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COLUMBIA RIVER ENTRANCE CHANNEL DEEP-DRAFT VESSEL MOTION STUDY.--ETC(U)

SEP 79 S WANG, C LEIDERSDORF, C BUTCHER

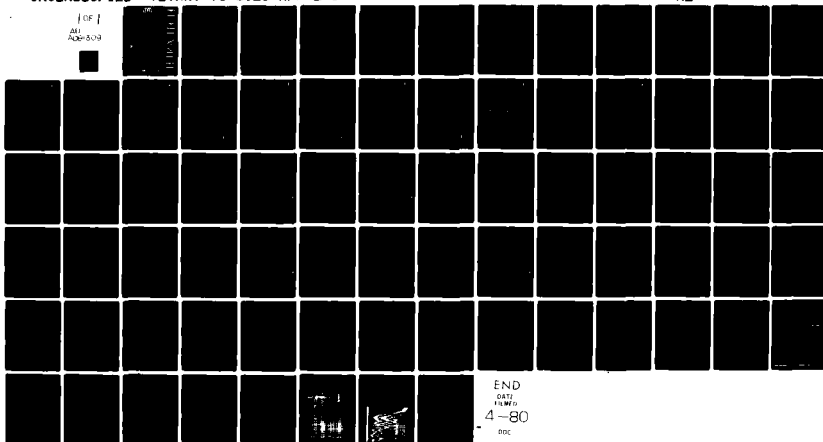
DACW57-78-C-0028

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TETRAT-TC-3925-APP-B-6

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**COLUMBIA RIVER ENTRANCE
CHANNEL DEEP-DRAFT VESSEL
MOTION STUDY**

FINAL REPORT - PHASE 1

ADA 081 309

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APPENDICES B, C, D, E, F, G

DDC FILE COPY

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TETRA TECH REPORT NO. TC-3925

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SEPTEMBER 1979

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TETRA TECH

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A081529

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) 6 Columbia River Entrance Channel Deep-Draft Vessel Motion Study. Appendices B thru G.		5. TYPE OF REPORT & PERIOD COVERED 9 Final Report & Phase 1, Through 31 Sep 79
7. AUTHOR 10 Shen/Wang Craig/Leidersdorf Chris/Butcher		6. PERFORMING ORG. REPORT NUMBER Tetra Tech Report #TC-3925
9. PERFORMING ORGANIZATION NAME AND ADDRESS Tetra Tech, Inc. 630 N. Rosemead Blvd. Pasadena, CA 91107		8. CONTRACT OR GRANT NUMBER(s) 15 DACW57-78-C-0028
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army Portland District, Corps of Engineers, NPPEN-PL-2 P.O. Box 2946, Portland, OR 97208		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		11. REPORT DATE 11 Sep 1979
		12. NUMBER OF PAGES Approx. 800
		13. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release, distribution unlimited.		
14 TETRAT-TC-3925-APP-B-G.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES To be presented at ASCE National Convention, 14-18 April 1980 in Portland, Oregon.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Ship motions in entrance channels, wave effects on ships, Columbia River entrance, prototype ship motion monitoring, shallow water ship motions, entrance channel design. Also Ship Motion, Water Wave Action on Ships, Approach Channels, Entrance Channels.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A prototype ship motion monitoring program was initiated by the Portland District, U.S. Army Corps of Engineers to provide design criteria for the entrance channel at the mouth of the Columbia River. The contractor's field team boarded deep draft vessels bound to or from the Columbia River and measured vertical acceleration (heave), pitch, roll, yaw, and position as the vessels transited the 5-mile entrance channel. Twenty-nine vessels were monitored in the period May 1978-March 1979.		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

403146 Jm

APPENDIX B
INSTRUMENTATION SPECIFICATIONS

403 146 Gm

QANTEX TAPE DRIVE SPECIFICATIONS

MEDIUM..... 3M DC 300A Data Cartridge

COMMANDS..... Write, Write Tape Mark, Erase, Read Forward, Read Reverse, Space Block Forward, Space Block Reverse, Space File Forward, Space File Reverse, Rewind, Unload and Eject.

COMMAND CHAINING.... Available for Read and Space Block Commands

DENSITY..... 1600 bpi, phase-encoded

TRANSFER RATE..... 6000 bytes per second at 30 inches per second

READ-WRITE SPEED.... 30 inches per second

REWIND & SEARCH
SPEED..... 90 inches per second

COMPATIBILITY..... ANSI & ECMA Standards

HEAD TYPE..... 4 track Read-After-Write

POWER..... 110V/60Hz or 105-235V/40-440Hz (Option 01)

SIZE..... 21"x17"x7½"

WEIGHT..... 29 lbs. (2710-1D), 34 lbs (2710-2D)

DATA CHECK..... Cyclic Redundancy Check Character

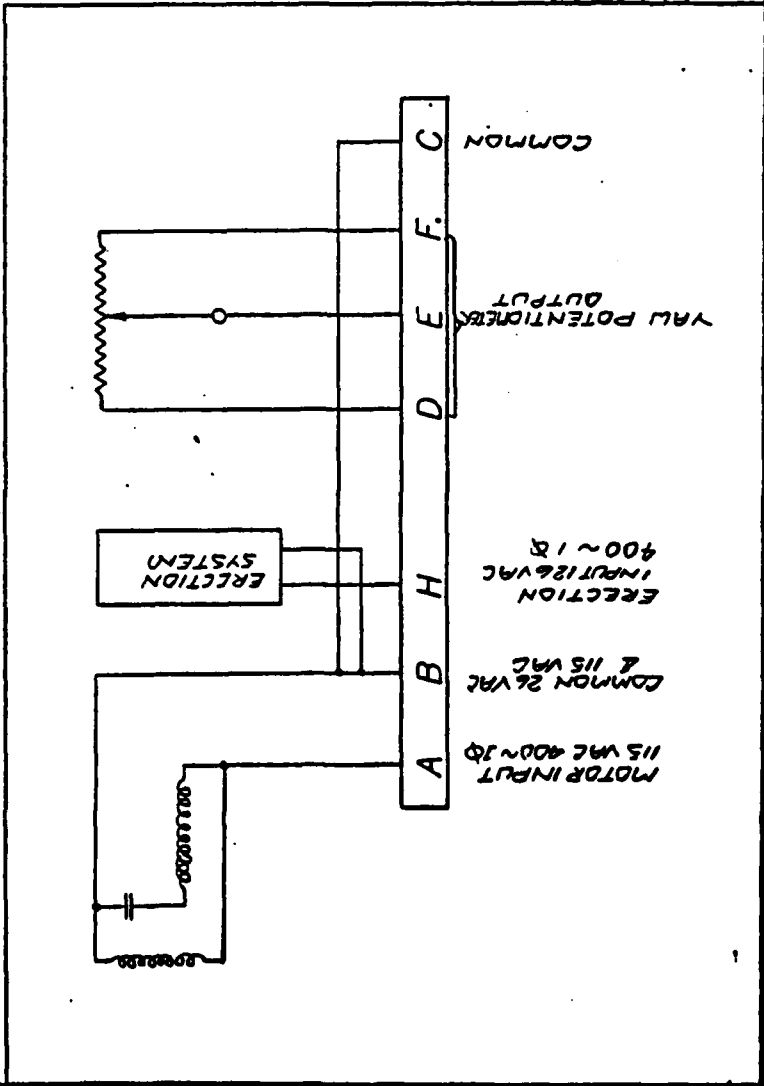
SPECIFICATIONS

- 01.0 GIMBAL FREEDOM
- 1.1 INNER GIMBAL 36° MINIMUM
- 1.2 OUTER GIMBAL 360° CONTINUOUS
- 2.0 OUTPUT TAN
- 02.1 PICKOFF POTENTIOMETER
- 02.1.1 RESISTANCE 5000 OHMS ±10%
- 2.1.2 POWER DISSIPATION 0.5 WATTS MAXIMUM
- 03.0 SPIN MOTOR
- 3.1 VOLTAGE 115 VAC ±10%, 400 HZ ±5%, 1 PHASE
- 3.2 CURRENT 100 MA MAXIMUM STARTING, 65 MA MAXIMUM RUNNING
- 3.3 TIME TO SPEED 2 MINUTES NOMINAL WITH 80% OF RATED VOLTAGE APPLIED
- 4.0 ERECTION
- 4.1 CURRENT 100 MA NOMINAL, INTERMITTENT, INTERNALLY CONNECTED WITH MOTOR
- 05.0 DRIFT
- 5.1 SCORBY NOT MORE THAN 10°/HOUR (SCORBY DEFINED AS ALTERNATE CLOCKWISE AND COUNTERCLOCKWISE 32.5° ROLL, PITCH, AND YAW MOVEMENTS AT 6.0 CYCLES PER MINUTE)
- 05.2 HEADING OUTPUT TO 0 - 359° ±1° (NON-SHORTING GAP IN POTENTIOMETER 1.0° TO 2.0°).
- 06.0 INSULATION RESISTANCE 20 MEGOHMS, ELECTRICAL CIRCUITS TO CASE WITH 500 VDC APPLIED

- 7.0 ENVIRONMENTAL SPECIFICATIONS
- 7.1 TEMPERATURE -40°F TO +165°F
- 7.3 ALTITUDE 1000 FEET TO 40,000 FEET
- 7.3 VIBRATION 5 TO 500 HZ, 0.036 INCH D.A. OR 5G WHICHEVER IS THE LIMITING VALUE
- 7.4 HUMIDITY 0 - 95% RELATIVE HUMIDITY AT 90°F
- 7.5 SEALING "G" RING, SEALED
- 8.0 REMARKS
- 8.1 ITEMS MARKED WITH (*) ARE CHECKED IN PRODUCTION TESTS. OTHER ITEMS FOR REFERENCE MAY BE CHECKED ON ORDER BY QUALIFICATION TESTS.
- 8.2 INSTRUMENT WEIGHT 3.5 LBS.

400-400-100	
WING CASE	
D-10 TAB	
UNCLASSIFIED	
Justification for	
By	
Date	
Availability Codes	
Dist	Avail and/or special
A	23
	44

Humphrey		ELECTRO-MECHANICAL INSTRUMENTS	
TITLE ENVELOPE DRAWING		REV	0604-0801-1
GYROSCOPE ASSEMBLY		REV	0604-0801-1
DATE		REV	0604-0801-1
DATE		REV	0604-0801-1



SPECIFICATIONS

1.0 MECHANICAL LIMITS 1.1 MINIMUM FREEDOM OF ROTATION ABOUT PITCH AXIS, 360° ABOUT ROLL AXIS 6.0 ENVIRONMENTAL 6.1 TEMPERATURE 0°F TO +130°F 6.2 ALTITUDE -1000 TO 40,000 FT. 6.3 VIBRATION 5 TO 500 HZ AT 0.036 G.A. ON 5G WHICH EVER IS LESS 6.4 SHOCK 20G ALL AXES 10 ± 1 MS 6.5 INSULATION RESISTANCE 20 MEGOHMS AT 50 VDC BETWEEN ISOLATED CIRCUITS AND CASE 6.6 FINISH MOUNTING BASE (BLACK EPOXY), CASE (BLACK ANODIZE), AND MOUNTING PLATE (STAINLESS STEEL) 6.7 WEIGHT 5 POUNDS MAXIMUM 6.8 SERVICE LIFE 500 HOURS 7.0 REMARKS 7.1 ITEMS MARKED WITH (*) ARE CHECKED IN PRODUCTION TESTS. OTHER ITEMS FOR REFERENCE MAY BE CHECKED ON ORDER BY QUALIFICATION TESTS.

2.0 OUTPUT 2.1 PICKOFF POTENTIOMETER OUTPUT PROPORTIONAL TO ANGULAR DISPLACEMENT ABOUT THE ROLL AND PITCH AXIS. 2.2 ROLL ELECTRICAL DISPLACEMENT 150° ± 2° 2.3 PITCH ELECTRICAL DISPLACEMENT 150° ± 2° 2.4 RESISTANCE 5,000 ± 5% OHMS 2.5 RESOLUTION 0.2° MAXIMUM 2.6 LINEARITY 0.5% OF FULL RANGE 2.7 POWER DISSIPATION 0.5 WATTS 2.8 CONTACT RESISTANCE 200 OHMS EQUIVALENT CONTACT RESISTANCE PER W.A.S. 710 3.0 ELECTRICAL REQUIREMENTS 3.1 VOLTAGE 24 VDC ± 5% 3.2 CURRENT 7.5 AMP NOMINAL

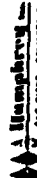
4.0 SPIN MOTOR AND ERECTION SYSTEM THROUGH INTERNAL INVERTER 4.1 VOLTAGE 115 VAC, 400 HZ, SINGLE PHASE 4.2 CURRENT (RUNNING) 110 MA NOMINAL 4.3 CURRENT (STARTING) 350 MA NOMINAL 4.4 TIME TO SPEED 3 MINUTES MAXIMUM 4.5 ERECTION RATES 4.5.1 TIME TO ERECT 3 MINUTES MAXIMUM TO WITHIN 1.0° OF VERTICAL AFTER POWER IS APPLIED UNDER STATIC CONDITIONS. 6 MIN. DYNAMIC CONDITIONS.

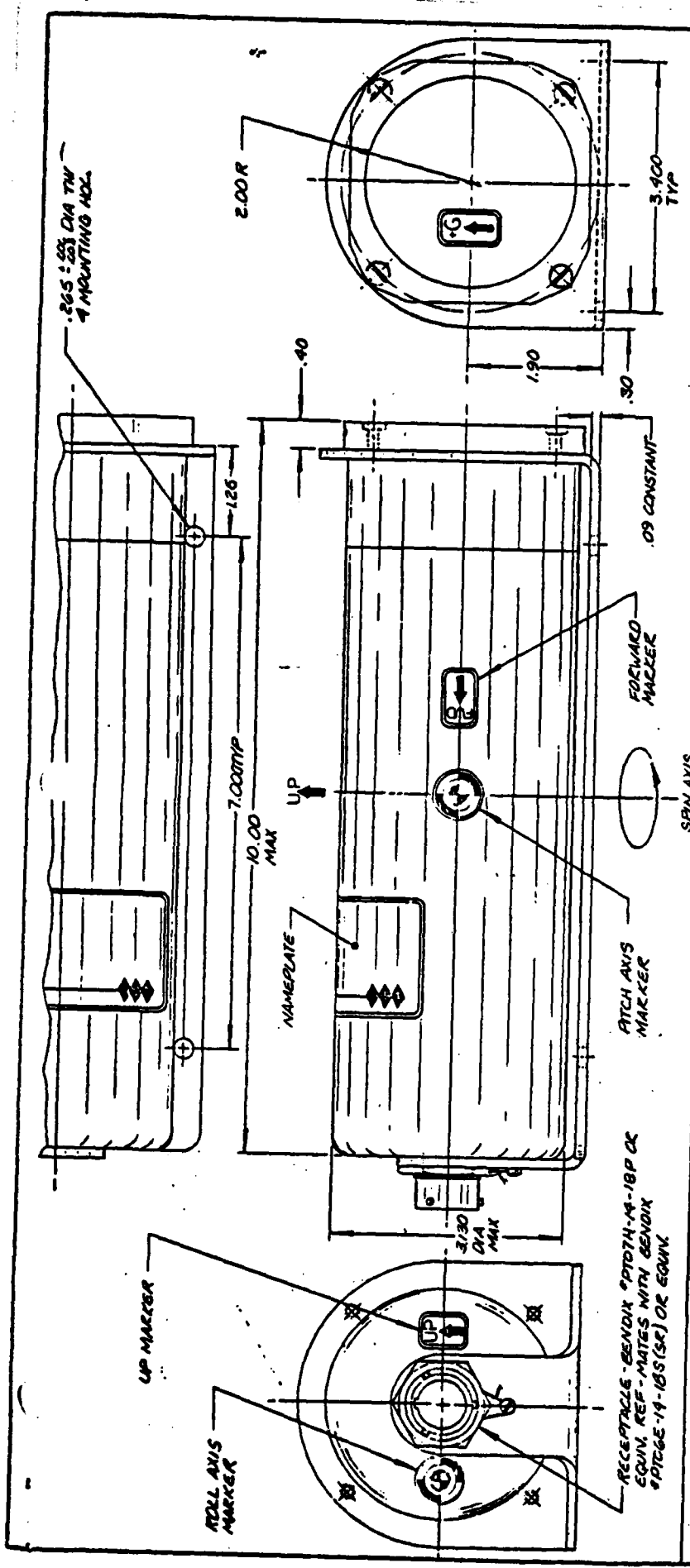
4.5.2 NOMINAL ERECTION RATE ROLL 7°/MIN. PITCH 7°/MIN.

4.5.3 VERTICAL ACCURACY ± 0.2° OF TRUE VERTICAL

5.0 ACCELEROMETER 5.1 RANGE ± 2.0G 5.2 INPUT 24 VDC FROM INPUT VOLTAGE (INTERNALLY REGULATED)

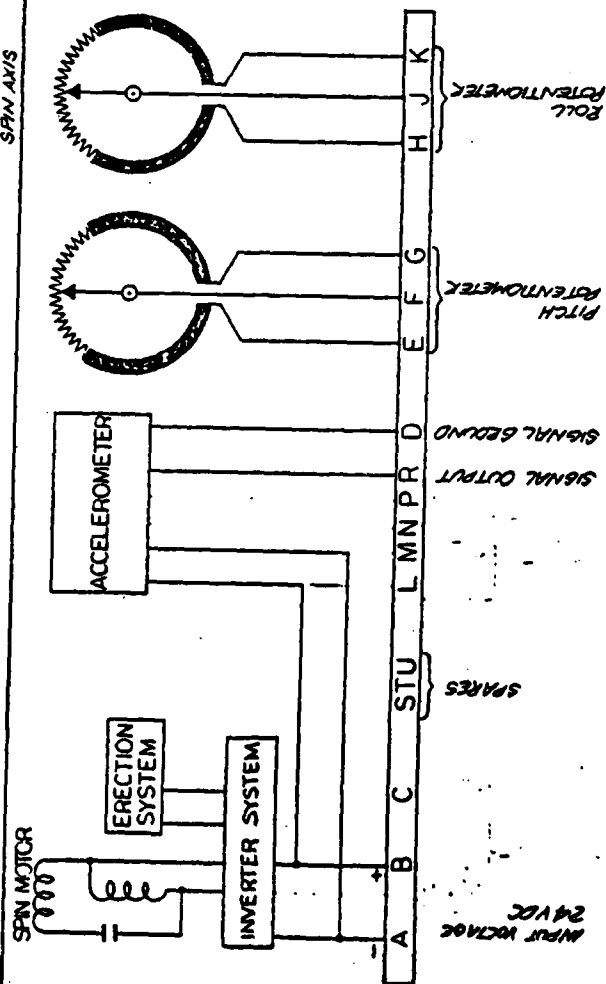
5.3 OUTPUT SENSITIVITY 2.50V/G 5.4 ACCURACY (INCLUDING HYSTERESIS AND REPEATABILITY) ± 0.1% OF FULL SCALE 5.5 SELF TEST CURRENT TORQUING CAPABILITY FOR CALIBRATION CHECK.

 Humphrey TEST EQUIPMENT, INSTRUMENTS		ELECTRONICS AND INSTRUMENTS	
MODEL LINEAR DYNAMICS ACCELEROMETER	PART NO. C 5409-0201-1	REV. 1	DATE 10-2-72
SECTION 2 OF 2			



NOTE:

1. NAMEPLATE AND ALL MARKERS .010 MAX THICKNESS
2. CW MOVEMENT OF INSTRUMENT WHILE VIEWING PITCH AXIS MARKER, WILL RESULT IN A DECREASING RESISTANCE BETWEEN PINS F & G
3. CW MOVEMENT OF INSTRUMENT WHILE VIEWING ROLL AXIS MARKER, WILL RESULT IN A DECREASING RESISTANCE BETWEEN PINS H & J



		ELECTRO-MECHANICAL	
TITLE SPARELINE DRAWING ACCELEROMETER VERTICAL SYMBOLIZED		PART NO. C 5A09-001-1	
QUANTITY 1		DATE 11/1/60	
DRAWN BY 1		CHECKED BY 2	
DESIGNED BY 3		APPROVED BY 4	
CUSTOMER REF NO.		5	

APPENDIX C

MONTHLY SUMMARIES OF WEATHER OBSERVATIONS AT CLATSOP
COUNTY AIRPORT, ASTORIA, OREGON

MAY, 1978 - JUNE, 1978
NOVEMBER, 1978 - MARCH, 1979

NATIONAL WEATHER SERVICE OFC
CLATSOP COUNTY AIRPORT

MONTHLY SUMMARY



ASTORIA, OREGON

001. 31 AUGUST 1962 WASH DC

14001 194320

[illegible]

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
 † TRACE AMOUNT
 • ALSO ON AN EARLIER DATE, OR DATES.
 HEAVY FOG - VISIBILITY 1/4 MILE OR LESS.
 FIGURES FOR WIND DIRECTIONS ARE TENS OF DEGREES CLOCKWISE FROM TRUE NORTH. DO = CALM.
 DATA IN CDS. 6 AND 12-15 ARE BASED ON 7 ON

MORE OBSERVATIONS PER DAY AT 3-HOUR INTERVALS.
FASTEST WIND MILE SPEEDS AND FASTEST OBSERVED
ONE-MINUTE VALUES WHEN DIRECTIONS ARE IN TENS
OF DEGREES. THE / WITH THE DIRECTION INDICATES
PEAK GUST SPEED.
ANY ERRORS DETECTED WILL BE CORRECTED AND
CHANGES IN SUMMARY DATA WILL BE ANNOTATED IN
THE ANNUAL SUMMARY

SUMMARY BY HOURS

DATE	TIME	LATITUDE	LONGITUDE	AVERAGES										RESULT	
				SEA SURF TEMPERATURE	TEMPERATURE				RELATIVE HUMIDITY				DIRECTION	SPEED	
					AIR °F	WET °F	SHADE °F	DEW P.	RELATIVE %	RELATIVE %	WIND SPEED	WIND DIR.			
01	7	30.12	47	45	44	43	88	88	87	86	1.7	2.			
04	7	30.11	46	44	44	43	87	87	86	0.2	17	2.			
07	7	30.12	46	44	44	43	86	86	85	1.1	18	1.			
10	7	30.13	46	51	47	74	74	74	73	6.3	27	4.			
13	8	30.13	46	52	48	70	70	70	70	12.6	27	7.			
16	8	30.12	46	52	48	69	69	69	69	10.3	27	8.			
19	8	30.11	45	48	45	73	73	73	73	12.3	28	8.			

HOURLY PRECIPITATION (WATER EQUIVALENT IN INCHES)

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Samuel B. Mitchell
DIRECTOR, NATIONAL CLIMATE CENTER

USCOMH--NOAA--ASHEVILLE

08/21/79 290

CEILING

T TOWNIES
 T TOWNIES TOWN
 S SQUALL
 A AMIN
 SM AMIN SHOWNERS
 SM FREEZING AMIN
 L GRIZZLE
 Z FREEZING GRIZZLE
 S SNOW
 SP SNOW PELLETS
 IC ICE CRYSTALS
 SM SNOW SHOWNERS
 SG SNOW GRAINS
 IP ICE PELLETS
 A HAIL
 F FOG
 IF ICE FOG
 G GROUND FOG
 BU BLOWING DUST
 BU BLOWING SAND
 BU BLOWING SNOW
 BU BLOWING SPRAY
 A SMOKE
 H HAZE
 D DUST

DIRECTIONS ARE THOSE FROM WHICH THE WIND BLOWS. INDICATED IN TENS OF DEGREES FROM TRUE NORTH: 1-2.. 09 FOR EAST. 18 FOR SOUTH. 27 FOR WEST. ENTRY OF 00 IN THE DIRECTION COLUMN INDICATES CALM.

SPEED IS EXPRESSED IN KNOTS;
MULTIPLY BY 1.15 TO CONVERT
TO MILES PER HOUR.

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NATIONAL CLIMATIC CENTER
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COM-210



FIRST CLASS

OBSERVATIONS AT 3-HOUR INTERVALS

NOTES

CEILING

WEATHER

- 0 FORTNIGHT
1 FORTNIGHTSTON
2 SHAMALL
3 SHAM
4 SHAM SHAMERS
5 FREEZING SHAM
6 SHIZZLE
7 FREEZING SHIZZLE
8 SHAM
9 SHAM PELLETS
10 ICE CRYSTALS
11 SHAM SHAMERS
12 SHAM SHAMERS
13 ICE PELLETS
14 HAIL
15 FOG
16 ICE FOG
17 GROUND FOG
18 SHAMING SHAM
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MIND

DIRECTIONS ARE THOSE FROM WHICH THE WIND BLOWS. INDICATED IN TERMS OF DEGREES FROM TRUE NORTH: I.E.. 09 FOR EAST. 18 FOR SOUTH. 27 FOR WEST. ENTRY OF 00 IN THE DIRECTION COLUMN INDICATES CALM.

SPEED IS EXPRESSED IN KNOTS;
MULTIPLY BY 1.15 TO CONVERT
TO MILES PER HOUR.

STATION

YEAR & MONTH
72 08

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FEDERAL BUILDING
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COM-210



FIRST CLASS

USCONN--NORR--ASHEVILLE 12/29/79 290

CEILING
WALL, INTERIOR OF CHURCH

7 TONGUE
 7 TONGUE DESIGN
 8 SQUARE
 8 SMILE
 00 SMILE SHIMERS
 20 FREEZING SMILE
 10 GRIZZLE
 21 FREEZING GRIZZLE
 5 SNOW
 30 SNOW PELLETS
 10 ICE CRYSTALS
 30 SNOW SHIMERS
 30 SNOW GEMMS
 10 ICE PELLETS
 0 MAIL
 0 FOG
 10 ICE FOG
 00 GLOWING FOG
 05 GLOWING GUST
 05 GLOWING SNOW
 05 GLOWING SNOW
 07 GLOWING SPARK
 0 SPRING
 0 WAVE
 0 OUST

DIRECTIONS ARE THOSE FROM WHICH THE WIND BLOWS. INDICATED IN TENS OF DEGREES FROM TRUE NORTH (I.E., 09 FOR EAST, 18 FOR SOUTH, 27 FOR WEST. ENTRY OF 00 IN THE DIRECTION COLUMN INDICATES CALM.

SPEED IS EXPRESSED IN KNOTS.
MULTIPLY BY 1.15 TO CONVERT
TO MILES PER HOUR.

YEAR & MONTH
70 11

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE

COM-210



FIRST CLASS



DECEMBER 1978 ASTORIA, OREGON

[illegible]

• EXTREME FOR THE NORTH - LAST OCCURRENCE IF MORE THAN ONE.
 † TRACE AMOUNT
 • ALSO ON AN EARLIER DATE, OR DATES.
 HEIGHT 900' - VISIBILITY 1/4 MILE OR LESS.
 FIGURES FOR WIND DIRECTIONS ARE TENS OF DEGREES CLOCKWISE FROM TRUE NORTH. OO = CALM.
 DATA IN CDS. 6 AND 12-18 ARE BASED ON 7 OR

NOTE OBSERVATIONS PER DAY AT 3-HOUR INTERVALS.
FASTEST WINDS AND SPEEDS ARE FASTEST OBSERVED
ONE-MINUTE VALUES WITH DIRECTIONS ARE IN TERMS
OF DEGREES. THE / WITH THE DIRECTION INDICATES
PERM OBTAIN SPEED.
ANY ERRORS DETECTED WILL BE CORRECTED AND
CHANGES IN SUMMARY DATA WILL BE ANNOTATED IN
THE ANNUAL SUMMARY

TIME	WIND DIRECTION	WIND SPEED	AVERAGES							WIND DIRECTION	WIND SPEED
			STATION	TEMPERATURE			RELATIVE HUMIDITY %	WIND SPEED M.P.H.	DIRECTION		
				AIR °F	SOIL °F	SEA. °F					
01	7	30.18	37	37	33	85	0.0	14	3.0		
04	8	30.18	36	36	33	85	7.4	18	3.1		
07	7	30.18	36	36	33	85	7.4	13	3.0		
10	7	30.22	36	36	33	85	7.0	10	2.8		
13	7	30.30	36	36	33	78	6.0	03	1.6		
16	7	30.30	36	36	33	78	6.0	11	1.2		
19	7	30.30	36	36	33	81	6.0	11	1.2		
22	7	30.21	36	35	31	87	7.2	14	2.2		

S. P. HOUR TRAINING ST													S. P. HOUR TRAINING ST												
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30																									
31											T		T	T	.01	.02	.04	.04	.01	T	T				

SUBSCRIPTION PRICE: \$2.55 PER YEAR INCLUDING ANNUAL SUMMARY. FOREIGN MAILING \$1.05 EXTRA. SINGLE COPY: 20 CENTS FOR MONTHLY OR ANNUAL ISSUE. THERE IS A MINIMUM CHARGE OF \$2.00 FOR EACH ORDER OF SELF-STORED ISSUES OF PUBLICATIONS. MAKE CHECKS PAYABLE TO DEPARTMENT OF COMMERCE, NOAA, 3406 PATTERSON. ORDERS AND INQUIRIES TO NATIONAL CLIMATE CENTER, FEDERAL BUILDING, ASHVEILLE, NORTH CAROLINA 28801.

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Daniel B. Mitchell
DIRECTOR, NATIONAL CLIMATE CENTER

USCDAW--NOMA--ASME V(LL) 01/28/78 200

OBSERVATIONS AT 3-HOUR INTERVALS

NOTES
CEILING
LUM. FIXTURES ON WALLS

MEATY MEER

- W E I N E R**

SPEED IS EXPRESSED IN KNOTS.
MULTIPLY BY 1.15 TO CONVERT
TO MILES PER HOUR.

FIRST CLASS

NATIONAL WEATHER SERVICE OF
CLATSOP COUNTY AIRPORT

MONTHLY SUMMARY



LOCATION 48° 09' N **LONGITUDE** 123° 53' W **ELEVATION** 1600M **SPT.** **STANDARD TIME USED:** PACIFIC **WMO#** 004724

JANUARY 1979 ASTORIA, OREGON

[illegible]

• EXTENDING FOR THE MONTH - LAST OCCURRENCE IS
MORE THAN ONE.
7 THIRTY SEVEN
• ALSO ON AN EARLIER DATE, OR DATES.
HEAVY FOG - VISIBILITY 1/4 MILE OR LESS.
FIGURES FOR WIND DIRECTION ARE TEN OF DE-
GREES CLOCKWISE FROM TRUE NORTH. 00 = CALM.
DATA IN COLS. 6 AND 12-18 ARE BASED ON 7 OF

MORE OBSERVATIONS PER DAY AT 3-HOUR INTERVALS.
FASTEST WIND WIND SPEEDS ARE FASTEST OBSERVED
ONE-MINUTE VALUES WHEN DIRECTIONS ARE IN TENS
OF DEGREES. THE / WITH THE DIRECTION INDICATES
PEAK GUST SPEED.
ANY ERRORS DETECTED WILL BE CORRECTED AND
CHANGES IN SUMMARY DATA WILL BE ANNOTATED IN
THE ANNUAL SUMMARY

SUMMARY BY HOURS

TIME	NO. OF SURF COVER THICK	OBSERVATIONS								WIND FORCE (KNOTS)	
		STATION PRESSURE	TEMPERATURE				RELATIVE HUMIDITY %	WIND SPEED KNOTS	DIRECTION	SPEED	
			AIR °	SEA °	WIND °	WIND SPEED M.P.H.					
01	7	30.08	32	30	26	78	6.4	08	4.0		
04	8	30.08	32	30	25	78	6.4	08	3.6		
07	7	30.08	32	30	25	78	6.4	08	3.6		
10	8	30.08	34	32	25	78	6.4	07	6.0		
13	8	30.07	34	32	25	78	10.0	08	6.0		
16	7	30.07	34	32	25	78	10.0	07	6.0		
19	7	30.07	33	31	27	78	6.4	07	3.6		
22	7	30.07	32	31	26	77	6.4	07	3.6		

HOURLY PRECIPITATION (WATER EQUIVALENT IN INCHES)

[illegible]

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Daniel B. Mitchell
DIRECTOR, NATIONAL CLIMATIC CENTER

USCOM - NORMA - ASHEVILLE

520

OBSERVATIONS AT 3-HOUR INTERVALS

NOTES

CEILING

UNITED STATES DEPARTMENT OF JUSTICE

WEATHER

WIND

DIRECTIONS ARE GIVEN FROM WHICH THE WIND BLOWS. INDICATED IN TERMS OF DEGREES FROM TRUE NORTH: 1-6. 00 FOR EAST. 18 FOR SOUTH. 27 FOR WEST. ENTRY OF 00 IN THE DIRECT. & COLUMN INDICATES CALM.

* SPEED IS EXPRESSED IN KNOTS.
MULTIPLY BY 1.15 TO CONVERT
TO MILES PER HOUR.

U.S. DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N.C. 28801

STATION
AUTUMN 1940

AN EQUAL OPPORTUNITY EMPLOYER

YEAR 4 POSITION

77 81

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE

COM-210



FIRST CLASS

NATIONAL WEATHER SERVICE OFC
CLATSOP COUNTY AIRPORT

MONTHLY SUMMARY



FEBRUARY 1979 ASTORIA, OREGON

LATITUDE 46° 00' N LONGITUDE 123° 53' W ELEVATION (GROUND) 577. STANDARD TIME USED: PACIFIC WASH 00-0234

* EXTEND FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
7 TRACE AMOUNT
* ALSO ON AN EMISSION DATE. ON DATES-
HEAVY FOG - VISIBILITY 1/4 MILE OR LESS.
PIKES FOR NINE DIRECTIONS AND TEND OF DE-
CREASED CLOUDS FROM THE NORTH. ON A CLOUD
DATE IN CLOUD. AND 12-15 ARE ON ONE ON 7 ON

MAKE OBSERVATIONS PER DAY AT 3-HOUR INTERVALS. FASTEST WIND SPEED AND FASTEST OBSERVED ONE-WING FLIGHT WHEN DIRECTION ARE IN TENS OF DEGREES. THE / WITH THE DIRECTION INDICATES PERM SHOT SPEED.

ANY ERRORS DETECTED WILL BE CORRECTED AND CHANGES IN SUMMARY DATA WILL BE INDICATED IN THE SUMMARY SUMMARY

SUMMARY BY HOURS

HOURLY PRECIPITATION (WATER EQUIVALENT IN INCHES)

SUBSCRIPTION PRICE: \$2.05 PER YEAR INCLUDING ANNUAL SUMMARY. FOREIGN MAILING \$1.05 EXTRA. SINGLE COPY: 20 CENTS FOR MONTHLY OR ANNUAL ISSUE. THERE IS A MINIMUM CHARGE OF \$2.00 FOR EACH ORDER OF SINGLE-COPIED ISSUES OF PUBLICATIONS. MAKE CHECKS PAYABLE TO DEPARTMENT OF COMMERCE, WASH. DC 20540. ORDERS, AND INQUIRIES TO NATIONAL CLIMATE CENTER, FEDERAL BUILDING, ASHEVILLE, NORTH CAROLINA 28801.

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noaa

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA AND INFORMATION SERVICE

Daniel B. Mitchell
DIRECTOR, NATIONAL CLIMATIC CENTER

USCIB- - NORM - - ASHEVILLE

02/20/74

256

CLATSOP COUNTY AIRPORT

MONTHLY SUMMARY



WMAN 00-4324

MARCH 1979

ASTORIA, OREGON

• EXTREME FOR THE MONTH - LAST OCCURRENCE IF
WINDY FROM SW.
• THUNDER AMOUNT
• ALSO ON AN EARLIER DATE, ON DATES.
HEAVY FOG - VISIBILITY 1/4 MILE OR LESS.
FIGURED FOR WIND DIRECTIONS ARE TENDS OF DE-
CREASED CLOUDINESS FROM THE NORTH. ON - CALM.
DATA IN C.M.S. 6 AND 12-15 ARE BASED ON 7 00

NOTE OBSERVATIONS PER DAY AT 3-HOUR INTERVALS. FASTEST MILE PER HOUR SPEEDS ARE FASTEST OBSERVED ONE-MINUTE VALUES WITH DIRECTION AND IN TERMS OF NUMBER. THE / WITH THE DIRECTION INDICATES PEAK GUST SPEED.

ANY ERRORS DETECTED WILL BE CORRECTED AND CHANGES IN SUMMARY DATA WILL BE ANNOTATED IN THE ANNUAL SUMMARY

SUMMARY BY HOURS

HOURLY PRECIPITATION (WATER EQUIVALENT IN INCHES)

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Daniel B. Mitchell
DIRECTOR, NATIONAL CLIMATE CENTER

USCONN--NORR--ASHEVILLE

296

10

NOTES

CEILING

LINE. FUNDAMENTAL CURVE FOR

0 FRODOGS
 1 FRODOGSTON
 2 SQUALL
 3 RAIN
 4 RAIN SHOWNERS
 5 FREEZING RAIN
 6 GRIZZLE
 7 FREEZING GRIZZLE
 8 SNOW
 9 SNOW PELLETS
 10 ICE CRYSTALS
 11 SNOW SHOWERS
 12 SNOW GRAINS
 13 ICE PELLETS
 14 HAIL
 15 FOG
 16 ICE FOG
 17 GROUND FOG
 18 BLOWING DUST
 19 BLOWING SAND
 20 BLOWING SMOKES
 21 BLOWING SPRAY
 22 SPRING
 23 HAIR
 24 HAIR

DIRECTIONS ARE THOSE FROM WHICH THE WIND BLOWS. INDICATED IN TERMS OF DEGREES FROM TRUE NORTH 1-E. 09 FOR EAST. 18 FOR SOUTH. 27 FOR WEST. ENTRY OF 00 IN THE DIRECTION COLUMN INDICATES CALM.

SPEED IS EXPRESSED IN KNOTS.
MULTIPLY BY 1.15 TO CONVERT
TO MILES PER HOUR.

YEAR & MONTH

COM-210



APPENDIX D

HOURLY WEATHER OBSERVATIONS AT CLATSOP COUNTY AIRPORT,
ASTORIA, OREGON, ON DATES OF BAR TRANSITS

WFO-10A
15-78

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

STATION

WSO ASTORIA, ORE

SURFACE WEATHER OBSERVATIONS

DATE

JUN 23 1978

TO CONVERT LST TO GMT
ADD 8 Hrs. SUBTRACT

TIME	TYPE	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (F)	DEW PT. (F)	WIND			ALTIMETER SETTING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA
			Surface	Through					Direction	Speed	Character		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
R 0056		E30LKN 55 OVC	8		NW-	161	53	50	12	04		001	RB20 60300 15//
R 0158		30SET E50LKN	10			161	52	49	08	03		001	RE40
R 0258		E50LKN	10			163	51	49	14	03		001	
R 0356		30SET E50BKN	10			165	50	48	12	04		002	30300 1500 50 20001
/		72771 51204	66028		16510	55500	09303	63156				70030	20001 46450 @
R 0458		15SET E50LKN 55BKN	10			166	50	48	10	04		002	
R 0558		10SET 35SET E40LKN	10			171	52	49	09	03		004	
R 0658		15SET E40BKN	15			175	54	51	11	04		005	310 1800
R 0755		16SET E50BKN 250LKN	15			180	57	50	12	04		006	
R 0857		18SET E45LKN	15			183	59	49	08	03		007	
R 0956		18SET E45LKN	15			183	62	48	03	03		007	108 1800 50
/		72791 60303	74022		18317	63400	09108	63174				26450 @	
R 1058		20SET E45LKN	15			187	59	50	23	06		009	
R 1155		18SET E40LKN	15			187	63	51	22	06		008	
R 1256		23SET E45LKN	15			188	65	52	25	05		009	305 1800
R 1357		20SET E50BKN	15			190	64	50	26	08		009	
R 1458		38SET E50BKN	15			192	65	51	24	12		010	
/		70BKN											
R 1554		E50 BKN	15			193	62	50	26	12		010	205 1800 67
/		72791 62612	74022		19317	63500	10205	63185				46750 @	
R 1655		E38 BKN	15			193	60	49	24	07		010	RWA DSNT SE
R 1755		M38 OVC	15			190	59	49	23	05		009	
R 1855		M38 OVC	15			193	58	49	24	04		010	BINOVC S-SW/500 1800
R 1955		M38 OVC	15			193	58	50	23	03		010	BINOVC
R 2055		E38 BKN	10			193	57	50	18	03		010	
R 2153		E50 BKN	10			195	56	50	20	03		011	302 1500 67
/		72791 72003	66022		19513	75500	10302	63186				46750 @	
R 2255		E50 OVC	10			193	55	50	18	04		010	BINOVC
R 2356		70SET	12			192	52	50	15	03		010	

FORM 100-10A (Rev. 1-78) PREPARED BY THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

USE PREVIOUS EDITIONS OF THIS FORM FOR OBSERVATIONS MADE PRIOR TO JANUARY 1, 1978

U.S. GOVERNMENT PRINTING OFFICE: 1977 O - 311-100

NO 1-100
15-70

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

STATION
WSO ASTORIA, ORE

SURFACE WEATHER OBSERVATIONS

DATE
JUN 24 1978

TO CONVERT LST TO GMT
ADD 8 hrs. SUBTRACT

TIME	SKY AND CEILING (Hundred ft. or less)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP (°F)	DEW PT. (°F)	WIND			ALTIMETER SETTING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA (15)
		SMALL	TO REM					DIRECTION (° True)	SPEED (Knots)	CHARACTER (11)		
R 0055	70 SCT	12			190.50	47	18	04			009	705 1030
R 0155	70 SCT	12			190.49	47	13	04			009	
R 0255	70 SCT	12			190.48	46	11	05			008	
R 0355	70 SCT	15			190.47	45	10	03			008	FEW Sc / 400 1530 47
/	72791 21003	74	021	19008	155.30	07400					63	181 46747(D)
R 0455	230 SCT	20			190.46	45	12	04			009	FEW Sc Ac H2303
R 0555	18 SCT 100 SCT 230	20			195.49	47	10	03			011	
/	SET											
R 0655	17 SCT 55 SCT 100	20			193.53	48	00	00				DIOTCU Pw S / 003 1838
/	SET 230 SCT											
R 0758	17 SCT 55 SCT 100 SCT	20			197.59	51	23	05			011	TCU S
R 0855	22 SCT 40 SCT 100 SCT	25			200.60	50	26	05			012	
R 0956	22 SCT 40 SCT 250 SCT	25			204.64	51	25	07			013	210 1801 46
/	72791 22507	82	020	20418	285.01	11210					63	195 467460
R 1057	22 SCT 45 SCT 250 SCT	25			207.64	52	24	09			014	
R 1158	22 SCT 45 SCT 100 SCT	25			210.65	51	24	10			015	
R 1256	25 SCT 45 SCT 100 SCT	25			214.65	50	25	12			016	210 1830
R 1355	25 SCT 45 SCT 100 SCT	25			217.63	50	25	08			017	
/	25 SCT											
R 1458	20 SCT 45 SCT 250 SCT	25			220.65	51	25	11			018	
R 1554	22 SCT 45 SCT 20 SCT	25			224.65	50	24	10			019	TCU NE / 210 1801 67
/	72791 22410	82	020	22418	285.01	10210					63	215 467460
R 1655	22 SCT 45 SCT 250 SCT	25			226.63	50	24	11			020	
R 1755	19 SCT 38 SCT 250 SCT	25			227.62	51	28	10			020	
R 1855	19 SCT E38 BKN 250 BKN	25			227.60	50	24	09			020	FEW TCU NE-SE / 103 1801
R 1955	19 SCT 38 SCT	20			229.58	50	27	06			021	FEW TCU NE-SE
/	90 SCT E250 BKN											
R 2055	E250 BKN	12			231.55	49	23	04			021	
R 2154	E250 BKN	12			231.55	49	22	03			021	103 1806 67
/	72791 62203	69	021	23113	184.06	09103					63	222 467460
R 2255	16 SCT M28 BKN	12			231.55	50	19	03			021	
R 2355	16 SCT M28 BKN 70	12			231.55	50	13	04			021	
/	ARC											

FORM 1-100 (Rev. 1-70) U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL WEATHER SERVICE, ASTORIA, OREGON 97103

U.S. GOVERNMENT PRINTING OFFICE: 1970

NO. 1-104
5-5-54U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE

STATION

WSO ASTORIA, ORE

SURFACE WEATHER OBSERVATIONS

DATE

NOV 9 1978

TO CONVERT LST TO GMT
ADD 8 hrs. SUBTRACT

TIME	SKY AND CEILING (Heights in Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (F)	DEW PT. (F)	WIND			ALTIMETER SETTING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA (13)
		SURFACE	TOPOG					DIRECTION (100-360)	SPEED (Kts.)	CHARACTER (1-4)		
1057	23 SCT 40 SCT	10			251	37	35	13	04		027	40003 1800
R 0157	22 SCT 645 URM	10			251	37	34	05	07		027	R020643
R 0258	23 SCT 645 BKN	10		hw-	251	40	36	15	07		027	RB15
R 0357	23 SCT 45 SCT	10			251	37	34	00	00		027	RE02 40004 1800 36 20008
/	72791 40000 06258	25103	48500	01400	63242	70420	20008	45336	1CB	PBLLTS	0	
1057	23 SCT 45 SCT	10			254	34	32	12	05		028	
R 0556	25 SCT 45 SCT	8			256	35	33	13	03		029	PTCHY F
R 0656	55 SCT 25 SCT 45 SCT	8			259	35	32	08	04		030	PTCHY F 308 1800
1058	7 SCT	10			264	34	32	12	06		031	
R 0856	CLR	15			270	39	37	11	05		033	FEW ST 7 HND
R 0956	CLR	15			275	43	39	11	05		034	FEW CU / 245 1100 32
/	72791 11005 74020	27506	11400	04215	63266	20007	44432	0				
R 1056	CLR	20			275	46	36	05	09		034	FEW CU
R 1156	CLR	20			271	47	35	07	08		033	FEW CU
R 1256	20 SCT	20			268	49	33	05	07		032	807 1100
R 1356	CLR	20			264	49	31	03	11		031	FEW CU
R 1456	30 SCT	20			264	49	31	36	09		031	
R 1556	35 SCT	20			263	48	30	01	06		031	605 1500 49
/	72791 20106	80000	26309	25600	51605	63605	20004	44932	0			
R 1655	35 SCT	15			261	45	35	33	13		030	
R 1754	38 SCT	12			261	44	35	36	11		030	
R 1856	CLR	12			261	44	35	04	10		030	602 1400
R 1954	CLR	12			263	43	29	04	10		031	
R 2057	CLR	12			268	34	30	13	05		032	
2156	CLR	12			264	32	30	13	04		031	F FRNG NE / 003 1500 49
/	72791 11304	69020	26400	15600	51003	63256	20004	44932	0			
R 2255	CLR	12			264	32	28	12	03		031	F NE
R 2355	CLR	12			261	30	27	07	04		030	F NE-C

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

U.S. GOVERNMENT PRINTING OFFICE: 1973

NOV-10A
15-77

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

STATION

WSO ASTORIA, ORE

SURFACE WEATHER OBSERVATIONS

DATE

NOV 10 1978

TO CONVERT LST TO GMT
ADD 8 HRS. SUBTRACT

TIME (EST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (INCHES)	TEMP (°F)	DEW PT. (°F)	WIND				ALTIM. ETER SET. TING (INCHES)	REMARKS AND SUPPLEMENTAL CODED DATA (13)
		SURFACE	TOWER					DIR	SPEED (KNOTS)	CHAR. ACTER	WAVE PERIOD (SECS)		
R 0057	CLR	10			261	33	27	13	05			030	603
R 0156	CLR	10			261	29	26	13	05			030	
R 0256	CLR	10			261	33	27	11	03			030	
R 0355	CLR	10			264	35	29	07	06			031	303 29
/	72791 00706	660	20	26402	00900	52	303	63256	44929	0			
R 0456	CLR	10			266	32	28	07	07			032	
R 0555	CLR	10			268	36	28	05	10			032	
R 0656	CLR	15			271	35	27	09	05			033	207 1500
R 0756	CLR	15			275	38	27	08	10			034	
R 0856	CLR	15			281	38	27	12	05			036	
R 0956	CLR	25			281	42	27	04	16	621		036	110 29
/	72791 00416	820	20	28106	00900	53	110	63273	44229	0			
R 1055	CLR	25			281	43	24	07	14			036	
R 1157	CLR	25			278	45	23	03	14			035	FEW CL NW-NE
R 1256	CLR	25			268	43	23	03	17			032	814 1100
R 1356	CLR	25			269	45	22	05	16	621		031	FEW CL
R 1457	CLR	25			263	44	20	04	18	623		031	FEW CL ALDS
R 1556	CLR	25			264	43	18	04	19	623		031	503 45
/	72791 00419	820	20	26406	00900	58	507	63256	44529	0			
R 1655	CLR	25			268	41	18	05	18	622		032	PK WND 0626/06
R 1755	CLR	15			270	40	18	05	18	622		033	
R 1855	CLR	15			275	40	18	05	12	616		034	310
R 1955	CLR	15			275	40	19	05	15			034	
R 2055	CLR	15			276	39	19	06	13	618		035	
R 2155	CLR	15			278	39	18	10	11			035	303 45
/	72791 01011	740	20	27804	00900	58	303	63269	44529	0			
R 2257	CLR	15			271	33	18	08	08			033	
R 2355	CLR	15			270	33	16	11	06			033	

FORM 1 11-77 VVAAW RPTT NCL-CuCh Td Td 000 6P P P P P 7RRR 8 8N Chh 9500000 2R2dR2dR2d 3P P M M M 6000 P M M M 6P Td Td Td

MP1-10A
(5-79)

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

STATION

WISO ASTORIA, ORE

SURFACE WEATHER OBSERVATIONS

DATE

DEC 30 1978

TO CONVERT LST TO GMT
ADD 8 hrs. SUBTRACT

TYPE	TIME (LST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (°F)	DEW PT. (°F)	WIND			ALTIM. COR- RECT- ING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA (13)
			SURFACE	LOWER					DIREC- TION (°T)	SPEED (Kts)	CHAR- ACTER		
R	0057	E 55 OVC	10			302	23	10	08	06		042	103 15 //
R	0156	E 55 OVC	10			303	23	8	08	04		043	
R	0257	E 55 BKN 100 OVC	10			302	24	9	07	06		042	
R	0356	55 SCT 100 SCT	10			300	22	8	08	06		042	802 1570 21
/	/	72791 40806	6012		30056	25770	63802	63291				43021	0
R	0456	405CT E 55 OVC	10			298	24	10	08	07		041	
R	0556	405CT E 65 BKN	10			295	22	10	07	08		040	
R	0658	M 38 BKN 65 OVC	10			298	23	11	07	08		041	502 15 //
R	0755	E 35 OVC	20			298	24	10	07	07		041	
S	0840	M 25 OVC	20						07	09		041	(FIRI)
R	0856	M 25 OVC	20			300	24	10	07	09		042	
R	0956	E 25 OVC	20			302	24	11	08	10		042	SUN DNT E / 103 15 // 21
/	/	72791 80810	80152		30254	855	//	62103		63293		42521	0
R	1056	E 25 OVC	15			302	25	11	07	11		042	SUN DSNT E
R	1156	M 28 OVC	10		S-	298	25	12	07	14		041	5046
R	1256	M 28 OVC	7		S-	292	25	15	07	12		039	81000 15 //
R	1356	M 28 OVC	4		S-	285	25	18	07	13		037	
S	1418	W 8 X	2		S-				06	11		036	
R	1456	W 8 X	1		S-	28	24	20	07	11		036	
S	1515	-X M 22 OVC	2		S-				07	12		036	52
R	1556	-X E 22 OVC	2		S-	281	24	19	09	11		036	59 / 81003 15 // 26
/	/	72791 80911	32717		28154	855	//	57810		63273		70359	20003 47421 0
R	1657	W 10 X	1		S-	275	23	19	09	08		034	
R	1758	-X M 22 OVC	2		S-	271	23	20	09	09		033	59
R	1859	-X M 22 OVC	2		S-	270	23	19	09	11		033	7 / 61209 15 // 598
R	1958	-X M 22 OVC	2		S-	278	24	19	06	12		035	88
S	2024	M 30 OVC	7						06	10		035	64 22
R	2057	M 32 OVC	7			280	24	19	06	15		036	55 22
R	2159	M 32 OVC	7			281	25	18	06	15		036	11209 15 // 26
/	/	72791 80915	61027		28154	855	//	58112		63273		70922	20012 42421 0
R	2256	35 SCT	7			287	24	18	06	13		038	
R	2357	35 SCT	7			288	24	16	06	16		038	

FILED: 1111 N44H VVWV# PRPTT MNC NCNCH TgTgooo 6P.P.P.P. 7RRR.1 0N.CN. 95-10000 2R2dR2dR2d 3P.S.M.M. dddP.M.M.M. 4T T.P.T.

MP1-10A
15-74

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

STATION

WSO ASTORIA, ORE

DATE

JAN 16 1979

TO CONVERT LST TO GMT
ADD 8 hrs. SUBTRACT

SURFACE WEATHER OBSERVATIONS

TYPE	TIME (LST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (In.)	TEMP. (°F)	DEW PT. (°F)	WIND			ALTIM. ETER. SET- TING (In.)	REMARKS AND SUPPLEMENTAL CODED DATA (13)
			SURFACE	TO WFR					DIREC- TION (°)	SPEED (Kts.)	CHAR- ACTER- ISTICS (11)		
SA	0057	E 25 OVC	10			176	36	33	03	06		005	214 15//
SA	0158	18 SCT E 23 OVC	10		RW-	185	37	33	00	00		008	RB40
SA	0258	12 SCT E 20 BKN 30 OVC	10			190	36	33	00	00		009	RE 30
SA	0356	12 SCT E 20 OVC	10			190	37	34	13	03		009	11400 18// 34
/	/	72791 81303 66028	19003	884//		01114	63181	70020					44434 0
SA	0456	12 SCT E 20 OVC	10			193	36	34	00	00		010	
SA	0556	14 SCT E 20 OVC	8			200	37	34	02	04		012	
SA	0657	14 SCT E 20 OVC	8			205	37	34	00	00		014	215 18//
SA	0758	E 18 BKN 25 OVC	5		F	207	38	35	08	03		014	
SA	0855	M 18 BKN 25 OVC	5		F	210	37	35	05	03		015	
SA	0954	M 18 BKN 25 OVC	5		F	217	39	36	03	05		017	212 15// 33
/	/	72791 80305	58102	21704		854//	02212	63208					43933 0
SA	1055	M 18 BKN 25 OVC	6		F	220	40	37	06	04		018	BINWLC DSNT S
SA	1155	M 18 BKN 25 OVC	6		F	217	41	37	05	03		017	
SA	1255	M 18 OVC	6		F	217	41	36	06	03		017	000 15//
SA	1355	11 SCT M 25 BKN 32 OVC	7			215	42	37	07	07		017	
SP	1429	22 SCT M 30 BKN	7						09	05		015	
SA	1455	M 30 OVC	10			214	44	38	09	04		016	BINWLC
SA	1551	M 30 BKN 90 BKN	10			210	42	37	08	06		015	707 1570 44
/	/	72791 50806	66012	21006		55570	03707	63202					44434 0
SA	1655	325 J 1105 J 250- OVC	10			210	39	35	00	00		015	
SA	1757	325 J 1105 J 250- OVC	10			210	37	34	00	00		015	
SA	1856	325 J 1105 J 250- BKN	10			207	37	34	00	00		014	803 1578
SA	1958	325 J 1105 J 250 S J	10			207	36	33	11	05		014	
SA	2057	325 J 1105 J 250 S J	10			204	35	32	00	00		013	
SA	2156	325 J 1205 J	12			197	33	30	00	00		011	810 1530 44
/	/	72791 20000	69021	19701		15530	51810	63188					44433 0
SA	2257	140 S J	12			190	34	31	09	06		009	
SA	2258	140 S J	12			183	34	31	07	06		007	

FM10: 11 1144H VV=PPDTT VVCLCCH T₀T₁₀₀₀ 6P₀P₀P₀ TRRR, 0N, CH, 950msec 2R₂₄R₂₄R₂₄ 3P₀P₀P₀ 4L₀P₀M₀ 4T₀T₀T₀

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE										STATION WSO ASTORIA, ORE.		
SURFACE WEATHER OBSERVATIONS										DATE JAN 18 1979		
										TO CONVERT LST TO GMT ADD <u>8</u> hrs. SUBTRACT		
TYPE	TIME (LST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (°F)	DEW PT. (°F)	WIND		ALTIM. ETER SET- TING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA
			SURFACE	TO WEN					DIREC- TION (°)	SPEED (Kts)		
SA	0058	M 11 OVC	3		R-F	222	37	35	06	06	019	80508 102/
SP	0131	1 SCT M 9 OVC	3		R-F				05	05	019	
RS	0157	2 SCT M 8 OVC	4		R-F	224	37	35	12	03	019	
SP	0245	2 SCT M 7 OVC	4		L-F				06	03	019	(FIBI)
SA	0256	2 SCT M 7 OVC	4		R-F	224	37	35	01	03	019	RELB40LERB52
RS	0356	2 SCT M 6 OVC	4		R-F	220	37	35	05	04	018	80210 172/ 37 20010
/	/	72791 80504	566	6	22003	2712	/	02802	63212	71060	20010	444370
RS	0456	2 SCT M 4 OVC	3		R-F	220	37	35	09	05	018	
SP	0518	M 2 BKN 4 OVC	2		R-F				05	07	018	
SA	0558	M 2 BKN 4 OVC	2		R-F	224	38	35	09	03	019	
SP	0644	M 2 BKN 4 OVC	1 1/2		R-F				08	08	019	(FIBI)
RS	0657	2 SCT M 4 OVC	1 1/2		R-F	227	38	36	07	09	020	30704 172/
SA	0757	2 SCT E 4 OVC	1 1/2		R-F	234	37	35	05	04	022	
RS	0855	M 2 OVC	1		L-F	241	38	36	05	03	024	RELB15
SP	0929	M 2 OVC	1 1/2		L-F	244			09	04	025	
RS	0954	M 2 OVC	2		L-F	248	38	37	07	04	026	22005 17// 32
/	/	72791 80704	325	16	24803	871	//	03220	63239	70570	20015	438320
SP	1024	M 2 OVC	3		F				03	03	027	THN SPTS 10VC
SA	1056	M 2 OVC	3		F	251	40	38	01	03	027	LEIS TUN SPTS 10VC
SP	1128	M 2 OVC	2		L-F				14	03	026	(FIBI)
SP	1135	M 2 OVC	1 1/2		L-F				07	03	026	
SP	1144	M 2 OVC	1		L-F				04	05	026	(FIBI)
SA	1155	M 2 OVC	1		L-F	251	40	39	36	04	027	LB25
SP	1217	E 2 OVC	3/4		L-F				03	05	026	
SA	1256	E 2 OVC	3/4		L-F	248	41	39	07	04	026	00000 16//
SA	1357	F 2 OVC	3/4		L-F	244	41	40	07	04	025	
SA	1455	250 E 3 OVC	3/4		L-F	244	42	40	04	03	025	
SA	1551	E 3 OVC	3/4		L-F	244	41	40	07	05	025	60300 16// 42
/	/	72791 80705	125	15	24405	862	//	04603	63235	70050	20015	442370
SA	1656	E 3 OVC	3/4		L-F	242	41	40	09	03	025	
SP	1731	E 3 BKN 7 OVC	1		R-F				07	03	024	
SA	1756	E 3 BKN 7 OVC	1		R-F	241	41	40	12	03	024	LE16R06
SP	1840	E 3 BKN 7 OVC	2		R-F				10	03	024	(FIBI)
SA	1856	E 2 BKN 7 OVC	2		R-F	241	41	39	07	05	024	60314 162/
SA	1956	E 2 BKN 6 OVC	2		RF	241	41	40	00	00	024	
SA	2056	E 3 BKN 6 OVC	2		RF	241	41	40	05	03	024	
SA	2156	M 2 OVC	2		R-F	237	42	40	05	07	023	80351 16// 42
/	/	72791 80507	326	18	23706	861	//	04803	63229	75770	20066	442370
SP	2238	M 2 OVC	1		R-F				03	03	023	
RS	2256	M 2 OVC	2		L-F	239	46	43	18	03	024	2535633
SA	2326	M 4 OVC	3		L-F				20	14	024	WSHFT 01 FROPA
SA	2356	M 4 OVC	3		L-F	239	49	48	20	12	024	WSHFT 01 FROPA

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE										STATION WSO ASTORIA, ORE		
SURFACE WEATHER OBSERVATIONS										DATE JAN 21 1973		
										TO CONVERT LST TO GMT ADD 8 hrs. SUBTRACT		
TYPE	TIME (LST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (F)	DEW PT. (F)	WIND		ALTIMETER SETTING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA
			SURFACE	TOOKEN					DIRECTION (True)	SPEED (Knots)		
RS	0055	55ct M7 OVC	3		L-F	190	48	46	20	12	007	RFLBOS / 81202 17//
SA	0155	15ct 35ct E7 OVC	3		R-F	187	43	41	30	08	003	35ct V BN VSEY UNSTDY LEBB WSHFT GEDL
SP	0205	M1BNJ3 OVC	2		R-F				29	07	008	
SP	0230	15ct E7BNJ13 OVC	3		R-F				30	12	009	R- ONLY R
SA	0255	15ct E7BNJ13 OVC	3		R-F	193	42	40	30	10	010	R- ONLY R
SA	0315	E7BNJ25 OVC	3		R-F	197	41	39	31	07	011	R- ONLY R / 30717 16// 41 20026
		72791 83107 48616	16		19705	853			04	307	63128	71770 20026 46341 (F)
EP	0415	75ct M19 OVC	5		R-F				10	02	012	
EA	0455	75ct M19 OVC	6		R-F	200	41	40	12	05	012	
SA	0516	95ct M25 OVC	10			197	42	39	18	03	010	REIS
SA	0615	95ct 165ct M23 BNJ65 OVC	12			204	40	39	24	04	013	30711 157/
SA	0715	155ct M22BNJ 65BNJ	10			204	39	38	00	00	013	RECHY GF
SA	0855	145ct M23 OVC	15			210	40	38	00	00	015	01MVC
SP	0925	145ct 235ct	15						30	03	016	
SA	0956	145ct 235ct	15			214	44	39	31	04	016	31011 1500 38
		72791 33104 74016	214	07	35400	04310	63205	71150	20036	449380		
SA	1057	145ct 235ct	15			217	43	38	30	06	017	
SA	1158	145ct 225ct	15			217	44	38	30	09	017	
SA	1256	165ct 225ct	15			217	45	36	31	12	017	103 1500
SA	1357	165ct 225ct	15			217	45	36	29	13	017	
SA	1458	165ct 235ct 250ct	15			219	45	36	31	08	018	
SA	1555	165ct 235ct 250ct	15			220	43	35	30	08	018	303 1801 46
		72791 33005 74020	220	06	28401	022303	63212	20032	446380			
SA	1656	185ct 250-Set	15			220	41	34	32	08	018	
SA	1757	185ct 250-Set	15			219	38	33	00	00	018	
SA	1856	250-Set	15			224	37	32	06	04	019	303 1001
SA	1955	CLB	15			226	33	30	10	04	020	
SA	2057	CLB	10			227	33	31	60	00	020	
SA	2159	CLB	10			232	31	29	10	03	022	308 49
		72791 01003 66020	232	51	00700	52008	63224	20028	44931 00			
SA	2255	CLB	7			234	30	28	09	05	022	
SA	2357	CLB	7			231	31	29	00	00	021	

File: 110011 VV=00 PRPTT H₀C₀H₀C₀H₀ T₀T₀000 6P₀P₀P₀P₀ 7RRR₀ BN₀Ch₀h₀ 95SpSnpnp 2R₀R₀R₀R₀R₀ 3P₀P₀H₀H₀ d₀d₀P₀H₀H₀ 4T₀T₀T₀T₀

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE										STATION WSO ASTORIA, ORE			
SURFACE WEATHER OBSERVATIONS										DATE JAN 24 1979			
										TO CONVERT LST TO GMT ADD <u>8</u> Hrs. SUBTRACT			
TYPE	TIME (LST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (F)	DEW PT. (F)	WIND			ALTIM. ETER SET- TING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA
			STATUTE	NAUTICAL					DIRECTION (True)	SPEED (Knots)	CHARACTER		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
SP0030		-XEBRN16BRN	1/8		F				11	04		991 F5	
SA0055		-X	0		F	104	33	32	00	00		991 F7/ B14	
SP0131		-XE17BRJ32BRN	1/4		F				00	00		991 F5	
SA0152		-XE17BRJ32BRN	1/4		F	106	33	33	11	04		992 F4 VSBY 5 1/2 N 7/8	
SP0225		-XE17BRJ32BRN	1 1/2		F				13	05		992 F5 VSBY 5 1/2 N 2	
SA0255		-X M26 BRN	2 1/2		F	122	33	33	13	04		992 F2 VSBY 5 1/2 N 4	
SP0317		M26 BRN	3		F				10	03		993	
SA0355		E26 BRN	3		F	112	34	33	00	00		992 B17 15// 33 2000B	
/	72791	80000	48104	11201	855	018	17	63	103			2000B 44320	
SA0455		M26 BRN	4		F	109	33	23	00	00		992 F BRN BRN N *DWS	
SA0555		-X145 BRN	4		F	102	35	24	05	05		992 F1 LB15 INTMT L-	
SA0655		-X M26 BRN	4		F	102	35	33	08	03		992 F1 DWS F BRN BRN N INTMT	
/												L- / 61003 15//	
SA0755		-X M26 BRN	2 1/2		F				00	00		992 F1 VSBY 5 1/2 N 4	
SA0855		L26 BRN	2 1/2		F	100	34	32	09	03		992 SML BRN F VSBY 5 1/2 DWS	
/												F BRN BRN NW LEOS	
SA0955		M26 BRN	2 1/2		F	102	35	33	07	03		992	
/												120 OVC	
SP0125		ESSE ESE BRN	2 1/2		F				08	07		993	
RS0155		ESSE ESE BRN	3		F	102	36	34	08	07		993 40000 1578 32	
/	72791	80507	48102	10202	35678	01400	63093	70030	20008	43732		0	
SA1057		ESSE ESE BRN	3		F	102	37	34	05	05		993	
SA1157		ESSE ESE BRN	3			099	40	35	07	09		992	
SA1257		ESSE ESE BRN	10			095	40	36	05	11		991 807 1878	
SA1357		ESSE ESE BRN	15			097	40	34	04	12		992	
SA1457		ESSE ESE BRN	20			102	41	35	05	11		993	
SA1557		ESSE ESE BRN	20			109	40	37	03	08		995 CB DSNT SE / 214 1902 41	
/	72791	10308	80011	10904	19402	01214	63100	20206	44132			0	
RS1656		E26 BRN	15			112	38	32	04	09		996	
SA1756		M16 BRN	10			115	37	31	06	05		997	
SP1839		ESSE ESE BRN	10						35	02		998	
SA1856		ESSE ESE BRN	10			122	34	30	34	13		999 214 1501	
SA1956		ESSE ESE BRN	10			126	31	28	00	00		990	
SA2056		ESSE ESE BRN	10			131	30	27	15	03		992	
SA2156		ESSE ESE BRN	10			138	30	27	12	03		994 215 1501 41	
/	72791	21203	66011	15851	15401	55215	63129	41128				0	
SA2256		ESSE ESE BRN	10			141	29	26	11	04		995 PTERY GE	
SA2356		ESSE ESE BRN	10			144	29	26	11	04		996 PTERY GE	

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE													STATION WSO ASTORIA, ORE	
SURFACE WEATHER OBSERVATIONS													DATE JAN 28 1979	
													TO CONVERT LST TO GMT ADD <u>8</u> hrs. SUBTRACT	
TYPE (1)	TIME (2)	SKY AND CEILING (3)	VISIBILITY (4)		WEATHER AND OBSTRUCTIONS TO VISION (5)	SEA LEVEL PRESS. (6)	TEMP (7)	DEW PT. (8)	WIND (9)			ALTIM. ETER SET- TING (12)	REMARKS AND SUPPLEMENTAL CODED DATA (13)	
			SURFACE (10)	TOWER (11)					DIRECT (91)	SPEED (92)	CHAR- ACTER (93)			
SA	0056	-X	1/4		F	254	27	24	00	00		028	F9 / 108	
SA	0155	-X	1/4		F	258	27	24	00	00		029	F7	
SP	0220	-X	2		F				00	00		029	F4	
SP	0235	-X	1/2		F				00	00		029	F9	
PS	0257	-X	2 1/2		F	258	25	22	00	00		029	F3	
PS	0356	-X	5		F	261	25	23	00	00		030	F1 / 307 24 20031	
/	/	72791	00000	58104	26154	00900	55307	63252	20031	438240				
SA	0458	-X	5		F	261	24	21	00	00		030	F1	
SA	0555	-X	4		F	261	25	22	00	00		030	F1	
SA	0656	CLR	15			263	25	23	00	00		031	PRCHY F / 302	
SP	0735	-X	3/4		F				00	00		031	F4	
SP	0745	W O X	1/8		F				00	00		032	(FIRI)	
SA	0757	W O X	1/8		F	268	24	20	00	00		032		
SP	0818	-X EV OK	1/2		F				00	00		032	F6	
SP	0934	-X 4 SCT	1/2		F				00	00		032	F2 VSBY HIR 5	
PS	0956	CLR	1		F	268	27	25	00	00		032	VSBY HIR 5	
SP	0940	CLR	3		F				00	00		032	VSBY HIR 2	
SA	0956	CLR	3		F	271	31	29	00	00		033	VSBY HIR 5-9W / 208 ES	
/	/	72791	00000	48104	27151	00900	52208	63262	20005	431230				
SA	1056	CLR	10			268	32	30	00	00		032	PRCHY F NW-N	
SA	1156	CLR	15			261	37	31	07	03		030	FEW CV	
SA	1256	CLR	15			249	39	30	04	05		027	FEW CV / 822 1100 -1	
SA	1356	CLR	15			241	39	31	01	06		024	FEW CV	
SA	1456	CLR	15			237	40	30	03	07		023	FEW CV	
SA	1556	CLR	15			237	38	30	04	07		023	FEW CV / 6142 1100 40	
/	/	72791	10407	74020	22703	1500	51412	63225	440230					
SA	1655	250-SCT	15			234	36	29	08	06		023	FEW CV	
SA	1755	250-SCT	15			231	34	28	08	05		021		
SA	1855	250-Brd	12			231	30	27	07	06		021	607 1006	
SA	1955	250-Brd	10			227	31	27	09	05		020		
SA	2055	250-SCT	10			224	38	26	09	04		019	F OVR GIVER N	
SA	2155	250-SCT	10			224	27	25	07	05		019	607 1008 40	
/	/	72791	20705	66021	22453	00900	54407	63215	440230					
SA	2255	CLR	10			220	28	25	08	04		018	PRCHY F	
SA	2355	CLR	10			217	28	25	06	05		017		

MP-10A
12-75

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

STATION

WSO ASTORIA, ORE

SURFACE WEATHER OBSERVATIONS

DATE

FEB 07 1979

TO CONVERT LST TO GMT
ADD 8 hrs. SUBTRACT

TIME	TYPE	SKY AND CEILING (Height in Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (F)	DEW PT. (F)	WIND			ALTIM. ETER. SET- TING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA
			Surface	Lower					Direction	Speed	Character		
0056	SA	4 SCT 10 SCT E 2500	6		R-	153	45	42	25	09		998	25210 172 /
0156	SA	4 SCT 10 SCT E 2500	7		R-	160	44	41	25	07		000	
0256	SA	14 SCT E 25 OVC	10			166	43	39	24	06		002	INTANT R-
0327	SA	25 SCT E 45 OVC	10						23	06		003	BIMVCL
0356	SA	25 SCT E 45 OVC	10			173	42	39	27	10		004	BIMVCL / 22015 1500 41 20169 *RE
/	/	72791 72710 660316	660316		7306 785	//	04220	66164	71380	20169	449410		
0456	SA	25 SCT E 45 OVC	10			176	40	37	26	05		005	
0556	SA	25 SCT E 45 BKN	10			180	40	37	22	03		006	
0656	SA	E 45 BKN	15			190	37	36	00	00		009	217 1500
0730	SA	B 20 BKN 45 OVC	10		RW-				14	03		010	
0756	SA	E 15 BKN 45 OVC	10		RW-	204	38	36	00	00		013	R824 BIMVCL
0818	SA	15 SCT M 38 BKN	12						14	05		013	
0855	SA	M 45 BKN 120 SCT 250 BKN	12			214	39	37	16	07		016	RG15
0955	SA	45 SCT 120 SCT 6250 JCL	12			220	41	39	12	07		018	23003 1578 34
/	/	72791 81207 69028	69028		22005	25678	04230	63212	70320	20134	448340		
1058	SA	45 SCT 120 SCT 6250 JCL	12			227	45	40	13	03		020	
1138	SA	17 SCT M 45 BKN 250 JCL	12			227	47	38	22	07		020	
1255	SA	17 SCT M 38 BKN 250 JCL	12			224	47	39	22	07		019	003 1808
1355	SA	17 SCT 215 JCL M 40 BKN	12			224	47	39	22	09		019	
/	/	25000											
1455	SA	20 SCT 30 SCT E 65 OVC	12			217	47	39	22	08		020	
1523	L	20 SCT 30 SCT E 65 OVC	12			46	39	22	07			020	
1550	SA	14 SCT 30 SCT E 65 OVC	12			231	46	39	22	07		021	307 1571 48
/	/	72791 82207 69022	69022		23108	35471	04307	63222	20093	448340			
1655	SA	12 SCT E 40 OVC	12			232	45	38	19	06		022	
1758	SA	12 SCT E 35 OVC	10			229	45	39	12	04		021	
1857	SA	15 SCT E 40 OVC	10			227	44	38	14	04		020	603 1511
1951	SA	18 SCT E 40 OVC	7		R-	226	44	38	13	03		020	RB15
2055	SA	15 SCT E 32 OVC	7		R-	222	42	38	00	00		019	
2156	RS	E 25 OVC	8			215	42	39	07	05		017	RE40 81201 1511 48
/	/	72791 80705 63216	63216		21506 855	//	04812	63207	70130	20017	448340		
2255	SA	M 19 OVC	8			209	42	39	10	04		015	
2356	SA	M 12 OVC	3		R-F	204	42	39	08	05		013	RB03

FM10: 11- NNNN VV=VV PPTT N=CC=CCM T=T J=DD PP=PP=PP=PP TRRR=NN=NN=NN 2500000 2R2R2R2R2R2R 3P=P=NN=NN 4=NN=NN=NN 5T=T=T=T=T

051-104
15-79

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

STATION

WSO ASTORIA, ORE

SURFACE WEATHER OBSERVATIONS

DATE

FEB 11 1979

TO CONVERT LST TO GMT
ADD 8 hrs. SUBTRACT

TYPE	TIME (LST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (F)	DEW PT. (F)	WIND			ALTIM. ETER SET- TING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA
			SURFACE	TOBORN					DIRECT	SPEED	CHAR- ACTER		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
3A0000	M1000		3		L-F	152.45	45	21	07			999	21402 16//
3A0000	M1000	500	5		L-F	160.45	44	21	07			000	
3A0000	1500	500	6		F	160.45	44	00	00			000	INTMT L-
3A0000	1500	1500	3		L-F	162.45	44	21	03			000	10302 16// 45 20083
/	72791	82103	48515	16007	8600	16007	8600	07103	63151	51	70270	20083	449450
3A0000	1500	M3000	4		L-F	160.47	46	20	07			000	
3A0000	2500	M3000	5		L-F	160.47	46	19	08			000	
3A0000	2500	M4000	6		L-F	160.48	46	18	08			000	40001 16//
A0000	2500	F4000	5		L-F	160.48	46	17	06			000	
SP0837	4500	M7000	2		R-F			14	06			000	
P0847	7500	E1000	8					15	05			000	(FBI)
3A0857	7500	E1000	10			160.48	47	12	04			000	LERBIORE45
SP0943	7500	E6000	6		RW-	160.48	47	18	13			000	(FBI)
3A0958	7500	E6000	6		RW-	160.48	47	21	12			000	RB15 50006 17// 42
/	72791	82112	57856	16009	872	16009	872	08500	63151	70610	20055	448420	
SP1013	6500	E14000	10					20	11			000	
3A1058	8500	E14000	12			158.50	47	18	12			000	RE05
3A1155	8500	E12000	15			154.50	47	18	14			999	
3A1258	8500	E12000	15			148.50	47	20	13			997	81200 18//
SP1315	M8000		12					19	15	624		997	
SP1325	M6000		4		L-F			20	14			997	
RS1357	E7000	12000	6		L-	149.50	48	20	14	622		997	LB20
3A1456	M7000	14000	10		R-	148.50	47	19	13			997	LERB45
SP1530	7500	14500	15					20	12			996	
RS1555	M7000	14000	12		R-	143.50	47	20	11			995	RE05050 80500 172/ 50
/	72791	82011	67608	14310	6732	14310	6732	08805	63134	70010	20011	450450	
3A1656	M7000	M4000	10		R-	139.48	46	23	05			994	
3A1756	M7000	M4000	5		R-E	136.49	47	22	12			983	
3A1856	M7000	M4000	5		R-E	136.48	46	22	10			994	50526 17//
3A1956	M7000	14000	5		R-E	139.47	45	19	13			994	
A2056	M7000	14000	5		R-E	138.47	45	18	06			994	
SP2133	7500	N4000	5		R-F			19	08			994	
3A2156	7500	E2500	5		R-F	136.46	44	17	06			994	00063 172/ 50
/	72791	81706	58616	13804	3732	13804	3732	07000	63129	76370	20071	450450	
3A2256	7500	E2500	5		R-F	134.45	43	00	00			993	
3A2356	7500	E2500	4		R-F	129.45	43	07	05			991	

0110: 11 114M VV=00 PPTT N4C4C4 T4T400 6700P4P4 7RRR 0N4CH4 9500000 2R24R24R24 3P4P4M4 444P4M4 470T4T4

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE													STATION WSO ASTORIA, ORE	
SURFACE WEATHER OBSERVATIONS													DATE FEB 27 1979	
													TO CONVERT LST TO GMT ADD <u>8</u> hrs. SUBTRACT	
TYPE (1)	TIME (2)	SKY AND CEILING (Hundredths of Feet) (3)	VISIBILITY (Miles) (4)		WEATHER AND OBSTRUCTIONS TO VISION (5)	SEA LEVEL PRESS. (Inches) (6)	TEMP. (°F) (7)	DEW PT. (°F) (8)	WIND (9)			ALTIM. ETER READING (Inches) (12)	REMARKS AND SUPPLEMENTAL CODED DATA (13)	
			SURFACE	TOPOG					DIRECTION (° True) (10)	SPEED (Kts.) (11)	CHARACTER (12)			
SA	0056	10 SCT M16 OVC	6		R-	171	43	41	19	15	62	204	73015 172	
SA	0156	10 SCT M16 OVC	6		R-	160	44	42	16	16	625	200	R- OCH R	
SA	0256	M14 BKN 25 AUC	6		R	163	43	41	24	14	624	001	W5HET 20 FROPA	
RS	0356	4 SCT M14 OVC	5		R	163	42	40	23	09		001	50862 1711 42 20066	
/	/	72791 82309	58636		16306	872	11	04	508	63154	74270	20066	447420	
SA	0456	4 SCT E14 BKN 30 OVC	8			161	41	40	19	05		001	R026	
SA	0556	4 SCT E15 BKN 30 OVC	9			163	40	40	09	04		001		
SA	0656	4 SCT M14 BKN 30 OVC	15		RW	163	40	39	10	07		001	50004 1911 4 RAYS	
SA	0756	4 SCT E14 BKN 30 OVC	15			173	40	38	02	10	620	004	R021 Hvy CU ALGDS BKNVL S-W	
SA	0855	E14 BKN 22 BKN	12			175	42	39	14	06		005	14 BKN V 6LT	
RS	0854	14 SCT 22 SCT	12			178	43	40	14	06		006	CB RWK SE / 21505 1903 40	
/	/	250 SCT												
/	/	72791 21406	69158		17806	29403	04215	63169	70530	20069	445400			
SA	1054	16 SCT 22 SCT	15			178	45	42	02	05		006	16 SCT V BKN	
SA	1157	16 SCT 22 SCT	15			176	48	41	22	09		005	TCL ALGDS	
SA	1257	14 SCT 250 SCT	15			171	49	40	23	11		004	CB DNT SW TCL ALGDS RWK DNT E, 807 1903	
SA	1355	14 SCT 22 SCT 250 SCT	15			168	48	37	20	10		003	TCL ALGDS RWK S-SW	
SA	1457	14 SCT 22 SCT 250 SCT	15			163	46	39	23	09		001	CB SW-MW AND DNT NE RWK W-NW TCL ALGDS	
SA	1553	19 SCT 250 SCT	15			160	48	39	23	12		000	CB DNT NE TCL ALGDS RWK DNT NW, 712 1903 SO	
/	/	72791 22312	74150		16009	29403	04712	63151	20069	450400				
SA	1658	30 SCT	15			154	47	38	21	08		999		
SA	1757	CLR	15			149	44	37	18	05		997	TCL E	
SA	1856	22 SCT	10			144	39	36	14	05		996	715 1200	
SA	1956	22 SCT	10			138	36	35	13	06		994		
SA	2056	22 SCT E200 BKN	10			132	35	34	13	05		992		
RS	2156	E23 BKN 200 OVC	10			129	36	35	11	04		991	715 1408 50	
/	/	72791 81104	06051		12902	64508	02715	63120	20067	450350				
SP	2250	20 SCT E40 OVC	10						11	05		989	(F1B1)	
SA	2357	20 SCT E40 OVC	10			122	37	36	12	05		989		
SA	2357	20 SCT E55 BKN 200 OVC	10			117	37	35	08	05		988		

PHID: 11 1100 VV=00 PDPPT N6C AC6C N T6T6000 6P6P6P6 TRRR6 8N6CH6 95N6 7P26R26R26R26 3P6P6N6 444P6N6N6 4T6T6T6T6

411-10A
1-73

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

STATION

WSO ASTORIA, ORE

DATE

MAR 14 1979

TO CONVERT LST TO GMT
ADD 8 Hrs. SUBTRACT

SURFACE WEATHER OBSERVATIONS

PR	TIME (LST)	SKY AND CEILING (Hundreds of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS. (Inches)	TEMP. (°F)	DEW PT. (°F)	WIND			ALTIM. ETER SET- TING (Inches)	REMARKS AND SUPPLEMENTAL CODED DATA
			SURFACE	TOWER					DIRECT	SPEED	CHAR- ACTER		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Q	0056	11 SCT M14 OVC	10			195	49	46	22	05		011	108 15//
R	0156	11 SCT M14 OVC	10			198	47	45	07	05		012	
R	0356	11 SCT M15 OVC	10			193	46	45	00	00		010	
R	0556	11 SCT M15 OVC	10			192	47	45	13	04		010	803 15// Y6
/	/	72791 8124 66022	19208	854//		07803	63183	47346	18	MIXSE			
R	0456	11 SCT M19 OVC	10			188	45	44	09	04		009	
R	0556	13 SCT MIX BKN 250 OVC	15			187	44	43	17	04		008	
R	0656	MIX BKN 120 BKN 250 OVC	15			187	43	42	12	04		008	605 1572
P	0734	15 SCT BKN 250 OVC	10						08	04		008	ACCS ALQDS
R	0756	15 SCT BKN 250 OVC	10			187	46	44	07	03		008	ACCS ALQDS
P	0842	M18 BKN 250 OVC	10						07	06		008	(F181)
A	0856	M18 BKN 250 OVC	12			187	49	46	04	07		008	
R	0956	M18 BKN 250 OVC	15			187	53	45	21	12		008	400 1508 43
/	/	72791 82112	74022	18712		75408	07400	63178	45343				
A	1057	M22 BKN 250 OVC	15			187	53	45	22	15		008	
A	1158	M22 BKN 75 BKN 250 OVC	15			183	55	45	20	12		007	22 BKN V SCT
P	1218	22 SCT 75 SCT 250 OVC	15						16	12		007	ACCS SE-SW
A	1256	22 SCT 75 BKN 250 OVC	15			183	55	44	19	15	623	007	603 1578
P	1334	M26 BKN 75 BKN 250 OVC	15						21	14		005	
A	1355	M26 BKN 75 BKN 250 OVC	15			176	55	45	22	12	620	005	
A	1455	M26 BKN 75 BKN 250 OVC	15			173	56	45	21	13		004	ACCS DSNT NE-E
A	1555	M26 BKN 250 OVC	15			173	55	45	18	14	624	004	610 1508 56
/	/	72791 81814	74022	17313		75508	07610	63164	45643				
A	1658	E25 BKN 75 BKN 250 OVC	15			170	54	47	18	16	625	003	
A	1757	E20 BKN 45 OVC	15			170	53	47	19	14	621	003	
A	1856	E16 BKN 30 OVC	8		R-	170	51	49	18	12	620	003	RB02 60300 15//
A	1955	E17 BKN 35 OVC	6		R-	168	51	49	18	07		003	
A	2056	M22 LKN 40 OVC	6		R-	168	50	49	16	05		003	
S	2157	75 CT E 30 OVC	4		R-F	170	50	49	18	06		003	50008 172/ 56
/	/	72791 81806	56616	17010		27321	07500	63161	70840	20008	45643		
R	2257	75 CT EMBN 35 OVC	4		R-F	170	48	47	22	08		003	
R	2356	65 CT E11 OVC	4		R-F	165	48	47	22	06		002	

4110: 11 1100H VV--R P00TT N₀C₀C₀ T₀T₀gmo 6P₀P₀P₀ TRRR₀ 0N₀Ch₀ 05pSno00 2R₀R₀R₀R₀ 3P₀P₀H₀M₀ d₀u₀u₀u₀M₀H₀ 17 17 17

APPENDIX E

WIND, SEA AND SWELL OBSERVATIONS FROM
LIGHTSHIP COLUMBIA AT APPROXIMATE TIMES OF BAR TRANSITS

SOURCE: S. Noble, U.S. Army Engineer District,
Portland, Personal Communication

**WIND, SEA AND SWELL OBSERVATIONS
FROM LIGHTSHIP COLUMBIA
AT APPROXIMATE TIMES OF BAR TRANSITS**

CORRESPONDING VOYAGE NUMBER	DATE	TIME (PST)	WIND		SEA		SWELL		
			DIRECTION (°T)	SPEED (knots)	HEIGHT (1/2-meters)	PERIOD (sec)	DIRECTION (°T)	HEIGHT (1/2-meters)	PERIOD (sec)
8	1 Nov 78	1300	310	22	1	2	270	3	6
9	4 Nov 78	1000	50	10	0	0	270	3	6
10	9 Nov 78	0400	40	15	0	0	270	3	6
10	9 Nov 78	0700	50	20	1	2	270	3	6
11	10 Nov 78	1300	360	22	1	2	270	3	6
11	10 Nov 78	1600	60	16	1	2	270	2	6
12	28 Nov 78	1300	180	15	0	0	240	2	7
13	3 Dec 78	0400	190	17	1	1	270	2	7
13	3 Dec 78	0700	180	25	2	5	240	3	7
14	4 Dec 78	1600	340	27	2	4	290	4	6
15	15 Dec 78	0400	270	11	0	0	270	5	6
15	15 Dec 78	0700	260	9	0	0	270	5	6
16	17 Dec 78	1300	160	12	2	3	270	6	7
16	17 Dec 78	1600	140	5	1	3	270	5	7
17	30 Dec 78	0100	70	16	1	5	280	2	7
18			---NO DATA---						
19									
20									
21	24 Jan 79	0700	90	12	0	0	270	2	7
22	28 Jan 79	0400	60	15	0	0	300	4	6
22	28 Jan 79	0700	50	12	0	0	280	3	5
23	7 Feb 79	2200	160	12	0	0	250	3	6
23	8 Feb 79	0100	150	13	1	4	250	3	6
24	11 Feb 79	1000	180	18	1	N/A	230	3	7
25	22 Feb 79	2200	80	16	1	3	280	2	6
26	27 Feb 79	1300	220	9	0	0	240	3	6
27			---NO DATA---						
28	22 Mar 79	0400	90	9	0	0	300	2	7
29	23 Mar 79	0700	70	10	0	0	330	2	7
29	23 Mar 79	1000	10	8	0	0	300	2	7

APPENDIX F

TIDE HYDROGRAPH AND RIVER DISCHARGE FOR EACH BAR CROSSING

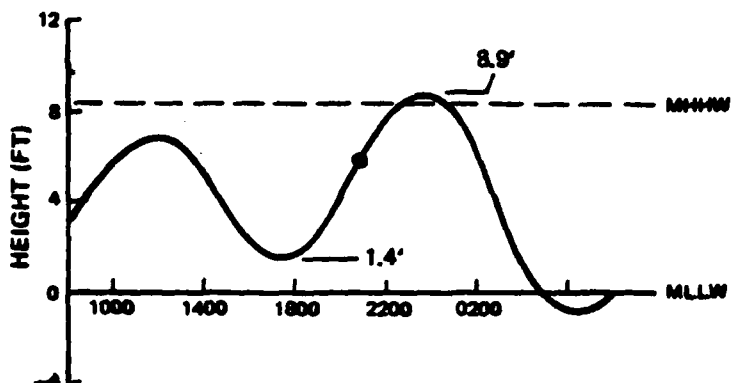
- SOURCES:
1. Observed Tide Heights from National Ocean Survey (NOAA) Gauge at Astoria, Oregon
 2. River Discharge Records for Vancouver, Washington from J.C. Huetter, Acting Chief, Engineering Division, U.S. Army Engineering District, Portland, 25 May 1979, Personal Communication.

Tide hydrographs for voyages occurring in 1979 will be included when the observed tide height data is made available from NOAA.

VOYAGE NO. 1

TIDE HYDROGRAPH FOR
20 - 21 MAY 1978

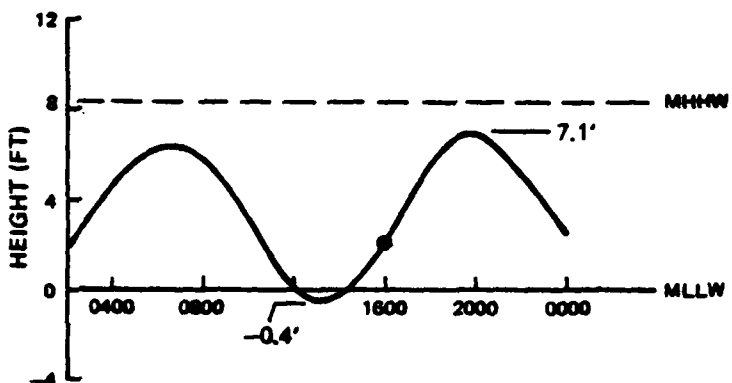
RIVER DISCHARGE = 232,000 CFS



VOYAGE NO. 2

TIDE HYDROGRAPH FOR
29 - 30 MAY 1978

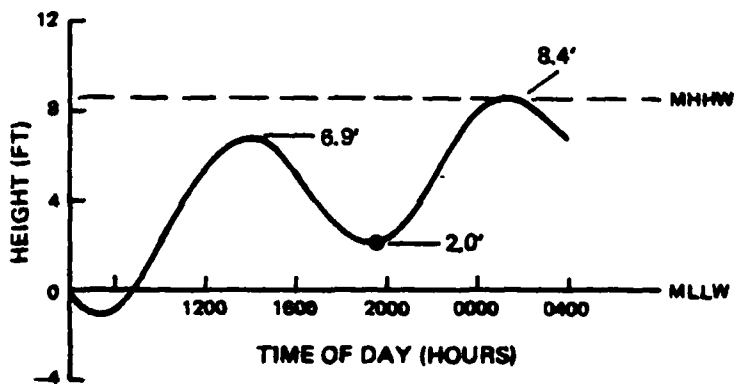
RIVER DISCHARGE = 210,000 CFS



VOYAGE NO. 3

TIDE HYDROGRAPH FOR
5 - 6 JUNE 1978

RIVER DISCHARGE = 219,000 CFS

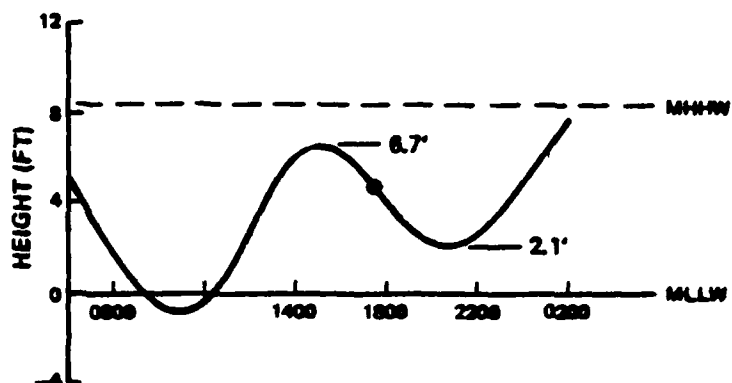


● INDICATES APPROXIMATE MID-POINT OF BAR CROSSING

VOYAGE NO. 4

TIDE HYDROGRAPH FOR
7 - 8 JUNE 1978

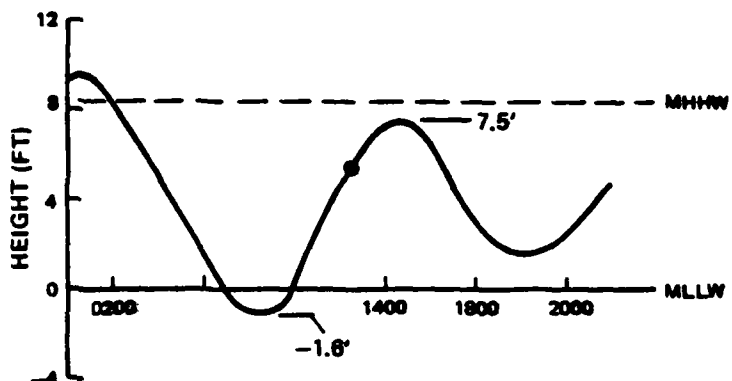
RIVER DISCHARGE = 217,000 CFS



VOYAGE NO. 5

TIDE HYDROGRAPH FOR
21 JUNE 1978

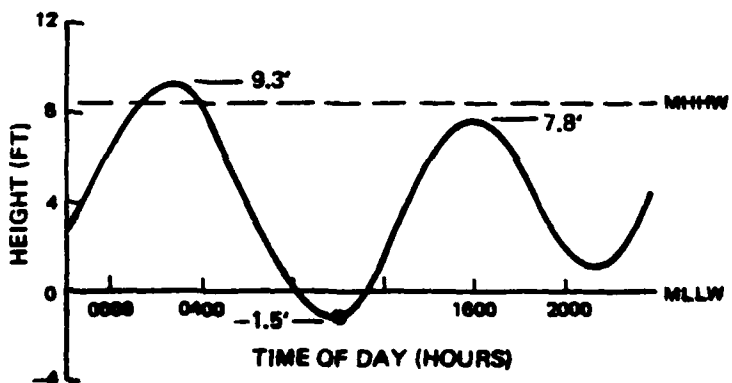
RIVER DISCHARGE = 247,000 CFS



VOYAGE NO. 6

TIDE HYDROGRAPH FOR
22 - 23 JUNE 1978

RIVER DISCHARGE = 219,000 CFS

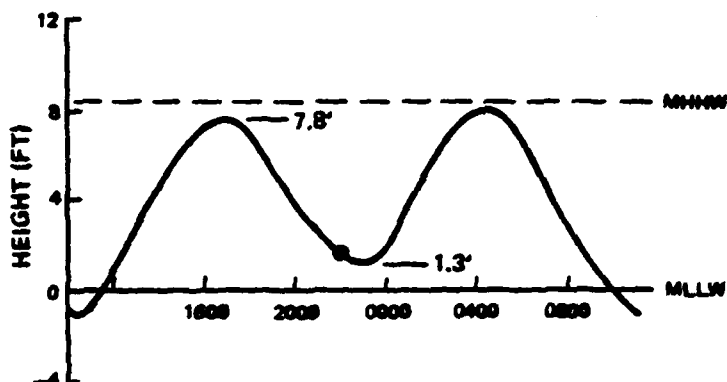


● INDICATES APPROXIMATE MID-POINT OF BAR CROSSING

VOYAGE NO. 7

TIDE HYDROGRAPH FOR
24 - 25 JUNE 1978

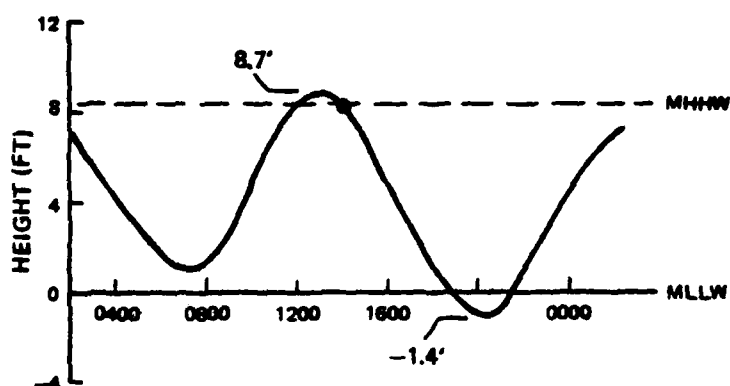
RIVER DISCHARGE = 214,000 CFS



VOYAGE NO. 8

TIDE HYDROGRAPH FOR
1 - 2 NOVEMBER

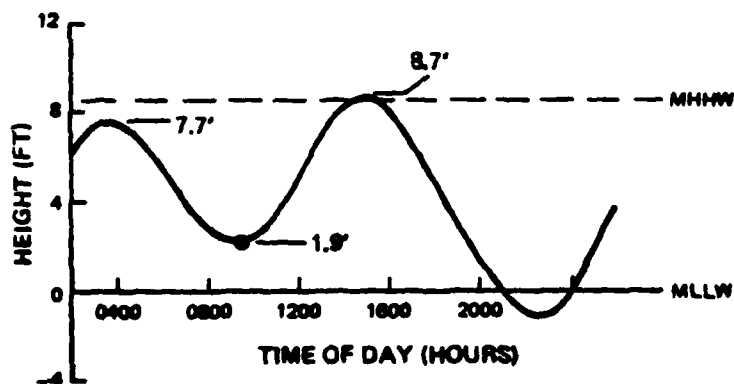
RIVER DISCHARGE = 139,000 CFS



VOYAGE NO. 9

TIDE HYDROGRAPH FOR
4 - 5 NOVEMBER 1978

RIVER DISCHARGE = 168,000 CFS

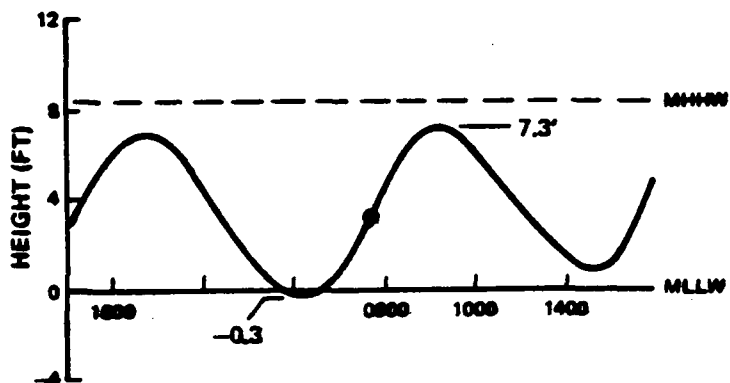


● INDICATES APPROXIMATE MID-POINT OF BAR CROSSING

VOYAGE NO. 10

TIDE HYDROGRAPH FOR
8 - 9 NOVEMBER 1978

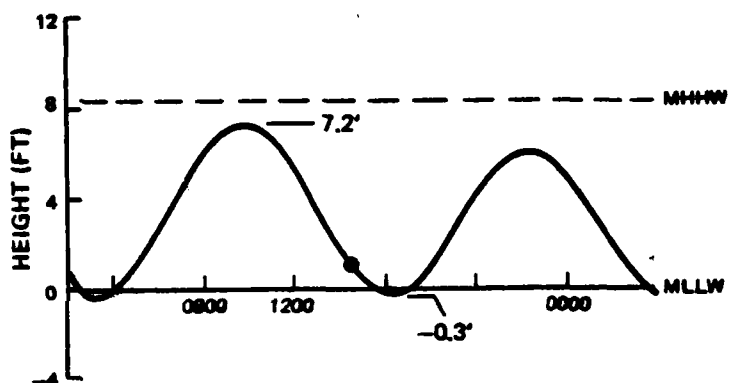
RIVER DISCHARGE = 113,000 CFS



VOYAGE NO. 11

TIDE HYDROGRAPH FOR
10 - 11 NOVEMBER 1978

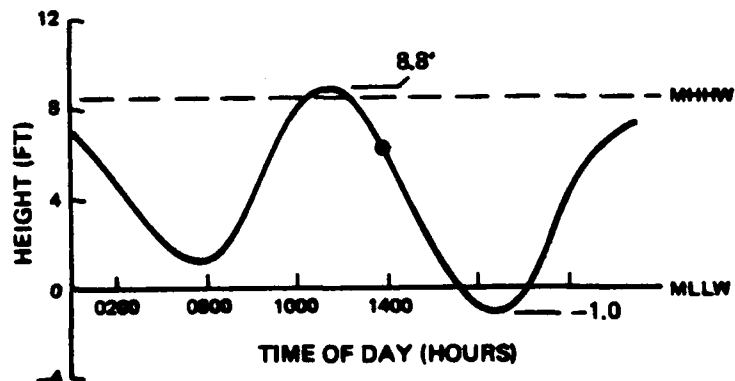
RIVER DISCHARGE = 118,000 CFS



VOYAGE NO. 12

TIDE HYDROGRAPH FOR
28 - 29 NOVEMBER 1978

RIVER DISCHARGE = 190,000 CFS

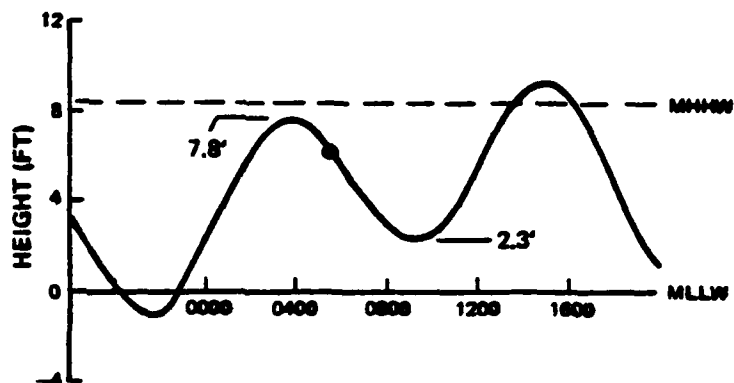


● INDICATES APPROXIMATE MID-POINT OF BAR CROSSING

VOYAGE NO. 13

TIDE HYDROGRAPH FOR
2 - 3 DECEMBER 1978

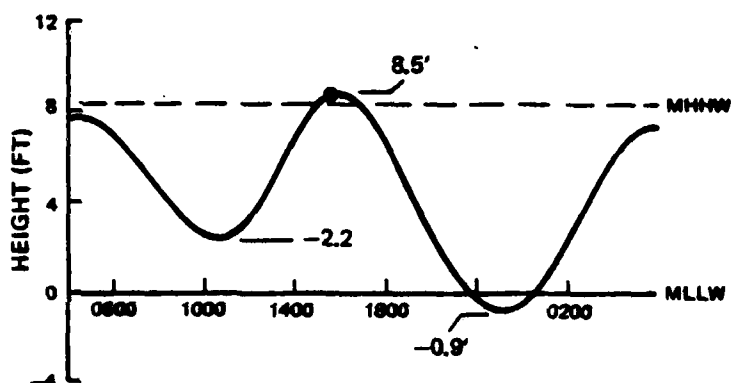
RIVER DISCHARGE = 208,000 CFS



VOYAGE NO. 14

TIDE HYDROGRAPH FOR
4 - 5 DECEMBER 1978

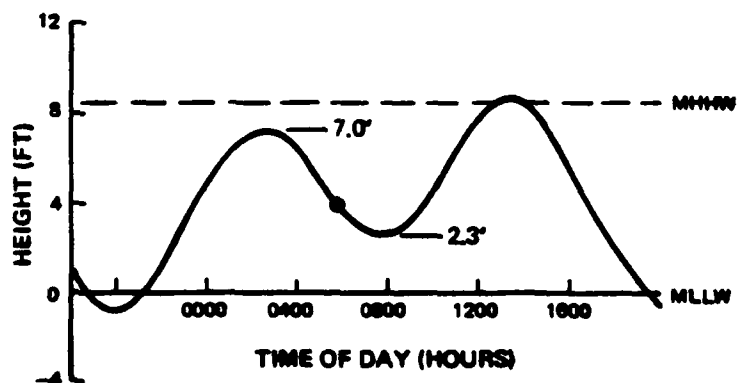
RIVER DISCHARGE = 198,000 CFS



VOYAGE NO. 15

TIDE HYDROGRAPH FOR
14 - 15 DECEMBER 1978

RIVER DISCHARGE = 211,000 CFS

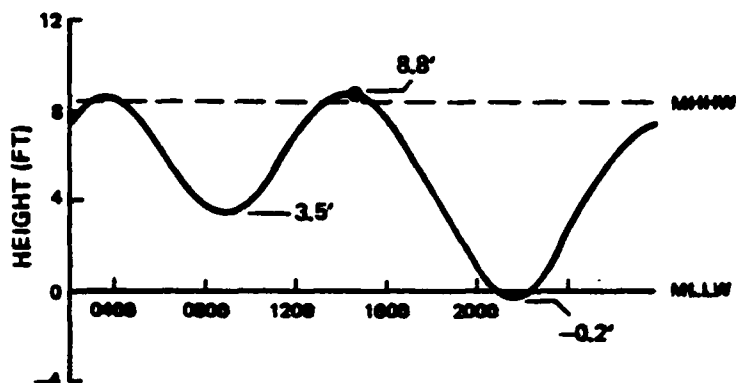


● INDICATES APPROXIMATE MID-POINT OF BAR CROSSING

VOYAGE NO. 16

**TIDE HYDROGRAPH FOR
17 - 18 DECEMBER 1978**

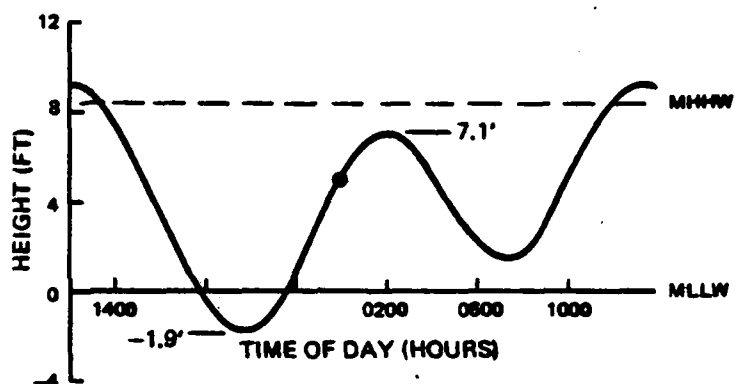
RIVER DISCHARGE = 195,000 CFS



VOYAGE NO. 17

**TIDE HYDROGRAPH FOR
29 - 30 DECEMBER 1978**

RIVER DISCHARGE = 217,000 CFS



● INDICATES APPROXIMATE MID-POINT OF BAR CROSSING

APPENDIX G
SAMPLE DATA SHEET FROM VOYAGE NO. 9

Voyage 9
Recorder C
Page 1 / 10

VOYAGE NO. 9

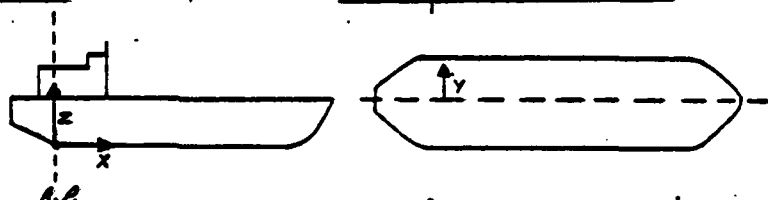
I. VOYAGE DESCRIPTION

Route: From WILL BRIDGE To RICHMOND
Dates: Depart 1515 3 Nov/78 Arrive 2345 5 NOV.
Time Zone Description PST (ZD+8)
Tt Personnel CRAIG LEIDERSDORF CHRIS BUTCHER

II. VESSEL DESCRIPTION

Name CHEVRON WASHINGTON Type OIL CARRIER
Captain STEVE ALEXANDER LBP 625'0"
LOA 651'4" Breadth (Molded) 96'0"
Draft: Fwd 27'0"
Aft 30'0"
Mean 28'6" Displacement 36,385 LT

III. CG AND SENSOR LOCATIONS



	X	Y	Z	COMMENTS
Motion Sensor	103.4'	+8.75'	100.7'	ON CHART TABLE BHD.
Mini Ranger R/T	93.8'	+1.25'	128.5'	ON AFT RAILING OF 125 PLATFORM ON RADAR MAST
Fathometer Transducer	596'	-	-	TRANSDUCER NEAR BOW
LCB (from Hydrostat Data)	324.4'	-	-	
LCG (computed)	318.9	-	-	
VCG (computed)	-	-	22.6	

IV. BAR CROSSING

Date 4 November 1978 Time 0856 - 0919
Bar Pilot CAPT K McALPIN (No. 11)
Pilot's Opinion of Crossing EASY

Voyage 9
Recorder 2
Page 2/10

TRANSIT LOG

Begin 0856 4 Nov 78 End 0919

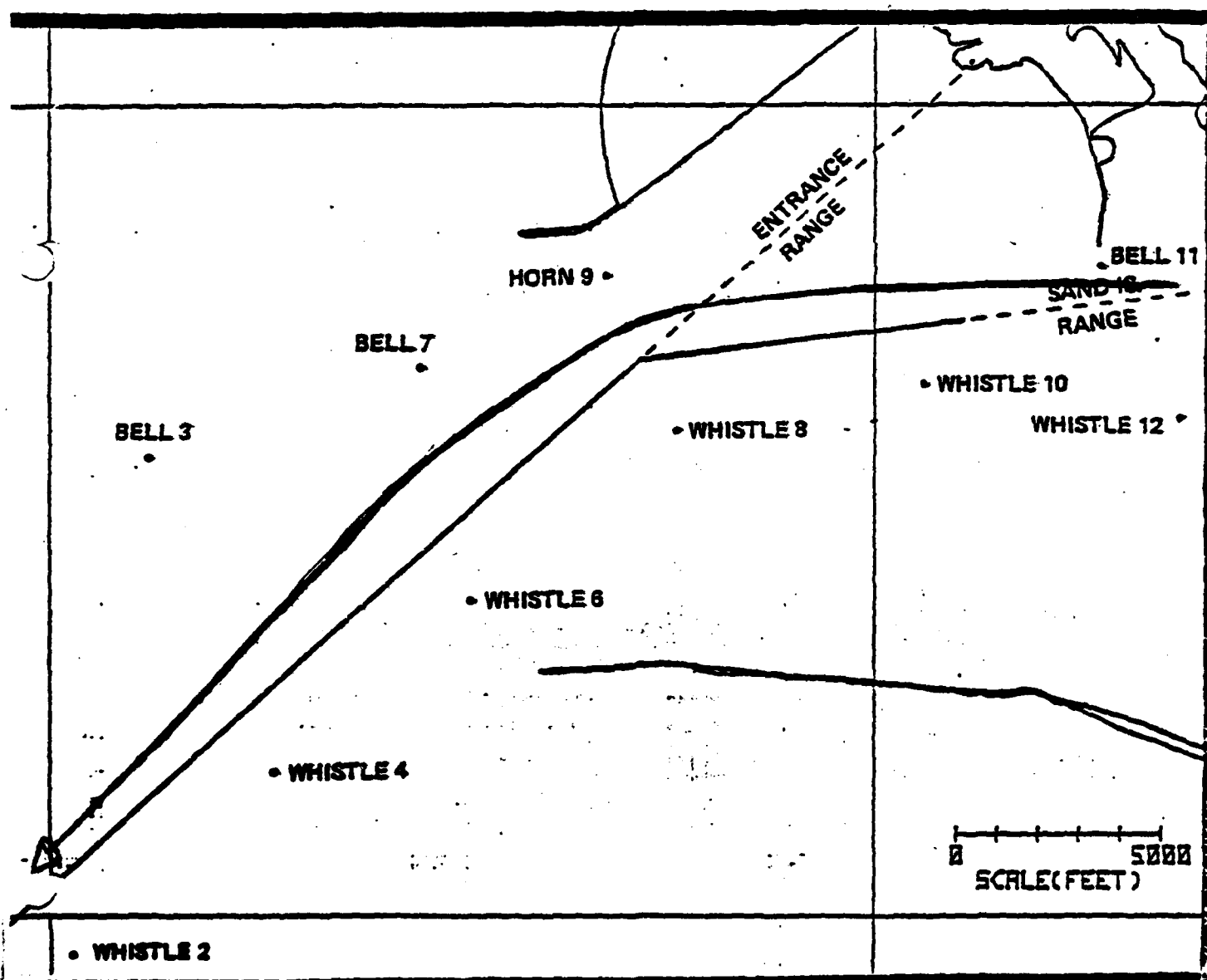
Bar Pilot Capt. K. Mc ALPIN (No. 11) Opinion of Crossing EASY

Cassette:

Number 1 Side A

Start 033 Stop 071

Intended Track:



Voyage 9
Recorder CE
Page 3/10

OBSERVATIONS

I. TIDES

	<u>Time</u>	<u>Elevation (ft)</u>	<u>Time</u>	<u>Elevation (ft)</u>
Astoria(Tongue Point)	<u>0927</u>	<u>+2.4 Low</u>	<u>1519</u>	<u>+8.7 High</u>
Correction	<u>-1^h10^m</u>	<u>+0.1</u>	<u>-0^h46^m</u>	<u>-0.7</u>
Entrance(North Jetty)	<u>0817</u>	<u>+2.5 Low</u>	<u>1433</u>	<u>+8.0 High</u>
Corrections on Astoria:	High Water	<u>-0^h46^m</u>	<u>-0.7 ft.</u>	
	Low Water	<u>-1^h10^m</u>	<u>+0.1 ft.</u>	

II. TIDAL CURRENTS

	<u>Time</u>	<u>Current (Kt)</u>	<u>Time</u>	<u>Current (Kt)</u>
Grays' Hbr. Entrance	<u>0628</u>	<u>2.4 EBB</u>	<u>0922</u>	<u>SLACK</u>
Correction	<u>+0^h20^m</u>	<u>x 1.5</u>	<u>+0^h05^m</u>	<u>-</u>
Entrance (Buoy No. 12)	<u>0648</u>	<u>3.6 EBB</u>	<u>0927</u>	<u>SLACK</u>
Corrections on Gray's Hbr.	Slack Water	<u>+0^h 05^m</u>		
	Max. Current	<u>+0^h 20^m</u>	Flood Ratio 1.4	Ebb Ratio 1.5

III PRE-RUN OBSERVATIONS

Time: 0850
Weather: FAIR
Temperature: 48°F Visibility: UNLIMITED
Wind: NW 10-15 KNOTS
Sea State: Seas: NW WIND CHOP Swell NIL
1-2'

IV. POST-RUN OBSERVATIONS

Time: 0935
Weather: FAIR
Temperature: 56°F Visibility: UNLIMITED
Wind: NW 15 KNOTS
Sea State: Seas: NW Swell W/NW
2-4' 10-12'
10 sec

Voyage 9
Recorder CB
Page A / 10

OBSERVATIONS DURING RUN

NOTE: Observations are to be recorded approximately every 2 minutes or when course and/or speed changes or other noteworthy events occur.

TIME	SHIP					EVENT / COMMENT
	Course °T	Speed Kts	Pitch/RPM Ft/RPM	Hummer G+no (or)		
START 0856	275	14.2	16	278.8	3.8W	-----
0858	265	14.5	16	272	7W	-----
0900	253	14.8	16	258	5W	-----
0903	255	13.8	15	258.5	3.5W	-----
0905	230	—	—	235.4	5.4W	-----
0907	227	13.1	15.5	231.8	4.8W	-----
0909	220	13.2	15.5	222.4	2.4W	-----
0911	221	12.7	15	223	2W	-----
0913	218.5	12.4	15.5	219	1.5W	-----
0915	222	12.0	15	224.9	2.9W	-----
0918	220	13.1	15	221.8	1.8W	-----
STOP 0919 25.						-----

01- 1 16' TO PORT 3.2' AFT OF CENTERLINE OF HULL

Voyage 1Recorder 4Page 5 / 10

INSTRUMENT CHECK & CALIBRATION

	Pre-Run	Post-Run	Comments
I. TAPE HEADS			
Clean HP Tape Head	✓	-	
Clean Qantex Tape Head	✓	-	
II. PITCH			
Level	/	/	
+45° (Down by Bow)	/	/	
-45° (Down by Stern)	/	/	
III. ROLL			
Level	/	/	
+45° (To Port)	/	/	
-45° (To Starboard)	/	/	
IV. HEAVE			
Rest	/	/	
Positive Acc. (Up)	/	/	
Negative Acc. (Down)	/	/	
V. HEADING			
Time	0842	0930	Ship's Gyro Deviation: 1.2° E
Gyro (°T)	315.5	161.9	
Corrected Ship's Gyro (°T)	315.5	169.0	
Deviation	-0-	1.9° W	Drift Rate: 1.9° in 40m = 0.04°/minute West
VI. MINI RANGER			
Byte Test Card Check	✓	/	New Station @ Cape D. Lanes OK
VII. SYSTEM TEST			
Record on Qantex & Playback	/	/	
VIII. OBTAIN COURSE/RUDDER ANGLE RECORD		/	
IX. OBTAIN FATHOMETER RECORD		/	

11/4/78

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VOY #9 PRE RUN CHECK

Pitch= 000.0deg
Roll=-000.8deg
Accel= 1.003Gs
Hdng= 255.7deg
A Rng=??????yds
B Rng=??????yds
Time: 00:07:21

Pitch= 045.5deg
Roll= 008.6deg
Accel= 1.003Gs
Hdng= 255.4deg
A Rng=??????yds
B Rng=??????yds
Time: 00:07:37

Pitch=-045.2deg
Roll=-002.9deg
Accel= 1.003Gs
Hdng= 255.3deg
A Rng=??????yds
B Rng=??????yds
Time: 00:07:52

Pitch= 001.1deg
Roll= 044.7deg
Accel= 1.005Gs
Hdng= 254.9deg
A Rng=??????yds
B Rng=??????yds
Time: 00:08:16

Pitch=-002.9deg
Roll=-046.1deg
Accel= 1.003Gs
Hdng= 254.8deg
A Rng=??????yds
B Rng=??????yds
Time: 00:08:24

Pitch= 001.1deg
Roll=-011.4deg
Accel= 1.628Gs
Hdng= 253.8deg
A Rng=??????yds
B Rng=??????yds
Time: 00:09:16

Pitch= 014.9deg
Roll= 012.2deg
Accel=-0.295Gs
Hdng= 253.5deg
A Rng=??????yds
B Rng=??????yds
Time: 00:09:29

VOYAGE # 9

PRE RUN EQUIPMENT CHECK

VOY #9 GUNTER PLAYBACK
PRE RUN

Pitch= 000.0deg
Roll=-000.8deg
Accel= 0.999Gs
Hdng= 246.8deg
A Rng=??????yds
B Rng=??????yds
Time: 00:14:30 BOT

Pitch= 000.0deg
Roll=-000.9deg
Accel= 1.003Gs
Hdng= 246.2deg
A Rng=??????yds
B Rng=??????yds
Time: 00:15:27 BOT

VOY #9 TAPE PLAYBACK
PRE RUN

POST RUN CHECK VOYAGE#9

Pitch= 001.1deg
Roll= 000.8deg
Accel= 0.942Gs
Hdng= 189.2deg
A Rng=016742yds
B Rng=014136yds
Time: 09:39:05

Pitch= 045.6deg
Roll=-002.2deg
Accel= 0.994Gs
Hdng= 189.4deg
A Rng=016742yds
B Rng=014364yds
Time: 09:39:40

Pitch=-044.9deg
Roll=-001.9deg
Accel= 1.059Gs
Hdng= 189.0deg
A Rng=016742yds
B Rng=014444yds
Time: 09:39:54

Pitch=-001.6deg
Roll= 044.8deg
Accel= 0.961Gs
Hdng= 189.1deg
A Rng=016742yds
B Rng=014506yds
Time: 09:40:04

Pitch= 000.8deg
Roll=-045.4deg
Accel= 1.003Gs
Hdng= 188.7deg
A Rng=016742yds
B Rng=014553yds
Time: 09:40:11

Pitch=-005.6deg
Roll= 000.4deg
Accel= 1.814Gs
Hdng= 189.5deg
A Rng=016999yds
B Rng=014645yds
Time: 09:40:25

Pitch= 015.2deg
Roll= 025.6deg
Accel=-0.807Gs
Hdng= 189.9deg
A Rng=016999yds
B Rng=014683yds
Time: 09:40:30

VOYAGE #9

POST RUN EQUIPMENT CHECK

EDITED TAPE RESULTS

VOYAGE# 9

4 scans at
090945

6 scans at
090946

4 scans at
090947

6 scans at
090948

4 scans at
090949

6 scans at
090950

4 scans at
090951

file mark

POST RUN TAPE RUN BACK
VOYAGE# 9

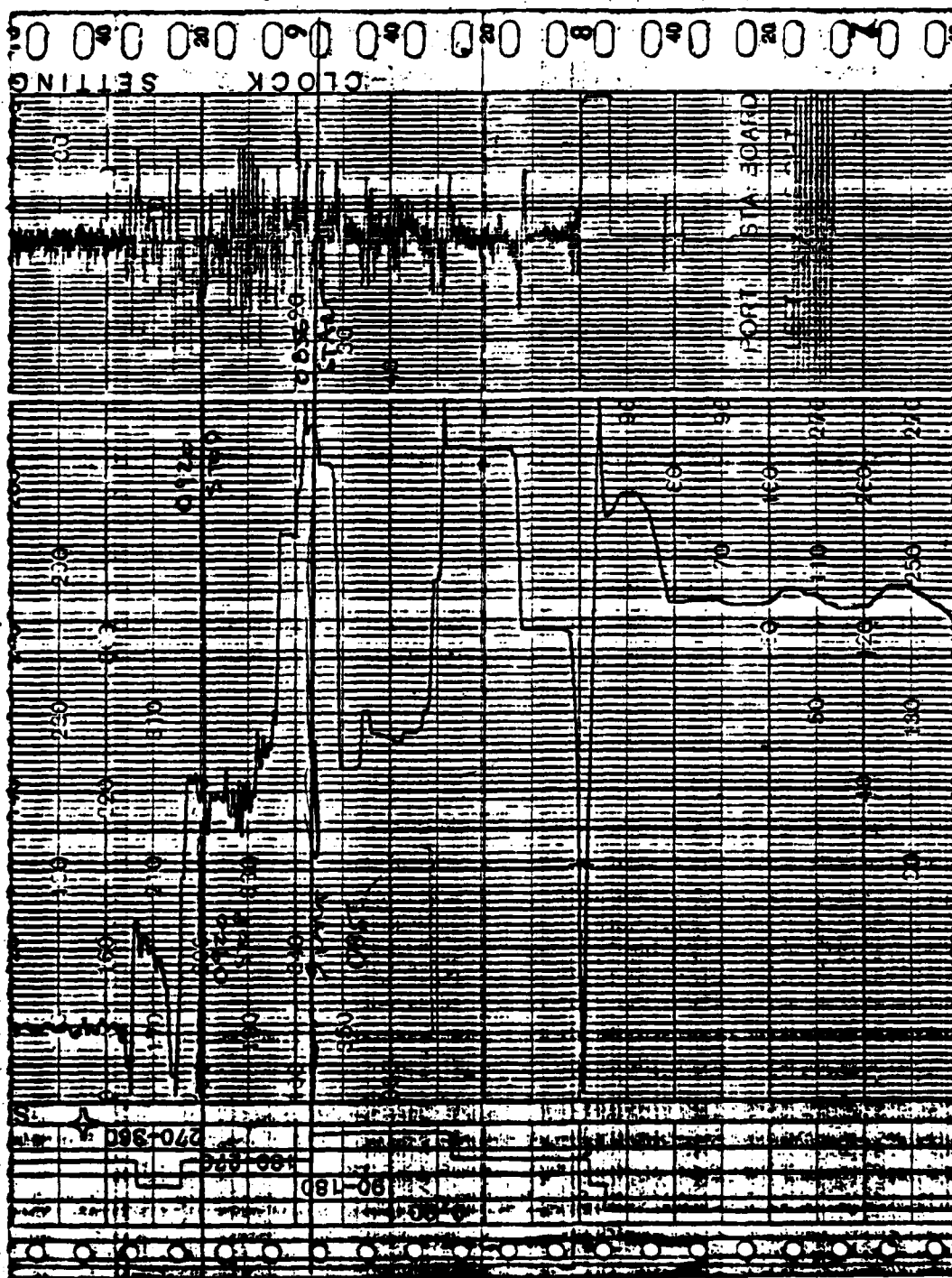
Pitch= 000.1deg
Roll=-000.9deg
Accel= 1.003Gs
Hdng= 279.0deg
A Rng=009278yds
B Rng=002490yds
Time: 08:56:00

Pitch= 000.4deg
Roll= 000.5deg
Accel= 0.968Gs
Hdng= 216.1deg
A Rng=015345yds
B Rng=009855yds
Time: 09:19:02

EOT

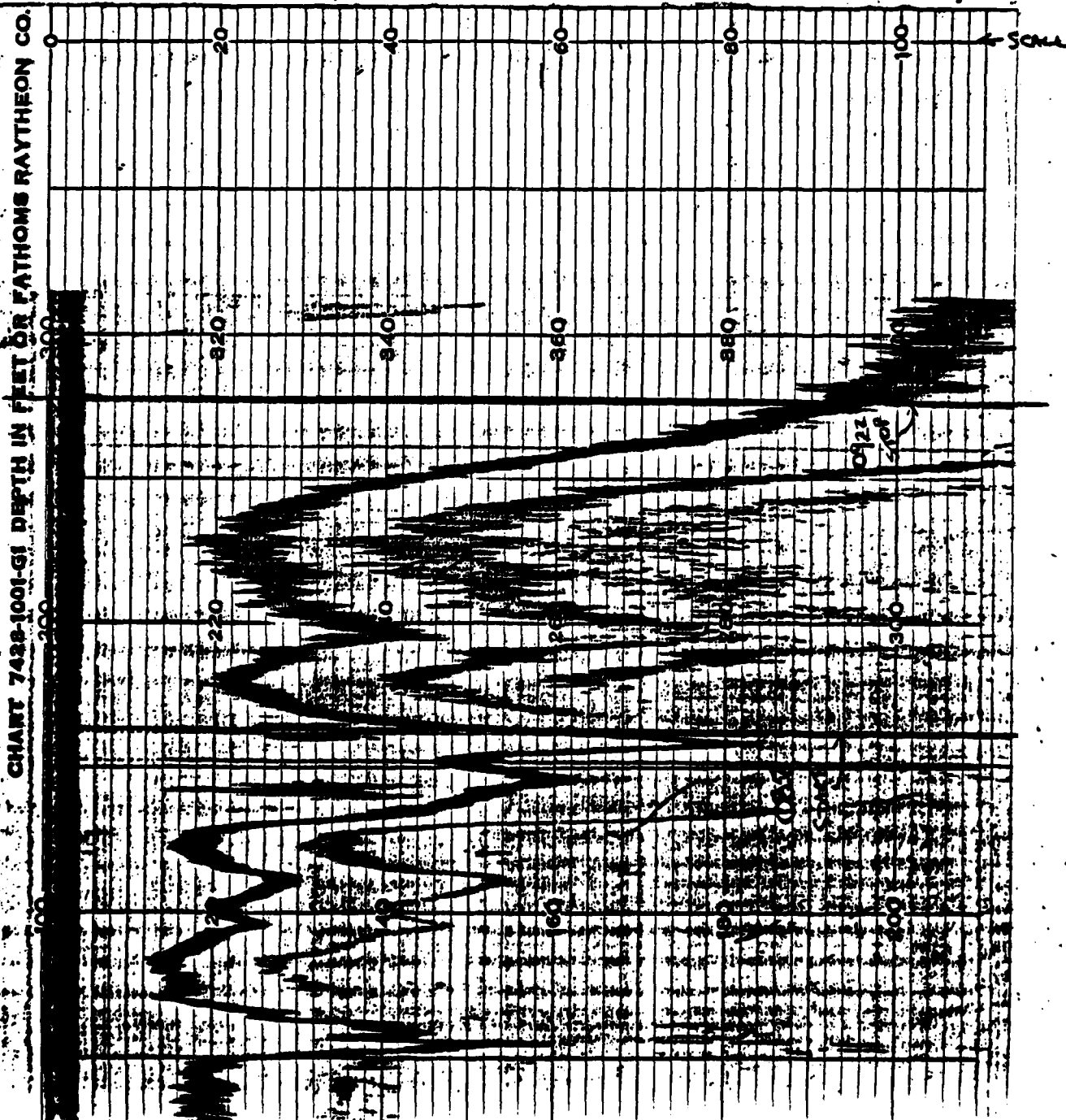
COURSE & PITCHER ANGLE RECORD

VOYAGE No. 9



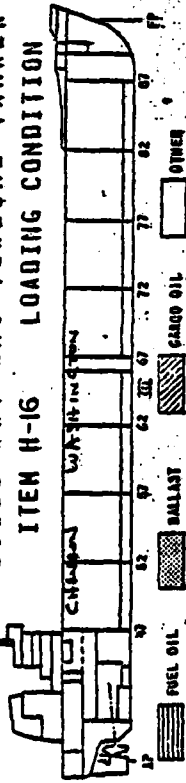
FATHOMETER RECORD VOYAGE No. 9

SOUNDINGS IN
FT. BELOW KEEL



ELAB. FORM

35000 DWT GAS TURBINE TANKER ITEM H-16 LOADING CONDITION



LOAD CONDITION: BALLAST
MAX. SHEAR: 10.4
MAX. BENDING: 10.4

NOTES:

LENGTH BETWEEN PERPENDICULARS IS 635.00 FT.

LCG BETWEEN PERPENDICULARS FROM MIDSHIP (+ FWD).

VERTICAL LETTERS ARE FROM HOLDING BASELINE.

WHS IN FT-TONS.

F.A. CORR = Σ WHS/1000.

P = LIQUID DENSITY IN 800./TON. SEE NOTE IN ITEM 6-5.

IN VALVE COLUMN INDICATE WHETHER SLICCE VALVE IS OPEN (O) OR SHUT (S).

ITEM	TYPE	TOIS	VOL	WM	LCG	LN	WHS
1.1 FUEL P/S	695	21.6	20592	-220.6	-166.07		
2.1 FUEL P/S	33	30.4	2927	-244.9	-250.17		
3.1 FUEL P/S	100	41.8	4294.4	-310.5	-333.82	1410	
4.1 FUEL P/S	12.8	46.0	503	-235.0	-370.5		
TOTAL	908.9		25604.4		-1051.55		

CONSUMABLES

ITEM	TYPE	TOIS	VOL	WM	LCG	LN	WHS
1.1 FUEL P/S	695	21.6	20592	-220.6	-166.07		
2.1 FUEL P/S	33	30.4	2927	-244.9	-250.17		
3.1 FUEL P/S	100	41.8	4294.4	-310.5	-333.82	1410	
4.1 FUEL P/S	12.8	46.0	503	-235.0	-370.5		
TOTAL	908.9		25604.4		-1051.55		

BALLAST

TANK	TYPE	TOIS	VOL	WM	LCG	LN	WHS
FORE PEAK	-0-	-0-	-	-	9282.2		
NO DEEP	-0-	-0-	-	-	9283.9		
1 P/S	152.4	19.6	20592.4	-220.6	-166.07		
2 P/S	194.2	13.4	12780.8	-171.5	-230.53		
3 P/S	150.1	8.4	12608.4	-119.3	-230.53		
4 P/S	150.1	8.4	12608.4	-119.3	-230.53		
5 P/S	120.3	24.0	11151	-22.8	-182.54		
6 P/S	182.1	13.4	12608.4	-119.3	-230.53		
7 P/S	205.1	13.4	12608.4	-119.3	-230.53		
8 P/S	133.5	11.6	12348.8	-171.5	-230.53		
9 P/S	-0-	-0-	-	-	-214.7		
10 P/S	57.6	15.5	1925	-202.7	-230.53		
AFTER PEAK	-0-	-0-	-	-	-202.0		
TOTAL	1604.7		24235		-210-12.9		

SUMMARY

ITEM	TYPE	TOIS	VOL	WM	LCG	LN	WHS
CARGO	908.9		25604.4		-1051.55		
BALLAST	1604.7		24235		-210-12.9		
CONSUMABLES	908.9		25604.4		-1051.55		
OPERATIONAL RESERVE	170.4		39.59		-155.9	-27-12	1.102
TOTAL DWT	10,039.0	31.72	319,937		-29.63	-227-17	
LIGHT SHIP	10,039.0	31.72	319,937		-29.63	-227-17	
TOTAL DISPL.	10,039.0	31.72	319,937		-29.63	-227-17	

AF