	**43.339**	**0**	**0**	**9.228**	**43.089**

PLIB Site (KP)	Est. Amt. to Bury (Km)	Est. Amt. to Inspect (Km)	# of Jetting Passes Last 24 Hours	Total Burial /Inspection Completed (Km)	Remaining (Km)
1.04-1.23	0.186	0	0	0.186	0
36.09-42.6	0	6.513	0	6.513	0
42.6-42.92	0.315	0	0	0.315	0
50.67-TRF	1.530	0	1	1.530	0
47.6-50.72	0	3.133	0	3.133	0

D. SCHEDULED DATE OF COMPLETION: 4/1/2007

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

E. ESTIMATED DATE OF COMPLETION: 4/1/2007

F. DAILY CHRONOLOGY: (ACTIVITIES LAST 24 HOURS)

Local Time (0000-2400)	Activity
0103	End jetting pass 3. N36 42.7401 W122 11.2092 WD 884m KP 52.020 Vs 0.15 kts ROV: N36 42.7548 W122 11.1933 KP 51.993
0136	Commence final inspection pass. N36 42.7444 W122 11.2027 WD 885m KP 52.012 Vs 0.33 kts ROV: N36 42.7626 W122 11.1967 KP 51.978
0703	Inspection pass complete. Commence ROV recovery. N36 45.1255 W122 11.2363 WD 770m KP 47.596 Vs 0.21 kts ROV: N36 45.1438 W122 11.2234 KP 47.566
0706	ROV off bottom N36 45.1260 W122 11.2366 WD 769m KP 47.595 Vs 0.16 kts ROV: N36 45.1424 W122 11.2231 KP 47.569
0727	ROV on deck N36 45.1257 W122 11.2367 WD 770m KP 47.596 Vs 0.05 kts
0929	ROV off deck to retrieve marker beacons from seabed. N36 42.6717 W122 11.1926 WD 891m KP 52.147 Vs 0.07 kts
0932	ROV in water N36 42.6708 W122 11.1918 WD 890m KP 52.148 Vs 0.02 kts ROV: N36 42.6833 W122 11.1683 KP 52.125
0948	ROV on bottom N36 42.6709 W122 11.1910 WD 891m KP 52.148 Vs 0.10 kts ROV: N36 42.6933 W122 11.1680 KP 52.106
1008	ROV retrieves first beacon N36 42.6714 W122 11.1915 WD 890m KP 52.147 Vs 0.02 kts ROV: N36 42.6740 W122 11.1612 KP 52.142
1103	ROV retrieves second beacon N36 42.6540 W122 11.2211 WD 893m KP 52.180 Vs 0.06 kts ROV: N36 42.6504 W122 11.2097 KP 52.186
1131	All beacons recovered. Commence ROV recovery. N36 42.6774 W122 11.2368 WD 891m KP 52.137 Vs 0.05 kts ROV: N36 42.6948 W122 11.2107 KP 52.104
1135	ROV off bottom N36 42.6773 W122 11.2358 WD 892m KP 52.137 Vs 0.09 kts ROV: N36 42.6943 W122 11.2115 KP 52.105
1156	ROV out of water N36 42.6774 W122 11.2363 WD 892m KP 52.137 Vs 0.05 kts ROV: N36 42.6881 W122 11.2123 KP 52.117
1201	ROV on deck N36 42.6771 W122 11.2364 WD 891m KP 52.138 Vs 0.11 kts
1355	Commence ROV launch to recover plow electronics N36 42.9652 W122 11.1969 WD 866m KP 51.604 Vs 0.13 kts
1402	ROV in the water. Recovery line lowered from bow. N36 42.9651 W122 11.1962 WD 867m KP 51.604 Vs 0.06 kts
1402	ROV in water N36 42.9650 W122 11.1971 WD 867m KP 51.604 Vs 0.03 kts ROV: N36 42.6882 W122 11.2139 KP 52.117

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

1429	ROV on bottom. N36 42.9651 W122 11.1966 WD 866m KP 51.604 Vs 0.07 kts ROV: N36 42.9940 W122 11.1967 KP 51.551
1607	ROV hooks recovery line plow cage N36 42.9172 W122 11.1906 WD 870m KP 51.692 Vs 0.06 kts ROV: N36 42.9402 W122 11.1773 KP 51.649
1609	Commence recovery of electronics. N36 42.9168 W122 11.1920 WD 871m KP 51.693 Vs 0.23 kts ROV: N36 42.9362 W122 11.1881 KP 51.657
1637	Commence ROV recovery N36 42.9168 W122 11.1910 WD 871m KP 51.693 Vs 0.11 kts ROV: N36 42.9308 W122 11.1892 KP 51.667
1638	ROV off bottom N36 42.9175 W122 11.1906 WD 871m KP 51.691 Vs 0.19 kts ROV: N36 42.9366 W122 11.1861 KP 51.656
1658	ROV out of the water N36 42.9170 W122 11.1906 WD 871m KP 51.693 Vs 0.11 kts ROV: N36 42.9359 W122 11.1848 KP 51.658
1703	ROV on deck N36 42.9170 W122 11.1897 WD 871m KP 51.692 Vs 0.06 kts
1726	Plow electronics on deck N36 42.9270 W122 11.1591 WD 868m KP 51.674 Vs 0.11 kts
1958	ROV off deck to clear wire rope under cable. N36 50.4222 W122 08.9729 WD 118m KP 36.202 Vs 0.05 kts
2002	ROV in the water N36 50.4240 W122 08.9731 WD 118m KP 36.201 Vs 0.06 kts ROV: N36 42.9452 W122 11.1529 KP 51.639
2027	ROV on bottom N36 50.4250 W122 08.9721 WD 118m KP 36.198 Vs 0.14 kts ROV: N36 50.4017 W122 08.9707 KP 36.215
2054	ROV at wire rope location. First cut complete. N36 50.4231 W122 08.9793 WD 118m KP 36.210 Vs 0.12 kts ROV: N36 50.4074 W122 08.9942 KP 36.242
2112	Second cut complete. N36 50.4213 W122 08.9847 WD 118m KP 36.218 Vs 0.13 kts ROV: N36 50.4037 W122 09.0024 KP 36.256
2303	Wire rope cleared from under cable. N36 50.4135 W122 08.9810 WD 118m KP 36.220 Vs 0.11 kts ROV: N36 50.3911 W122 08.9941 KP 36.255
2316	Inspection of location complete. Commence ROV recovery. N36 50.4199 W122 08.9651 WD 118m KP 36.193 Vs 0.02 kts ROV: N36 50.4110 W122 08.9820 KP 36.223
2326	ROV off bottom N36 50.4287 W122 08.9914 WD 118m KP 36.221 Vs 0.07 kts ROV: N36 50.4128 W122 08.9848 KP 36.225
2330	ROV at surface N36 50.4284 W122 08.9913 WD 119m KP 36.221 Vs 0.04 kts ROV: N36 50.4162 W122 08.9925 KP 36.233
2335	ROV on deck N36 50.4285 W122 08.9914 WD 119m KP 36.222 Vs 0.16 kts ROV: N36 50.4282 W122 08.9917 KP 36.222
2345	Commence transit to San Francisco. N36 50.4288 W122 08.9911 WD 119m KP 36.221 Vs 0.14 kts

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

G. PLANNED ACTIVITIES NEXT 24 HOURS:
Arrive San Francisco to disembark personnel.

H. OPERATIONAL SUMMARY

Activity	Today (Hours)	Brought Forward (Hours)	Total Hours To Date
In Port Working	0.00	126.00	126.00
Standby	0.00	24.00	24.00
Splicing Operations	0.00	37.50	37.50
Burial Operations	0.00	96.75	96.75
Surface Lay Operations	0.00	31.75	31.75
Transit	0.25	88.50	88.75
Weather Downtime	0.00	4.50	4.50
Equipment Downtime	0.00	9.75	9.75
Vessel Downtime	0.00	0.00	0.00
Plow Downtime	0.00	31.25	31.25
Downtime/Other	0.00	0.00	0.00
Sea Plow Trial	0.00	13.50	13.50
PLGR Operations	0.00	50.00	50.00
ROV Operations	16.25	24.50	40.75
Calibration	0.00	12.50	12.50
PLIB Operations	7.50	38.00	45.50
TOTALS	**24.00**	**588.50**	**612.50**

I. ESTIMATED DATES FOR PLANNING PROJECT RELATED ACTIVITIES

Date	Activity
3/14/2007	Shore Landing
3/20/2007	Complete Surface Lay
3/30/2007	Install TRF
4/2/2007	Disembark Personnel

J. TRANSMISSION:

K. SUPPORT VESSEL STATUS

L. CONTACT NUMBERS

Tyco Voice:		**Vessel Mobile:**	
Tyco FAX:		**Vessel Email:**	
Tyco Mobile:		**Other Voice:**	872 353 832 231
Tyco Email:		**Other FAX:**	872 353 832 232
Vessel Voice:	872 353 832 235	**Other Mobile:**	
Vessel FAX:	872 353 832 237	**Other Email:**	

TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

M. GENERAL REMARKS/COMMENTS:

N. TYCO REPRESENTATIVE COMMENTS: This is the final daily report for the MARS system installation. GLOBL SENTINEL is enroute San Francisco to disembark personnel.

O. VESSEL REPRESENTATIVE COMMENTS: Vessel is operating in compliance with all known permit requirements.

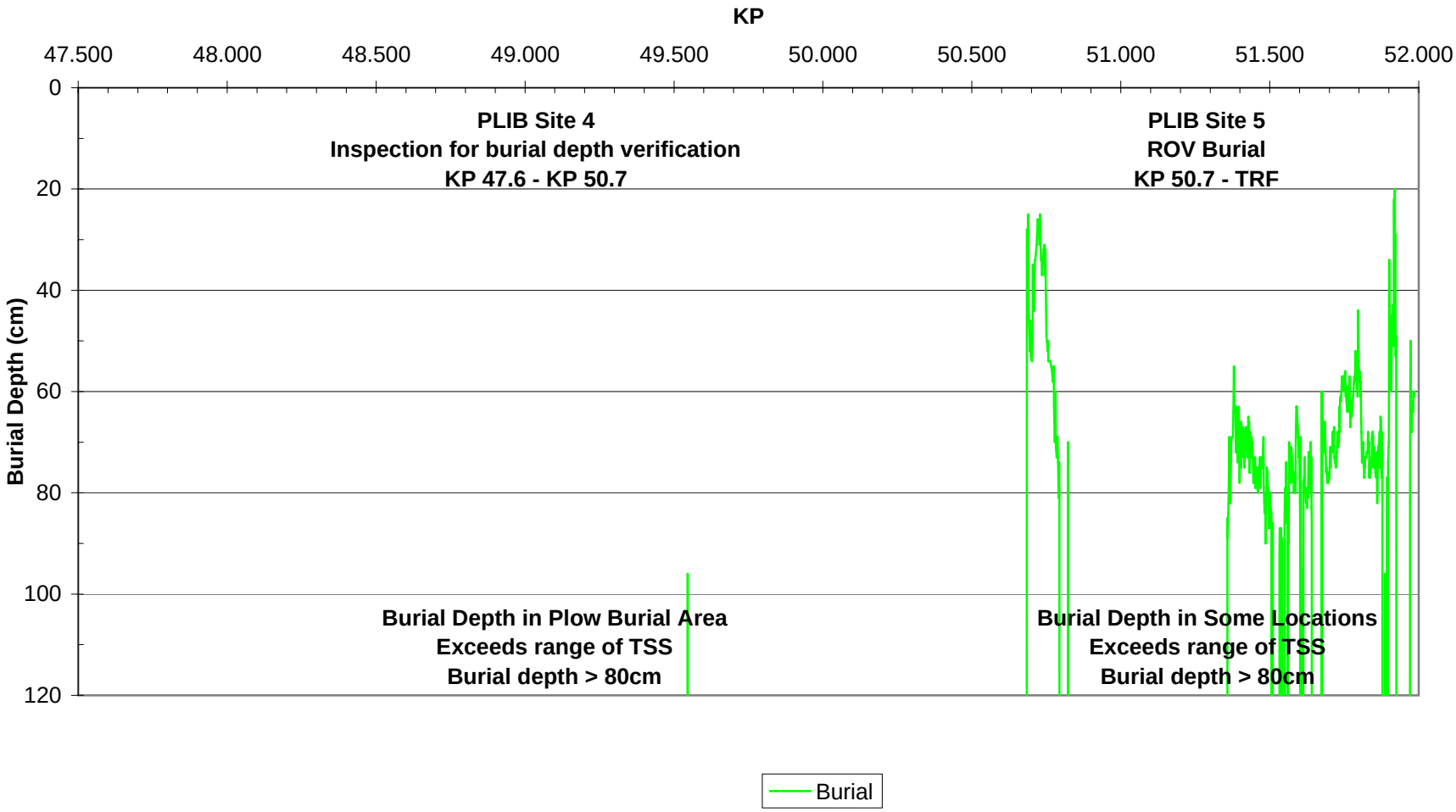
P. PURCHASER REPRESENTATIVE COMMENTS:

Q. SIGNATURES:

_____	_____	_____
D Brawn	**G Thomas**	**M Wilson**
Tyco Representative	**Vessel Master**	**ASN Representative**
_____	_____	
K Brekke	**J Slaughter**	
MBARI Representative	**MBNMS Representative**	

© Copyright 2007 All rights reserved.

MARS
PLIB Site 4 & 5 - GLOBAL SENTINEL
01 Apr 2007 0835 UTC to 01 Apr 2007 1405 UTC



TYCO TELECOMMUNICATIONS (US) INC. CONFIDENTIAL AND PROPRIETARY
© Copyright 2007 All rights reserved.

U.S. Department
of Homeland Security
**United States
Coast Guard**

LOCAL NOTICE TO MARINERS
WEEKLY EDITION
District: 11 Week: 10/07

SEND CORRESPONDENCE TO:
COMMANDER
DISTRICT ELEVEN (DPW)
COAST GUARD ISLAND BUILDING 50-2
ALAMEDA, CA 94501-5100

BROADCAST NOTICE TO MARINERS - Information concerning aids to navigation and waterway management promulgated by BNM 0078-07 to BNM 0087-07 has been incorporated in this notice if still significant.

SECTION I - SPECIAL NOTICES
This section contains information of special concern to the Mariner.

SUBMITTING INFORMATION FOR PUBLICATION IN THE LOCAL NOTICE TO MARINERS:

A complete set of guidelines with examples and contact information can be found on our website at http://www.uscg.mil/d11/dp/dpw or call BM1 Ronald Hellberg at 510-437-2970 or e-mail D11LNM@uscg.mil.

BRIDGE INFORMATION-DISCREPANCIES AND CORRECTIONS

For bridge related issues during normal working hours Monday through Friday, contact the Eleventh Coast Guard District Bridge Section, Coast Guard Island, Building 50-2, Alameda, CA 94501-5100, telephone: 510-437-3461 Office; 510-219-4366 Cell. For emergencies or discrepancies during nights, weekends and holidays, immediately notify the nearest Coast Guard Sector Command via VHF-FM CH 16 or via telephone: San Diego & Colorado River 619-295-3121, Los Angeles 310-732-2044, San Francisco 415-399-3547, Eureka 707-839-6113. Flotsam and drift may have accumulated on and near bridge piers and abutments and mariners should approach all bridges with caution.
To REPORT A DELAY AT A DRAWBRIDGE see enclosure at the end of this document.

AUTOMATIC IDENTIFICATION SYSTEM (AIS) FOR COMMERCIAL VESSELS

All mariners using AIS are reminded to enter correct AIS data before sailing and to keep AIS data accurate and current throughout the voyage. Additional Resources for the internet web pages, and hyper links related to AIS in the VTS San Francisco Area can be found in the Enclosures below.

121.5/243 MHZ EMERGENCY POSITION INDICATING RADIO BEACON (EPIRB) USE PROHIBITED

Mariners are advised that as of 1 January 2007 the operation of Class A, B, and S EPIRBs (Emergency Position Indicating Radio Beacons) is PROHIBITED. Refer to 47 CFR Parts 80.1051 through 80.1059.
FCC regulations that prohibit the operation of EPIRBs that transmit on the 121.5 MHz and 243 MHz frequencies are part of a phased plan to remove all distress alerting beacons operating on these frequencies prior to 1 February 2009 when satellite detection of these frequencies will terminate. Owners of Class A, B, or S 121.5 MHz EPIRBS are encouraged to replace these beacons with Category I or Category II 406 MHz beacons as soon as possible. When taking obsolete beacons out of service, owners must remove and properly dispose of batteries to prevent future false alerts from occurring.
Beacon owners in the U.S. are required by law to register their 406 MHz beacons in the national database operated by NOAA at: www.beaconregistration.noaa.gov or by calling 1-888-212-SAVE. All beacon owners are reminded to carefully follow their specific beacon manufacturer-s instructions when conducting tests of emergency beacons to prevent false alert

LNM: 10/07

DGPS

For information regarding the DGPS system, or for status updates contact the Petaluma Control Center at 707-765-7612/7613. Current DGPS Status is available 24 hrs per day through the Internet at: http://www.navcen.uscg.gov.

LORAN-C

For information regarding the Loran-C System, contact the Coordinator of Chain Operations West Coast at 707-765-7518. Users may address inquiries to the Western Pacific U.S. Loran-C Chain Operations Control Officer at 707-765-7598. Users shall address inquiries to the Southeast U.S. Chain Operations Control Officer, Lieutenant J. Bailey, at 703-313-5873 or the West Coast Chain Operations Control Officer, CWO Peter Bower at 707-765-7595. Current Loran-C Status is available 24 hrs per day through the Internet at: http://www.navcen.uscg.gov.

SOUTHERN CALIFORNIA-VANDENBERG DANGER ZONES

For information regarding the current Vandenberg Danger Zones status updates contact 800-648-3019 or 805-606-8825.

Charts: 18720 18740

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO BAY

For information on Yacht Races-Please refer to the Yacht Race Association website: www.YRA.org for yacht race schedules in the SF Bay. For further details or comments, contact MST1 Brian Clark at 415-399-3440.

Chart 18649

SECTION II - DISCREPANCIES

This section lists all reported and corrected discrepancies related to Aids to Navigation in this edition. A discrepancy is a change in the status of an aid to navigation that differs from what is published or charted.

DISCREPANCIES (FEDERAL AIDS)

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
405	Fort Ross Bell Buoy 32	MISSING/TRUB	18640	0571-06	40/06	
510	NOAA Environmental Lighted Buoy 46006	MISSING	501		50/06	
1567	San Diego Bay Submerged Jetty Light E	TRLB/REDUCED INT	18773	28/06	02/06	
4955	San Bruno Shoal Channel Light 3	DBD DMGD/REDUCED INT/DBN DMGD	18651	0845-05	45/05	
4960	San Bruno Shoal Channel Light 4	TRLB/DBN DEST/DBD DEST	18651	0672-06	49/06	
7170	Sacramento Deep Water Ship Channel Light 1	MISSING/TRLB	18659	0542-06	37/06	
7185	Sacramento River Deep Water Ship Channel Light 5	MISSING/TRLB	18659	0499-06	34/06	
7235	Sacramento River Deep Water Ship Channel Light 15	MISSING/TRLB	18660	0039-06	02/06	
7245	Sacramento River Deep Water Ship Channel Light 17	MISSING/TRLB	18660	0046-06	02/06	
7255	Sacramento River Deep Water Ship Channel Light 19	MISSING/TRLB	18661	451/06	29/06	
7290	Sacramento Deep Water Ship Channel Light 26	MISSING/TRLB	18661	0693-06	51/06	
7305	Sacramento Deep Water Ship Channel Light 28	MISSING/TRLB	18661	0536-06	37/06	
7690	Sacramento River Light 9	MISSING/TRLB	18662	0051/06	02/06	
7945	Bodega Harbor Channel Daybeacon 34	MISSING/TRUB	18643	829/03	27/03	
8216	Humboldt Bay Channel Light 13	MISSING/TRLB	18622	0173-06	42/06	
8300	Hookton Channel Range Rear Light	DBD DEST	18622	0236-06	15/06	
8315	Hookton Channel Light 7	MISSING/TRLB	18622	160/06	09/06	

DISCREPANCIES (FEDERAL AIDS) CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
200	Point Conception Light	WATCHING PROPERLY	18721	0082-07	10/07	10/07
5900	San Pablo Bay Channel Lighted Buoy 7	WATCHING PROPERLY	18654	0085-07	10/07	10/07

DISCREPANCIES (PRIVATE AIDS)

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
2235	SD CHULA VISTA CHANNEL LIGHT 17	MISSING/TRLB	18773	0560-06	39/06	
5390	EMERYVILLE MARINA LIGHT 7	LT EXT	18650	0706-06	52/06	
5395	EMERYVILLE MARINA LIGHT 8	LT EXT	18650	0633-06	46/06	

DISCREPANCIES (PRIVATE AIDS) CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End

None

PLATFORM DISCREPANCIES

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

PLATFORM DISCREPANCIES CORRECTED

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

SECTION III - TEMPORARY CHANGES and TEMPORARY CHANGES CORRECTED

This section contains temporary changes and corrections to Aids to Navigation for this edition. When charted aids are temporarily relocated for dredging, testing, evaluation, or marking an obstruction, a temporary correction shall be listed in Section IV giving the new position.

TEMPORARY CHANGES

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
3775	Santa Barbara Harbor Lighted Buoy 7	DISCONTINUED FOR DREDGING	18725	0077-07	09/07	
4573	Pier 14 Pier End Light	DISCONTINUED	18650		08/07	38/07
4575	Pier 14 Pier Midpoint Light	DISCONTINUED	18650		08/07	30/07
4665	Oakland Inner Harbor Lighted Buoy 5	DISCONTINUED FOR DREDGING	18650	0353-06	22/06	
4669	Oakland Inner Harbor Lighted Buoy 4	RELOCATED FOR DREDGING	18650	379-06	25/06	
4684	Oakland Inner Harbor Turn Basin Light B	TRLB	18650	0309-06	20/06	
6090	Mare Island Strait Lighted Buoy 1	TRLB	18655	0154-05	34/05	

TEMPORARY CHANGES CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
	YELLOW BLUFF YACHT RACING BUOY Y	Reestablished	18652		10/07	10/07

PLATFORM TEMPORARY CHANGES

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

PLATFORM TEMPORARY CHANGES CORRECTED

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

SECTION IV - CHART CORRECTIONS

This section contains corrections to federally and privately maintained Aids to Navigation, as well as NOS corrections.

This section contains corrective actions affecting chart(s). Corrections appear numerically by chart number, and pertain to that chart only. **It is up to the mariner to decide which chart(s) are to be corrected.** The following example explains individual elements of a typical chart correction.

Chart Number	Chart Edition	Edition Date	Last Local Notice to Mariners	Horizontal Datum Reference	Source of Correction	Current Local Notice to Mariners
12327	91st Ed.	19-APR-97	Last LNM: 26/97	NAD 83		27/97

Chart Title: NY-NJ-NEW YORK HARBOR - RARITAN RIVER

Main Panel 2245 NEW YORK HARBOR

Corrective Action	Object of Corrective Action	Source of Correction	Position
(Temp) ADD	NATIONAL DOCK CHANNEL BUOY 3 Green can	CGD01	at 40-41-09.001N 074-02-48.001W

(Temp) indicates that the chart correction action is temporary in nature. Courses and bearings are given in degrees clockwise from 000 true. Bearings of light sectors are toward the light from seaward. The nominal range of lights is expressed in nautical miles (NM) unless otherwise noted.

18649 **65th Ed.** **01-JUL-06** **Last LNM: 17/05** **NAD 83** **10/07**

ChartTitle: **Entrance to San Francisco Bay**

Main Panel 1823 ENTRANCE TO SAN FRANCISCO BAY. Page/Side: N/A

RELOCATE	Bay Farm Island Light 6	CGD11 from 37-44-01.680N to 37-44-01.680N	122-16-29.100W 122-15-29.100W

18650 **54th Ed.** **01-OCT-05** **Last LNM: 15/05** **NAD 83** **10/07**

ChartTitle: **San Francisco Bay Candlestick Point to Angel Island**

Main Panel 1824 SAN FRANCISCO BAY CANDLESTICK POINT TO ANGEL ISLAND. Page/Side: N/A

RELOCATE	Bay Farm Island Light 6	CGD11 from 37-44-01.680N to 37-44-01.680N	122-16-29.100W 122-15-29.100W

18652 **33rd Ed.** **01-FEB-05** **Last LNM: 17/05** **NAD 83** **10/07**

ChartTitle: **FOLIO SMALL CRAFT CHART San Francisco Bay to Antioch**

CHART CA - SAN FRANCISCO BAY TO ANTIOCH. Page/Side: N/A

RELOCATE	Bay Farm Island Light 6	CGD11 from 37-44-01.680N to 37-44-01.680N	122-16-29.100W 122-15-29.100W
CHANGE	SF BAY ANCHORAGE 6 LMB N "M" to "N"	CGD11 at 37-50-09.410N	122-21-14.140W
ADD	SF BAY ANCHORAGE 6 LMB I "I" Fl W 2s	CGD11 at 37-50-07.460N	122-21-41.570W

18654 **43rd Ed.** **01-MAR-04** **Last LNM: 17/05** **NAD 83** **10/07**

ChartTitle: **San Pablo Bay**

CHART CA - SAN PABLO BAY. Page/Side: N/A

ADD	PINOLE SHOAL RANGE FRONT LIGHT Visible 4 deg each side of range line. Fl G 2.5s 22 Ft	CGD11 at 38-03-15.755N	122-19-26.196W
ADD	PINOLE SHOAL RANGE REAR LIGHT Visible 4 deg each side of range line. Iso G 6s 54 Ft	CGD11 at 38-03-19.932N	122-19-17.703W

18765 **16th Ed.** **01-JAN-05** **Last LNM: 24/04** **NAD 83** **10/07**

ChartTitle: **Approaches to San Diego Bay;Mission Bay**

Inset 1918 MISSION BAY. Page/Side: N/A

DELETE	Sounding in Fathoms & Feet; 4 fms 4 ft (NOS NW-13815)	NOS 32-45-51.000N	117-15-32.300W

		NOS	
DELETE	Sounding in Fathoms & Feet; 5 fms 3 ft (NOS NW-13815)	32-45-56.500N	117-15-37.600W
		NOS	
DELETE	Sounding in Fathoms & Feet; 6 fms 1 ft (NOS NW-13815)	32-45-51.100N	117-15-42.000W
		NOS	
DELETE	Sounding in Fathoms & Feet; 6 fms 1 ft (NOS NW-13815)	32-45-58.800N	117-15-42.400W
		NOS	
CHANGE	Depth Legend - Mission Bay to:; LEFT QUARTER 6 FT MIDDLE HALF 14 FT AUG 2006 RIGHT QUARTER 9 FT (NOS NW-13815)	32-45-30.300N	117-15-05.400W
		NOS	
ADD	Sounding in Fathoms & Feet; 2 fms 1 ft (NOS NW-13815)	32-45-43.900N	117-15-37.100W
		NOS	
ADD	Sounding in Fathoms & Feet; 3 fms 1 ft (NOS NW-13815)	32-46-00.900N	117-15-41.900W
		NOS	
ADD	Sounding in Fathoms & Feet; 3 fms 2 ft (NOS NW-13815)	32-45-56.600N	117-15-38.900W
		NOS	
ADD	Sounding in Fathoms & Feet; 3 fms 3 ft (NOS NW-13815)	32-45-50.800N	117-15-33.000W
		NOS	
ADD	Sounding in Fathoms & Feet; 3 fms 3 ft (NOS NW-13815)	32-45-51.700N	117-15-41.100W

Main Panel 1917 APPROACHES TO SAN DIEGO BAY. Page/Side: N/A

		NOS	
SUBSTITUTE	Sounding in Fathoms & Feet; 3 fms 3 ft for 4 fms 4 ft (NOS NW-13815)	32-45-50.800N	117-15-33.000W

SECTION V - ADVANCE NOTICES

This section contains advance notice of approved projects, changes to aids to navigation, or upcoming temporary changes such as dredging, etc. Mariners are advised to use caution while transiting these areas.

SUMMARY OF ADVANCED APPROVED PROJECTS

Approved Project(s)	Project Date	Ref. LNM
None		

SOUTHERN CALIFORNIA-OCEANSIDE HARBOR

The Coast Guard intends to light and rename Oceanside Buoy 5 (LLNR 2315). The new lighted buoy will be named Oceanside Lighted Buoy 5 (LLNR 2315). The buoy's new characteristic will be FL G (2.5) with a 3nm nominal range.

Charts: 18758 18774 LNM: 04/07

SOUTHERN CALIFORNIA-OCEANSIDE HARBOR

The Coast Guard intends to light and rename Oceanside Junction Buoy (LLNR 2300). The new lighted buoy will be named Oceanside Junction Lighted Buoy (LLNR 2300). The buoy's new characteristic will be FL G (2+1) with a 3nm nominal range.

Charts: 18758 18774 LNM: 04/07

SOUTHERN CALIFORNIA-OCEANSIDE HARBOR

The Coast Guard intends to light and rename Oceanside Harbor Buoy 3 (LLNR 2305). The new lighted buoy will be named Oceanside Harbor Lighted Buoy 3 (LLNR 2305). The buoy's new characteristic will be FL G (4) with a 3nm nominal range.

Charts: 18758 18774 LNM: 04/07

SECTION VI - PROPOSED CHANGES

Periodically, the Coast Guard evaluates its system of aids to navigation to determine whether the conditions for which the aids to navigation were established have changed. When changes occur, the feasibility of improving, relocating, replacing, or discontinuing aids are considered. This section contains notice(s) of non-approved, proposed projects open for comment. SPECIAL NOTE: Mariners are requested to respond in writing to the District office unless otherwise noted (see banner page for address).

PROPOSED WATERWAY PROJECTS OPEN FOR PUBLIC COMMENT

Proposed Project(s)	Closing	Docket No.	Ref. LNM

None

NORTHERN CALIFORNIA-BRIDGE-SAN JOAQUIN RIVER

The U.S. Coast Guard has issued a permit for the widening of the I-5 dual bridges at Mossdale, CA. The bridge owner has submitted plans for a proposed temporary trestle be in place from June 2007 through June 2009. The proposed temporary trestle would extend from the south bank to within 40 ft of the north bank, leaving approximately 40 ft horizontal clearance for vessels to pass between the north bank and the trestle. (See attached drawing at the end of this notice). The Coast Guard is requesting comments from waterway users to determine if the proposed trestle would be sufficient to meet the needs of the mariner. Comments are requested by the Coast Guard Bridge Office at (510) 437-3461 until the close of business on Friday, March 9, 2007.

Chart 18661 LNM: 09/07

SOUTHERN CALIFORNIA-SAN DIEGO BAY-WAMS ANNOUNCEMENT

The U.S. Coast Guard is conducting a Waterways Analysis Management System (WAMS) study of the San Diego Bay Channel. The study will include looking at waterborne commerce and safe commercial and recreational navigation with a focus on the existing aids to navigation in the area. The San Diego Bay Channel WAMS study includes the San Diego Bay Channel, starting at the seaward entrance to San Diego Bay and ending by National City Marine Terminal. The study specifically targets: the San Diego Bay Channel. WAMS studies are conducted periodically throughout designated navigable waters to better facilitate safe and effective waterways. Any interested company or individual wishing to provide recommendations on existing or additional aids to navigation in this area, participate in a user survey, or receive further information should contact LTJG Jose Caballero by 12 March 2007. LTJG Caballero can be reached at Coast Guard Sector San Diego, Waterways Management Branch, at 619-278-7264.

Charts: 18772 18773 LNM: 06/07

SECTION VII - GENERAL

This section contains information of general concern to the Mariners. Mariners are advised to use caution while transiting these areas.

ARIZONA-BRIDGE-COLORADO RIVER

LONDON BRIDGE SUPERSTRUCTURE LAMP REHABILITATION-Over water work will be in progress, Monday through Friday between the hours of 0600 and 1600, until 15 May 2007. Scaffolding and containment located over the navigational channel spans will not reduce clearances for vessels. Mariners are requested to exercise caution and avoid transiting under the active work area.

LNM: 09/07

NORTHERN CALIFORNIA-BRIDGE-BEAR CREEK-STOCKTON-Updated 10/02/06

AKSLAND AVE/TRINITY PKWY BRIDGE CONSTRUCTION-Construction of a new bridge is in progress, west of Stockton, 700 ft downstream of the I-5 highway bridge, over Bear Creek, during daylight hours, through March 2007.

Chart 18661 LNM: 34/06

NORTHERN CALIFORNIA-BRIDGE-CARQUINEZ STRAIT-Updated 02/20/2007

I-680 HIGHWAY BRIDGE CONSTRUCTION-Barge anchor wires extend parallel to the main navigation channel as much as 900 ft upstream and downstream from barges at the main navigation opening of the bridge. Anchors upstream of the construction site are approx 50 ft outside the north margin of the channel. Anchor wires can be moved upon 3 hrs advance notice when a tug is present and 6 hrs when a tug is not present. Mariners should contact the Westar Marine Tug at Benicia Bridge via VHF-FM Ch-13 to make passing arrangements. Bridge pier and superstructure construction is in progress along the entire length of the bridge, with anchor lines extending 800 ft upstream and downstream from the bridge. Anchor wires may be difficult to see and mariners are advised, for their own safety, to avoid passing through the construction area by going around the construction and using the main navigational channel. For work out of the main channel span, mariners should contact the D/B Pacific, the D/B Haaken, or the D/B LA, via VHF-FM Ch 13, 14, and 67, to discuss wake issues and passing arrangements.

Chart 18657 LNM: 45/05

NORTHERN CALIFORNIA-BRIDGE-CARQUINEZ STRAIT-Updated 02/20/2007

1927 I-80 HIGHWAY BRIDGE DEMOLITION THROUGH October 2007 - Demolition of the bridge continues. A 50 Ft X 160 Ft barge will be periodically moored against the south side of the center pier to facilitate superstructure demolition. Mariners should contact California Engineering Contractors at Carquinez Bridge via VHF-FM Ch 14 or at 925-382-3544 for information.

Chart 18655 LNM: 47/05

NORTHERN CALIFORNIA-BRIDGE-ISLAIS CREEK-Updated 9/14/2006

ILLINOIS STREET DRAWBRIDGE CONSTRUCTION-Drawbridge construction is in progress during daylight hours, Monday through Friday, through August 2007. The bridge deck completely spans the waterway. The navigation span of the bridge, between piers 6 & 7, provides 5 ft vertical clearance at Mean High Water and 65 ft horizontal clearance. The navigational span of the bridge will remain in the closed-to-navigation position until the end of construction.

Chart 18650 LNM: 36/05

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER

ELKHORN FERRY I-5 HIGHWAY BRIDGE fendering is riding high and may not provide protection for the bridge or passing vessels. Mariners are requested to exercise caution and avoid vessel-to-bridge contact during transit.

Chart 18664 LNM: 42/06

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER

The Tower drawbridge will be secured in the closed to navigation position from 0745U until 0945U on 11 Mar 2007 in support of the "Shamrock'n Half Marathon & 5k Race". The bridge provides 20 ft vertical clearance above Mean High Water when closed. Vessels that can safely pass through the bridge in the closed position may continue to do so at any time.

Chart 18664 LNM: 029/07

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER-Updated 2/23/2007

PAINTERSVILLE DRAWBRIDGE-Due to maintenance, the drawspan will be secured in the closed-to-navigation position from 28 February through 08 March 2007. From 09 March through 11 April 2007, mariners are requested to provide at least 12 hours advance notice for bridge openings to avoid delays. The bridge provides 24 feet vertical clearance above Mean High Water in the closed-to-navigation position. Vessels that can transit the bridge while in the closed-to-navigation position may continue to do so. For further information contact the 11th Coast Guard District Bridge Office at (510) 437-3515.

Chart 18662 LNM: 03/07

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER-Updated 2/23/2007

ISLETON DRAWBRIDGE-Due to maintenance, the drawspan will be secured in the closed-to-navigation position from 12 April through 20 April 2007. From 21 April through 25 May 2007, mariners are requested to provide at least 12 hours advance notice for bridge openings to avoid delays. The bridge provides 13 feet vertical clearance above Mean High Water in the closed-to-navigation position. Vessels that can transit the bridge while in the closed-to-navigation position may continue to do so. For further information contact the 11th Coast Guard District Bridge Office at (510) 437-3515.

Chart 18661 LNM: 03/07

NORTHERN CALIFORNIA-BRIDGE-SAN FRANCISCO BAY-Updated 1/9/2007

SAN FRANCISCO-OAKLAND BAY BRIDGE REPLACEMENT-EAST OF YBI: The green center span lights have been temporarily extinguished in the three spans east of the main channel span due to the presence of construction equipment in those spans. Bridge construction continues on the skyway portion of the bridge. Approximately 450 heavy lift operations will be conducted in the construction area between YBI and Oakland. Mariners are requested to produce no wake in the construction area during lifting operations to ensure worker safety. Anchor wires extending up to 1,100 ft in any direction from floating equipment may be difficult to see and mariners are advised, for their own safety, to avoid passing through the construction area by using the main navigational channel east of YBI. Barges are being used in the construction of the suspension span pier footings. There will be 800 ft of horizontal clearance between the footings. Construction equipment is lighted at night. Mariners may contact the D/B General, D/B Haakon, or the D/B Vancouver via VHF-FM Ch 66, or by telephone at 510-385-9675, to determine conditions at the bridge.

Chart 18650 LNM: 50/05

NORTHERN CALIFORNIA-BRIDGE-STEAMBOAT SLOUGH Updated 02/28/2007

STEAMBOAT SLOUGH DRAWBRIDGE - Maintenance has been completed and the bridge has resumed normal operations. For further information contact the 11th Coast Guard District Bridge Office at 510-437-3515.

Chart 18662 LNM: 08/07

NORTHERN CALIFORNIA-CABLE OPERATIONS-MONTEREY BAY

The C/S Global Sentinel will be operating in Monterey Bay from 7 March to 31 March 2007. The vessel will be engaged in cable laying operations 24 hours a day along a track from Moss Landing to 36-42-42.000N 122-11-12.000W via positions: 36-52-30.000N, 122-04-12.000W 36-49-30.000N, 122-10-12.000W.

The vessel will be restricted in her ability to maneuver and requests vessels provide 1 nm clearance.

On 9 March 2007, the Global Sentinel will conduct a pre-lay grapnel run (PLGR) from the shore landing out to the location where the science node will be deployed on Smooth Ridge (36 42-40.800N, 122 11-12.600W). Cable installation will follow over the next few days. The science node frame will be deployed on 15 March 2007. The Global Sentinel will monitor VHF-FM Ch 16 and 13. For more details, call 831-775-1900 or 1-866-830-0169 (24 hr number).

NORTHERN CALIFORNIA-CABLE OPERATIONS-MONTEREY BAY

Chart 18685 LNM: 09/07

NORTHERN CALIFORNIA-CAPSIZED BARGE-SAN FRANCISCO BAY-Updated 9/12/2006

In position 37-43.43N, 122-20.25W, in the southern portion of Anchorage 9. The barge contents, reported as gravel, have been emptied into the San Francisco Bay. Charted depths may not be accurate in close proximity to this location. Mariners are requested to avoid the area. Traffic unable to avoid the area is requested to contact San Francisco Traffic on VHF-FM CH 14 for clearance. For further details or comments contact the Marine Safety Office Duty Officer at 415-399-3547.

Chart 18650 LNM: 39/05

NORTHERN CALIFORNIA-CONSTRUCTION-NAPA RIVER

Cooper Crane & Rigging/West Coast Welding is conducting wetland construction operations in the Napa River in the vicinity of South Slough, Dutchman Slough and China Slough. Construction operations will continue through 15 May 2007. Tugs Hayden Bay and Power Pusher will be on site along with 2 derrick barges and monitoring VHF-FM CH 13 and 14. For further details or comments contact Tim Curtin 415-892-2778.

Chart 18654 LNM: 42/05

NORTHERN CALIFORNIA-CONSTRUCTION-OAKLAND

Mason Construction has commenced water side operations at berth 37 Port of Oakland through 15 May 2007. Placement of form requires skiffs and floats to work under the Berth. All vessels should proceed with caution and with a minimum wake when transiting the area. For more details or comments contact Bill Partidge at 510-451-4965.

Chart 18650 LNM: 10/07

NORTHERN CALIFORNIA-DREDGING-EUREKA

Nehalem River Dredging will begin dredging from 1 November 2006 through March 2007. Dredge Nehalem will monitor VHF-FM Ch 8 and 16. The pipeline will be located in the City of Eureka's Small Boat Basin and will advance to the most northerly site along the Eureka waterfront as well as the Woodley Island Marina. There will be a floating pontoon pipeline approximately 500 ft behind the dredge. The floating pipeline will have yellow flashing lights marking the pipeline. The remaining pipeline will be submerged across Humboldt Bay to Somoa. For more details or comments contact Irene Scovell at 503-805-5536.

Chart 18622 LNM: 44/06

NORTHERN CALIFORNIA-DREDGING-SAN FRANCISCO

Camenzind Dredging, Inc. will commence Dredging of Bel Marin Keys North Lagoon from 1 March 2007 to 22 June 2007, operation will be 16 hrs./day Monday through Saturday. The Dredge Paul Vincent, work boat Fester and work boat Shadow will monitor VHF-FM Ch 16 and 77. A 14" diameter plastic pipeline, will come from the dredge and, cross the North Lagoon (floating-submerged pipeline marked with yellow floats), cross Bel Marin Keys Blvd. (On-land crossing), cross the South Lagoon (a weighted submerged crossing marked with white floats, and red floats where it represents a hazard to navigation). Mariners are advised to use extreme caution. For more details or comments contact Contractor Project Manager: Kurt Camenzind at 650 424-0367, On-site: Kurt at 650-444-8453, Bart at 650-444-8455, Superintendent w/Cerrudo Services: Andy Bell at 775-219-7174.

Chart 18652 LNM: 09/07

NORTHERN CALIFORNIA-DREDGING-SANTA CRUZ

The Santa Cruz Port District will commence dredging operations in the harbor entrance through April 2007. The dredge Seabright will be on scene monitoring VHF-FM Ch 16. A buoy will mark the out flow pipe, and some shoaling may occur. For more details or comments, contact the Santa Cruz Port District at 831-475-6161.

Chart 18685 LNM: 52/06

NORTHERN CALIFORNIA-FISH SURVEY BUOYS-SAN FRANCISCO-Updated 01/11/07

The Army Corps of Engineers has deployed unlit fish survey buoys. All buoys will be outside of the Federally Maintained Channels. The buoys are white and orange in color, with the words: -USACE Survey-. They will remain on station through April 2007. Location as follows:
Richmond San Rafael Bridge, 21 buoys.
Raccoon Strait crossing from Pt Tiburon to Angel Island, 4 buoys.
Separation Zone west of Alcatraz, 1 buoy.
San Pablo Bay, 6 buoys (Light 5: 2 buoys, buoys 9 and 10: 4 buoys)
Black Point Railroad Bridge in the Petaluma River, 1buoy.
For more details, comments or exact positions, contact Ken Danielson at 415-332-0334.

Charts: 18649 18650 18653 18654 LNM: 52/06

NORTHERN CALIFORNIA-GATE OPERATIONS FOR 2006/2007-SUISUN BAY-Update 9 February 2007

Suisun Marsh Salinity control gates operation for 2006-2007. Department of Water Resources plans to operate the control structure beginning 12 December 2006. Once they begin, gate operations will continue through May 2007. Commencing 12 December 2006, the flashboards will be in place across the maintenance channel, all vessels must pass through the boat locks. THE BOAT LOCK OPERATION WILL BE DURING DAYLIGHT HOURS ONLY. Mariners are advise to use extreme caution when operating in this area. For more details or comments contact John Moe at 209-833-2082 or Rhett Cotter at 209-833-2077.

Chart 18656 LNM: 49/06

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO BAY

The South End Rowing Club will sponsor a swimming event involving 50 participants swimming from Anita Rock to Aquatic Park from 0830 to 0930 on 18 March 2007. All mariners are advised to exercise extreme caution when transiting this area. The swim coordinator will be monitoring VHF-FM Ch 14 during the event. For further details or comments contact MST1 B. Clark at 415-399-3440.

Chart 18650 LNM: 10/07

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO BAY

Alcatraz Challenge will sponsor two swimming events involving 15 participants swimming from Alcatraz to the St. Francis Yacht Club in San Francisco Bay from 0800 to 0900 on 10 and 11 March 2007. All mariners are advised to exercise caution when transiting this area. The swim coordinator will be monitoring VHF-FM Ch 14 during the event. For further details or comments contact MST1 B. Clark at 415-399-3440.

Chart 18650 LNM: 10/07

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO BAY

Alcatraz Challenge will sponsor a swimming event involving 15 participants swimming from Alcatraz to Aquatic Park in San Francisco Bay from 0715 to 0815 on 14 March 2007. All mariners are advised to exercise caution when transiting this area. The swim coordinator will be monitoring VHF-FM Ch 14 during the event. For further details or comments contact MST1 B. Clark at 415-399-3440.

Chart 18650 LNM: 10/07

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO BAY

Waterworld Swims will sponsor a swimming event involving 10 participants swimming from the Alcatraz to Aquatic Park from 0900 to 1000 on 10 March 2007 All mariners are advised to exercise extreme caution when transiting this area. The swim coordinator will be monitoring VHF-FM Ch 14 during the event. For further details or comments contact MST1 B. Clark at 415-399-3440.

Chart 18650 LNM: 10/07

NORTHERN CALIFORNIA-NOAA BUOY DEPLOYMENT-SAN FRANCISCO

Depending on weather, a one day deployment for this aid will take place within the month of March. See the enclosure for the proposed deployment location and aid specifications.

Chart 18645 LNM: 09/07

NORTHERN CALIFORNIA-OBSTRUCTION-TOMALES BAY

There is a 10 foot by 1 foot partially submerged metal pipe stuck in the sand in position: 38-14-21.000N, 122-59-09.600W. Mariners are advised to transit the area with caution.

Chart 18643 LNM: 31/06

NORTHERN CALIFORNIA-SHOALING-BERKELEY MARINA-SAN FRANCISCO BAY

Shoaling has been reported in the vicinity of Berkeley Harbor Entrance, in the vicinity of Berkeley Breakwater Light 2 (LLNR-5450). Vessels have reported depths as shallow as 3 feet at MLLW. A chartlet of the area is included in the enclosures. For further details or comments please contact LT Stephen Walters at 510-437-2982.

Chart 18653 LNM: 09/06

NORTHERN CALIFORNIA-SHOALING-SOUTHHAMPTON SHOAL-SAN FRANCISCO

Shoaling has been reported between Southampton Shoal Channel and Richmond Harbor Entrance Channel. A depth of 17 feet was reported in the vicinity of 37-54.630N, 122-25.010W. Mariners are advised to use caution when transiting the area.

Chart 18653 LNM: 05/07

NORTHERN CALIFORNIA-SUBMERGED WOODEN PILING-BODEGA AND TOMALES BAY

There is a three foot by three foot submerged wooden piling approximately 100 yards off Doran Park Beach in Position: 38-18-39.600N, 123-02-41.400W. Mariners are advised to use caution in the area.

Chart 18643 LNM: 31/06

NORTHERN CALIFORNIA-SURVEY OPERATIONS-SAN FRANCISCO BAY TO SUISUN BAY

Dixon Marine Services, Inc. will be conducting Vibracore operations (sediment sample operation) from 23 February through March 2007, starting in the south bay at Potrero and continuing to end of Suisun Bay at Pittsburg. All operations will be preformed during daylight hours. The R/V LAKOTA will be conducting the operation and monitoring VF-FM Ch 16. For further comments or detail contact Mark Sutton at 415-760-7227. See enclosure for charted area.

Charts: 18650 18652 18653 LNM: 09/07

NORTHERN CALIFORNIA-SURVEY-SAN FRANCISCO

Fugro Pelagos, Inc. has commenced a Multi Beam Echo Sounder survey around the Farallon Islands until 20 March 2007. Operations will be for 12 hours each day. The vessel Quicksilver will be monitoring VHF-FM Ch 16. See enclosure for charted area.

Chart 18645 LNM: 10/07

NORTHERN CALIFORNIA-SURVEY-SAN FRANCISCO/PT ARENA

Fugro Pelagos, Inc. will conduct a multi beam echo sounder survey along the coast from San Francisco to Pt Arena. Operations will be 24 hrs from 11 February to 11 April 2007. The M/V Pacific Star will monitor VHF-FM Ch 16.

NORTHERN CALIFORNIA-SURVEY-SAN FRANCISCO/PT ARENA

Charts: 18640 18643 18647 LNM: 06/07

SOUTHERN CALIFORNIA-BRIDGE-LOS ANGELES MAIN CHANNEL

VINCENT THOMAS BRIDGE-Temporary scaffolding installed below low steel, 125 feet - 255 feet west of the center of the channel through 20 April 2007, will reduce vertical clearance by approximately 5 feet.

Chart 18749 LNM: 03/07

SOUTHERN CALIFORNIA-CAMP PENDLETON: Updated 1/23/2007

EXPEDITIONARY FIGHTING VEHICLE TESTING. The U.S. Marine Corps is testing the Expeditionary Fighting Vehicle (EFV) 24 HOURS A DAY through June 2008 off of Camp Pendleton, from the Oceanside Harbor entrance to San Mateo Point and to 25 NM off shore. There may be as many as (4) EFVs testing at the same time and as many as (4) 10 meter RHIBs and (1) MK-6 workboat supporting testing and in the vicinity of the EFVs. All vessels will have lighting in accordance with regulations. There may be times when spotlights and or strobe lights will be visible in the test area. All support vessels in the test team will be monitoring RADAR and VHF-FM Ch 81A. The Water Safety Officer will be monitoring VHF-FM CH 81A as well. For further details or comments contact Capt Filos at 760-763-4360 or Director, Vehicle Branch at 760-763-4327.

Chart 18740 LNM: 39/05

SOUTHERN CALIFORNIA-CONSTRUCTION-LONG BEACH

Manson Construction will be conducting construction operations on Berth T-121 and 123 using D/B Valhalla. Construction operations are scheduled to commence 2 October 2006 and continue through 30 April 2007. D/B Valhalla will monitor VHF-FM Ch 13, 16 and 66. For additional information or comments contact Jerry Gienger at 310-521-1302.

Chart 18751 LNM: 39/06

SOUTHERN CALIFORNIA-CONSTRUCTION-LONG BEACH

The DB Southman has commenced the loading of piles from the shore onto barges. The Southman will be moored to the inactive section of wharf at the southern end of Berth 227. From 26 February 2007 though May 2007 the DB Valkyrie will begin pile driving operations from east to west along the south slope of Berth 226. For more details or comments, contact Manson Construction at 562-435-5818.

Chart 18751 LNM: 08/07

SOUTHERN CALIFORNIA-CONSTRUCTION-LONG BEACH-LOS ANGELES

Manson Construction will be conducting construction operations at Berth G-226 in Port of Long Beach. No anchors, crown cans or wires will be deployed. Operations will be from 27 November 2006 through 30 July 2008. The vessels DB Valhalla, DB Valkyrie and Jeffrey M. will monitor VHF-FM Ch. 13, 16 and 66. For more details or comments contact D/B Valhalla at 562-762-5424, or Jerry Gienger at 562-762-5404.

Chart 18751 LNM: 47/06

SOUTHERN CALIFORNIA-CONSTRUCTION-LOS ANGELES

The Los Angeles Deepening Project is currently being conducted in Southwest Slip near Los Angeles Pier 100. A submerged rock dike has been constructed from Pier 100 northwesterly into Southwest Slip and is being filled to +10 ft MLLW. All mariners are advised to remain clear of this area. For further details or comments contact BMC Ralph Williams at 310-732-2020.

Chart 18751 LNM: 39/05

SOUTHERN CALIFORNIA-CONSTRUCTION-LOS ANGELES

Connolly Pacific Co will begin work on Dock 9 Rainbow Harbor for the City of Long Beach. The derrick barge Los Angeles (DBLA) will be on site from 1 February to 16 March 2007. The DBLA will monitor VHF-FM Ch 79A during hours of operation. The DBLA will be at anchor in position 33-45-00.666N, 118-11-00.500W. For more details or comments, contact Earle Newman at 562-437-2831 or Ron Allard at 562-577-0814.

Chart 18751 LNM: 05/07

SOUTHERN CALIFORNIA-CONSTRUCTION-LOS ANGELES-Updated 8/14/2006

Manson Construction will be conducting construction operations in the vicinity of the south side of Pier 400 in the Port of Los Angeles through December 2007. Three Coast Guard Lights have been established to mark the perimeter. Mariners requiring 8 ft or greater navigational draft must remain clear of this area. Several vessels will be on scene monitoring VHF-FM Ch 8, 13, 66, and 79A. For further details or comments contact Mike Ellis at 310-521-1300.

Chart 18751 LNM: 39/05

SOUTHERN CALIFORNIA-CONSTRUCTION-MARINA DEL REY

Repairing of the Marina Del Rey Seawall Rock Revetment will commence from 7 February to 15 September 2007. The potential obstruction to navigation will come from the crane being moved inside the marina from one work site to another. These moves will be coordinated with the local Sheriffs office and dock master. Divers will be used to place underwater grout tubes and inspect the work. Mariners should use caution when transiting the area. For more details or comments, contact Ashraf Hamdi at 310-505-7370 or Kyrk Reid at 310-505-0196.

Chart 18744 LNM: 06/07

SOUTHERN CALIFORNIA-CONSTRUCTION-PORT OF LONG BEACH-LOS ANGELES

Removal and replacement of a reinforced concrete abutment, removal and replacement of a structural steel pier approach ramp, removal and replacement of selected portions of a reinforced concrete pier, repairs to selected portions of a reinforced concrete pier, protection and temporary support of pier utilities, removal of portions of a timber fender system, installation of a pre stressed concrete pile supported pre cast concrete

SOUTHERN CALIFORNIA-CONSTRUCTION-PORT OF LONG BEACH-LOS ANGELES

floating fender backboard system, installation of foam filled floating fenders and incidental related work. Construction will continue through December 2007, the hours of operation will be Monday through Friday 0600 to 1700 each day, NO weekends. Pier T16 is located inside the West Basin of the Port of Long Beach. Most of the work will be done on and inside the footprint of the pier and shouldn't impact vessel traffic in the area. The work will include small boat work as well as periods where they will be bringing in a crane barge to drive piles. All of the work is planned to take place within the footprint of the Sea Launch vessels. Most of the work will be done from on top or below the pier structure. All mariners are urged to use caution when transiting the area. For more details or comments call Jeremiah Jilk from the John S. Meek Company at 310-830-6323. See enclosure section for charted work area.

Chart 18751 LNM: 48/05

SOUTHERN CALIFORNIA-CONSTRUCTION-SAN DIEGO

Fender pile installation (at the Fish Market Pier (Chesapeake Pier)) will be conducted from a waterside crane barge from 5 February to 26 March 2007. The crane barge and all tugs will monitor VHF-FM Ch 16. For more details or comments, contact David Lobaugh at 619-477-7900 or the Harbor tug and barge at 619-477-3920.

Chart 18773 LNM: 05/07

SOUTHERN CALIFORNIA-CONSTRUCTION/MOORING BUOY DEPLOYED-LOS ANGELES

Pacific Tugboat Services in conjunction with South Coast Water District has established a mooring buoy just offshore from 1000 Steps Beach in position 33-29.652 N, 117-44.459 W. The buoy is a white 30 inch sphere and will be on station until 31 May 2007. For more details or comments contact Wayne Caley at 562-477-8342 (Pacific Tug) or Joe McDevitt 949-533-2587 (South Coast Water).

Chart 18740 LNM: 04/07

SOUTHERN CALIFORNIA-DREDGING-CONSTRUCTION-LOS ANGELES

The L.A. Deepening Constructors, Manson Construction and Connolly-Pacific Co., will be conducting construction operations including clam dredging and rock replacement at Pier 300 24 hours per day through December 2007 and dredging in the main channel working outbound. A rock dike perimeter to +9 ft MLLW will be constructed, followed by hydraulic fill operation to +15 ft MLLW. The D/B Long Beach, D/B Njord and the D/B Los Angeles, along with the assist vessels, will be on scene and monitoring VHF-FM CH 13, 16, 66, and 79A. A lighted warning buoy has been placed in position 33-44.30N, 118-14.92W. For further details or comments contact John Molvar or Ken Feldhacker at 310-521-1300.

Chart 18751 LNM: 39/05

SOUTHERN CALIFORNIA-DREDGING-LOS ANGELES/LONG BEACH

Marina maintenance dredging will commence from 1 March 2007 through May 2007 during daylight hours at 2525 Ocean Blvd, Newport Beach. Vessels will monitor VHF-FM Ch 13 and 16. For more details or comments use the 24 hour number 949-533-0993 or contact BM1 Michael Mims at 310-732-2020.

Chart 18754 LNM: 09/07

SOUTHERN CALIFORNIA-DREDGING-MARINA DEL RAY

J.E. McAmis will commence dredging in the Marina Del Ray Harbor from 2 January to 15 March 2007. Operations will be 24 hours. All mariners are advised to use caution during and after passing arrangements have been made. For more details contact Tug Norton Bay on VHF-FM Ch 16 or at 503-791-2427.

Chart 18744 LNM: 52/06

SOUTHERN CALIFORNIA-DREDGING-NEWPORT BAY-Updated 9/11/06

DD-M Crane & Rigging has commenced dredging the Upper Newport Bay area, from approximately the PCH Bridge to Hotdog Tern Island near Jamboree Rd. in position: 33-38-32.655N, 117-53-12.916W. DD-M is currently dredging in the vicinity of the Unit II Basin, and will continue northward into the ecological preserve, dredging the access channel, island channels and sediment basins. Dredging hours have been restricted to Monday through Saturday with exclusion of Federal Holidays. Dredging operations will be twenty-four hours a day for the six working days through May 2007. Clamshell dredge DB 3 will conduct dredging. Two Brusco tugs, the Cleo Brusco and the Roland Brusco will assist the dredge and tow scows through the Lower Bay to and from the Offshore and Nearshore disposal sites. All equipment will monitor VHF-FM CH 13, 14, 16, and 82. The names as well as the VHF-FM channel are posted on the side of each piece of equipment to ease communications. One of the scows will be intermittently moored in the Lower Bay adjacent to Harbor Island when passage under the PCH Bridge is not possible. Mariners are urged to transit at their slowest safe speed to minimize wake, and proceed with caution after passing arrangements have been made. Mariners are urged not to transit between the buoys marking the pipeline. For more details or comments contact Oriana Klundt at 415-259-7458.

Chart 18754 LNM: 18/06

SOUTHERN CALIFORNIA-DREDGING-SANTA BARBARA

The city of Santa Barbara Waterfront Department will be conducting dredging operations between the seawall and Marinas 2, 3, and 4 beginning 1 February 2007 and complete on 17 March 2007. The project involves the removal of approximately 5,000 cubic yards of sediment via hydraulic dredge with surf zone disposal of the dredged material at East Beach. For more details or comments, contact Karl Treiberg at 805-564-5527.

Chart 18725 LNM: 05/07

SOUTHERN CALIFORNIA-DREDGING-SANTA BARBARA

The cutterhead dredge La Encina will be working until 15 April 2007 at various points of the main channel in Santa Barbara Harbor bounded by Stearns Wharf, the Jetty, West Beach, and Marina 1. The dredge will be connected to a floating pipeline which may be up to 1000 ft long. A high voltage power cable connects the dredge to the shore and mariners are cautioned to avoid anchoring in the vicinity. Operations may be conducted 24 hrs per day. All vessels will monitor VHF-FM Ch 16 and 6. Mariners are urged to use caution before and after passing arrangements have been

SOUTHERN CALIFORNIA-DREDGING-SANTA BARBARA

made. For more details or comments, contact Gary Foster at 805-331-2995.

Chart 18725 LNM: 08/07

SOUTHERN CALIFORNIA-DREDGING/CONSTRUCTION-SAN DIEGO BAY

Traylor Pacific has commenced dredging, sediment remediation and aquatic enhancement operations at the former Campbell Shipyard site until 15 July 2007. Operations are located north of the Tenth Avenue Marine Terminal and West of the San Diego Convention Center. Derrick barge 5 and derrick barge William F will be on site and moored on anchors. All mariners are advised to use caution when transiting the area. For further details or comments contact Traylor Pacific at 619-702-8021 or the Port of San Diego at 619-686-6254. See enclosure for charted area.

Chart 18773 LNM: 50/06

SOUTHERN CALIFORNIA-DREDGING/REVETMENT-CORONADO

Glorietta Bay Marina Dredging and Revetment Project will run 1 November 2006 through 1 June 2007. The work associated with this project includes the removal of existing marina floats and guide piles and dredging. All tugs will monitor VHF-FM Ch 16. For more details or comments contact Walt Jellison at 619-477-7900 or the Harbor Tug and Barge at 619-477-3920. See enclosure for charted area.

Chart 18773 LNM: 44/06

SOUTHERN CALIFORNIA-NAVAL OPERATION-SAN CLEMENTE ISLAND

The U.S. Navy will be conducting operations requiring restricted maneuverability from 10 March to 18 March 2007 in the vicinity of Eel Point. The area of operations will be as follows:
32-59-42.000N, 118-34-54.000W
32-59-42.000N, 118-39-30.000W
32-50-54.000N, 118-38-36.000W
32-54-36.000N, 118-32-24.000W
32-50-54.000N, 118-32-00.000W
Mariners are advised to keep a at least 1nm outside the area of operations. The charter vessel Pacific Venture will be on station acting as safety vessel and will monitor VHF-FM Ch 16. For more details or comments, contact Lonnie Hamme at 619-767-4090. Chart number 18762.

Chart 18762 LNM: 10/07

SOUTHERN CALIFORNIA-NOAA DATA BUOY-SAN DIEGO

The NOAA data buoy COLOS 7 has been deployed in position: 32-44.238N, 117-21.908W through June 2007. It is a yellow foam buoy, approx 4ft in diameter with 3ft of freeboard and is identified by the markings NOAA and COLOS 7. Buoy displays a flashing (4) 20sec yellow light. Mariners are advised to transit this area with caution.

Chart 18772 LNM: 09/07

SOUTHERN CALIFORNIA-PIER REHABILITATION-SAN DIEGO

Reyes Construction will commence pier rehabilitation on the former navy pier from 5 September 2006 to 16 October 2007. The work entails topside improvements to the pavement surface and the drainage system, structural concrete repairs to the underside beams and deck soffit and inserting some grout under the retaining wall that encircles the mole portion of the pier. There may be a need to employ a temporary boom and silt curtain slightly outboard of the pier during work activities. Steps will be taken to assure that it is not a hazard to navigation if need to temporarily employ one becomes necessary. For more details or comments, see enclosures for the charted work area and contacts.

Chart 18773 LNM: 35/06

SOUTHERN CALIFORNIA-PIER REHABILITATION-SAN DIEGO

Reyes Construction Inc. has commenced with Encasement Repair of Concrete Piles at Broadway Pier until 14 March 2007. The work entails encasement of 168 existing concrete piles. The encasement will be accomplished by divers and 4 Ft x 8 Ft work floats, first cleaning the piles of marine growth and any loose concrete, putting a form around the piles and then removing the forms. There is not anticipated to be any hazards to navigation. The work is anticipated to be confined to the footprint of the pier. There may be a need to employ a temporary boom and silt curtain slightly outboard of the pier during work activities to adhere to conditions of the permit, but steps will be taken to assure that it is not a hazard to navigation if the need to temporarily employ one becomes necessary. For more details or comments, see enclosures for the charted work area and contacts. Mariners are urged to transit at their slowest safe speed to minimize wake, and proceed with caution due to divers under the Pier.

Chart 18773 LNM: 43/06

SOUTHERN CALIFORNIA-RESEARCH BUOY DEPLOYED-SAN DIEGO TO SANTA ROSA ISLAND-DEL MAR

A Waverider buoy has been deployed 2.5 nautical miles, bearing 310 degrees true from Del Mar, in position: 32-56.1N, 117-19.1W, in 56 fathoms of water. The buoy will be deployed until 30 June 2007. The buoy is operated by Scripps Institution of Oceanography. The buoy is a 2.5 meter diameter yellow buoy with a 3 meter tower, showing a light characteristic of Flashing Yellow 4s. For more information contact Paul Harvey at 858-534-4333.

Charts: 18720 18740 LNM: 08/06

SOUTHERN CALIFORNIA-RESEARCH BUOY-APPROACHES TO SAN DIEGO

Science Applications International Corporation (SAIC) has collaborated with the National Data Buoy Center (NDBC) in the Deep-Ocean Assessment and Reporting Tsunamis (DART) program. The first enhanced SAIC Tsunami Buoy (STB) is scheduled to deploy in late October 2006, 200 miles west of San Diego, in position:
31-58-10.800N, 120-27-37.200W, in 2000 fathoms of water.
Buoy will be recovered on 4 May 2007. The yellow 7 foot wide, and 4 foot tall cylindrical shaped buoy will be lighted with a Fl 4s Y light. For further

SOUTHERN CALIFORNIA-RESEARCH BUOY-APPROACHES TO SAN DIEGO

details or comments contact Jimmy Thai, Program Manager, at 858-826-1154, or Email: thaij@saic.com.

Chart 18740

LNM: 43/06

SOUTHERN CALIFORNIA-SECURITY EXERCISE-SAN DIEGO

A security exercise will take place in the vicinity of TG-1 anchorage and MSS-3 pier. Operation will commence at 0700 to 1500 from 13 though 15 March 2007. NCWRON-5 Security Boats and various kayaks and jet skis will be onscene throughout the week. All vessels will monitor VHF-FM Ch 16 and 21A. For more details or comments, contact LTJG Tom Yale at 619-580-1418.

Chart 18773

LNM: 10/07

SOUTHERN CALIFORNIA-SHOALING-VENTURA HARBOR ENTRANCE

The Coast Guard has placed Buoy 8 (LLNR-3715) to mark best water at the edge of the shoaling in 28ft of water. This marking reduces the channel by 40-45% of its width. The shoaling is located on the south breakwater in the vicinity of LT 6 and extending in a NW direction into the channel. The aids in this area will be moved to mark best water. For more details or comments contact BMCS David Bullard at 310-732-7312.

Chart 18725

LNM: 51/06

SECTION VIII - LIGHT LIST CORRECTIONS

An Asterisk *, indicates the column in which a correction has been made to new information

(1) No.	(2) Name and Location	(3) Position	(4) Characteristic	(5) Height	(6) Range	(7) Structure	(8) Remarks	
4826.3	Bay Farm Island Light 6	37-44-01.680N 122-15-29.100W	Fl R 4s			TR on pile.	Private aid.	10/07
	*	*						
5922	PINOLE SHOAL RANGE FRONT LIGHT	38-03-15.755N 122-19-26.196W	Fl G 2.5s	22		KRW on pile.	Visible 4 deg each side of rangeline.	10/07
							*	
5923	PINOLE SHOAL RANGE REAR LIGHT	38-03-19.932N 122-19-17.703W	Iso G 6s	54		KRW on pile.	Visible 4 deg each side of range line.	10/07
	*						*	

PUBLICATION CORRECTIONS

NOS PUBLICATION

The list of latest editions of Nautical Charts and Miscellaneous Maps, published by the National Ocean Service, is available for issue. It may be obtained free by mail from the National Aeronautical Charting Office, AVN-530, Federal Aviation Administration, 6303 Ivy Lane, Suite 400, Greenbelt MD, 20770-1479, by telephone at 1-800-638-8972 or from your local authorized nautical chart sales agent. This is a quarterly publication listing the most recent editions of nautical charts, miscellaneous maps and publications relating to navigation, weather, etc. with brief descriptions and up-to-date prices for most of the publications listed. Much of this information may also be obtained online at: http://chartmaker.ncd.noaa.gov/mcd/dole.htm.

COAST PILOT 7-NEW EDITION AND CORRECTIONS

See enclosure for CP 7 update.

LNM: 10/07

ENCLOSURES

AUTOMATIC IDENTIFICATION SYSTEM (AIS) FOR COMMERCIAL VESSELS

AISinformation.pdf

The above link will access the internet web pages and hyper links related to AIS in the VTS San Francisco Area.

LNM: 49/05

NORTHERN CALIFORNIA-BERKELEY MARINA-SAN FRANCISCO BAY

Berkeley_Shoaling.pdf

See link above for chartlet of shoaled area. Number of pages 1

LNM: 09/06

SOUTHERN CALIFORNIA-PIER REHABILITATION-SAN DIEGO

pier-rehab-san-diego.pdf

See link above for charted work area. Page 1 of 1.

Chart 18773

LNM: 35/06

SOUTHERN CALIFORNIA-DREDGING/REVETMENT-CORONADO

Glorietta-Bay-Marina.pdf

See link above for charted area. Number of pages 1.

Chart 18773

LNM: 44/06

SOUTHERN CALIFORNIA-DREDGING/CONSTRUCTION-SAN DIEGO BAY

traylordredging.pdf

See link above for charted area. Number of pages 1.

LNM: 50/06

NORTHERN CALIFORNIA-SURVEY OPERATIONS-SAN FRANCISCO BAY TO SUISUN BAY

sanfran-suisun-survey.pdf

See link above for charted area. Number of pages, 1.

LNM: 02/07

REPORT OF DELAY AT DRAWBRIDGE

DelayRept0207.pdf

Use link above to Report a Delay at a Drawbridge

LNM: 06/07

NORTHERN CALIFORNIA-NOAA BUOY DEPLOYMENT-SAN FRANCISCO

NOOA-buoy.pdf

See link above for the proposed deployment location and aid specifications. Number of pages, 1.

LNM: 09/07

NORTHERN CALIFORNIA-BRIDGE-SAN JOAQUIN RIVER

Proposed_Trestle.pdf

Proposed temporary construction trestle for the I-5 Bridge Widening Project, mile 56.3, San Joaquin River

Chart 18661

LNM: 10/07

NORTHERN CALIFORNIA-SURVEY-SAN FRANCISCO

Farallones.pdf

See link above for charted area. Number of pages, 1.

Chart 18645

LNM: 10/07

COAST PILOT 7-NEW EDITION AND CORRECTIONS

CP7-0705.pdf

See link above for CP 7 update. Number of pages, 1.

LNM: 10/07

THE LOCAL NOTICE TO MARINERS IS AVAILABLE ON THE WORLD WIDE WEB AT WWW.NAVCEN.USCG.GOV/LNM/D11/.

A.J. SHAW
Commander, U.S. Coast Guard
Chief, Waterways Management Branch

AUTOMATIC INDENTIFICATION SYSTEM (AIS) FOR COMMERCIAL VESSELS

All mariners using AIS are reminded to enter correct AIS data before sailing and to keep AIS data accurate and current throughout the voyage.

Procedure:

Perform the following AIS steps before making your Sailing Plan call to VTS. If your transit information changes during your transit, update your AIS data as soon as possible.

Note: For vessels that are not required to report to VTS, perform these steps immediately before getting underway.

1. Select the correct TYPE OF SHIP/HAZARDOUS CARGO TYPE.
2. Enter SHIPS DRAFT (DRAUGHT) accurately using metric measurements.
3. Enter your DESTINATION in accordance with VTS San Francisco dock numbering procedures. (Notice the spaces and symbols.)

   Examples:

   a. Inbound from the Pacific Ocean
      Destination field example: **CA VAN>US OAK**
      Means coming from Vancouver BC Canada going to Oakland CA USA.

   b. Outbound to the Pacific Ocean
      Destination field example: **US BNC>NL RTM**
      Means departing from Benicia CA USA going to Rotterdam, Netherlands.

   c. One location to another within the VTS San Francisco Area.
      Destination field example: **>US BNC 4**
      Means enroute Benicia dock number four.

4. Enter your ETA (estimated time of arrival) for your next destination.
   a. If going to any of the following places enter your ETA for that location.
      i. Any dock, pier, berth, etc. within the VTS area.
      ii. Any Federal Anchorage within the VTS area.
      iii. Petaluma River Entrance (VTS area boundary line).
      iv. Mare Island Causeway Bridge (VTS area boundary line).
      v. Dumbarton Bridge (VTS area boundary line).
   b. If departing for or arriving from the Pacific Ocean enter your ETA for the San Francisco Sea Buoy (the Pilot Area).
5. Set the NAVIGATION STATUS and update as necessary.

Contact Information:

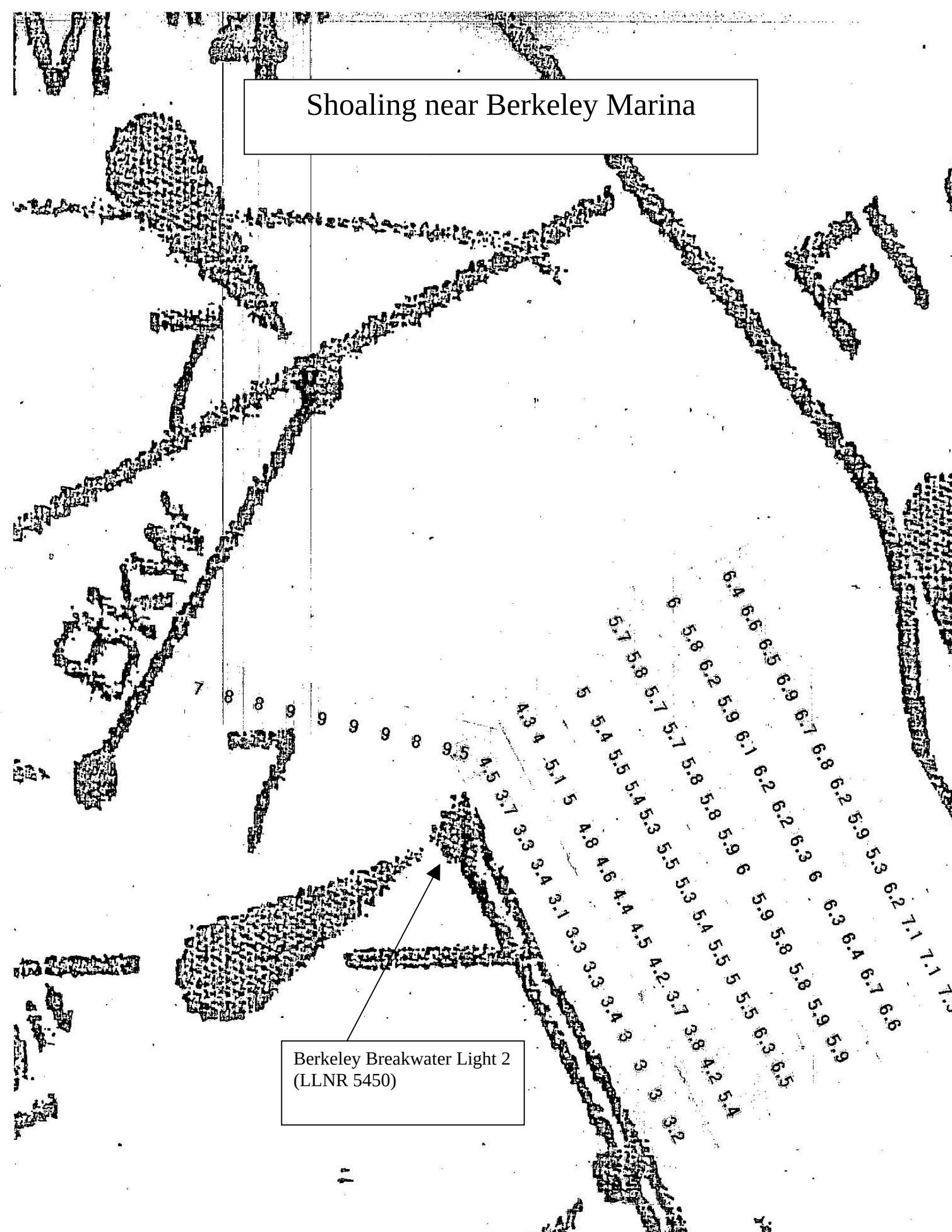
For questions or comments please contact:

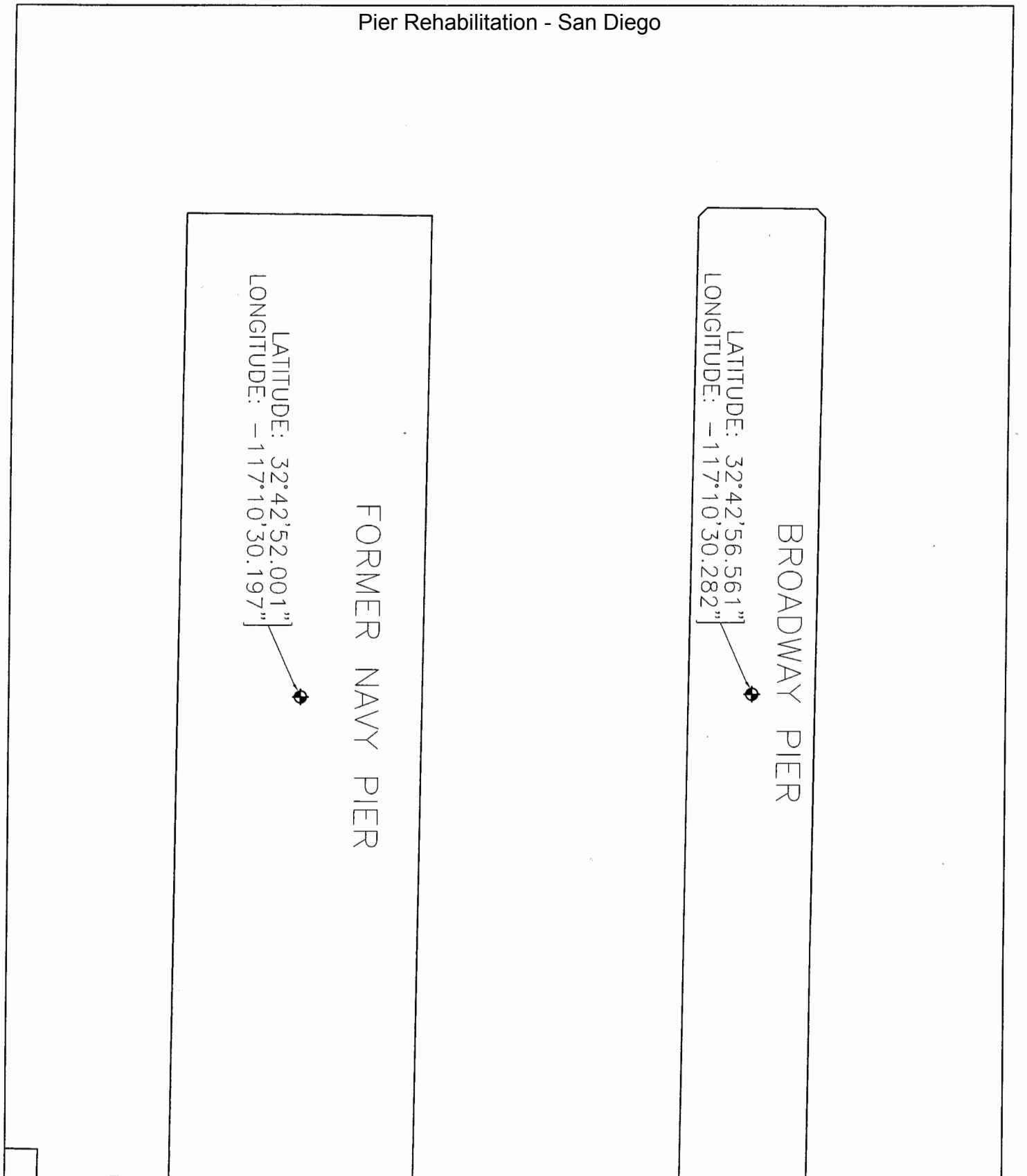
F. Scott Humphrey, Sector San Francisco Vessel Traffic Service Training Director
Email: shumphrey@d11.uscg.mil
Phone: 415 556 0127 extension 112

Additional Resources:

The following are internet web pages related to AIS in the VTS San Francisco Area.

VTS San Francisco Area dock numbers and diagrams
United Nations Location Codes
Overview of VTS San Francisco AIS procedures
VTS San Francisco AIS Frequently Asked Questions


Shoaling near Berkeley Marina
Berkeley Breakwater Light 2
(LLNR 5450)

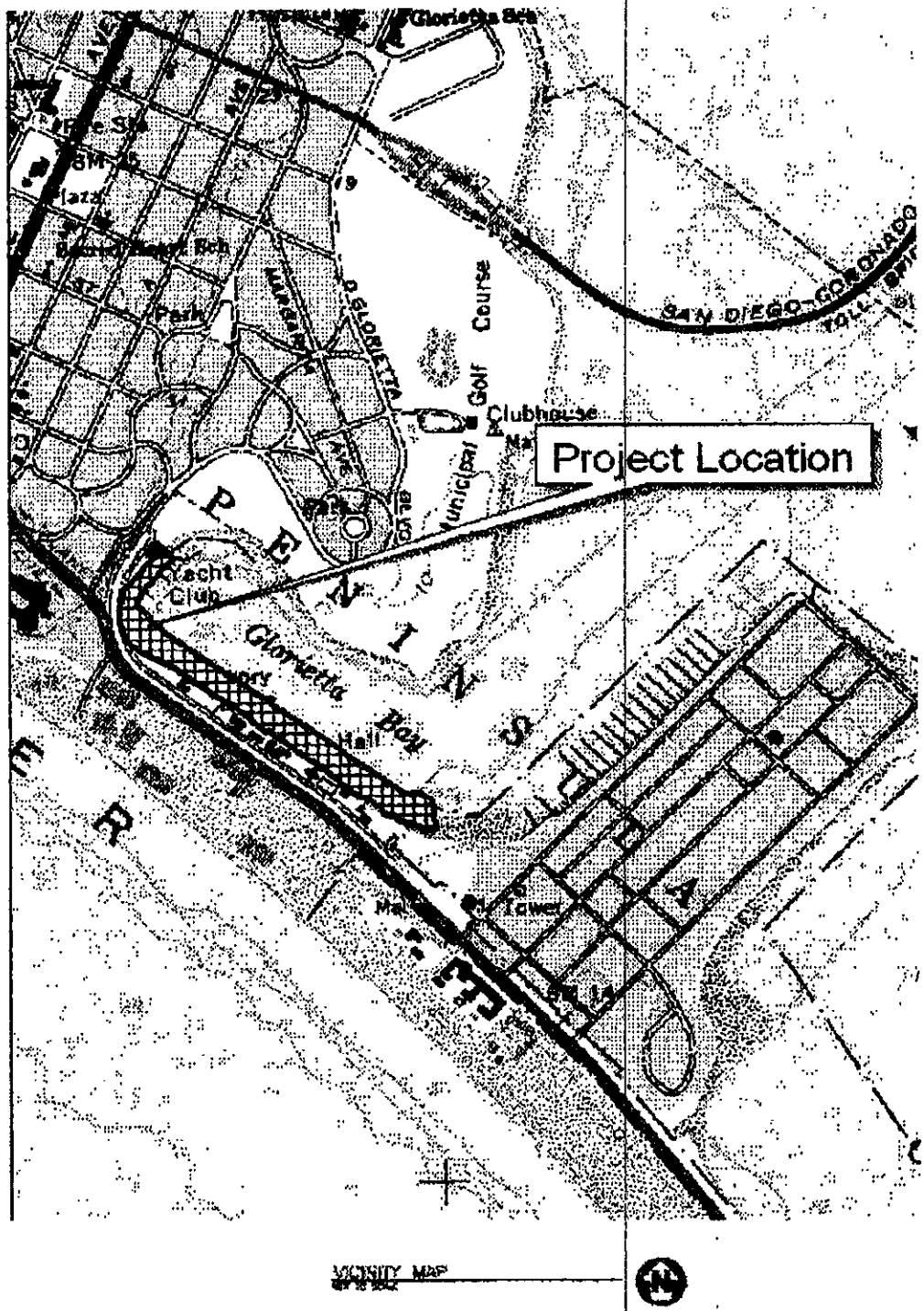

BROADWAY PIER
LATITUDE: 32°42'56.561"
LONGITUDE: -117°10'30.282"
FORMER NAVY PIER
LATITUDE: 32°42'52.001"
LONGITUDE: -117°10'30.197"

EMERGENCY CONTACT LIST
PROJECT: Former Navy Pier Rehabilitation
CONTRACT/P.O.: P2049-1 & P0096-1

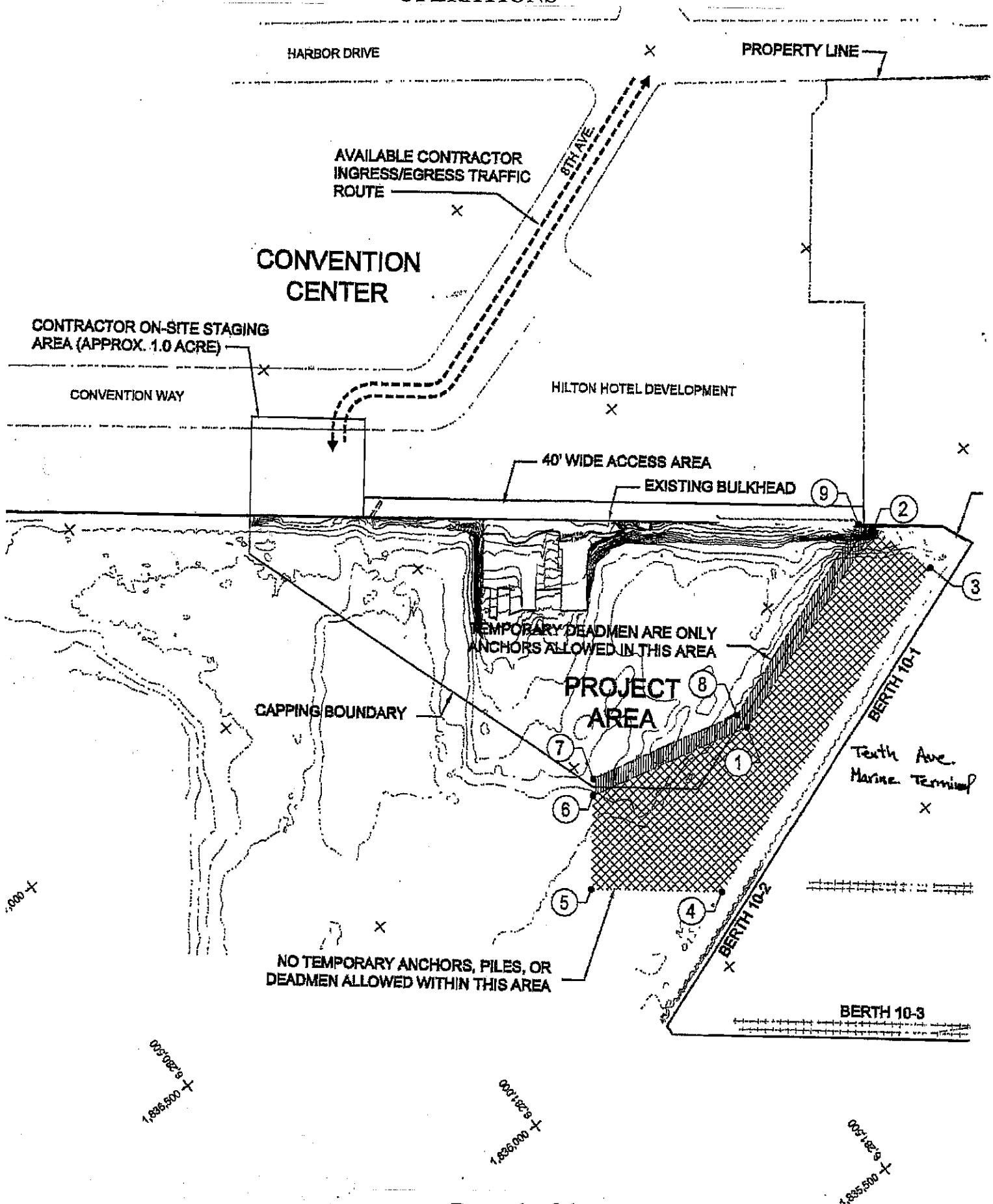
PRIME CONTRACTOR	CONTACT	PHONE NUMBERS
Reyes Construction, Inc. 337 35th Street, Suite R San Diego, CA 91950	Tom Beutler, Project Manager	Mob: 619-454-7989 Hm: 619-222-4154
	Tom Kvitli, Superintendent	Mob: 619-454-9653 Hm: 619-670-4080
	Oscar Ojeda, Asst Project Manager	Mob: 619-414-2578 Hm: 619-219-4735
	Jorge Diaz, Project Engineer	Mob: 619-250-8090 Hm: 619-403-3884

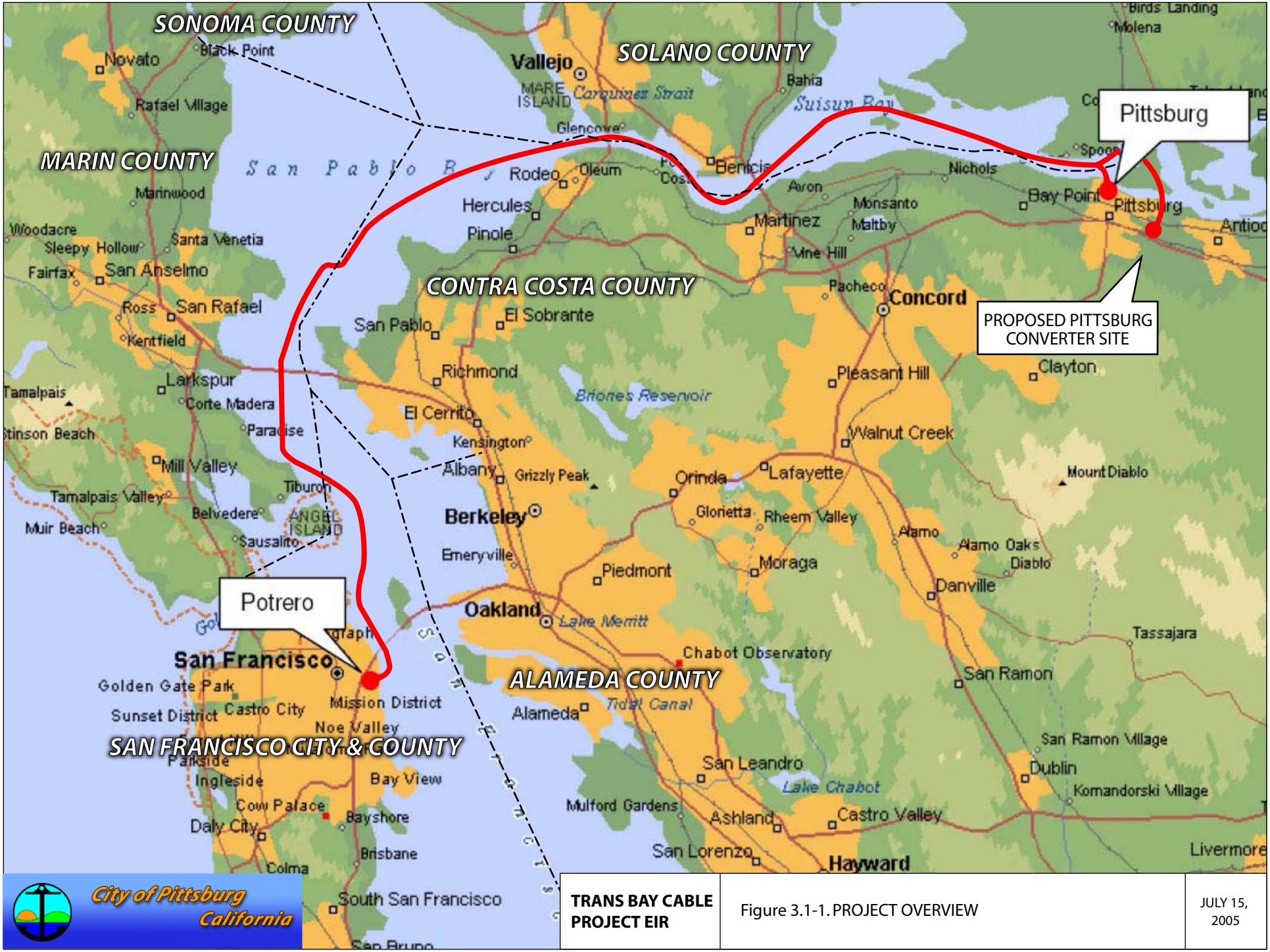
Glorietta Bay Marina

Appendix A — Vicinity Map and Site Map(s)



TRAYLOR PACIFIC DREDGING AND CONSTRUCTION OPERATIONS





City of Pittsburg California

TRANS BAY CABLE PROJECT EIR	Figure 3.1-1. PROJECT OVERVIEW	JULY 15, 2005

U.S. COAST GUARD
REPORT OF DELAY AT DRAWBRIDGE
PER 33 CFR 117.5

BRIDGE NAME_____ DATE _____

MILE _____ WATERWAY _____

1. Name/ Type of Vessel _____ Direction of Travel _____
2. Vessel Owner (Name) _____
   (Address) _____
3. Name of Pilot (if applicable) _____
   (Address) _____
4. Time vessel signaled for bridge opening _____
5. Location of vessel when signal was given _____
6. Time and location of vessel when delay began _____
7. Method of signal for bridge opening ( ) Radio ( ) Sound ( ) Visual
   (If sound or visual signal was used, specify _____)
8. Time bridge operator acknowledged signal _____
9. Method of bridge operator acknowledgement ( ) Radio ( ) Sound ( ) Visual
   (If sound or visual signal was used, specify _____)
10. Did bridge operator acknowledgement indicate the bridge
    ( ) Could be opened immediately
    ( ) Could not be opened immediately
11. If land traffic crossed the bridge:
    Time land traffic started across the bridge _____
    Time land traffic stopped crossing the bridge _____
    Did land traffic stop on the bridge? _____
    Duration land traffic stopped on the bridge _____
12. Time drawbridge opened for navigation _____
14. Additional comments _____

_____

_____

_____

I certify the above information is true to the best of my knowledge and understand this statement may be used by the U.S. Coast Guard in levying fines against the bridge owner.

Signature _____

Telephone _____

Mariners may complete and send via fax or mail to:

USCG D11(dpw) Bridge Administration
Building 50-2
Coast Guard Island
Alameda, CA 94501-5100
Cellular: (510) 219-4366, Work Phone: (510) 437-3516
Work Fax: (510) 437-5836

Mariners are reminded not to require bridge openings for appurtenances nonessential to navigation, per 33 CFR 117.11

NOAA

Cordell Bank National Marine Sanctuary Buoy
in Partnership with Bodega Marine Lab

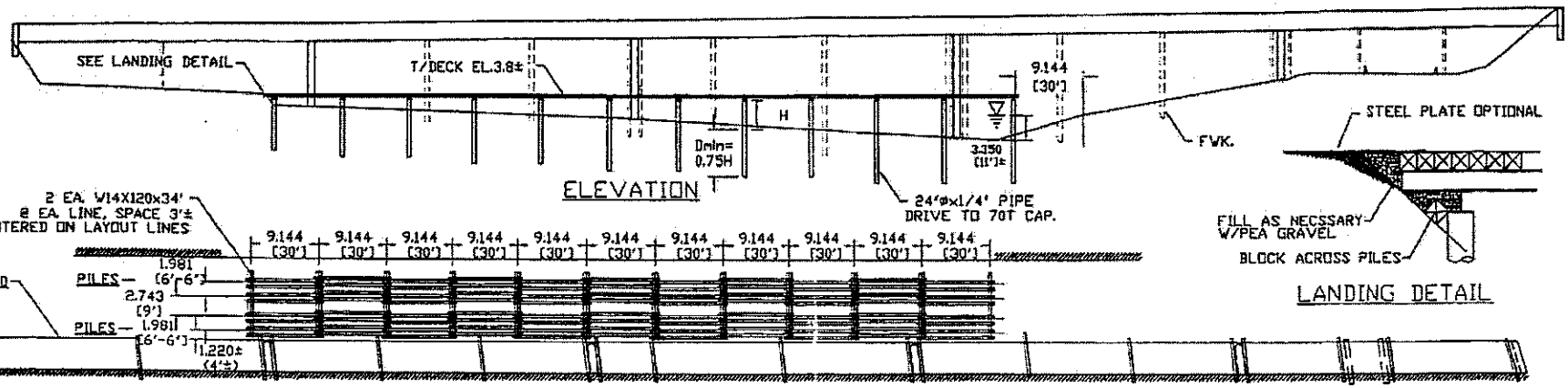


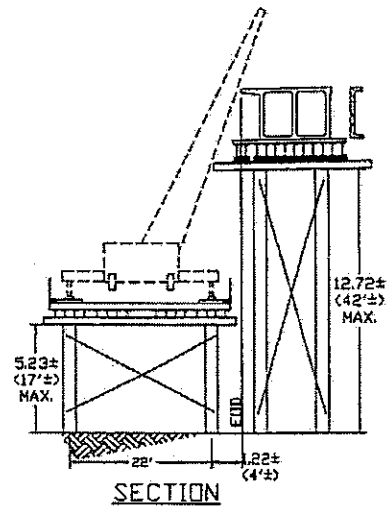


Instruments Package:
Conductivity, Temperature - SBE37SIP
Fluorescence, turbidity - Wetlabs FLNTUS
Currents - Nortek Aquadopp 400 kHz ADCP
Winds - R.M. Young 5103
GPS/AIS unit

Buoy Basics:
Dimensions of the buoy: 1.7 meters wide, 3.3 meters tall, 1200lbs.
Equipped with moon pool and instrument extender (not shown in photograph)
Specifications of the anchor: 3600lbs
Solar panels with rechargeable batteries
Reflective lights
Amber Carmanah light model 601 flashing 5 every 20seconds currently
Data controller / storage
Software for viewing data
Two-way communication
Alarm and tracking via Inmarsat if the anchor line is cut

Deployment Lat/Lon will be: 38 02' 59.11N, 123 27' 20.58W. Depending on bottom depth and other variables this location could change by as much as a mile.





NOTES:

1. ALL STEEL IS A36 UNLESS NOTED OTHERWISE.
2. PILES WILL BE DRIVEN TO 70 TON CAPACITY. TOP OF PILE WILL BE WITHIN 6" OF THEORETICAL POSITION AT CUT OFF ELEVATION. PILES WILL NOT BE PULLED.
3. ALL WELDS WILL BE MADE WITH E70XX ELECTRODES, BY A QUALIFIED WELDER IN ACCORDANCE WITH ANSI/AWS D1.1.
4. ALL OUTRIGGERS WILL BE SET ON A 4' SQUARE PAD.
5. MATERIAL WILL BE ERECTED BY CRANE OR FORKLIFT.

FEB - 3 2007

REGISTERED PROFESSIONAL ENGINEER
WILLIAM E. HUBBARD
No. 31784
EXPIRES 12/31/2008
CIVIL
STATE OF CALIFORNIA

20.000 [65'-7"]
SCALE: 1:600

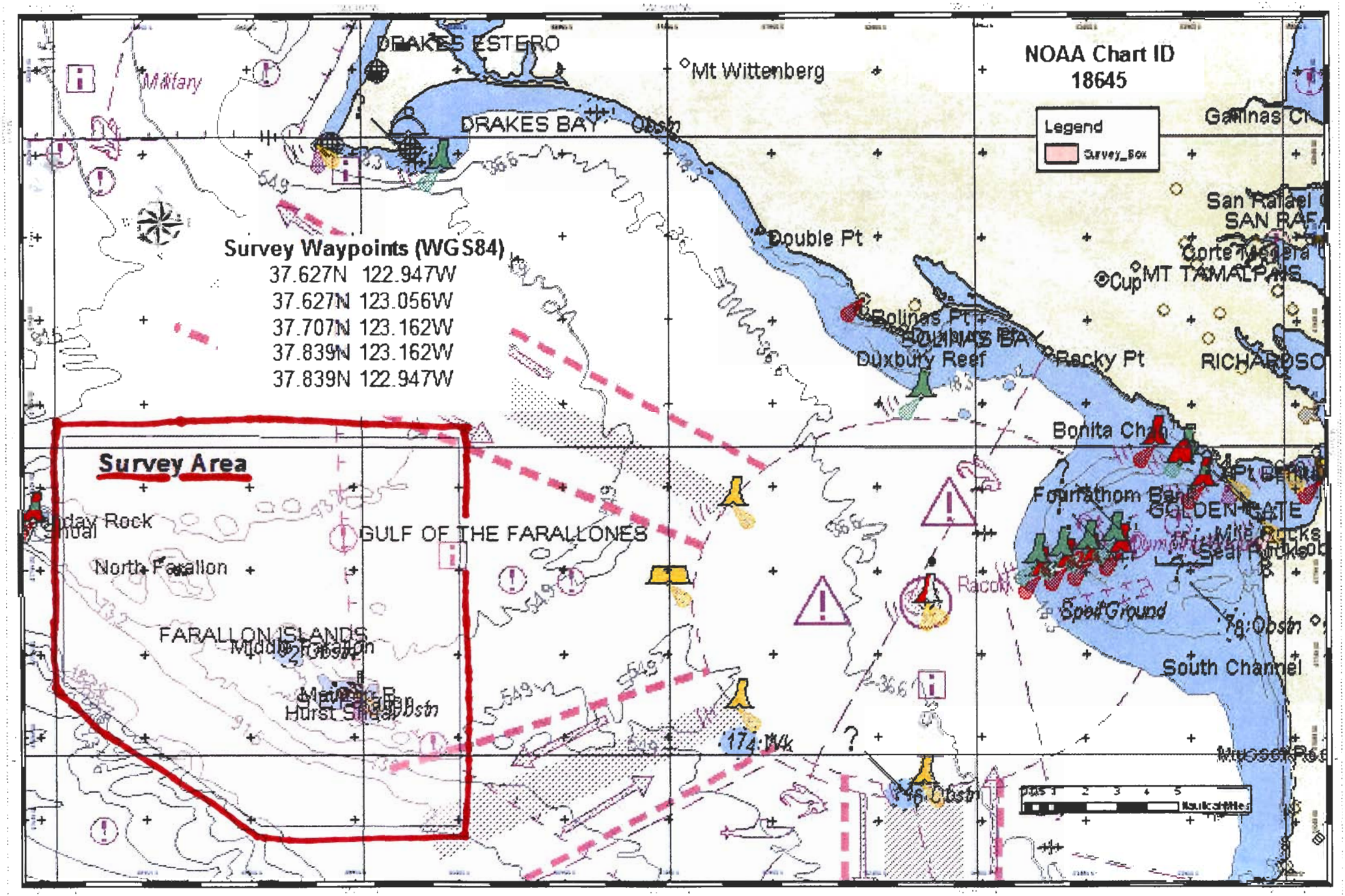
Project:
San Joaquin River Bridge
(WIDEN)
BR.#29-0252R
TRESTLE
Contract #10-3A1204

Falsework & Shoring Designs, Inc.
P.O. Box 9950, San Jose, CA 95157-0950
E-mail: Bill@falseworkshoring.com (408) 777-8289
www.falseworkshoring.com Fax (408) 777-8279

Contractor:
Nehemiah Construction, Inc.
Phone (707) 746-6870 Fax (707) 746-6815

DWG. 1 of 2

DATE: 02/05/07 0


NOAA Chart ID
18645
Legend
Survey_Box
Survey Waypoints (WGS84)
37.627N 122.947W
37.627N 123.056W
37.707N 123.162W
37.839N 123.162W
37.839N 122.947W
Survey Area
DRAKES ESTERO
DRAKES BAY
Mt Wittenberg
Double Pt
Bolinas Pt
Duxbury Reef
Rocky Pt
Bonita Chan
Fourfathom Bank
GOLDEN GATE
GULF OF THE FARALLONES
North Farallon
FARALLON ISLANDS
Middle Farallon
Hurst Shoal
SpoilGround
South Channel
174 Wk
Military
Gallinas Ch
San Rafael
MT TAMALPAIS
RICHARDSO
Seal Rocks
Mussel Rock

Publication–National Ocean Service–U.S. Coast Pilot 7, Pacific Coast: California, Oregon, Washington, Hawaii, and Pacific Islands, 2007 (39th) Edition. Change No. 05.

Coast Pilot 7 39th 2007 Corrections

Page 668-Paragraphs 209-210, read:

The International Maritime Organization has designated NAVTEX as the primary means for transmitting coastal urgent marine safety information to ships worldwide. NAVTEX transmissions have a designed range of 400 NM and coverage is reasonably continuous in the east, west and Gulf coasts of the United States, as well as the area around Kodiak, Alaska, Guam and Puerto Rico. All NAVTEX broadcasts are made on 518 kHz. NAVTEX broadcast stations and message content for the West Coast are as follows:

STATION	ID	WX BROADCAST SCHEDULE (UTC)
Kodiak	J	0300, 0700, 1100*, 1500, 1900, 2300*
	X	0340, 0740, 1140*, 1540, 1940, 2340*
Astoria	W	0130, 0530, 0930*, 1330, 1730, 2130*
San Francisco	C	0000, 0400*, 0800, 1200, 1600*, 2000
Cambria	Q	0045, 0445*, 0845, 1245, 1645*, 2045
Marianas	V	0100, 0500, 0900, 1300, 1700, 2100
Honolulu	O	0040, 0440, 0840*, 1240, 1640, 2040*

*Routine weather forecasts are broadcast four times per day with these being the normal times when repeats of Notices to Mariners are broadcast in lieu of weather. Weather warnings may be broadcast at any time.

Cambria (NMC) (Station Q)

(CL 1230/06; 40/06 CG17)

Page 668-Paragraph 215: Delete.

(CL 1230/06; 40/06 CG17)

Page 669-Paragraph 223: Delete.

(CL 1230/06; 40/06 CG17)

Page 669-Paragraph 229: Delete.

(CL 1230/06; 40/06 CG17)

Page 669-Paragraph 235, read:

Kodiak (NOJ) (Station X)

Seventeenth Coast Guard District Broadcast Notice to Mariners.

Distress, Urgent, and Safety messages.

Gale, storm, and hurricane warnings.

Coastal weather forecasts for the Andreanof Island vicinity.

(CL 1230/06; 40/06 CG17)

Page 669-Paragraphs 243-244, read:

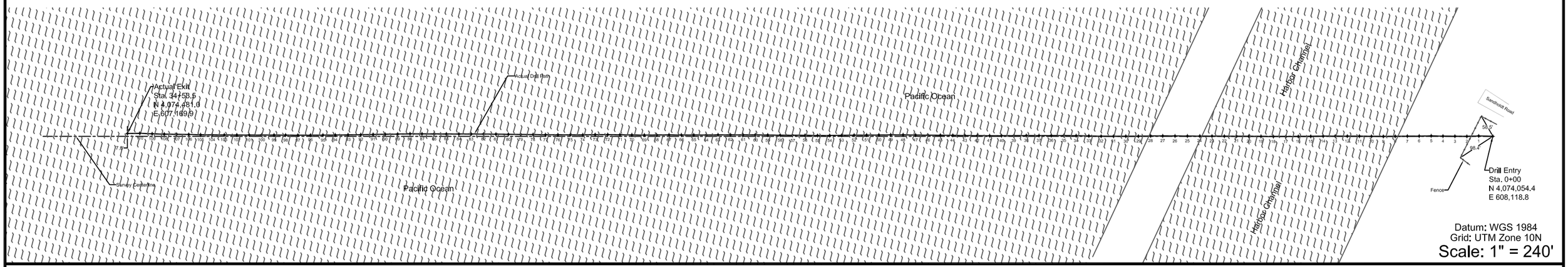
Marianas (NRV) (Station V)

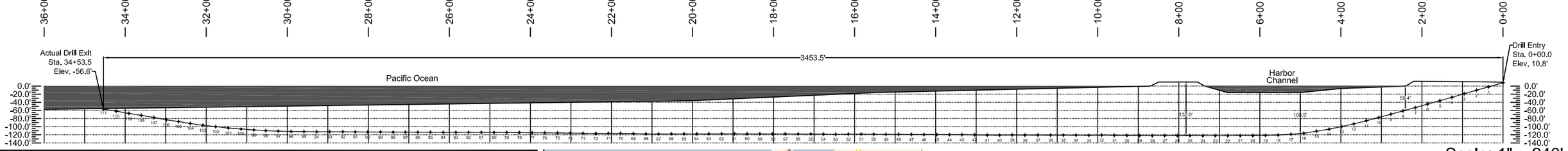
(CL 1230/06; 40/06 CG17)

Page 669-Paragraph 249: Delete.

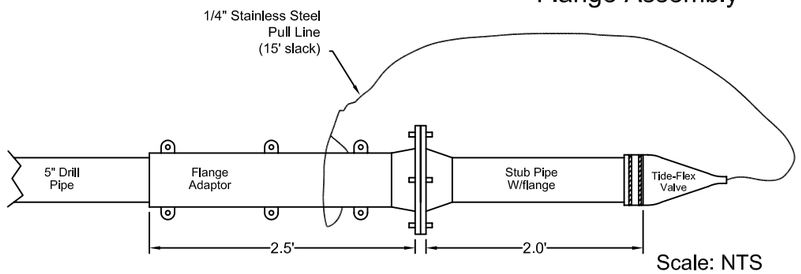
(CL 1230/06; 40/06 CG17)

Monterey Bay Aquarium Research Institute
Monterey Accelerated Research System
HDD Shore Approach

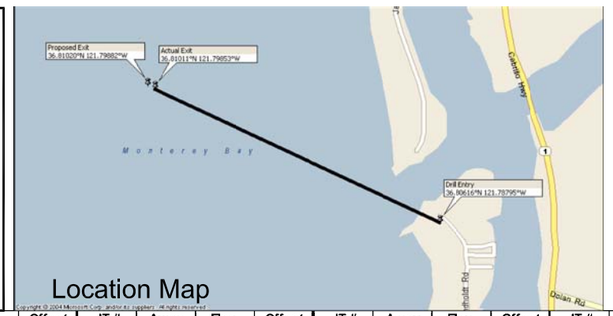




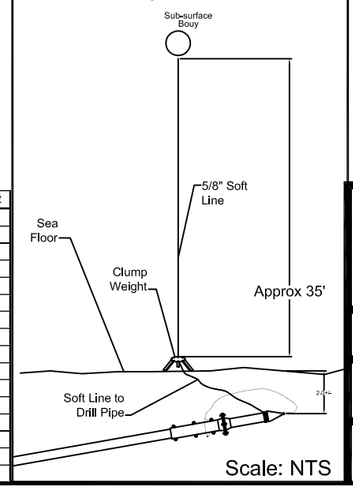
Flange Assembly



Scale: NTS



Buoy Marker



Scale: NTS

Horizontal Diatance = 3453.5'
Measured Diatance = 3473.5'

JT #	Away	Elev.	Offset	JT #	Away	Elev.	Offset	JT #	Away	Elev.	Offset	JT #	Away	Elev.	Offset	JT #	Away	Elev.	Offset	JT #	Away	Elev.	Offset	JT #	Away	Elev.	Offset
Entry	0+00.0	10.8	0.0	16	4+91.7	-116.0	-0.5	32	9+90.5	-121.0	0.2	48	14+91.5	-118.8	3.7	64	19+89.6	-117.8	3.3	80	24+89.9	-114.1	4.9	96	29+90.5	-111.9	2.8
1	0+35.6	-1.7	0.8	17	5+23.3	-118.6	-0.7	33	10+21.7	-121.3	0.9	49	15+22.7	-118.9	3.7	65	20+21.0	-117.8	3.4	81	25+21.3	-114.0	5.3	97	30+22.2	-111.0	2.8
2	0+65.5	-10.2	-0.2	18	5+54.9	-120.6	-0.6	34	10+53.7	-120.9	1.6	50	15+52.8	-118.5	3.3	66	20+52.3	-117.8	3.3	82	25+52.5	-113.9	5.7	98	30+53.3	-109.8	3.0
3	0+95.8	-18.7	0.1	19	5+86.2	-121.5	-0.4	35	10+85.0	-120.9	1.9	51	15+83.8	-118.3	3.1	67	20+83.6	-117.9	3.6	83	25+83.9	-114.0	5.8	99	30+82.5	-108.1	3.2
4	1+26.0	-27.7	0.4	20	6+17.2	-122.0	-0.1	36	11+16.6	-120.9	1.9	52	16+15.4	-118.4	2.9	68	21+14.9	-117.7	3.5	84	26+15.1	-113.9	5.7	100	31+14.0	-105.6	3.3
5	1+55.8	-35.8	1.0	21	6+48.3	-122.1	0.1	37	11+47.8	-120.7	1.7	53	16+46.8	-118.7	2.4	69	21+45.9	-117.1	3.1	85	26+46.8	-113.7	5.8	101	31+45.5	-103.3	3.3
6	1+86.2	-44.3	0.5	22	6+79.0	-122.4	0.2	38	11+79.7	-120.8	1.8	54	16+77.1	-118.4	2.0	70	21+77.6	-116.6	3.5	86	26+77.8	-113.6	6.0	102	31+76.7	-100.0	3.3
7	2+16.1	-52.9	0.3	23	7+10.2	-122.2	0.4	39	12+11.3	-120.4	1.6	55	17+07.9	-117.8	1.9	71	22+07.6	-116.6	3.9	87	27+08.4	-113.5	6.1	103	32+08.3	-96.5	3.4
8	2+46.7	-61.2	-0.1	24	7+40.9	-122.3	0.5	40	12+42.3	-120.9	1.4	56	17+39.3	-117.9	2.5	72	22+38.5	-116.6	4.3	88	27+38.6	-113.4	6.3	104	32+39.4	-92.1	3.7
9	2+76.8	-69.2	-0.5	25	7+72.4	-122.0	0.7	41	12+72.6	-120.8	1.3	57	17+71.2	-117.7	2.5	73	22+70.3	-116.4	4.2	89	27+69.9	-113.2	5.7	105	32+68.4	-87.3	3.9
10	3+06.8	-77.5	-0.2	26	8+03.7	-122.0	0.8	42	13+03.9	-120.0	1.5	58	18+02.6	-117.7	2.7	74	23+01.6	-116.0	3.6	90	28+01.7	-113.1	5.1	106	32+98.3	-82.9	4.6
11	3+37.3	-85.4	0.3	27	8+34.8	-122.0	1.0	43	13+35.1	-119.7	1.8	59	18+33.9	-117.7	3.2	75	23+33.1	-115.4	3.6	91	28+32.1	-112.8	4.5	107	33+29.1	-77.3	5.1
12	3+67.8	-93.0	0.3	28	8+65.3	-122.4	0.8	44	13+65.8	-119.6	2.5	60	18+65.2	-117.7	3.7	76	23+64.6	-115.2	3.8	92	28+63.1	-112.6	4.0	108	33+60.3	-72.2	5.5
13	3+98.3	-99.8	0.4	29	8+96.5	-122.0	0.2	45	13+97.2	-119.5	2.7	61	18+96.4	-117.6	3.7	77	23+96.0	-114.9	3.9	93	28+95.4	-112.6	3.6	109	33+90.9	-67.3	6.4
14	4+28.9	-106.0	0.5	30	9+28.2	-121.7	0.0	46	14+28.7	-119.5	2.8	62	19+28.2	-117.6	3.7	78	24+27.4	-114.4	4.3	94	29+27.5	-112.5	3.3	110	34+22.1	-59.2	7.5
15	4+60.3	-111.2	-0.2	31	9+59.3	-121.3	0.1	47	14+59.9	-119.1	3.3	63	19+59.6	-117.7	3.7	79	24+58.5	-114.2	4.6	95	29+58.9	-112.2	3.1	Exit	34+53.5	-56.6	7.0

ENVIRONMENTAL CROSSINGS INC
868 ROBINWOOD CT.
TRAVERSE CITY, MI 49686
PH: (231) 929-1242
FAX: (231) 941-7412

DATE:	JOB No.:	DRAWN BY:
4-10-06	05-5041	GJH

CLIENT:	PROFILE DIRECTION:
Monterey Bay Aquarium Research Institute	SE to NW

LOCATION:	DRAWING No.:
MARS HDD Shore Approach Moss Landing, CA	As-Built



Aspen
Environmental Group

PROJECT MEMORANDUM
MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH SYSTEM (MARS) PROJECT

To: Michelle Brown, California State Lands Commission (CSLC)
Deirdre Hall, Monterey Bay National Marine Sanctuary (MBNMS)

From: Jenny Slaughter, Aspen Environmental Monitor

Date: March 27, 2006

Subject: HDD Phase Construction Completion Report

Horizontal Directional Drill (HDD) Phase Cable Installation

CSLC/MBNMS Aspen Environmental Monitor (EM): Jenny Slaughter.

Summary of Activity: HDD Operations

The CSLC/MBNMS Aspen EM, Jenny Slaughter, was on site at the HDD location to monitor equipment set up, construction, and site restoration activities. Construction took place during daylight hours (between 7:00 am- 7:00 pm) seven days a week. A representative from MBARI was present during construction activities.

The HDD Contractor, Environmental Crossings Inc. (ECI), mobilized equipment to the construction site March 3rd through 7th. Silt fence, hay bales, and gravel were used around the construction site perimeter to minimize erosion, sedimentation, and runoff onto the shoreline (see Figure 1). Plastic sheets and absorbent pads were placed underneath motorized equipment including the drill rig and pumps and hay bale berms were placed around the equipment to contain potential spills (see Figure 2).

Initial survey data showed the bore length to be 4,800 feet in length, however once the site was resurveyed; the length of the bore was closer to 3,500 feet long (see Figure 3).

Drilling began on Wednesday, March 8th and crews drilled under the onshore portion of the bore, stopping just before the harbor breakwater. At this point the contractor added rhodamine, a red dye, to the drilling mud to aid in the detection of frac-outs (release of drilling fluid on the surface) that occur underwater (see Figure 4). During the drilling, the fluid returns were closely monitored to determine if any bentonite was being lost in the ground or on the surface as a frac-out over the drill path.

Once the drill head reached the harbor breakwater, a monitoring vessel was used to conduct fluorometery readings of the water. This system is used to detect the rhodamine dye that has been added to the drilling mud. The fluorometry monitoring was conducted at all times while the drilling was occurring offshore (see Figure 5).

As outlined in the HDD Monitoring Plan, the specific drilling conditions are categorized by the potential fluid loss and existing monitoring conditions.

- Condition 1 drilling, full bentonite returns are being brought back to the bore entry pit and no evidence of a surface or subsurface release is found.
- Condition 2 drilling, a loss of normal expected drilling fluid returns occurs but no dye or bentonite is detected in the water or on the surface.
- Condition 3 drilling, normal expected returns are observed and a detection of dye is present in the water, but not bentonite.

30423 Canwood Street, Suite 215, Agoura Hills, CA 91301 • Phone (818) 597-3407 • Fax (818) 597-8001
E-mail:Aspen@AspenEG.com • http://www.AspenEG.com

- Condition 4, loss of normal expected returns is observed with detection of dye and bentonite release in the water.

Drilling continued under Condition 1 through Saturday, March 11th until drilling fluid returns ceased completely around 5:00pm. The drill head was approximately 2,000-feet out when the loss of fluids occurred. The monitoring vessel did not encounter any readings that would indicate a release of bentonite had occurred into the water. Actions taken by the contractor included modifying the drilling mud viscosity and advancing/retreating of the bore stem to see if the fluids would return to the bore entry pit. Drilling continued under Condition 2 Operating Measures as identified in the HDD Monitoring Plan until the bore was completed on Monday, March 13th. It is estimated that approximately 7,000-gallons of bentonite were lost into the substrate during the HDD operation. As identified in the HDD Monitoring Plan, as the bore begins, a high percentage of the drilling fluid returns to the drill site entry pit, and as the drill progresses, more of the returns are absorbed by the earth or rock formations and do not return to the drill site. The applicant indicated that it was anticipated that most or all of the drilling fluids that were lost were absorbed by the surrounding formation becoming lost in lateral and subterranean fractures within the formation.

At the completion of the bore, the Monitoring vessel used side-scan sonar to find the location of the drill stem exposed on the ocean floor. The drilling crew used water instead of bentonite drilling fluid for the last few sections of the bore in order to flush the drilling mud from the pipe. After the drill stem extited onto the ocean floor, a thin sheen of bentonite was detected on the sea floor by the side-scan sonar in the area immediately surrounding the exit point. The area affected was estimated to be 10 by 20 feet. Rhodamine dye was also detected during the drill exit, which was expected. Divers determined that the bentonite had dissipated by the time they reached the exit site.

Once the drill head was exposed on the ocean floor, divers were used to cut off and retrieve the drill stem (see Figure 6). Progress on the drill stem retrieval was hindered due to adverse weather conditions throughout the week and was further delayed when the check valves for the end of the pipe were lost during diving operations. Once the drill stem was cut off, it was lifted to the surface using air bag floats and towed into the harbor (see Figure 7). The drill pipe, also the conduit for the MARS cable, was left in place and buried approximately two feet under the sand at the exit point. A pig was run through the pipe which pulled a wire cable to be used during the communications cable installation. A new check valve was ordered and was placed on the end of the pipe to ensure that no sand would enter the pipe.

Once construction activities were completed, the drilling equipment was demobilized from the site. Straw was spread over disturbed areas to prevent erosion (see Figure 8). Drill cuttings and fluids, straw bales, and contaminated materials such as oil rags and absorbent pads were disposed of at the Marina Landfill. Demobilization and restoration was completed on Tuesday, March 21st.

Environmental Compliance Activities:

1. The CSLC/MBNMS Aspen EM and the on-site MBARI representative verified the placement and condition of containment materials under the drilling equipment.

2. Sound monitoring was conducted by the MBARI on-site representative to record construction related noise. Readings taken during drilling operations were consistently below the Monterey County Permit requirements (under 85 dBA).

3. The monitoring vessel was deployed at all times during drilling operations under the ocean and was immediately notified of the loss of drilling fluid returns to the entry pit. The boat was running transects around the bore path taking constant samples for the detection of dye in the drilling mud. No evidence of dye has been recorded during the drilling operations until the drill head exited, releasing a small amount of bentonite onto the sea floor. The CSLC/MBNMS Aspen EM made fluid loss notifications to the agencies including CSLC, MBNMS, California Coastal Commission (CCC), Regional Water Quality Control Board, and Monterey County.

4. Water was used to lubricate the last three to four drill stems of the borehole to reduce the amount of bentonite that could surface during drill exit onto the sea floor.

5. MBARI received clarification on drill cutting disposal requirements from Monterey County. The cuttings were removed from the work site and hauled to a nearby Landfill.

6. The CSLC/MBNMS Environmental Monitor verified that spill response material was kept on site and that proper disposal protocol was followed for contaminated materials.

Environmental Training

On Monday, March 6th the HDD contractor, Environmental Crossings Inc. (ECI), the CSLC/MBNMS Aspen Environmental Monitor (EM), and representatives from MBARI and MBNMS attended an Environmental Training to review project compliance requirements and permit conditions.

Agency Personnel:

Agency representatives who visited the HDD construction site included Michelle Brown (CSLC), Chandra Basavalinganadoddi (CSLC), Deirdre Hall (MBNMS), Roger Van Horn (Monterey County), and Patrick Treffry (Monterey County).

MARS PROJECT PHOTOGRAPHS



Figure 1: Silt fencing and hay bales were installed around the perimeter of the construction site to prevent run off onto the shoreline.



Figure 2: Plastic sheeting, absorbent pads, and hay bales were installed around motorized equipment to contain any spills.



Figure 3: The drill path went under the Moss Landing Harbor entrance to a point approximately 3,500-feet offshore.



Figure 4: Rhodamine dye was added to the drilling mud and is evident here during Condition 1 drilling with full bentonite returns.



Figure 5: A Fluorometer was used aboard the monitoring vessel to detect any dye released into the water during drilling.



Figure 6: The approximate exit area of the drill head (marked with a buoy).



Figure 7: The drill head was recovered by divers and towed into the harbor.



Figure 8: Site restoration after all HDD equipment was removed from the project site. Straw was spread out over the disturbed areas for erosion control. The cement vault will be installed during onshore trenching operations which are expected to take place in the next few weeks.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: **Deirdre Hall (MBNMS), Dave Plummer (CSLC)**
From: **Jenny Slaughter, CSLC / MBNMS Environmental Monitor**
Date: **March 10, 2007**
Subject: **MARS Daily Environmental Monitoring Log**

WEATHER INFORMATION

LOCATION	TEMP	SEAS	RAIN/FOG/CLEAR	AVG VISIBILITY
Monterey Bay	70	Calm	Clear	20 miles +

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Prior to cable laying operations, a 30-minute marine mammal survey was conducted within a 500-meter Safety Zone established around the cable ship. Observations are included in Table 1 of this report and are also submitted daily and in more detailed reports from the Marine Mammal Monitors.

2. Diving operations took place at the Directional Drill end terminus off shore of Moss Landing to asses the location and condition of the end of the pipe for cable connection. This activity was conducted off another vessel (see Figure 1).

3. The pre-lay grapnel run (PLGR) began in the shallow waters near the HDD pipe terminus and continued toward the Trawl Resistant Frame (TRF) site (see Figures 2 and 3). The PLGR is planned to occur in all areas where the cable can be plowed in, to clear the alignment of any debris (abandoned fishing gear, etc). No debris was recovered during operations on Saturday. PLGR operations are expected to continue through Sunday.

4. A Field Verification of Safety Zone to verify the 160dB sound pressure levels associated with ship operations (see Figure 4). According to the NOAA-NMFS letter dated September 15, 2005 the 500-meter safety zone is recommended until field measurements are taken, not a 500-foot safety zone. The Safety Zone took place during the PLGR operations and is also schedule to occur during initial plowing operations.

5. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are on board, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors have expressed concern that with only one Marine Mammal Monitor on shift at any one time, there is not one location onboard the ship that offers a 360 degree view of the Safety Zone and that they have limited sight of the ship's stern, which is the location of the main propeller. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. The Cable ship's speed during grapnel operations has averaged below 1 knot, below maximum speed limit for the protection of marine mammals and turtles.

3. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan is on board the cable ship and has arranged for a fast response vessel to be available during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

California Sea lions and Sea otters were commonly observed within the 500-meter safety zone and are listed in Table 1. Two California Grey whales were observed traveling across the ship's path approximately 700-meters from the bow, outside of the Safety Zone. Birds are frequently observed surrounding the ship.

TABLE 1

WITHIN 500-METER SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS***
California Sea Lion	**Zaca**	**8**
Southern Sea Otter	**Enlu**	**25**

*****Data collected during a 17 hour period between 7am and 12am from B.Watts and T.Brookens (Marine Mammal Monitors)

* Data is approximate, please see Marine Mammal Monitoring Logs for detailed reports.

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was notified when whales were observed, other mammals (Sea lions and Sea otters) within the 500-meter Safety Zone were not reported to the Bridge because they were not in immediate danger, according to the Marine Mammal Monitors.

ACTIONS TAKEN:

None.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING WITHIN 500-METER SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable.

PROJECT PHOTOS



Figure 1: Divers were used to located and inspect the HDD pipe offshore location where the cable will be run onto shore. The vessels in the photo are not the cable ship.



Figure 2: The orange grapnel hook is used to conduct Pre-Lay Grapnel Run (PLGR) surveys. The hook is towed underneath the cable ship and is intended to clear the cable route of any debris.

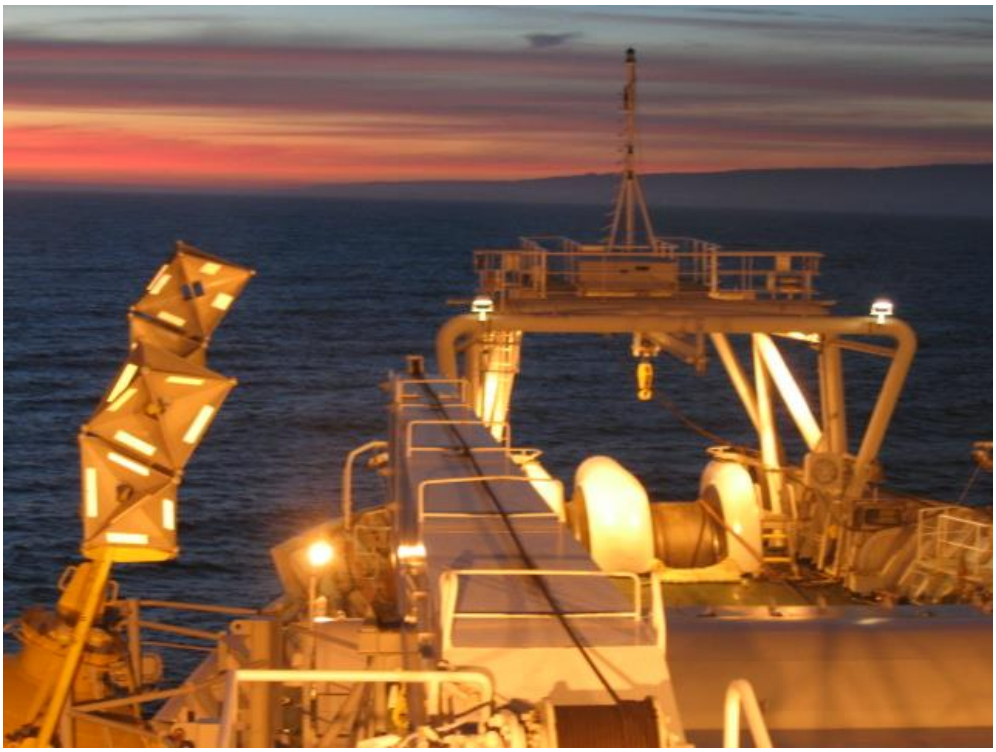


Figure 3: The bow of the Global Sentinel showing the grapnel towing equipment.



Figure 4: A Field Verification of the 500-meter Safety Zone was conducted from another vessel to verify the 160dB sound pressure levels associated with ship operations at various distances from the cable ship.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Monday March 12, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP	SEAS	WIND	RAIN/FOG/CLEAR	AVG VISIBILITY
Monterey Bay	65	3-6 foot swell	5-15 knots	Clear	20 miles +

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. The cable ship Global Sentinel completed the Pre-Lay Grapnel Run (PLGR) of the cable route in areas where the cable will be plow-buried, ending at the proposed Trawl Resistant Frame (TRF) location at the offshore cable terminus.

2. The Remotely Operated Vehicle (ROV) was deployed at the TRF site to install three location beacons and to conduct a survey of the proposed cable route 1 km from the TRF site (see Figures 1-3). The location beacons will be used for precise placement of the TRF.

3. Calibration of the location beacons took place after the ROV was recovered and is expected to be completed Tuesday morning.

4. A Spill Response Drill was conducted at 1:00 pm and all personnel were briefed on spill response protocol and containment material locations (see Figure 4). National Response Corporation (NRC) is the contractor responsible for major fuel spill containment and clean up for all project vessels. They have a fast response vessel available in Moss Landing in the event of a spill as well as additional containment materials onboard the cable ship.

5. Guard boats recovered debris unrelated to the project from the water surface, reported to be helium balloons.

6. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns.

UPCOMING ACTIVITES:

The ship will go back to the HDD pipe location near shore and begin cable installation operations on Wednesday morning scheduled at 8:00am.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors have expressed concern that with only one Marine Mammal Monitor on shift at any one time, there is not one location onboard the ship that offers a 360 degree view of the Safety Zone and that they have limited sight of the ship's stern, which is the location of the main propeller. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured.

3. The Cable ship's speed during grapnel operations has averaged below 1 knot.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is on board the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

California Sea lions and birds were commonly observed within the 500-foot Safety Zone. This table also includes data from the 12pm-12am shift Sunday which I could not include in yesterday's report. This table is intended to provide a summary of marine mammal observations, for more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN 500-FOOT SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**1**
Southern Sea Otter	**Enlu**	
OUTSIDE 500-FOOT SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Gray whale	**Esro**	**40-60**
Humpback whale	**Meno**	**16+**

Northern right whale dolphin	**Libo**	**100+**
Pacific white-sided dolphin	**Laob**	**100+**
Unidentified	**Unif**	**14 large whales**

*****Data collected during a 24 hour period on Sunday between 12am and 12am from B.Watts and T.Brookens (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by marine mammal monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was notified when whales were observed, other mammals (Sea lions and Sea otters) within the 500-foot Safety Zone were not reported to the Bridge because they were not in immediate danger, according to the Marine Mammal Monitors.

ACTIONS TAKEN:

None.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE 500-FOOT SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable.

PROJECT PHOTOS



Figure 1: The ROV was deployed to install temporary location beacons and to survey the proposed cable alignment near the TRF site.



Figure 2: One of the location beacons deployed during ROV operations. This took place at a depth of 899-meters.



Figure 3: The trench created from towing the grapnel was evident during the ROV survey of the proposed cable route near the TRF site.



Figure 4: A portion of the Spill Response containment materials kept onboard the cable ship, including oil booms and absorbent pads.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Tuesday March 13, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP	SEAS	WIND	RAIN/FOG/CLEAR	AVG VISIBILITY
Monterey Bay	60	3-6 foot swell	5-15 knots	Heavy Fog-Clear	0-20 miles +

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Several representatives from MBARI and the shore-end team came onboard to conduct a pre-shore end connection meeting. The shore end connection is scheduled for Wednesday morning and will be followed by the commencement of active plow-burial cable installation. A messenger line connected to the cable will be attached to the pull wire already inside of the bore pipe and a reel truck onshore will begin to pull the cable onshore. After this, the cable plow will be deployed and will begin to bury the cable away from shore. The vessel speed during plowing operations is expected to be approximately 0.5 knots.

2. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns.

3. The ship did not conduct any active operations for most of the day, and was in position about 5-miles offshore overnight. Because the ship uses global positioning technology to stay in place, thrusters are constantly moving, therefore, marine mammal observers are on watch.

UPCOMING ACTIVITES:

Once the ship makes the shore end connection, active plow burial of the cable will occur heading offshore. This is expected to take place 24 hours per day and is expected to take several days to complete. In areas where plow-burial is not feasible, because of rocks or steep slopes, the cable will be surface laid. Small sections leading to the TRF location and near the shore end pipe will be jet-buried using the ROV. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors have expressed concern that with only one Marine Mammal Monitor on shift at any one time, there is not one location onboard the ship that offers a 360 degree view of the Safety Zone and that they have limited sight of the ship's stern, which is the location of the main propeller. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

   The MBNMS / CSLC Environmental Monitor (EM) was notified by bridge crew that the marine mammal observer on shift was inside the bridge sleeping during part of her watch. The EM also noticed that fog had limited the visibility of the Safety Zone to less than 500-feet, and the monitor was not actively monitoring for marine mammals. The EM discussed these concerns with the MBARI representative onboard. This marine mammal monitor was previously scheduled to be switched out later in the day with another observer transferred from shore and is no longer monitoring for this project.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations begin, the Safety Zone will be expanded to 500-meters, until the second field verification of sound measurements are analyzed. If the verification shows that sound levels are below 160dB at 500-feet during the plowing operations, the Safety Zone will be reduced to 500-feet.

3. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is on board the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

California Sea lions and birds were commonly observed within the 500-foot Safety Zone. No whales were observed during this period, most likely due to the fact that the ship was in close to shore for most of the monitoring period. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN 500-FOOT SAFETY ZONE		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**3**
Southern Sea Otter	**Enlu**	
OUTSIDE 500-FOOT SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Gray whale	**Esro**	
Humpback whale	**Meno**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Unidentified	**Unif**	

*****Data collected during a 24 hour period on Sunday between 12am and 12am from B.Watts and T.Brookens (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

No (See note 1 in Compliance Section)

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was notified when whales were observed, other mammals (Sea lions and Sea otters) within the 500-foot Safety Zone were not reported to the Bridge because they were not in immediate danger, according to the Marine Mammal Monitors.

ACTIONS TAKEN:

None.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE 500-FOOT SAFETY ZONE?

Yes.

ACTIONS TAKEN:

See note 1 in Compliance Section

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable.

PROJECT PHOTOS



Figure 1: Foggy conditions precluded visibility of the entire 500-foot Safety Zone for part of the day on Tuesday.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: **Deirdre Hall (MBNMS), Eric Gillies (CSLC)**
From: **Jenny Slaughter, CSLC / MBNMS Environmental Monitor**
Date: **Wednesday March 14, 2007**
Subject: **MARS Daily Environmental Monitoring Log**

WEATHER INFORMATION

LOCATION	TEMP	SEAS	WIND	RAIN/FOG/CLEAR	AVG VISIBILITY
Monterey Bay	65	3-6 foot swell	5-15 knots	Fog-Clear	2-20 miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. The cable ship Global Sentinel mobilized to the shore end connection position (approximately 1-mile offshore of Moss Landing) in the morning. A messenger line connected to the MARS cable was transferred via small vessel to the divers stationed above the bore pipe offshore exit (see Figures 1 and 2). The divers connected the messenger line to the pull cable inside of the HDD pipe located in 20-meters of water. The steel pulling cable was placed inside of the HDD pipe during HDD installation last year. A winch or reel truck staged near the HDD entry site onshore was used to pull the steel cable/messenger line/MARS cable onshore.

2. After the MARS cable was pulled through the HDD pipe on to shore, the plow was launched to begin cable installation approximately 100-meters from the HDD pipe terminus at a depth of 20-meters (see Figures 3-5). Plow-burial of the MARS cable began at approximately 2:00pm. The vessel speed during plowing operations averaged less than 0.5 knots. At 5:45pm, a malfunction of the plow and plow winch was reported. The plow had to be recovered for repairs. Because of winch and plow hydraulic problems, recovery of the plow took approximately 10 hours. In addition to the winch and plow problems, a 1-inch steel cable was snagged by the plow, most likely another abandoned towing cable. Due to safety concerns, the steel cable was not able to be recovered, but had to be cut in order to recover the plow. Approximately 320-meters of cable was plow buried before the plow was recovered.

3. The support vessel Shayna Ray was conducting field verification of sound pressure levels during plowing operations, but had to be discontinued due to the recovery of the plow. Once the plow is re-launched, the sound pressure level tests will resume. The Safety Zone for marine mammals will continue to be 500-meters until results are analyzed. If the verification shows that sound levels are below 160dB at 500-feet during the plowing operations, the Safety Zone will be reduced to 500-feet.

4. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted.

UPCOMING ACTIVITES:

Plow burial of the MARS cable will continue once repairs are made to the plow, expected to be sometime Thursday afternoon. This is expected to take place 24 hours per day and is expected to take several days to complete. In areas where plow-burial is not feasible, because of rocks or steep slopes, the cable will be surface laid. Small sections leading to the TRF location and near the shore end pipe will be jet-buried using the ROV. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors have expressed concern that with only one Marine Mammal Monitor on shift at any one time, there is not one location onboard the ship that offers a 360 degree view of the Safety Zone and that they have limited sight of the ship's stern, which is the location of the main propeller. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations begin, the Safety Zone will be expanded to 500-meters, until the second field verification of sound measurements are analyzed. If the verification shows that sound levels are below 160dB at 500-feet during the plowing operations, the Safety Zone will be reduced to 500-feet.

3. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is on board the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

California Sea lions, sea otters, and birds were commonly observed within the 500-foot Safety Zone. No whales were observed during this period, most likely due to the fact that the ship was in close to shore for

most of the monitoring period. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**16**
Harbor Seal	**Povi**	**3**
Southern Sea Otter	**Enlu**	**14**
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**2**
Harbor Seal	**Povi**	**1**
Southern Sea Otter	**Enlu**	**3**
California Gray whale	**Esro**	
Humpback whale	**Meno**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Unidentified	**Unif**	

*****Data collected during a 24 hour period on Sunday between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was notified when whales were observed, other mammals (Sea lions and Sea otters) within the 500-foot Safety Zone were not reported to the Bridge because they were not in immediate danger, according to the Marine Mammal Monitors.

ACTIONS TAKEN:

None.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE 500-FOOT SAFETY ZONE?

No.

ACTIONS TAKEN:

None.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable.

PROJECT PHOTOS



Figure 1: The messenger line attached to the MARS cable was delivered to divers via the small vessel seen between the stern of the cable ship Global Sentinel and the dive operations ship, the White Holly.



Figure 2: The diving support vessel, the White Holly is stationed above the HDD pipe exit location in 20-meters of water.



Figure 3: Preparations for plow launch showing the threading or loading of the MARS cable into the plow. This plow was designed to bury cable up to 1.5-meters into the ocean floor.

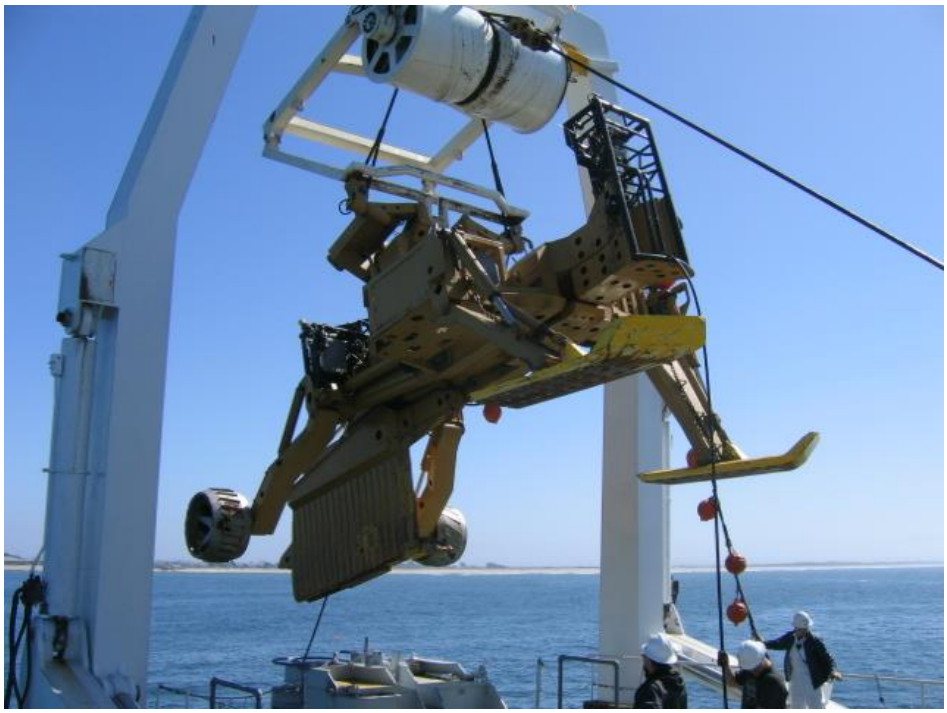


Figure 4: When the plow is loaded with the cable, a winch lowers the plow into the water. The plow is also connected to the ship via an umbilical, which enables the plow operators to control the movement of plow skids which help determine cable burial depth.



Figure 5: Plow launching takes place from the ship's stern. The tow cable (seen in pully at the top of the A-Frame) is used to pull the plow during cable burial. During plowing operations, the plow towed behind the ship at various distances depending on water depth.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Thursday March 15, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	70+	2-4 foot swell	0-5 knots	Early Fog, Clear for majority of the day	0-20+ miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday, March 10th. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. The cable plow was brought onboard at approximately 6:00am on Thursday after a 12-hour recovery. The hydraulic motor failure on the plow caused what is known as a "dead plow recovery", which takes longer to bring back to the surface than normal due to the inability to control the moving parts of the plow.

2. Plow repair took place throughout the day (see Figure 1). The ship maintained position close to the HDD pipe exit location because the cable is connected onshore. Approximately 320-meters of cable was plow buried before the plow was recovered.

3. Once the plow repairs were completed, re-launch took place at 10:45 pm (see Figure 2). The 320-meters of cable that was buried yesterday was recovered and the plow started over again from the original position. This was done as a precaution to ensure the consistent burial of the cable by the plow instead of returning back later to rebury with the ROV.

4. Electrical problems associated with the plow forced another plow recovery shortly after launch. The plow was recovered to fix the problem and was re-launched at 3:00am Friday morning.

5. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

6. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

UPCOMING ACTIVITES:

Plow burial of the MARS cable will continue from the HDD site offshore. This activity will take place 24 hours per day and is expected to take several days to complete. In areas where plow-burial is not feasible, because of rocks or steep slopes, the cable will be surface laid. Small sections leading to the TRF location and near the shore end pipe will be jet-buried using the ROV. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV. Once post-cable inspection is completed, the ship will travel to San Francisco to pick up the Trawl Resistant Frame (TRF), and return to Monterey Bay for TRF installation.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations begin, the Safety Zone will be expanded to 500-meters, until the second field verification of sound measurements are analyzed. If the verification shows that sound levels are below 160dB at 500-feet during the plowing operations, the Safety Zone will be reduced to 500-feet.

3. Cable ship speed during plow burial has averaged 0.2 knots, due to hard subsurface conditions.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

California Sea lions, sea otters, and birds were commonly observed within the Safety Zone. One whale were observed during this period, outside of the Safety Zone. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**41**
Harbor Seal	**Phvi**	**2**
Southern Sea Otter	**Enlu**	**11**
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**5**
Harbor Seal	**Povi**	**1**
Southern Sea Otter	**Enlu**	**3**
California Gray whale	**Esro**	**1**
Humpback whale	**Meno**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Unidentified	**Unif**	

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

Yes.

ACTIONS TAKEN:

The Marine Mammal Monitor scanned the visible portion of the Safety Zone.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PROJECT PHOTOS



Figure 1: Repairs to the hydraulic system on the plow took place for the majority of the day on Thursday. The hydraulic problem was internal and did not result in any fluid leaks or spills.



Figure 2: The plow was repaired and launched again at 10:45 pm Thursday night, but was recovered when an electrical problem was noted shortly thereafter. The plow was recovered a second time, electrical problem fixed, and was re-launched at 3:00am Friday morning.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Friday March 16, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	65	2-4 foot swell	0-5 knots	Clear in the am heavy fog pm	0-20+ miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday, March 10th. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. The cable plow was launched at 3:00am after electrical problems were fixed. Plow-burial continued during the day without incident (see Figures 1-3). Approximately 6-kilometers of cable installation was completed on Friday. Plow-burial is expected to continue over the next few days.

2. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

3. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

4. The MBARI vessel Point Lobos was conducting post-lay inspections of the buried cable behind the cable ship. The Point Lobos is also verifying that the cable was installed within the approved corridor.

5. Field verification of sound levels produced during plowing operations was completed (see Figure 4). Initial reports of the data collected show that noise generated during plowing are 160dB at a distance of 500-meters. This is most likely due to the increased propeller activity from the ship when towing the plow, especially when towing through compacted substrate. The marine mammal monitors will continue to utilize the 500-meter Safety Zone.

UPCOMING ACTIVITES:

Plow burial of the MARS cable will continue offshore. This activity will take place 24 hours per day and is expected to take several days to complete. In areas where plow-burial is not feasible, because of rocks or steep slopes, the cable will be surface laid. Small sections leading to the TRF location and near the shore end HDD pipe will be jet-buried using the ROV onboard the Global Sentinel. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV. Once post-cable inspection is completed, the ship will travel to San Francisco to pick up the Trawl Resistant Frame (TRF), and return to Monterey Bay for TRF installation.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations began, the Safety Zone was expanded to 500-meters. Initial results indicate that a 500-meter Safety Zone will be maintained.

3. Cable ship speed during plow burial has averaged between 0.2-0.8 knots, depending on subsurface conditions.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

California Sea lions, sea otters, and birds were commonly observed within the Safety Zone. No whales were observed during this period. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**6**

Harbor Seal	**Phvi**	
Southern Sea Otter	**Enlu**	**10**
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**50**
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	**10**
California Gray whale	**Esro**	
Humpback whale	**Meno**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Unidentified	**Unif**	

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

Yes, from 12:30pm on, foggy conditions persisted.

ACTIONS TAKEN:

The Marine Mammal Monitor scanned the visible portion of the Safety Zone, and made frequent observations from the stern near the location of the propeller.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PROJECT PHOTOS



Figure 1: During plowing, the tow line connected to the plow is visible from the stern of the ship.



Figure 2: The cable is fed to the plow through a series of controls which control the payout and tension of the cable.



Figure 3: The cable being slowly fed to the plow from the cable tanks, where the cable is stored.



Figure 4: The support vessel, Shana Rae conducting sound pressure level tests during plowing operations.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Saturday March 17, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	60	2-4 foot swell	0-6 knots	Fog-Clear	0-20+ miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday, March 10th. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Plow-burial of the cable continued. Approximately 14-kilometers of cable installation was completed on Saturday. Plow-burial is expected to continue over the next few days.

2. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

3. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

4. The MBARI vessel Point Lobos was conducting post-lay inspections of the buried cable behind the cable ship. The Point Lobos is also verifying that the cable was installed within the approved corridor.

UPCOMING ACTIVITES:

Plow burial of the MARS cable will continue offshore. This activity will take place 24 hours per day and is expected to take several days to complete. In areas where plow-burial is not feasible, because of rocks or steep slopes, the cable will be surface laid. Small sections leading to the TRF location and near the shore end HDD pipe will be jet-buried using the ROV onboard the Global Sentinel. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV. Once post-cable inspection is completed, the ship will travel to San Francisco to pick up the Trawl Resistant Frame (TRF), and return to Monterey Bay for TRF installation.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations began, the Safety Zone was expanded to 500-meters. Initial results indicate that a 500-meter Safety Zone will be maintained.

3. Cable ship speed during plow burial has averaged between 0.2-0.8 knots, depending on subsurface conditions.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

California Sea lions, sea otters, and birds were commonly observed within the Safety Zone. Three whales were observed during this period, one observed on the edge of the 500-meter Safety Zone. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**32**
Harbor Seal	**Phvi**	**1**
Southern Sea Otter	**Enlu**	**15**
California Gray whale	**Esro**	**1**
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	**4**
California Gray whale	**Esro**	**2**

Humpback whale	**Meno**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Unidentified	**Unif**	

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

Yes, there was heavy fog in the early morning.

ACTIONS TAKEN:

The Marine Mammal Monitor scanned the visible portion of the Safety Zone, and made frequent observations from the stern near the location of the propeller.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Sunday March 18, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	60	2-4 foot swell	0-25 knots	Fog-Clear	0-15 miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday, March 10th. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Plow-burial of the cable continued. Approximately 10.8-kilometers of cable installation was completed on Sunday. At 1:00pm, plowing was halted in order to complete a splice of the cable near the 33-kilometer point. This splice was necessary for the transition from single armored light to single armored cable. The cable splice is expected to take up to 24-hours. During this time, the ship will remain in place. The section of cable to be surface laid (approximately 6-kilometers) will be single armored, which offers more protection for the cable. Plow-burial will continue until the 36-kilometer mark, and then the cable will be surface laid. After the 6-kilometer surface laid section is completed, the plow will be re-deployed and bury another 8-kilometer section. Cable installation is expected to continue over the next few days.

2. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

3. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

UPCOMING ACTIVITES:

Plow burial of the MARS cable will continue offshore. This activity will take place 24 hours per day and is expected to take several days to complete. In areas where plow-burial is not feasible, because of rocks or steep slopes, the cable will be surface laid. Small sections leading to the TRF location and near the shore end HDD pipe will be jet-buried using the ROV onboard the Global Sentinel. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV. Once post-cable inspection is completed, the ship will

travel to San Francisco to pick up the Trawl Resistant Frame (TRF), and return to Monterey Bay for TRF installation.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations began, the Safety Zone was expanded to 500-meters. Initial results indicate that a 500-meter Safety Zone will be maintained.

3. Cable ship speed during plow burial has averaged between 0.2-0.8 knots, depending on subsurface conditions.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

Many whales were observed during this period, as the ship has been working farther offshore. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**1**
Harbor Seal	**Phvi**	
Southern Sea Otter	**Enlu**	
California Gray whale	**Esro**	**2**
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	

Southern Sea Otter	**Enlu**	
California Gray whale	**Esro**	**53**
Humpback whale	**Meno**	**4**
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Unidentified	**Unif**	**3 large whales**

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: **Deirdre Hall (MBNMS), Eric Gillies (CSLC)**
From: **Jenny Slaughter, CSLC / MBNMS Environmental Monitor**
Date: **Monday March 19, 2007**
Subject: **MARS Daily Environmental Monitoring Log**

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	60	2-4 foot swell	0-5 knots	High clouds	5-15 miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday, March 10th. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Splicing of the cable was completed and the plow-burial resumed at 9:00am (see Figure 1). Plow-burial continued for approximately 3-kilometers, which took approximately 8 hours due to slow plowing speed through hard substrate conditions. The plow was recovery took approximately one hour and when it surfaced, a wire cable was observed to be caught in the plow. This appeared to be another abandoned towing wire between one to two inches in diameter. The wire cable was cut and approximately 7-meters was recovered and stored on the ship (see Figure 2).

2. Surface lay installation of the cable began at 9:30pm. By midnight, 3.033-kilometers had been installed.

3. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

4. An increase of whale observations were noted in the area, as the ship moves farther offshore. Both California Grays and Humpbacks have been commonly observed. A group of California Gray whales displaying mating behavior and two pods of Risso's dolphins were observed on Monday. Conditions for whale observations were excellent for most of the day.

5. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

6. The MBARI vessel the Point Lobos continued to conduct a post-lay inspection of the cable to verify position of the installation within the approved corridor.

UPCOMING ACTIVITES:

Plow burial of the MARS cable will continue offshore. This activity will take place 24 hours per day and is expected to take several days to complete. In areas where plow-burial is not feasible, because of rocks or steep slopes, the cable will be surface laid. Small sections leading to the TRF location and near the shore end HDD pipe will be jet-buried using the ROV onboard the Global Sentinel. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV. Once post-cable inspection is completed, the ship will travel to San Francisco to pick up the Trawl Resistant Frame (TRF), and return to Monterey Bay for TRF installation.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations began, the Safety Zone was expanded to 500-meters. Initial results indicate that a 500-meter Safety Zone will be maintained.

3. Cable ship speed during plow burial has averaged between 0.2-0.8 knots, depending on subsurface conditions.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

Many whales were observed during this period, as the ship has been working farther offshore. During the mid morning hours, at least two California Gray whales were observed within the 500-meter Safety Zone near the stern of the ship. During plowing operations, an umbilical line controlling the movements of the plow extends 100 to 150-meters behind the ship on floats to avoid entanglement with the cable and towing wire. The marine mammal monitor has identified this umbilical line as an area of concern for whale entanglement, and is being carefully monitored. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**1**
Harbor Seal	**Phvi**	**1**
Southern Sea Otter	**Enlu**	
California Gray whale	**Esro**	**7**
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	
California Gray whale	**Esro**	**67**
Humpback whale	**Meno**	**9**
Rissos dolphin	**Grgr**	**50**
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Unidentified	**Unif**	**4 large whales**

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PHOTOS

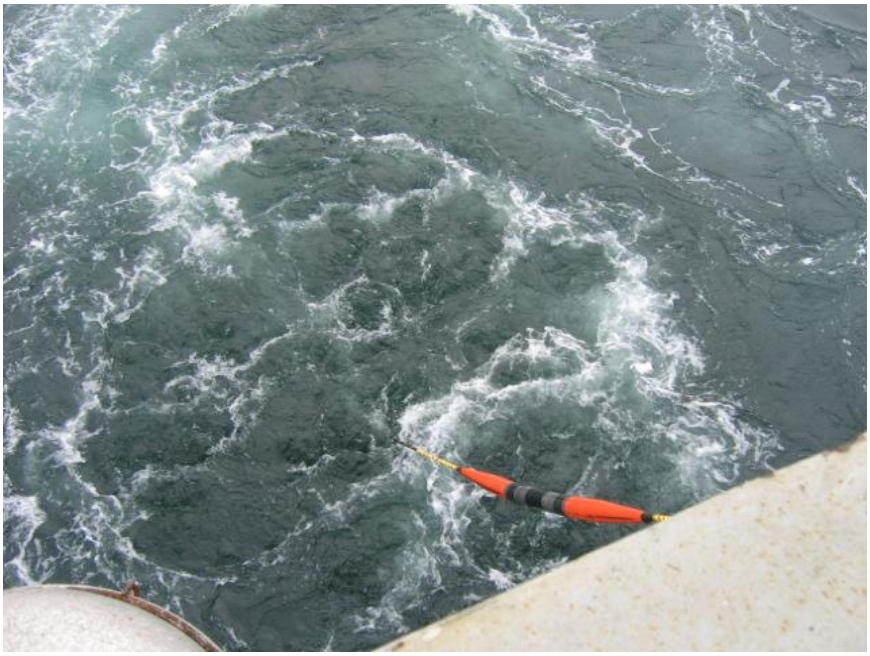


Figure 1: Two sections of the MARS cable were spliced together joining the single armored light and the single armored types of cable. This orange splice can take up to 24-hours to complete.

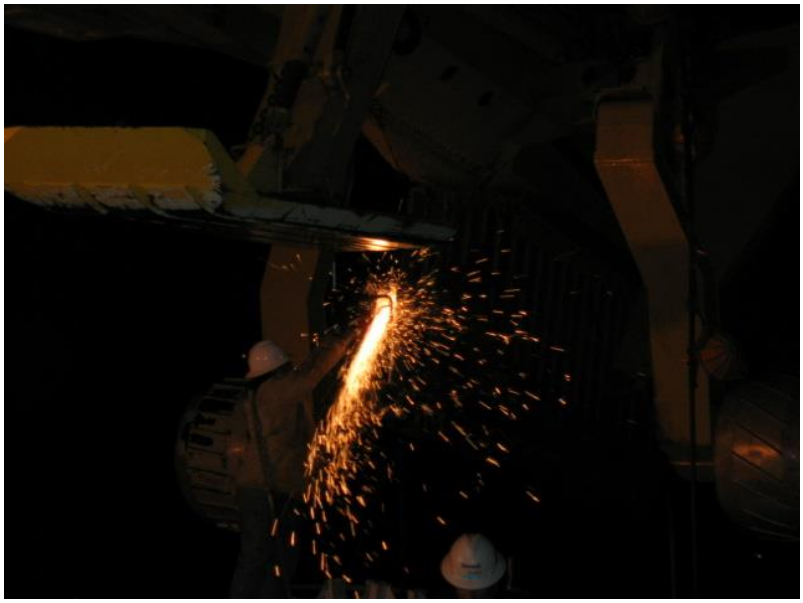


Figure 2: A section of abandoned tow wire was discovered to be caught in the plow and had to be cut away. A small section was recovered and stored onboard the ship.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Tuesday March 20, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	57	6-12 foot swell	10-30 knots	Am rain, high clouds	5-10 miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday, March 10th. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Surface lay installation of the cable continued and by at 6:00am, an additional 4.9-kilometers had been laid. This completed the surface laid section.

2. The plow was deployed at 7:00am to complete the remaining 8.2-kilometers. During the descent of the plow, an electrical problem was noted and the plow was brought back onboard for repairs. The plow was repaired and re-launched at 4:00pm (see Figure 1). Approximately 2.8-kilometers of cable was plow buried by midnight.

3. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

4. An increase of whale observations were noted in the area, as the ship moves farther offshore. Both California Grays and Humpbacks have been commonly observed. Small groups of Humpback whales were observed displaying feeding and lob-tailing behaviors (see Figure 2).

5. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

6. The MBARI vessel the Point Lobos continued to conduct a post-lay inspection of the cable to verify position of the installation within the approved corridor.

UPCOMING ACTIVITES:

Plow burial of the MARS cable will continue offshore. This activity will take place 24 hours per day and is expected to be completed on Wednesday. Small sections leading to the TRF location and near the

shore end HDD pipe will be jet-buried using the ROV onboard the Global Sentinel. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV. Once post-cable inspection is completed, the ship will travel to San Francisco to pick up the Trawl Resistant Frame (TRF), and return to Monterey Bay for TRF installation.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations began, the Safety Zone was expanded to 500-meters. Initial results indicate that a 500-meter Safety Zone will be maintained.

3. Cable ship speed during plow burial has averaged between 0.2-0.8 knots, depending on subsurface conditions.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

Many whales were observed during this period, as the ship has been working farther offshore. During the day on Tuesday, at least four Humpback whales were observed within the 500-meter Safety Zone passing in front of the ship while the ship was stationary. Two new animals were observed during this period, a Steller's sea lion and a fur seal. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**1**
Harbor Seal	**Phvi**	

Southern Sea Otter	**Enlu**	
Steller's Sea Lion	**Euja**	**1**
Pacific white-sided dolphin	**Laob**	**90**
Rissos dolphin	**Grgr**	**15**
California Gray whale	**Esro**	
Humpback whale	**Meno**	**4**
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	
Fur Seal		**1**
California Gray whale	**Esro**	**5**
Humpback whale	**Meno**	**21**
Rissos dolphin	**Grgr**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Common dolphin	**Dede**	**600**
Dall's porpoise	**Phda**	**5**
Unidentified	**Unid**	**5 large whales**

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PHOTOS

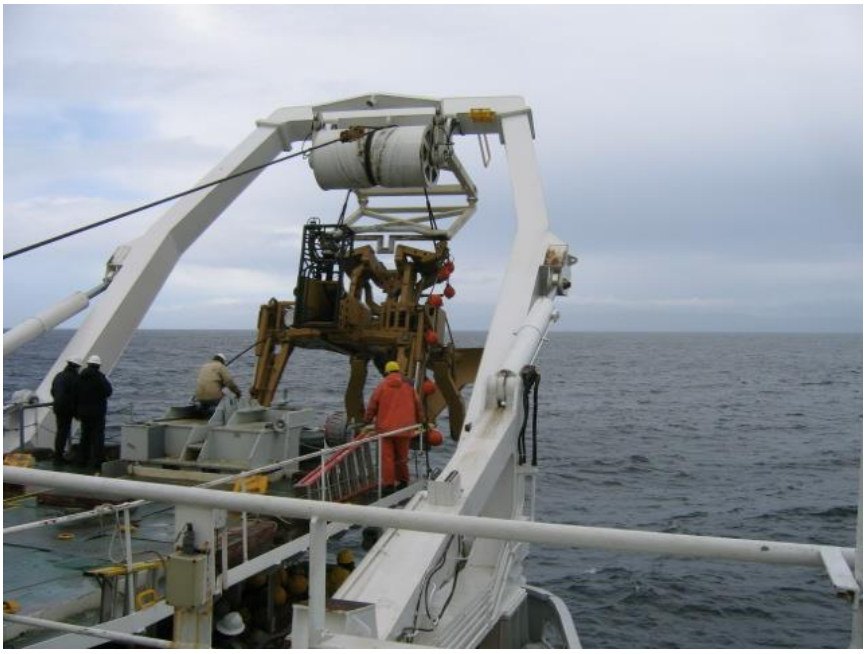


Figure 1: The plow was re-launched after the electrical problems encountered in the morning were repaired.



Figure 2: Many Humpback whales were observed during the day on Tuesday, some displaying tail-lobbing behavior.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Wednesday March 21, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	58	6-11 foot swell	10-25 knots	High clouds	10+ miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel arrived in Monterey Bay at approximately 0700 hours Saturday, March 10th. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Plow burial continued into Wednesday. The last 5.2-kilometers of cable was plow buried by 8:00am and the plow was recovered (see Figure 1). Plow recovery took almost four hours because the plow was at a depth of almost 900-meters and took place during high seas and winds. The front of the plow was damaged during recovery, most likely when the tow cable bridle surged into the plow frame and some equipment broke off. Efforts will be made to recover the lost parts, including a camera and sonar head that had been mounted onto the plow, during ROV inspection of the area. Once the plow was onboard, a ground rope was attached to the cable end, which will be used to recover the cable end when connecting to the Trawl Resistant Frame (TRF).

2. The ship traveled back to the HDD start near Moss Landing to conduct the post-lay inspection and jet-burial using the Remote Operated Vehicle (ROV) of the 180-meters of cable between the HDD end and the original plow start position (see Figure 2 and 3).

3. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

4. Fewer whales were observed during this time period, possible due to the windy conditions and higher sea state offshore. Near shore, sea lions were commonly observed within the 500-meter Safety Zone.

5. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

6. The MBARI vessel the Point Lobos continued to conduct a post-lay inspection of the cable to verify position of the installation within the approved corridor.

UPCOMING ACTIVITES:

Now that the cable installation is completed, post-lay inspections will continue in areas including Smooth Ridge and the section leading to the TRF location. During post-cable lay inspection using the ROV, if any areas are identified that require further burial, this will also be accomplished using jet-burial from the ROV. Once post-cable inspection is completed, the ship will travel to San Francisco to pick up the Trawl Resistant Frame (TRF), and return to Monterey Bay for TRF installation.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship, and that a 500-foot marine mammal Safety Zone would now be in effect, instead of 500-meters. The MBNMS / CSLC Environmental Monitor requested the data from this field verification and will forward it to Agency representatives. A separate field verification of sound levels is planned once plowing operations begin to ensure that the additional noise generated by the plow is measured. Once the initial plowing operations began, the Safety Zone was expanded to 500-meters. Initial results indicate that a 500-meter Safety Zone will be maintained.

3. Cable ship speed during plow burial and ROV survey has averaged between 0.2-0.8 knots, depending on subsurface conditions.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

Many whales were observed during this period, as the ship has been working farther offshore. During the day on Tuesday, at least four Humpback whales were observed within the 500-meter Safety Zone passing in front of the ship while the ship was stationary. Two new animals were observed during this period, a Steller's sea lion and a fur seal. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**5**
Harbor Seal	**Phvi**	
Southern Sea Otter	**Enlu**	
Steller's Sea Lion	**Euja**	
Pacific white-sided dolphin	**Laob**	
Rissos dolphin	**Grgr**	
California Gray whale	**Esro**	
Humpback whale	**Meno**	
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	**1**
Fur Seal		
California Gray whale	**Esro**	**6**
Humpback whale	**Meno**	
Rissos dolphin	**Grgr**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	
Common dolphin	**Dede**	
Dall's porpoise	**Phda**	
Unidentified	**Unid**	**3 large whales**

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PHOTOS



Figure 1: The plow was recovered in high seas and winds, in the morning. Some equipment, including a mounted video camera was lost during plow recovery.



Figure 2: The ship traveled back to the HDD end to commence post-lay inspection and jet-burial using the ROV.

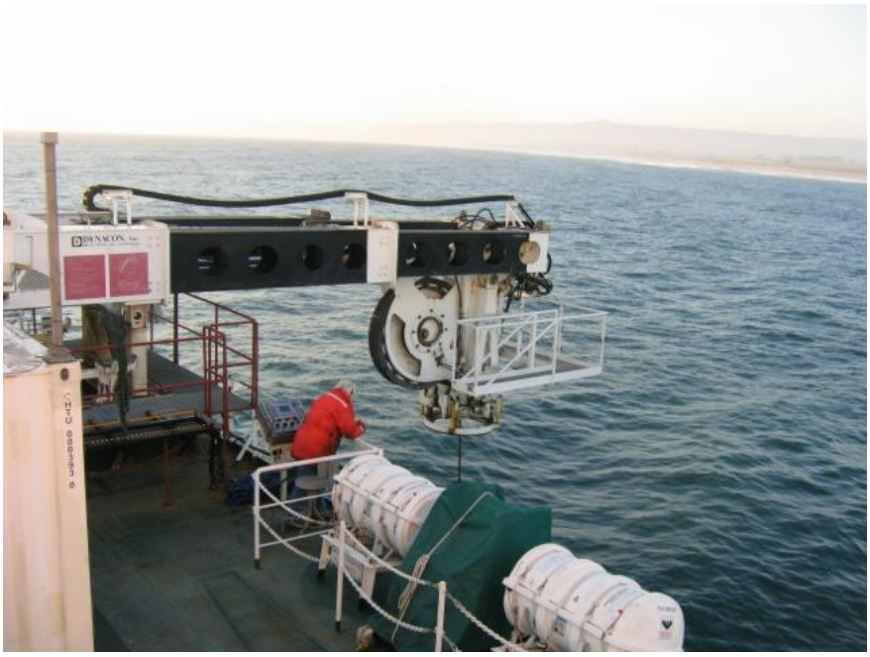


Figure 3: The ship used an ROV to conduct the post-lay inspection of the near shore end and to bury a 180-meter section of cable.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: **Deirdre Hall (MBNMS), Eric Gillies (CSLC)**
From: **Jenny Slaughter, CSLC / MBNMS Environmental Monitor**
Date: **Thursday March 29, 2007**
Subject: **MARS Daily Environmental Monitoring Log**

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	65	2 foot	0-5 knots	Clear	15+ miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel was in port in San Francisco between March 23rd and 28th. While in port, the crew conducted launching trials using a Trawl Resistant Frame (TRF) mock-up, and made preparations for placement of the TRF onboard the ship (see Figures 1 and 2). The ship arrived in Monterey Bay and resumed cable operations on Thursday morning. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. Once the ship arrived at the TRF site, the ROV was launched to locate the cable end and connect it with a messenger line from the ship (see Figure 3). The cable was brought onboard and tested. The cable end was prepared for splicing to the cable tail connected to the TRF. This splice continued through the night and is expected to be completed on Friday morning.

2. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

3. During work at the TRF site, the ship is stationary using global positioning to maintain position.

4. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

UPCOMING ACTIVITES:

Once the final splice has been tested using x-rays, the TRF will be launched and placed on the ocean floor. The ship will use it's ROV to conduct a post-lay inspection and will jet bury the cable section leading to the TRF. Total project completion is expected on April 2nd.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly

taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship while not plowing. The monitors will continue to utilize the 500-foot safety zone now that the plowing is completed.

3. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

Many whales were observed during this period, as the ship has been working near the TRF site, far offshore. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**3**
Harbor Seal	**Phvi**	
Southern Sea Otter	**Enlu**	
Steller's Sea Lion	**Euja**	
Pacific white-sided dolphin	**Laob**	**100**
Rissos dolphin	**Grgr**	
California Gray whale	**Esro**	
Humpback whale	**Meno**	
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	
Fur Seal		
California Gray whale	**Esro**	**5**
Humpback whale	**Meno**	**23**
Rissos dolphin	**Grgr**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	**900**
Common dolphin	**Dede**	
Dall's porpoise	**Phda**	
Unidentified	**Unid**	**50 dolphins**

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PHOTOS



Figure 1: While in port, a mock-op of the TRF was used for launching trials. This will take place off the bow of the ship.



Figure 2: The TRF was stabilized to the front of the bow using welded brackets to hold it in place during transit to Monterey.



Figure 3: The ship used an ROV to locate the cable terminus near the TRF site and connect with a messenger line for retrieval back to the ship for splicing.

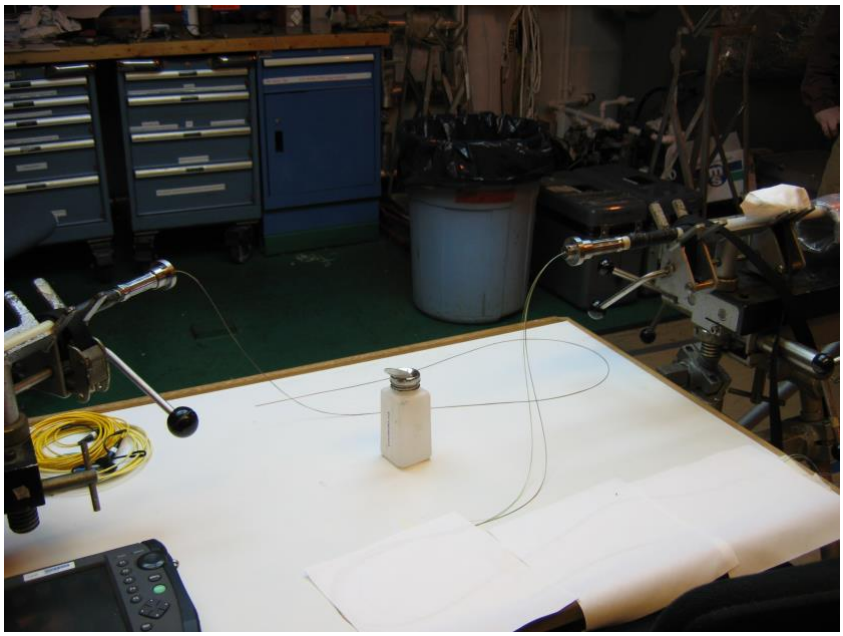


Figure 4: The splice between the cable end and the TRF cable tail takes up to 24-hours to complete.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Friday March 30, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	65	2-4 foot	0-13 knots	Fog-Clear	0-15 miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel was in port in San Francisco between March 23rd and 28th. While in port, the crew conducted launching trials using a Trawl Resistant Frame (TRF) mock-up, and made preparations for placement of the TRF onboard the ship. The ship arrived in Monterey Bay and resumed cable operations on Thursday morning. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. The final splice connecting the cable end to the TRF cable tail was completed Friday morning. After several tests were conducted, including X-ray and electrical tests, the splice was approved and the TRF deployment began (see Figure 1).

2. The TRF was deployed from the bow of the cable ship and took several hours to complete. A tugboat was standing by to assist with the removal of stabilizing ropes once the TRF was lowered into the water, but was unable to remove them (see Figure 2). Once the TRF was lowered onto the bottom, the ship's ROV was deployed to cut away the harness and remaining ropes (see Figure 3). The TRF location was within the approved corridor, however it was approximately 100-meters short of where Alcatel had expected.

3. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

4. During TRF deployment and ROV work, the ship's speed has averaged less than 0.2-knots.

5. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

UPCOMING ACTIVITES:

The ship will use it's ROV to conduct a post-lay inspection and will jet bury the cable section leading to the TRF. Total project completion is expected on April 2nd.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. According to Tyco, the entire route of the MARS cable, including the TRF has been placed inside of the approved 40-meter corridor. An accurate route position list of the cable will be provided to agencies by MBARI in their completion report.

3. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship while not plowing. The monitors will continue to utilize the 500-foot safety zone now that the plowing is completed.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

Many whales were observed during this period, as the ship has been working near the TRF site, far offshore. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**1**
Harbor Seal	**Phvi**	
Southern Sea Otter	**Enlu**	
Steller's Sea Lion	**Euja**	
Pacific white-sided dolphin	**Laob**	**7**
Rissos dolphin	**Grgr**	
California Gray whale	**Esro**	
Humpback whale	**Meno**	
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	

Fur Seal		
California Gray whale	**Esro**	
Humpback whale	**Meno**	**15**
Rissos dolphin	**Grgr**	
Northern right whale dolphin	**Libo**	**5**
Pacific white-sided dolphin	**Laob**	**800**
Common dolphin	**Dede**	
Dall's porpoise	**Phda**	
Unidentified	**Unid**	**1 large whale**

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

Yes.

ACTIONS TAKEN:

The monitors increased their scans of the safety zone during foggy conditions.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PHOTOS



Figure 1: Launching of the TRF from the bow of the cable ship. The TRF is orange in color and is visible off the bow.



Figure 2: A support vessel was on site to cut several stabilizing ropes connected to the TRF once it was lowered into the water, but could not reach the ropes. The ropes had to be cut by the cable ship crew, and the TRF was slowly lowered onto the bottom in 900-meters of water.

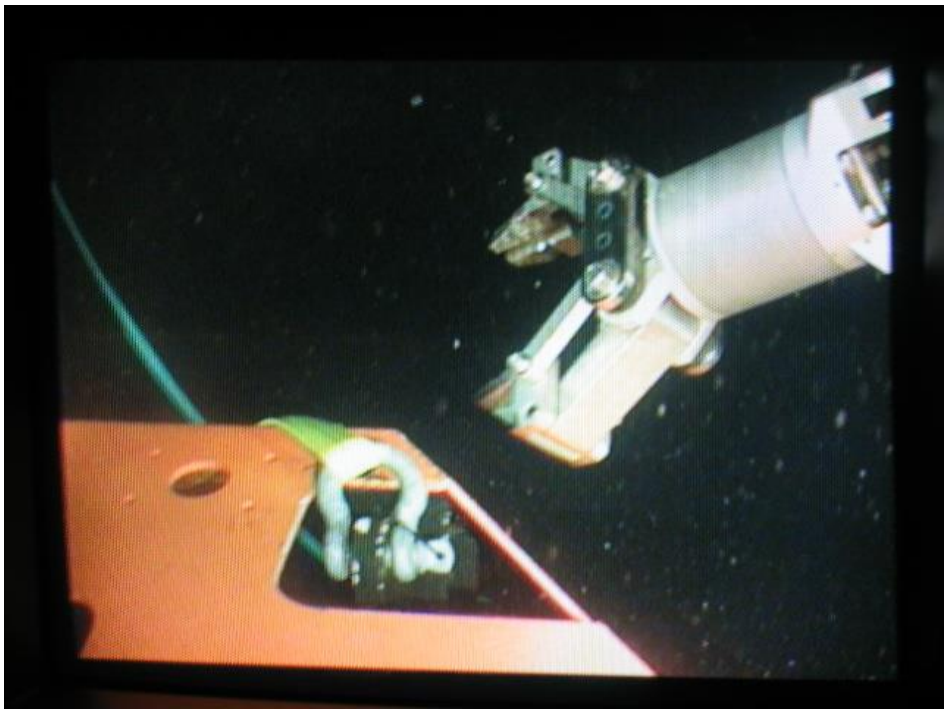


Figure 3: The ship used their ROV to locate the TRF and to cut the lowering harness away from the TRF at a depth of almost 900-meters.



Aspen Environmental Group

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI)
MONTEREY ACCELERATED RESEARCH CABLE (MARS) PROJECT

To: Deirdre Hall (MBNMS), Eric Gillies (CSLC)
From: Jenny Slaughter, CSLC / MBNMS Environmental Monitor
Date: Saturday March 31, 2007
Subject: MARS Daily Environmental Monitoring Log

WEATHER INFORMATION

LOCATION	TEMP (high)	SEAS	WIND	RAIN/FOG/CLEAR	VISIBILITY
Monterey Bay	57	5-7 foot	35 knot gusts	Overcast	7-10 miles

SUMMARY OF ACTIVITY:

The cable ship Global Sentinel was in port in San Francisco between March 23rd and 28th. While in port, the crew conducted launching trials using a Trawl Resistant Frame (TRF) mock-up, and made preparations for placement of the TRF onboard the ship. The ship arrived in Monterey Bay and resumed cable operations on Thursday morning. Construction activities are scheduled to occur 24 hours a day. MARS Project operations included the following activities:

1. The ship's ROV conducted an inspection of approximately 1.5-kilometers of cable leading to the TRF. After the cable inspection, the ROV began to jet bury this section of cable. Three passes of jet burial using the ROV will be completed in order to achieve maximum burial depth.

2. During the second pass of jet burial of the cable, weather conditions deteriorated and the ROV had to be recovered (see Figure 1). Wind gusts were recorded up to 35-knots and the crew had to wait until conditions improved in order to re-launch the ROV.

3. Daily operations meetings are conducted including representatives from MBARI, Alcatel (primary cable installation contractor), Tyco (cable ship operators), and the MBNMS / CSLC Environmental Monitor to discuss the day's schedule of activities and any operations or environmental concerns. No environmental concerns were noted by the EM.

4. During TRF deployment and ROV work, the ship's speed has averaged less than 0.2-knots.

5. Fishing vessels are rotating shifts as guard boats for the cable ship and are helping to clear the immediate area of other vessel traffic.

UPCOMING ACTIVITES:

The ship will continue the ROV work to jet bury the cable section leading to the TRF. Other ROV operations will include the recovery of the location beacons near the TRF site, locating and removing the damaged sonar and camera housing that fell off the plow during recovery, and cutting a section of wire rope found laying under the cable in the surface laid section. Total project completion is expected on April 2nd.

ENVIRONMENTAL COMPLIANCE:

1. Two Marine Mammal Monitors are onboard, each taking 12-hour shifts to monitor marine mammals that enter the Safety Zone. The Marine Mammal Monitor observations are mainly taking place from the Navigation Bridge Wings, which offers the best view of the Safety Zone. The Monitors are scanning the Safety Zone from both sides of the ship in order to maximize their viewing area. The Monitors carry radios in order to communicate with the Bridge when marine mammals are sighted within the Safety Zone. The Monitors have explained that dolphins, seals, sea-lions, and sea otters, are more likely to be able to avoid the moving parts of the ship (propeller and thrusters), and are primarily concerned with any large, slow moving whales. For night-time observations, night vision binoculars are used to scan the Safety Zone for marine mammals.

2. According to Tyco, the entire route of the MARS cable, including the TRF has been placed inside of the approved 40-meter corridor. An accurate route position list of the cable will be provided to agencies by MBARI in their completion report.

3. In an email from MBARI on Saturday, March 10, results from the field verification of the Safety Zone explained that sound pressure levels are below 160dB at 500-feet from the cable ship while not plowing. The monitors will continue to utilize the 500-foot safety zone now that the plowing is completed.

4. The contractor responsible for implementation of the project specific Hazardous Spill Contingency Plan, NRC is onboard the cable ship and has a fast response vessel available on stand-by in Moss Landing during MARS Project construction activities.

MARINE MAMMAL SIGHTINGS:

Many whales and dolphins were observed during this period, as the ship has been working near the TRF site, far offshore. Table 1 is a summary of marine mammal observations recorded by the marine mammal monitors. For more detailed information, please refer to the reports submitted by the marine mammal monitors.

TABLE 1- Marine Mammal Observations

WITHIN SAFETY ZONE *(500-foor Safety Zone was increased to 500-meters during plowing)		
COMMON NAME	**SPECIES (genus/species code)**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	**1**
Harbor Seal	**Phvi**	
Southern Sea Otter	**Enlu**	
Steller's Sea Lion	**Euja**	
Pacific white-sided dolphin	**Laob**	
Rissos dolphin	**Grgr**	
California Gray whale	**Esro**	
Humpback whale	**Meno**	
OUTSIDE SAFETY ZONE		
COMMON NAME	**SPECIES**	**NUMBER of ANIMALS**
California Sea Lion	**Zaca**	
Harbor Seal	**Povi**	
Southern Sea Otter	**Enlu**	

Fur Seal		
California Gray whale	**Esro**	
Humpback whale	**Meno**	**5**
Rissos dolphin	**Grgr**	
Northern right whale dolphin	**Libo**	
Pacific white-sided dolphin	**Laob**	**1000**
Common dolphin	**Dede**	
Dall's porpoise	**Phda**	
Unidentified	**Unid**	**4 whales**

*****Data collected during a 24 hour period between 12am and 12am from B.Watts and S. Hanson (Marine Mammal Monitors)

WERE MARINE MAMMAL OBSERVATIONS CONDUCTED DURING ALL INSTALLATION ACTIVITIES?

Yes, with the exception of short meal breaks taken by monitors.

WAS THE VESSEL PILOT IMMEDIATELY ADVISED OF ALL MARINE MAMMALS POTENTIALLY THREATENED BY PROJECT OPERATIONS?

The Captain's Bridge was advised when marine mammals were observed within the Safety Zone.

ACTIONS TAKEN:

The Monitors did not observe any marine mammals in immediate danger from cable installation operations, and no avoidance tactics were recommended.

DID ENVIRONMENTAL CONDITIONS (E.G. HIGH SEAS, FOG) PRECLUDE MONITORS FROM SEEING ENTIRE SAFETY ZONE?

No.

ACTIONS TAKEN:

Not Applicable.

DID THE CABLE INSTALLATION ACTIVITIES RESULT IN ANY ENTANGLEMENTS OR COLLISIONS WITH MARINE MAMMALS?

No.

ACTIONS TAKEN:

Not Applicable

PHOTOS

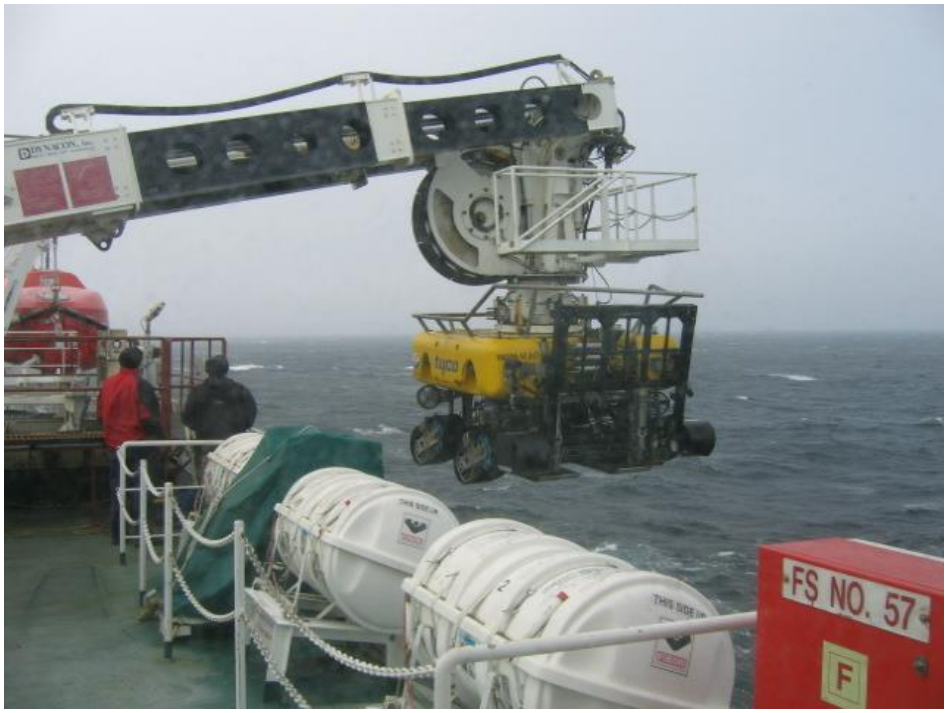


Figure 1: The ROV had to be recovered when wind speeds reached over 35-knots.

MBARI cable laying cruise for MARS cable

Date: 3/10/07
Recorder: T. Brookens
Position on vessel: Starboard bridge wing

Beginning time: 8:19
End time: 12:01
Weather: Clear, sunny, minimal swell

*started pulling grapple @ 1000

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
8:24	ENLH	36.80441	121.81812	220	4(R)	N/A	idling	-not traveling, foraging
8:27	ENLH	36.80508	121.81602	185	2(R)	N/A	idling	-not traveling, foraging
8:39	ENLH	36.80726	121.80968	53	3(R)	N/A	slowly to shore	-not traveling, foraging
8:42	ENLH	36.80727	121.80748	105	100(m)	N/A	slowly to shore	-diving
8:43	ENLH	36.80804	121.80694	65	2(R)	N/A	slowly to shore	-diving
8:58	ENLH	36.80954	121.80227	80	140(m)	N/A	* slowly to shore	-diving
9:16	ENLH	36.81065	121.80179	200	2(R)	N/A	turning →	towing grabbling equipment - foraging
9:53	ZACA	36.81168	121.80215	230	5(m)	SW	turning	- diving * same subadult
10:04	ZACA	36.81197	121.80278	205	40(m)	W	holding position	- diving * same
10:10	ENLH	36.81220	121.80303	55	4(R)	N/A	holding position	- foraging * same
10:20	ZACA	36.81255	121.80349	260	100(m)	milling	holding position	- diving in bait ball C * same
10:23	ENLH	36.81263	121.80366	210	20(m)	N/A	pulling grapple	- foraging
10:27	ZACA	36.81290	121.80392	265	1.5(R)	milling	pulling grapple	- diving * same
10:30	ENLH	36.81311	121.80416	50	2(R)	N/A	pulling grapple	- foraging * same
10:46	ENLH	36.81417	121.80539	360	159(m)	N/A	grapple	- foraging * same
11:24	ZACA	36.81433	121.80545	95	100(m)	W	grapple	- diving * adult mate
11:55	2 ESEO	36.81623	121.80822	240	750(m)	N.NE	grapple	- traveling - 2 adults

601 - 2149 c
724 - 5135 h
ret. conv.

MBARI cable laying cruise for MARS cable

Date: 10 Mar 07 **Beginning time:** 1200
Recorder: B. Watts **End time:** 2359
Position on vessel: port/stbd bridge wings (alternating) ~30min. **Weather:** partly cloudy, bft 1-2, ~1m swell

PORT/STARBOARD

Time	Species	Latitude	Longitude	Bearing (ship's gyro compass) T=true	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes (Same letter = same animal (A, B, etc))
P 1200	Esro	36.81667	121.80872	320T	700m	20T	pulling Grapple	2 E.r. slow travel
P 1225	EnLv	36.81866	121.81106	230T	~350m	—	PLGR	resting, Bft 3
S 1250	EnLv	36.82145	121.81337	305T	400m	—	"	resting, asleep
P 1304	EnLv	36.82247	121.81557	300T	125m	—	"	resting, awake
P 1320	EnLv	36.82445	121.81793	345T	300m	—	"	(A) " " in kelp
I 1322	Zaca	"	"	-	40m	—	"	from J. Slaughter, "fyi"
S 1331	EnLv	36.82594	121.81928	20T	220m	—	"	(A) resting, awake in kelp, BFT
S 1418	EnLv	.83145	.82603	342T	80m	—	"	resting, asleep
S 1456	EnLv	.83695	.83208	35T	400m	—	"	diving — foraging
S 1456	EnLv	"	"	0T	400m	—	"	(B) " " w/2 gulls associated
P 1502	EnLv	.83754	.83312	175T	200m	—	"	diving — foraging
P 1510	EnLv	.83848	.83421	300T	50m	—	"	(B) " " , swam W. ~300m
P 1525	EnLv	36° 50.401 N	121° 50.151 W	305T	200m	—	"	"
S 1549	ZACA	.84345	.83973	190T	300m	130T	"	juv/?
P 1604	EnLv	.84531	.84230	220T	400m	—	"	resting, asleep
P 1610	EnLv	.84633	.84346	280T	100m	30T	"	surface swim, slow
P 1615	EnLv	.84691	.84420	320T	450m	—	"	resting awake — short interaction
S 1634	EnLv	.84912	.84804	20T	300m	—	"	resting
S 1639	Zaca	.84959	.84896	120T	25m	random	"	juv., investigating ship,
S 1734	EnLv	.85540	.86072	0T	200m	—	↓	first seen on FB by J. Slaughter,
↓								seen again @ 200m, 30T, 1644
↓							"	resting, asleep

No Mammals seen after dark

BIRDS highly visible.

wind 13 kts

Bft 2 @1445

MBARI cable laying cruise for MARS cable

Date: 3/11/07
Recorder: T. Brookens
Position on vessel: bridge wing - starboard & port

Beginning time: 12:00 am
End time: 12:29 pm
Weather: clear, 3 knot winds

* changed clocks 1 hour forward @ 2:00 am
- stationed both port & starboard every 15 minutes until 7:15 then every 30 min switch between port & starboard from 7:30

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
3:30 -	3:45						grapple	hooks pulled @ 10KM mark. they were clean, so they were placed back down & grappling commenced again
8:23	2 ESRO	36.88335	122.09757	135	2000 m	N. NE	grappling	- mammals easily distinguished by eye
10:13	2 ACA	36.87603	122.06667	94	10 m	milling	pulling grapple	traveling & then milling for 30 min
								submitted 2 ACA
10:29							pulling	grapple onto boat to disentangle old cable - will hold position until cable is disentangled from grapple hooks & line cleared

Heezen '57

MBARI cable laying cruise for MARS cable

Date: 11 Mar. 07
Recorder: B. Watts
Position on vessel: Bridge Wings, Attending eq. 30 min daylight

Beginning time: 1226
End time: 0025, 12 Mar 07
Weather: partly cloudy, calm, bft 1, swell ~ 1/2m

My location Port/Starboard

Time	Species	Latitude	Longitude	Bearing (°T)	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
1233	Mono	36.87670	122.06587	140	200m	300	idle — cable retrieval	Fluked; sub-adult. Moved West. (A)
1315	"	.87678	.06602	270	800m	—	prep. grapple	Logging! (A)
1400	Zaca	.87785	.06418	340	5m	80	"	porpoising, investigating ship, juv.
1415	Esro	.87774	.06404	200	500m	280	deploy grapple	traveling single
1528	Esro	.87461	.07088	190	1500m	310	PLGR	2 traveling together (B)
1605	"	.87045	.08002	272+274	1500m	310	PLGR	separated now (B)
1635	Esro	.86735	.08730	275	3000m	?(N)	PLGR	3 whales (2+1)
1712	Esro	.86273	.09709	215	3000m	N	"	pair
"	"	"	"	225	"	N	"	single
"	"	"	"	215	4000m	N	"	pair
1903	Esro	36.85576	122.11276	242	4 km	N	"	pair
"				250	"	N	"	single
"				225	3000m	N	"	pair
"				222	4500m	N	"	pair
"				210	4000m	N	"	single
"				208	5000m	N	"	single
"				283	3000m	N	"	2+1
1834	Esro	.85429	.11549	180	600m	N	"	(C) single
1843	"	.85448	.11491	205	500m	320	retrieving	(C)
"	"			212	800m	320	grapple	single
"	"			218	3500	N	"	single
	No Mammals seen after Sunset							

Bft 4 @ 1430
Bft 3 @ 1630
Bft 4 @ 1800

wind
20 kts @ 2030
12 kts @ 2200
10 kts @ 1100

MBARI cable laying cruise for MARS cable

Date: 3/12/07 **Beginning time:** 12:27am (00:27)
Recorder: J. Brookens **End time:** 12:29pm (12:29)
Position on vessel: bridge wing - alternate **Weather:** clear, minimal swell, blowing @ 14 kts @ 6am (0600)
surveys @ both port & starboard every 15 min until 7:15, then change port to starboard every 30 min

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
7:45	2 ESRO	36.74287	122.18496	290	500(m)	N	grappling	- 2 whales traveling N
7:46	1 ESRO	36.74232	122.18469	315	1000(m)	N.NE	grappling	- traveling
7:50	2 ESRO	36.74195	122.18456	120	1500(m)	N	grappling	- traveling
8:24	2 ESRO	36.73656	122.18517	215	1000(m)	N	grappling	- traveling
8:29	10 ESRO	36.73624	122.18548	215	2000(m)	N	grappling	- traveling - at least one calf
8:32	1 ESRO	36.73594	122.18569	180	2000(m)	N	grappling	- traveling
8:34	2 ESRO	36.73562	122.18602	50	2500(m)	N.NE	grappling	- traveling
9:17	1 ESRO	36.72374	122.18645	290	2000(m)	N	grappling	- traveling
9:30	2 ESRO	36.71964	122.18653	315	2500(m)	N.NE	grappling	- traveling
9:34	1 ESRO	36.71796	122.18652	5	2500(m)	N	grappling	- traveling
9:42	2 ESRO	36.71355	122.18668	315	2500(m)	N.NE	grappling	- traveling - regrappling grapple
10:53	2 ESRO	36.70264	122.18731	360	3500(m)	N.NE	grappling	- traveling (6.5E)
11:02	2 ESRO	36.70380	122.18756	355	3000(m)	N.NE	grappling	- traveling
11:13	2 ESRO	36.70432	122.18734	340	3000(m)	N.NW	pulling grapple	- traveling
11:28	2 ESRO	36.70485	122.18704	320	2500(m)	N.NE	pulling cable	- traveling
11:30	100's LABO	36.70433	122.18705	300	2000(m)	N.NW	pulling grapple	- feeding on bait ball 600+
11:30	100's LABO	36.70433	122.18785	300	2000(m)	N.NW	pulling grapple	- feeding " " 400+
11:30	3 MFWD	36.70433	122.18785	300	2000(m)	N.NW	pulling grapple	- feeding adults " "
12:03	100's LABO	36.70613	122.18786	190	1500(m)	N.NW	"	turned boat 180° - traveling to bait ball 400+
12:08	2 ACA	36.70943	122.18805	180	1000(m)	N	"	milling about
12:03	100's LABO	36.70613	122.18788	190	1500(m)	N.NW	grapple	on deck traveling to bait ball 200+

~14 mi to AZ
= ~26 km to HZ

MBARI cable laying cruise for MARS cable

Date: 12 Mar 07
Recorder: B. Watts
Position on vessel: bridge wings alt. 30 mins

Beginning time: 1230
End time: 2359
Weather: partly cloudy, BFt 3-4, 1m swell

Position	Time	Species	Latitude	Longitude	Bearing (°T)	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
S	1237	Meno	36.71092	122.18812	242	800m	350	prep. ROV	single w/ handful of unid. dolphins - Lags?
	"	"	"	"	337	2500m	—	"	3 feeding w/ numerous dolphins
	1250	"	.71097	.18807	215	3500m	~N	launch ROV	2 pairs separated by 20 m
P	1308	unid. lg. whale	.71099	.18784	100	6000m	~N	ROV	2
	1322	unid. lg. whale	.71100	.18786	88	6km	~N	"	1 unknown —
S	1348	Meno	.71069	.18743	330	1200m	110	"	single
	"	"	"	"	342	2500m	NE	"	3, socializing, slow travel
P	1410	UNID	.71065	.18717	145	7km	?	"	4 to 6
S	1438	UNID	.71107	.18661	318	6-7km	W?	"	2
P	1611	UNID	.71632	.18681	35	3km	~N	"	2
	"	"	"	"	33	4km	~N	"	single
S	1657	UNID	.72327	.18701	340	7 km	?	"	some splashing, 2 blows
P	1727	Meno	.72340	.18637	52	800m	N	"	lobtailing, 2 whales
S	1823	UNID	.72359	.18771	~310	7-12km	—	pulled up ROV	lobtailing; ≥4 whales
	"	UNID	"	"	328	5km	—	"	lobtailing; ≥1 whale
S	1859	Meno	.72353	.18323	340	2500m	—	calibrating sonobuoys	lobtailing
	1730	24 kts wind. Numerous lobtailers very distant @ 325°T. Prob. Meno.							

BFt 4-5 @1346

BFt 5 @1501

20 kts @1830

14 kts @2350

No mammals after dark

MBARI cable laying cruise for MARS cable

Date: 3/13/07
Recorder: T. Brooks
Position on vessel: bridge wing - alternate port & starboard every 15 min until 5:30, no surveys from 5:30 to 8:05 due to fog, surveys from 8:30 on from starboard bridge wing due to fog until 9:15, then alternating starboard & port every 30 min

Beginning time: 12:00 am (0:00)
End time: 12:01 pm (12:01)
Weather: clear, 18 knot winds, Beaufort 4

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
3:55								fog has set in & visibility is minimal w/ night vision
							performing	transponder positioning of beacons - no equipment in water other than pole
5:30								visibility almost 0
10:49							pulled	retrieved single & began traveling to shore, visibility less than 50m
8:05							transiting	@ 5 knots to Moss Landing 13 knot winds, fog burning off above but still thick @ water level, visibility about 75m
9:12							transiting	fog burning off, visibility
11:52	ZALA	36.79881	121.84371	75	5M	milling	stationary	@ least 150m

MBARI cable laying cruise for MARS cable

Date: 3-14-07
Recorder: S Hansen
Position on vessel: Bridge wings

Beginning time: 2400
End time: 1200
Weather: BFT 0 Wind Sp. 2kt Swell 2-4ft

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
0000		36°50.7	121053.3				Stationary	Fog, Vis 20m
0530								" "
0600							Transit	Moving to dive boat location
0700								Fog, Vis 100m, BFT1, Wind 5Kt
0722	ZaCa	36°81.217	121°80.608	25°	50 m	Milling	Transit	
0730	PoVi	36°81.236	121°80.621	45°	40 m		Stationary	Large fish ball
0804	ZaCa	36°81.082	121°80.051	170°	50m	Milling	Stationary	(Attaching messenger to cable on dive boat)
0807	Enlv	36°81.077	121°80055	210	75m	NW	~~Foraging~~	Foraging
0833	Enlv	36°81.086	121°80040	340	100m	W	"	Traveling
0833	Enlv	36°81.086	121°80.040	10	100m	Resting		Resting Vis 100m
0858	Zaca	36°81.101	121°80.045	50	50m	SE		Traveling
0907	Enlv	36°81.091	121°80.049	215	300m	Resting		Vis 100-300m variable
0930	Zaca	36°81.081	121°80.049	290	250m	Milling		6/10/8 Foraging, Birds
0945								Fog, Vis .5NM, BFT1, Wind 5 Kts
0950	Enlv	36°81.100	121°80.048	340	100m	S SE		Traveling
0953	Zaca	36°81.100	121°80.048	90	150m	NW		Traveling
1000	PoVi	36°81.103	121°80.044	115	20m			Pulling cable from CSGS to beach
1008	Enlv	36°81.077	121°80.048	225	140m	NW		Off stern of CSGS
—	—	—	—	—	—	—		Traveling
1015	PoVi	36°81.070	121°80.055	215	150m	SE		Traveling
1029	Zaca	36°81.079	121°80.059	230	100m	Milling		
1038	Zaca	36°81.091	121°80.040	330	120m	Milling		
1048	Zaca	36°81.091	121°80.033	95	100m	Resting		2 Zaca 100m off stern
1115	Zaca	36°81.078	121°80.053	120	15m	Milling		2 Zaca 15m off stern
1127	Enlv	36°81.075	121°80.050	300	106m	W		Traveling
1140	Zaca	36°81.091	121°80.039	30	75m	SE		3 Zaca Traveling
1147	Zaca	3681.099	121°80.038	310	50m	S		Traveling, Off bow

MBARI cable laying cruise for MARS cable

Date: 13 Mar 07
Recorder: B. Watts
Position on vessel: bridge wings

Beginning time: 1200
End time: 2359
Weather: mostly sunny, Bft 4, 1m swell increasing mid-day to 1.5m

Position	Time	Species	Latitude	Longitude	Bearing °T	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
P	1250	Zaca	36.79857	121.84543	80	4	240	idle	swam alongside, looking at ship, 4 Bft 2
	1330	—	.79848	.84540	-	-	-	"	fog bank 2.00m to West, wind 12 kts
	1337								visibility down to 50m, variable — FOG
	1350								15 kts, West, Bft 4, fog
	1433								17 kts, NW Bft 5, fog
	~1455								clearing
	1552								Fog, vis. down to 50m variable
	1700								20 kts, NW, fog off W to E
	1730								12 kts
	1810								Bft 3, sunny to NW, fog far off other direction
	1830								Bft 2
	1915								Wind from SE, & FOG at 12 kts
	2230								6 kts, FOG
P	2258	ZACA	36° 50.734	121° 53.257	190	10m	3	idle	splashing around alot, very difficult to see, swam with head out, barely saw shape.
		1	Marine Mammal	seen after	sunset.				
			FOG all night;	visibility	≤50m				

MBARI cable laying cruise for MARS cable

Date: 14 March 07 B. Watts
Recorder:
Position on vessel: Bridge Wings

Beginning time: 1200
End time: 0000
Weather: FOG, calm, swell ~1m

Position	Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
P	1217	ENLU	36.81074	121.80052	355	80m	280	shore cable	floating on back; hidden by crane
S	1246	PHVI	.81096	.80039	18	900m	SE	"	
	"	ENLU	"	"	343	800m	—	"	sleeping (A)
	"	ENLU	"	"	312	400m	—	"	(B) " in extensive surf scoter flock
	1253	ZACA	"	"	110	15m		"	jumping in + out of water outflow off starboard side (cooling H_2O)
	1258	ENLU	"	"	85	150m	0	"	eating + moving E, away
P	1315		"	"				"	sun peeking out, FOG receeding
P	1316	ZACA	"	"	125	600m	30	"	handful
P	"	ZACA	.81080	.80054	183	1500m	—	"	several hundred, resting
S	1333	ENLU	.81097	.80045	336	60m	—	"	sleeping, probably (A), drifted SW
P	@1400,	safety	zone = 500 km						
P	1422	ZACA	.81082	.80072	114	60m	E	deploy plow	jumping around buoy near dive boat. Wind 10 kts, NW
S	1436	ENLU	.81080	.80070	352	40m	—	"	diving; possibly (B); foraging
S	1440	ZACA	.81130	.80122	110	1m	NW/SE	"	jumping around stbd outflow + stern
S	1455	ENLU	.81154	.80202	292	700m	—	"	on back
P	1510	ENLU	.81150	.80290	289	30	118	plowing	surface swim. Changed course to ~160 for 30 or 40m around fort side. BF 4
P	1519	ENLU	.81184	.80359	260	180m	90	"	grooming + surface swim
S	1559	ENLU	.81319	.80484	48	1200m	~	"	resting @1740, BF 3
	~1800	problem w/plow, retreiving							
P	1850	ZACA	.81487	.80668	180	110	135	retrieval	jumping alongside ship
S	1917	ZACA	.81504	.80645	85	350	N	"	3 or 4
	1950	Hydraulic problems — can't retreive plow right now. Wind 3 kts.							
P	2150	ZACA	36°48.6'	121°33.9'	220	10	160	idle	jumping

MBARI cable laying cruise for MARS cable

Date: 3-15-07
Recorder: S Hansen
Position on vessel: Bridge Wings

Beginning time: 0000
End time: 1200
Weather: Clear w Haze

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
								Haze BFt 2, Swell 2-5, Wind 8Kts @ 80°
0048	Zaca	36°81.619	121°80.801	10	15m	Milling	Stationary	Fog Vis 150m
0200								Fog Vis 0
0245								No Fog light haze
0330								Testing tow winch, Plow still dead
0446	Zaca	36°81.346	121°80.488	30	10m	Milling		Recovering Plow
0500	Zaca 2	36°81.346	121°80.488	180	15m	Milling		2 Zaca
0535	Zaca 2	36°81.346	121°80.488	50	20m	Milling		2 Zaca Unknown cable wrapped around plow
0601	Zaca	36°81.404	121°80 547	200	50m	SE		Traveling Birds gathering at stern
0630								Plow on deck, Hydraulic line failure
0653	Phvi	36°81.419	121°80.550	40	150m	NW		Traveling
0742	Zaca	36°81.419	121°80.550	330	20m	Milling		20m off bow
0747	Zaca	36°81.419	121°80.550	30	60m	Milling		
0800								Clear No Haze, BFt 2, Swell 2-5ft, Wind 6Kts @ 90°
0833	Zaca 7	36°81.396	121°80.515	60	60m	Milling		2 Zaca + 5 Zaca
0845	Phvi	36°81.374	121°80.537	240	40m	S		Juv.
0940	Enlv	36°81.345	121°80.449	115	50m	Resting		
0948	Enlv	36°81.345	121°80.449	90	50m	N		Traveling BFt 1, Wind 0-2 Kts
1013	Enlv	36°81.345	121°80.449	240	50m	Foraging		BFt 0, Swell 2-3 ft
1031	Zaca	36°81.345	121°80.449	25	75m	Milling		
1042	Enlv	36°81.345	121°80.449	60	150m	NW		Traveling
1052	Zaca 2	36°81.345	121°80.449	50	75m	NW		Traveling BFt 1
1058	Zaca 3	36°81.345	121°80.449	320	10m	Milling		10m off bow
1101	Enlv	36°81.345	121°80.449	245	60m	Foraging		
1115	Zaca 2	36°81.345	121°80.449	250	120m	SE		Traveling BFt 2, Wind 7kts @ 290°
1124	Zaca 4	36°81.345	121°80.449	160	100m	Milling		
1138	Enlv	36°81.345	121°80.449	170	100m	N		Traveling, Wind 10Kts @ 290°
1146	Zaca	36°81.345	121°80.449	80	75m	SE		Traveling

MBARI cable laying cruise for MARS cable

Date: 3-17-05 Beginning time: 0000 Pg 1 of 2
Recorder: SHansen End time: 1200
Position on vessel: Bridge Wings Weather: Fog BFt 1 Swell 2-4 Wind 2kts @ 280

	Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
	0000		~~36°85.315~~	~~.630~~				Plowing	Vis less than 50m
S	0030	Zaca 2	36°85.315	121°85.630	90	40m	Milling	"	
P	0125	Phvi	.457	.924	240	50m		"	Adult males
S	0204	Zaca 6	36°85.556	121°86.121	110	5m	Milling	"	5m off stern Vis 150m BFt 0 Wind 0
	0215	Walked to stern to check area where cables enter water All OK							
S	0255	Zaca 6	.728	.469	110	5m	Milling	"	Same Zaca off stern Vis 100m
P	0330	Zaca 2	.939	.893	50	10m	Milling	"	
S	0345	Zaca 5	36°86.065	121°87.177	110	5m	Milling	"	Zaca repeatedly diving under stern
	0350	Stern check	All OK						
P	0419	Zaca 3	.141	.572	120	15m	Milling	"	
	0610	Stern check	All OK						
S	0635	Zaca	36°87.023	121°90.464	70	30m	Milling	"	
	0640								Pt Lobos begining ROV survey
S	0655	Enlv 2	.169	.900	80	15m	W	"	First light Vis 150m
P	0700	Enlv	36°87.202	121°91.092	150	25m	E	"	Travel
P	0702	Enlv	.202	.092	170	10m	W	"	Travel
P	0706	Zaca	.242	.239	270	15m	E	"	Travel Large group birds forming
P	0712	Enlv	.291	.373	160	20m	E	"	Travel Vis 300m
P	0722	Zaca	.366	.641	190	100m	E	"	Travel
S	0732	Enlv	.471	.890	90	70m	NW	"	Travel
S	0739	Zaca	36°87.539	121°92.054	70	60m	W	"	Travel
S	0740	Enlv	.539	.054	80	60m	E	"	Travel
	0750	Stern Check		All OK					
P	0810	Enlv	.758	.845	170	50m	E	"	Travel Vis 800m BFt 1 Wind 2
P	0825	Enlv	36°87.877	121°93.290	220	30m	E	"	Travel
S	0830	Enlv	.920	.401	30	30m	E	"	Travel Vis 1500m
P	0916	Enlv	36°88.204	121°94.386	110	1000m	Rest	"	
	0917	Enlv	.204	.420	120	400m	Groom	"	

Vis 3Km

MBARI cable laying cruise for MARS cable

Date: 3-17-07
Recorder: SHansen
Position on vessel: Bridge wings

Beginning time: 0000
End time: 1200
Weather: Fog BFT 1 Wind 2Kts Swell 2ft

	Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
P	1020	EnIv	36° 88.388	121° 95.010	220	100m	N	Plowing	Swam directly to bow then swam along length of ship within 10M (Juv.)
S	1033	EnIv	36° 88.436	121° 95.088	55	700m	Forage	"	and then back up Stbd side. Repeated ly diving around ship but not coming up w/ food. (1050) ~~Last seen ≈ 1120 alongside~~ Last seen ≈ 1130 Travel East
	1100	BFT 2	Wind 8Kts						
P	1101	Zaca	.415	.272	140	30m	Travel	"	Juv. Zaca Vis 6 Km
S	1135	EnIv	.473	.498	285	1700m	Rest	"	
S	1144	Zaca	.490	.542	285	50m	Milling	"	

MBARI cable laying cruise for MARS cable

Date: 16 Mar 07
Recorder: B. Watts
Position on vessel: bridge wings

Beginning time: 1200
End time: 2359
Weather: bft 3, clear w/haze, swell ½m

	Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
P	1210	ENLU	36.82633°	121.82004°	290	900m	—	plowing	sleeping
	"	"	"	"	210	850m	—	"	sleeping (2)
	1219	Bft 4,	Fog moving	in from SW	quickly				
	1230	both sides of ship	enveloped.	Visibility ~	30 to 150m.				foghorn @ 2 min intervals.
S	1540	ZACA	.83399	.82864	95	150	220	plowing	rushed towards stern @ 10m.
	1630	10 kts	wind ~220°,	Fog remaining,	30-150m vis.				
	1930	vis. ~ 20m							
	2359	vis. ~ 100m or	less						

No mammals after dark.

257
13716

MBARI cable laying cruise for MARS cable

Date: 17 Mar 07
Recorder: B. Watts
Position on vessel: Bridge wings

Beginning time: 1200
End time: 0002
Weather: overcast, Bft 0-1, 1 m swell

	Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
									ruby crowned kinglet 3 on ship, sanderling 5-6 hummingbirds 3 in AM
P	1235	ENLU	36.88515	121.95893	230	1000	—	plowing	foraging / diving, w/ 2 gulls (A)
	1258	same	.88560	.96070	204	800	—	"	foraging, same individual as above
P	1340	ENLU	.88556	.96337	138	900	—	"	resting BFT 2 & rising, @ 16 kts
	1430			Bft 2-3 around ship, but strong ~1 km to W & S					
P	1435	ENLU	.88544	.96695	122	450	—	plowing	foraging, w/ 1 gull, likely (A)
P	1449	ZACA	.88540	.96796	145	30	120	"	swimming (2)
S	1525	ESRO	.88560	.97057	345	600	280	"	breaching a calf or juvenile, and one swimming next to it larger. Breached just after a small boat circled around our stern & toward Santa Cruz & was just past whales location. BFT 2, 70°F
P	1634	ENLU	.88549	.97551	208	450	—	"	foraging, w/ 1 gull
	1813								BFT 3
S	1814	ESRO	.88570	.98270	42	~500	310	"	single. One breath every ~4 min. wind suddenly up to 47 kts.
	1900								wind 6 kts
P	2201	ZACA	36° 53.142	121° 59.820	140	7	95	"	swam in circle then to stern wind 1 kt.

One sea lion after dark.

No discernable impacts to marine mammals

MBARI cable laying cruise for MARS cable

Date: 3-18-07 Beginning time: 0000
Recorder: S Hansen End time: 1200
Position on vessel: Bridge Wings Weather: Overcast Bft 1 Wind 5Kts Swell 4ft

	Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
	0140							Plowing	BFT 3 Wind 12Kts @ 290°
	0230	Partly Overcast		Stern check OK					BFT 4 Wind 17Kts @ 306°
	0315	Clear							
	0415	Overcast		stern check OK					BFT 3 Wind 10Kts @ 320°
	0600			stern check OK					Wind 15Kts @ 320°
	0615		36°86.575	122°09.645					Large bait ball
P	0711	ESRO 2	36°86.108	122° 10.082	187	1 Ret	N		(A)
P	0725	UNID 1	86.077	10.150	230	.2			Unident. large whale
P	0727	ESRO 2	86.059	10.152	210	1.5	N		(A)
P	0733	ESRO 2	86.047	10.208	230	1.7	N		Partly Cloudy (A)
S	0752	ESRO 1	86.000	10.332	260	1.2	N		
P	0826	ESRO 1	85.884	10.519	210	.5	N		
S	0839	MENO 1	85.886	10.598	45	1.5	S		
P	0906	UNID	85.793	10.774	148	.4	N		3/5/4 Need to switch sides and can't track progress effectivly
P	0968	MENO 3	85.765	.10800	225	.7			Surface activity w/ Birds
SP	0952	ESRO 2	85677	.11063	170	.8	N		(B)
S	0958	ESRO 1	85663	.11092	10	1500m	N		Wind 10 Kts @ 330
P	1005	ESRO 2	85624	.11121	185	1.0	Feeding?		(B) Diving in area w/birds
P	1016	ESRO 2	85585	11193	200	1.3	NW		(B) Surface traveling NOW
P	1030	ESRO 1	85571	11294	240	1.4	N		Combined w/(B) 3 total in group
P	1104	UNID 1	85456	11482	182	.3			Large whale.
S	1144	ESRO 1	85343	11719	190	.8	W		
S	1158	ESRO 4	85329	11835	190	1.1	N		2 groups in similar area
		Grey whales (many of them)		appear to maintain a closest point of approach (CPA)					
		of about two Kms.		as they travel north.					As the ship moved to the

west they maintained that distance. Not all of them!

MBARI cable laying cruise for MARS cable

Date: 3-19-07 Beginning time: 0000
Recorder: SHansen End time: 1200
Position on vessel: Bridge Wings Weather: Overcast

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
								Overcast BFT 2 Wind 3Kts swell 4
0000	Stern check	OK					Stationary	Continuing w/ splice / Plow tether trailing stern by 150 m (Entanglement possibility)
	stern check each hour until	sunup		All Ok				
0315								BFT 3 Wind 9Kts @ 300°
S 0530	Zaca	36°85258°	122°12040°	30	40 m	Milling	Splicing w/plow in water	
0600								Fog Vis 100 m
0645								Vis 1000 m
S 0745	ESRO 2	85258	120 60	280	2000m	N		Patchy fog Whale at edge of fog
0819	PHVI 1	85241	12050	120	50m	—		No fog BFT 2 Wind 5Kts @ 210
0828	ESRO 2	85215	12041	200	.8 R			Splice complete prep for plowing
0828	ESRO 2	85215	12035	200	.3 R			
0836	ESRO 3	85214	12035	154	.4 R			(A)
0844	UNID	85209	12008	154	0 Ret			
0845	ESRO 2	85229	11993	220	500m	N		
0850	ESRO 2	85233	11970	230	1.0 R	N		
0907	ESRO 2	85245	11934	164	1.1 R	N	Plowing	(A) Lost 1 whale
0917	2	85220	11992	175	1.8 R	N		(A)
0930	1	85181	12075	220	3.0 R	N		Part of (A)
0938	2	85163	12107	200	2.5 R	N		(A)
0944	2	85147	12157	240	2.5 R	N		(A)
0948	2	85140	12165	148	.8 R	W		(B) Milling a bit Maybe 3
0955	1	85097	12215	190	1.0 R			
0955	1	85097	12215	192	.6 R			
1020	3	85051	12375	145	1.4 R			(B) Milling
1022	1	85047	12382	180	2.2 R			
1027	2	85038	12412	135	3.5 R			
1028	3	85026	12431	150	2.2 R			(B) Guard boat moved in close and they dove.
1035	1	85027	12452	63	300m	N		Directly off stern of ship within ≈100 m of where the tether drops below surface of water

MBARI cable laying cruise for MARS cable

Pg 2 of 2

Date: 3-19-07 Beginning time: 0000
Recorder: S Hansen End time: 1200
Position on vessel: Bridge Wings Weather:

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
								BFT 1 Wind 2Kts Overcast Swell 2-4ft
1042	MENO 2	84980	12589	195	3 Ret	SE	Plowing	Moving w/ GRGR
1042	GRGR	84980	12589	195	3 Ret	SE		30/50/40
1044	ESRO 1	84980	12589	290	5.0 R			
1057	ESRO 2	84954	12585	110	400m	NE		(C) Water Depth 106m Tow wire 340m
1101	ESRO 2	84994	12540	90	300m	NE		(C) Directly off stern
1115	ESRO 3	84915	12663	116	3.0 R	Milling		(B)
1129	GRGR	84862	12703	210	4.0 R	SE		7/15/10
1135	ESRO 3	84825	12868	80	2.5	Milling		(B) Obvious sexual activity on this surfacing
1152	ESRO 3	84799	12928	58	2.8	Milling		(B) Directly off stern

MBARI cable laying cruise for MARS cable

~~503~~ ~~3F 5755~~ ~~1F 570 1015~~

Date: 18 Mar 07 Beginning time: 1200

Recorder: B. Watts End time: 2359

Position on vessel: bridge wings - mostly portside to see Weather: BFt 4, sunny, 1m swell

Time	Species	Latitude	Longitude	Bearing (ESRO path)	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes (2.5 ret ~3/4 nm)
								mom/calf
1203	ESRO	36.85302	122.11825	160	450	290	plowing	~~3 adult~~, moving towards bow (9 o'clock) closest approach ~100m
1226	ESRO 4	.85260	.11903	170	7000m	290	"	
	2			185	5000m	"	"	
	2			168	8500m	"	"	
1240	2			246	2500m	"	"	~1.5 ret.
1305	—	.85209	.12045	—	—	—	stopped	splicing, not plowing 12-24 hrs
1340	ESRO 3+2	"	"	208	1.25r	NW	"	wind ~16 kts ~1 nm ~3.6km
1350	ESRO 2	"	"	240	2000m	NW	"	
1400	ZACA 1	"	"	142	50m	320	"	jumping + coming to stern
1411	ESRO 3	"	"	154	0.5r	NW	"	
1420	ESRO 1	"	"	225	2500m	NW	"	
"	ESRO 1	"	"	190	1800m	NW	"	BFT 5-6 NW, cloudy ~80%
1453	ESRO 1	"	"	275	60m	330	"	sighted by Mate (Dow). Overcast 100%
1521	BFAL 9	"	"	80 to 260	varies	N/A	"	9 black-footed albatross in bino scan
1542	—							fog @ 3km 150 to 330°T
1557	ESRO 2	"	"	176	3000	NW	"	(A) breaks in cloudy skies are few.
1608	ESRO 2	"	"	215	3500	NW	"	fog receeding.
1612	ESRO 2	"	"	215	1900	NW	"	(A) some socializing (flukes up + out)
1630	—							clearing, 24 kts, BFT 6, haze
1651	ESRO 3	"	"	194	6000+	NW	"	(a) furthest view before haze/fog
1751	—							Stormy weather
"	ESRO 1	"	"	298	4000	UNK	"	
1816	ESRO 2	"	"	208	1600	NW	"	
1917	—							22 kts, fog 170 to 335° ~5km

No mammals after dark. No impacts.

MBARI cable laying cruise for MARS cable

Date: 3-21-07 **Beginning time:** 0000
Recorder: S Hansen **End time:** 1200
Position on vessel: Bridge wings **Weather:** Overcast BFT 5 Wind 26 Kts @ 310 Swell 6-8 ft

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
0217							Plowing	Wind 25~~+30~~ KTS BFT 5
0600						Partly cloudy		Wind 15 Kts @ 310 BFT 4
0700						20% Cloudcover		Wind 8 Kts @ 15° BFT 4 Swell 8-10 Ft.
0800	UNID	36.71349°	122.18631°	20	.3 R	-		Large whale
0804	ESRO 3	.71349°	18636°	345	.5 R	300		Near end of cable laying ops.
0901	UNID 2	.71730°	.18616°	10	1.3 R	-		Wind 15 Kts @ 15°, BFT 5, Clear, Swell 10-15 ft
	← Large whale						Recovery	0845 Bringing plow up
		No animals within Safety Zone						

MBARI cable laying cruise for MARS cable

Date: 20 Mar 07
Recorder: B. Watts
Position on vessel: bridge wings

Beginning time: 1203
End time: 2359
Weather: rain, BFT 5, overcast, ~1m swell

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
1205	MEND 3	36.79916	122.18916	0	700m	N/A	IDLE	(A)
1222	"	"	"	264	600m	230	"	(A)
"	LAOB	"	"	165	125m	mill/260	"	25/30/40
1229	MEND 1	"	"	40	400m	140	"	(B)
1234	MEND 3	"	"	62	1500m	210	"	(A)
1235	MEND 2	"	"	162	300m	190		(A) plus 1
1248	MEND 1			135	300m	310	"	(B)
		Starting	Fresh —	(A) have	departed area			
1255	MEND			126	700m	200		2 to 3
"	MEND 2			212	600m	240		lobtailing
1303	UNID 2			54	2500m	?		
1330								BFT 5-6
1405	ESRO 2	"	"	176	~~NW~~ 1km	NW		
1420	UNID 2	"	"	138	3200m	NW	"	probably ESRO
1440	PHDA 5	"	"	100	600m	130	"	rooster tail spray pattern
1454	ZACA 1	.79700	.18915	30	10m	290	plow deploy	approaching stern — curious?
1506	UNID 3			~260	N/NW ↔ 4500m		"	possibly ESRO or (A); wind 17-20 kts
1536	MEND 1	.79567	.18968	90	3km	160	"	
1544	MEND 1	.79522	.18987	130	1 KM	230	"	} SAME WHALE
1545	"	79463	19009	175	700m	270		
1627	ESRO 2	.79190	.19144	190	4000m	NW	"	
1645								20 kts, sunshine!
1703	EUJU	.78846	.19306	191	10m	—	"	looking @ ship, $ to 24 kts wind
1718								
1752	MEND 2	.78333	.19557	130	1900m	20		some surface activity, M/C — C breaching 4/o+
1815							Plowing	another whale to L ~500m, breaching when M/C @ 90° bearing

No mammals after dark, 24 to 30 kts NW wind,
No obvious impacts except EUJU approaching ship.

Fred 207

MBARI cable laying cruise for MARS cable

Date: 22 Mar 07
Recorder: B Watts
Position on vessel: Port wing mostly

Beginning time: 1200
End time: 2000
Weather: sunny, BFT 2, 2m swell

34
18
272
340
6.12

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
1202	ESRO 2+1	36, 81964	122. 17180	200	0.3r *pair	N/NW	Roving	0.3r (pair), 1r (single)
	ESRO 2	"	"	177	2500m	NNW	"	M/C reported by S Hansen
1212	ESRO 2	.82067	.17157	180	10km	N/NW	"	
	ESRO 2	.82702	.16927	89	4500m	N/NW	"	
1356	ESRO 2	.83294	.16469	180	8km	N/NW	"	
1418								BFT 3, 80% overcast, haze
1440								17 kts NW
1530								20 kts NW, fog/haze @ ~ 4nm
1550								23 kts
1620	ESRO 2	.84035	.15022	206	1200m	N/NW		
1725								~~20~~ kts - 23 kts NW
1907	ESRO 1	.84007	.15026	25	2200m	N		~~26~~-28 kts NW BFT 6-7! Swell 2-4m

MBARI cable laying cruise for MARS cable

Date: 03-29-07 Beginning time: 0400
Recorder: SHansen End time: 1200
Position on vessel: Bridge Wings Weather: Clear BFT 3 Wind 6 Kts @ 5° Swell 6-8ft

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
0400								On station ROV in water 0405
0522	LAOB 1	36.70515	122.18762	180	150 m	Feeding	ROV	
0711	MENO 2	.70358	.18759	310	.5 R	Feeding		~~UNID Dolphins~~
0711	UNID			310	.5 R			UNID Dolphins 25/100/50
0836	MENO 3	.70370	.18677	245	.4 R	Feeding		Same MENO + 1 more
0905	MENO 5	.70396	.18660	240	.3 R	Feeding		
0915	ESRO 1	.70396	.18649	45	.8 R	N		
~~0947~~ 1002	ESRO 1	.70403	.18668	75	.3 R	N		
1026	ESRO 3	.70407	.18670	60	.4 R	N		
1115	ZACA 1	.70395	.18672	100	5m			Swam toward and under ship
1120								BFT 2, Wind 3Kts @ 340° Swell 5-7 ft

MBARI cable laying cruise for MARS cable

Date: 3-30-07 **Beginning time:** 0000
Recorder: SHansen **End time:** 1200
Position on vessel: Bridge wings **Weather:** Clear BFT 2 Wind 8Kts. @340° swell 5-8ft

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
0245								BFT 3 Wind 13 Kts @ 320° swell 5-8ft
0330								High fog Vis. still good
0502	LAOB	36.71804°	122.18677°	230	20-50m	S	Splicing	5/9/7 Clear - No fog swell 3-5ft.
0615								Fog to East Vis 2 km
0722								Fog Patchy Vis 0-.5Km
0800								Fog Vis 0-100m
0915								Fog Patchy Vis 2-5 km Wind 10 Kts
0918	MENO 2	.71812	.18707	160	5 Km	–	Splicing	
0927	MENO 2	.71812	.18707	255	3Km		Splicing	complete Preping for TRF Deployment
(A) 1107	MENO 1	.71812	.18707	230	7 R	10	Stationary	Traveling fast Closest approach 200m
(A) 1130	MENO 1	.71812	.18707	35	1.5 R	50	"	Alerted bridge officer - No actions taken
								No activity w/ cable or TRF
1135	~~ESRO~~ 2 MENO	.71826	.18665	100	1.0 R	N	"	

No Impacts

MBARI cable laying cruise for MARS cable

Date: 29 Mar 07 **Beginning time:** 1200
Recorder: B. Watts **End time:** 2359
Position on vessel: bridge wings **Weather:** 10% clouds, 2m swell, 3kt wind

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
1210	UNID	36.70399	122.18709	220	≈0.1r	U	retrieve ROV	saw spout(?) & shiny flash of back, sp/ash
								~100 or more black footed albatross around guard boat to 5 ~ 3/4 mile.
1240	ZACA	.70410	.18695	165	15m	N/A	pulling cable	1 zaca still in thruster wash
1320	Laob 1000	.70415	.18698	all around	20-6000m	~170	"	came in off ~310° T. Widespread
"	MENO 2+1	"	"	290	1200m	180	"	1200m for 2, 2500m for 1
1324	Meno 2	"	.18718	275	3700m	180	"	w/ Laob's
1330	Meno 6	.70420	.18723	230	4500m	180	"	spread out
1500		.70903	.18694	— WIND @ 12 KTS —				some Meno stopped to forage. Hazy
1603	Meno 2	.71374	.18600	70	700m	190	holding cable	
1730								16 kts wind, lost haze
1800								12 kts
1840	UNID 1-2	36.71830	122.18642	311	0.3r	U	splicing	
1915	ZACA 1	.71832	.18641	90	60m	N/A	"	jumping & flipping in bow thruster wash

No mammals after dark.
Zaca apparently attracted to ship.

MBARI cable laying cruise for MARS cable

Date: 30 Mar '07 **Beginning time:** 1200
Recorder: B. Watts **End time:** 2359
Position on vessel: bridge wings **Weather:** sunny, ≤1m swell, calm to 8kts NW, haze @ N to W horizon

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
1340	Meno 2	36.71739	122.18675	143	4500m	U	prep TRF	breach
	Meno 2	"	"	124	2500m+	50		tail lobbing (A)
	Meno 1	"	"	139	3000m+			
	UNID —	"	"	120	3500m+	50	release TRF	small dolphin 600/900/800 fast travel
1418	→LAOB	.71705	.18676	60	400m	0	"	(B)
1431	LIBO 5	.71700	.18678	122	450m	180	"	w/ (A); A turned to course 120°
								by 1600, all MENO & LAOB >1km
1640	LAOB 800	.71574	.18681	130	200m	200→170	putting dong TRF	tight pod slow travel
1750	MENO 2	.71210	.18687	140	200m	240	"	w/ LAOB pod spread over large area; occ slapping
"	ZACA 1	"	"	160	40	N/A	"	thrash @ surface (w/ prey?)
1930	UNID 1	.71050	.18693	85	5 km	U	ROVing	1 blows, large whale

No mammals after dark.
Ship probably attracted some dolphins.

MBARI cable laying cruise for MARS cable

Date: 3-31-07 **Beginning time:** 0000
Recorder: SHansen **End time:** 1200
Position on vessel: Bridge wings **Weather:** Clear BFT 4, Wind 20kts @ 320° Swell 5-7 ft

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
							ROV ing	
0122								ROV out of water, Recovering line over bow.
0202								All lines out of water, ROV refitting for BL1B
~~0400~~								
~~0419~~ 0408								ROV In water
0419								ROV out of water for additional equip
0450	7ACA 1	36.71202°	122 18728	250	40	Milling	Stationary/ ROV ing	Overcast, Wind 20 kts @ 320, swell 5-7ft
0538								ROV In water
0800								Overcast BFT 3, Wind 12 Kts @ 330 5-7ft Swell
0925	UNID 1	36.72063°	122.18674	60	.5 R	—		Haze Vis 7-10 Km.
1027	MENO 1	.71733°	.18694	40	.8 R	Breach		
1105	LAOB	71516	.18695	110	600m	330°		
1110	MENO 1	.71502	.18660	120	3Km	150°		700/1300/1000 Traveling

No Impacts

MBARI cable laying cruise for MARS cable

Date: 31 Mar '07
Recorder: B Watts
Position on vessel: bridge wings

Beginning time: 1200
End time:
Weather: 15 kts NW, 80% cloudy, 1-2 m swell

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
1210	Meno 1	36.71236	122.18695	128	0.3 r	230	ROVing	
1315	—	.71478	.18687					Hazy horizon E, fog ~150m @ W; wind 20 kts NW
1400	Meno 2	.71655	.18676	25	300	260*	"	breach + chin slaps. Oriented no particular direction but ended up on other side of ship!! * is final course.
1432	—	.71774	.18673					27 kts NW
1500								~23 kts
1530								30 kts
1620	—	.72321	.18652					gusts to 35 kts
1630	—							suspending ops, retrieving ROV, ordered indoors.
"	UNID 3							JUST saw 3 under wave @ stern, possible GRGR
2030	—	36° 43.419	122° 11.197					wind ~ 20-25 kts... deploy ROV

No Mammals after dark

MBARI cable laying cruise for MARS cable

Date: 4-1-07 S Hansen
Recorder:
Position on vessel: Bridge Wings

Beginning time: 0000
End time: 1200
Weather: Clear, BFT 4, Wind 22 Kts @ 320, Swell 5-7 ft

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
0000							Roving	
0315								Overcast
0600								Clear
0722								ROV Out of Water
0932							ROV ing	ROV In Water
0940								Partly Overcast BFT 4, 18 Kts @ 330° Swell 5-7
1158								ROV out of Water
		No Sightings Poor Viewing Cond						

MBARI cable laying cruise for MARS cable

Date: 1 Apr '07
Recorder: B. Watts
Position on vessel: bridge wings

Beginning time: 1200
End time: 2336
Weather: partly cloudy, ~1m swell, 20kts NW

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes
1320	—	36.71611	122.18647	—	—	—	Std By	26kts NW
1402								ROV in water
1545								Wind ~25 to 30 kts
1640	LAOB	.71531	.18632	80-180	25 to 150m	N/A, but ~N	ROV up	400/800/700 fishing
"	LIBO	"	"	210	50m			mixed in ≥12
1700							ROV on deck, bow line still over.	
1730								no lines in water
2000							ROV	final dive
2330								ROV on its way up.
2336								ROV on deck ✓
		No mammals after dark.						END
		No obvious impacts.						

Moss Landing Marine Laboratories
8272 Moss Landing Road
Moss Landing, CA 95039

(831) 771-4400
(831) 632-4403 fax
www.mlml.calstate.edu

Marine Mammal Monitoring Final Report
MARS Project – Cable Laying

15 May, 2007

Prepared for:

Monterey Bay Aquarium Research Institute
7700 Sandholdt Road
Moss Landing, CA 95039

for the
MARS Project
May 2007

Prepared by:

Dr. James T. Harvey and Bridget H. Watts

Executive Summary

Marine mammal monitoring was provided by observers from Moss Landing Marine Laboratories (MLML) for the Monterey Bay Aquarium Research Institute (MBARI) Monterey Accelerated Research System (MARS) cable laying project in Monterey Bay, California, from 10 March to 1 April, 2007. Observations were conducted aboard the cable ship Global Sentinel during the pre-lay grapnel run (PLGR), cable burial and surface lay, ROV operations, deployment of the trawl-resistant frame, and ship transit within Monterey Bay.

Before beginning cable operations, CS Global Sentinel performed a PLGR to check for surface debris, running from the closest shore approach out to the deep water termination point. Once the cable path was cleared, the ship transited back to the near shore starting point to anchor the cable onshore before initiating plowing operations and laying the cable along the route. A support vessel then inspected the lay using an ROV, and the cable ship deployed the trawl-resistant frame at the terminal end of the cable.

In general, sea otters (*Enhydra lutris*) and California sea lions (*Zalophus californianus*) were the most commonly sighted marine mammals near shore, gray whales (*Eschrichtius robustus*) were sighted commonly along the mid-section of the cable path, and humpback whales (*Megaptera novaeangliae*) and various species of dolphins were sighted most commonly in deeper waters towards the termination point (Fig. 1).

The greatest numbers of small marine mammals sighted were three species of dolphin and California sea lions, with gray whales being the most commonly sighted large cetacean (Table 1). Although we used night-vision equipment, few marine mammals were observed during nighttime, owing to the dark skin or fur of these animals. All but one of the nighttime sightings were made within 50 m of the ship (a single Pacific white-sided dolphin was sighted at 150 m in the early morning). There were no observed direct takes (i.e. causing injury or mortality) of marine mammals, and we did not observe any major changes in behavior due to the presence and activities of the cable-laying vessel.

Recommendations for future monitoring projects include: increased observer effort and placement of observers at better vantage points if multiple observers are available during each shift. Because there was only one observer on duty at a time there was always a lack of complete coverage around the vessel. Observers had the best vantage point on the bridge wings, which were approximately 80 m from the stern of the vessel. These elevated observation spots allowed good visibility to the horizon, but poor visibility off the stern where the cable entered the water, so any marine mammal interactions with the propeller or where the cable entered the water were nearly impossible to observe. An observation location near the fantail helped, but this was not always possible with only one observer on duty because they would not have been able to see far from the vessel or much beyond a small arc centered at 180 degrees relative bearing. Additionally, rough weather or work conducted at the stern sometimes precluded observer presence in that area. A dedicated vessel for observations would be one solution, allowing more autonomy, greater flexibility for observations, and a better vantage point for observing all directions around the cable-laying vessel, although observations at any given time would not cover all locations around the vessel. More

observers on duty during all shifts would have increased the concurrent observation field around the vessel, and improved locating and tracking marine mammals around the vessel.

Introduction

Project Overview

The placement of fiber-optic cables on the sea floor in the nearshore environment (i.e. within 50 km of shore) has the possibility of disturbing sea turtles, seabirds, and marine mammals via the presence of vessels and noise generated during cable-laying. Cable operations also have the possibility of harming individuals via entanglement with the cable or collisions with vessels. The Monterey Bay Aquarium Research Institute (MBARI) proposed placing a 31.7 mile undersea cable (28 mm in diameter) from the shoreline of Moss Landing out to approximately 20 miles offshore as part of a program to develop an undersea observatory (Monterey Accelerated Research System; MARS). Moss Landing Marine Laboratories (MLML) was contracted to provide trained observers that would assess and record potential interactions between the cable-laying operations and specific, protected marine vertebrates.

The waters within Monterey Bay support an incredible abundance and diversity of marine life, including 90 seabird (Table 1; Ainley and Terrill 1996), 3 sea turtle, and at least 28 marine mammal species (Harvey 1996: http://montereybay.nos.noaa.gov/sitechar /mamm1.html). Great numbers of marine vertebrates are attracted to central California because of the strong upwelling events and subsequent primary production, the central location of Monterey Bay between arctic and tropical habitats, and the variety of habitats and prey available. Some species of seabirds and marine mammals use Monterey Bay as a foraging area during winter (e.g. surf scoter, *Melanitta perspicillata*, and northern fulmar, *Fulmarus glacialis*), some migrate to Monterey Bay in the summer and fall to take advantage of the high productivity (e.g. sooty shearwater, *Puffinus griseus*, humpback whale, and blue whale, *Balaenoptera musculus*), and some reside in the area year round (e.g. Brandt's cormorant, *Phalacrocorax penicillatus*, and harbor porpoise, *Phocoena phocoena*). Sea turtles are typically seen during summer and fall, corresponding to warmer sea surface temperatures and increased prey abundance.

In general, several Federal (National Marine Fisheries Service – NMFS, Monterey Bay National Marine Sanctuary – MBNMS, and United States Fish and Wildlife Service – USFWS) and state agencies (California Coastal Commision – CCC) have jurisdiction over the protection of living resources, and thus required certain procedures to be followed to approve the permits for cable laying. The permits stipulated that two observers be placed on the cable-laying vessel and conduct observations according to a marine mammal observation plan (MMOP). The development of a marine mammal observation plan was contracted by MBARI, formulated by Ecology and Environment, Inc. (based in San Francisco, CA), and was approved by federal and state agencies. MLML was contracted by MBARI to provide trained observers and equipment to

implement the monitoring plan. NMFS reviewed the qualifications of the MLML observers and approved personnel for these positions.

Marine Mammal Monitoring Component

The U.S. Marine Mammal Protection Act (MMPA) provides for the protection of marine mammals from harm or disturbance related to human activities. The U.S. Endangered Species Act (ESA) provides for protection of federally listed species, as well as protection of critical habitat. Incidental take permits issued by federal agencies allow for certain levels of harassment of species protected by the MMPA and ESA if activities are accompanied by a monitoring program that will verify that disturbance does not exceed those levels.

In accord with granted permits, the two NOAA-approved marine mammal monitors observed and documented marine mammals in the vicinity of the cable ship, and recommended action if any animals were determined to be endangered by vessel activities. Monitors had authority to order the cessation of vessel activities if the safety of any marine mammal within the safety zone was threatened.

The safety zone was 500 ft (152 m) during non-cable laying activities and surface lay, and 500 m while the cable ship pulled the plow. These distances were based on acoustic tests performed by a support vessel that checked for a received sound level of 160 dB or less at 500 m and 152 m from the ship. Sound levels were mainly dependent on noise generated by the ship's engines. While the ship pulled the plow, the engines worked harder and thus produced a greater amount of sound, so the safety zone was expanded to the greater distance.

Marine mammal species expected to be encountered during cable operations were sea otters, California sea lions, harbor seals (*Phoca vitulina*), gray whales, humpback whales, Risso's dolphins (*Grampus griseus*), and Pacific white-sided dolphins (*Lagenorhynchus obliquidens*). Other species that could be seen in the area included a much greater number of pinnipeds and cetaceans which are more rarely seen than those listed above.

Methods

Equipment

Daytime observations were conducted using Fujinon 7x50 reticulated binoculars with a built-in compass. Laser rangefinders were employed to test the accuracy of monitor's distance estimates. GPS units were used to record latitude and longitude for each marine mammal sighted. Nighttime observations were conducted using night-vision equipment. Handheld radios were used to communicate emergencies to the vessel pilot.

Observations

The Final Marine Mammal Monitoring Plan (by Ecology and Environment, Inc.) stipulated that monitors were to work in shifts of four hours maximum duration,

providing 24 hour coverage. Monitors were to have a 360-degree view around the vessel. Monitors were to observe for a minimum of 30 minutes prior to cable activities, ensuring the safety zone was free of marine mammals before activities were allowed to start. None of these stipulations were satisfied for the following reasons: No point on the cable ship provided a 360-degree view around the vessel, so monitors established locations on the ship from which they could monitor the greatest area around the ship (the bridge wings); observers worked for shifts of 12 hours each to provide for 24 hour coverage and to allow for the greatest time off shift for sleep periods; and, monitors ensured the safety zone was free of large, slow moving marine mammals (large whales) and did not suspend vessel activities due to the presence of small, highly mobile marine mammals (e.g., California sea lions) unless it appeared that they were in any danger of interacting with the vessel or cable.

During daylight, monitors alternated 30 minute shifts from each bridge wing unless mammal activity was intensive enough to keep the monitor in either location. The bridge wings provided views from approximately 170 degrees (relative bearing) to approximately 30 degrees around the bow on the opposite side of the ship, for a total view shed of approximately 200 degrees (Fig. 2). No position on the ship provided a clear view of the stern, except a position on the stern that gave little view around the rest of the ship. Additionally, by monitoring from the bridge wings observers had quick access to vessel pilots in the event of a possible marine mammal interaction.

During darkness, monitors scanned with night-vision equipment every 15 minutes. Scans covered varying areas depending on the number of deck lights that were turned on for crew working at any given time. Deck lights overwhelmed the capability of the equipment to see into dark areas around the ship.

For each marine mammal sighted, a variety of data were recorded (Fig. 3), and an animal was tracked if its course indicated a closer approach or potentially dangerous encounter with the ship.

Observers initially used the compass of the Fujinon binoculars to estimate marine mammal bearings, but the metal of the ship interfered with accurate readings. Gyro compass repeaters were located on each bridge wing, and these instruments provided accurate readings of true (non-magnetic) bearing.

Potentially hazardous parts of the ship included the main propeller, the two stern thrusters, two in-hull bow thrusters, and the cable itself plus associated floats and umbilical for the plow or ROV. The main propeller and the umbilicals were treated as the most dangerous parts, as the propeller was not surrounded by a cage structure (as were the thrusters), and the umbilicals had some slack, which could have presented an entanglement threat. Therefore, if animals were concurrently viewed at different positions around the ship, those closest to the propeller or umbilicals were given a greater degree of attention from the monitor. This prioritization was necessary given the sparse coverage afforded by a single observer.

Results

Twelve species of marine mammals were observed on the MARS cruise (Table 1). Additionally, multiple sightings of unidentified whales and dolphins were made, so a

greater number of species may have been present in the work area. Pacific white-sided dolphins were the most numerous small cetacean, gray whales were the most numerous large cetacean, and California sea lions were the most common pinniped observed. Sightings are summarized in the Appendix.

Mammals were sighted in habitats concurrent with their life-history traits. Sea otters, benthic feeders, were seen near shore in shallow waters. California sea lions, which haul out on land, also were seen near shore. Gray whales were sighted commonly along the mid-section of the cable path as they migrated to the north past the Monterey peninsula. Humpback whales and various species of dolphins were sighted most commonly in deeper waters towards the termination point, and were seen feeding near the water's surface.

Interactions with the cable ship included investigating the vessel, avoiding the vessel, interacting with thruster wash or engine cooling outflow, and hunting fish attracted by the ship (Table 2). No harmful interactions were observed by marine mammal monitors, although large whales did exhibit behaviors on two occasions that were potentially dangerous. On 19 March, two gray whales came within 300 m of the stern, and fairly close to the umbilical float (from the viewpoint of the observer). The whales continued along the migration path. On 31 March, two humpbacks dove at 300 m off the port side of the ship and came up off the starboard side of the ship. They were not oriented towards the ship when they dove, so they were not immediately sighted on the starboard side. It is impossible to know how closely they came to the ROV umbilical or the hull of the ship.

Sea Otters

Approximately 57% of sea otters sighted were within the safety zone (Table 1). Otters appeared to be more tightly clustered near the ship when it was not plowing (Fig. 4), so otter distance may have been dependent on sound pressure levels. When sightings were plotted on a relative scale, animals appeared to be located in a random pattern around the vessel (Fig. 5).

California Sea Lions

Although only approximately 26% of individual California sea lions sighted were within the safety zone (Table 1), approximately 80% of sightings, including groups of sea lions, were within the safety zone. This discrepancy arises due to several sightings of greater than 50 sea lions resting at a distance away from the ship. Of 92 total California sea lion sightings, 88 were plotted (Fig. 6, Fig. 7) because the ship bearing was unconfirmed for 4 sightings during ROV operations. During plowing, California sea lions appeared to be sighted nearer to the ship (Fig. 6), coinciding with frequent behavioral reports of investigating the ship. Average distance of all sightings during plowing was less than sightings made at all other times (141 m and 163 m, respectively). There were few sightings made close to the ship between 20 and 70 degrees (port and starboard) relative bearing (Fig. 7). These areas were more difficult to observe due to the structure of the bridge wing wind scoop, so this barrier most likely explains the lack of close by sea lion sightings in these areas of the view shed.

Gray Whales

Approximately 4% of gray whales sighted were within the safety zone (Table 1); most were initially spotted outside the zone and tracked as they approached the cable ship. Of 104 total gray whale sightings, 103 were plotted (Fig. 8, Fig. 9) because the ship heading was unconfirmed for 1 sighting during ROV operations. During plowing, gray whales were sighted primarily off the port bow (i.e., between 270 and 360 degrees relative bearing) but appeared to be more randomly distributed at other times (Fig. 8). This was an artifact of the cable route in relation to the gray whale migration corridor. The plot of all sightings on a relative scale (Fig. 9) displayed a reverse pattern to that seen in sea otters and California sea lions, with the majority of sightings outside of the safety zone.

Humpback Whales

No humpback whales sighted were within the safety zone (Table 1). Many fewer humpbacks were sighted during plowing than at other times, so differences in patterns between the two periods are not possible to detect (Fig. 10). The difference in numbers arises from the greater duration spent during non-plowing operations than in plowing operations in areas where humpbacks were sighted. When all sightings were plotted together, sightings appeared to be randomly located around the ship (Fig. 11).

Dolphins

Between zero and 23% of dolphins (by species) were sighted within the safety zone (Table 1). All dolphin species were plotted together, and locations around the ship appeared to be random (Fig. 12). Several sightings of Pacific white-sided dolphins included animals seen in wide arcs around the ship, and covering a large geographic area, and were therefore not plotted.

Recommendations/Conclusions

Recommendations for future monitoring projects are focused on more than one observer on duty during each shift and a better vantage point for observations. We only could use one observer on duty at a time; therefore, there was a lack of complete coverage around the vessel. The observers had the best vantage point from the bridge wings, which placed the observers approximately 80 m from the stern of the vessel. This elevated observation spot allowed good visibility to the horizon within an arc of about 200°, but poor visibility off the stern where the cable entered the water. Any marine mammal interactions with the propeller or where the cable entered the water were nearly impossible to observe. An observation location near the fantail would have helped, but this was not possible with only one observer on duty because they would not have been able to see far from the vessel or much beyond a small arc centered at 180 degrees relative bearing, and there was no appropriate safe location aft. Also the observer had the

best visibility from the bridge wing but could not see a full 360° around the ship so they had to walk back and forth between the port and starboard wings. This meant that observations were discontinued on one side of the vessel while the observer was on the opposite side. Generally this is not a problem if you can see to the horizon and approaching marine mammals can be seen and tracked. But if visibility is impaired (e.g. fog, night), or if the observer cannot check the opposite side because of excess animal activity on the current side, then an animal could approach the vessel without being detected. Having a minimum of two observers on duty at a time would have improved data collection by allowing better and more complete tracking of individual marine mammals. Because the single observer had to switch positions to the other side of the vessel, continuous tracking was not always possible. Additionally, rough weather or work conducted at the stern sometimes precluded observer presence in that area. A dedicated vessel for observations would be one solution, which allows more autonomy, greater flexibility for observations, and a better vantage point for observing all directions around the cable-laying vessel, although observations at any given time would not cover all locations around the vessel. We realize this might be a financial burden for the process but from an observational standpoint it would be better.

We did not observe any major negative impacts (e.g. entanglements, collisions with the vessel) with marine mammals. There were some indications that a few animals avoided the vessel, for instance a sea otter was observed swimming away from the vessel, and the distribution of some species around the vessel indicated some avoidance (Fig.9, Fig. 11). Because the vessel is loud, slow moving, large, and well lit, it is nearly impossible for a marine mammal to be unaware of its presence. Hence, all marine mammals within the safety zone either knowingly approached the vessel or did not avoid the approaching vessel. We know of only one incident of a harmful take of a marine mammal during past cable-laying activities, a young gray whale that was cut on the peduncle by the propellers of a vessel off Morro Bay on 9 January 2001 (Harvey et al. 2001). Therefore, it seems that cable-laying activities have a small probability of endangering marine mammals, and that only on rare occasions may a freak accident occur.

Table 1. Summary of species sighted on MARS cruise. Safety zone was 500 m while plowing, 152 m at all other times; data are combined for both zone radii. Average distance is in meters, calculated across all groups sighted.

Species	Total Number of Individuals and Number of Sightings	Number In Safety Zone	Number Outside Safety Zone	Proportion Of Individuals Inside Safety Zone	Avg. Distance	Total After Dark
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	4598*, 10	>98	<4500	>0.021	970	58
Common dolphin *Delphinus delphis*	800, 2	0	800	0	1800	
Northern right whale dolphin *Lissodelphis borealis*	417, 3	12	405	0.029	670	
California sea lion *Zalophus californianus*	506, 92	131	375	0.259	159	41
Unidentified dolphin	303, 4	3	300	0.010	2950	
Gray whale *Eschrichtius robustus*	210, 104	9	201	0.043	2300	
Humpback whale *Megaptera novaeangliae*	92, 45	0	92	0	2245	
Sea otter *Enhydra lutris*	90, 85	51	39	0.567	458	
Risso's dolphin *Grampus griseus*	65, 3	15	50	0.230	538	15
Unidentified whale	49, 30	0	49	0	5050	
Harbor seal *Phoca vitulina*	8, 8	7	1	0.875	233	1
Dall's porpoise *Phocoenoides dalli*	5, 1	0	5	0	600	
Steller sea lion *Eumetopias jubatus*	2,2	2	0	1.000	10	1
Northern fur seal *Callorhinus ursinus*	1,1	0	1	0	800	

*Sightings of large groups (400 to 1000) made on 3/12 and 3/29 to 4/1 may have been same pods resighted a number of times. These sightings were made in roughly the same location, so a low estimate of 1000 animals may be more accurate than 4500 animals summed from these dates. This low estimate would result in a proportion inside safety zone of 0.089.

Table 2. Summary of interactions with cable ship observed on MARS cruise. Animals were assumed to be investigating ship when monitors could see them looking at the ship and approaching closely.

Date	Species	Interaction with ship	Number
3/10/2007	California sea lion	Investigating	1
3/11/2007	California sea lion	Investigating	1
3/13/2007	California sea lion	Investigating	2
3/14/2007	California sea lion	Investigating and jumping in engine cooling water outflow	4
3/15/2007	California sea lion	Fishing	5
3/15/2007	California sea lion	Investigating	1
3/17/2007	California sea lion	Investigating	11
3/20/2007	California sea lion	Investigating	1
3/21/2007	California sea lion	Investigating	1
3/29/2007	California sea lion	Investigating	1
3/29/2007	California sea lion	Investigating and jumping in thruster wash	2
3/30/2007	Pacific white-sided dolphin	Attracted?	100+
3/14/2007	Sea otter	Avoiding	2
3/17/2007	Sea otter	Investigating	1
3/20/2007	Steller sea lion	Investigating	1
3/31/2007	Unidentified dolphin	Next to stern, possibly Risso's dolphins	3

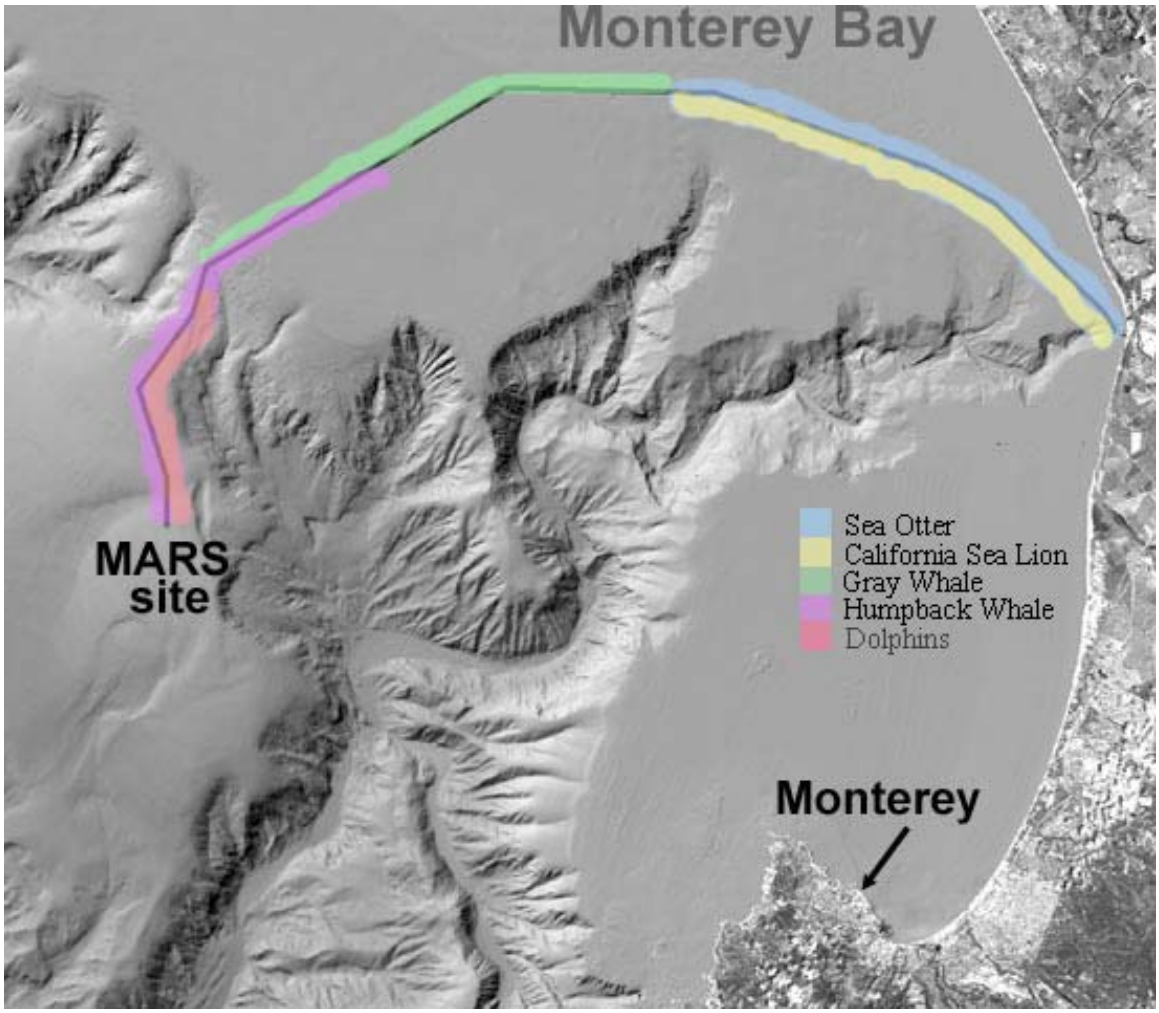


Figure 1. Generalized distribution of sightings of various marine mammal groupings. Basemap obtained from www.mbari.org/mars.

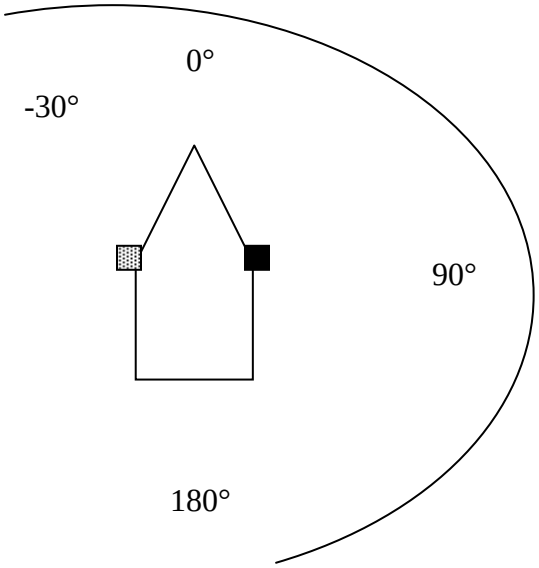
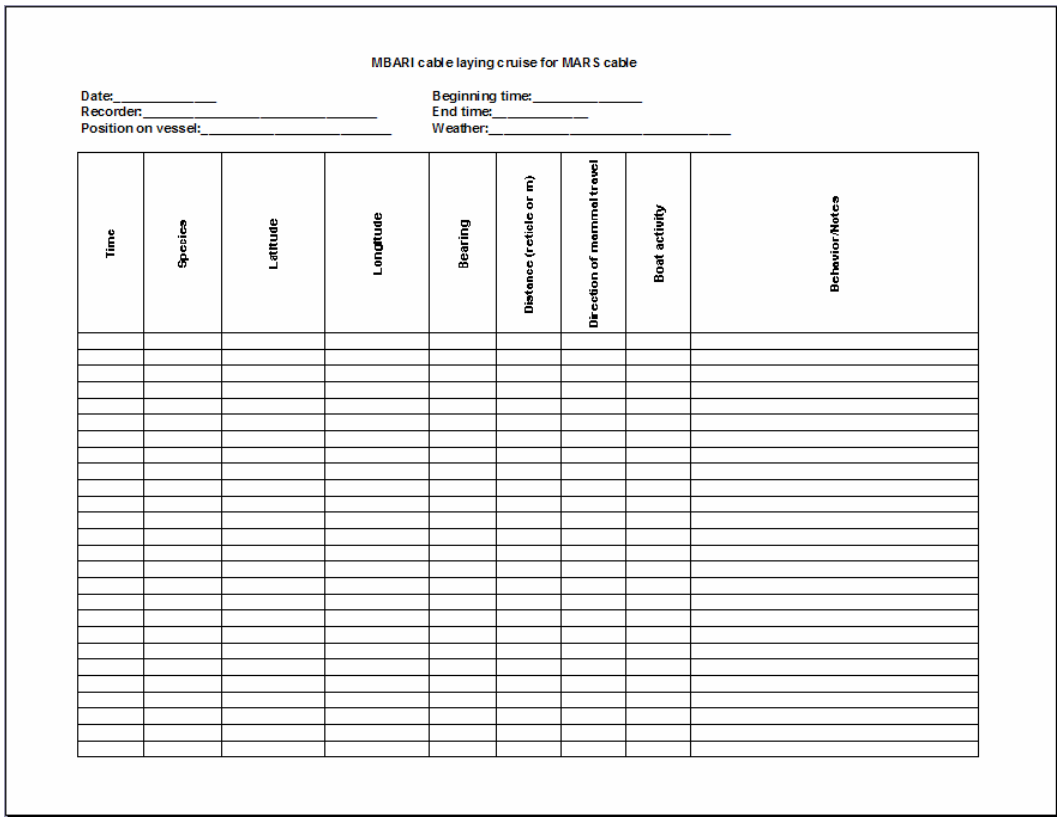


Figure 2. Arc showing approximate view shed around cable ship from starboard bridge wing (black square) and relative bearings around ship.



MBARI cable laying cruise for MARS cable

Date:_____ Beginning time:_____
Recorder:_____ End time:_____
Position on vessel:_____ Weather:_____

Time	Species	Latitude	Longitude	Bearing	Distance (reticle or m)	Direction of mammal travel	Boat activity	Behavior/Notes

Figure 3. Data sheet for marine mammal observations aboard the cable ship Global Sentinel.

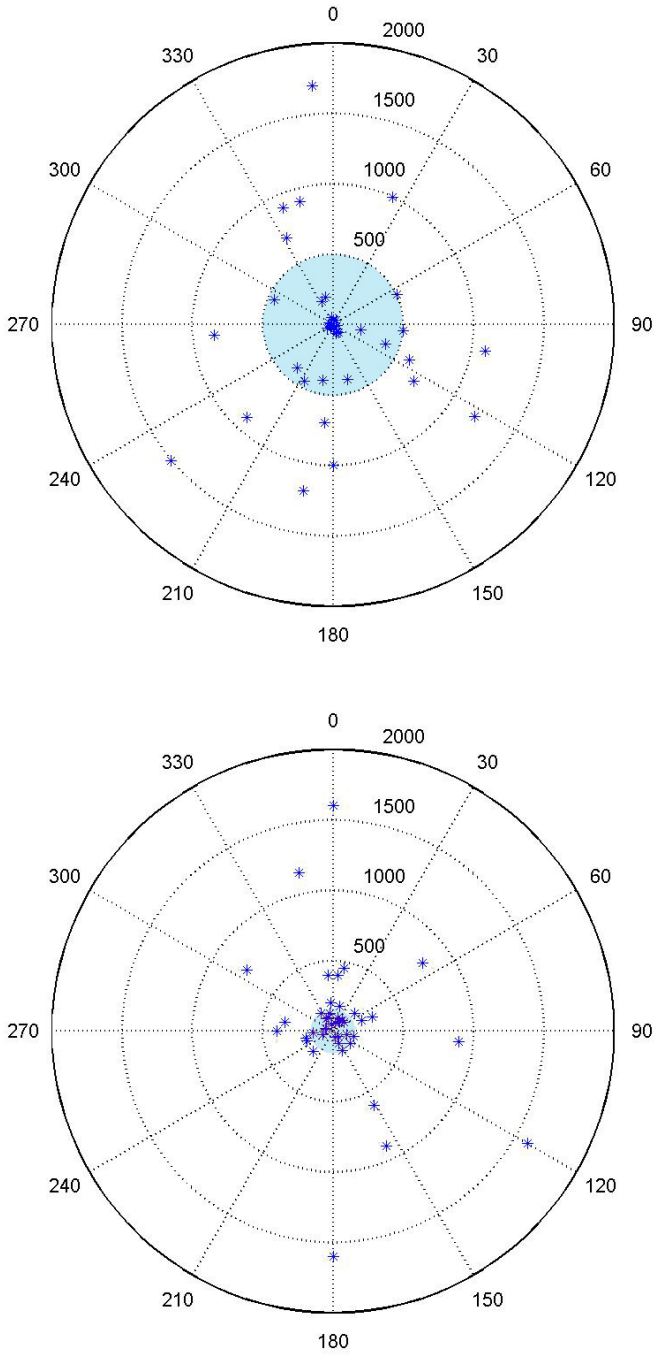


Figure 4. Sea otter sightings while plowing (top) with 500 m safety zone, and at other times (bottom) with 152 m safety zone. Shaded circles indicate safety zone, and ship's orientation is with bow towards 0 degrees.

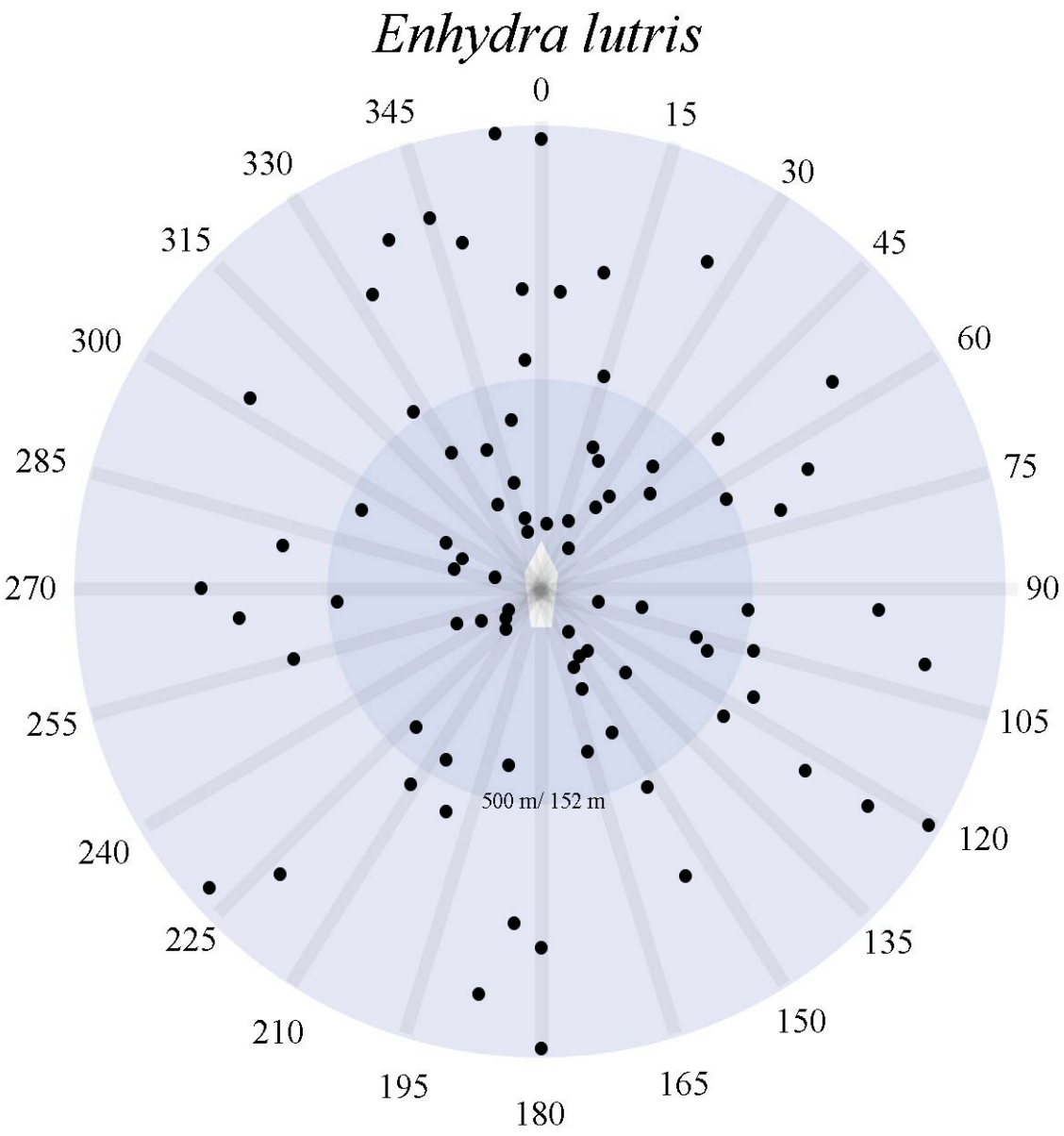


Figure 5. Relative bearing and relative distance of sea otter sightings, not to scale. The boundary between dark and light shading represents inside versus outside of the safety zone (500 m while plowing, 152 m at all other times). Outermost circle represents the greatest distance that sightings were made for each safety zone condition (1600 m while plowing, 1500 m without plow).

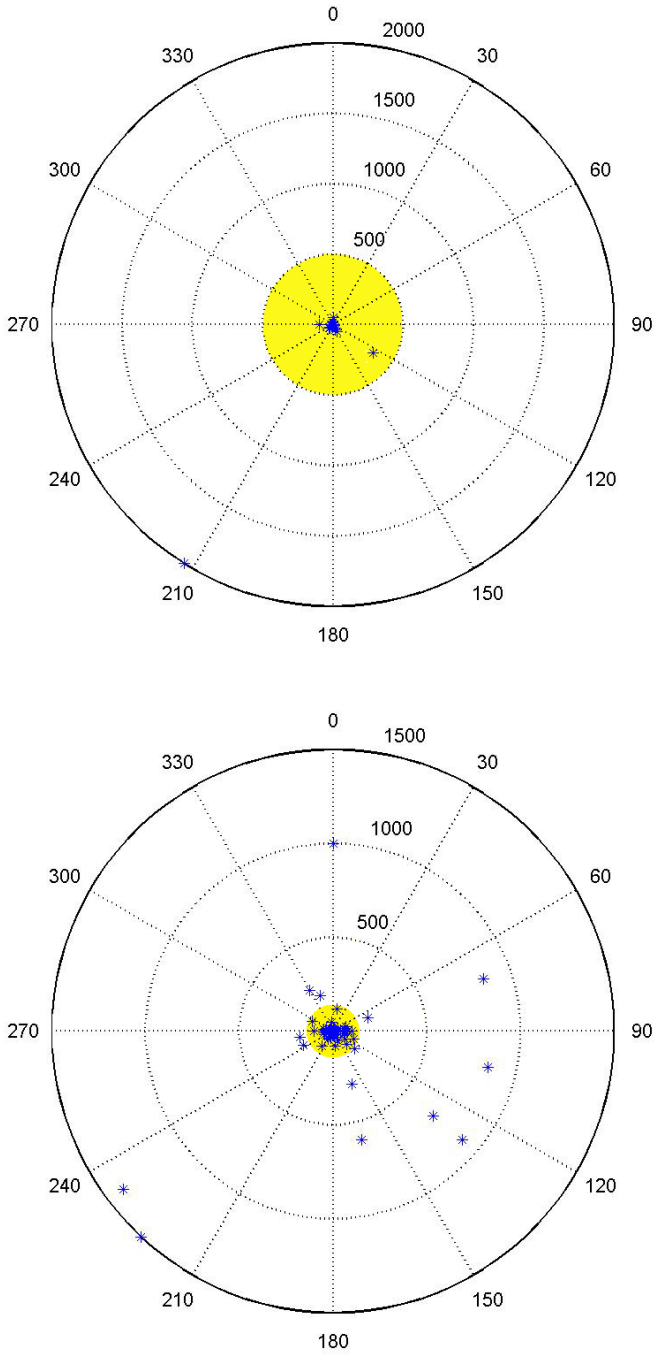


Figure 6. California sea lion sightings while plowing (top) with 500 m safety zone, and at other times (bottom) with 152 m safety zone. Shaded circles indicate safety zone, and ship's orientation is with bow towards 0 degrees.

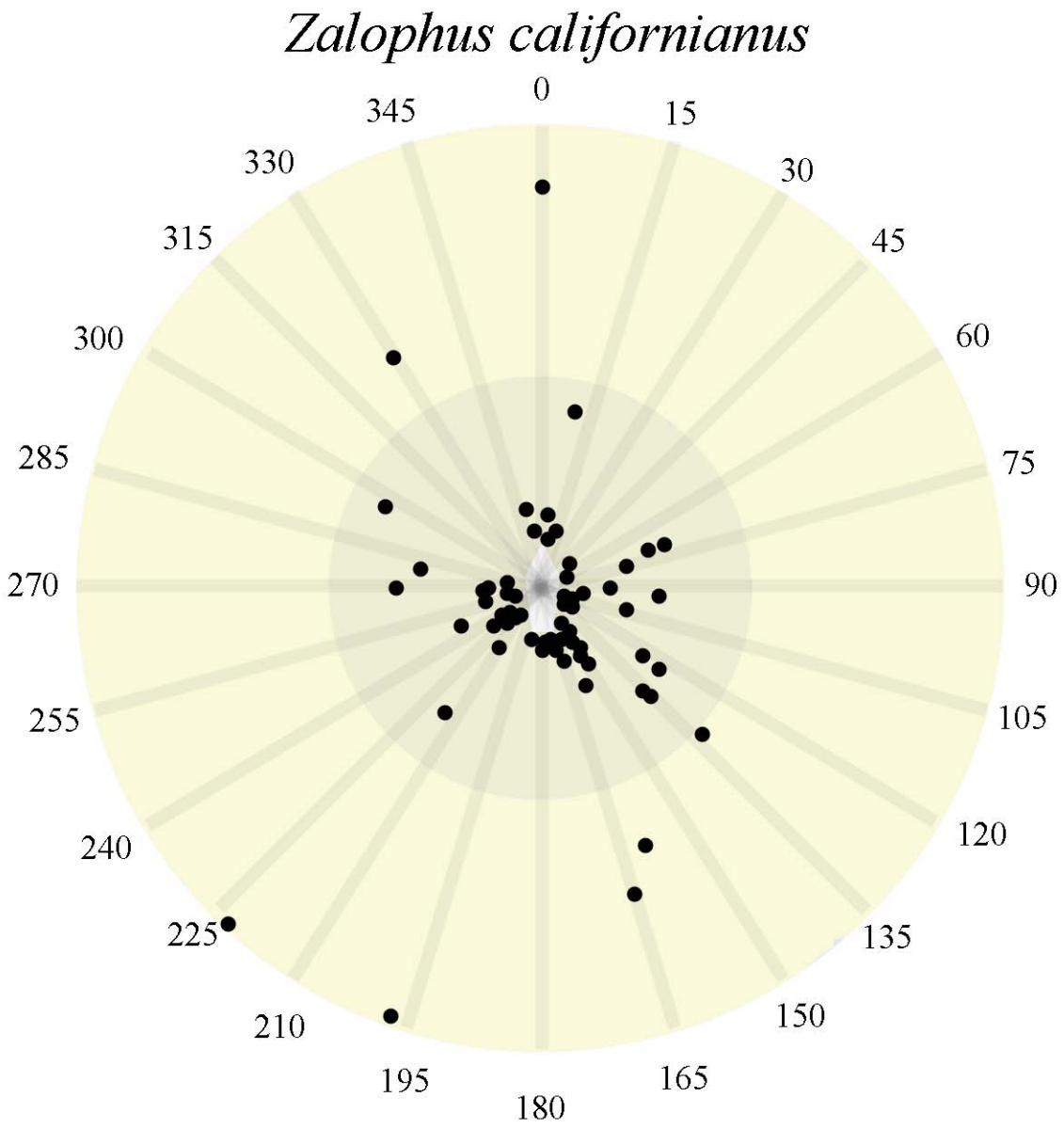


Figure 7. Relative bearing and relative distance of California sea lion sightings, not to scale. The boundary between dark and light shading represents inside versus outside of the safety zone (500 m while plowing, 152 m at all other times). Outermost circle represents the greatest distance that sightings were made for each safety zone condition (2000 m while plowing, 1500 m without plow).

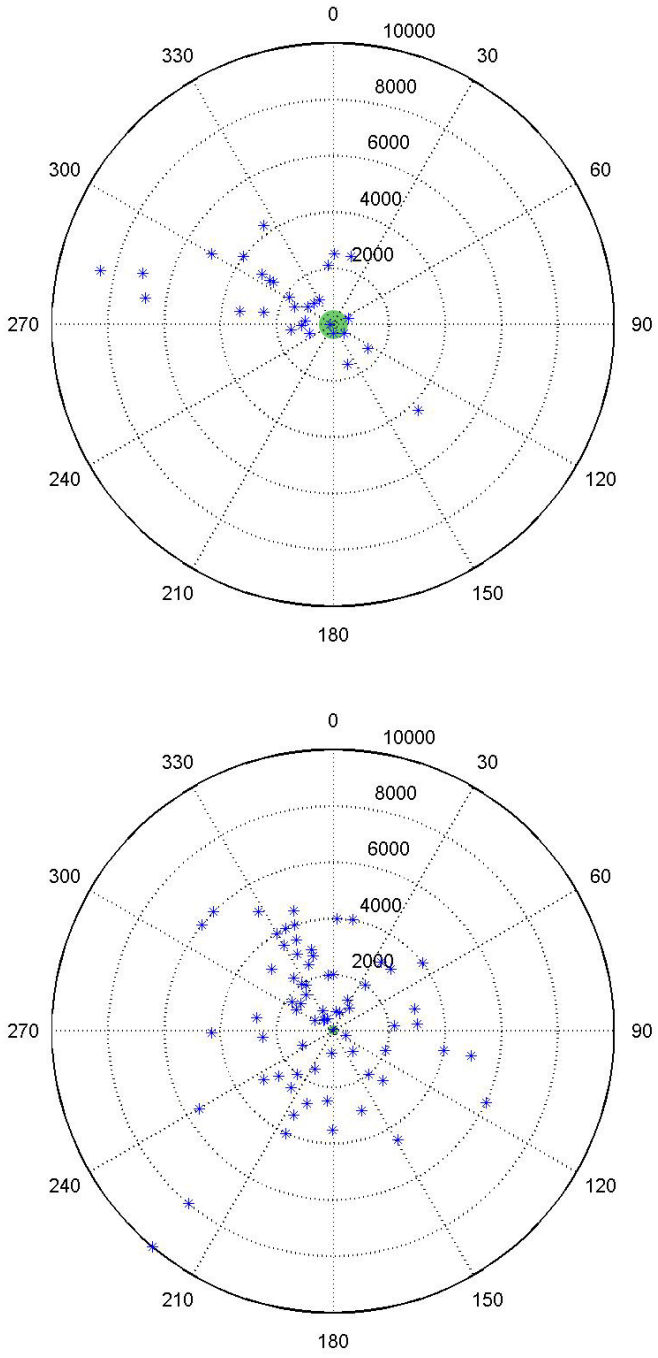


Figure 8. Gray whale sightings while plowing (top) with 500 m safety zone, and at other times (bottom) with 152 m safety zone. Shaded circles indicate safety zone, and ship's orientation is with bow towards 0 degrees.

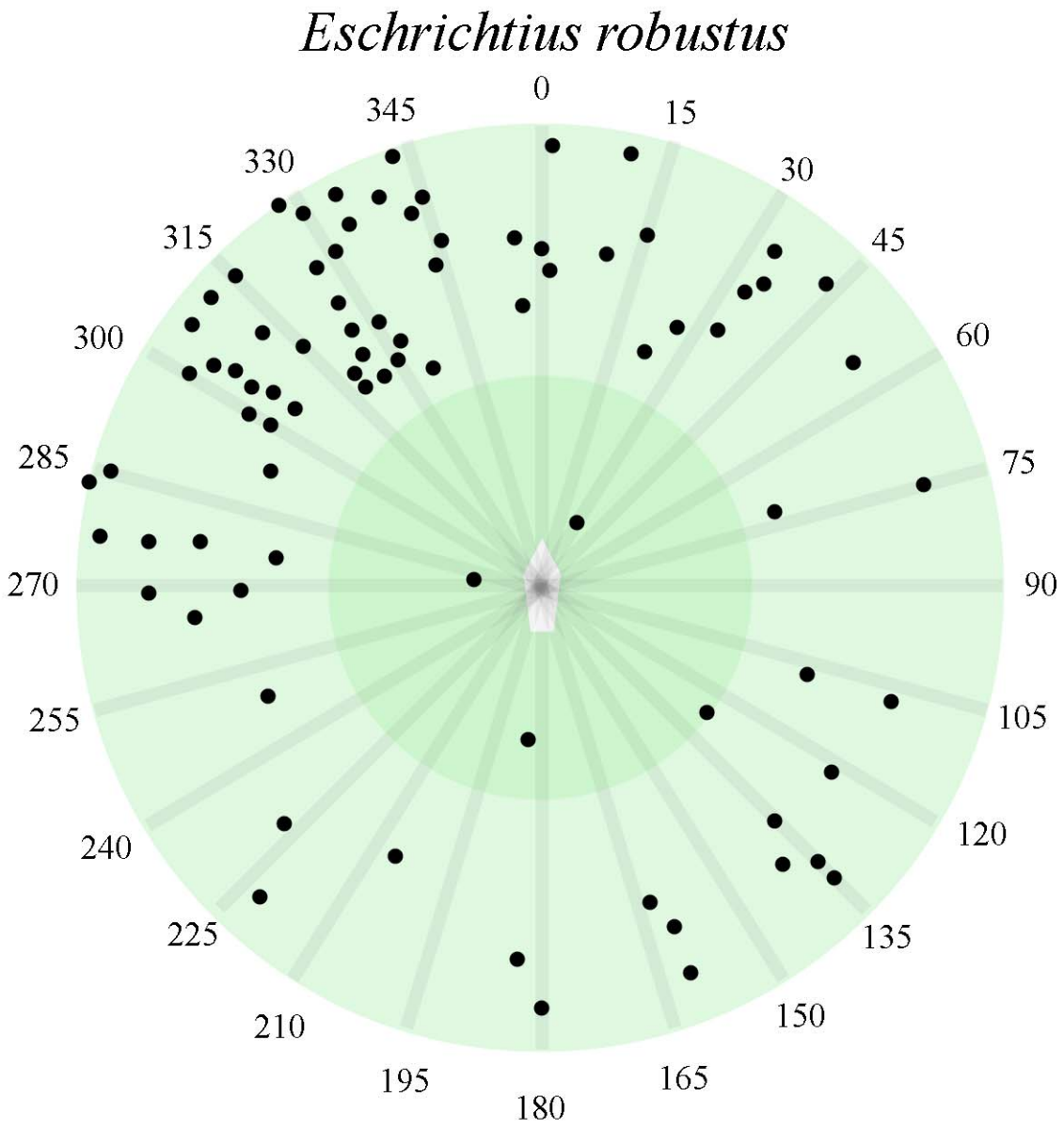


Figure 9. Relative bearing and relative distance of gray whale sightings, not to scale. The boundary between dark and light shading represents inside versus outside of the safety zone (500 m while plowing, 152 m at all other times). Outermost circle represents the greatest distance that sightings were made for each safety zone condition (8500 m while plowing, 6000 m without plow).

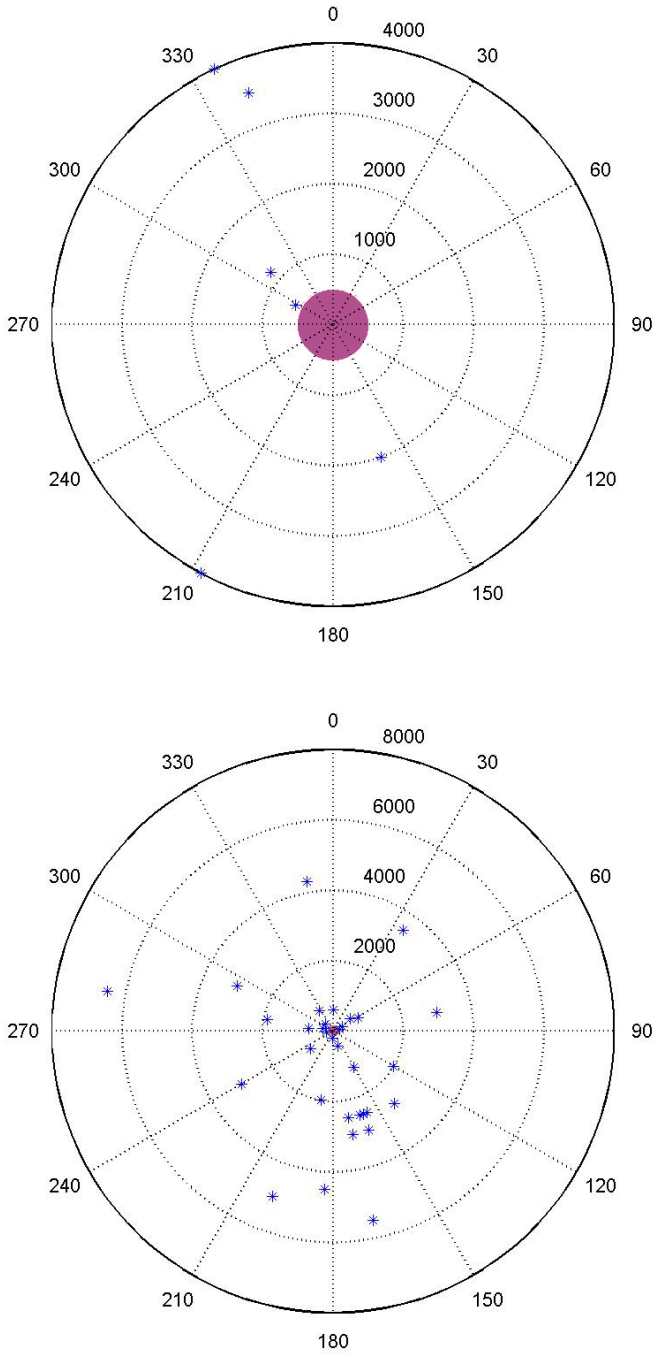


Figure 10. Humpback whale sightings while plowing (top) with 500 m safety zone, and at other times (bottom) with 152 m safety zone. Shaded circles indicate safety zone, and ship's orientation is with bow towards 0 degrees.

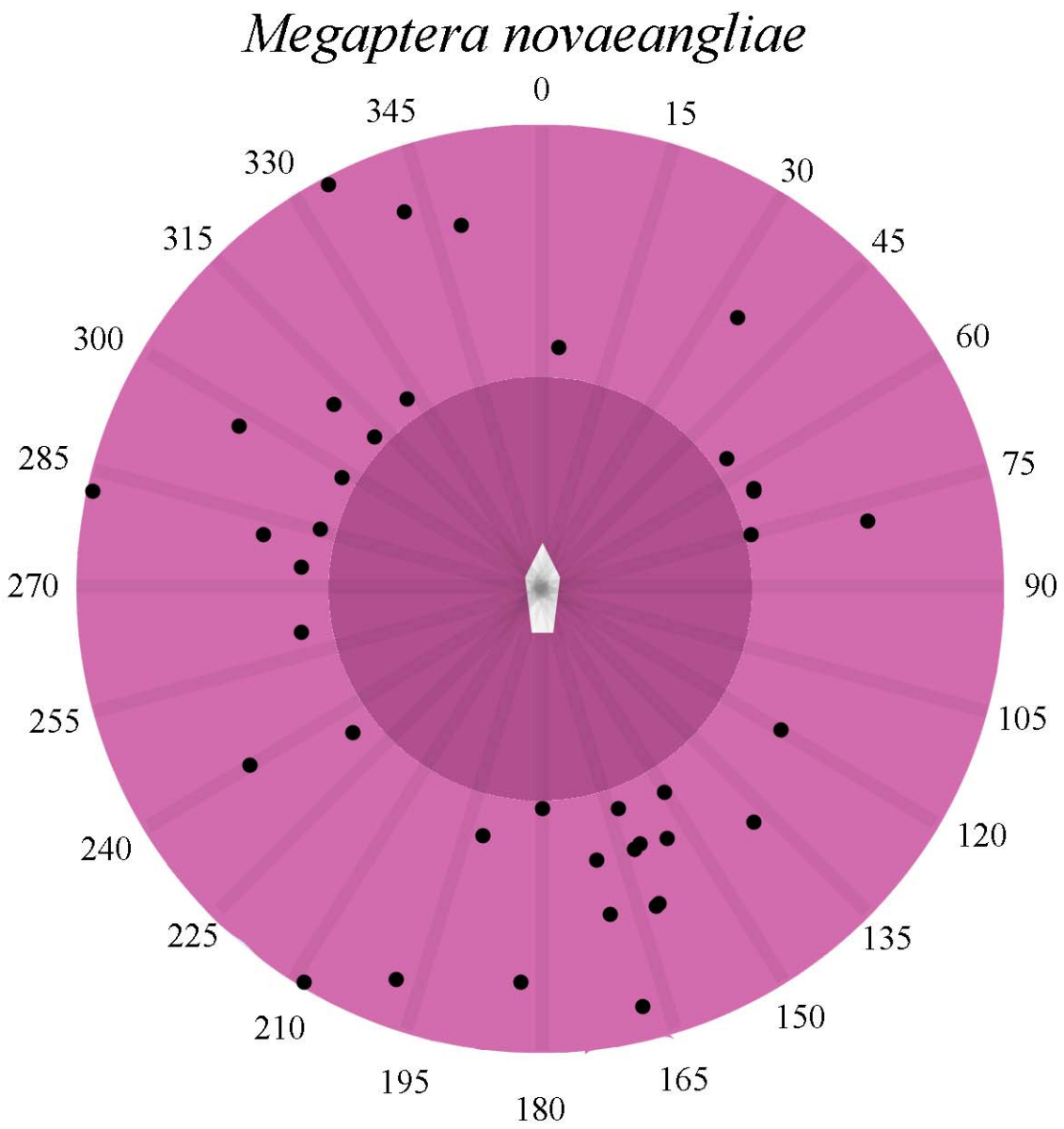


Figure 11. Relative bearing and relative distance of humpback whale sightings, not to scale. The boundary between dark and light shading represents inside versus outside of the safety zone (500 m while plowing, 152 m at all other times). Outermost circle represents the greatest distance that sightings were made for each safety zone condition (4000 m while plowing, 6500 m without plow).

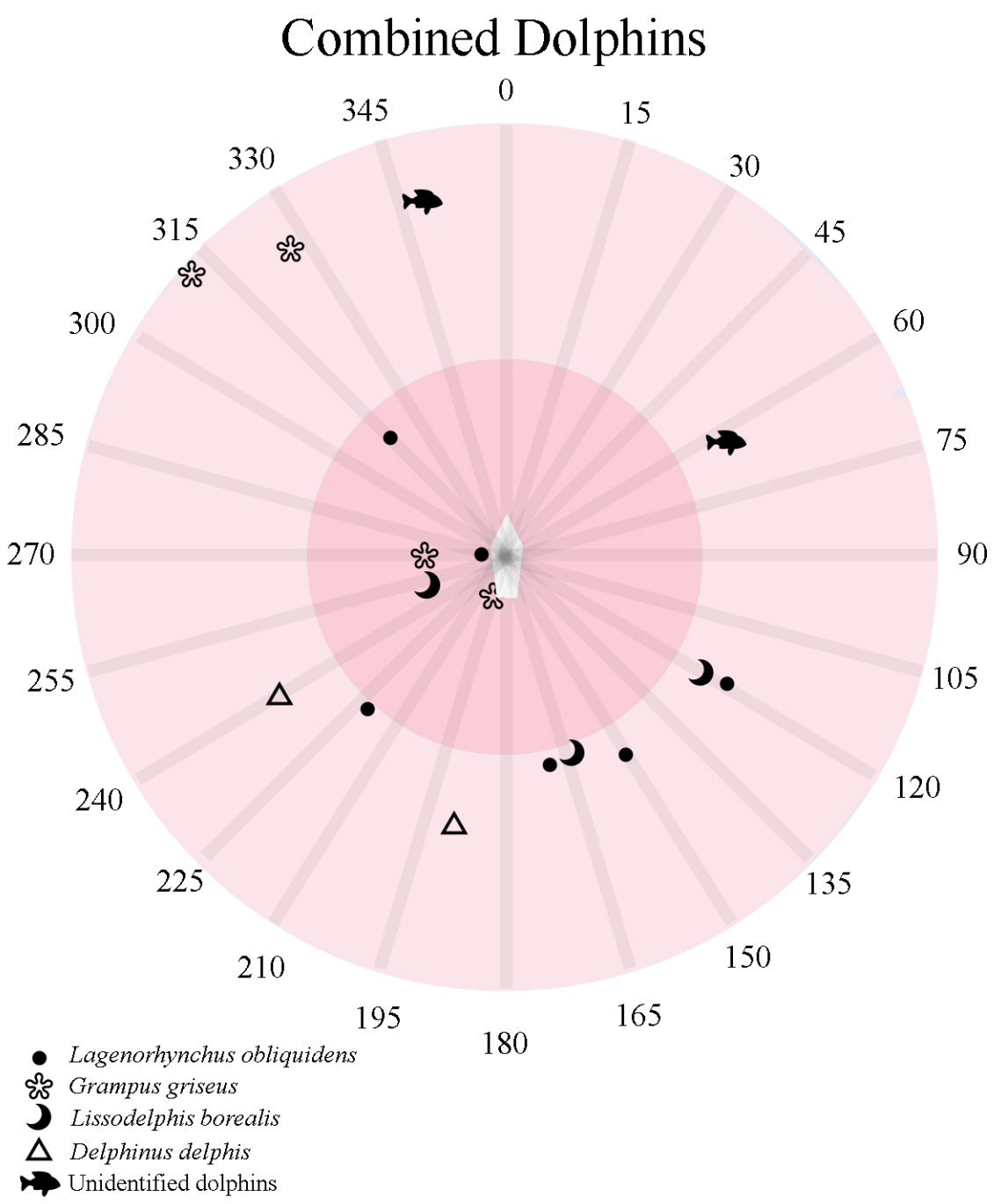


Figure 12. Relative bearing and relative distance of combined dolphin sightings, not to scale. The boundary between dark and light shading represents inside versus outside of the safety zone (500 m while plowing, 152 m at all other times). Outermost circle represents the greatest distance that sightings were made for each safety zone condition (1150 m while plowing, 6000 m without plow). Additional *Lagenorhynchus* sightings were made at 50 m and 20 to 6000 m, all around vessel (2 sightings), and at 25 to 1500 m, between 120 and 220 degrees, relative bearing (1 sighting). One probable sighting of *Grampus* was included in that category (190 degrees relative bearing).

Appendix. Summary of marine mammals sighted during MARS cruise, March 10 to April 1, 2007. Two instances of each date indicate midnight to noon and noon to midnight shifts (separate observers). Species codes: ENLU = sea otter, ZACA = California sea lion, ESRO = gray whale, MENO = humpback whale, LAOB = Pacific white-sided dolphin, LIBO = northern right whale dolphin, UNID = unidentified, PHVI = harbor seal, GRGR = Risso's dolphin, CAUR = northern fur seal, DEDE = common dolphin, PHDA = Dall's porpoise, EUJU = Steller (northern) sea lion.

Date	Species	Number	Inside Zone	Outside zone	Ship Interaction?	Notes	Avg Dist, m
3/10/2007	ENLU	9	*1*	*8*	n		914
	ZACA	2	*2*	*0*	n		70
	ESRO	2	*0*	*2*	n		750
3/10/2007	ENLU	14	*4*	*10*	n		248
	ZACA	3	*2*	*1*	y 1 investigated ship		122
	ESRO	2	*0*	*2*	n		700
3/11/2007	ZACA	1	*1*	*0*	n		10
	ESRO	2	*0*	*2*	n		2000
3/11/2007	ZACA	1	*1*	*0*	y 1 investigated ship		5
	ESRO	35	*0*	*35*	n		2950
	MENO	1	*0*	*1*	n		200
3/12/2007	ZACA	1	*0*	*1*	n		1000
	ESRO	34	*0*	*34*	n		2070
	MENO	3	*0*	*3*	n		2000
	LAOB	600	*0*	*2*	n		1750
	LIBO	400	*0*	*2*	n		1500
3/12/2007	MENO	15	*0*	*15*	n		1970
	UNID	20	*0*	*20*	n	large whales dolph assoc	5940
	UNID	50	*0*	*50*	n	w/Meno	800
3/13/2007	ZACA	1	*1*	*0*	n		5
3/13/2007	ZACA	2	*2*	*0*	y 2 investigated ship		7
3/14/2007	ENLU	7	*6*	*1*	n		116
	ZACA	22	*14*	*8*	n		92
	PHVI	3	*3*	*0*	n		70
3/14/2007	ENLU	8	*6*	*2*	y 2 avoid		305
	ZACA	11 + 200	*5*	6+200	y 4 investigating		318
	PHVI	1	*0*	*1*	n		900
3/15/2007	ENLU	6	*6*	*0*	n		77
	ZACA	29	*29*	*0*	n		47
	PHVI	2	*2*	*0*	n		95
3/15/2007	ENLU	6	*4*	*2*	n		390
	ZACA	40+100	*29*	*11+100*	y, 5 fishing, 1 investigating		346
	ESRO	1	*0*	*1*	n		800
3/16/2007	ENLU	18	*9*	*9*	n		621
	ZACA	5+50	*5*	*50*	n		419
3/16/2007	ENLU	3	*0*	*3*	n		875
	ZACA	1	*1*	*0*	y		10
3/17/2007	ENLU	14	*12*	*2*	y, 1 investigated ship		294
	ZACA	24	*24*	*0*	y, 11 milling around stern		33

Date	Species	Number	Inside Zone	Outside zone	Ship Interaction?	Notes	Avg Dist, m
	PHVI	1	*1*	*0*	n		50
3/17/2007	ENLU	3	*2*	*1*	n		600
	ZACA	3	*3*	*0*	n		19
	ESRO	3	*1*	*2*	n		550
3/18/2007	ESRO	13	*0*	*13*	n		2500
	MENO	4	*0*	*4*	n		2750
	UNID	6	*0*	*6*	n	large whales	6000
3/18/2007	ZACA	1	*1*	*0*	n		50
	ESRO	35	*3*	*32*	n		3300
3/19/2007	ZACA	1	*1*	*0*	n		40
	PHVI	1	*1*	*0*	n		50
	ESRO	25	*5*	*20*	n		2050
	MENO	2	*0*	*2*	n		1150
	UNID	1	*0*	*1*	n		horizon
	GRGR	50	*0*	*50*	n	2 groups, 40 + 10	1025
3/19/2007	ESRO	18	*0*	*18*	n		1500
	MENO	5	*0*	*5*	n		1800
	UNID	4	*0*	*4*	n		5180
3/20/2007	ESRO	1	*0*	*1*	n		1500
	MENO	7	*0*	*7*	n		2333
	GRGR	15	*15*	*0*	n		50
	CAUR	1	*0*	*1*	n		800
	DEDE	600	*0*	*600*	n		2000
	LAOB	50	*50*	*0*	n		50
3/20/2007	ESRO	4	*0*	*4*	n		3000
	MENO	14	*0*	*14*	n		1030
	UNID	7	*0*	*7*	n		3400
	LAOB	40	*40*	*0*	n		125
	PHDA	5	*0*	*5*	n		600
	EUJU	1	*1*	*0*	y, 1 investigating		10
3/21/2007	ESRO	3	*0*	*3*	n		4300
	UNID	3	*0*	*3*	n		4000
3/21/2007	ENLU	1	*0*	*1*	n		600
	ZACA	5	*5*	*0*	y, 1 investigating		24
	ESRO	3	*0*	*3*	n		950
3/22/2007	ESRO	12	*0*	*12*	n		2645
	UNID	4	*0*	*4*	n	large whale	5900
	UNID	200	*0*	*600*	n	dolphins	6700
	DEDE	200	*0*	*200*	n		1625
	EUJU	1	*1*	*0*	n		10
3/22/2007	ESRO	12	*0*	*12*	n		5250
3/29/2007	ZACA	1	*1*	*0*	y, 1 investigating		5
	ESRO	5	*0*	*5*	n		4550
	MENO	8	*0*	*8*	n		5000
	UNID	50	*0*	*50*	n	unid dolphins	4300
	LAOB	1	*1*	*0*	n		150
3/29/2007	ZACA	2	*2*	*0*	y, 2 investigating		38

Date	Species	Number	Inside Zone	Outside zone	Ship Interaction?	Notes	Avg Dist, m
	MENO	13	*0*	*13*	n		2500
	UNID	2	*0*	*2*	n	large whale	5625
	LAOB	1000	-	-	n		20 to 6000
3/30/2007	MENO	8	*1*	*7*	n		2600
	LAOB	7	*7*	*0*	n		35
3/30/2007	ZACA	1	*1*	*0*	n		40
	MENO	7	*0*	*7*	n		2050
	UNID	1	*0*	*1*	n	large whale	5000
	LAOB	800	*0*	*800*	y, some possible attraction		400
	LIBO	5	*0*	*5*	n		450
3/31/2007	ZACA	1	*1*	*0*	n		40
	MENO	2	*0*	*2*	n		3100
	UNID	1	*0*	*1*	n	large whale	4300
	LAOB	1000	*0*	*1000*	n		600
3/31/2007	MENO	3	*0*	*3*	n		2963
	UNID	3	*3*	*0*	y, 3 at stern	probable GRGR	5
4/1/2007	none						
4/1/2007	LAOB	700	-	-	n		25 to 1500
	LIBO	12	*12*	*0*	n	12 or more	50

CSGS Fallen Debris Log

Date	Time	Type of debris	Action taken to recover debris
21 MARCH 2007	1356 – 1423 UTC	Umbilical Float	F/V 'Donna Kathleen' called; float recovered by guard boat
21 March 2007	1933-2007	Umbilical Float	F/V "Ocean Gypsy" called 2nd recovered Float
3 April 2007	—	—	No further entries for remainder of MARS Project. Bridget Watts Bridget Watts Marine Mammal Monitor

Cable Job, Radio Log.

Mar.12 ,2007 No Contact

Mar.15,2007 No Contact

Mar.16,2007 845.Sail boat Victoria, small power boat- no answer, 9:33small fish boat, 1015: small fish boat.

Mar.18,2007 1100 hrs-small power boat, 1131 hrs small sail boat Wildfire.

Mar.19,2007 0300Talked to .Capt John-Droger, He wants way points for cable

Mar.21,2007 No contact

Mar.,29,2007 No contact

Mar.,30,2007 2100 hrs talked to fish boat-El Dorado

Paul Wheeler
4-1-07

TSS 350

Subsea Cable Tracking System

VT TSS



- Cable location data
- Depth of burial data
- Cable fault location
- Vehicle skew angle data
- Look-ahead information
- Tone discrimination

Features

- Good detection range
- Accurate and reliable survey data with quality control envelope
- Combination of advanced DSP technology and proven tone-detection techniques
- Tone frequency discrimination

Benefits

- Efficient location of cables at all burial depths
- Confidence in survey data; provides efficient post-processing
- Allows accurate location of all tone-carrying cables
- Allows location and survey of one cable among other cables and subsea pipelines and structures

With modern subsea cable systems becoming increasingly sophisticated and their deployment, recovery and repair a more exacting science, there is a need for accurate subsea cable location. The TSS 350 cable survey system has been developed to meet this requirement in a compact modular system that provides enhanced features whilst remaining easy to use.

The TSS 350 system is designed specifically for the detection and survey of tone-carrying cables. Featuring a comprehensive software display and menu structure, real-time information is presented in a clear graphical format and provided as a digital output for storage and subsequent processing.

This fully integrated system provides accurate survey data, verifying location and burial status of a cable as well as providing operators with fault location, vehicle skew angle and look-ahead information.

Designed to be installed on a wide range of subsea vehicles, the 350 system can detect tones on a telecommunications or power cable, or an umbilical.

The TSS 350 provides today's specialist operating companies with a system that will significantly improve their subsea operations allowing cable detection at greater burial depths for a variety of applications.

TSS S G Brown

TSS 350

TECHNICAL SPECIFICATIONS		
System performance *(dependent on tone – stated performance is based on 25Hz tone at 10mA current)*	Vertical measurement accuracy	5cm or 5% of slant range whichever is greater Stated accuracy applies within an envelope approximately 4.2m wide and 4.0m deep
	Maximum detection range	Cable detected at vertical range up to 10m and within a total horizontal swath width of 20m centred on the coil array
Subsea electonics pod (SEP)	Dimensions	140mm (diameter) x 450mm (h)
	Weight	10 Kg in air; 2 Kg in water
	SDC communication	2-wire 20mA digital current loop or 4-wire 20mA digital current loop, RS232 or RS422 via multiplexer
	Voltage input	110V ac (input range 98-135V ac) Optional : 240V ac (input range 198-270V ac)
	Input frequency	57-63 Hz @ 100/132V 47-53 Hz @ 180/264V
Altimeter	Dimensions	140mm (diameter) x 290mm (h)
	Frequency	200 kHz
	Range	Minimum 30cm – maximum 30m
	Connection cable	4m length (optional 7m length)
	Connection to	Subsea electronics pod
Depth rating	All subsea components are depth-rated to 3000m	
Field support kit	Supplied as part of the recommended system	
Warranty	15 months international warranty including parts and labour	
		Due to continuous development, specifications may vary from those listed above.

VT TSS

1 Garnett Close, Greycaine Industrial Estate, Watford, Hertfordshire WD24 7JZ, UK
Tel: +44 (0)1923 470800 Fax: +44 (0)1923 244849 Email: tssmail@vttss.com

Aberdeen: 10 The Technology Centre, Aberdeen Offshore Technology Park, Claymore Drive, Bridge of Don AB23 8JD, UK
Tel: +44 (0)1224 707081 Fax: +44 (0)1224 707085 Email: tssmail@vttss.com

Houston: 10801 Hammerly Blvd, Suite 128, Houston TX 77043, USA
Tel: +1 713 461 3030 Fax: +1 713 461 3099 Email: sales@vttss.com

A OPERATING THEORY

The 350 System locates a target by:

1. Detecting the alternating magnetic fields associated with tone currents injected onto the cable.

2. Isolating the tone frequency from background noise.

3. Calculating the position of the target cable from the relative strengths of the signals on each channel.

This appendix describes these processes.

A.1 Electromagnetic Fields **Page 2**

Magnetic fields surround any current-carrying conductor. These must be alternating fields produced by a tone current so that the 350 System can detect them.

A.2 Field Detection **Page 2**

The System uses an array of sensitive coils on the ROV to detect the alternating magnetic fields from the target cable.

A.3 Signal Isolation **Page 3**

The 350 System receives signals across a wide band of frequencies. These include noise together with the desired tone frequency. The System uses powerful signal processing techniques to reduce or eliminate background noise.

A.4 Calculation **Page 4**

Combinations of signals on the six channels allow the 350 System to deliver measurements of target co-ordinates, forward search range, and the angle of skew.

A.1 Electromagnetic Fields

The 350 System uses an array of sensing coils to detect the presence of alternating magnetic fields and applies complex and powerful signal-processing techniques to locate the origin of these magnetic fields.

Alternating magnetic fields exist around any conductor that carries an alternating current and are of a strength that varies directly with the instantaneous magnitude of the current.

Figure A–1: Lines of magnetic flux

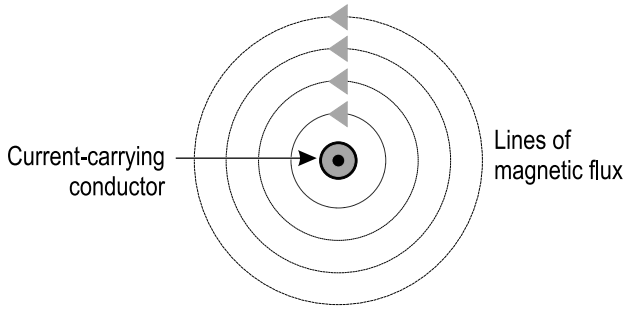


Figure A–1 shows the situation when a conductor carries a current. In this example, the conductor appears in cross-section with conventional current flow rising upwards out of the page. As the current begins to flow, lines of magnetic flux expand concentrically from the centre of the conductor with their polarity in an anti-clockwise direction as shown. The strength of the flux varies inversely with distance from the conductor.

When the amplitude of current varies, the flux lines will expand or collapse simultaneously. The flux lines will reverse polarity when the current changes direction.

A.2 Field Detection

Each sensing coil of the 350 System consists of a very large number of turns of fine copper wire wound around a ferrous metal core. The continuously changing magnetic fields that exist around a tone-carrying conductor act upon the sensing coils and induce in them an alternating voltage *v*. This voltage varies in magnitude according to the following relationships:

$$v \propto \frac{1}{d} \qquad v \propto f \qquad v \propto i$$

Where d = distance from the conductor to the sensing coil
f = frequency of current in the conductor
i = magnitude of current in the conductor

 © TSS (UK) Limited

A.3 Signal Isolation

Marine survey environments suffer from significant levels of background noise produced by other electrical systems on board the ROV. The 350 System must remove this noise from the coil signals before it can perform meaningful calculations.

This noise reduction process involves many stages, including:

1. Band-pass filtering:

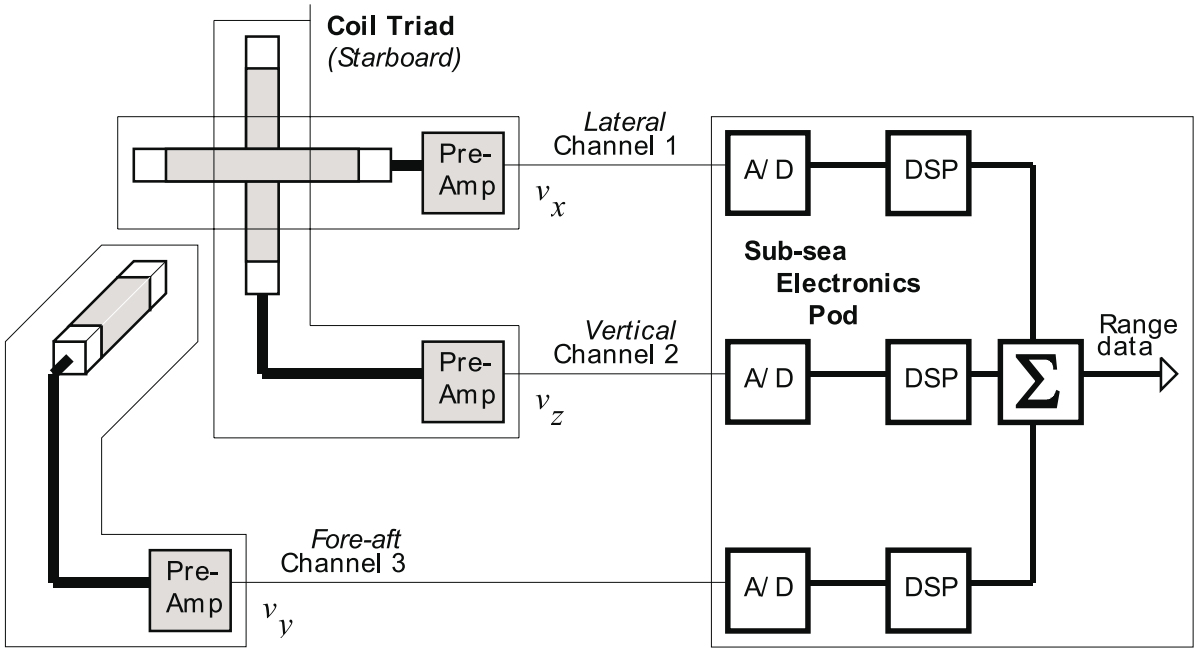
Signals received by the coils may be extremely weak – possibly less than 5µV in amplitude. Each of the six windings in the coil array therefore includes a precision pre-amplifier and filter board to apply amplification and signal conditioning before it transmits the signals to the relatively noisy environment on board the ROV. The pre-amplifier can vary its overall gain automatically according to circumstances.

An additional function of the pre-amplifier board is to apply high-pass and low-pass filtering. This function limits the pass-band of signals that arrive at the SEP to between 7.2Hz and 300Hz.

2. Frequency spectrum analysis

The SEP converts the analogue signals supplied by the coils to an 18-bit digital format for processing by the digital signal processor (DSP). Figure A–2 shows a simplified block diagram of the signal path for three of the six channels in the 350 System.

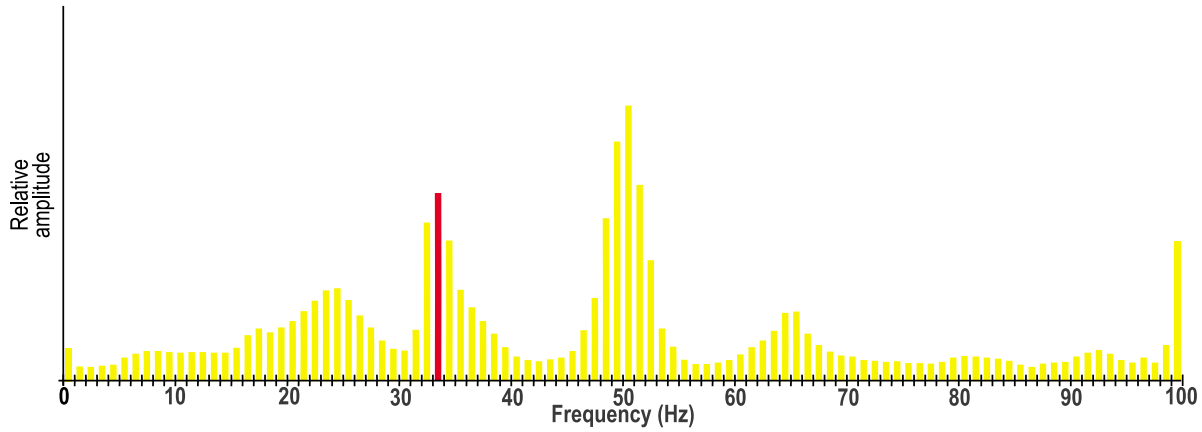
Figure A–2: Simplified signal path



The SEP samples the supplied signals approximately 1000 times per second and uses powerful signal processing techniques to determine the spectrum of received frequencies.

After processing the signals in this way, the SEP divides the entire received spectrum into narrow ‘windows’ as shown in Figure A–3. The System stores the instantaneous signal amplitude for each of these ‘windows’ in a series of memory locations.

Figure A–3: Frequency 'windows'



This process isolates the various frequency components in a signal very effectively so that the System can distinguish the tone frequency easily from among the background noise. The SDC display software provides a Frequency Spectrum feature similar to Figure A–3, with the tone frequency identified as a solid red bar. The example in Figure A–3 shows the tone frequency at 33Hz.

See sub-section 6.1.1.4 for a more detailed description of the complete Frequency Spectrum display.

A.4 Calculation

By using an array of two coil triads, the 350 System avoids potential sources of measurement error caused by changes in the amplitude of the tone signal. Calculations performed by the 350 System provide three modes of operation:

1. **Survey mode**:
   The SDC displays the vertical range to target and the lateral offset of the target relative to the centre of the coil array. If the System receives altitude information or you have specified a fixed coil height, this mode can also supply measurements of altitude and target depth of cover.

   See sub-section 6.1.1 for a full description of the Run Display screen.

2. **Forward Search mode**:
   The SDC can display an *estimate* of the range to a tone-carrying cable that lies along an intersecting course ahead of the ROV. This facility allows you to use the 350 System to conduct a search for a target in the survey area.

   See sub-section 6.1.2 for a full description of the Forward Search screen.

3. **Skew Measurement mode** *(operates with the Survey mode)*:
   The SDC displays and transmits the angle of skew measured between the track of the target and the ROV heading. Ideally, there should be no angle of skew present during a survey.

The SDC displays all measurements relative to the ROV. They might therefore contain errors if you operate the ROV with some angle of roll or pitch.

 © TSS (UK) Limited

You may pass measurements made using any available mode to an external data logger for subsequent analysis.

See Sections 5 and 6 for a description of the SDC software. Refer to Section 7 for instructions to use the 350 System during a survey.

A.4.1 Survey Mode

To measure the target co-ordinates (vertical range and lateral offset), the 350 System uses signals from only the vertical and the lateral sensing coils in each coil triad.

Given a known frequency and magnitude of current in the conductor, the amplitude of signal voltage delivered by each coil winding will depend upon the relative angle between the coil and the conductor.

Figure A–4: The effect of incident angle on coil response

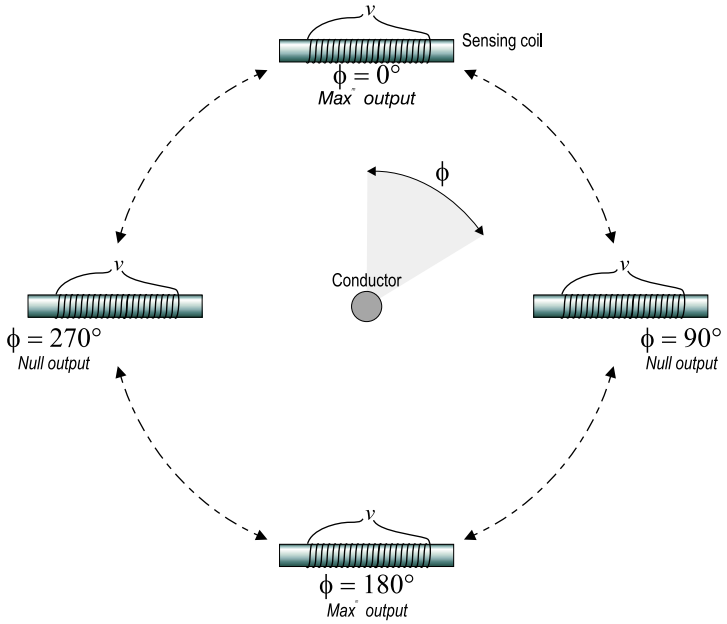


Figure A–4 shows the cross-section of a conductor carrying an alternating current that has a constant peak amplitude and frequency.

Figure A–5: Coil response as incident angle varies

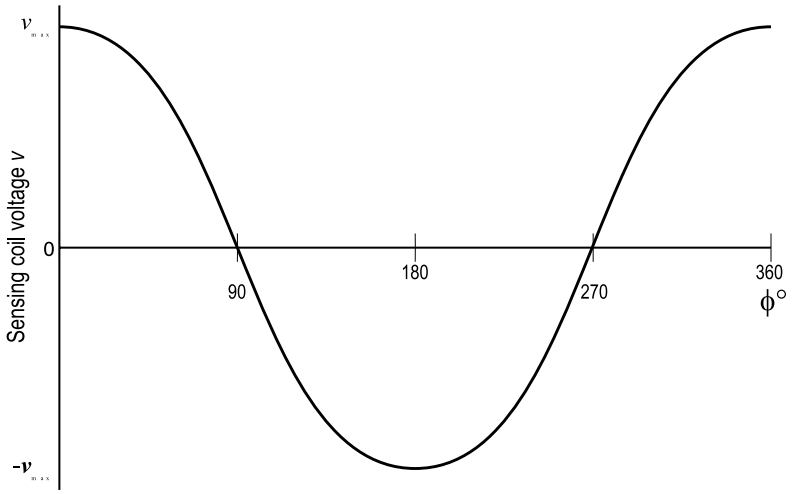


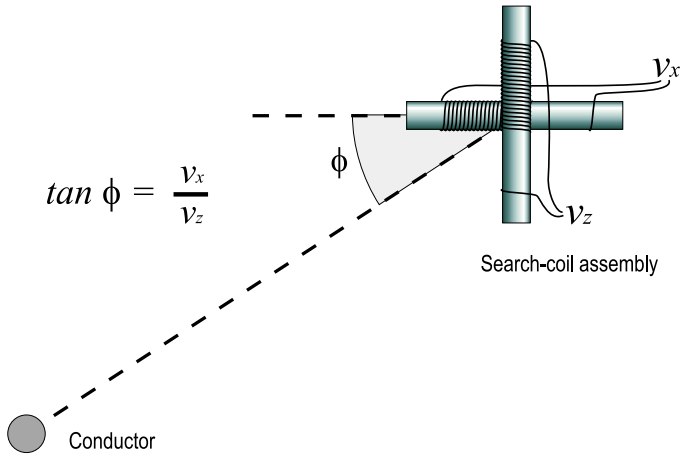
Figure A–5 shows the relationship that exists between the signal voltage v received by the coil in Figure A–4 and the angle ϕ between the coil and the conductor:

$v \propto \cos\phi$

- There will be no output (a null condition) when the conductor lies along the major axis of the sensing coil ($\phi = 90°$ or $\phi = 270°$).
- There will be maximum output when the conductor is on a line perpendicular to the major axis ($\phi = 0°$ or $\phi = 180°$).
- In all other conditions the coil output will be at some intermediate value between maximum and zero as defined in Figure A–5.

The 350 System uses two coils arranged at right angles to extend the coverage through a full 360°. By comparing the relative outputs from the two coils, the System can determine the angle between the centre of the coil pair and the target as shown in Figure A–6.

Figure A–6: Determination of relative angle using two coil voltages



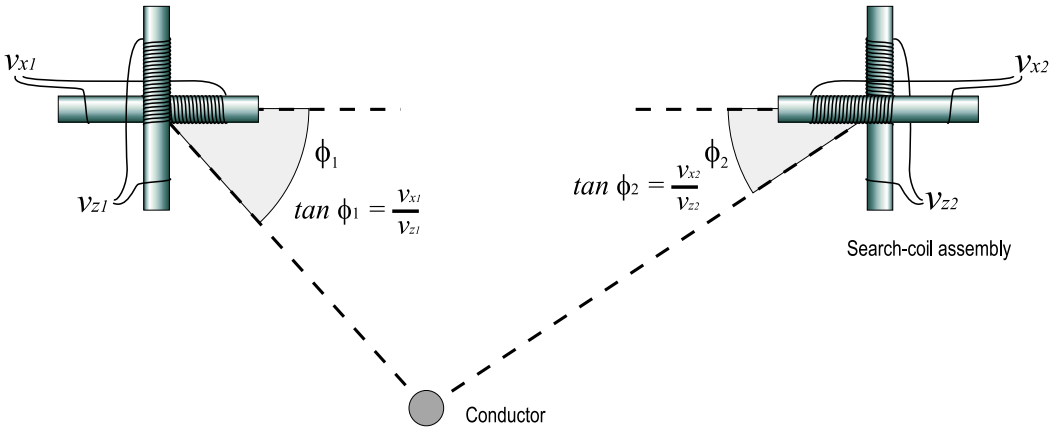
In Figure A–6 the two independent windings of the coil assembly supply signal voltages v_x (lateral coil) and v_z (vertical coil). The System uses these to derive the angle ϕ between the coil assembly and the conductor:

$$\tan\phi = \frac{v_x}{v_z}$$

Since TSS calibrates and matches the coil windings during manufacture, any changes to the tone frequency or current will have an equal effect on all coils. The ratio of their output voltages (and therefore the evaluation of ϕ) will therefore remain constant.

 © TSS (UK) Limited

Figure A–7: Target location using two coil pairs



The 350 System uses an array of two coil pairs to determine the *position* of the target cable. Figure A–7 shows this situation.

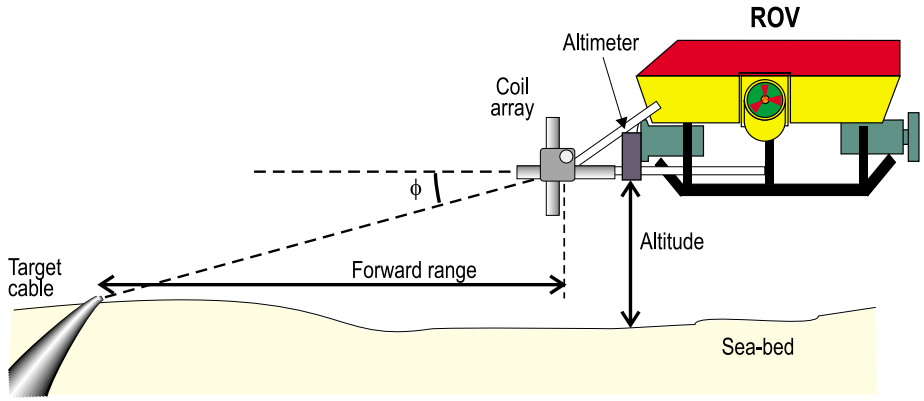
The SEP measures the strength of signals simultaneously on each of the four channels v_{x1}/v_{z1} and v_{x2}/v_{z2} and determines the target location by triangulation. The SEP extracts the co-ordinates for lateral offset and vertical range, and transmits these through the umbilical to the SDC.

A.4.2 Forward Search Mode

If the 350 System receives input from an altimeter, it can use this information to estimate the range to a tone-carrying cable that lies along an intersecting course ahead of the ROV.

You may find this facility useful if you are searching for a target in the survey area. You may use the display to steer the ROV towards the expected position of the target at a near-perpendicular angle and then switch to the run mode to steer a course along the target.

Figure A–8: Forward Range Calculation



When operating in the Forward Search mode, the 350 System uses signals from the vertical and the fore-aft coils.

Signals from the relevant coil pair allow the 350 System to determine the search angle ϕ to the target cable in the same way as described in sub-section A.4.1 above. The System then uses this information, together with the measured altitude of the ROV, to estimate the forward range:

$$\text{Forward range} \cong \frac{\text{Altitude}}{\tan\phi}$$

It is important to note that this range is an *estimate* only. Factors that affect the accuracy of this estimate are:

- The flatness of the seabed topography.
  The calculation assumes that the height of the coils relative to the target cable is the same as the altitude measured by the altimeter. Errors caused by uneven seabed topography are likely to be larger at greater forward ranges. The accuracy of the estimate will degrade further with a target buried beneath the seabed.

- Operating the ROV with pitch.
  Any angle of pitch will affect the forward search angle ϕ directly. The magnitude of errors caused by angles of pitch increases rapidly with forward range.

A.4.3 Skew Measurement

The Run Display screen includes a graphical element that shows the angle of skew between the ROV and the target cable (see sub-section 6.1.1 for further details of this display feature). The System uses the lateral and the fore-aft coils on one side of the array to measure skew.

Figure A–9 shows a survey ROV above the target cable. A small angle of skew exists between the target and the ROV.

The 350 System measures the target co-ordinates as explained in sub-section A.4.1 above. These measurements retain the specified accuracy for that part of the target directly between the two coil triads.

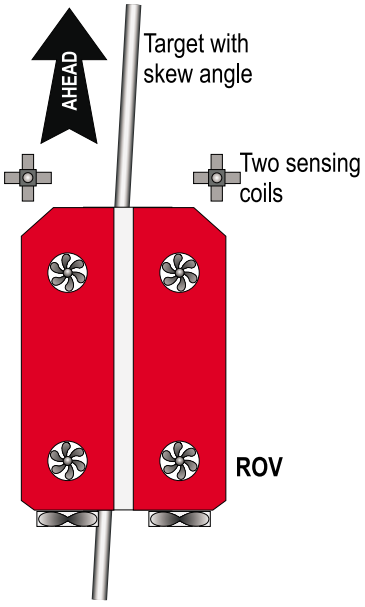


Figure A–9: Vehicle following target with skew angle

The example of Fig A–10 shows the target with a skew angle θ and the output voltages from the lateral coil (v_x) and the fore-aft coil (v_y) in the port coil triad.

Signal voltages supplied by the coil will be at a maximum with the major axis of the coil perpendicular to the target. A coil lying parallel to the course of the target will give a very weak output. The peak amplitude of output voltage will vary with the sine of the relative angle between the major axis of the coil and the target cable.

 © TSS (UK) Limited

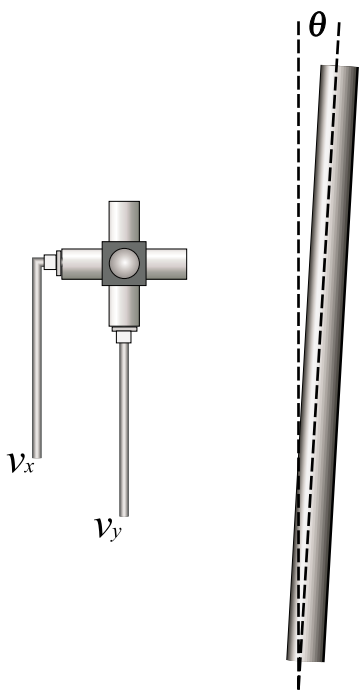


Figure A–10: Skew angle measurement

Because of this relationship, the System can determine the angle of skew θ:

$$\theta = \text{atan}\frac{v_y}{v_x}$$

The skew measurement method described does not require you to locate the coil triad directly over the target cable. It can work to the specified accuracy over a considerable swath range.

The convention used by the 350 System is to define positive skew with the ROV rotated clockwise relative to the target.

The SDC displays measurements of skew only with the System operating in the Survey mode.

 © TSS (UK) Limited

Appendix 9. Terms used in Appendix 10 and on various maps to describe the condition of the substrate and MARS cable in 2007. Conditions are depicted in the Figures referenced in the last column.

Observation Category	Description	Figure
cable < x meter section visible on surface	the cable is buried except for a specific short section of the cable which is visible on the seafloor	2
cable buried	the cable is not visible	11, 13
cable buried w/intermittent 0.3 m-long unburied sections	the cable is mostly buried, but with short sections visible on the seafloor	2
cable intermittently taut	the cable is laying directly on the seafloor, except occasionally where it is pulled tight and is 0.5-2 inches above the seafloor	3, 4
cable intermittently visible (every few meters)	the cable is alternately buried and unburied every few meters	5
cable partially buried (sinking into mud)	the cable is partially buried because it is sinking into soft sediment	19
cable slack on sediment surface	the cable is surface-laid and is lying directly on the seafloor	12
cable suspended within trench	the cable is suspended 1-2 inches above the bottom of the trench; the cable is not above the seafloor, but is not covered with sediment	6, 16
cable visible in trench	the cable is lying flat in bottom of the trench; the cable is not above the seafloor, but is not covered with sediment	18
cable visible within trench (<1 m section)	the cable is lying flat in bottom of the trench; the cable is not above the seafloor, but is not covered with sediment	17
eroded mixed substrate (mud interspersed with hard substrate)	substrate type	3, 4
MARS cable on top of discarded section	section of unused cable; this was later removed from the seafloor	14
minor span (x.xx m height, x m long)	cable is suspended a maximum est. height above the seafloor for the est. distance indicated	7
minor suspension (x.xx m height, x m long)	short section of cable is above the seafloor	8, 9
mixed substrate (mud interspersed with hard substrate)	mixed alternating substrate types	2
mud	substrate type	2
mud over clay	substrate type	18
rippled sand	substrate type	5, 11, 13
rocky habitat	substrate type	10
sandy mud	substrate type	14
splice	splice box where two sections of cable have been joined	12
trap	man-made trap encountered on the seafloor	15

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/16/07 17:17		36.810974	-121.799034	17.65	V2984-01	00:00:39:27	begin V2984
3/16/07 17:17		36.810974	-121.799034	17.65	V2984-01	00:00:39:27	begin rippled sand
3/16/07 17:33		36.809834	-121.798935	18.99	V2984-01	00:02:26:03	cable < 1 meter section visible on surface
3/16/07 17:36		36.810510	-121.799515	18.39	V2984-01	00:05:51:17	begin cable slack on sediment surface
3/16/07 17:36		36.810530	-121.799570	17.84	V2984-01	00:06:00:22	end cable slack on sediment surface
3/16/07 17:37		36.810604	-121.799770	18.77	V2984-01	00:06:41:10	begin cable slack on sediment surface
3/16/07 17:37		36.810640	-121.799870	18.57	V2984-01	00:06:56:15	end cable slack on sediment surface
3/16/07 17:37		36.810665	-121.799960	19.25	V2984-01	00:07:09:27	begin cable slack on sediment surface
3/16/07 17:38		36.810673	-121.799990	19.14	V2984-01	00:07:16:24	end cable slack on sediment surface
3/16/07 17:38		36.810715	-121.800110	19.11	V2984-01	00:07:34:27	begin cable slack on sediment surface
3/16/07 17:38		36.810715	-121.800110	19.09	V2984-01	00:07:37:20	end cable slack on sediment surface
3/16/07 17:38		36.810753	-121.800200	19.29	V2984-01	00:07:52:03	begin cable slack on sediment surface
3/16/07 17:38		36.810760	-121.800240	19.02	V2984-01	00:07:57:00	end cable slack on sediment surface
3/16/07 17:38		36.810780	-121.800260	18.99	V2984-01	00:08:00:06	begin cable slack on sediment surface
3/16/07 17:39		36.810814	-121.800350	18.33	V2984-01	00:08:12:14	end cable slack on sediment surface
3/16/07 17:44		36.810972	-121.800772	19.45	V2984-01	00:13:52:28	cable < 1 meter section visible on surface
3/16/07 17:44		36.811085	-121.800960	20.77	V2984-01	00:13:52:28	cable < 1 meter section visible on surface
3/16/07 18:20		36.819040	-121.811250	20.52	V2984-01	00:49:54:24	end V2984
3/17/07 13:46		36.818980	-121.811250	20.95	V2985-01	00:04:28:15	begin V2985
3/17/07 20:11		36.883975	-121.950525	38.37	V2985-06	05:56:52:27	end V2985
3/19/07 17:38		36.883766	-121.950096	39.79	V2986-01	00:00:16:04	begin V2986
3/19/07 20:04		36.885567	-122.032210	55.96	V2986-03	02:24:51:04	end rippled sand
3/19/07 20:04		36.885550	-122.032330	56.01	V2986-03	02:25:09:09	begin sandy mud
3/19/07 20:51		36.879772	-122.059940	70.97	V2986-03	03:12:46:06	end V2986
3/20/07 15:47		36.879837	-122.060005	71.12	V2987-01	00:00:18:09	begin V2987
3/20/07 19:44		36.846897	-122.130226	105.43	V2987-03	02:47:11:12	begin cable slack on sediment surface
3/20/07 19:45		36.847088	-122.131150	105.49	V2987-03	02:47:31:08	end cable slack on sediment surface
3/20/07 19:50		36.846104	-122.133354	106.89	V2987-03	02:53:00:15	begin cable slack on sediment surface
3/20/07 19:51		36.846004	-122.133736	107.15	V2987-03	02:53:28:26	end cable slack on sediment surface
3/20/07 19:54		36.845890	-122.135793	107.56	V2987-03	02:57:20:13	begin cable slack on sediment surface

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/20/07 19:55		36.845220	-122.135544	107.98	V2987-03	02:57:55:18	end cable slack on sediment surface
3/20/07 20:06		36.843216	-122.140180	110.35	V2987-03	03:08:52:22	begin cable slack on sediment surface
3/20/07 20:06		36.843216	-122.140180	109.98	V2987-03	03:08:58:01	end cable slack on sediment surface
3/20/07 20:18		36.842484	-122.140915	110.40	V2987-04	03:17:41:15	cable < 2 meter section visible on surface
3/20/07 20:19		36.842860	-122.141400	110.46	V2987-04	03:18:09:26	cable < 2 meter section visible on surface
3/20/07 20:19		36.842862	-122.141402	110.11	V2987-04	03:18:27:02	begin cable slack on sediment surface
3/20/07 20:20		36.842130	-122.141975	112.19	V2987-04	03:19:48:01	end cable slack on sediment surface
3/20/07 20:21		36.842113	-122.142296	113.29	V2987-04	03:20:29:25	cable < 2 meter section visible on surface m
3/20/07 20:32		36.841092	-122.147230	117.36	V2987-04	03:31:42:02	begin cable slack on sediment surface
							note: tape V2987-04 continues recording video that overlaps with terrain recorded (and reported here) on KP 36.481-36.021
3/22/2007	13:54:10	36.792952	-122.191020	462.00	KP 42.923-40.324	13:54:10	Begin *Triton T-200* Dive (**moving toward shore**)
3/22/2007	13:54:10	36.792952	-122.191020	462.00	KP 42.923-40.324	13:54:10	begin cable buried
3/22/2007	13:54:10	36.792952	-122.191020	462.00	KP 42.923-40.324	13:54:10	begin rippled sand
3/22/2007	13:54:10	36.792952	-122.191020	462.00	KP 42.923-40.324	13:54:10	begin wide trench
3/22/2007	13:59:58	36.793218	-122.191032	461.00	KP 42.923-40.324	13:59:58	begin cable visible in trench
3/22/2007	13:59:58	36.793218	-122.191032	461.00	KP 42.923-40.324	13:59:58	end cable buried
3/22/2007	14:01:45	36.793357	-122.190813	460.00	KP 42.923-40.324	14:01:45	begin cable slack on sediment surface
3/22/2007	14:01:45	36.793357	-122.190813	460.00	KP 42.923-40.324	14:01:45	begin cable intermittently taut
3/22/2007	14:01:45	36.793357	-122.190813	460.00	KP 42.923-40.324	14:01:45	end cable visible in trench
3/22/2007	14:01:45	36.793357	-122.190813	460.00	KP 42.923-40.324	14:01:45	end wide trench (cable buried)
3/22/2007	14:08:55	36.793847	-122.190497	459.00	KP 42.923-40.324	14:08:55	end cable slack on sediment surface
3/22/2007	14:08:55	36.793847	-122.190497	459.00	KP 42.923-40.324	14:08:55	begin cable intermittently visible (every few meters)
3/22/2007	14:08:55	36.793847	-122.190497	459.00	KP 42.923-40.324	14:08:55	end cable intermittently taut
3/22/2007	14:12:53	36.793847	-122.190497	459.00	KP 42.923-40.324	14:12:53	end cable intermittently visible (every few meters)
3/22/2007	14:12:53	36.792952	-122.191020	458.00	KP 42.923-40.324	14:12:53	begin cable buried with intermittent 0.3 m-distance unburied sections
3/22/2007	14:22:03	36.794457	-122.190173	456.00	KP 42.923-40.324	14:22:03	begin cable slack on sediment surface
3/22/2007	14:22:03	36.794457	-122.190173	456.00	KP 42.923-40.324	14:22:03	begin cable intermittently taut
3/22/2007	14:22:03	36.794457	-122.190173	456.00	KP 42.923-40.324	14:22:03	end cable buried with intermittent 0.3 m-distance unburied sections
3/22/2007	14:24:40	36.794653	-122.190053	456.00	KP 42.923-40.324	14:24:40	begin eroded mixed substrate (mud interspersed with hard substrate)

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/22/2007	14:24:40	36.794653	-122.190053	456.00	KP 42.923-40.324	14:24:40	end rippled sand
3/22/2007	14:29:28	36.795063	-122.189848	455.00	KP 42.923-40.324	14:29:28	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	14:31:10	36.795185	-122.189740	455.00	KP 42.923-40.324	14:31:10	cable grip
3/22/2007	14:32:44	36.795298	-122.189670	455.00	KP 42.923-40.324	14:32:44	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	14:34:19	36.795460	-122.189623	454.00	KP 42.923-40.324	14:34:19	begin cable suspended within trench
3/22/2007	14:34:19	36.795460	-122.189623	454.00	KP 42.923-40.324	14:34:19	end cable slack on sediment surface
3/22/2007	14:34:19	36.795460	-122.189623	454.00	KP 42.923-40.324	14:34:19	end cable intermittently taut
3/22/2007	14:36:45	36.795625	-122.189470	455.00	KP 42.923-40.324	14:36:45	end cable suspended within trench
3/22/2007	14:37:04	36.795657	-122.189448	455.00	KP 42.923-40.324	14:37:04	begin cable slack on sediment surface
3/22/2007	14:37:04	36.795657	-122.189448	455.00	KP 42.923-40.324	14:37:04	begin cable intermittently taut
3/22/2007	14:37:04	36.795657	-122.189448	455.00	KP 42.923-40.324	14:37:04	begin rocky habitat
3/22/2007	14:37:04	36.795657	-122.189448	455.00	KP 42.923-40.324	14:37:04	end eroded mixed substrate (mud interspersed with hard substrate)
3/22/2007	14:37:53	36.795723	-122.189428	453.00	KP 42.923-40.324	14:37:53	begin cable slack on sediment surface
3/22/2007	14:37:53	36.795723	-122.189428	453.00	KP 42.923-40.324	14:37:53	end cable intermittently taut
3/22/2007	14:40:38	36.795952	-122.189292	456.00	KP 42.923-40.324	14:40:38	begin cable intermittently taut
3/22/2007	14:40:38	36.795952	-122.189292	456.00	KP 42.923-40.324	14:40:38	end cable slack on sediment surface
3/22/2007	15:16:10	36.799015	-122.187265	441.00	KP 42.923-40.324	15:16:10	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	15:23:31	36.799720	-122.186725	439.00	KP 42.923-40.324	15:23:31	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	15:28:42	36.800232	-122.186385	436.00	KP 42.923-40.324	15:28:42	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	15:32:29	36.800612	-122.186092	434.00	KP 42.923-40.324	15:32:29	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	15:34:17	36.800772	-122.185963	433.00	KP 42.923-40.324	15:34:17	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	15:48:39	36.802140	-122.184773	433.00	KP 42.923-40.324	15:48:39	begin cable slack on sediment surface
3/22/2007	15:48:39	36.802140	-122.184773	433.00	KP 42.923-40.324	15:48:39	end cable intermittently taut
3/22/2007	16:03:58	36.803585	-122.183528	431.00	KP 42.923-40.324	16:03:58	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	16:03:58	36.803585	-122.183528	431.00	KP 42.923-40.324	16:03:58	end cable slack on sediment surface
3/22/2007	16:06:43	36.803838	-122.183267	431.00	KP 42.923-40.324	16:06:43	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	16:13:10	36.804313	-122.182785	429.00	KP 42.923-40.324	16:13:10	begin cable intermittently taut
3/22/2007	16:14:37	36.804452	-122.182705	429.00	KP 42.923-40.324	16:14:37	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	16:16:32	36.804595	-122.182533	428.00	KP 42.923-40.324	16:16:32	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	16:50:16	36.807503	-122.179657	407.00	KP 42.923-40.324	16:50:16	begin cable slack on sediment surface

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/22/2007	16:50:16	36.807503	-122.179657	407.00	KP 42.923-40.324	16:50:16	end cable intermittently taut
3/22/2007	16:52:17	36.807632	-122.179508	405.00	KP 42.923-40.324	16:52:17	begin cable intermittently taut
3/22/2007	16:52:17	36.807632	-122.179508	405.00	KP 42.923-40.324	16:52:17	end cable slack on sediment surface
3/22/2007	17:04:58	36.808732	-122.178293	395.00	KP 42.923-40.324	17:04:58	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:05:37	36.808785	-122.178193	394.00	KP 42.923-40.324	17:05:37	begin minor span (0.15 m height, 16 m distance)
3/22/2007	17:07:14	36.808913	-122.178077	394.00	KP 42.923-40.324	17:07:14	end minor span (0.15 m height, 16 m distance)
3/22/2007	17:11:44	36.809293	-122.177588	391.00	KP 42.923-40.324	17:11:44	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:14:13	36.809465	-122.177375	390.00	KP 42.923-40.324	17:14:13	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:20:07	36.809967	-122.176888	386.00	KP 42.923-40.324	17:20:07	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:22:39	36.810198	-122.176657	385.00	KP 42.923-40.324	17:22:39	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:24:15	36.810340	-122.176522	384.00	KP 42.923-40.324	17:24:15	begin minor span (0.15 m height, 18 m distance)
3/22/2007	17:25:44	36.810443	-122.176362	384.00	KP 42.923-40.324	17:25:44	end minor span (0.15 m height, 18 m distance)
3/22/2007	17:28:14	36.810690	-122.176190	383.00	KP 42.923-40.324	17:28:14	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:35:05	36.811285	-122.175597	380.00	KP 42.923-40.324	17:35:05	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:36:10	36.811378	-122.175472	380.00	KP 42.923-40.324	17:36:10	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:37:21	36.811475	-122.175405	380.00	KP 42.923-40.324	17:37:21	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:41:22	36.811872	-122.175083	379.00	KP 42.923-40.324	17:41:22	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:41:55	36.811913	-122.175058	379.00	KP 42.923-40.324	17:41:55	begin minor span (0.2 m height, 16 m distance)
3/22/2007	17:43:00	36.812000	-122.174912	379.00	KP 42.923-40.324	17:43:00	end minor span (0.2 m height, 16 m distance)
3/22/2007	17:50:13	36.814640	-122.173132	367.00	KP 40.324-36.481	17:50:13	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	17:50:13	36.814640	-122.174877	379.00	KP 40.324-36.481	17:50:13	end rocky habitat
3/22/2007	17:50:13	36.812058	-122.174877	379.00	KP 40.324-36.481	17:50:13	begin mud
3/22/2007	17:50:13	36.812058	-122.174877	379.00	KP 40.324-36.481	17:50:13	begin cable intermittently taut
3/22/2007	17:50:13	36.812058	-122.174877	379.00	KP 40.324-36.481	17:50:13	begin cable slack on sediment surface
3/22/2007	18:17:48	36.814800	-122.173018	366.00	KP 40.324-36.481	18:17:48	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:19:59	36.814867	-122.172985	366.00	KP 40.324-36.481	18:19:59	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:21:20	36.815000	-122.172935	366.00	KP 40.324-36.481	18:21:20	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:26:08	36.815485	-122.172738	365.00	KP 40.324-36.481	18:26:08	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:26:55	36.815562	-122.172725	365.00	KP 40.324-36.481	18:26:55	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:28:26	36.815723	-122.172637	364.00	KP 40.324-36.481	18:28:26	minor suspension (< 0.1 m height, < 1 m distance)

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/22/2007	18:31:26	36.816058	-122.172537	364.00	KP 40.324-36.481	18:31:26	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:34:41	36.816407	-122.172443	362.00	KP 40.324-36.481	18:34:41	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:38:26	36.816783	-122.172320	360.00	KP 40.324-36.481	18:38:26	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:40:11	36.816990	-122.172273	359.00	KP 40.324-36.481	18:40:11	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:42:33	36.817222	-122.172187	358.00	KP 40.324-36.481	18:42:33	minor suspension (0.17 m height, <1 m distance)
3/22/2007	18:50:58	36.818142	-122.171942	358.00	KP 40.324-36.481	18:50:58	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:52:52	36.818328	-122.171870	357.00	KP 40.324-36.481	18:52:52	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:58:19	36.818913	-122.171685	355.00	KP 40.324-36.481	18:58:19	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	18:59:40	36.819072	-122.171660	355.00	KP 40.324-36.481	18:59:40	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:03:37	36.819472	-122.171528	353.00	KP 40.324-36.481	19:03:37	minor suspension (0.15 m height, < 1 m distance)
3/22/2007	19:04:59	36.819580	-122.171505	351.00	KP 40.324-36.481	19:04:59	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:08:05	36.819910	-122.171432	348.00	KP 40.324-36.481	19:08:05	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:12:17	36.820372	-122.171263	346.00	KP 40.324-36.481	19:12:17	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:12:53	36.820423	-122.171245	346.00	KP 40.324-36.481	19:12:53	minor suspension (0.1 m height, < 1 m distance)
3/22/2007	19:15:27	36.820707	-122.171178	344.00	KP 40.324-36.481	19:15:27	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:22:11	36.821427	-122.170955	340.00	KP 40.324-36.481	19:22:11	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:23:24	36.821550	-122.170910	340.00	KP 40.324-36.481	19:23:24	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:29:54	36.822255	-122.170687	336.00	KP 40.324-36.481	19:29:54	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:36:01	36.822907	-122.170483	333.00	KP 40.324-36.481	19:36:01	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:41:32	36.823505	-122.170178	330.00	KP 40.324-36.481	19:41:32	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	19:59:28	36.825417	-122.169555	322.00	KP 40.324-36.481	19:59:28	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:00:59	36.826282	-122.169113	317.00	KP 40.324-36.481	20:00:59	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:02:03	36.825682	-122.169407	321.00	KP 40.324-36.481	20:02:03	begin minor span (0.15 m height, 9 m distance)
3/22/2007	20:03:50	36.825758	-122.169365	321.00	KP 40.324-36.481	20:03:50	end minor span (0.15 m height, 9 m distance)
3/22/2007	20:17:20	36.827080	-122.168680	312.00	KP 40.324-36.481	20:17:20	minor suspension (0.1 m height, < 1 m distance)
3/22/2007	20:21:53	36.827685	-122.168337	309.00	KP 40.324-36.481	20:21:53	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:27:57	36.828563	-122.167858	310.00	KP 40.324-36.481	20:27:57	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:29:25	36.829850	-122.167005	315.00	KP 40.324-36.481	20:29:25	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:29:25	36.828743	-122.167742	311.00	KP 40.324-36.481	20:29:25	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:29:25	36.828743	-122.167742	311.00	KP 40.324-36.481	20:29:25	minor suspension (< 0.1 m height, < 1 m distance)

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/22/2007	20:29:50	36.828803	-122.167697	311.00	KP 40.324-36.481	20:29:50	begin minor span (0.08 m height, 159 m distance)
3/22/2007	20:30:18	36.828848	-122.167675	312.00	KP 40.324-36.481	20:30:18	end minor span (0.08 m height,159 m distance)
3/22/2007	20:31:27	36.829007	-122.167590	312.00	KP 40.324-36.481	20:31:27	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:31:59	36.829052	-122.167552	312.00	KP 40.324-36.481	20:31:59	start minor span (0.08 m height, 12 m distance)
3/22/2007	20:32:38	36.829157	-122.167502	312.00	KP 40.324-36.481	20:32:38	end minor span (0.08 m height,12 m distance)
3/22/2007	20:35:00	36.829483	-122.167287	313.00	KP 40.324-36.481	20:35:00	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:35:48	36.829585	-122.167220	314.00	KP 40.324-36.481	20:35:48	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:36:37	36.829718	-122.167132	315.00	KP 40.324-36.481	20:36:37	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:40:32	36.830295	-122.166715	315.00	KP 40.324-36.481	20:40:32	begin cable partially buried
3/22/2007	20:40:32	36.830295	-122.166715	315.00	KP 40.324-36.481	20:40:32	begin sandy mud
3/22/2007	20:40:32	36.830295	-122.166715	315.00	KP 40.324-36.481	20:40:32	end mud
3/22/2007	20:40:32	36.830295	-122.166715	315.00	KP 40.324-36.481	20:40:32	end cable intermittently taut
3/22/2007	20:41:28	36.830448	-122.166573	314.00	KP 40.324-36.481	20:41:28	begin cable intermittently taut
3/22/2007	20:41:28	36.830448	-122.166573	314.00	KP 40.324-36.481	20:41:28	end cable partially buried
3/22/2007	20:42:39	36.830610	-122.166413	313.00	KP 40.324-36.481	20:42:39	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:43:19	36.830840	-122.166198	309.00	KP 40.324-36.481	20:43:19	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	20:44:15	36.830840	-122.166233	310.00	KP 40.324-36.481	20:44:15	begin minor span (0.08 m height, 128 m distance)
3/22/2007	20:44:51	36.830885	-122.166172	310.00	KP 40.324-36.481	20:44:51	end minor span (0.08 m height,128 m distance)
3/22/2007	20:52:13	36.831995	-122.165110	300.00	KP 40.324-36.481	20:52:13	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	21:03:59	36.833782	-122.163113	274.00	KP 40.324-36.481	21:03:59	begin cable partially buried
3/22/2007	21:03:59	36.833782	-122.163113	274.00	KP 40.324-36.481	21:03:59	end cable intermittently taut
3/22/2007	21:14:09	36.835115	-122.161240	310.00	KP 40.324-36.481	21:14:09	begin minor span (0.5 m height, 25 m distance)
3/22/2007	21:15:13	36.835258	-122.161045	310.00	KP 40.324-36.481	21:15:13	end minor span (0.5 m height, 25 m distance)
3/22/2007	21:15:46	36.835308	-122.160935	309.00	KP 40.324-36.481	21:15:46	begin minor span (0.09 m height, 10 m distance)
3/22/2007	21:16:33	36.835398	-122.160830	309.00	KP 40.324-36.481	21:16:33	end minor span (0.09 m height,10 m distance)
3/22/2007	21:18:04	36.835555	-122.160617	216.00	KP 40.324-36.481	21:18:04	begin mixed substrate (mud interspersed with hard substrate)
3/22/2007	21:18:04	36.835555	-122.160617	216.00	KP 40.324-36.481	21:18:04	end sandy mud
3/22/2007	21:18:04	36.835555	-122.160617	216.00	KP 40.324-36.481	21:18:04	begin cable intermittently taut
3/22/2007	21:18:04	36.835555	-122.160617	216.00	KP 40.324-36.481	21:18:04	end cable partially buried
3/22/2007	21:23:22	36.836228	-122.159548	194.00	KP 40.324-36.481	21:23:22	begin minor span (0.15 m height, 27 m distance)

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/22/2007	21:24:30	36.836325	-122.159342	189.00	KP 40.324-36.481	21:24:30	begin sandy mud
3/22/2007	21:24:30	36.836325	-122.159342	189.00	KP 40.324-36.481	21:24:30	end mixed substrate (mud interspersed with hard substrate)
3/22/2007	21:24:44	36.836363	-122.159310	188.00	KP 40.324-36.481	21:24:44	begin cable slack on sediment surface
3/22/2007	21:24:44	36.836363	-122.159310	188.00	KP 40.324-36.481	21:24:44	end cable intermittently taut
3/22/2007	21:24:44	36.836363	-122.159310	188.00	KP 40.324-36.481	21:24:44	end minor span (0.15 m height, 27 m distance)
3/22/2007	21:31:53	36.837080	-122.157688	160.00	KP 40.324-36.481	21:31:53	splice
3/22/2007	21:37:15	36.836845	-122.156332	149.00	KP 40.324-36.481	21:37:15	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	21:37:54	36.837560	-122.156203	147.00	KP 40.324-36.481	21:37:54	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	21:44:00	36.838180	-122.154503	142.00	KP 40.324-36.481	21:44:00	begin mixed substrate (mud interspersed with hard substrate)
3/22/2007	21:44:00	36.838180	-122.154503	142.00	KP 40.324-36.481	21:44:00	end sandy mud
3/22/2007	21:45:01	36.838218	-122.154418	139.00	KP 40.324-36.481	21:45:01	begin minor span (0.08 m height, 8 m distance)
3/22/2007	21:45:16	36.838232	-122.154333	139.00	KP 40.324-36.481	21:45:16	end minor span (0.08 m height, 8 m distance)
3/22/2007	21:46:12	36.838340	-122.154053	138.00	KP 40.324-36.481	21:46:12	minor suspension (< 0.1 m height, < 1 m distance)
3/22/2007	21:47:05	36.838432	-122.153823	136.00	KP 40.324-36.481	21:47:05	begin minor span (0.08 m height, 13 m distance)
3/22/2007	21:47:30	36.838478	-122.153685	136.00	KP 40.324-36.481	21:47:30	end minor span (0.08 m height, 13 m distance)
3/22/2007	21:52:00	36.839008	-122.152258	129.00	KP 40.324-36.481	21:52:00	begin mud
3/22/2007	21:52:00	36.839008	-122.152258	129.00	KP 40.324-36.481	21:52:00	end mixed substrate (mud interspersed with hard substrate)
3/22/2007	21:55:40	36.839200	-122.151747	129.00	KP 40.324-36.481	21:55:40	begin cable intermittently taut
3/22/2007	21:55:40	36.839200	-122.151747	129.00	KP 36.481-36.021	21:55:40	end cable slack on sediment surface
3/22/2007	21:56:39	36.839245	-122.151610	128.00	KP 36.481-36.021	21:56:39	begin cable slack on sediment surface
3/22/2007	21:56:39	36.839245	-122.151610	128.00	KP 36.481-36.021	21:56:39	end cable intermittently taut
3/22/2007	22:16:00	36.840078	-122.149512	124.00	KP 36.481-36.021	22:16:00	begin cable intermittently taut
3/22/2007	22:16:00	36.840078	-122.149512	124.00	KP 36.481-36.021	22:16:00	end cable slack on sediment surface
3/22/2007	22:17:00	36.840120	-122.149402	124.00	KP 36.481-36.021	22:17:00	begin mixed substrate (mud interspersed with hard substrate)
3/22/2007	22:17:00	36.840120	-122.149402	124.00	KP 36.481-36.021	22:17:00	end mud
3/22/2007	22:19:00	36.840293	-122.148970	122.00	KP 36.481-36.021	22:19:00	begin cable slack on sediment surface
3/22/2007	22:19:00	36.840293	-122.148970	122.00	KP 36.481-36.021	22:19:00	end cable intermittently taut
3/22/2007	22:28:00	36.840850	-122.147725	119.00	KP 36.481-36.021	22:28:00	minor suspension (0.2 m height, <1 m distance)
3/22/2007	22:28:00	36.840850	-122.147725	119.00	KP 36.481-36.021	22:28:00	begin cable intermittently taut
3/22/2007	22:28:00	36.840850	-122.147725	119.00	KP 36.481-36.021	22:28:00	end cable slack on sediment surface

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/22/2007	22:28:38	36.840870	-122.147705	120.00	KP 36.481-36.021	22:28:38	minor suspension (0.2 m height, <1 m distance)
3/22/2007	22:29:12	36.840905	-122.147603	119.00	KP 36.481-36.021	22:29:12	end cable slack on sediment surface
3/22/2007	22:29:12	36.840905	-122.147603	119.00	KP 36.481-36.021	22:29:12	begin cable buried
3/22/2007	22:29:12	36.840905	-122.147603	119.00	KP 36.481-36.021	22:29:12	end cable intermittently taut
3/22/2007	22:43:17	36.840785	-122.148257	120.00	KP 36.481-36.021	22:43:17	begin cable intermittently taut
3/22/2007	22:43:17	36.840785	-122.148257	120.00	KP 36.481-36.021	22:43:17	end cable buried
3/22/2007	22:43:17	36.840785	-122.148257	120.00	KP 36.481-36.021	22:43:17	begin cable slack on sediment surface
3/22/2007	23:15:40	36.839968	-122.149802	124.00	KP 36.481-36.021	23:15:40	end cable intermittently taut
3/22/2007	23:15:40	36.839968	-122.149802	124.00	KP 36.481-36.021	23:15:40	MARS cable on top of discarded section; also recorded on V2987
3/22/2007	23:15:40	36.839968	-122.149802	124.00	KP 36.481-36.021	23:15:40	end cable slack on sediment surface
3/22/2007	23:15:40	36.839968	-122.149802	124.00	KP 36.481-36.021	23:15:40	end mixed substrate (mud interspersed with hard substrate)
3/22/2007	23:15:40	36.839968	-122.149802	124.00	KP 36.481-36.021	23:15:40	end *Triton T-200* Dive
3/22/07 16:35		36.723263	-122.186570	817.59	V2988-01	00:00:05:08	begin V2988 (moving toward shore)
3/22/07 16:35		36.723263	-122.186570	817.59	V2988-01	00:00:05:08	begin mud over clay
3/22/07 16:41		36.722440	-122.186380	823.32	V2988-01	00:06:36:25	cable < 1 meter section visible on surface
3/22/07 16:42		36.722298	-122.186480	823.27	V2988-01	00:06:43:20	cable < 1 meter section visible on surface
3/22/07 16:42		36.722137	-122.186470	824.44	V2988-01	00:07:14:18	cable < 1 meter section visible on surface
3/22/07 16:42		36.722183	-122.186066	824.81	V2988-01	00:07:29:19	cable < 1 meter section visible on surface
3/22/07 16:42		36.721860	-122.186950	825.05	V2988-01	00:07:33:00	cable < 1 meter section visible on surface
3/22/07 16:42		36.721890	-122.186340	825.32	V2988-01	00:07:39:27	cable < 1 meter section visible on surface
3/22/07 16:42		36.721890	-122.186340	825.32	V2988-01	00:07:40:17	cable < 1 meter section visible on surface
3/22/07 16:43		36.721870	-122.186560	825.51	V2988-01	00:07:45:00	begin cable slack on sediment surface
3/22/07 16:43		36.721893	-122.186485	825.81	V2988-01	00:07:54:02	end cable slack on sediment surface
3/22/07 16:44		36.721220	-122.186640	829.07	V2988-01	00:09:26:29	cable < 1 meter section visible on surface
3/22/07 16:45		36.721096	-122.186646	830.45	V2988-01	00:09:56:24	cable < 1 meter section visible on surface
3/22/07 16:45		36.720818	-122.186520	830.97	V2988-01	00:10:17:09	cable < 1 meter section visible on surface
3/22/07 16:49		36.720882	-122.186676	831.19	V2988-01	00:13:53:05	cable < 1 meter section visible on surface
3/22/07 16:49		36.721010	-122.186745	831.08	V2988-01	00:14:17:10	cable < 1 meter section visible on surface
3/22/07 16:50		36.721176	-122.186550	829.54	V2988-01	00:14:43:05	begin cable slack on sediment surface
3/22/07 16:50		36.721268	-122.186790	829.44	V2988-01	00:14:45:08	end cable slack on sediment surface

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
3/22/07 16:51		36.721740	-122.186584	826.49	V2988-01	00:15:48:21	cable < 1 meter section visible on surface
3/22/07 16:51		36.721767	-122.186554	826.34	V2988-01	00:15:55:06	cable < 1 meter section visible on surface
3/22/07 16:51		36.720802	-122.187256	826.19	V2988-01	00:16:02:07	begin cable slack on sediment surface
3/22/07 16:51		36.721313	-122.186400	825.94	V2988-01	00:16:10:26	end cable slack on sediment surface
3/22/07 16:51		36.723022	-122.187340	825.88	V2988-01	00:16:13:08	cable < 1 meter section visible on surface
3/22/07 16:51		36.721695	-122.186710	825.79	V2988-01	00:16:15:01	cable < 1 meter section visible on surface
3/22/07 16:51		36.722034	-122.186520	825.61	V2988-01	00:16:20:11	cable < 1 meter section visible on surface
3/22/07 16:51		36.722034	-122.186520	825.51	V2988-01	00:16:21:03	cable < 1 meter section visible on surface
3/22/07 16:51		36.722730	-122.186810	825.07	V2988-01	00:16:34:06	cable < 1 meter section visible on surface
3/22/07 16:52		36.722730	-122.186810	824.56	V2988-01	00:16:47:00	cable < 1 meter section visible on surface
3/22/07 16:52		36.722730	-122.186810	824.44	V2988-01	00:16:48:08	cable < 1 meter section visible on surface
3/22/07 16:52		36.722424	-122.186516	823.81	V2988-01	00:17:01:10	cable < 1 meter section visible on surface
3/22/07 16:52		36.722412	-122.187000	823.65	V2988-01	00:17:05:22	cable < 1 meter section visible on surface
3/22/07 16:52		36.722412	-122.187000	823.65	V2988-01	00:17:06:17	cable < 1 meter section visible on surface
3/22/07 16:52		36.722477	-122.186356	823.28	V2988-01	00:17:12:06	cable < 1 meter section visible on surface
3/22/07 16:52		36.722477	-122.186356	823.16	V2988-01	00:17:13:01	cable < 1 meter section visible on surface
3/22/07 16:52		36.722477	-122.186356	823.16	V2988-01	00:17:13:24	cable < 1 meter section visible on surface
3/22/07 16:52		36.722477	-122.186356	822.56	V2988-01	00:17:27:07	cable < 1 meter section visible on surface
3/22/07 16:52		36.722477	-122.186356	822.56	V2988-01	00:17:28:02	cable < 1 meter section visible on surface
3/22/07 16:52		36.723717	-122.185640	822.37	V2988-01	00:17:32:02	cable < 1 meter section visible on surface
3/22/07 16:52		36.723717	-122.185640	822.24	V2988-01	00:17:33:19	cable < 1 meter section visible on surface
3/22/07 16:52		36.722622	-122.186600	822.04	V2988-01	00:17:37:05	cable < 1 meter section visible on surface
3/22/07 16:52		36.722622	-122.186600	822.04	V2988-01	00:17:38:06	cable < 1 meter section visible on surface
3/22/07 16:55		36.723045	-122.186806	819.43	V2988-01	00:20:37:06	cable < 1 meter section visible on surface
3/22/07 18:38		36.748420	-122.186340	757.09	V2988-02	01:43:56:04	cable < 1 meter section visible on surface
							Tapes V2988-02 to 05 continue recording video that overlaps with terrain recorded (and reported here) on KP 42.923 to 40.324
6/7/07 17:45		36.712353	-122.186806	879.00	V3016-01	00:33:22:05	begin dive V3016 (moving toward shore)
6/7/07 17:45		36.712353	-122.186806	879.00	V3016-01	00:33:22:05	begin mud
6/7/07 17:45		36.712353	-122.186806	879.00	V3016-01	00:33:22:05	begin cable buried

Appendix 10. Post-lay observations of the MARS cable from video footage. Appendix 9 contains an explanation for each observation category.

Date/Time	Time (GMT)	Latitude	Longitude	Depth (m)	Dive/Tape	Time Code	Observation
6/7/07 17:45		36.712414	-122.186740	879.21	V3016-01	00:33:45:24	begin cable visible in trench
6/7/07 17:45		36.712414	-122.186740	879.21	V3016-01	00:33:45:24	end cable buried
6/7/07 17:46		36.712517	-122.186760	879.39	V3016-01	00:34:17:02	end cable visible in trench
6/7/07 17:48		36.712963	-122.186780	876.64	V3016-01	00:36:47:16	cable visible with trench (<1 m section)
6/7/07 17:51		36.713690	-122.186680	872.13	V3016-01	00:39:40:06	cable visible with trench (<1 m section)
6/7/07 17:57		36.714720	-122.186830	869.40	V3016-01	00:45:24:24	cable visible with trench (<1 m section)
6/7/07 18:01		36.715510	-122.186615	865.77	V3016-01	00:49:45:15	cable visible with trench (<1 m section)
6/7/07 18:59		36.724016	-122.186485	815.20	V3016-02	01:41:06:06	end mud
6/7/07 18:59		36.724016	-122.186485	815.20	V3016-02	01:41:06:06	end dive V3016
6/7/07 18:59		36.723904	-122.186530	818.28	V3016-02	01:41:06:06	cable visible with trench (<1 m section)

MARS As-Laid Route Position List

Line #	Vessel Name	Operation Date	Latitude DD	Longitude DD	Latitude	Longitude	Remarks (splices, alter course, etc.)	Splice Box, etc.	Cable Type	Cable Length Each Event	Cable Length Cummulative km	Route Distance Each Event	Route Distance Cummulative km	Slack Btwn Repeaters Percent	Burial Depth cm	Water Depth m	Comments
1.	Global Sentinel	14 Mar 07	36.806150	-121.787950	36° 48.369' N	121° 47.277' W	HDD Start		SAL							0	
2.	Global Sentinel	14 Mar 07	36.806150	-121.787950	36° 48.369' N	121° 47.277' W	Cable allowance		SAL	0.064	0.064	0.000	0.000			0	64m cable retained at beach manhole
3.	Global Sentinel	14 Mar 07	36.810117	-121.798533	36° 48.607' N	121° 47.912' W	HDD End		SAL			1.042	1.042			20	
4.	Global Sentinel	16 Mar 07	36.810833	-121.800417	36° 48.650' N	121° 48.025' W	Plow Down		SAL			0.186	1.228		151	22	PLIB completed 21 Mar 07
5.	Global Sentinel	16 Mar 07	36.811333	-121.801683	36° 48.680' N	121° 48.101' W	A/C		SAL			0.126	1.354		79	22	
6.	Global Sentinel	16 Mar 07	36.811767	-121.802650	36° 48.706' N	121° 48.159' W	A/C		SAL			0.099	1.453		70	22	
7.	Global Sentinel	16 Mar 07	36.812317	-121.803400	36° 48.739' N	121° 48.204' W	A/C		SAL			0.091	1.543		110	21	
8.	Global Sentinel	17 Mar 07	36.846150	-121.843083	36° 50.769' N	121° 50.585' W	Enter Naval Ops Area		SAL			5.160	6.704		116	27	
9.	Global Sentinel	17 Mar 07	36.847200	-121.844317	36° 50.832' N	121° 50.659' W	A/C		SAL			0.160	6.864		69	27	
10.	Global Sentinel	19 Mar 07	36.859750	-121.869683	36° 51.585' N	121° 52.181' W	A/C		SAL			2.657	9.520		69	38	
11.	Global Sentinel	17 Mar 07	36.883483	-121.948333	36° 53.009' N	121° 56.900' W	A/C		SAL			7.491	17.011		116	34	
12.	Global Sentinel	17 Mar 07	36.885450	-121.960183	36° 53.127' N	121° 57.611' W	A/C		SAL			1.079	18.090		81	34	
13.	Global Sentinel	19 Mar 07	36.885567	-121.976983	36° 53.134' N	121° 58.619' W	Exit Naval Ops Area		SAL			1.498	19.588		83	43	
14.	Global Sentinel	18 Mar 07	36.885733	-122.031683	36° 53.144' N	122° 01.901' W	A/C		SAL			4.876	24.464		81	60	
15.	Global Sentinel	18 Mar 07	36.879967	-122.059417	36° 52.798' N	122° 03.565' W	A/C		SAL			2.554	27.018		135	75	
16.	Global Sentinel	18 Mar 07	36.874650	-122.071050	36° 52.479' N	122° 04.263' W	Exit 3NM LIMIT		SAL			1.193	28.211		141	83	
17.	Global Sentinel	19 Mar 07	36.851550	-122.121700	36° 51.093' N	122° 07.302' W	Splice Box	SJ1	SAL	33.450	33.514	5.193	33.404	0.14%	145	106	
18.	Global Sentinel	19 Mar 07	36.845333	-122.135283	36° 50.720' N	122° 08.117' W	A/C		SA			1.394	34.798		96	113	
19.	Global Sentinel	19 Mar 07	36.843483	-122.138550	36° 50.609' N	122° 08.313' W	A/C		SA			0.356	35.155		57	116	
20.	Global Sentinel	20 Mar 07	36.842183	-122.142450	36° 50.531' N	122° 08.547' W	A/C		SA			0.377	35.531		93	118	
21.	Global Sentinel	20 Mar 07	36.841567	-122.145767	36° 50.494' N	122° 08.746' W	A/C		SA			0.304	35.835		68	123	
22.	Global Sentinel	20 Mar 07	36.840583	-122.148333	36° 50.435' N	122° 08.900' W	Plow Up		SA			0.254	36.089		63	123	
23.	Global Sentinel	20 Mar 07	36.839267	-122.151583	36° 50.356' N	122° 09.095' W	A/C		SA			0.325	36.413		0	131	
24.	Global Sentinel	20 Mar 07	36.837183	-122.157500	36° 50.231' N	122° 09.450' W	A/C		SA			0.576	36.990		0	171	
25.	Global Sentinel	20 Mar 07	36.837017	-122.158033	36° 50.221' N	122° 09.482' W	Splice Box	SJ2	SA	3.642	37.156	0.052	37.041	0.16%	0	171	
26.	Global Sentinel	20 Mar 07	36.836717	-122.158833	36° 50.203' N	122° 09.530' W	A/C		SA			0.079	37.119		0	191	
27.	Global Sentinel	20 Mar 07	36.835817	-122.160517	36° 50.149' N	122° 09.631' W	A/C		SA			0.308	37.300		0	214	
28.	Global Sentinel		36.833789	-122.163103	36° 50.027' N	122° 09.786' W	A/C		SA			0.327	37.626		0	268	
29.	Global Sentinel		36.831995	-122.165110	36° 49.919' N	122° 09.906' W	A/C		SA			0.268	37.894		0	300	
30.	Global Sentinel		36.830295	-122.166715	36° 49.817' N	122° 10.002' W	A/C		SA			0.237	38.131		0	315	
31.	Global Sentinel		36.829007	-122.167590	36° 49.740' N	122° 10.055' W	A/C		SA			0.163	38.293		0	312	
32.	Global Sentinel		36.825417	-122.169555	36° 49.525' N	122° 10.173' W	A/C		SA			0.435	38.729		0	317	
33.	Global Sentinel		36.822907	-122.170483	36° 49.374' N	122° 10.229' W	A/C		SA			0.290	39.019		0	333	
34.	Global Sentinel		36.819580	-122.171505	36° 49.174' N	122° 10.290' W	A/C		SA			0.380	39.399		0	351	
35.	Global Sentinel	21 Mar 07	36.814867	-122.173033	36° 48.892' N	122° 10.382' W	A/C		SA			0.540	39.940		0	366	
36.	Global Sentinel	21 Mar 07	36.812500	-122.174517	36° 48.750' N	122° 10.471' W	A/C		SA			0.294	40.234		0	372	
37.	Global Sentinel	21 Mar 07	36.810383	-122.176450	36° 48.623' N	122° 10.587' W	A/C		SA			0.291	40.525		0	381	
38.	Global Sentinel		36.807503	-122.179657	36° 48.450' N	122° 10.779' W	A/C		SA			0.294	40.819		0	407	
39.	Global Sentinel		36.804313	-122.182785	36° 48.258' N	122° 10.967' W	A/C		SA			0.451	41.270		0	429	
40.	Global Sentinel		36.800612	-122.186092	36° 48.036' N	122° 11.165' W	A/C		SA			0.506	41.775		0	434	
41.	Global Sentinel		36.799015	-122.187265	36° 47.941' N	122° 11.235' W	A/C		SA			0.206	41.981		0	441	
42.	Global Sentinel	21 Mar 07	36.792983	-122.191083	36° 47.579' N	122° 11.465' W	Plow Down		SA			0.751	42.732		50	458	
43.	Global Sentinel		36.789294	-122.192811	36° 47.357' N	122° 11.568' W	A/C		SA			0.437	43.169		50	462	
44.	Global Sentinel		36.788769	-122.192883	36° 47.326' N	122° 11.572' W	A/C		SA			0.059	43.228		71	476	
45.	Global Sentinel		36.784794	-122.194369	36° 47.087' N	122° 11.662' W	A/C		SA			0.460	43.688		82	494	
46.	Global Sentinel		36.783197	-122.194672	36° 46.991' N	122° 11.680' W	A/C		SA			0.179	43.868		62	501	
47.	Global Sentinel		36.779631	-122.194731	36° 46.777' N	122° 11.683' W	A/C		SA			0.396	44.263		71	522	
48.	Global Sentinel		36.779244	-122.194911	36° 46.754' N	122° 11.694' W	A/C		SA			0.046	44.309		121	525	
49.	Global Sentinel		36.777953	-122.194917	36° 46.677' N	122° 11.695' W	A/C		SA			0.143	44.452		47	531	
50.	Global Sentinel		36.777139	-122.195094	36° 46.628' N	122° 11.705' W	A/C		SA			0.092	44.544		72	538	
51.	Global Sentinel		36.769053	-122.193903	36° 46.143' N	122° 11.634' W	A/C		SA			0.903	45.447		35	603	
52.	Global Sentinel		36.766847	-122.193078	36° 46.011' N	122° 11.584' W	A/C		SA			0.256	45.703		70	624	
53.	Global Sentinel		36.757364	-122.188406	36° 45.441' N	122° 11.304' W	A/C		SA			1.132	46.835		10	721	
54.	Global Sentinel		36.748200	-122.186431	36° 44.891' N	122° 11.185' W	A/C		SA			1.032	47.866		10	761	
55.	Global Sentinel		36.733775	-122.186578	36° 44.026' N	122° 11.194' W	A/C		SA			1.600	49.467		10	786	
56.	Global Sentinel	21 Mar 07	36.724033	-122.186583	36° 43.442' N	122° 11.195' W	Plow Up		SAL			1.081	50.547		10	818	PLIB completed 01 Apr 07
57.	Global Sentinel	30 Mar 07	36.713350	-122.186767	36° 42.801' N	122° 11.206' W	Splice Box	SJ3	SAL	7.246	52.026	1.185	51.733	0.04%	20	880	PLIB completed 01 Apr 07
58.	Global Sentinel	30 Mar 07	36.712333	-122.186833	36° 42.740' N	122° 11.210' W	TRF	TRF	SAH	0.113	52.139	0.113	51.846	0.02%	0	886	