H12065

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey: Hydrographic Survey

Registry Number: **H12065**

LOCALITY

State: Alaska

General Locality: Southwest Peninsula

Sub-locality: 10 NM SE of Unimak Island

2009

CHIEF OF PARTY
Marta Krynytzky
TerraSond Ltd

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY No

HYDROGRAPHIC TITLE SHEET

OPR-P188-TE09

INSTRUCTIONS – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD No. **H12065**

Alaska **State**

Southwest **General Locality** Peninsula

Sub-Locality 10 NM SE of Unimak Island

1:40,000 **Scale** **Date of Survey** 5/24/2009 – 8/23/2009

Instructions dated March 30, 2009 **Project No.** OPR-P188-TE-09

Vessel *M/V Bluefin, R/V Mt. Augustine*

Marta **Chief of party** Krynytzky

TerraSond **Surveyed by** Ltd

Echo **Soundings by echo sounder, lead line, pole** Sounder

N/A **Graphic record scaled by**

N/A **Graphic record checked by** **Automated Plot** N/A

Kathleen **Verification by** Mildon

MLLW **Soundings in fathoms feet at MLW MLLW**

REMARKS: Contract No.: DG133C-08-CQ-0005

Contractor: TerraSond Ltd. All times recorded in UTC

1617 South Industrial Way, Suite 3

Palmer, AK 99645

DESCRIPTIVE REPORT
OPR-P188-TE-09

Shishaldin Volcano at sunrise from survey area H12065

Registry Number: **H12065**

Vessels: ***M/V Bluefin, R/V Mt. Augustine and skiff 'Spare Rhib'***

Survey: **Sheet D**

State: **Alaska**

General Locality: **Southwest Peninsula**

Sublocality: **10 NM SE of Unimak Is., AK**

Survey Dates: **May 24 – August 23, 2009**

Lead Hydrographer: **Marta Krynytzky**

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APPENDICES

SEPARATES *Filed with original field records.*

A. AREA SURVEYED

A navigable area survey was conducted 10 NM SE of Unimak Is. in accordance with the NOAA, National Ocean Service, *Statement of Work*, OPR-P188-TE-09, dated December, 2008.

The purpose of this project was to provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts. The project encompasses an area commonly known as Unimak Pass. The safety fairway through Unimak Pass is a major shipping lane connecting the Pacific Ocean to the Bering Sea at the western edge of the Alaskan mainland. The pass is convenient to the great circle route between North America and Asia, as well as more local routes between Western Alaskan waters and Southcentral Alaska. As such, Unimak Pass supports international shipping and a strong commercial fishing infrastructure. Unimak Pass is ice free year round but is well known for its fierce weather, strong currents and generally unforgiving conditions.

The frequency and density of high-risk marine traffic, proximity to pristine environments, dynamic seafloor profiles and powerful tides and currents demand the most accurate and up-to-date navigational charts to operate in a safe and efficient manner.

The survey area covered the eastern end of Unimak Pass, and as such was a highly varied mixing zone subject to strong currents. H12065 comprises approximately 250.6 square nautical miles in area and presents a passage of 26.39 nautical miles in length.

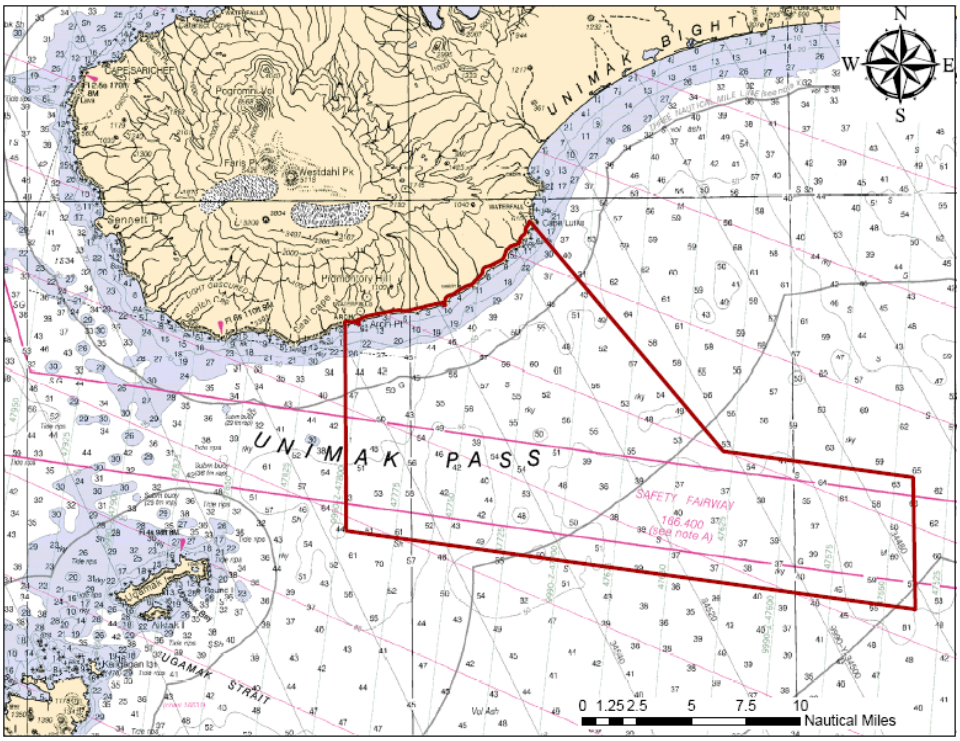


Figure 1– Overlay of H12065 on Chart 16520, 23rd Edition, August, 2008. Soundings in fathoms.

Full bottom shallow-water multibeam echosounder coverage was achieved within the limits of hydrography for this survey. This survey area has a maximum depth of 162.6 meters and a minimum depth of 1.57 meters below the Mean Lower Low Water (MLLW) tidal datum. ***Concur***

Data Type for Each Vessel	M/V Bluefin	R/V Mt. Augustine	Spare RHIB	Totals
Lineal Nautical Miles of Multibeam Mainscheme	2857.19	292.98	0	3150.17
Lineal Nautical Miles of Multibeam Crosslines (No Single Beam Cross Lines Acquired)	113.20	15.09	0	128.9
Lineal Nautical Miles of Developments	0	0	0	0
Lineal Nautical Miles of Shoreline Investigation	0	0	17.8	17.8
Number of Bottom Samples Collected	180	5	0	185
Number of Items Investigated (Detached Positions)	0	0	19	19

Table 1 - Data Acquisition Summary

Month	Dates
May	24, 26-29
June	2-3, 6-7, 9, 13, 15-20, 22-24, 26-30
July	1-2, 4-6, 9-12, 14-16, 20, 24- 26, 29-31
August	1, 3-5, 16-17, 19, 22-23

Table 2 - Specific Dates of Data Acquisition

For complete survey limits, refer to Figure 1 above and *Appendix III: Final Progress Sketch and Survey Outline** of this report. ***Concur***

Data attached to this report.

B. DATA ACQUISITION AND PROCESSING *SEE ALSO THE H-CELL REPORT.*

B.1. Equipment

Bathymetry for this survey was acquired using the hydrographic survey vessel(s) *M/V Bluefin*, *R/V Mt. Augustine* and launch *Spare Rhib*.

M/V Bluefin

The *M/V Bluefin* is steel hull vessel 53.6 meters length overall with an 11.6 meter beam and a 3.96 meter draft. Major systems used on the *M/V Bluefin* are listed in Table 3

VESSEL M/V Bluefin LOA: 53.6 m, BEAM 11.6 m, DRAFT: 3.96 m	
Equipment	Manufacturer & Model
Multibeam sonar	Reson SeaBat 8101
Positioning	Applanix POS MV V4
Sound speed	ODIM MVP 200 with Micro SV&P probe, Applied Microsystems SV Plus v2
Vessel attitude	Applanix POS MV IMU

***Table 3 - Major systems used aboard the* M/V Bluefin.**

R/V Mt. Augustine

The *R/V Mt. Augustine* is an aluminum hull vessel, 10.2 meters length overall with a 3.3 meter beam and a 0.9 meter draft. Major systems used on *R/V Mt. Augustine* are listed in Table 4

VESSEL R/V Mt. Augustine LOA: 10.2 m, BEAM 3.3 m, DRAFT: 0.9 m	
Equipment	Manufacturer & Model
Multibeam sonar	Reson SeaBat 8101
Positioning	Applanix POS MV V4
Sound speed	Applied Microsystems SV Plus v2
Vessel attitude	Applanix POS MV IMU

***Table 4 - Major systems used aboard the* R/V Mt. Augustine.**

Spare Rhib

The *Spare Rhib* is a rigid hull safe boat, 6.2 meters length overall with a 2.7 meter beam and a 0.5 meter draft. Major systems used on *Spare Rhib* are listed in Table 5.

VESSEL Spare Rhib LOA: 6.2 m, BEAM 2.7 m, DRAFT: 0.5 m	
Equipment	Manufacturer & Model
Positioning	Trimble DSM 212
Laser Range Finder	Leupold RX-IV

***Table 5 - Major systems used aboard the* Spare Rhib.**

Equipment performance details are provided in the Data Acquisition and Processing Report (DAPR)*, *Sections A: Equipment* and *B: Quality Control*.

B.2. Quality Control

B.2.1. Crosslines

821 mainscheme lines totaling 3150.17 lineal nautical miles and 51 crosslines totaling 131.54 lineal nautical miles were run during the 2009 survey of H12065. The ratio of the lineal nautical miles of crosslines to the lineal nautical miles of mainscheme lines, at 4.18 %, exceeds the 4% required by NOAA Hydrographic Surveys Specifications and Deliverables (HSSD)**, *Section 5.1.4.3*.

The crossline analysis was conducted using CARIS HIPS' QC Report routine. Each crossline was selected and run through the process, which calculated the difference between each accepted crossline sounding and a BASE surface created from the mainscheme data.

The differences in depth were grouped by beam number and statistics computed which included the percentage of soundings compared whose differences from the BASE surface fall within IHO survey Order 1.

The majority of beams meet IHO Order 1 at the 95 % confidence level or better Refer to ***Separate IV: Checkpoint Summary and Crossline Comparisons* for the QC Reports.

B.2.2. Uncertainty Values

CUBE surfaces were built in CARIS HIPS in which the uncertainty value for the grid is the greater of the standard deviation and the apriority uncertainty at each node. The CUBE surface uncertainty child layer was examined to verify that no areas of high uncertainty exceed IHO levels as described in HSSD section 5.1.2 and 5.2.2. However,

Included with H-Cell deliverables.

****Data filed with original field records.***

there a re i solated areas of el evated u ncertainty which ar e t ypically r elegated t o o uter beams p resenting s ound v elocity (refraction) ar tifacts, ar eas o f d ynamic seabed morphology and areas of steep/changeable terrain.

B.2.3. Contemporary Survey Junctions *See also the H-Cell Report.*

This survey junction's with two other contemporary surveys. S ee Table 6 and Figure 2 below.

Survey Registry Number	Project Number	Scale	Date	Junction with H12065 Edge
H12004	OPR-P188-TE-09	1:40,000	August 2009	West
H12066	OPR-P188-TE-09	1:40,000	August 2009	East

Table 6 - Contemporary survey junctions with H12065.

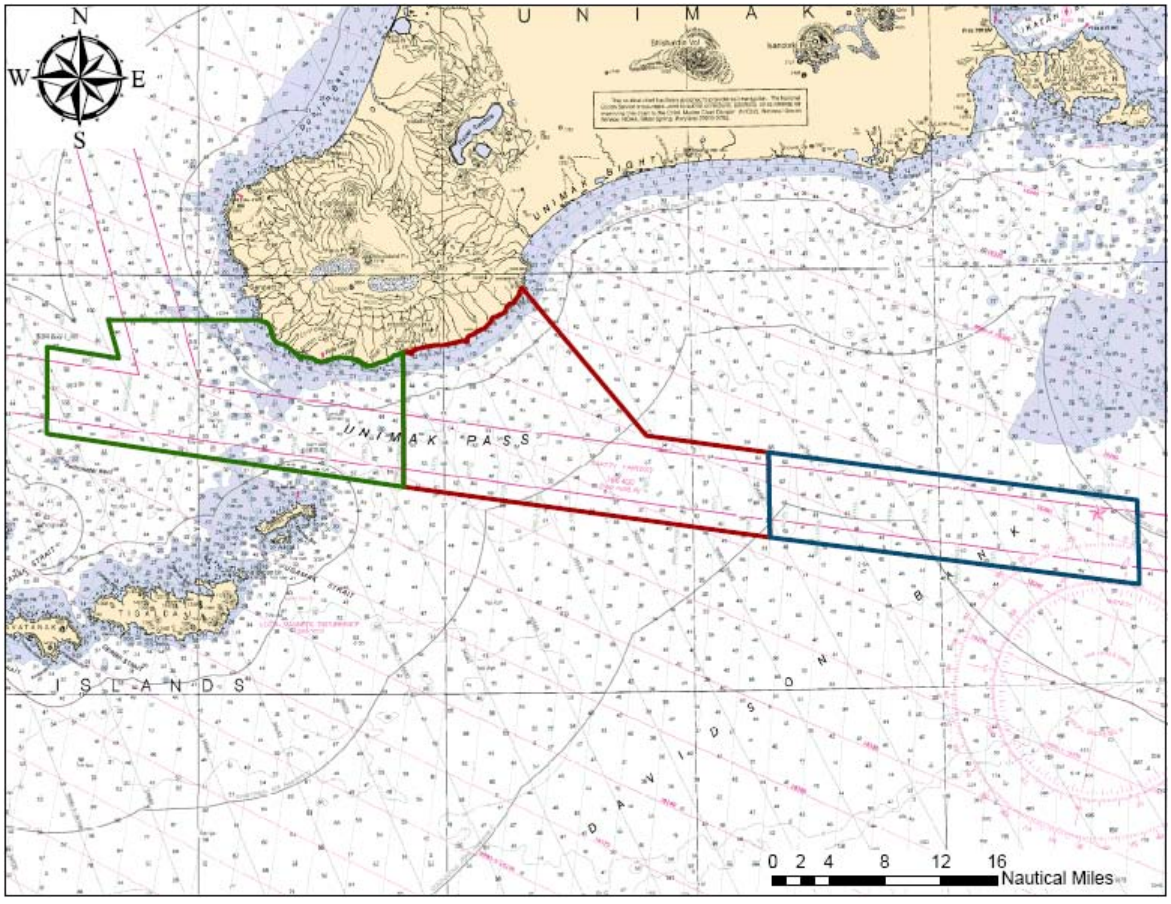


Figure 2 – Overlay showing the junction locations of H12065 (red) with H12004 (green) and H12066 (blue) from this project (OPR-P188-TE-09) on Chart 16520, 23rd Edition, August, 2008.

In CARIS HIPS the BASE surfaces for each survey sheet were opened. The tool tip feature was then incorporated to analyze the difference between sounding values for each sheet at multiple locations along the survey junction. The soundings are in good general agreement between the surveys. No adjustments or recommendations were made based on the junction analysis.

B.2.4. Sonar System Quality Control Checks

Multibeam confidence checks were conducted on the *M/V Bluefin* and *R/V Mt. Augustine* to verify proper operation of the multibeam suite on a weekly basis, weather permitting. The confidence checks were performed by comparing nadir beam depths with lead line depths or alternatively by comparing soundings collected on the *M/V Bluefin* with those collected by the *R/V Mt. Augustine* at the same location. The results of these comparisons and the acquisition logs detailing aspects of quality control for each survey line are contained in *Separate I: Acquisition and Processing Logs*** of this report.
Concur

B.2.5. Unusual Conditions Encountered

No conditions with the potential for adversely affecting data integrity were encountered with the multibeam suite used during this survey, with the exception of the following:

1. On the *M/V Bluefin*, the Applanix POS IMU was not mounted near the center of rotation of the vessel. The IMU was mounted approximately 16 m forward of the vessels center of rotation, directly above the Reson 8108 sonar head. This configuration resulted in a non-zero heave average, but did not otherwise affect the quality of the data. For further details refer to section A.1.1.1 of the DAPR.*
2. Vessel to vessel line comparisons between the *M/V Bluefin* and the *R/V Mt. Augustine* reveal variable discrepancies in soundings. Lead line checks taken from each vessel agree with each vessel's sonar readings. TerraSond Ltd. suspects the discrepancies between underway soundings is due to separation of the center of motion and the IMU onboard the *M/V Bluefin*. For further details refer to section A.1.1.1 of the DAPR.*
3. Twice during the survey the *M/V Bluefin* roll offset value changed. In both instances the change was noticed as an artifact during onboard processing, the *M/V Bluefin* was patch tested as soon as possible, and the new values applied in post processing from the time that the offset was noticed. Additionally, in both instances at the earliest convenience the sonar head was inspected by a diver in Dutch Harbor. Neither dive investigation revealed any noticeable change or alteration to the sonar mount. The changes were discrete changes and new patch values removed all offset artifacts from the data. Refer to the DAPR, *Section A.1.1.1** for further details.

Included with H-Cell deliverables.
****Filed with original field records.***

4. On July 14 and 15, 2009 (Julian Day 195 and 196) data from the *R/V Mt. Augustine* displayed an inconsistent roll artifact that was attributed to a wobble in the multibeam mount arm. The artifact disappeared and reappeared in correlation with the multibeam swing arm being raised and lowered several times. The multibeam swing arm was typically raised for transits of speeds over 10 knots. Line data that exhibited this inconsistent roll offset were rejected from processing and the area was rerun at a later date. The multibeam swing arm in its correct position sat snug against a stopper on the outside hull of the vessel. To prevent further wobble issues, a chain come-a-long was used to ensure the swing arm remained snug against the stopper in the lowered position. Since no changes were made to the stopping position of the multibeam swing arm mount, the chain was only used to ensure that the mount did not move from its patch tested position, and the latest patch test values continued to produce quality data, the *R/V Mt. Augustine* was not re-patch tested.

5. On July 23, 2009 (Julian Day Number 204) the Reson 81-P began malfunctioning on the *M/V Bluefin*. The unit was immediately taken out of service. For the remainder of the project one Reson 81-P was transferred between the *R/V Mt. Augustine* and the *M/V Bluefin*. *M/V Bluefin* was patch tested once with the new Reson 81-P. Since the Reson 81-P is a topside processing unit with no positioning offsets, a new patch test was not performed each time the unit was moved from one vessel to the other. Refer to the DAPR, *Section A.1.1.1** for further details.

6. On July 31, 2009 (Julian Day Number 212) the DGPS station Cold Bay used for real time positioning control was not available. The DGPS outage lasted several hours, during which no multibeam data was collected. Refer to the DAPR, *Section A.1.1.1** for further details.

7. Vertical discrepancies between survey lines were thoroughly vetted. TerraSond's vetting process investigated at all the vertical components that Caris uses to determine processed depths.

   In order to eliminate possible tidal anomalies in areas where adjacent survey lines were vertically offset; lines in these areas were copied to a separate CARIS HIPS project and processed referencing the WGS84 ellipsoid. This was accomplished using the POSPac-processed SBET data loaded in the CARIS HIPS project to compute and process a GPS tide solution. Thus, tide station observations and zones were eliminated from processed depth computations. Subsequent to this process, vertical discrepancies remaining which do not meet IHO specifications were investigated to consider the possibility of sedimentary movement. Areas of investigation commonly contained data separated by several weeks in time, and survey line data which did agree vertically in nearby locations. Figure 3 below show example data processed to MLLW using tide station observations and zones and Figure 4 shows the same data processed to the ellipsoid, both images show the data colored by day. The fact that the vertical offset remains in both cases and

all other vertical components were fully investigated indicates the possibility of sediment transfer. This is typically supported by shallow depths and local sea-bottom morphology given to sediment movement.

Included with H-Cell deliverables.

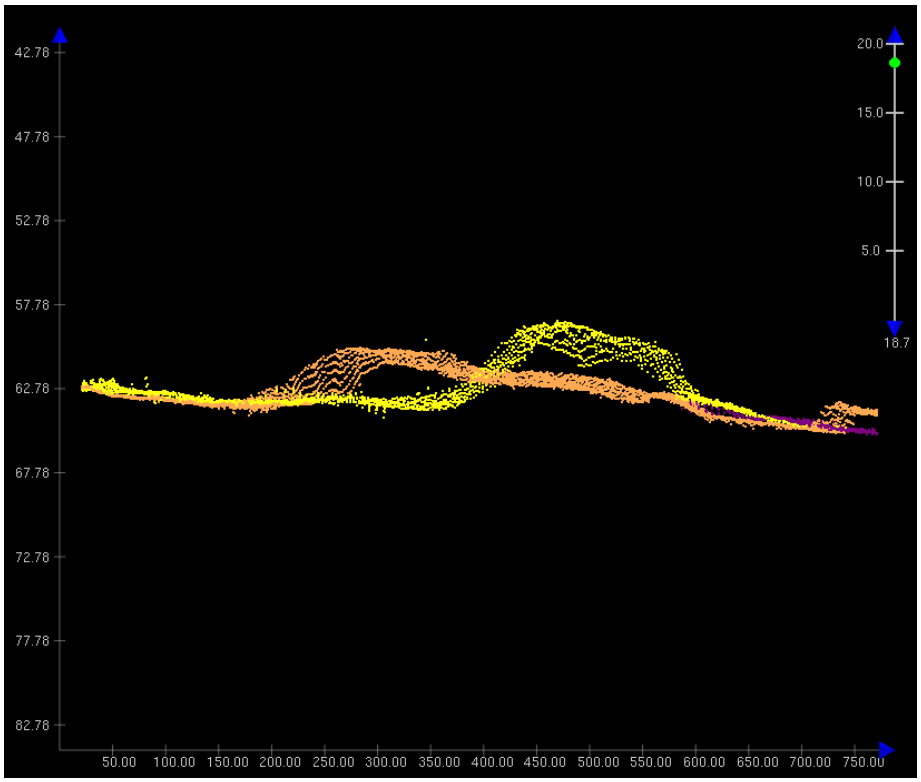


Figure 3 - Data processed to MLLW

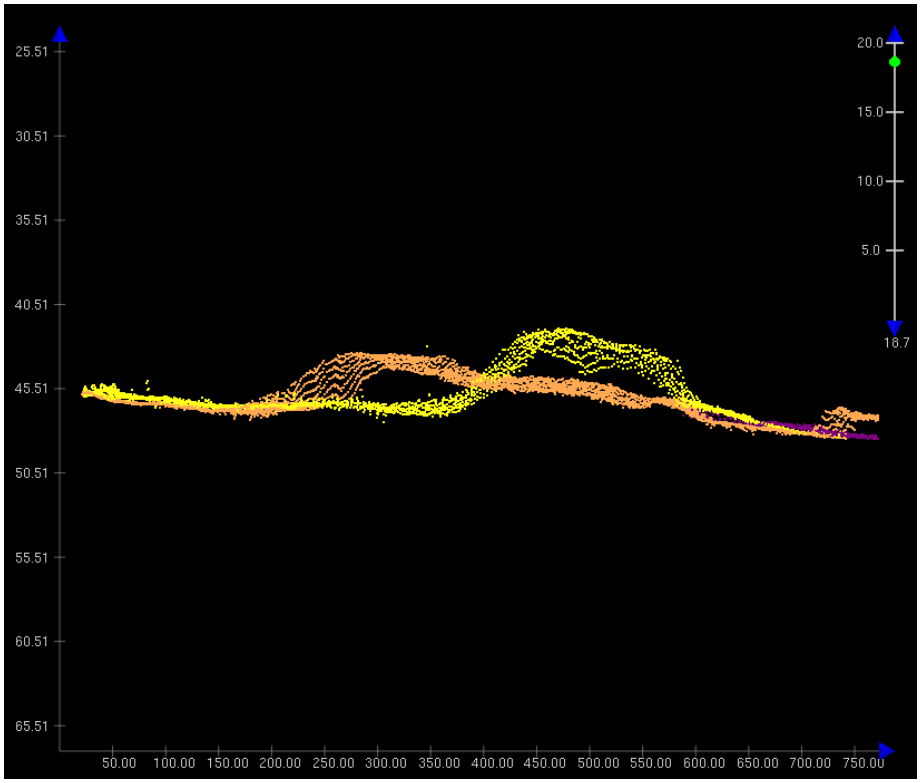


Figure 4 - Data processed to the ellipsoid

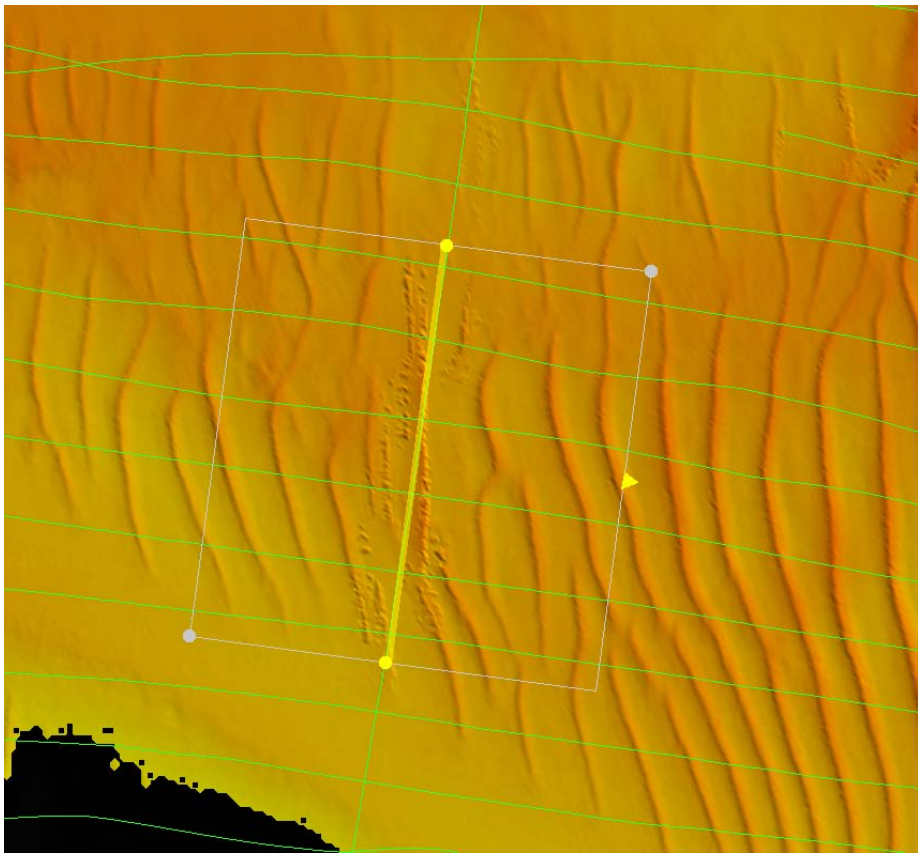


Figure 5 - Area represented by figures 3 and 4

B.2.6. Sound Speed

Unimak Pass is a dynamic area with strong tidal currents and major mixing occurs between the Northern Pacific Ocean, the Gulf of Alaska and the Bering Sea. Sound speed measurements throughout the area varied both spatially and temporally. To minimize sound speed errors, sound speed casts were taken every 2-4 hours, with frequency determined by an onboard review of data quality. Sound speed profiles were taken as deep as possible. Conservative line spacing and generous overlap also contributed to minimizing sound speed errors. All sound speed profiles were applied 'previous in time' in CARIS HIPS with the exception of the following:

CARIS Line Name	Vessel	Method used for applying Sound Speed Profiles
0233_-_D	M/V Bluefin	SVP applied using Nearest in Time
0234_-_D	M/V Bluefin	SVP applied using Nearest in Time

CARIS Line Name	Vessel	Method used for applying Sound Speed Profiles
0982_-_D	M/V Bluefin	SVP applied using Nearest in Time
0824_-_D_XL	M/V Bluefin	SVP applied using Nearest in Distance Within Time 4 Hours

Table 7 - Sound speed application method exceptions

B.2.7. Requirements for Object Detection and Coverage

The *M/V Bluefin* and the *R/V Mt. Augustine* were each outfitted with a Reson SeaBat 8101 multibeam sonar and an Applanix POS MV V4 positioning system.

Complete coverage was achieved by building real time grids with QPS QINSy acquisition software. When several vessels were working in adjacent areas, each vessel's grid was updated frequently with the other vessels' progress and coverage.

A detailed discussion of multibeam system calibrations, patch tests, data acquisition and processing is provided in the DAPR.*

B.3. Corrections to Echo Soundings

Survey H12065 was performed in conjunction with three other surveys in Project OPR-P188-TE-09. Any change to the corrections to echo soundings affects all surveys in the area and is described in detail in the DAPR.*

Included with H-Cell deliverables.

All sounding data were corrected for true heave with the exception of the following:

CARIS line name	Vessel	Comment
5119-D	R/V Mt. Augustine	True Heave Not Available
5157-D	R/V Mt. Augustine	True Heave Not Available
5383-D	R/V Mt. Augustine	True Heave Not Available
5664-D	R/V Mt. Augustine	True Heave Not Available
6142-D_XL	R/V Mt. Augustine	True Heave Not Available
6143-D_XL	R/V Mt. Augustine	True Heave Not Available
6145-D_XL	R/V Mt. Augustine	True Heave Not Available
6147-D_XL	R/V Mt. Augustine	True Heave Not Available
6148-D_XL	R/V Mt. Augustine	True Heave Not Available
6370-D	R/V Mt. Augustine	True Heave Not Available
6371-D	R/V Mt. Augustine	True Heave Not Available

CARIS line name	Vessel	Comment
6372-D	R/V Mt. Augustine	True Heave Not Available
6373-D	R/V Mt. Augustine	True Heave Not Available
6374-D	R/V Mt. Augustine	True Heave Not Available
6375-D	R/V Mt. Augustine	True Heave Not Available
0186-D	M/V Bluefin	True Heave Not Available
0206-D	M/V Bluefin	True Heave Not Available
0215-D	M/V Bluefin	True Heave Not Available
0228-D	M/V Bluefin	True Heave Not Available
0262-D	M/V Bluefin	True Heave Not Available
0486-D	M/V Bluefin	True Heave Not Available
0490-D	M/V Bluefin	True Heave Not Available
0515-D	M/V Bluefin	True Heave Not Available
0516-D	M/V Bluefin	True Heave Not Available
0754-D	M/V Bluefin	True Heave Not Available
0818-D	M/V Bluefin	True Heave Not Available
0962-D	M/V Bluefin	True Heave Not Available
0979-D	M/V Bluefin	True Heave Not Available
1125-D	M/V Bluefin	True Heave Not Available

Table 8 – Survey lines which do not have true heave applied.

Sounding data were reduced using zoning provided by John Oswald and Associates using data from installed tide gauges at the historic Scotch Cap, AK (946-2808) site, a new station installed at Akun Bay (946-2719) and the Coast Guard maintained station King Cove, AK (945-9881). Refer to the Vertical and Horizontal Control Report (VHCR)* for tidal zoning methods and operations. ***Concur***

Final zoning and tides were applied during field operations.

****Included with H-Cell deliverables.***

B.4. Data Processing ***See also the H-Cell report.***

The final depth information for this survey was submitted as a collection of CARIS BASE CUBE surfaces which best represented the seafloor at the time of the 2009 survey. All possible measures were taken to ensure the data were correctly processed and the appropriate designated soundings, representing the least depth of significant contacts, were selected and retained in the finalized surfaces.

Several grids of varying resolution were created for H12065 due to the wide depth range and varying bathymetry found in the survey area. Grid spacing of 1, 2, 4 and 8 meters was used for the BASE surfaces. All grids are projected to UTM Zone 3 North, NAD 1983.

Depth Range (m)	BASE Surface Resolution (m)
0-23	1
20-52	2
46-115	4
103-350	8

Table 9 - BASE surface resolution vs. survey depth.

Four CUBE BASE surface digital products were submitted for the 2009 survey. The BASE surfaces are named with their resolution in the following format: 2m_Final, and stored in a fieldsheet named with the survey number (H12065_Final).

A data set containing a single S-57 (.000) base cell file and supporting files were submitted in conjunction with the other 2009 survey deliverables. The base cell contains information on objects not represented in the depth grid, including, but not limited to, shoreline, nature of the seabed from bottom samples, identified rocky seabed areas and bedform areas identified as sandwave areas. Each feature object includes the mandatory S-57 attributes, contract specific attributes, and any additional attributes assigned. Survey outline nodes were filtered in CARIS Notebook to 30 meters to be able to create S-57 attributed metadata objects.

The DAPR,* *Sections A.2: Data Collection* and *B: Quality Control* contain a detailed discussion of the steps followed when acquiring and processing the 2009 survey data.

C. VERTICAL AND HORIZONTAL CONTROL *SEE ALSO THE H-CELL REPORT.*

Sounding data were tide adjusted using final tide levels from installed stations at the historic United States Coast Guard (USCG) tide stations at Scotch Cap, AK (946-2808) and new station at Akun Bay (946-2719) and the USCG maintained station King Cove, AK (945-9881). The original zoning was modified by JOA. Final zoning methodology is described in detail in the project-wide VHCR.*

Final tides and zoning were applied by the field unit.

In the field, sounding position control was determined using a Global Positioning System (GPS). The primary source of navigation correctors was the USCG differential GPS (DGPS) station at Cold Bay, Station ID 289. A summary of weekly DGPS confidence checks is provided in *Separate I* **of this report.

Included with H-Cell deliverables.
****Filed with original field records.***

Final sounding position control was determined using Post Processed Kinematic Smoothed Best Estimate Trajectory (PPK SBET). SBET's were applied to the sounding data through CARIS. SBET processing is described in detail in the DAPR *Section B: Quality Control.**

PPK navigation data was applied to the sounding data with the exception of the following:

CARIS line name	Vessel	Comment
0486_-_D	M/V Bluefin	SBET Not Available
0516_-_D	M/V Bluefin	SBET Not Available
0754_-_D	M/V Bluefin	SBET Not Available
0924_-_D	M/V Bluefin	SBET Not Available
0962_-_D	M/V Bluefin	SBET Not Available
0979_-_D	M/V Bluefin	SBET Not Available

Table 10 – Survey lines which do not have PPK navigation applied.

The horizontal control datum used for this survey is the North American Datum of 1983 (NAD 83). The projection used was UTM, Zone 3 North. ***Concur***

D. RESULTS AND RECOMMENDATIONS *SEE ALSO THE H-CELL REPORT.*

D.1. Chart Comparison

The chart comparison for H12065 was performed by examining the Raster Navigational Charts (RNCs) and Electronic Navigation Charts (ENCs) specified by the Project Instructions. See *Separates III: Hydrographic Survey Letter Instructions*** for this document.

Discrepancies are discussed in context of the largest scale chart available and assumed to apply to the smaller scale charts unless specifically mentioned. Shoreline discrepancies are addressed in the shoreline section D.2.1 of this report.

All survey data were compared to the data published in the RNCs and ENCs listed in Table 10.

***Included with H-Cell deliverables.**
****Filed with original field records.**

Chart	Type	Scale	Edition	Issue Date	NM / LNM Through
16520	RNC	1:300,000	23rd	2008-08-01	2008-08-09 2008-07-29
US3AK61M (16520)	ENC	N/A	11th	2009-10-01	2009-10-01

Table 11 – Charts used during chart comparisons.

Notices to Mariners (NM) and Local Notice to Mariners (LNM) issued from April 2009 through August 2009 (from issuance of SOW to completion of survey) that affected the survey were examined as well, ending with NM 39/09 and LNM 35/09. No discrepancies were found.

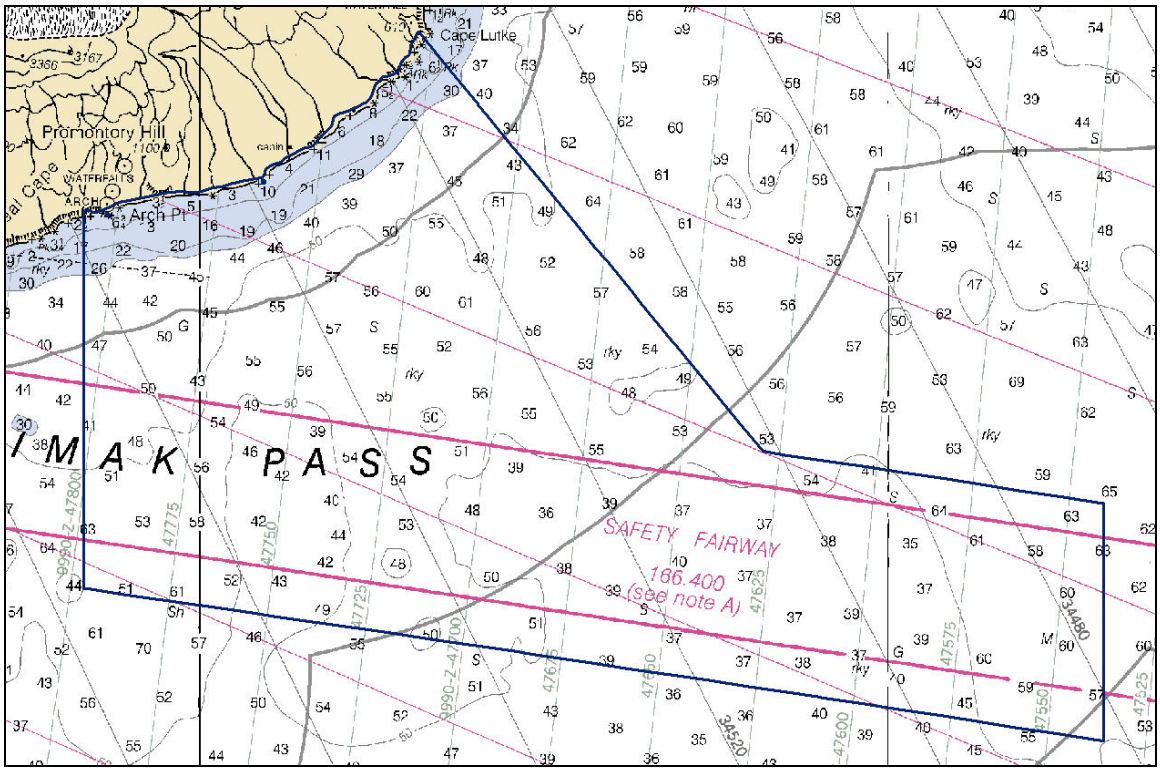


Figure 6 – Sheet limits of H12065 shown on chart 16520.

The chart comparison was accomplished by generating shoal-biased soundings and contours and overlaying them along with the finalized BASE surfaces on the latest edition NOAA charts. The general agreement between charted soundings and H12065 soundings was then examined and a more detailed comparison was undertaken for any shoals or other dangerous features.

General agreement between this survey and the charts is good. Significant differences are itemized in the sections below.

D.1.1. New Features

Three new DtoN features were identified during H12065.

A rock with a depth of 4.35 meters (2 ¼ fathoms in units of chart 16520), was found by this survey (survey position 54-28-09N, 164-20-03W) and submitted as a DtoN (OPR_P188_TE_09_H12065_169_2036_Report_rev). It appears in LNM 28/09 (17th District) with a preliminary depth of 6 ½ fathoms. Feature received complete multibeam coverage. Recommend updating charted Rk to final position and depth as depicted in the S57 feature file. ***See Appendix I for final charting recommendation.***

A rock with a depth of 1.57 meters (3/4 fathom in units of chart 16520), was found by this survey (survey position 54-28-03N, 164-20-47W) and submitted as a DtoN (OPR_P188_TE_09_H12065_149-5171). It appears in LNM 38/09 (17th District) with a preliminary depth of 3/4 fathoms. Due to safety issues multibeam coverage is incomplete and the actual least depth is likely shoaler. Recommend updating chart to Rk depth unknown as depicted in the S57 feature file. ***See Appendix I for final charting recommendation.***

One of the three DtoNs reported lies outside of the sheet limits of this survey. The DtoN report for this feature is included in *Appendix I: DtoN Reports* of this survey for record keeping purposes only. This feature is in no other way associated with this survey and is not included in the S-57 feature file:

Charted Rk (chart 16520) survey position 54-29-25N, 164-19-49W was submitted as a DtoN (OPR_P188_TE_09_H12065_196_0058) with least depth of 9.7 feet. Included in LNM 35/09 (17th District) with a preliminary depth of 1 fathom and ½ feet. Feature received complete multibeam coverage. ***See Appendix I for final charting recommendation.***

D.1.2. Charted Features

Several charted rocks (chart 16520) did not receive corresponding multibeam coverage or received only partial coverage due to their proximity to shore. For the complete shoreline item report, including these rocks, please refer to *Appendix II: Survey Features Report** of the descriptive report. ***Concur***
****Data attached to this report.***

D.1.3. Soundings

Survey depth agreement with the charts was consistent across the project area.

There is no discernable shoaling or deepening area.

One significant difference (greater then ± 10 % of charted depth) is itemized in the table below. It is recommended that soundings from H 12065 supersede previously charted soundings.

Chart	Charted Depth	Survey Depth in Vicinity	Charted Position	Comments
*16520	51 fathoms	63 fathoms	54-14-49.69N, 164-33-11.68W	none

Table 12 – Sounding discrepancies

****Concur with clarification - A survey depth of 47fm in Latitude 54°14'36.499"N, Longitude 164°33'04.243"W was located during office processing. The 47 fm depth is 350 m to the SSE of the 51 fm depth. It is recommended that the charted 51 fm depth be superseded by the present survey 47 fathoms depth. Do not chart 63 fathoms depth.***

D.1.4. Trends and Changeable Areas

Contours were created in CARIS Bathy DataBASE and examined concurrently with the charted contours from chart 16520 (largest scale chart) using ESRI ArcMap.

Agreement across the survey area is good, with most areas comparing well, but a few sections along the 50 fathom contour showing shifts to the south and east. There are also two regions of 50 fathom contours with significant change, one in the central region of the survey area in the southern section of the Safety Fairway and one to the north of the fairway boundary. ***Concur***

Some examples of the shifts are illustrated below.

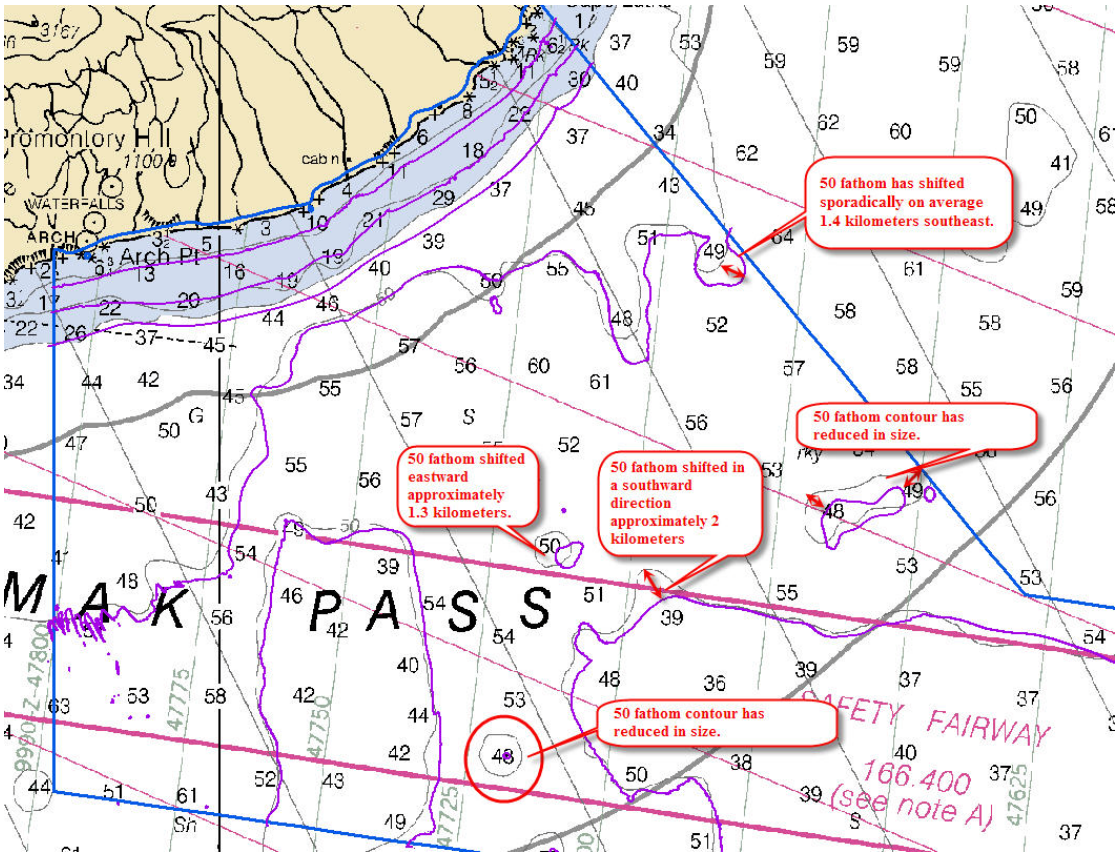


Figure 7 – Contours from H12065 (purple) overlaid on chart 16520

The hydrographer recommends that the charted contours be updated to reflect the 2009 survey data. ***Concur***

D.1.5. AWOIS Items Summary

No Automated Wreck and Obstruction Information System (AWOIS) items were included in the area of this survey. See memos included in *Appendix V: Supplemental Survey Records & Correspondence** for more detail. ***Concur – *Attached to this report.***

D.1.6. Features Labeled PA, ED, PD or rep.

There were no charted features labeled "PA, ED, PD, or Rep." within the survey extents of H12065. ***Concur***

D.2. Additional Results

D.2.1. Shoreline Verification

Remote Sensing Division (RSD) data was provided for the shoreline detail for this sheet in two files (106 and 103) from the data set GC10613. The primary objective of the

shoreline survey was to verify, modify or disprove features depicted on the RSD official shoreline. NOAA nautical chart 16520_1 and electronic navigational chart (ENC) US3AK61M were evaluated as secondary sources. Significant features were determined to be those potentially dangerous to navigation or seaward of the 8-meter contour. Features inshore of the 8-meter contour were investigated to a limited extent and generally not approached directly. ***Concur***

Visual inspection during shoreline verification determined the RSD shoreline to be fairly accurate. 19 Detached positions were acquired for shoreline verification of H12065, 15 new objects were identified and 11 RSD objects were found to need modifications. RSD foul areas generally did not extend seaward enough and required some adjustment. As a general rule, RSD rocks found to be located within new or existing foul areas were not specifically identified or investigated, and should be retained. The following tables document any errors or discrepancies found in the RSD source and charted shorelines. For complete shoreline item report please refers to *Appendix II: *Survey Features Report* of the descriptive report. ***Concur***

Of the shoreline files provided, the S-57 feature file (H12065_S57_Features.000) is the final deliverable and the CARIS Notebook HOB and CARIS Notebook marker layer files (included with the S-57 file) are internal office notes provided for reference only. In addition, the reference RSD data from NOAA is included. The S-57 feature file includes data from several sources and depicts the shoreline as surveyed. New features from shoreline verification and from multibeam data and bottom samples are included and attributed with a source indication of this survey. Confirmed RSD features are included. Confirmed charted features are also included in the S-57 feature file, with exception of features charted on RNC's which did not have corresponding features on ENC's. These features are addressed in the Notebook marker layer and in *Appendix II *of this report.

**** Data attached to this report.***

See Appendix II for final charting recommendations of items discussed below.

New Feature	Latitude and Longitude	Recommendations	Applicable DP form(s)
ROCK	54-24-21.58N 164-33-51.68W	Chart new rock.	DP026
ROCK	54-24-23.15N 164-33-37.17W	Chart new rock.	DP027
BREAKERS	54-25-08.65N 164-26-56.13W	Chart new breakers.	N/A
ROCK	54-26-01.89N 164-24-46.04W	Chart new rock.	DP029
BREAKERS	54-26-48.93N 164-23-09.48W	Chart new breakers.	N/A
ROCK	54-27-04.30N 164-22-31.34W	Chart new rock.	DP030
ISLET	54-27-07.24N 164-22-25.22W	Chart new islet.	DP031
ROCK	54-27-12.03N 164-22-19.76W	Chart new rock.	DP032
FOUL LIMIT	54-27-47.50N 164-21-00.27W	Chart new foul area.	DP041
ROCK	54-27-53.96N 164-21-05.48W	Chart RSD data with updated height.	DP041
ISLET	54-28-26.43N 164-20-38.50W	Chart new islet.	DP037
FOUL LIMIT	54-28-18.65N 164-20-26.97W	Chart new foul area.	DP038
ISLET	54-28-37.50N 164-20-25.93W	Chart new islet.	DP035
ROCK	54-28-36.89N 164-20-20.84W	Chart new rock.	DP036
ROCK	54-28-43.11N 164-20-16.47W	Chart new rock.	DP034 P0832

Table 13 – New Shoreline objects found in survey H12065. * indicates times taken from CARIS Notebook Marker layer time stamp.

See Appendix II for final charting recommendations of items discussed below.

RSD Feature	Latitude and Longitude	Recommendations	Applicable DP form(s)
Rock	54-24-22.09N 164-34-09.95W	RSD data modified height data. Chart ad depicted in S-57 file.	DP023
Rock	54-24-18.12N 164-33-55.07W	RSD data modified height data. Chart as depicted in S-57 file.	DP025
Rock	54-27-42.94N 164-21-38.30W	RSD data modified height data. Chart as depicted in S-57 file.	N/A
Ledge	54-27-50.60N 164-21-12.13W	Chart RSD data with updated height.	N/A
Ledge	54-27-53.96N 164-21-05.48W	Chart RSD data with updated height.	DP041
Ledge	54-27-49.90N 164-21-10.89W	Chart RSD data with updated height.	N/A
Foul	54-27-49.68N 164-21-01.82W	Remove RSD data, chart new foul area with greater extents.	DP041
Islet	54-28-07.12N 164-20-53.97W	RSD data modified. Remove RSD rock and chart new islet in its place. Chart as depicted in S-57 feature file.	DP040
Ledge	54-28-05.01N 164-20-52.99W	Chart RSD data with updated height.	N/A
Ledge	54-28-20.53N 164-20-30.15W	Chart RSD data with updated height.	N/A
Ledge	54-28-22.90N 164-20-32.68W	Chart RSD data with updated height.	N/A

Table 14 – Discrepancies with RSD data found in survey H12065. * indicates times taken from CARIS Notebook Marker layer time stamp.

See Appendix II for final charting recommendations of items discussed below.

Chart(s) and Feature	Latitude and Longitude	Recommendations	Applicable DP forms
16520_1 ROCK	54-24-22.09N 164-34-09.95W	Remove. Recommend chart three RSD rocks and RSD reef in place of charted rock.	DP023
US3AK61M SHORELINE	54-24-21.85N 164-34-01.06W	Remove from chart(s), disproved by surface visual investigation.	N/A
US3AK61M ISLET	54-24-51.21N 164-29-56.85W	Remove from chart(s), disproved by surface visual investigation.	N/A
16520_1 ROCK	54-24-48.75N 164-29-23.58W	Remove charted rock, chart three RSD rocks in vicinity.	DP028
USAK61M ROCK	54-24-50.23N 164-29-20.68W	Remove charted rock, chart three RSD rocks in vicinity.	DP028
US3AK61M, 16520_1 ISLAND	54-25-11.83N 164-27-12.70W	Remove from chart(s), disproved by surface visual investigation.	N/A
US3AK61M ROCK	54-27-45.53N 164-21-45.90W	Remove from chart, chart RSD rock to the SW with updated height as depicted in S-57 feature file.	N/A
16520_1 LEDGE	54-28-20.47N 164-20-24.22W	Remove from chart. Chart RSD ledge.	N/A
US3AK61M ROCK	54-28-43.73N 164-20-28.05W	Remove from chart. Charted rock is far inside (shoreward) of COALNE RSD object	N/A
US3AK61M, 16520_1 ROCK	54-28-15.30N 164-20-47.29W	Remove from chart. Charted rock is far inside (shoreward) of COALNE RSD object	N/A
US3AK61M, 16520_1 ROCK	54-28-07.67N 164-21-02.13W	Remove from chart. Charted rock is far inside (shoreward) of COALNE RSD object	N/A
16520_1 ISLET	54-26-58.95N 164-23-17.16W	Remove from chart. Charted islet is far inside (shoreward) of COALNE RSD object	N/A

Table 15 – Discrepancies with charted data found in survey H12065

D.2.2. Aids to Navigation

There are no aids to navigation in this survey area. ***Concur***

D.2.3. Drilling Structures

An investigation of drilling structures is not required under this task order. There are no drilling structures within the project area. ***Concur***

D.2.4. Comparison with Prior Surveys

A comparison with prior surveys was not required under this task order. See Section D.1 of this report for a comparison to the existing nautical charts. ***Concur***

D.2.5. Bottom Samples ***See also the H-Cell report.***

One hundred eighty-five bottom samples were collected in support of the 2009 survey. The samples were distributed geographically to obtain a full representation of the bottom characteristics as specified in HSSD, *Section 7.1*. A listing and description of the bottom samples is provided in *Appendix V* ******of this report. ****Data attached to this report.***

D.2.6. Bridges and Overhead Cables

There are no bridges or overhead cables in the survey area. ***Concur***

D.2.7. Submarine Cables and Pipelines

There are no submarine cables in the survey area. ***Concur***

LETTER OF APPROVAL

REGISTRY NUMBER H12065

This report and the accompanying digital data are respectfully submitted.

Field operations contributing to the accomplishment of survey H12065 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report, digital data and accompanying records have been closely reviewed and are considered complete and adequate as per the *Statement of Work*. Other reports submitted with this survey include the Data Acquisition and Processing Report and the Vertical and Horizontal Control Report.

I believe this survey is complete and adequate for its intended purpose.

Marta Krynytzky

Digitally signed by Marta Krynytzky
DN: CN = Marta Krynytzky, C = US, O = TerraSond Ltd., OU = Charting
Date: 2010.01.14 11:46:43 -09'00'

Marta Krynytzky, Lead Hydrographer
TerraSond Ltd.

Date January 14, 2010

H112065-APPENDIX I DTON

Registry Number:

State:

Locality:

Sub-locality:

Project Number:

Survey Date: 03/30/2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16520	23rd	08/01/2008	1:300,000 (16520_1)	USCG LNM: 10/12/2010 (1/18/2011) CHS NTM: None (12/31/2010) NGA NTM: 1/11/2003 (1/29/2011)
16011	37th	11/01/2007	1:1,023,188 (16011_1)	[L]NTM: ?
16006	35th	04/01/2008	1:1,534,076 (16006_1)	[L]NTM: ?
513	7th	06/01/2004	1:3,500,000 (513_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	3/4 fm Rk	Rock	1.60 m	54° 28' 03.6" N	164° 20' 47.8" W	---
1.2	2 1/4 fm Rk	Rock	4.40 m	54° 28' 09.0" N	164° 20' 03.2" W	---
1.3	1 1/2 fm Rk	GP	2.96 m	54° 29' 25.0" N	164° 19' 49.0" W	---

1 - DR_DToN

1.1) 3/4 fm Rk

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 28' 03.6" N, 164° 20' 47.8" W
Least Depth:	1.60 m (= 5.25 ft = 0.875 fm = 0 fm 5.25 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	[None]
GP Dataset:	ChartGPs - ENC H12065_S57_Features
GP No.:	Danger 6
Charts Affected:	16520_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON feature. Least depth unknown as feature on edge of MB coverage

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC H12065_S57_Features	Danger 6	0.00	000.0	Primary

Hydrographer Recommendations

Chart 3/4 fm Rk.

Cartographically-Rounded Depth (Affected Charts):

0 ¾fm (16520_1, 16011_1, 16006_1, 530_1)

1.6m (500_1, 513_1, 50_1)

S-57 Data

Geo object 1:	Cartographic symbol ($CSYMB)
Attributes:	INFORM - DO NOT CHART
Geo object 2:	Underwater rock / awash rock (UWTROC)
Attributes:	INFORM - DTON feature. Least depth unknown as feature on edge of MB coverage
	QUASOU - 6:least depth known
	SORIND - US,US,nsurf,H12065

TECSOU - 3:found by multi-beam

VALSOU - 1.600 m

Office Notes

Concur with clarification - Shown on chart 16520 23rd. Ed., Aug. /2008 and smaller scale charts as a Rk, least depth 3/4 fm. Office processing determined that the position and leaast depth are different from the initial DToN submission to MCD. Delete charted Rk, least depth 3/4 fm. Chart a rock, least depth 3/4 fm at the present surevy position in Latitude 54°28'03.577"N, Longitude -164°20'47.809"W.

1.2) 2 1/4 fm Rk

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 28' 09.0" N, 164° 20' 03.2" W
Least Depth:	4.40 m (= 14.44 ft = 2.406 fm = 2 fm 2.44 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	[None]
GP Dataset:	ChartGPs - ENC H12065_S57_Features
GP No.:	Danger 7
Charts Affected:	16520_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

Object discovered: Rock

Chart 6 1/2 fm rock corrected to Mean Lower Low Water suing predicted tide correctors.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC H12065_S57_Features	Danger 7	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 6 1/2 fm rock at surveyed location.

Cartographically-Rounded Depth (Affected Charts):

2 ¼fm (16520_1, 16011_1, 16006_1, 530_1)

4.4m (500_1, 513_1, 50_1)

S-57 Data

Geo object 1:	Cartographic symbol ($CSYMB)
Attributes:	INFORM - DO NOT CHART
Geo object 2:	Underwater rock / awash rock (UWTROC)
Attributes:	INFORM - Reported as DTON
	QUASOU - 6:least depth known

SORDAT - 20090823

SORIND - US,US,graph,H12065

TECSOU - 3:found by multi-beam

VALSOU - 4.400 m

WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification - Shown on chart 16520 23rd. Ed., Aug. /2008 and smaller scale charts as a Rk, least depth 6 1/2 fm. Office processing determined that the position and leaast depth are different from the initial DToN submission to MCD. Delete charted Rk, least depth 6 1/2 fm. Chart a rock, least depth 2 1/4 fm at the present surevy position in Latitude 54°28'09.029"N, Longitude 164°20'03.165"W.

1.3) 1 1/2 fm Rk

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 29' 25.0" N, 164° 19' 49.0" W
Least Depth:	2.96 m (= 9.71 ft = 1.619 fm = 1 fm 3.71 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2011-089.13:31:00 (03/30/2011)
GP Dataset:	ChartGPs - Digitized
GP No.:	2
Charts Affected:	16520_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

Object Discrovered: Rock Covered 1 1/2 fm rock corrected to Mean Lower Low Water using predicted tide correctors.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - Digitized	2	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 1 1/2 fm Rock at surveyed position.

Cartographically-Rounded Depth (Affected Charts):

1 ½fm (16520_1, 16011_1, 16006_1, 530_1)

3.0m (500_1, 513_1, 50_1)

S-57 Data

[None]

Office Notes

Concur with clarification - Item is located outside the limits of present survey. No data was submitted with this survey on the rock. Shown on chart 16520 23 rd. Ed., Aug. /08. No change in charting is recommended.

APPENDIX II
Survey Features Report

AWOIS

There were no Automated Wrecks and Obstructions (AWOIS) assigned in survey area H12065. ***Concur***

Uncharted Wrecks

There were no uncharted wrecks in this survey area. ***Concur***

Shoreline Elements

19 Detached positions were acquired for shoreline verification of H12065. 15 new objects were identified and 11 RSD and 12 charted objects were found to need modifications or be removed. The following three tables address each object and show the Hydrographer's recommendation for each.

See end of tables for final charting recommendations.

New Feature	Latitude and Longitude	Final Depth / Height (m)	Acquisition Julian Day and Time	Recommendations	Applicable DP form(s)	Photo Name(s)
ROCK *1*	54-24-21.58N 164-33-51.68W	-1.38	2009-190 23:44	Chart new rock. ***Determined insignificant – Shoaler rock in vicinity. Do not chart.***	DP026	P0757_DP026
ROCK *2*	54-24-23.15N 164-33-37.17W	-0.91	2009-190 23:50	Chart new rock. ***Concur***	DP027	P0758_DP027
BREAKERS *3*	54-25-08.65N 164-26-56.13W	N/A	2009-211 1954*	Chart new breakers. ***Concur***	N/A	N/A
ROCK *4*	54-26-01.89N 164-24-46.04W	-2.17	2009-191 01:13	Chart new rock. *	DP029	P0767_DP029, P0768_DP029
BREAKERS *5*	54-26-48.93N 164-23-09.48W	N/A	2009-191 00:22	Chart new breakers. ***Concur***	N/A	N/A
ROCK *6*	54-27-04.30N 164-22-31.34W	-2.03	2009-192 21:12	Chart new rock. *	DP030	P0784_DP030_DP031
ISLET *7*	54-27-07.24N 164-22-25.22W	0.827	2009-192 21:18	Chart new islet. *	DP031	P0784_DP030_DP031, P0785_DP031, P0790_DP031_DP032

New Feature	Latitude and Longitude	Final Depth / Height (m)	Acquisition Julian Day and Time	Recommendations	Applicable DP form(s)	Photo Name(s)
ROCK *8*	54-27-12.03N 164-22-19.76W	-1.06	2009-192 21:26	Chart new rock. *	DP032	P0790_DP031_DP032, P0787_DP032
FOUL LIMIT *9*	54-27-47.50N 164-21-00.27W	-2.05	2009-211 18:42	Chart new fouled area. ***Do not concur - Determined insignificant during office processing. Do not chart.***	DP041	P0841_DP041
ROCK *10*	54-27-53.96N 164-21-05.48W	-2.05	2009-211 19:05	Chart RSD data with updated height. *	DP041	P0841_DP041
ISLET *11*	54-28-26.43N 164-20-38.50W	30	2009-211 18:38	Chart new islet. *	DP037	P0835_DP037
FOUL LIMIT *12*	54-28-18.65N 164-20-26.97W	-0.63	2009-211 18:38	Chart new fouled area. ***Do not concur - Determined insignificant during office processing. Do not chart.***	DP038	P0836_DP038
ISLET *13*	54-28-37.50N 164-20-25.93W	30	2009-211 18:26	Chart new islet. *	DP035	P0833_DP035, P0834_DP035_DP36
ROCK *14*	54-28-36.89N 164-20-20.84W	-0.68	2009-211 18:31	Chart new rock. *	DP036	P0834_DP035_DP36
ROCK *15*	54-28-43.11N 164-20-16.47W	-1.73	2009-211 18:17	Chart new rock. *	DP034 P0832	P0832_DP034

*Table 1: New shoreline features for H12065. * indicates time taken from CARIS Notebook Marker layer time stamp.*

RSD Feature	Latitude and Longitude	Final Depth / Height (m)	Acquisition Julian Day and Time	Recommendations	Applicable DP form(s)	Photo Name(s)
REEF *16*	54-24-21.59N 164-34-14.95W	UNKNOWN	2009-190 23:21	Retain RSD data. *	DP024	P0755_DP024
ROCK *17*	54-24-22.15N 164-34-13.21W	UNKNOWN	2009-190 N/A	Retain RSD data. *	N/A	N/A
ROCK *18*	54-24-22.09N 164-34-09.95W	-1.73	2009-190 23:14	RSD data modified height data. Chart ad depicted in S-57 file. *	DP023	P0752_DP023, P0753_DP024
ROCK *19*	54-24-22.99N 164-34-05.62W	UNKNOWN	2009-190 N/A	Retain RSD data. *	N/A	N/A
ROCK *20*	54-24-18.12N 164-33-55.07W	-1.85	2009-190 23:38	RSD data modified height data. Chart as depicted in S-57 file. ***Concur with clarification – Delete charted rock. Add new UWTROC.***	DP025	P0756_DP025
ROCK *21*	54-24-48.85N 164-29-26.34W	UNKNOWN	2009-191 00:19	Retain RSD data. *	DP028	P0762_DP028
ROCK *22*	54-24-49.89N 164-29-20.98W	UNKNOWN	2009-191 00:19	Retain RSD data. *	DP028	P0762_DP028

RSD Feature	Latitude and Longitude	Final Depth / Height (m)	Acquisition Julian Day and Time	Recommendations	Applicable DP form(s)	Photo Name(s)
ROCK *23*	54-24-50.92N 164-29-19.39W	UNKNOWN	2009-191 00:19	Retain RSD data. *	DP028	P0762_DP028
ROCK *24*	54-27-06.41N 164-22-29.05W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
ROCK *25*	54-27-09.66N 164-22-23.41W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
ROCK *26*	54-27-42.94N 164-21-38.30W	-0.46	2009-211 19:27*	RSD data modified height data. Chart as depicted in S-57 file. *	N/A	N/A
LEDGE *27*	54-27-50.60N 164-21-12.13W	-1.7 to 0	2009-211	Chart RSD data with updated height. *	N/A	N/A
ROCK *28*	54-27-48.70N 164-21-06.21W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
ROCK *29*	54-27-49.17N 164-21-05.78W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
LEDGE *30*	54-27-53.96N 164-21-05.48W	-1.7 to 0	2009-211 19:05	Chart RSD data with updated height. ***Same as 10.***	DP041	P0841_DP041

RSD Feature	Latitude and Longitude	Final Depth / Height (m)	Acquisition Julian Day and Time	Recommendations	Applicable DP form(s)	Photo Name(s)
LEDGE *31*	24-27-49.90N 164-21-10.89W	-1.7 to 0	2009-211	Chart RSD data with updated height. *	N/A	N/A
ROCK *32*	54-27-~~49.86~~*50.79*N 164-21-~~02.62~~*00.82*W	UNKNOWN	N/A	Retain RSD data. ***Concur-Retain Rock awash.***	N/A	N/A
FOUL *33*	54-27-49.68N 164-21-01.82W	UNKNOWN	2009-211 19:05	Remove RSD data, chart new foul area with greater extents. ***Do not concur - Determined insignificant during office processing. Do not chart.***	DP041	P0841_DP041
ISLET *34*	54-28-07.12N 164-20-53.97W	15	2009-211 18:57	RSD data modified. Remove RSD rock and chart new islet in its place. Chart as depicted in S-57 feature file.*	DP040	P0840_DP040, P0839_DP040
LEDGE *35*	54-28-05.01N 164-20-52.99W	-1.7 to 0	N/A	Chart RSD data with updated height. *	N/A	N/A
LEDGE *36*	54-28-20.53N 164-20-30.15W	-1.7 to 0	N/A	Chart RSD data with updated height. ***Concur with clarification – Retain charted ledge.***	N/A	N/A

RSD Feature	Latitude and Longitude	Final Depth / Height (m)	Acquisition Julian Day and Time	Recommendations	Applicable DP form(s)	Photo Name(s)
LEDGE *37*	54-28-22.90N 164-20-32.68W	-1.7 to 0	N/A	Chart RSD data with updated height. ***Same as #36.***	N/A	N/A
ROCK *38*	54-28-15.10N 164-20-27.34W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
ROCK *39*	54-28-12.83N 164-20-26.33W	UNKNOWN	N/A	Retain RSD data. ***Concur – Retain rock awash.***	N/A	N/A
ROCK *40*	54-28-39.27N 164-20-20.90W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
ROCK *41*	54-28-39.03N 164-20-19.34W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
REEF *42*	54-28-40.03N 164-20-18.94W	UNKNOWN	N/A	Retain RSD data. *	N/A	N/A
REEF *43*	54-28-47.77N 164-20-12.36W	UNKNOWN	N/A	Retain RSD data. ***Do not concur - Item not shown on chart 16520 23rd. Ed., Aug. /08 or ENC US3AK61M. No change in charting recommended.***	N/A	N/A

Table 2: Remote Sensing Data feature verification objects for H12065. * indicates time taken from CARIS Notebook Marker layer time stamp. Grey colored cells represent features that are unchanged by this survey.

Chart(s) and Feature	Latitude and Longitude	Final Depth / Height (m)	Recommendations	Applicable DP forms	Photo Name(s)
US3AK61M, 16520_1 ROCK ***44***	54-24-17.45N 164-34-45.10W	UNKNOWN	Retain as charted. *	N/A	N/A
16520_1 ROCK ***45***	54-24-22.09N 164-34-09.95W	UNKNOWN	Remove. Recommend chart three RSD rocks and RSD reef in place of charted rock. ***Same as #18.***	DP023	P0752_DP023, P0753_DP023
US3AK61M SHORELINE ***46***	54-24-21.85N 164-34-01.06W	N/A	Remove from chart(s), disproved by surface visual investigation. ***Concur with clarification - New shoreline from RSD added to H-Cell. Revise shoreline from H-Cell.***	N/A	N/A
US3AK61M, 16520_1 ROCK ***47***	54-24-30.20N 164-33-29.90W	UNKNOWN	Retain as charted. *	N/A	N/A

Chart(s) and Feature	Latitude and Longitude	Final Depth / Height (m)	Recommendations	Applicable DP forms	Photo Name(s)
US3AK61M ISLET ***48***	54-24-51.21N 164-29-56.85W	UNKNOWN	Remove from chart(s), disproved by surface visual investigation. ***Concur with clarification - Item not shown on chart 16520 23rd. Ed., Aug. /08 or ENC US3AK61M. No change in charting recommended.***	N/A	P0845
16520_1 ROCK ***49***	54-24-48.75N 164-29-23.58W	UNKNOWN	Remove charted rock, chart three RSD rocks in vicinity. *	DP028	P0762_DP028
USAK61M ROCK ***50***	54-24-50.23N 164-29-20.68W	UNKNOWN	Remove charted rock, chart three RSD rocks in vicinity. *	DP028	P0762_DP028
US3AK61M, 16520_1 ROCK ***51***	54-25-07.08N 164-27-25.05W	UNKNOWN	Retain as charted. *	N/A	N/A
US3AK61M, 16520_1 ISLAND ***52***	54-25-11.83N 164-27-12.70W	N/A	Remove from chart(s), disproved by surface visual investigation. ***Concur – Delete island.***	N/A	N/A
US3AK61M, 16520_1 ROCK ***53***	54-25-20.31N 164-26-57.53W	UNKNOWN	Retain as charted. *	N/A	N/A

Chart(s) and Feature	Latitude and Longitude	Final Depth / Height (m)	Recommendations	Applicable DP forms	Photo Name(s)
US3AK61M, 16520_1 CABIN ***54***	54-26-03.05N 164-26-03.39W	N/A	Retain as charted. ***Concur***	N/A	N/A
US3AK61M, 16520_1 ROCK ***55***	54-25-59.01N 164-25-01.21W	UNKNOWN	Retain as charted. *	N/A	N/A
US3AK61M, 16520_1 ROCK ***56***	54-26-09.87N 164-24-40.03W	UNKNOWN	Retain as charted. *	N/A	N/A
US3AK6, 16520_1 ROCK ***57***	54-26-50.54N 164-23-26.79W	UNKNOWN	Retain as charted. *	N/A	N/A
16520_1 ISLET ***58***	54-26-58.95N 164-23-17.16W	UNKNOWN	Remove from chart. Charted islet is far inside (shoreward) of COALNE RSD object. ***Concur – Delete charted rock awash.***	N/A	N/A
16520_1 ROCK ***59***	54-27-10.08N 164-22-20.90W	UNKNOWN	Retain as charted. *	N/A	N/A

Chart(s) and Feature	Latitude and Longitude	Final Depth / Height (m)	Recommendations	Applicable DP forms	Photo Name(s)
US3AK61M ROCK ***60***	54-27-45.53N 164-21-45.90W	UNKNOWN	Remove from chart, chart RSD rock to the SW with updated height as depicted in S-57 feature file. ***Concur with clarification - Item not shown on chart 16520 23rd. Ed., Aug. /08 or ENC US3AK61M. No change in charting recommended.***	N/A	N/A
16520_1 ROCK ***61***	54-27-42.94N 164-21-38.30W	UNKNOWN	Retain as charted. *	N/A	N/A
US3AK61M ROCK ***62***	54-27-50.60N 164-21-12.13W	UNKNOWN	Retain as charted. ***Same as #27.***	N/A	N/A
16520_1 ROCK ***63***	54-27-49.86N 164-21-02.62W	UNKNOWN	Retain as charted. ***Same as #32.***	N/A	N/A
US3AK61M, 16520_1 ROCK ***64***	54-28-07.67N 164-21-02.13W	UNKNOWN	Remove from chart. Charted rock is far inside (shoreward) of COALNE RSD object. ***Concur – Delete charted rock awash.***	N/A	N/A

Chart(s) and Feature	Latitude and Longitude	Final Depth / Height (m)	Recommendations	Applicable DP forms	Photo Name(s)
US3AK61M, 16520_1 ROCK ***65***	54-28-15.30N 164-20-47.29W	UNKNOWN	Remove from chart. Charted rock is far inside (shoreward) of COALNE RSD object. ***Concur with clarification - Item not shown on chart 16520 23rd. Ed., Aug. /08. No change in charting recommended.***	N/A	N/A
US3AK61M ROCK ***66***	54-28-19.30N 164-20-34.81W	UNKNOWN	Retain as charted. ***Do not concur - Item not shown on chart 16520 23rd. Ed., Aug. /08 or ENC US3AK61M. No change in charting recommended.***	N/A	N/A
16520_1, US3AK61M ROCK ***67***	54-28-27.41N 164-20-38.49W	UNKNOWN	Retain as charted. *	N/A	N/A
16520_1 LEDGE ***68***	54-28-20.47N 164-20-24.22W	UNKNOWN	Remove from chart. Chart RSD ledge. ***Do not concur – Item shown on chart 16520 23rd. Ed., Aug. /08 and ENC US3AK61M.*** ***No change in charting recommended.***	N/A	N/A

Chart(s) and Feature	Latitude and Longitude	Final Depth / Height (m)	Recommendations	Applicable DP forms	Photo Name(s)
US3AK61M ROCK ***69***	54-28-43.73N 164-20-28.05W	UNKNOWN	Remove from chart. Charted rock is far inside (shoreward) of COALNE RSD object. ***Concur with clarification - Item not shown on chart 16520 23rd. Ed., Aug. /08 or ENC US3AK61M. No change in charting recommended.***	N/A	N/A

Table 3: Remote Sensing Data feature verification objects for H12065. Grey colored cells represent features that are unchanged by this survey.

****Do not concur – Per a telephone discussion with MCD the above discussed items falling on or within the shoreline should not be charted. It is recommended that the charted items be deleted. It is also recommended that the new rocks on or within the shoreline not be charted.***

Attachments:

Detached Position Forms and Photos:

H12065_DP_Forms&Photos.pdf

Shoreline Boat Sheets:

H12065_Shoreline_Boat_Sheets.pdf

TERRASOND

Detached Position and Item Investigation

Project:	2009 - 001
Locality:	Unimak Pass, AK
Sheet:	SHEET D
Vessel:	RHIB

Julian Date:	2009 - 190
Time:	23:14
Position Number:	DP - 23
Crew:	WODARZ, ROELL, KRYNYTZKY
Equipment:	DSM212, CARIS HIPS 3.0 LEUPOLD RANGE FINDER

Additional Notes

Position modified in S-57 file to match RSD rock position. New DP Position: 54-24-22.09N 164-34-09.95W

POSITION MARKER

Lat/Lon:	54-24-22.04 N 164-34-09.70 W
Observed Depth/Height:	1 - 1.5 METERS
Bearing:	~~320°~~ 301°
Range:	~~244 M~~ +0

DESCRIPTION/ ITEM TYPE

ROCKS NOTED - VERY CLOSE TO SHORE

BEARING -

DID NOT ACQUIRE POSITION

RANGE -

PHOTOS:

PIC - 752
PIC - 753

DIRECTION YOU WERE FACING?

N

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP


DP023
P0752_DP023

P0753_DP023

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	SHEET 0
Vessel:	RHIB

Julian Date:	2009-190
Time:	23:21
Position Number:	DP-24
Crew:	WOODARK, DAGG, KRTNYTZKY
Equipment:	DSM 212, CORIS NTBK 3 LEUPOLD RANGE FINDER

Additional Notes

REEF NOTED NEAR SHORE

POSITION MARKER

Lat/Lon:	54-24-21.59 N	164-34-14.95 W	
Observed Depth/Height:			
Bearing:	N/A	Range:	N/A

DESCRIPTION/ ITEM TYPE REEF NOTED NEAR SHORE, POSITION IS ESTIMATED

PHOTOS: PIC-755

DIRECTION YOU WERE FACING?

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

P0755_DP024

TERRASOND

Detached Position and Item Investigation

Project:	2009-061
Locality:	Unimak Pass, AK
Sheet:	SHEET D
Vessel:	RHIB

Julian Date:	2009-190
Time:	23:38
Position Number:	DP-025
Crew:	WODARCZ, RACK, KRYNYTZKY
Equipment:	DSM 212, CASIS NTBC 3.0 LEUPOLD RANGE FINDER

POSITION HOB

Lat/Lon: 54-24-17.83 164-33-55.08

Observed Depth/Height: 1 METER

Bearing: ~~303°~~ N/A Range: ~~120 METERS~~ N/A ~~40~~

DESCRIPTION/ ITEM TYPE

ROCKS – COVERS/UNCOVERS

POSITION-ESTIMATED

BEARING 316°

~~RANGE 130 METERS~~

~~40~~

PHOTOS: PIC - 756

DIRECTION YOU WERE FACING?

Additional Notes

~~2ND RANGE/BEARING~~

~~294°~~

~~122 METERS~~

~~40~~

UNABLE TO ATTAIN RANGE/BEARING - POSITION ESTIMATED

DP position modified to match RSD rock position.
New DP position:
54-24-18.12N
164-33-55.07W

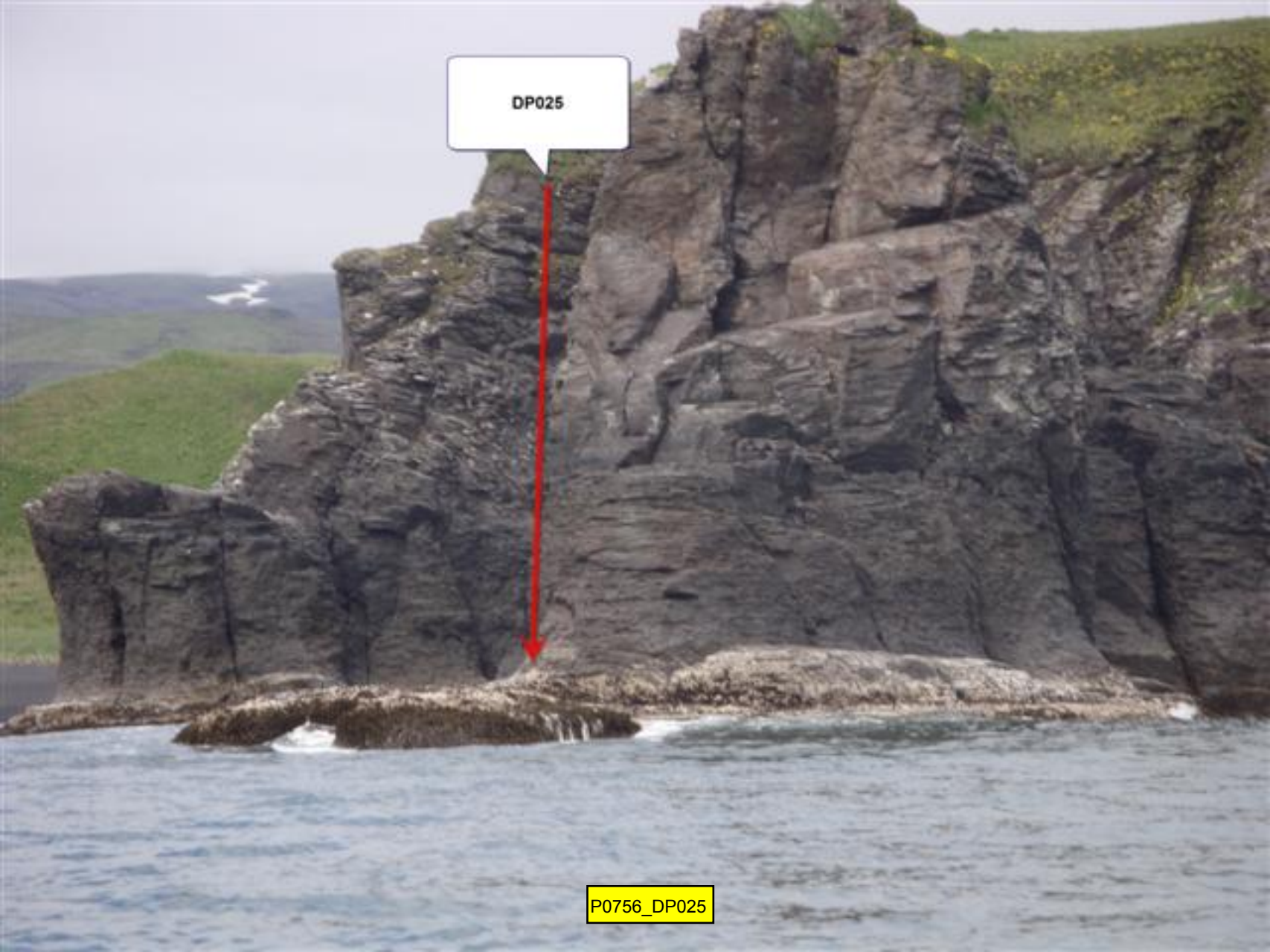
S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

✓



P0756_DP025

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	SHEET D
Vessel:	RHIB

Julian Date:	2009-190
Time:	23:44
Position Number:	DP-026
Crew:	WOODRIC, DOCK, KRYNYTZKY
Equipment:	DSM 212, CARIS HIPS 3.0 RANGE FINDER

Additional Notes

P757

POSITION HOB

Lat/Lon:	54-24-21.58 164-33-51.68
Observed Depth/Height:	0.5 M
Bearing:	~~282°~~
Range:	~~138 FT~~ ~~30 L~~

DESCRIPTION/ ITEM TYPE

EXPOSED ROCK / ROCK REEF
POSITION APPROXIMATED -

PHOTOS: PIC - 757

DIRECTION YOU WERE FACING? N

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

✓


DP026
P0757_DP026

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	SHEET D
Vessel:	RHIB

Julian Date:	2009-190
Time:	23:50
Position Number:	DP-027
Crew:	WODARK, DACH, KRYNYTZKY
Equipment:	DSM122, CARIS NTBK 3.0, RANGE FINDER

Additional Notes

P758

POSITION HOB

Lat/Lon:	54-24-23.15 164-33-37.17
Observed Depth/Height:	0.0 (SUBMERGED)
Bearing:	0°
Range:	150 M

DESCRIPTION/ ITEM TYPE

SUBMERGED ROCK - ALWAYS UW

ESTIMATED RANGE + BEARING

POSITION (APPROXIMATED)

PHOTOS: PIC - 758

DIRECTION YOU WERE FACING? N

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM _____

PICREP _____

✓


DP027
P0758_DP027

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	SHEET D
Vessel:	RHIB

Julian Date:	2009-191
Time:	00:19
Position Number:	DP-28
Crew:	WOODARD, PACE, KENYNTZKY
Equipment:	DSM212, CARIS NTBIC 3.0 RANGE FINDER

Additional Notes

P 762

POSITION MARKER

Lat/Lon:	54-24-49.69 N 164-29-22.14 W
Observed Depth/Height:	N/A
Bearing:	—
Range:	—

Reference Position for multiple rocks.

DESCRIPTION/ ITEM TYPE

MULTIPLE ROCKS SEEN ON BEACH

54-24-49.69 N 164-29-22.14 W

PHOTOS: PHOTOS 762 - 766

DIRECTION YOU WERE FACING?

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

✓


DP028
P0762_DP028

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	SHEET 0
Vessel:	RHIB

Julian Date:	2009-191
Time:	01:03
Position Number:	DP-29
Crew:	WORDAHL, BACH, KRYNYTZKY
Equipment:	USM2I2, CARIS HTBIC 3.0 RANGE FINDER

Additional Notes

THESE ROCKS ARE NOT NOTED ON OUR SHEETS

P767
P768

POSITION HOB

Lat/Lon:	54-26-01.89	164-24-46.04
Observed Depth/Height:		
Bearing:	~~282°~~	Range: ~~204 m~~ ~~1° L~~

DESCRIPTION/ ITEM TYPE

BEARING - 289°

RANGE - 175°

ROCKS (NEAR BEACH) - NOT ON CHART

~~RANGE 180 m~~ (RANGE SHOT PAST ROCKS)

RANGE 150°

Height estimated at 1 m from photo.

PHOTOS: PICS 767 AND 768

DIRECTION YOU WERE FACING? N/E

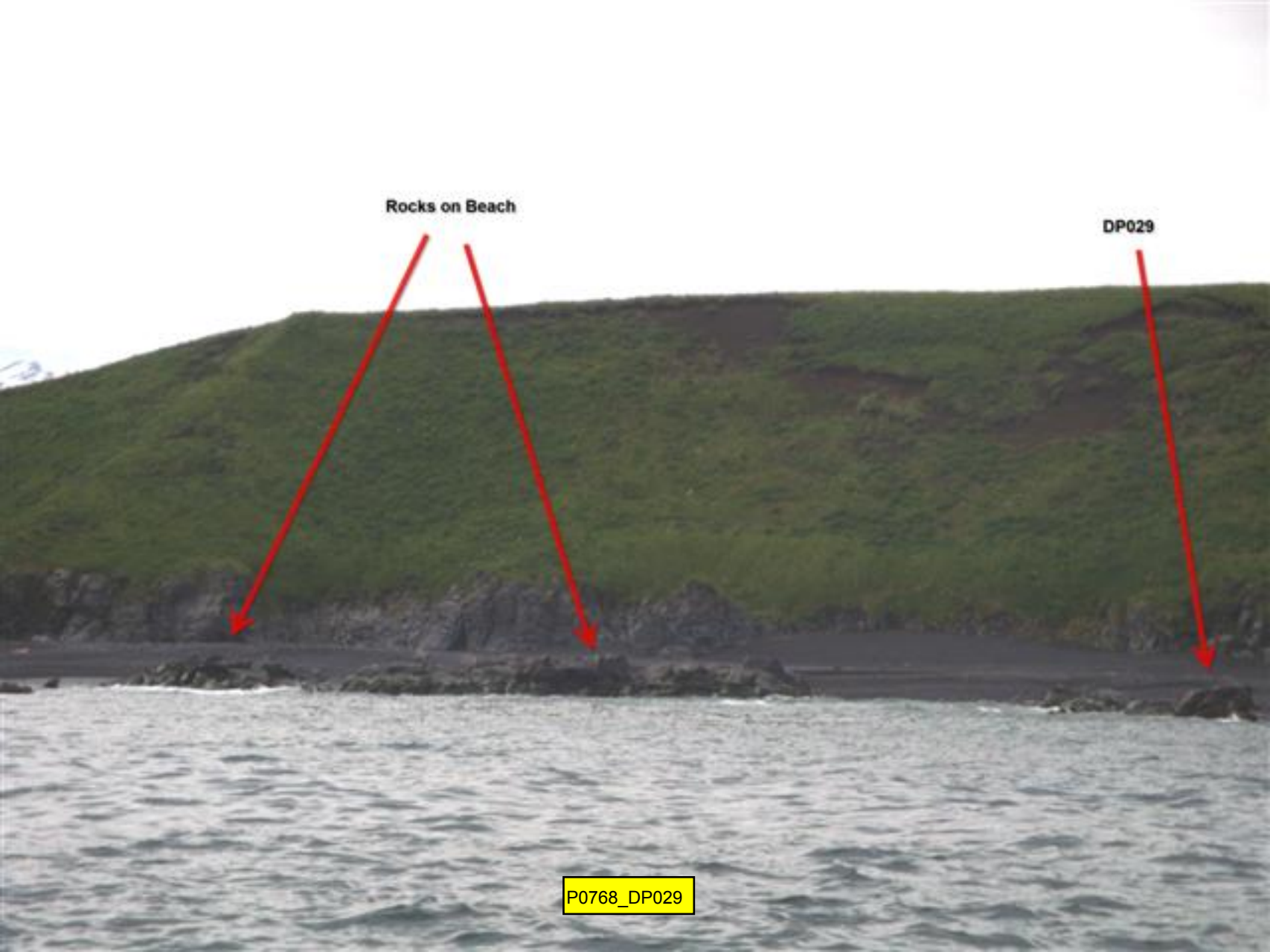
S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP


DP029
P0767_DP029


Rocks on Beach
DP029
P0768_DP029

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	SHEET 0
Vessel:	RHIB

Julian Date:	2009-192
Time:	21:12
Position Number:	DP-30
Crew:	KRYNYTZKY, PACIL, WOOAREK
Equipment:	DSM 212, CARIS NTBK, RANGEFINDER

Additional Notes

P784

POSITION	HOB	
Lat/Lon:	54-27-04.30 N	164-22-31.34 W
Observed Depth/Height:	2.0 METERS	
Bearing:	280°	Range: 143 1°L

DESCRIPTION/ ITEM TYPE

ROCK OUTCROPPING JUST (OFF-SHORE OF BASALT COLUMNS)

COVERS/UNCOVERS

PHOTOS: PICTURE 0784

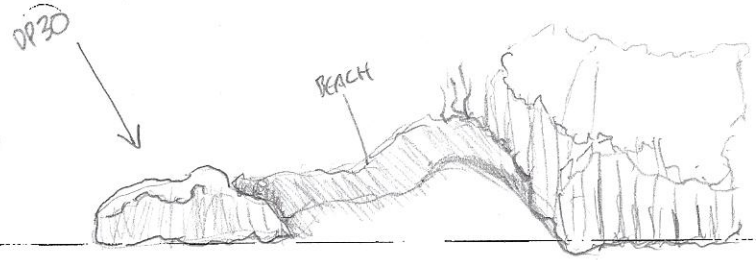
DIRECTION YOU WERE FACING? NW

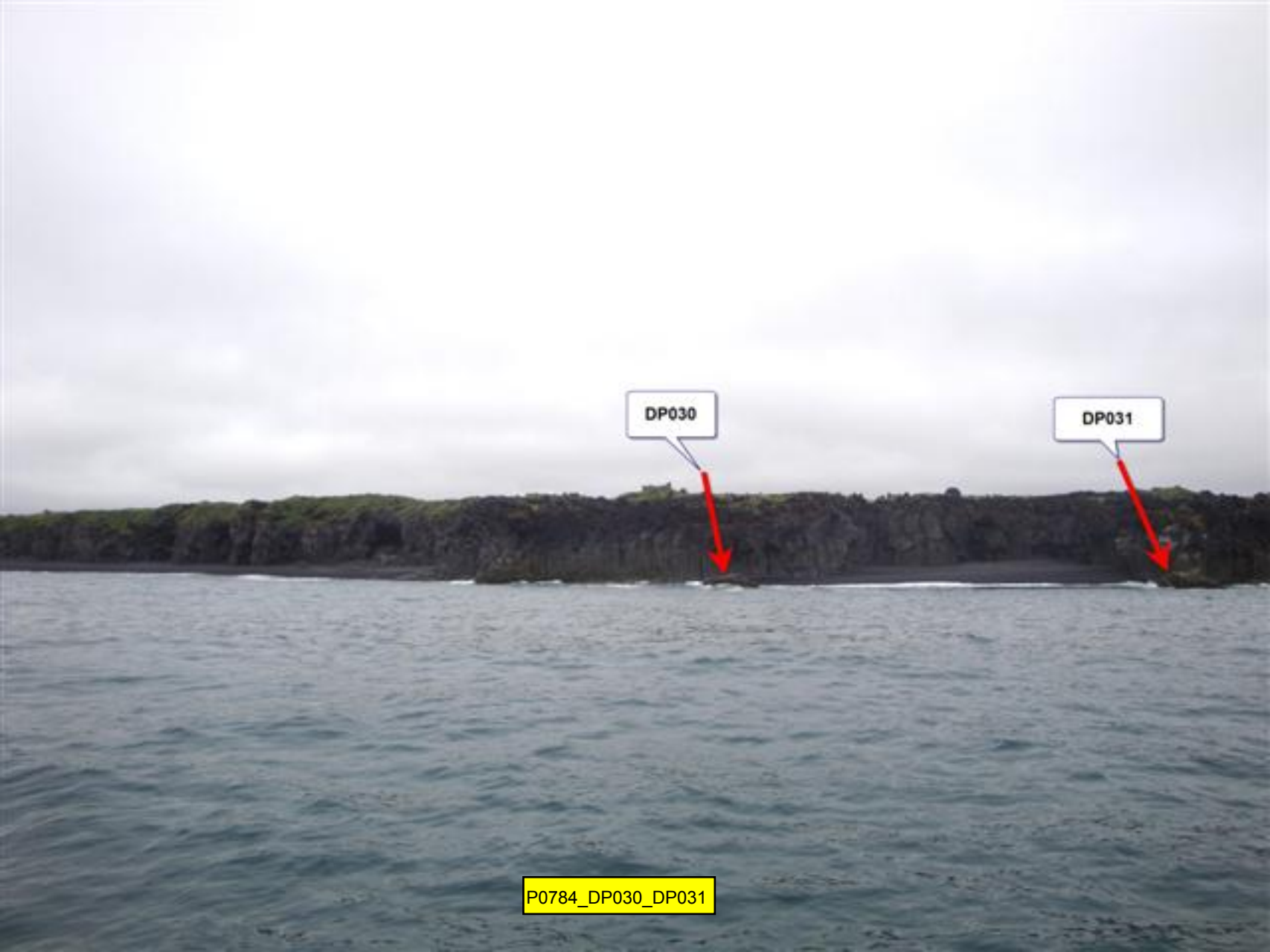
S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP





P0784_DP030_DP031

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	SHEET D
Vessel:	RHIB

Julian Date:	2009 - 191
Time:	21:18 UTC
Position Number:	DP-031
Crew:	KRYNYTZKY, PACK, WODAREIL
Equipment:	DSM212, CARIS NTBK, RANGEFINDER

Additional Notes

P785
P786

Correct Julian Day is 2009-192.

POSITION HOB

Lat/Lon: 54-27-07.24 N 164-22-25.22 W

Observed Depth/Height: 2.5 - 3.0 METERS

Bearing: 277° Range: 131 M 3° L

DESCRIPTION/ ITEM TYPE

ROCK OUTCROPPING JUST OFF-SHORE OF BASALT COLUMNS

PHOTOS: P785, P786 (CLOSE-UP)

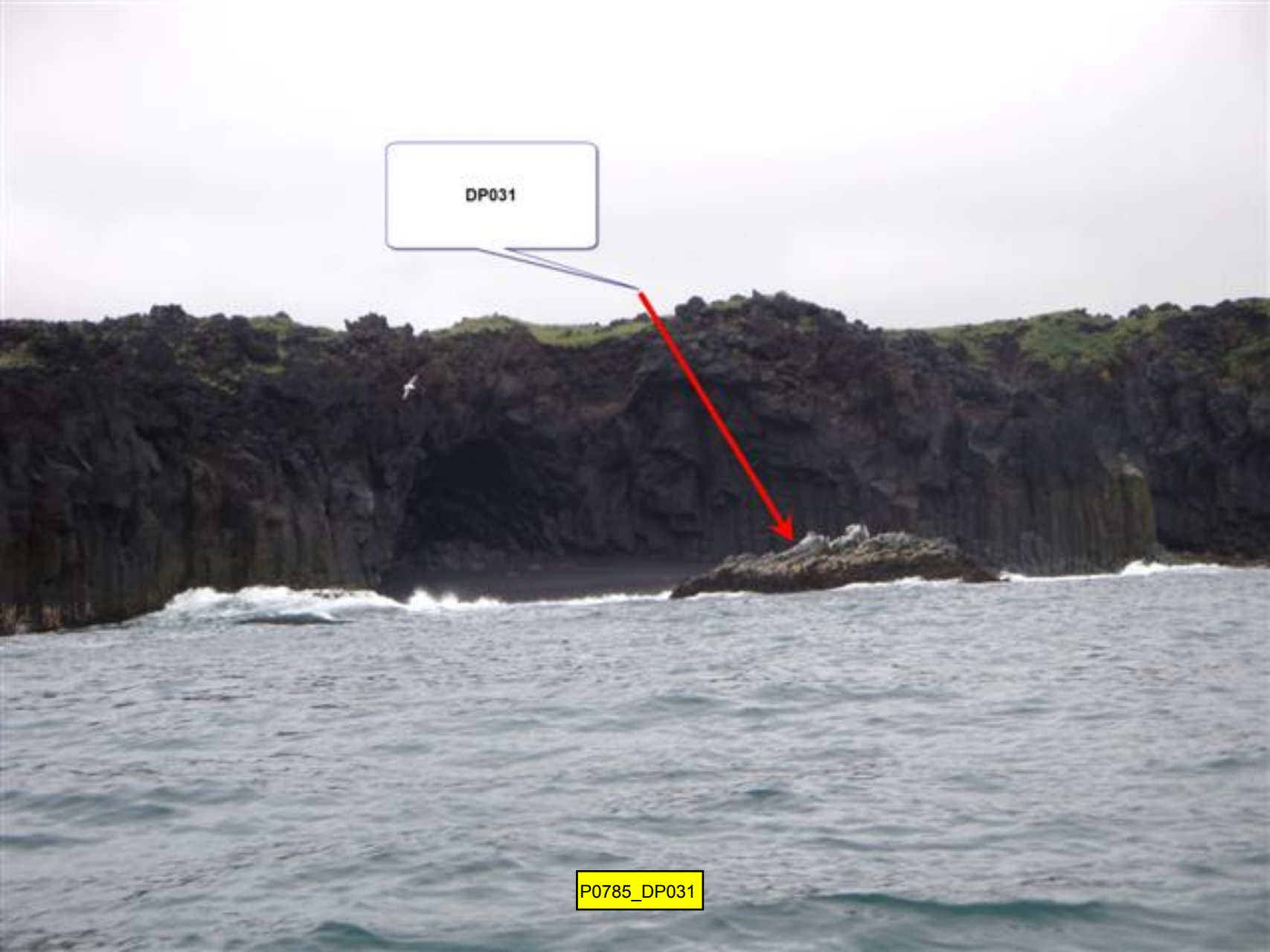
DIRECTION YOU WERE FACING? N

S-57 Attributes Please circle the number

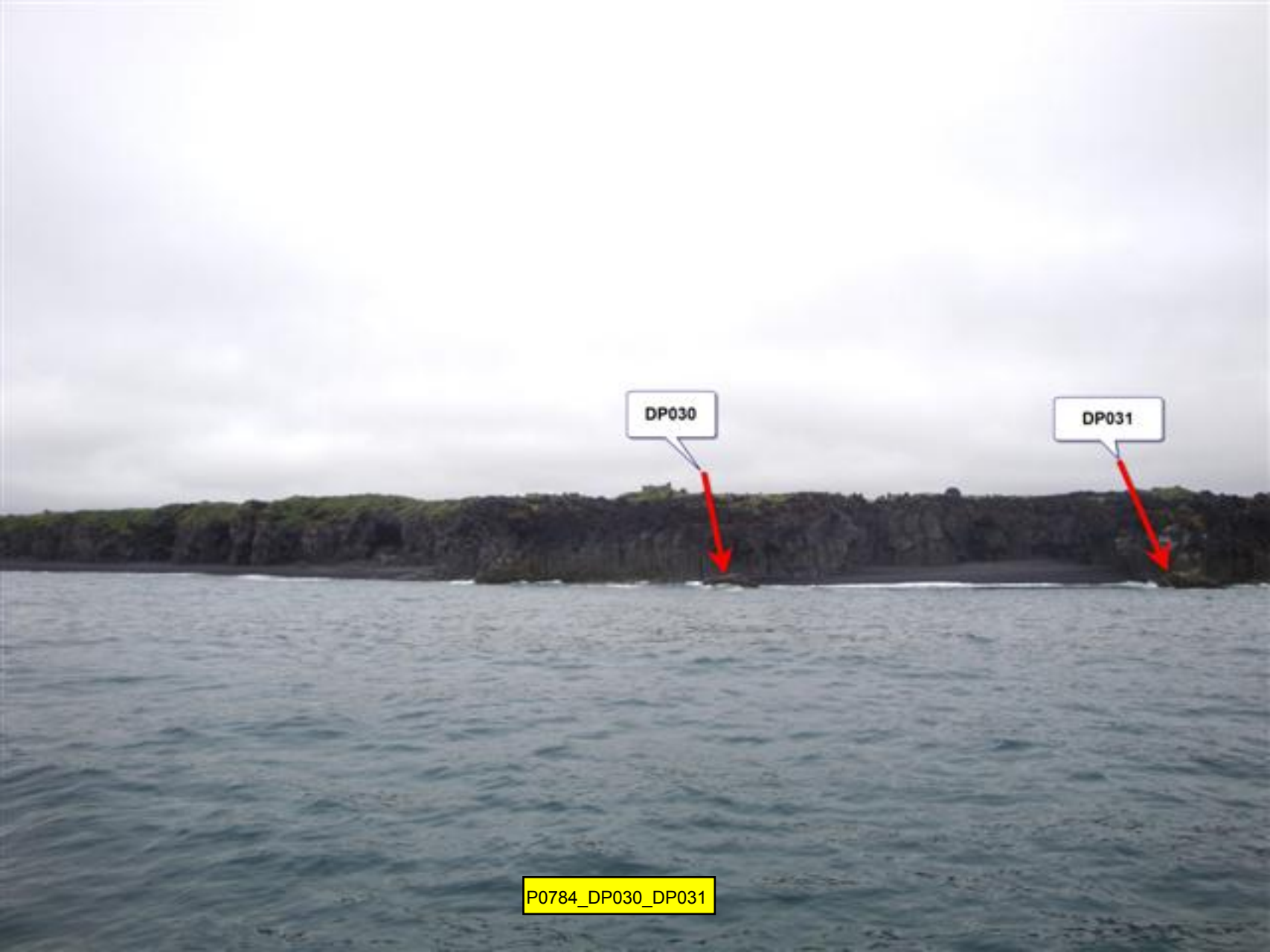
OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP


DP031
P0785_DP031


DP031
just off
frame
DP032
P0790_DP031_DP032



P0784_DP030_DP031

TERRASOND

Detached Position and Item Investigation

Project:	2009-00
Locality:	Unimak Pass, AK
Sheet:	SHEET D
Vessel:	RHIB

Julian Date:	2009-192
Time:	21:26
Position Number:	DP-032
Crew:	KRYNYTZKY, RACK, WOOAREK
Equipment:	DSM 212, CARIS NTBC

Additional Notes

2 ROCKS - SHOT BIR ON HIGHER

2ND ROCK PARTIALLY SUBMERGED

P787
~~P789~~

POSITION HOB

Lat/Lon:	54-27-12.~~30~~ 03 N	164-22-19.76 W
Observed Depth/Height:	HIGHER ≈ 1.0M	
Bearing: 273°	Range: 148 m	-1°L

DESCRIPTION/ ITEM TYPE

ROCK OUTCROPPING OFF-SHORE OF BASALT COLUMNS
TAKING DP ON SHOALER (SEAWARD) OF 2 ROCKS (AS SEEN IN PHOTOS)

PHOTOS: P787-790

DIRECTION YOU WERE FACING? N

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP


DP032
P0787_DP032


DP031
just off
frame
DP032
P0790_DP031_DP032

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	D, H12065
Vessel:	Spare Rhib

Julian Date:	2009-211
Time:	1817
Position Number:	DP-034
Crew:	Bennett, Krynytzky, McCarthy
Equipment:	Caris Notebook, DSM 212 Laser range finder

POSITION MRK

Lat/Lon:	54° 28-41.41 N 164° 20-01.80W
Observed Depth/Height:	1.5m
Bearing:	~~283~~ ~~210~~ 281
Range:	196 <0

Not Corrected for R/B in Notebook

DESCRIPTION/ ITEM TYPE

New Rock

PHOTOS: 0832

DIRECTION YOU WERE FACING? NE

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

Additional Notes

picture: 0831 taken facing N and is to the ~~West~~ East of sheet D limit.

Processed Position:

~~54-28-47.64N~~

~~164-20-12.31W~~

54-28-43.11 N

164-20-16.47W

Wx: 3-4 ft swells


DP034
P0832_DP034

TERRASOND

Detached Position and Item Investigation

Project: 2009-001	Julian Date: 2009-211
Locality: Unimak Pass, AK	Time: 1826
Sheet: D, H12065	Position Number: DP035
Vessel: Spare Rhib	Crew: Bennett, Krynytzky, McCarthy
	Equipment: DSM 212, Caris Notebook, Laser range finder

POSITION

Lat/Lon: 54° 28-37.56N 164° 20-06.61W

Not corrected RTB in NB

Observed Depth/Height: 30m

Bearing: 271 Range: 342 3%

DESCRIPTION/ ITEM TYPE

New Islet

PHOTOS: 0833

DIRECTION YOU WERE FACING? NE

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	(2)	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

Additional Notes

Processed Position:
54-28-37.50 N
164-20-25.93 W

Wx: 3-4 ft swells

P0833_DP035


DP035
DP036
P0834_DP035_DP36

TERRASOND

Detached Position and Item Investigation

Project: 2009-001	Julian Date: 2009-211
Locality: Unimak Pass, AK	Time: 1831
Sheet: D, H12065	Position Number: DP 036
Vessel: Spare Rhib	Crew: Bennett, Krynytzky, McCarthy
	Equipment: DSM 212, Caris Note book Laser range finder

POSITION

Lat/Lon:	54° 28 36.17N 164° 20 07.66W
Observed Depth/Height:	.5m
Bearing: 274	Range: 235 LO

position not corrected in field

DESCRIPTION/ ITEM TYPE

RSD Rock

several rocks

PHOTOS: 0834

DIRECTION YOU WERE FACING? NE

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	(4)	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

Additional Notes

Corrected position:

54-28-36.89N

164-20-20.84W

Wx: 3-4 ft swell


DP035
DP036
P0834_DP035_DP36

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	D, H12065
Vessel:	Spare Rhib

Julian Date:	2009-211
Time:	1838
Position Number:	DP037
Crew:	Bennett, Krynytzky, McCarthy
Equipment:	DSM 212, Cars Notebook, laser range finder

Additional Notes

POSITION

Lat/Lon: 54° 28 25.94 N 164 20 20.54 W

position not corrected in field

Observed Depth/~~Height~~: 30m

Bearing: 231 | Range: 326 1 °L

DESCRIPTION/ ITEM TYPE

New Islet / Western extent of foul area

PHOTOS: 0835

DIRECTION YOU WERE FACING? W

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

Corrected position:
~~54-28-27.41 N~~
~~164-20-38.49 W~~
54-28-26.43N
164-20-38.50W

See Condition: 3-4 ft long period swell


DP037
P0835_DP037

TERRASOND

Detached Position and Item Investigation

Project: 2009-001	Julian Date: 2009-211
Locality: Unimak Pass, AK	Time: 1842
Sheet: Sheet D	Position Number: DP038
Vessel: Spare Rhib	Crew: Bennette, Krynytzky, McCarthy
	Equipment: Caris Notebook, DSM 212 Laser range finder

Additional Notes: Track line logged around Foul Area

POSITION

Lat/Lon:

Observed Depth/Height: .5M (Max Height of Foul Area

Bearing: Range:

position not corrected in field

DESCRIPTION/ ITEM TYPE

New Foul Area

PHOTOS: 0836-0838

DIRECTION YOU WERE FACING? W

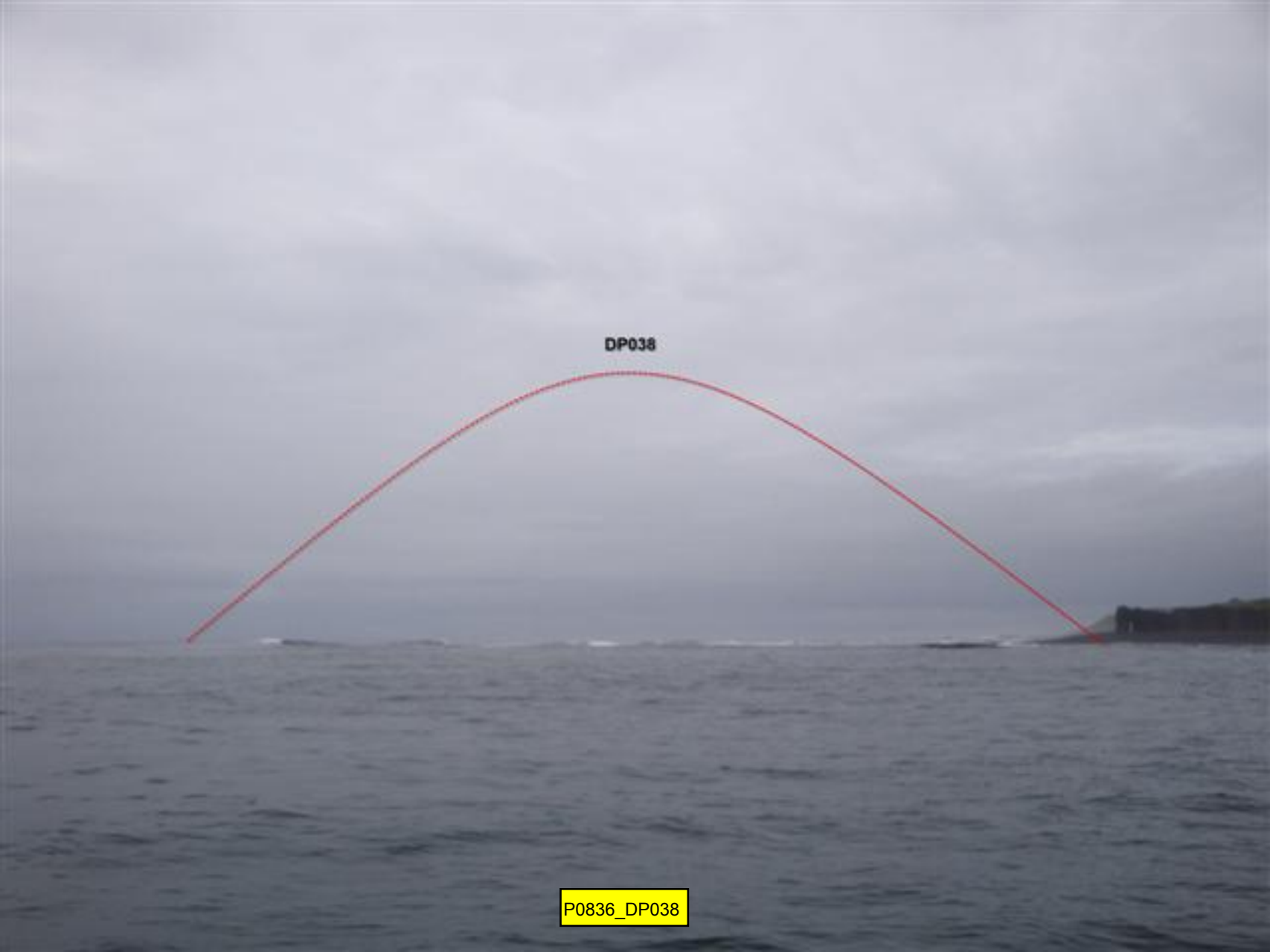
S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	(4)	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

Sea Conditions: 3-4 ft long period swell


DP038
P0836_DP038

TERRASOND

Detached Position and Item Investigation

Project: 2009-001	Julian Date: 2009-211
Locality: Unimak Pass, AK	Time: 1852
Sheet: Sheet D	Position Number: DP039
Vessel: Spare Rhib	Crew: Bennett, Krynytzky, McCarthy
	Equipment: DSM 212, Caris Notebook, Laser range finder

Additional Notes

DP 039 rejected. Feature is attached to cliffs onshore and is not a new islet.

POSITION

Lat/Lon: 54 28 07.37N 164 20 35.72W (position not corrected in field)

Observed Depth/Height: ~~30~~ 15M

Bearing: 256 Range: 335 0°L

DESCRIPTION/ ITEM TYPE

New Islet

PHOTOS: 0839-0840

DIRECTION YOU WERE FACING? W

S-57 Attributes

Please circle the number

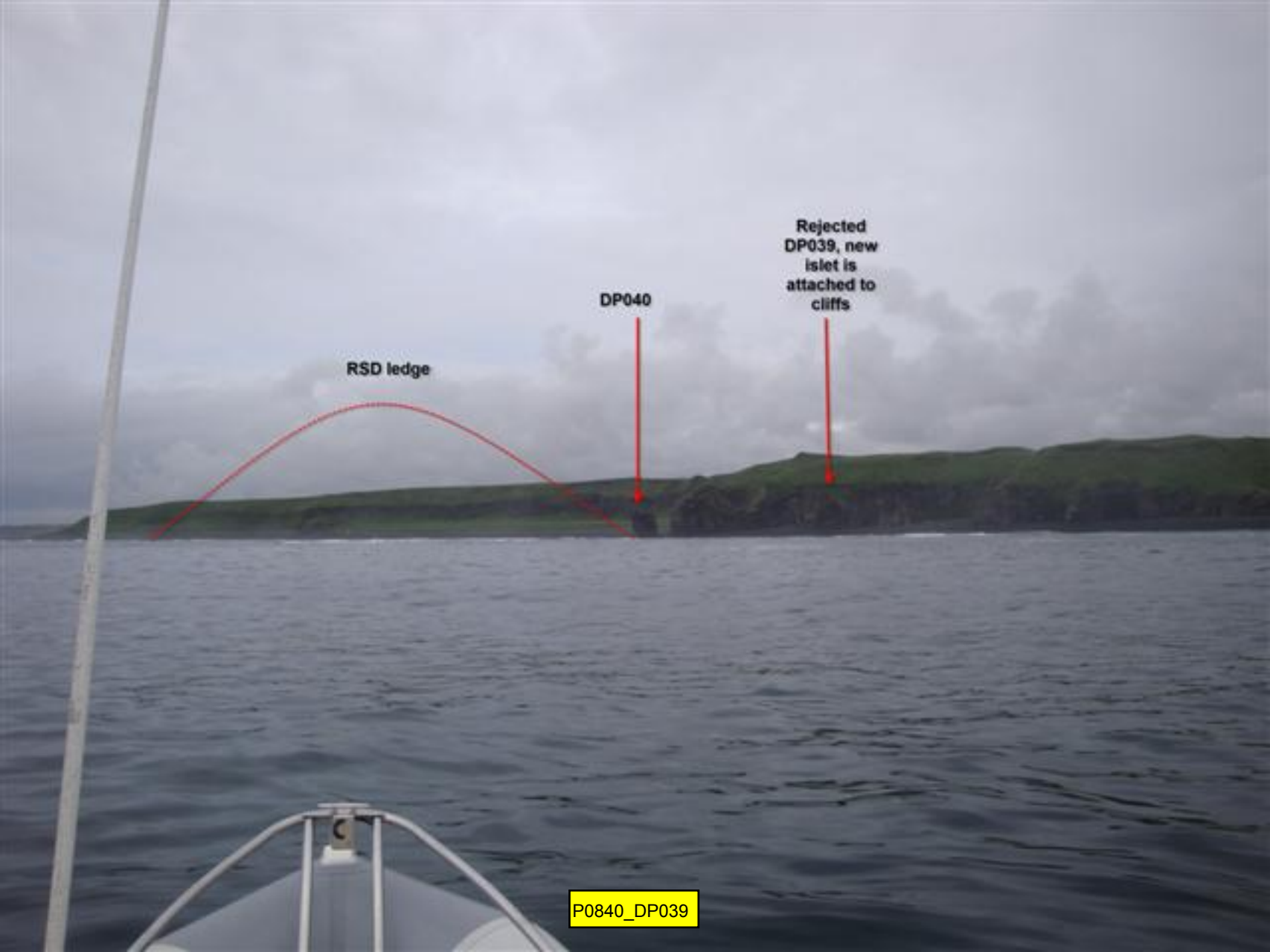
OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM _____

PICREP _____

reject DP 039, no new islet

Sea Conditions: 3-4 foot long period swell


Rejected DP039, new islet is attached to cliffs
DP040
RSD ledge
P0840_DP039

TERRASOND

Detached Position and Item Investigation

Project: 2009-001	Julian Date: 2009-211
Locality: Unimak Pass, AK	Time: ~~1905~~ 1857
Sheet: Sheet D	Position Number: ~~DP 034~~ DP 040
Vessel: Spare Rhib	Crew: Bennett, Krynytzky, McCarthy
	Equipment: DSM 212, Cars Notebook, Laser range finder

POSITION

Lat/Lon: 54 28 06.70N 164 20 37.48W

Position not corrected in field

Observed ~~Depth~~/~~Height~~: 15m

Bearing: 249 Range: 320 1L°

DESCRIPTION/ ITEM TYPE

RSD Bare rock, found to be/slet

PHOTOS: 0839-0840

DIRECTION YOU WERE FACING? W

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

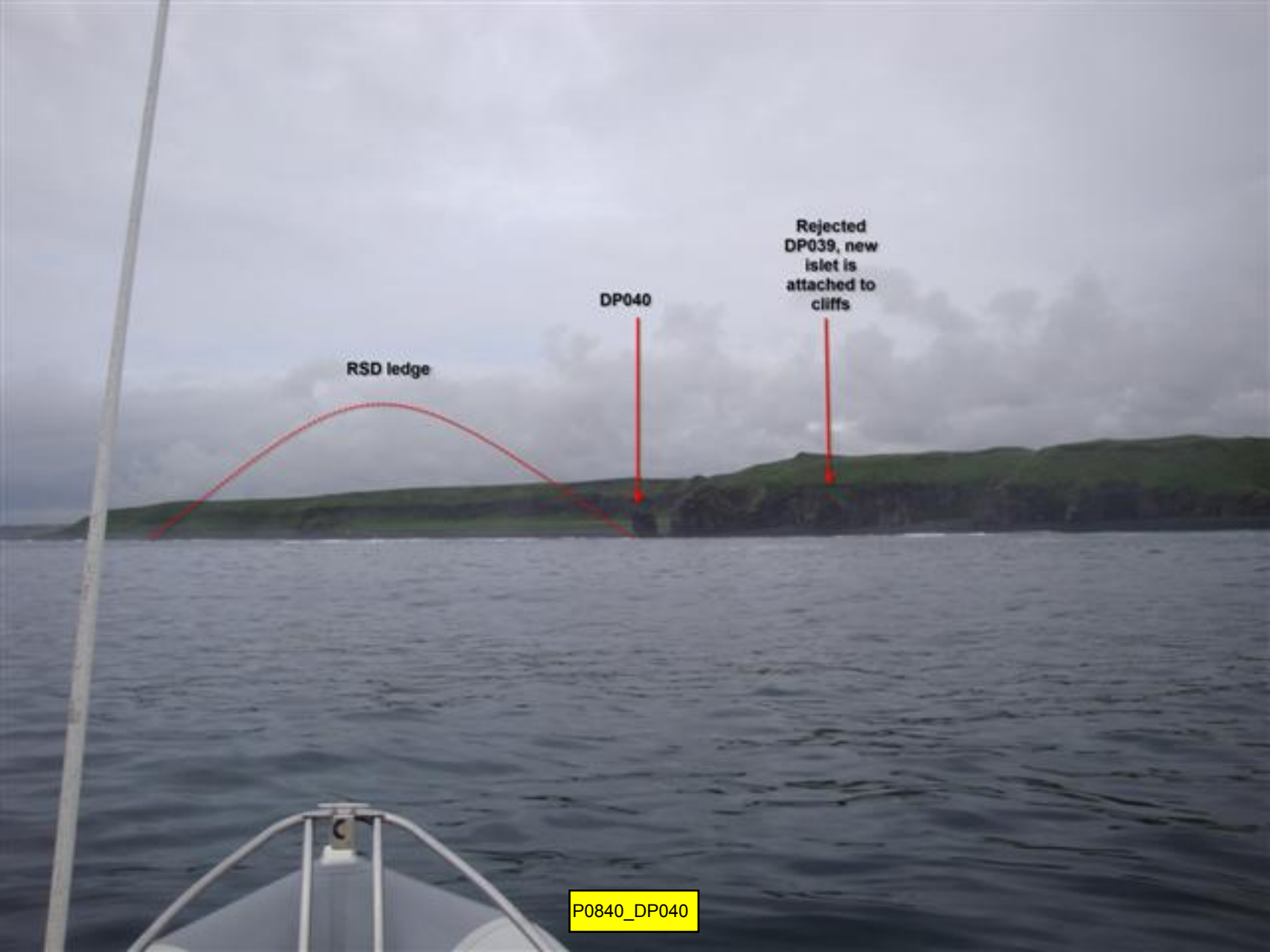
PICREP

Additional Notes

Corrected position:
54-28-67.12N
164-20-53.97W

Sea Conditions: long period 3-4 ft swell

P0839_DP040


Rejected DP039, new islet is attached to cliffs
DP040
RSD ledge
P0840_DP040

TERRASOND

Detached Position and Item Investigation

Project: 2009-001	Julian Date: 2009-211
Locality: Unimak Pass, AK	Time: 1905
Sheet: Sheet D	Position Number: DP 041
Vessel: Spare Rhib	Crew: Bennett, Krynytzky, McCarthy
	Equipment: DSM 212, Caris Notebook, Laser Range Finder

Additional Notes

POSITION

Lat/Lon: 54°27-53.06N / 164°20-55.23W

position not corrected in field

Observed Depth/~~Height~~: 2m

Bearing: 239 Range: 155 -21

DESCRIPTION/ ITEM TYPE

High point on RSD ledge

PHOTOS: 0841-0842

DIRECTION YOU WERE FACING? W

S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP

Corrected position:

~~54-27-50.53N~~

~~164-21-02.94W~~

54-27-53.96 N

164-21-05.48 W

Sea Conditions: long period 3-4 ft swell

P0841_DP041

TERRASOND

Detached Position and Item Investigation

Project:	2009-001
Locality:	Unimak Pass, AK
Sheet:	sheet D
Vessel:	Spare RHIB

Julian Date:	2009-211 *
Time:	20:01 *
Position Number:	DP042
Crew:	Bennette, Krynytzky, McCarthy
Equipment:	DSM 212, Carls Notebook, Laser Rang Finder

Additional Notes

* time and date taken from CARIS notebook marker layer

Position from ENC US3AK61:

54-24-51.21N
164-29-56.85W

POSITION marker

Lat/Lon: position not taken, marker layer point estimated.

Observed Depth/Height: n/a

Bearing: n/a Range: n/a

DESCRIPTION/ ITEM TYPE

Charted Islet seen above MHW, on shore

PHOTOS: 0845

DIRECTION YOU WERE FACING? N

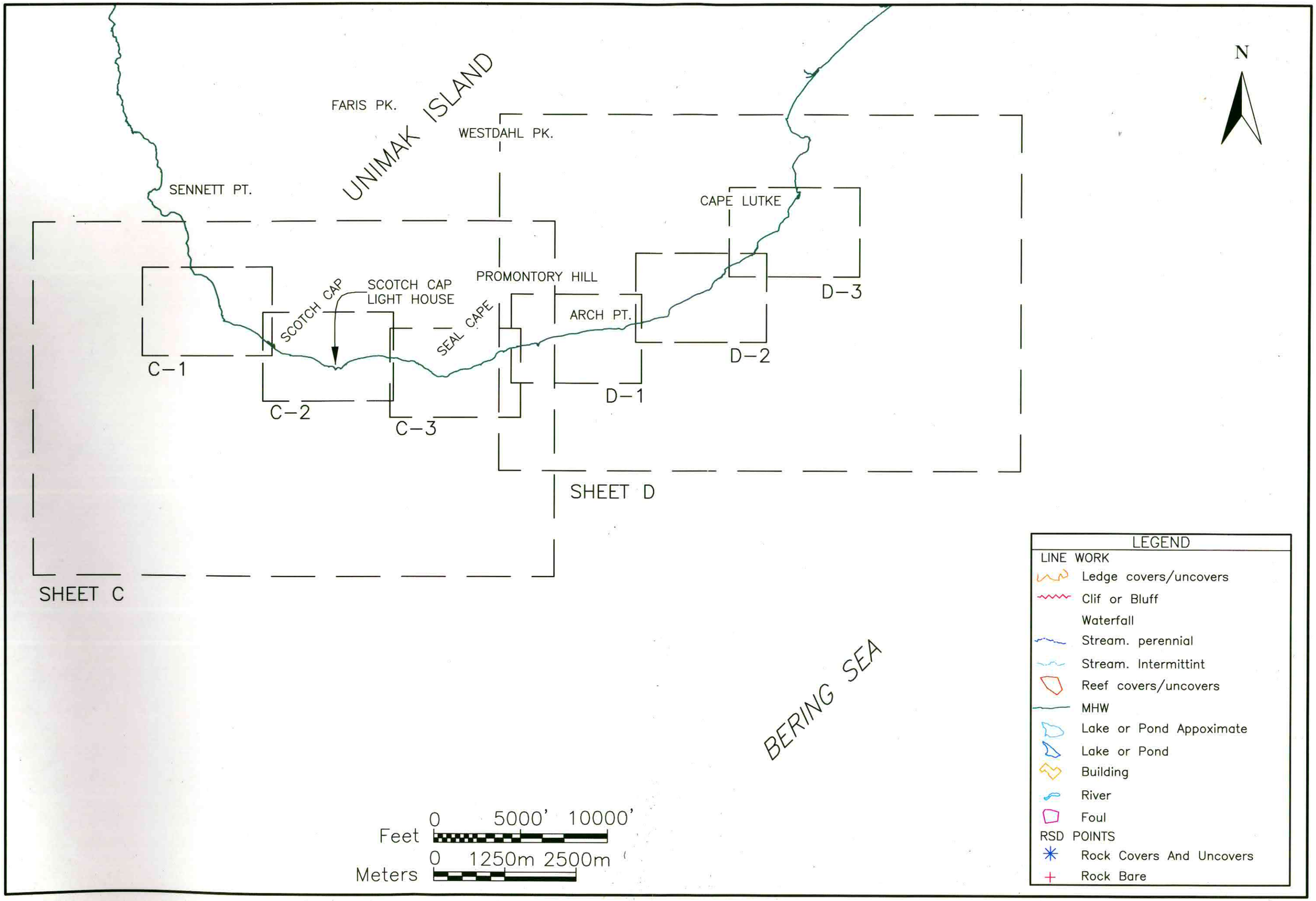
S-57 Attributes Please circle the number

OBSTRN	CATOBS	SBDARE	NATSUR	SBDARE	NATQUA	WRECKS	CATWRK	WATLEV	
1	snag/stump	1	mud	1	fine	1	non-dangerous	1	partially submerged at high water
2	wellhead	2	clay	2	medium	2	dangerous	2	always dry
3	diffuser	3	silt	3	coarse	3	distributed remains of wreck	3	always wet
4	crib	4	sand	4	broken	4	mast showing	4	covers and uncovers
5	fish haven	5	stone	5	sticky	5	hull or superstructure showing	5	awash
6	foul area	6	gravel	6	soft			6	subject to inundation or flooding
7	foul ground	7	pebbles	7	stiff			7	floating
8	ice boom	8	cobbles	8	volcanic				
9	ground tackle	9	rock	9	calcareous				
10	boom	10	lava	10	hard				
		11	coral						
		12	shells						
		13	boulder						

OBJNAM

PICREP


charted islet onshore
P0845_DP042



INDEX - C & D

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Unimak Island, AK - Shoreline Verification Aid

OPR-P188-TE-09

UNIMAK ISLAND

CAPE LUTKE

ARCH PT.

PROMONTORY HILL

D–3

D–2

D–1

C–3

N

Feet 0 2000' 4000'

Meters 0 500m 1000m

BERING SEA

LEGEND

LINE WORK

- Ledge covers/uncovers
- Clif or Bluff
- Waterfall
- Stream. perennial
- Stream. Intermittint
- Reef covers/uncovers
- MHW
- Lake or Pond Appoximate
- Lake or Pond
- Building
- River
- Foul

RSD POINTS

- Rock Covers And Uncovers
- Rock Bare

INDEX - D

TERRA SOND, LTD. for NOAA

Unimak Island, AK - Shoreline Verification Aid

OPR-P188-TE-09

NOTES:

JULIAN DAY: 2009 - 190

GREGORIAN DAY:

CREW: BRIAN

NOTE: DP023 (RETURN)

UNIMAK ISLAND

ARCH PT.

BERING SEA

N

2009-191 00:19 ROCKS NOTED ON BEACH DP 028

2009-191 NEW PATH 00:25

23:53 NEW PATH

2009-190 23:14 DP 23 ROCKS DP 24 REEF 23:21

23:03 2009-190 NEW PATH SHEET D

2009-190 ROCKS NOTED VERY CLOSE TO SHORE (ON-SHORE)

DP-23 AND DP-24

2009-190 ROCK NOTED DP 025 (POSMOO ESTIMATED)

23:44 2009-190 DP 026 EXPOSED ROCK / REEF (POSMOO ESTIMATED)

23:50 2009-190 DP 027 SUBMERGED ROCK (POSMOO APPROX)

SHEET C-3

SHEET D-2

Feet 0 500' 1000'

Meters 0 125m 250m

LEGEND

LINE WORK
- Ledge covers/uncovers
- Clif or Bluff
- Waterfall
- Stream. perennial
- Stream. Intermittint
- Reef covers/uncovers
- MHW
- Lake or Pond Appoximate
- Lake or Pond
- Building
- River
- Foul

RSD POINTS
- Rock Covers And Uncovers
- Rock Bare

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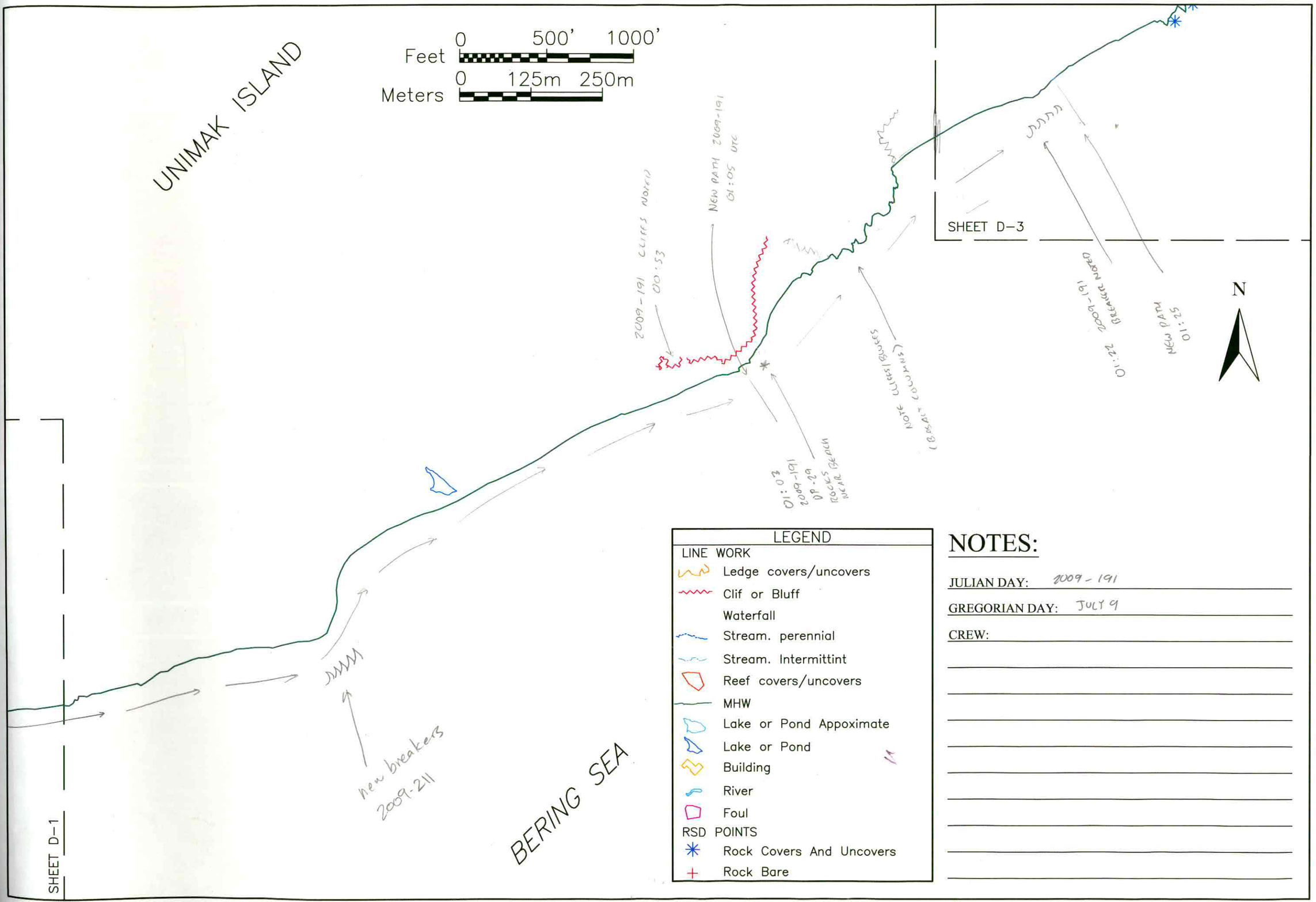
Unimak Island, AK - Shoreline Verification Aid

OPR-P188-TE-09

UNIMAK ISLAND

Feet 0 500' 1000'

Meters 0 125m 250m



LEGEND

LINE WORK
- Ledge covers/uncovers
- Clif or Bluff
- Waterfall
- Stream. perennial
- Stream. Intermittint
- Reef covers/uncovers
- MHW
- Lake or Pond Appoximate
- Lake or Pond
- Building
- River
- Foul

RSD POINTS
- Rock Covers And Uncovers
- Rock Bare

NOTES:

JULIAN DAY: 2009 - 191

GREGORIAN DAY: JULY 9

CREW:

INDEX - D2

TERRA SOND, LTD. for NOAA

Unimak Island, AK - Shoreline Verification Aid

OPR-P188-TE-09

UNIMAK ISLAND

CAPE LUTKE

BERING SEA

N

Feet 0 500' 1000'

Meters 0 125m 250m

SHEET D-2

INDEX - D3

TERRA SOND, LTD. for NOAA

Unimak Island, AK - Shoreline Verification Aid

OPR-P188-TE-09

LEGEND

LINE WORK
- Ledge covers/uncovers
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- Building
- River
- Foul

RSD POINTS
- Rock Covers And Uncovers
- Rock Bare

NOTES:

JULIAN DAY: 2009-192

GREGORIAN DAY:

CREW: MARTA KRZYWATSKY, PAMELA PACK, BRIAN

HOB FILES = NEW FEATURES → DOCUMENT THOUROUGHLY

NOTE TAICER

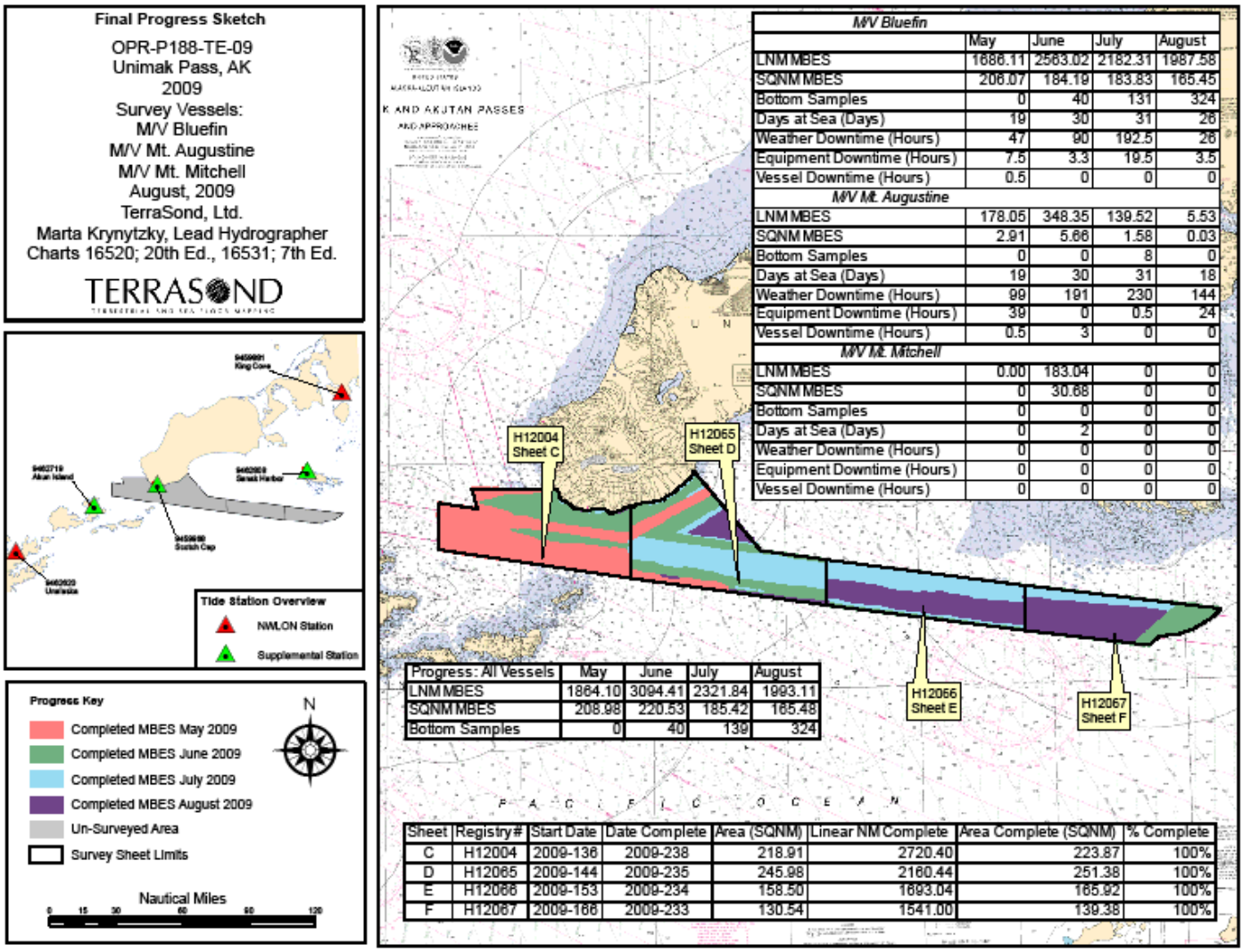
(1) IDENTIFY OBJECT – IS THE OBJECT ON THE CHART OR A NEW FEATURE?

(2) TAICE PHOTOS AND RECORD ON OP FORM

(3) WRITE RANGE / BEARING / ANGLE

(4) MAICE ANY ADDITIONAL NOTES ABOUT OBJECT

APPENDIX III
Final Progress Report



M/V Bluefin	May	June	July	August
LNM MBES	1686.11	2563.02	2182.31	1987.58
SQNM MBES	206.07	184.19	183.83	165.45
Bottom Samples	0	40	131	324
Days at Sea (Days)	19	30	31	26
Weather Downtime (Hours)	47	90	192.5	26
Equipment Downtime (Hours)	7.5	3.3	19.5	3.5
Vessel Downtime (Hours)	0.5	0	0	0
M/V Mt. Augustine				
LNM MBES	178.05	348.35	139.52	5.53
SQNM MBES	2.91	5.66	1.58	0.03
Bottom Samples	0	0	8	0
Days at Sea (Days)	19	30	31	18
Weather Downtime (Hours)	99	191	230	144
Equipment Downtime (Hours)	39	0	0.5	24
Vessel Downtime (Hours)	0.5	3	0	0
M/V Mt. Mitchell				
LNM MBES	0.00	183.04	0	0
SQNM MBES	0	30.68	0	0
Bottom Samples	0	0	0	0
Days at Sea (Days)	0	2	0	0
Weather Downtime (Hours)	0	0	0	0
Equipment Downtime (Hours)	0	0	0	0
Vessel Downtime (Hours)	0	0	0	0

Progress: All Vessels	May	June	July	August
LNM MBES	1864.10	3094.41	2321.84	1993.11
SQNM MBES	208.98	220.53	185.42	165.48
Bottom Samples	0	40	139	324

Sheet	Registry#	Start Date	Date Complete	Area (SQNM)	Linear NM Complete	Area Complete (SQNM)	% Complete
C	H12004	2009-136	2009-238	218.91	2720.40	223.87	100%
D	H12065	2009-144	2009-235	245.98	2160.44	251.38	100%
E	H12066	2009-153	2009-234	158.50	1693.04	165.92	100%
F	H12067	2009-166	2009-233	130.54	1541.00	139.38	100%

Figure 1 – Final Progress Sketch for OPR-P188-TE-09

APPENDIX IV
Tides and Water Levels

Abstract of Times Hydrography

Project: OPR-P188-TE-09

Registry No.: H12065

Inclusive Dates: May 24, 2009 – August 23, 2009. This Survey ran 24 hours a day.

START		END	
Day (Julian)	**Time (UTC)**	**Day (Julian)**	**Time (UTC)**
144	18:00	235	14:52

Table 1 – Abstract Times of Hydrography

Attachments:

946-2719 Akun Island Installation and Closing Site Reports

946-2808 Scotch Cap Installation and Closing Site Reports

945-9968 Sanak Harbor Installation Site Report (Site was not part of CO-OPS submittal, so no Closing Report was generated.)

Site Report

946-2719 Akun Island, Akun Bay, AK

Site Visit	Purpose of Visit	Installation	Team Leader	Nathan Wardwell, JOA	Date of Visit	4/7/09 - 4/11/09
Tertiary Station	Installation	April 10, 2009	Removal		Number of Days	
Project	OCS	OPR-P188-TE-09			JOA	141
Position (NAD83)	Latitude (N)	54° 14' 20"	Longitude (W)	165° 32' 28"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	981539	GOES Angles	Elev 22°/ Az 144°	Magnetic Declination	11° E, +0° 8' W/year

Contractor	Prime	Tide Consultant
	TerraSond Ltd. 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Kathleen Mildon	JOA Surveys, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: John Oswald

Owner	Akutan Corporation PO Box 8 Akutan, AK 99553 (907) 698-2206
Location	To reach the tidal bench marks from the Unalaska (Dutch Harbor) City Dock, proceed by boat NNE 26km (14nm) to the north side of Akutan Island, then proceed NE for 37km (20nm) to the entrance to Akutan Pass between Akutan and Akun islands, then proceed East 26km (14nm) to Billings Head at the NE point of Akun Island, then proceed 5km (3nm) South to Akun Bay, then proceed SW 6km (3nm) to Helianthus Cove. The bench marks are located on a rock ledge/bluff facing north.
Tide House	The tide gauge electronics are housed in individual Pelican cases mounted inside a 4' (wide) by 3' (high) by 3' (deep) wooden shed anchored down with guide wires. There is barbed-wire fence surrounding the tide house and solar cells. A gate to the fence is located in the SW corner. The orifice line for the two bubbler gauges run outside to the grass edge then across the boulders on the beach. The orifice tubing is attached to 3/8" cable. There is a Duckbill anchor at the grass ledge and just outside the tide house that are used to anchor the orifice lines and cable. From the tide house to the barbed-wire fence the orifice tubing is covered with grass, then from outside the fence to the surf zone the tubing is covered with rocks to protect from fox and cattle. GPS and GOES antennas are mounted to the shed itself.

Gauge 1						
	Installed	4/10/2009	**Removed**			
	Pressure Sensor	DAA H350XL	Serial No.	1354	Vent Value (m)	NA
			Averaging Interval	180 seconds	Slope Constant in Gauge	0.68398
	Data Logger	combined in H350XL	Firmware	2.120		
	Pump	DAA H355	Serial No.	TID 1899		
	GOES Radio	DAA H222	Serial No.	1002	GPS timing	Yes
	GOES Address	9070464A	Channel	170	Format	NGWLMS
	Interval	1 hour	Offset	0:01:00	Transmit Window	10 seconds
	Power	Two 12v deep cycle Optima batteries with a 70watt solar panel and solar controller.				
	Orifice	The bubbler orifice is attached to a 3/4" diameter galvanized pipe that is mounted vertically to a 1100 lbs anchor. The bubbler orifice is hose clamped to a 4"x3/4" pipe that is welded to the anchor. Between the orifice pipe and the pipe that is welded onto the anchor are plastic spacers. The length of the orifice tubing is approximately 550'.				
	Anchors	The anchor is 1.2m in diameter. They have three legs equally spaced. Each leg is 50cm (wide) by 50cm (long) by 20cm (tall). Inside each leg are four 60 lbs lengths of railroad rail. At the end of each leg is a handle. The buoy line is 3/4" blue polyline that is approximately 45' long. There are two buoys used as surface expressions: one large white inflatable drag buoy and another small foam trailing buoy. The trailing buoy is attached to the main buoy line with a separate piece of floating line.				

Gauge 2						
	Installed	4/10/2009	**Removed**			
	Pressure Sensor	DAA H350XL	Serial No.	3541	Vent Value (m)	NA
			Averaging Interval	180 seconds	Slope Constant in Gauge	0.68398
	Data Logger	combined in H350XL	Firmware	2.12		
	Pump	DAA H355	Serial No.	1803		
	GOES Radio	DAA H222	Serial No.	1003	GPS timing	Yes
	GOES Address	907060A6	Channel	170	Format	NGWLMS
	Interval	1 hour	Offset	0:01:20	Transmit Window	10 seconds
	Power	Two 12v deep cycle Optima batteries with a 70watt solar panel and solar controller.				
	Orifice	The bubbler orifice is attached to a 3/4" diameter galvanized pipe that is mounted vertically to the metal yoke for the 1100 lbs anchor. Hose are used to clamp the orifice to the yoke. Between the orifice pipe and the pipe that is welded				
	Anchors	The anchor is 1.2m in diameter. They have three legs equally spaced. Each leg is 50cm (wide) by 50cm (long) by 20cm (tall). Inside each leg are four 60 lbs lengths of railroad rail. At the end of each leg is a handle. The buoy line is 3/4" blue polyline that is approximately 45' long. There are two buoys used as surface expressions: one large white inflatable drag buoy and another small foam trailing buoy. The trailing buoy is attached to the main buoy line with a separate piece of floating line.				

Gauge 3						
	Installed	4/10/2009	**Removed**			
	Pressure Sensor	SBE 26+ (100 psi)	Serial No.	1158	Vent Value (m)	NA
			Averaging Interval	180 seconds		
	Data Logger	combined in SBE 26+	Firmware	NA		
	Acoustic Modem	LinkQuest UWM 1000	Serial No.	010216		
	Power for modem	Link quest	Serial No.	010220		
	Power	12 D-Cell (1.5v) batteries for the seabird and extra battery pack for the modem				
	Anchors	The anchor is 1.2m in diameter. They have three legs equally spaced. Each leg is 50cm (wide) by 50cm (long) by 20cm (tall). Inside each leg are four 60 lbs lengths of railroad rail. At the end of each leg is a handle. The buoy line is 3/4" blue polyline that is approximately 60' long. There are two buoys used as surface expressions: one large Green inflatable drag buoy and another small foam trailing buoy. The trailing buoy is attached to the main buoy line with a separate piece of floating line.				

Tidal Bench Marks	Primary	Recovered	Established	Designations
		4	1	946 2719 TIDAL 1, 946 2719 TIDAL 2, 946 2719 TIDAL 3, 946 2719 TIDAL 4, 946 2719 A

Leveling	Date	Order	Type	Bench Marks Connected
	4/9/09 - 4/11/09	Third	Optical	946 2719 TIDAL 1, 946 2719 TIDAL 2, 946 2719 TIDAL 3, 946 2719 TIDAL 4, 946 2719 A
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	9462719 A	4/9/2009	22.5 hrs	54° 14' 20.08925"	165° 32' 28.20926"	19.789
	NAVD88 GPS Tie	Not required per OCS hydro specifications until OPUS Projects is operational.				
	Comments	link to OPUS-DB datasheet http://beta.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=BBBH93&style=modern				

Station History	4/7/09 - 4/11/09: The tide station was re-occupied with two bubblers and one seabird. Four historic marks were found and one new (SS rod) was established.

Site Report

946-2719 Akun Island, Akun Bay, AK

Site Visit	Purpose of Visit	Removal	Team Leader	N. Wardwell, JOA	Date of Visit	9/5/09 - 9/7/09
Tertiary Station	Installation	April 10, 2009	Removal	September 7, 2009	Number of Days	151
Project	OCS	OPR-P188-TE-09			JOA	141
Position (NAD83)	Latitude (N)	54° 14' 20"	Longitude (W)	165° 32' 28"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	981539	GOES Angles	Elev 22°/ Az 144°	Magnetic Declination	11° E, +0° 8' W/year

Contractor	Prime	Tide Consultant
	TerraSond Ltd. 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Kathleen Mildon	JOA Surveys, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: Nathan Wardwell

Owner	Akutan Corporation PO Box 8 Akutan, AK 99553 (907) 698-2206
Location	To reach the tidal bench marks from the Unalaska (Dutch Harbor) City Dock, proceed by boat NNE 26km (14nm) to the north side of Akutan Island, then proceed NE for 37km (20nm) to the entrance to Akutan Pass between Akutan and Akun islands, then proceed East 26km (14nm) to Billings Head at the NE point of Akun Island, then proceed 5km (3nm) South to Akun Bay, then proceed SW 6km (3nm) to Helianthus Cove. The bench marks are located on a rock ledge/bluff facing north.
Tide House	The tide gauge electronics are housed in individual Pelican cases mounted inside a 4' (wide) by 3' (high) by 3' (deep) wooden shed anchored down with guide wires. There is barbed-wire fence surrounding the tide house and solar cells. A gate to the fence is located in the SW corner. The orifice line for the two bubbler gauges run outside to the grass edge then across the boulders on the beach. The orifice tubing is attached to 3/8" cable. There is a Duckbill anchor at the grass ledge and just outside the tide house that are used to anchor the orifice lines and cable. From the tide house to the barbed-wire fence the orifice tubing is covered with grass, then from outside the fence to the surf zone the tubing is covered with rocks to protect from fox and cattle. GPS and GOES antennas are mounted to the shed itself.

Gauge 1						
	Installed	4/10/2009	**Removed**	9/7/2009		
	Pressure Sensor	DAA H350XL	Serial No.	1354	Vent Value (m)	NA
			Averaging Interval	180 seconds	Slope Constant in Gauge	0.68398
	Data Logger	combined in H350XL	Firmware	2.120		
	Pump	DAA H355	Serial No.	TID 1899		
	GOES Radio	DAA H222	Serial No.	1002	GPS timing	Yes
	GOES Address	9070464A	Channel	170	Format	NGWLMS
	Interval	1 hour	Offset	0:01:00	Transmit Window	10 seconds
	Power	Two 12v deep cycle Optima batteries with a 70watt solar panel and solar controller.				
	Orifice	The bubbler orifice is attached to a 3/4" diameter galvanized pipe that is mounted vertically to a 1100 lbs anchor. The bubbler orifice is hose clamped to a 4"x3/4" pipe that is welded to the anchor. Between the orifice pipe and the pipe that is welded onto the anchor are plastic spacers. The length of the orifice tubing is approximately 550'.				
	Anchors	The anchor is 1.2m in diameter. They have three legs equally spaced. Each leg is 50cm (wide) by 50cm (long) by 20cm (tall). Inside each leg are four 60 lbs lengths of railroad rail. At the end of each leg is a handle. The buoy line is 3/4" blue polyline that is approximately 45' long. There are two buoys used as surface expressions: one large white inflatable drag buoy and another small foam trailing buoy. The trailing buoy is attached to the main buoy line with a separate piece of floating line.				

Gauge 2						
	Installed	4/10/2009	**Removed**	9/7/2009		
	Pressure Sensor	DAA H350XL	Serial No.	3541	Vent Value (m)	NA
			Averaging Interval	180 seconds	Slope Constant in Gauge	0.68398
	Data Logger	combined in H350XL	Firmware	2.12		
	Pump	DAA H355	Serial No.	1803		
	GOES Radio	DAA H222	Serial No.	1003	GPS timing	Yes
	GOES Address	907060A6	Channel	170	Format	NGWLMS
	Interval	1 hour	Offset	0:01:20	Transmit Window	10 seconds
	Power	Two 12v deep cycle Optima batteries with a 70watt solar panel and solar controller.				
	Orifice	The bubbler orifice is attached to a 3/4" diameter galvanized pipe that is mounted vertically to the metal yoke for the 1100 lbs anchor. Hose are used to clamp the orifice to the yoke. Between the orifice pipe and the pipe that is welded				
	Anchors	The anchor is 1.2m in diameter. They have three legs equally spaced. Each leg is 50cm (wide) by 50cm (long) by 20cm (tall). Inside each leg are four 60 lbs lengths of railroad rail. At the end of each leg is a handle. The buoy line is 3/4" blue polyline that is approximately 45' long. There are two buoys used as surface expressions: one large white inflatable drag buoy and another small foam trailing buoy. The trailing buoy is attached to the main buoy line with a separate piece of floating line.				

Gauge 3						
	Installed	4/10/2009	**Removed**	9/7/2009		
	Pressure Sensor	SBE 26+ (100 psi)	Serial No.	1158	Vent Value (m)	NA
			Averaging Interval	180 seconds		
	Data Logger	combined in SBE 26+	Firmware	NA		
	Acoustic Modem	LinkQuest UWM 1000	Serial No.	010216		
	Power for modem	Link quest	Serial No.	010220		
	Power	12 D-Cell (1.5v) batteries for the seabird and extra battery pack for the modem				
	Anchors	The anchor is 1.2m in diameter. They have three legs equally spaced. Each leg is 50cm (wide) by 50cm (long) by 20cm (tall). Inside each leg are four 60 lbs lengths of railroad rail. At the end of each leg is a handle. The buoy line is 3/4" blue polyline that is approximately 60' long. There are two buoys used as surface expressions: one large Green inflatable drag buoy and another small foam trailing buoy. The trailing buoy is attached to the main buoy line with a separate piece of floating line.				

Tidal Bench Marks	Primary	Recovered	Established	Designations
	946 2719 TIDAL 1	4	1	946 2719 TIDAL 1, 946 2719 TIDAL 2, 946 2719 TIDAL 3, 946 2719 TIDAL 4, 946 2719 A

Leveling	Date	Order	Type	Bench Marks Connected
	4/9/09 - 4/11/09	Third	Optical	946 2719 TIDAL 1, 946 2719 TIDAL 2, 946 2719 TIDAL 3, 946 2719 TIDAL 4, 946 2719 A
	9/5/2009	Third	Optical	946 2719 TIDAL 1, 946 2719 TIDAL 2, 946 2719 TIDAL 3, 946 2719 TIDAL 4, 946 2719 A
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	9462719 A	4/9/2009	22.5 hrs	54° 14' 20.08925"	165° 32' 28.20926"	19.789
	NAVD88 GPS Tie Comments	link to OPUS-DB datasheet http://beta.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=BBBH93&style=modern				

Station History	4/7/09 - 4/11/09: The tide station was re-occupied with two bubblers and one seabird. Four historic marks were found and one new (Stain less steel deep rod rod) was established.
	9/5/09 -9/7/09: The tide station was removed by N. Wardwell and G. Gray. Leveling was completed on 9/5/09, the staff shots were performed the following day, and the removal was completed on 9/7/09.

Site Report

946-2808 Scotch Cap, Unimak Island, AK

Site Visit	Purpose of Visit	Installation	Team Leader	Nathan Wardwell JOA	Date of Visit	4/26-4/28/2009
Tertiary Station	Installation	April 28, 2009	Removal		Number of Days	
Project	OCS	OPR-P188-TE-09			JOA	141
Position (NAD83)	Latitude (N)	54° 23' 37.1"	Longitude (W)	164° 44' 44.6"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	981562	GOES Angles	Elev 22.9°/ Az 147.1°	Magnetic Declination	11.5° E, +0° 8' W/year

Contractor	Prime	Tide Consultant
	TerraSond Ltd. 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Kathleen Mildon	John Oswald & Associates, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: John Oswald

Owner	United States Coast Guard District 17 Sector Anchorage 510 L Street Suite 100 Anchorage, Alaska 99501 (907) 271-6700
Location	To reach the tidal bench marks from the Unalaska (Dutch Harbor) City Dock, proceed by boat northeast 30 nautical miles past Akutan Island, then east 47 nautical miles past Akun Island and across Unimak Pass to the southwestern shore of Unimak Island SSE of Scotch Cap to the unmanned Coast Guard light and ruins of the Scotch Cap Lighthouse. The bench marks are located on the rock outcrop below the lighthouse and on the next rock outcrop down the beach to the east. The submersible tide gauges are located to the east in around 10 fathoms, the bubbler gauge is mounted in the ruins of the lighthouse destroyed by the 1946 tsunami.
Tide House	The tide gauge electronics are housed in a Pelican case mounted inside of the concrete ruins of the lighthouse. The orifice line for the bubbler gauge runs through a hole in the SE facing concrete wall of the lighthouse, down the hill on the ground and down a short cliff to the rock outcrop that the orifice is bolted on. The orifice line is weighted down with large lead weights. The GPS and GOES antennas as well as the solar panel are mounted on the outside wall of the SE facign concrete wall of the lighthouse ruins.

Primary DCP						
	Installed	4/28/2009	**Removed**			
	Sensor	Seabird 26-plus	Serial No.	1155	Slope Constant	0.00000
	Data Logger	combined in 26-plus	Averaging Interval	180 seconds	Firmware	6.1 d
	Aprox. Depth	10 Fathoms (18m)	Latitude	N 54° 23' 30.66"	Longitude	W 164° 43' 43.38"
	Modem	Link Quest	Wake Up Period	120sec	Serial No.	10589
	Modem Address	3				
	Power	SBE 26-plus has d-cell batteries inside and Link Quest Modem has external battery pack on anchor.				
	Anchor / Rigging	The 1000 pound steel anchor is roughly four feet across with the Seabird mounted in an aluminum tube. An acoustic modem and external power source for the modem are mounted to exterior of tube. A surface bouy line with two hard floats and one small trailing bouy made of hard foam are attached to the end of the buoyline which is 18 fathoms long. A 150' ground line runs south along the bottom from anchor to a 150 lb. steel weight.				

Secondary DCP						
	Installed	4/28/2009	**Removed**			
	Sensor	Seabird 26-plus	Serial No.	1156	Slope Constant	0.00000
	Data Logger	combined in 26-plus	Averaging Interval	180 seconds	Firmware	6.1 d
	Aprox. Depth	11 Fathoms (20m)	Latitude	N 54° 23' 31.44"	Longitude	W 164° 43' 26.64"
	Modem	Link Quest	Wake Up Period	120sec	Serial No.	009869
	Modem Address	2				
	Power	SBE 26-plus has d-cell batteries inside and Link Quest Modem has external battery pack on anchor.				
	Anchor / Rigging	The 1000 pound steel anchor is roughly four feet across with the Seabird mounted in an aluminum tube. An acoustic modem and external power source for the modem are mounted to exterior of tube. A surface bouy line with two hard floats and one small trailing bouy made of hard foam are attached to the end of the buoyline which is 18 fathoms long. A 150' ground line runs south along the bottom from anchor to a 150 lb. steel weight.				

Tertiary DCP						
	Installed	4/28/2009	**Removed**			
	Sensor	Seabird 26-plus	Serial No.	1131	Slope Constant	0.00000
	Data Logger	combined in 26-plus	Averaging Interval	180 seconds	Firmware	6.1 d
	Aprox. Depth	10 Fathoms (18m)	Latitude	N 54° 23' 27.42"	Longitude	W 164° 43' 10.44"
	Modem	Link Quest	Wake Up Period	120sec	Serial No.	010215
	Modem Address	1				
	Power	SBE 26-plus has d-cell batteries inside and Link Quest Modem has external battery pack on anchor.				
	Anchor / Rigging	The 1000 pound steel anchor is roughly four feet across with the Seabird mounted in an aluminum tube. An acoustic modem and external power source for the modem are mounted to exterior of tube. A surface bouy line with two hard floats and one small trailing bouy made of hard foam are attached to the end of the buoyline which is 18 fathoms long. A 150' ground line runs south along the bottom from anchor to a 150 lb. steel weight.				

Backup DCP						
	Installed	4/27/2009	**Removed**			
	Sensor	DAA H350XL	Serial No.	1051	Level Point to orifice "0"	0.183
			Averaging Interval	181 seconds	Slope Constant in Gauge	0.68396
	Data Logger	DAA H350XL			Firmware	2.12
	GOES Radio	DAA H222	Serial No.		GPS timing	Yes
	GOES Address	9070B6CE	Channel	170	Format	NGWLMS
	Interval	1 hour	Offset	0:02:10	Transmit Window	10 seconds
	Power	Two batteries with a 20watt solar panel with solar controller.				
	Orifice Mount	The Orifice is mounted with a clamp to a section of Uni-Strut that is boltted to an area of the bedrock outcrop below the tide house. Orifice was dry at install, roughly a -1.4' low tide. Tubing was joined to 1/4" cable and weighted with lead weights and concrete wedge anchors.				
	Comments	This gauge installed as a partial tide check for the primary offshore gauges.				

Tidal Bench Marks	Primary	Recovered	Established	Designations
	9462808 Tidal 2	2	3	9462808 TIDAL 2, 9462808 TIDAL 4, 9462808 A, 9462808 B, 9462808 C

Leveling	Date	Order	Type	Bench Marks Connected
	4/27/2009	Third	Optical	9462808 TIDAL 2, 9462808 TIDAL 4, 9462808 A, 9462808 B, 9462808 C
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		
	Comments	Level run included Gauge 1 orifice "0"		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	9462808 Tidal 4	4/27/2009	4hours 59 min.	54° 23' 39.14616"	164° 44' 23.20766"	22.637
	Comments	Link to OPUS DB Datasheet http://beta.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=BBBH99&style=modern				

Station History	

Site Report

946-2808 Scotch Cap, Unimak Island, AK

Site Visit	Purpose of Visit	Installation	Team Leader	Nathan Wardwell JOA	Date of Visit	9/4/2009 - 9/5/2009
Tertiary Station	Installation	April 28, 2009	Removal	September 5, 2009	Number of Days	131
Project	OCS	OPR-P188-TE-09			JOA	141
Position (NAD83)	Latitude (N)	54° 23' 37.1"	Longitude (W)	164° 44' 44.6"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	981562	GOES Angles	Elev 22.9°/ Az 147.1°	Magnetic Declination	11.5° E, +0° 8' W/year

Contractor	Prime	Tide Consultant
	TerraSond Ltd. 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Kathleen Mildon	John Oswald & Associates, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: John Oswald

Owner	United States Coast Guard District 17 Sector Anchorage 510 L Street Suite 100 Anchorage, Alaska 99501 (907) 271-6700
Location	To reach the tidal bench marks from the Unalaska (Dutch Harbor) City Dock, proceed by boat northeast 30 nautical miles past Akutan Island, then east 47 nautical miles past Akun Island and across Unimak Pass to the southwestern shore of Unimak Island SSE of Scotch Cap to the unmanned Coast Guard light and ruins of the Scotch Cap Lighthouse. The bench marks are located on the rock outcrop below the lighthouse and on the next rock outcrop down the beach to the east. The submersible tide gauges are located to the east in around 10 fathoms, the bubbler gauge is mounted in the ruins of the lighthouse destroyed by the 1946 tsunami.
Tide House	The tide gauge electronics are housed in a Pelican case mounted inside of the concrete ruins of the lighthouse. The orifice line for the bubbler gauge runs through a hole in the SE facing concrete wall of the lighthouse, down the hill on the ground and down a short cliff to the rock outcrop that the orifice is bolted on. The orifice line is weighted down with large lead weights. The GPS and GOES antennas as well as the solar panel are mounted on the outside wall of the SE facign concrete wall of the lighthouse ruins.

Primary DCP						
	Installed	4/28/2009	**Removed**			
	Sensor	Seabird 26-plus	Serial No.	1155	Slope Constant	0.00000
	Data Logger	combined in 26-plus	Averaging Interval	180 seconds	Firmware	6.1 d
	Aprox. Depth	10 Fathoms (18m)	Latitude	N 54° 23' 30.66"	Longitude	W 164° 43' 43.38"
	Modem	Link Quest	Wake Up Period	120sec	Serial No.	10589
	Modem Address	3				
	Power	SBE 26-plus has d-cell batteries inside and Link Quest Modem has external battery pack on anchor.				
	Anchor / Rigging	The 1000 pound steel anchor is roughly four feet across with the Seabird mounted in an aluminum tube. An acoustic modem and external power source for the modem are mounted to exterior of tube. A surface bouy line with two hard floats and one small trailing bouy made of hard foam are attached to the end of the buoyline which is 18 fathoms long. A 150' ground line runs south along the bottom from anchor to a 150 lb. steel weight.				

Secondary DCP						
	Installed	4/28/2009	**Removed**			
	Sensor	Seabird 26-plus	Serial No.	1156	Slope Constant	0.00000
	Data Logger	combined in 26-plus	Averaging Interval	180 seconds	Firmware	6.1 d
	Aprox. Depth	11 Fathoms (20m)	Latitude	N 54° 23' 31.44"	Longitude	W 164° 43' 26.64"
	Modem	Link Quest	Wake Up Period	120sec	Serial No.	009869
	Modem Address	2				
	Power	SBE 26-plus has d-cell batteries inside and Link Quest Modem has external battery pack on anchor.				
	Anchor / Rigging	The 1000 pound steel anchor is roughly four feet across with the Seabird mounted in an aluminum tube. An acoustic modem and external power source for the modem are mounted to exterior of tube. A surface bouy line with two hard floats and one small trailing bouy made of hard foam are attached to the end of the buoyline which is 18 fathoms long. A 150' ground line runs south along the bottom from anchor to a 150 lb. steel weight.				

Tertiary DCP						
	Installed	4/28/2009	**Removed**			
	Sensor	Seabird 26-plus	Serial No.	1131	Slope Constant	0.00000
	Data Logger	combined in 26-plus	Averaging Interval	180 seconds	Firmware	6.1 d
	Aprox. Depth	10 Fathoms (18m)	Latitude	N 54° 23' 27.42"	Longitude	W 164° 43' 10.44"
	Modem	Link Quest	Wake Up Period	120sec	Serial No.	010215
	Modem Address	1				
	Power	SBE 26-plus has d-cell batteries inside and Link Quest Modem has external battery pack on anchor.				
	Anchor / Rigging	The 1000 pound steel anchor is roughly four feet across with the Seabird mounted in an aluminum tube. An acoustic modem and external power source for the modem are mounted to exterior of tube. A surface bouy line with two hard floats and one small trailing bouy made of hard foam are attached to the end of the buoyline which is 18 fathoms long. A 150' ground line runs south along the bottom from anchor to a 150 lb. steel weight.				

Backup DCP						
	Installed	4/27/2009	**Removed**			
	Sensor	DAA H350XL	Serial No.	1051	Level Point to orifice "0"	0.183
			Averaging Interval	181 seconds	Slope Constant in Gauge	0.68396
	Data Logger	DAA H350XL			Firmware	2.12
	GOES Radio	DAA H222	Serial No.		GPS timing	Yes
	GOES Address	9070B6CE	Channel	170	Format	NGWLMS
	Interval	1 hour	Offset	0:02:10	Transmit Window	10 seconds
	Power	Two batteries with a 20watt solar panel with solar controller.				
	Orifice Mount	The Orifice is mounted with a clamp to a section of Uni-Strut that is boltted to an area of the bedrock outcrop below the tide house. Orifice was dry at install, roughly a -1.4' low tide. Tubing was joined to 1/4" cable and weighted with lead weights and concrete wedge anchors.				
	Comments	This gauge installed as a partial tide check for the primary offshore gauges.				

Tidal Bench Marks	Primary	Recovered	Established	Designations
	9462808 Tidal 2	2	3	9462808 TIDAL 2, 9462808 TIDAL 4, 9462808 A, 9462808 B, 9462808 C

Leveling	Date	Order	Type	Bench Marks Connected
	4/27/2009	Third	Optical	9462808 TIDAL 2, 9462808 TIDAL 4, 9462808 A, 9462808 B, 9462808 C
	9/4/2009	Third	Optical	9462808 TIDAL 2, 9462808 TIDAL 4, 9462808 A, 9462808 B, 9462808 C
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		
	Comments	Install level run included Gauge 4 orifice "0".		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	9462808 Tidal 4	4/27/2009	4hours 59 min.	54° 23' 39.14616"	164° 44' 23.20766"	22.637
	Comments	Link to OPUS DB Datasheet http://beta.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=BBBH99&style=modern				

Station History	See the '9462719 Tide Note.pdf' document.

Site Report

945-9968 Sanak Harbor, Sanak Island, AK

Site Visit	Purpose of Visit	Installation	Team Leader	Nathan Wardwell (JOA)	Date of Visit	4/29 - 4/30/2009
Tertiary Station	Installation	April 29, 2009	Removal		Number of Days	
Project	OCS	OPR-P188-TE-09			JOA	141
Position (NAD83)	Latitude (N)	54° 28' 48.6"	Longitude (W)	162° 48' 50.1"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	981577	GOES Angles	NA	Magnetic Declination	12° 46' E, +0° 9' W/year

Contractor	Prime	Tide Consultant
	TerraSond, Ltd 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Kathleen Mildon	JOA Surveys, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: John Oswald

Owner	Sanak Corporation 1 Main St Sand Point, AK 9961 (907) 383-2106
Location	To reach the tidal bench marks from the Unalaska (Dutch Harbor) City Dock, proceed by boat NE 27km (15nm) to the north side of the pass between Unalaska and Akutan Islands, then proceed ENE for 46km (25nm) to the entrance to Akutan Pass between Akutan and Akun islands, then proceed East 187km (101nm) to the enterance to Sanak Harbor, then proceed south 1km (0.6nm) to Sanak Harbor. The bench marks are located along the SE side of the Harbor.
Tide House	Not Applicable because the pressure sensor deployed at this site is used for tidal zoning purposes only.

Primary DCP						
	Installed	5/13/2008	**Removed**			
	Pressure Sensor	SBE 26+ (100 psi)	Serial No.	1157	Vent Value (m)	0.000
			Averaging Interval	180 seconds		
	Data Logger	combined in SBE 26+	Firmware	NA		
	Acoustic Modem	LinkQuest UWM	Serial No.	010218		
	Power for modem	LinkQuest	Serial No.	009851		
	Power	12 D-Cell (1.5v) batteries for the seabird and extra battery pack for the modem				
	Anchor	The anchor is 1.2m in diameter and as three legs equally spaced. Each leg is 50cm (wide) by 50cm (long) by 20cm (tall). Inside each leg are four 60 lbs lengths of railroad rail. At the end of each leg is a handle. The buoy line is 3/4" blue polyline that is approximately 78' long. There are two buoys used as surface expressions: one white and one orange. A trailing buoy is attached to the main buoy line with a separate piece of floating line.				
	Comments	A 100' dragline is attached to the anchor. At the other end of the dragline is a 150 lb weight. The dragline is streched out in a South orientation from the anchor.				

Secondary DCP						
	Installed	NA	**Removed**			
	Pressure Sensor	NA	Serial No.	NA	Vent Value (m)	0.000
			Averaging Interval	NA		
	Data Logger	NA	Firmware	NA		
	Acoustic Modem	NA	Serial No.	NA		
	Power for modem	NA	Serial No.	NA		
	Power	NA				
	Anchor	NA				
	Comments					

Tide Staff	NA

Tidal Bench Marks	Primary	Recovered	Established	Designations
	NA	3	0	9459968 TIDAL 1, 9459968 TIDAL 2, 9459968 TIDAL 3

Leveling	Date	Order	Type	Bench Marks Connected
	4/29/2009	Third	Optical	9459968 TIDAL 1, 9459968 TIDAL 2, 9459968 TIDAL 3
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		
	Comments	Single wire levels run between the three historic marks		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	NA					
	NAVD88 GPS Tie	NA				
	Comments	No GPS was performed because the gauge deployed at this site is used only for tidal zoning.				

Station History	4/29 - 4/30/2009: N. Wardwell and C. Mayfield from JOA and M. Ewing from Terra deployed one zoning seabird.

APPENDIX V
Supplemental Survey Records and Correspondence

Bottom Samples

185 bottom samples were collected in support of H12065. The samples were distributed geographically to obtain a full representation of the bottom characteristics as specified in NOAA Hydrographic Surveys Specifications and Deliverables, *Section 7.1*.

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS001	2009-181	16:36	77	54° 21' 52.67 N	164° 33' 28.58 W	fine, fine	black, black	sand, pebbles
DBS002	2009-181	17:03	78	54° 21' 49.3 N	164° 31' 36.03 W	fine, fine	black, black	sand, pebbles
DBS003	2009-181	17:19	78	54° 21' 51.48 N	164° 29' 45 W	medium, broken	black, amber	sand, shells
DBS004	2009-181	17:33	93	54° 21' 50.5 N	164° 27' 52.8 W	medium, fine	black, black	sand, sand
DBS005	2009-181	17:46	97	54° 21' 46.97 N	164° 26' 4.95 W	fine	black	sand
DBS006	2009-179	20:57	84.3	54° 20' 46.27 N	164° 33' 28.41 W	fine	black	sand
DBS007	2009-179	22:07	82.8	54° 20' 46.03 N	164° 31' 36.55 W	fine	black	sand
DBS008	2009-181	18:45	82	54° 20' 45.71 N	164° 29' 42.4 W	medium, broken	black, amber	sand, shells
DBS009	2009-181	18:34	95	54° 20' 45.46 N	164° 27' 56.47 W	fine, sticky	black, brown	sand, clay

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS010	2009-181	18:21	97	54° 20' 44.28 N	164° 26' 1.62 W	fine	black	sand
DBS011	2009-179	22:43	83.2	54° 19' 42.05 N	164° 33' 28.21 W	fine	black	sand
DBS012	2009-179	22:25	85.9	54° 19' 42.07 N	164° 31' 38.71 W	fine	black	sand
DBS013	2009-181	19:11	75	54° 19' 41.7 N	164° 29' 52.9 W	medium, medium, broken	black, black, amber	sand, gravel, shells
DBS014	2009-192	16:40	88.5	54° 19' 40.7 N	164° 27' 53.12 W	fine	black	sand
DBS015	2009-192	17:01	93	54° 19' 37.77 N	164° 26' 8.94 W	fine	black	sand
DBS016	2009-181	20:18	82	54° 18' 37.42 N	164° 33' 29.43 W	fine	black	sand
DBS017	2009-181	19:51	87	54° 18' 38.2 N	164° 31' 39.41 W	fine	black	sand
DBS018	2009-181	19:37	90	54° 18' 35 N	164° 29' 45.25 W	fine	black	sand
DBS019	2009-196	23:53	80	54° 18' 37.15 N	164° 28' 0 W	coarse	black	sand
DBS020	2009-196	23:39	79	54° 18' 36.93 N	164° 26' 6.39 W	medium	black	sand
DBS021	2009-196	20:16	87	54° 17' 32.87 N	164° 33' 31.98 W	medium, broken	black, white	sand, shells
DBS022	2009-196	20:39	95	54° 17' 31.05 N	164° 31' 40.94 W	medium	black	sand
DBS023	2009-196	20:54	97	54° 17' 32.2 N	164° 29' 52.85 W	medium, fine	black, black	sand, sand
DBS024	2009-196	21:12	77	54° 17' 31.8 N	164° 27' 57.72 W	coarse	black	sand
DBS025	2009-196	21:26	72	54° 17' 31.46 N	164° 26' 5.06 W	medium	black	sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS026	2009-228	20:15	98	54° 21' 47.78 N	164° 24' 15.86 W	medium, broken	black, white	sand, shells
DBS027	2009-228	19:58	98	54° 21' 47.05 N	164° 22' 21.34 W	medium	black	sand
DBS028	2009-192	23:07	102	54° 21' 46.38 N	164° 20' 35.88 W	n/a, n/a	black, n/a	silt, shells
DBS029	2009-228	19:37	98	54° 21' 47.06 N	164° 18' 41.97 W	fine	black	silt
DBS030	2009-228	19:19	98	54° 21' 47.58 N	164° 16' 53.87 W	fine, fine	black, black	silt, clay
DBS031	2009-228	20:30	95	54° 20' 44.09 N	164° 24' 12.77 W	medium	black	sand
DBS032	2009-192	23:56	99	54° 20' 44.86 N	164° 22' 24.02 W	fine	black	silt
DBS033	2009-192	23:40	97	54° 20' 42.75 N	164° 20' 36.15 W	medium	black	sand
DBS034	2009-192	19:04	94	54° 20' 41.32 N	164° 18' 41.77 W	fine, fine	black, black	silt, sand
DBS035	2009-228	21:05	94	54° 20' 40.80 N	164° 16' 51.61 W	fine	black	sand
DBS036	2009-192	17:18	91.5	54° 19' 37.09 N	164° 24' 12.82 W	fine, medium	black, black	sand, silt
DBS037	2009-192	17:38	95.7	54° 19' 36.73 N	164° 22' 27.61 W	fine, fine	black, black	silt, sand
DBS038	2009-192	17:55	95	54° 19' 40.08 N	164° 20' 32.04 W	fine, fine	black, black	silt, sand
DBS039	2009-192	18:10	91.2	54° 19' 39.78 N	164° 18' 41.05 W	fine, fine	black, black	silt, sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS040	2009-229	1:00	92	54° 19' 37.72 N	164° 16' 50.61 W	medium	black	sand
DBS041	2009-196	23:27	71	54° 18' 36.22 N	164° 24' 17.54 W	n/a, fine	black, black	shells, cobbles
DBS042	2009-196	23:14	94.5	54° 18' 34.89 N	164° 22' 23.54 W	coarse	black	silt
DBS043	2009-196	23:00	96	54° 18' 34.82 N	164° 20' 34.1 W	medium	black	silt
DBS044	2009-196	22:46	95	54° 18' 34.17 N	164° 18' 42.33 W	fine	black	silt
DBS045	2009-234	19:12	89	54° 18' 32.98 N	164° 16' 50.58 W	coarse	black	silt
DBS046	2009-196	21:38	73	54° 17' 30.93 N	164° 24' 16.75 W	fine	black	silt
DBS047	2009-196	21:52	96.5	54° 17' 31.08 N	164° 22' 27.08 W	medium, fine	black, black	silt, sand
DBS048	2009-196	22:07	96.9	54° 17' 30.14 N	164° 20' 33.51 W	fine	black	silt
DBS049	2009-196	22:30	85	54° 17' 29.24 N	164° 18' 44.09 W	medium, medium	black, black	silt, sand
DBS050	2009-234	18:58	72	54° 17' 27.57 N	164° 16' 55.87 W	medium, coarse	black, black	sand, silt
DBS051	2009-211	18:31	9.1	54° 24' 52.9 N	164° 27' 48.3 W	medium, fine	black, black	sand, sand
DBS052	2009-191	1:06	22	54° 25' 4.32 N	164° 25' 59.79 W	fine	black	sand
DBS053	2009-211	18:48	20.3	54° 24' 0.3 N	164° 33' 24.1 W	medium	black	sand
DBS054	2009-191	0:33	23	54° 24' 1.43 N	164° 31' 34.55 W	medium	black	sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS055	2009-191	0:21	26	54° 23' 59.66 N	164° 29' 43.81 W	medium	black, yellow	sand, shells
DBS056	2009-191	0:08	31	54° 23' 59.52 N	164° 27' 53.66 W	coarse	black, white	pebbles, shells
DBS057	2009-190	23:55	50	54° 24' 1.09 N	164° 26' 4.55 W	medium	black	gravel
DBS058	2009-205	17:45	58.5	54° 22' 56.06 N	164° 33' 25.96 W	fine, medium	black, white	gravel, shells
DBS059	2009-190	22:25	67	54° 22' 55.2 N	164° 31' 35.15 W	coarse, broken	black, white	gravel, shells
DBS060	2009-190	22:50	72	54° 22' 57.01 N	164° 29' 46.75 W	coarse, broken	black, white	gravel, shells
DBS061	2009-190	23:06	84	54° 22' 55.03 N	164° 27' 55.21 W	medium, broken	black, white	sand, shells
DBS062	2009-190	23:21	92	54° 22' 54.7 N	164° 26' 6.48 W	medium	black	sand
DBS063	2009-211	18:10	18.2	54° 27' 10.9 N	164° 22' 12.7 W	medium	black	sand
DBS064	2009-192	21:26	29.3	54° 27' 2.62 N	164° 19' 57.89 W	fine, broken	black, white	sand, shells
DBS065	2009-192	21:11	59.7	54° 27' 9.79 N	164° 18' 36.72 W	medium, broken	black, white	sand, shells
DBS066	2009-211	18:17	17.1	54° 26' 8.3 N	164° 24' 8.3 W	fine	black	sand
DBS067	2009-192	21:40	27.9	54° 26' 7.54 N	164° 22' 18.18 W	fine	black	sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS068	2009-207	16:37	54.5	54° 26' 8.4 N	164° 20' 25.9 W	fine, broken	black, white	gravel, shells
DBS069	2009-192	20:24	66.6	54° 26' 5.88 N	164° 18' 36.12 W	coarse, fine	black, black	sand, pebbles
DBS070	2009-211	21:52	70	54° 26' 5.113 N	164° 16' 44.506 W	fine, broken	black, white	sand, shells
DBS071	2009-191	1:19	42	54° 25' 2.32 N	164° 24' 8.77 W	fine	black	sand
DBS072	2009-191	1:35	62	54° 25' 2.37 N	164° 22' 18.22 W	coarse	black	gravel
DBS073	2009-192	21:58	77.9	54° 25' 1.47 N	164° 20' 29.78 W	medium, coarse	black, black	sand, gravel
DBS074	2009-192	20:11	78.2	54° 25' 1.96 N	164° 18' 38.84 W	medium, coarse	black, black	sand, sand
DBS075	2009-211	22:31	83	54° 25' 1.496 N	164° 16' 47.567 W	coarse, broken	black, white	sand, shells
DBS076	2009-190	23:37	86	54° 23' 57.96 N	164° 24' 15.77 W	medium	black	sand
DBS077	2009-192	22:40	89.6	54° 23' 56.58 N	164° 22' 18.93 W	medium	black	sand
DBS078	2009-192	22:56	94.2	54° 23' 56.95 N	164° 20' 31.16 W	medium, n/a	black, black	gravel, silt
DBS079	2009-192	19:54	87.5	54° 23' 56.55 N	164° 18' 38.49 W	coarse	black	sand
DBS080	2009-211	22:50	90	54° 23' 54.63 N	164° 16' 49.63 W	coarse, medium	black, black	gravel, pebbles
DBS081	2009-207	17:09	97.2	54° 22' 53.7 N	164° 24' 8.9 W	coarse	black	sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS082	2009-207	17:33	100.2	54° 22' 51 N	164° 22' 22.3 W	medium, sticky	black, grey	silt, clay
DBS083	2009-207	17:52	100.3	54° 22' 55.2 N	164° 20' 28.6 W	medium, coarse	black, black	gravel, sand
DBS084	2009-192	19:39	102	54° 22' 52.58 N	164° 18' 38.77 W	fine, medium	black, black	silt, sand
DBS085	2009-207	18:27	89.1	54° 22' 49.9 N	164° 16' 51.2 W	medium, coarse	black, black	pebbles, gravel
DBS086	2009-234	18:44	66	54° 17' 27.33 N	164° 15' 4.93 W	medium, fine	black, black	pebbles, cobbles
DBS087	2009-234	18:32	66	54° 17' 27.38 N	164° 13' 13.76 W	fine, coarse	black, black	sand, silt
DBS088	2009-234	18:19	76	54° 17' 26.11 N	164° 11' 25.26 W	medium, broken	black, white	sand, shells
DBS089	2009-234	18:01	72	54° 17' 26.55 N	164° 9' 59 W	fine, coarse	black, black	sand, silt
DBS090	2009-234	17:47	70	54° 17' 25.36 N	164° 7' 39.28 W	coarse, medium	black, black	gravel, pebbles
DBS091	2009-234	23:18	67.3	54° 16' 21.99 N	164° 15' 10.48 W	coarse	black	sand
DBS092	2009-234	23:33	67.3	54° 16' 23.21 N	164° 13' 16.37 W	fine	black	gravel
DBS093	2009-234	23:46	68.3	54° 16' 21.32 N	164° 11' 28.53 W	coarse, broken	black, white	sand, shells
DBS094	2009-234	0:02	67.9	54° 16' 20.36 N	164° 9' 34.88 W	coarse	black	sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS095	2009-235	0:16	67.5	54° 16' 18.61 N	164° 7' 42.9 W	coarse, fine	black, black	sand, gravel
DBS096	2009-235	8:27	72	54° 15' 18.35 N	164° 15' 1.12 W	fine	black	sand
DBS097	2009-235	8:12	66	54° 15' 17.74 N	164° 13' 11.86 W	medium	black	sand
DBS098	2009-235	7:58	67.9	54° 15' 15.99 N	164° 11' 22.36 W	fine, coarse	black, black	gravel, sand
DBS099	2009-235	7:42	67.3	54° 15' 15.77 N	164° 9' 33.97 W	fine	black	gravel
DBS100	2009-235	7:30	64.3	54° 15' 14.27 N	164° 7' 44.02 W	fine	black	gravel
DBS101	2009-182	2:16	90	54° 14' 13.86 N	164° 15' 7.86 W	fine, fine	black, black	sand, silt
DBS102	2009-235	5:26	68.8	54° 14' 11.79 N	164° 13' 16.75 W	fine	black	sand
DBS103	2009-235	5:38	66.4	54° 14' 11.93 N	164° 11' 29.86 W	fine	black	silt
DBS104	2009-235	5:49	66.5	54° 14' 9.76 N	164° 9' 40.67 W	fine, coarse	black, black	pebbles, gravel
DBS105	2009-235	6:01	63.7	54° 14' 8.09 N	164° 7' 47.36 W	medium	black	sand
DBS106	2009-235	5:08	87.7	54° 13' 10.33 N	164° 16' 9.21 W	fine, sticky	black, brown	silt, clay
DBS107	2009-235	4:43	68.7	54° 13' 7.58 N	164° 13' 19.93 W	medium	black	sand
DBS108	2009-235	4:29	66.4	54° 13' 6.69 N	164° 11' 26.99 W	fine	black	sand
DBS109	2009-235	4:14	64.6	54° 13' 6.18 N	164° 9' 37.32 W	coarse	black	sand
DBS110	2009-235	3:58	65	54° 13' 5.8 N	164° 7' 48.16 W	medium	black	sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS111	2009-207	18:47	89.5	54° 22' 51 N	164° 14' 58.2 W	coarse	black	silt
DBS113	2009-228	18:56	97	54° 21' 46.38 N	164° 14' 59.93 W	medium, fine	black, black	silt, sand
DBS114	2009-228	18:39	96	54° 21' 45.69 N	164° 13' 5.63 W	coarse	black	sand
DBS115	2009-228	18:28	94	54° 21' 42.85 N	164° 11' 17.96 W	coarse	black	sand
DBS116	2009-228	21:22	92	54° 20' 40.98 N	164° 15' 1.94 W	fine	black	sand
DBS117	2009-228	21:41	92	54° 20' 40.31 N	164° 13' 9.88 W	medium	black	silt
DBS118	2009-228	21:58	92.5	54° 20' 40.39 N	164° 11' 18.43 W	fine	black	sand
DBS119	2009-228	22:26	92	54° 20' 39.08 N	164° 9' 26.96 W	hard	n/a	n/a
DBS120	2009-229	1:21	93.5	54° 19' 37.25 N	164° 15' 3.02 W	coarse	black	sand
DBS121	2009-229	1:38	93	54° 19' 37.61 N	164° 13' 10.37 W	coarse	black	sand
DBS122	2009-229	0:10	80	54° 19' 35.19 N	164° 11' 18.42 W	coarse	black	sand
DBS123	2009-228	23:43	89	54° 19' 35.43 N	164° 9' 29.34 W	hard	n/a	n/a
DBS124	2009-228	23:03	89.5	54° 19' 34.67 N	164° 7' 40.74 W	hard	n/a	n/a
DBS125	2009-234	19:26	100	54° 18' 33.3 N	164° 14' 59.21 W	coarse	black	silt
DBS126	2009-234	19:40	98	54° 18' 32.05 N	164° 13' 12.88 W	coarse	black	silt
DBS127	2009-234	19:55	94	54° 18' 30.57 N	164° 11' 23.66 W	coarse	black	silt
DBS128	2009-229	2:25	90.5	54° 18' 31.41 N	164° 9' 32.04 W	hard	n/a	n/a
DBS129	2009-234	17:31	92	54° 18' 28.67 N	164° 7' 44.28 W	coarse, fine	black, black	silt, sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS130	2009-234	16:59	72	54° 17' 24.334 N	164° 5' 51.91 W	medium, coarse	black, black	sand, silt
DBS131	2009-234	16:45	82	54° 17' 23.33 N	164° 4' 0.4 W	coarse	black	silt
DBS132	2009-234	16:28	88	54° 17' 21.87 N	164° 2' 12.78 W	coarse	black	silt
DBS133	2009-234	16:05	75	54° 17' 21.71 N	164° 0' 19.05 W	medium	black	cobbles
DBS135	2009-235	0:29	66.7	54° 16' 18.27 N	164° 5' 53.08 W	medium	black	sand
DBS136	2009-235	0:45	66	54° 16' 15.67 N	164° 4' 2.87 W	fine	black	sand
DBS137	2009-235	0:58	67.3	54° 16' 15.7 N	164° 2' 13.27 W	coarse	black	silt
DBS138	2009-235	1:12	69.3	54° 16' 13.41 N	164° 0' 20.55 W	medium	black	pebbles
DBS139	2009-234	15:48	67	54° 16' 15.34 N	163° 58' 29.49 W	medium	black	sand
DBS140	2009-235	7:18	64.1	54° 15' 12.83 N	164° 5' 53.6 W	medium	black	sand
DBS141	2009-235	7:05	62.9	54° 15' 10.65 N	164° 4' 0.6 W	fine	black	sand
DBS142	2009-235	6:52	64.9	54° 15' 12.41 N	164° 2' 10.44 W	fine	black	sand
DBS143	2009-235	1:30	98.1	54° 15' 10.49 N	164° 0' 20.72 W	medium	black	silt
DBS144	2009-234	15:33	67	54° 15' 11.25 N	163° 58' 33.01 W	medium	black	sand
DBS145	2009-235	6:14	63.5	54° 14' 7.07 N	164° 5' 56.09 W	fine	black	sand
DBS146	2009-235	6:24	65.2	54° 14' 6.1 N	164° 4' 3.51 W	fine	black	sand
DBS147	2009-235	6:36	65.2	54° 14' 4.57 N	164° 2' 14.82 W	fine	black	sand
DBS148	2009-235	1:43	69.4	54° 14' 4.92 N	164° 0' 23.76 W	fine	black	sand
DBS149	2009-234	15:16	70	54° 14' 6.99 N	163° 58' 31.74 W	fine	black	sand

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS150	2009-235	3:47	66.7	54° 13' 2.58 N	164° 5' 57.64 W	fine	black	sand
DBS151	2009-235	3:34	67.7	54° 13' 3.36 N	164° 4' 10.19 W	medium	black	silt
DBS152	2009-235	3:20	69.6	54° 13' 3.87 N	164° 2' 18.04 W	fine	black	sand
DBS153	2009-235	3:06	68.9	54° 13' 3.28 N	164° 0' 28.72 W	fine	black	sand
DBS154	2009-235	2:20	71.9	54° 13' 01.52 N	163° 58' 37.48 W	coarse	black	silt
DBS163	2009-234	14:54	87	54° 14' 4.7 N	163° 56' 46.93 W	fine	black	sand
DBS167	2009-234	14:37	78	54° 13' 0.96 N	163° 56' 46.75 W	medium, coarse	black, black	sand, gravel
DBS171	2009-234	14:22	76	54° 11' 56.69 N	163° 56' 48.51 W	fine	black	sand
DBS177	2009-235	2:37	73.7	54° 11' 56.42 N	163° 58' 39.56 W	coarse, fine	black, black	sand, gravel
DBS178	2009-235	2:51	69.7	54° 11' 58.39 N	164° 0' 30.03 W	fine	black	sand
DBS179	2009-234	17:16	93	54° 18' 29.5 N	164° 5' 45.43 W	medium	black	sand
DBS180	2009-182	2:00	91	54° 14' 14.75 N	164° 16' 56.33 W	fine, fine	black, black	sand, silt
DBS181	2009-182	1:27	92	54° 14' 16.88 N	164° 18' 49.63 W	fine, fine	black, black	sand, silt
DBS182	2009-182	1:08	94	54° 14' 15.69 N	164° 20' 38.93 W	fine, fine	black, black	sand, silt
DBS183	2009-182	0:52	95.4	54° 14' 14.59 N	164° 22' 28.72 W	fine, fine	black, black	sand, silt

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS184	2009-235	9:35	95	54° 15' 21.17 N	164° 22' 28.55 W	coarse	black	silt
DBS185	2009-235	9:18	92	54° 15' 19.33 N	164° 20' 34.54 W	coarse	black	silt
DBS186	2009-235	9:00	89	54° 15' 17.7 N	164° 18' 44.43 W	coarse	black	silt
DBS187	2009-235	8:43	85	54° 15' 17.64 N	164° 16' 51.8 W	coarse	black	silt
DBS188	2009-234	23:00	74.4	54° 16' 23.47 N	164° 16' 56.66 W	fine, fine	black, black	gravel, sand
DBS189	2009-234	22:44	81.9	54° 16' 26.15 N	164° 18' 46.81 W	coarse, coarse	black, black	sand, gravel
DBS190	2009-235	9:54	95	54° 16' 25.47 N	164° 20' 36.46 W	coarse	black	silt
DBS191	2009-235	10:09	97	54° 16' 25.83 N	164° 22' 29.35 W	fine	black	sand
DBS192	2009-235	10:38	74	54° 16' 24.42 N	164° 24' 18.62 W	medium	black	sand
DBS193	2009-235	13:13	74	54° 16' 26.54 N	164° 26' 7.73 W	medium	black	sand
DBS194	2009-235	12:44	74	54° 15' 20.66 N	164° 26' 6.76 W	medium	black	sand
DBS195	2009-235	10:53	74	54° 15' 21.77 N	164° 24' 19.89 W	medium	black	sand
DBS196	2009-235	11:25	85	54° 14' 17.47 N	164° 24' 20.98 W	medium	black	sand
DBS197	2009-235	11:42	77	54° 14' 15.55 N	164° 26' 6.91 W	medium	black	sand
DBS198	2009-235	13:31	79	54° 16' 25.01 N	164° 28' 0.13 W	medium, broken	black, white	sand, shells
DBS199	2009-235	12:26	82	54° 15' 21.24 N	164° 27' 56.99 W	fine	black	pebbles
DBS200	2009-235	11:59	81	54° 14' 15.53 N	164° 27' 58.69 W	medium, broken	black, white	sand, shells

Bottom Sample Number	Julian Day Number	Time (UTC)	Depth (m)	Latitude	Longitude	Surface Description	Color	Nature of Surface
DBS201	2009-235	14:19	97	54° 16' 27.62 N	164° 33' 34.97 W	fine, broken	black, white	sand, shells
DBS202	2009-235	14:02	96	54° 16' 26.82 N	164° 31' 37.58 W	fine, broken	black, white	sand, shells
DBS203	2009-235	13:45	99	54° 16' 26.11 N	164° 29' 52.62 W	medium	black	sand
DBS207	2009-211	18:00	13.8	54° 28' 15 N	164° 20' 18.3 W	medium	black	sand
DBS208	2009-211	23:07	86	54° 23' 55.22 N	164° 14' 54.56 W	coarse, coarse	black, black	gravel, sand
DBS209	2009-211	22:13	84	54° 24' 58.014 N	164° 14' 52.85 W	medium	black	sand

Table 1 – Bottom samples obtained in conjunction with survey H12065 (2009).

Correspondence

Item 1: RE: Coverage 2008 Specs

Item 2: RE: AWOIS Items

Item 3: RE: RSD Data 1

Item 4: RE: RSD Data 2

Item 1:

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]

Sent: Tuesday, June 23, 2009 9:25 AM

To: Kathleen Mildon

Cc: Castle.E.Parker; Brian Busey; Thomas Newman; Jeffrey.Ferguson@noaa.gov

Subject: Re: Coverage follow up

Kathleen,

You are authorized to survey to the 2008 Specifications and Deliverables, Section 5.1.2.2 for all work this year.

Mark

Kathleen Mildon wrote:

Gene,

This em ail is in summ ary of our conversation yesterday morn ing, Monday June 22, on the 2009 Sp ecifications and Deliverables section 5.1.2.2 concerning Uni mak Pass. TerraSond is trying to m eet the specification of the third bullet point in that section in particular. It states that:

"• Grid resolution sh all be 1m in waters less th an 20m deep, a nd approxim ately 5% of the water depth in waters 20m and deeper. Coarser resolutions m ay be warranted in certain areas due to bo ttom topography (“steep and deep”), or if side scan data is also collected, or other project specif ic reasons. However, there is rarely a circum stance where the d epths encountered are deep enough to warrant the use of grid resolutions greater than 10m. The coarsest resolution shall be 8m for areas with depths up to 350m and a 16m resolution for areas with depths greater than 350m . At least 95% of all nodes on the surface sha ll be populated, with at least 5 soundings."

The highlighted section is the portion is what we are having trouble meeting, that there be 5 s oundings per resolution pixel on the surface.

In the 2008 and previous specifications it stat es that ". At least 95% of all nodes on the surface shall be populated." which w e are meeting currently.

We are m eeting currently the 2008 specifications with our al ong track coverage although this was also taken out of the 2009 specifications. In 2008 and previous this is the along track statement in section 5.1.1.2 :

"To ensure proper along track cove rage, the hydrographer shall ensure that vessel speed is adjusted so that no less than 3.2 be am footprints, center-to-center, fall within 3 m , or a distance eq ual to 10 percent of the depth, whichever is greater, in the alo ng track direction."

To meet this new specification as we spoke about earlier today we have to slow cons iderably to around 4 knots in the deep areas over 100 m. This also happens in areas around 40-60 m where the resolution changes.

We had discussed that as long as we are m eeting our along track ping rate, as well as having no holiday spanning 3 nodes in wat ers less than 30m and also that if we had our grid nodes populated that our survey would m ore than likel y not be checked against th e "95% of all nodes on the surface shall be populated, with at least 5soundings.".

I would just like to reiterate that we are currently meeting the 2008 specification of along track coverage as well as grid resolution that was changed in the 2009 specs.

Upon writing our Work Plan we had estimated our time based on the previous year's jobs. These j obs all ran to the 2008 or prev ious years specifications and deliverables. The 2009 Specifications and Deliverables was not out until April which was after our wor k plan had been accepted.

TerraSond is requesting a relaxation of th e specifications to abide by the 2008 specificat ions or a review and am endment of the 2009 specifications to alleviate this issue.

Thank you for your time,

Katie

Katie Mildon

Charting Program Manager

TerraSond Ltd

Terrestrial and Sea Floor Mapping

1617 South Industrial Way Suite 3, Palmer, Alaska 99645

(907) 745-7215 Office (907) 745-7273 FAX (907) 715-1825 Cell

kmildon@terrasond.com www.terrasond.com

Item 2:

From: Mark.T.Lathrop [Mark.T.Lathrop@noaa.gov]

Sent: Friday, August 21, 2009 10:03 AM

To: Kathleen Mildon

Subject: awois

Katie,

You are correct, there are no AWOIS items assigned for Unimak Pass.

Mark

Item 3:

-----Original Message-----
From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Fri 3/13/2009 10:21 AM
To: Anne Dollard
Subject: Re: Unimak RSD data and NOAA visitor for Cook INlet

Hi Anne,

I'll get you the new SOW next to you next week. Still waiting on the new tides file, though. Your RSD data is the same as before.

I'll see if anyone from AHB can get to your office. This would be to discuss the unusual nature of this survey to the reviewer in person, I assume?

Cheers,

Mark

Anne Dollard wrote:
> Hi Mark,
>
> We are doing everything we can to be prepared for the Unimak job. We have RSD data from 2007 that covers sheets C and D, but we wanted to be sure that is THE data you want us to use. Could you verify?

>
> We discussed that since AHB is reviewing our Cook Inlet work, it might be good for a NOAA representative to visit Palmer. I think this is a great idea to facilitate the review. Would you like to send someone our way soon? The delivery is 3-4 weeks out; so any time soon would be great. I really think it will help. Let me know how I can assist.
>
> Lastly, any word on a SOW for tides and for Unimak overall? I know Tom will be visiting..so I don't mean to hammer you from all sides.
>
> Thanks Mark!
> Anne
>
> This email contains information that is privileged and confidential. It is intended only for the addressee. If you receive this email in error, please do not read, copy, or disseminate it. Please reply to the sender immediately to inform the sender that the email was misdirected, then erase it from your computer system. Your assistance in correcting the error is appreciated. While we have made effort to make sure this email is free from viruses, we cannot guarantee its safety. We suggest you use every precaution to protect your computer system. This email was scanned and found virus free by GFI on 13/3/2009.
>
>

Item 4:

From: Castle.E.Parker [mailto:Castle.E.Parker@noaa.gov]

Sent: Tue 7/28/2009 5:33 AM

To: Kathleen Mildon

Cc: Marta Krynytzky; James DePasquale; Matthew Gudger; Andrew Orthmann

Subject: Re: S-57 deliverables for shoreline

Good Morning,

After proof reading this, it so rt of sounds like som e kind of cartographic ba bbling.... if you are unable to gain insight and c larity to what AHB needs, then call and we can discuss.

The S57 feature file is a group of chartable features represented by the bathymetric survey data and specifically selected as a chartable features at s urvey scale. The feature file represents the m ost significant features (wrecks, ro cks, and obstructions) located w ithin the survy limits.

If a charted feature h as been ve rified and has not been superseded by another s hoaler feature within the near vicinity, it then remains as the m ost significant feature within that com mon area; it shoul d be included within the S57 f eature file. Do you have bathy data representing that feature? If so, the m ost significant feature within that ar ea should be included in the S57 feature file. A second questions might be, do I want to represen t this feature as a Group2 objec t (non-skin of the earth) si ngle point feature or do I want to recommend that the feature be charted as a sounding. Usually this is related to rocks. Nor mally, we want to include all wreck s and obstructions found within the survey in the S57 feature file. Only with rocks do we have the libe rty to display them as single point rocks or as soundings.

To answer your question.... include a ll the RSD shoreline features that have been verified and thos e that are new. The intent is to indicate to AHB what was found i n relation to the RSD shoreline and the charted shorel ine features. If the survey does not loc ate a charted feature or RSD feature, the feature's disproval should be discussed som ewhere in the DR Section D Chart Comparison or i n Appendix 2. Thus, if the feature is disproved, it won' t be included in the S57 f eature file, but it should be noted in the cha rt comparison section. Just because yo u verified something and the location and depth has not chang ed, does not mean that it should be excluded from the feature file.

One thought might be to generate a disprova l S57 feature file. Basically, one would create a cartographic feature object and a ttribute the NINFOM field with a disproval note such as " 1.5 fm rock not located, considered disproved." In lieu of this disproval feature file, one should generate a table and place in Sect ion D of the DR listing all th e features that are consider ed as disproved. One c ould create an S57 disproval feature file, and then export the file to ASCII which would serve as the source for a table within the DR.

NOS HSSD:

The S-57 feature file shall include shoreline data only if the hydrographer conducted shoreline verification. New features and changes to the source shoreline shall be portrayed in the S-57 feature file and be fully attributed. If you don't include verified charted features in the S57 feature file, one should indicate somewhere in the survey record (DR) the survey results or findings. Somewhere Terra would need to inform AHB if they found the feature or is considered as disproved. If Terra located the charted feature, then why not add it to the feature file. By including the verified feature, you are documenting the feature and including it in a group of chartable features.

Call if my guidance is unclear and confusing.

Cheers,

Gene

PS: I've been looking at the project files and don't find any RSD supplied files. Can you send be the RSD file that you reference? Thanks.

Subject: [Fwd: Re: Unimak Pass grid resolution]
From: "Mark.T.Lathrop" <Mark.T.Lathrop@noaa.gov>
Date: Wed, 06 Oct 2010 13:46:05 -0400
To: gene_parker <Castle.E.Parker@noaa.gov>

Gene,

Here's the appropriate e-mail. Now I remember this issue was cropping up in all the deep-water surveys,; both KR and NOAA platforms. Don't know why they didn't include this in their DR.

Mark

Subject: Re: Unimak Pass grid resolution
From: "Mark.T.Lathrop" <Mark.T.Lathrop@noaa.gov>
Date: Mon, 14 Dec 2009 14:07:00 -0500
To: Kathleen Mildon <kmildon@terrasond.com>
CC: James DePasquale <jdepasquale@terrasond.com>, Andrew Orthmann <aorthmann@terrasond.com>

Katie,

Your proposal is fine. We authorized the use of the 2008 Specs for 5.1.2.2 and that should logically carry over to the CUBE parameters as well.

Mark

Kathleen Mildon wrote:

> Mark,
>
> I am forwarding along a concern that Andy Orthmann discovered during our data processing. Please see below.
>
> Mark,
>
> We would like to deviate from the specs concerning depth range resolution requirements for H12004 (Unimak sheet C). Specifically we propose:
>
> 1. Adjusting the 4 meter resolution surface to terminate at 80 meters depth (therefore 4m from 46 to 80 instead of 46 to 115 meters)
> 2. Starting the 8 meter resolution surface at 72 meters depth (therefore 8m from 72 to 350 instead of 103 to 350 meters)
> 3. The remaining surfaces (1m and 2m) would be unchanged from the specs
>
> We are seeing excessive holidays between adjacent lines in the 4-meter surface in depths of 80 to 115 meters in this sheet. Though we haven't quantified it, it is likely to cause the 95 % requirement for node population outlined in the specs to not be met unless the resolution is adjusted.
>
> The data meets the complete multibeam requirements in sections 5.1.2.2 of 2008 Specs and Deliverables (we were exempted from adhering to the 2009 specs for that section). However, we are using CUBE parameters that meet the more stringent 2009 specs requirements because we have good results in the other sheets. But in this sheet on this particular surface the results are not good due to wider line spacing used early in the project.
>
> We would prefer adjusting the resolution range for H12004 as outlined above over using different CUBE parameters specific to this sheet in order to keep the CUBE parameters consistent project wide.

Thank you,
Katie

Katie Mildon
Charting Program Manager

TerraSond Ltd
Terrestrial and Sea Floor Mapping
1617 South Industrial Way Suite 3, Palmer, Alaska 99645
(907) 745-7215 Office (907) 745-7273 FAX (907) 715-1825 Cell
kmildon@terrasond.com www.terrasond.com

Re: Unimak Pass grid resolution.eml	**Content-Type:** message/rfc822 **Content-Encoding:** 7bit

H12065 COMPILATION LOG

General Survey Information		
REGISTRY No.	*H12065*	
PROJECT No.	*OPR-P188-TE-09*	
FIELD UNIT	*TERRASOND LTD.*	
DATE OF SURVEY	*May 24, 2009 to August 23, 2009*	
LARGEST SCALE CHART	*16250, 23rd. Edition, 20080801*	
SOUNDING UNITS	*Fathoms*	
COMPILER	*Norris Wike*	
Source Grids	**File Name**	
	H12065_1_of_5_1m_Final.hns 398,007 KB HNS File H12065_1_of_5_2m_Final.hns 198,341 KB HNS File H12065_1_of_5_4m_Final.hns 120,674 KB HNS File H12065_2_of_5_1m_Final.hns 159,923 KB HNS File H12065_2_of_5_2m_Final.hns 72,560 KB HNS File H12065_2_of_5_4m_Final.hns 195,194 KB HNS File H12065_3_of_5_4m_Final.hns 309,736 KB HNS File H12065_3_of_5_8m_Final.hns 13,585 KB HNS File H12065_4_of_5_4m_Final.hns 433,443 KB HNS File H12065_5_of_5_4m_Final.hns 400,770 KB HNS File H12065_5_of_5_8m_Final.hns 36,066 KB HNS File	
Surfaces	**File Name**	
Combined	*H12065_8M_Combined.csar*	
Interpolated TIN	*H12065_16M_InterpTIN.csar*	
Shifted Interpolated TIN	*H12065_16M_InterpTIN_shifted.csar*	
Final HOBs	**File Name**	
Survey Scale Soundings	*H12065_SS.hob*	
Chart Scale Soundings	*H12065_CS.hob*	
Contour Layer	*H12065_Contours.hob*	
Feature Layer	*H12065_Features.hob*	
Meta-Objects Layer	*H12065_MetaObjects.hob*	
Blue Notes	*H12065_BlueNotes.hob*	
Bottom Samples	*H12065_BottomSamples.hob*	
ENC	*H12065_ENC_Retain.hob*	
Coastline	*H12065_Coastline.hob*	
SandWaves	*H12065_Sandwaves.hob*	
Meta-Objects Attribution		
Acronym		
M_COVR		
CATCOV	*1*	
SORDAT	*20090823*	
SORIND	*US,US,graph,H12065*	
M_QUAL		
CATZOC	*6*	
INFORM	*M/V Bluefin, R/V Mt. Augustine*	
POSACC	*10*	
SORDAT	*20090823*	
SORIND	*US,US,graph,H12065*	
SUREND	*20090823*	
SURSTA	*20090524*	
DEPARE		
DRVALV 1	*-4.0 fm*	

DRVALV2	***87.0 fm***	
SORDAT	***20090823***	
SORIND	***US,US,graph,H12065***	

SPECIFICATIONS:

I. COMBINED SURFACE:
   a. Number of ESAR Final Grids: ***11***
   b. Resolution of Combined (m): ***8M***

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (mm at Map Scale): ***300000***
      i. Radius Value (m): ***1***
      ii. Or use a Sounding Space Range Table (if applicable): ***NA***

   d. Queried Depth of All Soundings
      i. Minimum: ***0.8596 fm***
      ii. Maximum: ***85.7246 fm***

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): ***16M***
   b. Linear
   c. Shifted value: *[-0.229m (feet), (≤ 10 fathoms)]*
      [-1.372m (fathoms), (> 10 fathoms)]

IV. CONTOURS:
   a. Use a Depth List: ***H12065_depth_curves_list.txt***
   b. Line Object: DEPCNT
   c. Value Attribute: VALDCO

V. FEATURES:
   a. Total Number of Features: ***9***
   b. Number of Insignificant Features: ***NA***

VI. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: ***135***
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius: m on the ground
      i. Radius Value (m): ***NA***
      ii. Or use a Sounding Space Range Table (if applicable): ***H 12065_CS_SSR.txt***

0	***18.288***	***1000***
18.2881	***54.864***	***1800***
54.8641	***164.821***	***2200***

   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings: ***140***

VII. Notes:

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H12065 (2009)

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.2. QUALITY CONTROL

H-Cell

The AHB source depth grid for the survey's nautical chart update product entailed the field's original 1m, 2m, 4m and 8m grids. These grids were combined at 8 meter resolution. The survey scale soundings were created from the combined surface using the MM at map scale process. Refer to the Compilation Log above for exact values used for this process. A TIN was created from the survey scale soundings from which an interpolated surface was generated. The chart scale soundings were derived from only the non-interpolated nodes of this surface to preserve absolute continuity between the charted depths, the survey scale soundings, and the original source grid. The chart scale soundings were selected using a sounding spacing range (SSR) file. The chart scale selected soundings are a subset of the survey scale selected soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

The interpolated TIN surface of 16m resolution was shifted by the NOAA sounding rounding value of -0.75 feet for depths less than 10 fathoms and -0.75 fathoms for depths greater than 10 fathoms. The shifted interpolated TIN was used to generate depth contours in fathoms. The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The compilation products (Final *.HOB files) for this survey are detailed in the H12065 AHB Compilation Log contained within this document. The Final HOB files included depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), meta-objects (M_COVR, M_QUAL), cartographic Blue Notes ($CSYMB), and features (COALNE, OBSTN, SBDARE, SNDWAV, UWTROC, WATTUR).

As dictated by Hydrographic Technical Directive 2008-8, the Final HOB files were combined into two separate H-Cell files in S-57 format. Both S-57 files were exported from CARIS Bathy DataBASE in meters, and then converted from metric units into feet using CARIS HOM ENC 3.3. Quality assurance and topology checks were conducted using CARIS S-57 Composer 2.1 and DKART Inspector 5.1 validation tests.

The final H-Cell products are two S-57 files, in Lat/Long NAD-83. The contents of these two H-Cell deliverables are listed in the table below:

TABLE 1 - Contents of H-Cell Files

H12065_CS.000			Scale 1:300,000
Object Class Types	**Geographic**	**Cartographic**	**Meta**
	COALNE	$CSYMB	M_COVR
S-57 Object Acronyms	DEPARE		M_QUAL
	SBDARE		
	SNDWAV		
	SOUNDG		
	UWTROC		
	WATTUR		
H12065_SS.000			**Scale 1:40,000**
Object Class Types	**Geographic**		
S-57 Object Acronyms	DEPCNT		
	SOUNDG		

B.2.3 Junctions

Survey H12065 (2009) junctions with surveys H12004 (2009) to the west and H12066 (2009) to the east. Present survey soundings compare within 1 foot with H12004 (2009) and H12066 (2009). Most present survey depths compare within 1 feet of the charted hydrography to the south and north.

DATA PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

CARIS HIPS/SIPS version 7.0 SP2, HF 2-7
CARIS Bathy DataBASE version 3.0 HF 1, 3, 5, 8, 9, 10
CARIS S-57 Composer version 2.1 HF 1-5
DKART INSPECTOR, version 5.1
CARIS HOM ENC 3.3 SP3 HF 1-8
PYDRO version 11.3 (r3347)

C. VERTICAL AND HORIZONTAL CONTROL

The hydrographer makes adequate mention of horizontal and vertical control used for this survey in section C of the DR. The sounding datum for this survey is Mean Lower Low Water (MLLW), and the vertical datum is Mean High Water (MHW). Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 3 North.

D. RESULTS AND RECOMMENDATIONS

CHART COMPARISON **16520 (23rd. Edition, Aug. /08)**
Unimak and Akutan Passes
Corrected through NM 02/26/2011
Corrected through LNM 02/22/2011
Scale 1:300,000

ENC Comparison **US3AK61M**
Unimak and Akutan Passes
Edition 16
Application Date 2011-01-12
Issue Date 2011-01-12
Chart 16520

Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section D. and Appendix I and II of the Descriptive Report. Any charted features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted.

The following should be noted:

Shoreline verification of RSD survey # GC10613 was requested for this project. The verification was submitted by the field unit and corrections or additions are shown on the H-Cell. It is recommended that the shoreline be revised from the H-Cell.

The field unit collected a total of 185 bottom samples. All charted seabed characteristics were superseded by the survey findings. Sixteen seabed characteristics were used for charting and the remaining 169 seabed characteristics are filed with this report.

A sandwave (SNDWAV) area was included with the H-Cell. This area is defined by undulating sandwaves with amplitude of 1m or more.

A charted notation ***rky*** in the vicinity of Latitude 54°12’45.952"N, Longitude 164°01’12.727"W was disproved by the present survey. Seabed characteristics show the bottom to be sand and silt. Delete the charted notation ***rky*.**

A charted notation ***rky*** in the vicinity of Latitude 54°20’50.563"N, Longitude 164°12’01.504"W was disproved by the present survey. Seabed characteristics show the bottom to be sand and silt. Delete the charted notation ***rky*.**

A charted notation ***rky*** in the vicinity of Latitude 54°20’15.607"N, Longitude 164°20’41.879"W was disproved by the present survey. Seabed characteristics show the bottom to be sand and silt. Delete the charted notation ***rky*.**

During office processing of the hydrographic data a phone call was made to MCD's Andrew Kampia (301-713-2721 x111). The discussion was on the charting of rocks alone the shoreline. We were informed to not chart rocks whose centroids fell on, or inshore of the GC shoreline. All rocks falling offshore of the shoreline were reviewed for applicability to the chart based on scale. Present survey rocks meeting this criterion were not charted. Charted rocks meeting this criterion were deleted. See also Appendix II for additional information.

MISCELLANEOUS

Chart compilation was completed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. See Section D.1.of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey.

ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell BASE Cell File or the Blue Notes should be retained as charted. Refer to the section D. and Appendix I and II of the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H12065 (2009)

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth contours, disposition of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the Evaluation Report.

All final products have undergone a comprehensive reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

Norris Wike
Digitally signed by Norris Wike
DN: cn=Norris Wike, o=NOAA, ou=AHB, email=norris.a.wike@noaa.gov, c=US
Date: 2011.04.21 14:51:17 -04'00'

Norris A. Wike
Cartographer
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Richard T. Brennan
2011.04.21 20:04:41
-04'00'

Approved: _____

Richard T. Brennan
Commander, NOAA
Chief, Atlantic Hydrographic Branch