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

TIDE NOTE FOR HYDROGRAPHIC SHEET

DATE: January 2,1987

Marine Center: Pacific

OPR: R184

Hydrographic Sheet: H-10222

Locality: Summit Island to Round Island, Bristol Bay, AK

Time Period: August 5 - September 4, 1986

Tide Station Used: 946-5182 Black Rock, AK

Plane of Reference (Mean Lower Low Water): 8.91 Ft.

Height of Mean High Water Above Plane of Reference: 9.0 Ft.

Remarks: Recommended Zoning:

1. North of latitude 58°49.0' apply a +10 minute time correction and a x1.03 Range Ratio to all heights.
2. South of latitude 58°49.0' Zone Direct.

James L. Hubbard
Chief, Tidal Datum Quality Assurance Section

FIELD TIDE NOTE
RA 20-4-86
H-10222

Field tide reduction of soundings was accomplished by applying range ratio and time correctors derived by RAINIER to predicted tides from Black Rock, Alaska. Black Rock predicted tides were supplied by N/OMA123 Tidal Datum Quality Assurance Section. Predicted tide corrections were derived using program AM500. All times of both predicted and recorded tides are Coordinated Universal Time (UTC).

Bristol Bubbler tide gages were installed at five locations in the project area. Data from these stations were used for zoning recommendations. Tide station information follows:

BLACK ROCK (946-5182)

Geographic Locale	- Black Rock, Walrus Islands, Bristol Bay, Alaska. 58-42.5 N, 160-11.3 W.
Installation Date	- June 6, 1986
Removal Date	- September 9, 1986
Gage Type	- Two 0-30 scale Bristol Bubblers, primary S/N 64A 11028 and backup S/N 67A 16208.
Levels	- Installation levels, 6/6/86, and final levels, 9/9/86 were in excellent agreement with previous levels (difference $\leq$ 0.002m).
Bench Marks	- Five recovered in good condition (BM No. 1 1948, No. 2 1948, No. 3 1948, BMs 5182 A 1985, 5182 B 1985).
Staff-Gage	- Primary = 0.73 ft - Backup = 0.19 ft.
Marigram Records	- Continuous records were obtained from both gages with the following exceptions: Primary - 1. Between July 20(DN 201) and July 23(DN 204) the gage was over-dampened. During this time the backup gage was also overdampened and no usable data were acquired. This break amounted to less than three days. It should be noted that the Summit Island and Kulukak gages were operational during this period. Hydrography on this survey was not run during this period.

2. Between July 31(DN 243) and September 4(DN 247) the gage lost nitrogen supply. During this period the backup gage was in continuous operation.
Backup - Between July 20(DN 201) and July 30(DN 211) was overdampened. Hourly heights were scaled from the primary marigram. Hydrography on this survey was not run during this period.

KULUKAK POINT (946-5265)

Geographic Locale	- Kulukak Point, AK. 58-50.4 N, 159-38.8W
Installation Date	- June 8, 1986
Removal Date	- September 7, 1986
Gage Type	- Two Bristol Bubbler 0-30 ft scale, primary S/N 68A14940, backup S/N 64A11030. The backup gage also has an electronic digital logger gage for field evaluation. The marigram for the backup gage will be sent to the Pacific Tide Party.
Levels	- Installation levels,6/8/86, and final levels, 9/7/86, were in excellent agreement with previous levels (difference $\leq$ 0.002m).
Bench Marks	- Recovered 5 in good condition (BM's 5265 A 1985, 5265 B 1985, 5265 C 1985, 5265 D 1985, 5265 E 1985).
Staff-Gage	- Primary 2.09 ft Backup 2.48 ft
Marigram Records	- Uninterupted records were obtained from the primary gage and hourly heights were scaled from this marigram. The backup gage lost nitrogen pressure between July 9(DN 190) and July 13(DN 194). The digital gage recorded data from July 3 (DN 184) through July 21 (DN 202).

NUSHAGAK PENINSULA (946-4961)

Geographic Locale	- Southwest side Nushagak Peninsula, AK 58/31.6 N, 159/09.6 W
Installation Date	- June 10, 1986
Removal Date	- August 7, 1986
Gage Type	- Two 0-30 ft Bristol Bubblers Primary S/N 67A 16205 Backup S/N 68A 9333

Levels	- Installation levels, 6/10/86, had excellent closure (difference =0.002m). Levels run on 6/19/86 and 8/7/86 verified no staff movement. Final levels, 9/7/86, had a closure of 0.004m.
Bench Marks	- One mark, 4961 B 1985, was recovered in good condition. BM's 4961 A 1985, 4961 C 1985, 4961 D 1985, 4961 E 1985 were destroyed. Six marks were set (4961 G 1986, 4961 H 1986, 4961 J 1986, 4961 K 1986, 4961 L 1986, TBM 1). BM's K, L, and TBM 1 are prefabricated 4 ft pipe marks. BM's G, H, and J are rod marks driven to refusal. All marks are protected with PVC pipe.
Staff-Gage	- Primary = 3.91 ft - Backup = 3.66 ft
Marigram Records	- Uninterrupted records were obtained from the primary gage which was used for hourly heights. The backup gage chart drive would not work consistently.

NE SIDE SUMMIT ISLAND (946-4961)

Geographic Locale	- Northeast side Summit Island, AK 58/50.8 N, 160/12.6 W
Installation Date	- July 18, 1986
Removal Date	- September 6, 1986
Gage Type	- Bristol Bubbler 0-30 ft Primary S/N 73A 235
Levels	- Installation levels, 7/19/86, had excellent closure (difference =0.001m). Final levels, 9/6/86, were in excellent excellent agreement with previous levels (difference $\leq$0.002m).
Bench Marks	- Five marks were set (5283 A 1986, 5283 B 1986, 5283 C 1986, 5283 D 1986, 5283 E 1986). BM's were standard NOS bronze disk set in bedrock.
Staff-Gage	- Primary = 2.02 ft
Marigram Records	- Uninterrupted records were obtained. Upon changing marigram paper types from Charts-Inc(brown) paper to Bristol Company(red) paper, the staff to gage ratio changed from 2.02 to 1.55 ft.

ROUND ISLAND

Note: This gage was not required for this survey. The data were used to determine zoning.

Geographic Locale	- Northeast side Round Island, AK 58/36.7 N, 159/58.0 W
Installation Date	- July 9, 1986
Removal Date	- July 16, 1986
Gage Type	- Bristol Bubbler 0-30 ft Primary S/N 73A 235
Levels	- No marks were set or leveled. The station was established only for zoning purposes. Levels were run to the waters edge from a rock TBM 1.
Bench Marks	- No marks were set.
Water-Gage	- Primary = 5.65 ft
Marigram Records	- Uninterrupted records were obtained.

UNALASKA CONTROL STATION

The control station at Unalaska was leveled July 26, 1986 by the Pacific Tide Party. RAINIER personnel also leveled the station. No problems were encountered with this station.

ZONING RECOMMENDATIONS

In accordance with section 5.9 of the project instructions for OPR-R184 the attached field tidal zoning is submitted for review.

Comparison of mainscheme data with soundings observed on crosslines and mainscheme splits indicated these data did not agree within expected tolerances. The apparent error was about one-half fathom, depending on the stage of tide. It was also noted that the tide data observed at two supplemental locations did not agree with the tidal zoning scheme provided in the project instructions.

One tide cycle was measured with the ship's echo sounder while anchored at 58/25.5N, 160/08.3W in Sheet X. This data conflicts with the preliminary zoning in that it indicates that the time correction with Black Rock is small and the range ratio is smaller offshore. In addition, a reconnaissance tide station was established on Round Island. This data confirmed that the co-tidal lines move from east to west and that the range of tide is less at Round Island than at Black Rock.

Therefore the RAINIER has developed a field tidal zoning scheme that resolves these discrepancies. The new scheme is based on the following information:

Tide Station	HWI	LWI	Mn	Remarks
Pt. Moller	7.24 hr.	1.01 hr.	7.38 ft.	Semi-diurnal
Nushagak	11.30	5.08	8.32	Semi-diurnal
Kulukak	11.68	5.51	8.22	Semi-diurnal
Black Rock	11.92	5.77	7.04	Semi-diurnal
Hagemeister	12.28	6.78	6.55	Diurnal
Round Island	11.8	5.7	6.7	7 day comparison with Black Rock
Summit Island	12.1	6.0	7.3	7 day comparison with Black Rock

The data from the first five tide stations were obtained from N/OMA via the telephone. They are based on historic data. The Round Island tide station was established on July 9, for seven days with permission from the state observer for the Alaska Department of Fish and Game. However, we were not allowed to set bench marks or install a tide staff, since the noise could disturb the walrus. The reconnaissance data from Round Island will be submitted directly to N/OMA12.

The Summit Island Tide Station was established on July 18, according to the project instructions and will collect a full month of data.

The RAINIER recommends that the attached field tidal zoning be used in place of the Preliminary Tidal Zoning specified in the project instructions.