EXHIBIT LIST

Case No. 3AN S 89-7217 CR, 89-7218 CR ☐ Pretrial Hearing ☒ Trial

State of Alaska vs. Joseph Hazelwood

Name of Party: State of Alaska ☒ Pltf. ☐ Def.
(There must be a separate exhibit list for each party.)

Party's Attorney: Brent Cole, asst DA

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	Withdrawn Date (Court Use Only)	To Jury (Court Use Only)	From Jury (Court Use Only)	To Ex. Stor. (Court Use Only)
1	Crew List		1		1	1	DG
2	Course recorder		2		2	2	DG
3	Bell Logger		3		3	3	DG
4	Bell log (Tally Book)		4		4	4.	DG
5	Official Log Book		5		5	5	DG
6	Deck Log Book		6		6	[illegible]	[illegible]
7	Maneuvering chart		7		7	7	DG
8	Marsat Phone Calls		8		8	8	DG
9	Night order Book (Partial)		9		9	9	DG
10	Night order Book (complete)		10		10	10	DG
11	RPM Table		11		11	11	DG
12	Gauging Report		12		12	12	DG
13	Ships Policy on alcohol use		13		13	13	DG
14	Bridge Manual		14		14	14	DG
15	Bridge Chart - 16708		15		15	15	DG

I certify that the exhibits checked in the "To Jury" column on this and all attached pages were given to the jury for deliberation.
Date 3-20-90 In-Ct. Clerk [signatures]

I certify that the exhibits checked in the "From Jury" column on this and all attached pages were received from the jury after the verdict.
Date 3-22-90 In-Ct. Clerk Scott Rueder [signature]

I certify that the exhibits checked in the "To Exhibit Storage" column on this and all attached pages have been placed in exhibit storage.
Date 3/30/90 Exhibit Clerk [signature]

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Civil Rule 43.1
Criminal Rule 26.1

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Case No. 3AN-S 89-7217 / 89-7218 CR. Name of Party: State

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	COURT USE ONLY With-drawn Date	To Jury	From Jury	To Ex. Stor.
16	Course recorder - Blow-up		16		16	16	DG
17	Bell Logger Blow-up	17	17		17	17	DG
18	Maneuvering Chart Blow-up		18		18	18	DG
19	Photo of Exxon Valdez chart		19		19	19	DG
20	Chart 16708	x					
21	Chart 16707		21		21	21	DG
22	Bridge Diagram chart		22		22	22	DG
23	City of Valdez Photo chart		23		23	23	DG
[redacted]							
25	Chart - 16700		25		25	25	DG
26	Chart 16708 with overlays		26		26	26	DG
27	Fiddle Board chart		27		27	27	DG
28	Diagram of Hull Damage			2-23-90 by Cole -			X
29	Exhibit 15 Blow-up		29		29	29	DG
30	Exhibit 29 - Blow-up		30		30	30	DG
31	Murphy immunity Letter		31		31	31	DG
32	Guard Logs		32		32	32	DG
33	Coast Guard Regulations re alcohol	x					
34	Pilotage regulations	x					
35	Photo of defendant	x					
36	9x14 Photo of Sailing Board	x					
37	9x14 Photo of Deck		37		37	37	DG
38	9x14 Photo of Starboard Bridgewing		38		38	38	DG

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Civil Rule 43.1
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Case No. 3AnS89 7217/7218CR Name of Party: State

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	COURT USE ONLY Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
39	9x14 Photo - Port Bridge		39		39	39	DS
40	9x14 Photo - Steering console		40		40	40	DS
41	9x14 Photo - collision avoidance Radar		41		41	41	DS
42	9x14 Photo - Bridge		42		42	42	DS
43	9x14 Photo - Chart Room (Starbd)		43		43	43	DS
44	9x14 Photo Bridge Bulkhead		44		44	44	DS
45	9x14 Photo - Course recorder		45		45	45	DS
46	9x14 Photo - Chart room		46		46	46	DS
[redacted]							
48	9x14 Photo - cargo control Panel (Stern)		48		48	48	DS
49	9x14 - Photo - Loran		49		49	49	DS
50	9x14 Photo - Fathometer		50		50	50	DS
51	9x12 Photo - Starboard Bridge wing		51		51	51	DS
52	7x12 Photo - Steering control		52		52	52	DS
53	7x12 Photo - Bridge		53		53	53	DS
54	7x12 Photo - Bridge Head		+				
55	7x12 Photo - Bridge Radios		55		55	55	DS
56	7x12 Photo - Bridge Books		56		56	56	DS
57	7x12 Photo - chart room		57		57	57	DS
58	7x12 Photo Bridge radios & flags		58		58	58	DS
59	7x12 Photo Bridge radios		59		59	59	DS
60	7x12 Photo - Fathometer		60		60	60	DS
61	7x12 Photo Loran		61		61	61	DS

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Case No. 3AN-S89-7217 / 7218 CR Name of Party: State

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	COURT USE ONLY Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
62	7x12 Photo - Chart table		62		62	62	DG
63	7x12 Photo - Radio room		63		63	63	DG
64	7x12 Photo - Marsat Phone		64		64	64	DG
65	7X12 Photo - Engine Room telegraph		65		65	[illegible]	DG
66	7x12 Photo - Engine room controls		66		66	66	DG
67	7x12 Photo - Bell Log		67		67	67	DG
68	7x12 Photo Engine room console		68		68	68	DG
69	7x12 Photo - captain's office		69		69	69	DG
70	7x12 Photo - Captain's stateroom forward		70		70	[illegible]	[illegible]
71	7x12 Photo - Captain's Starboard Stateroom		71		71	71	DG
72	7x12 Photo - Propeller sounder		72		72	72	DG
73	Photo - Hazelwood		73		73	73	DG
74	Dentist appt record		74		74	74	DG
75	VTS users manual		75		75	75	DG
76	Vessel Data Sheet		76		76	76	DG
77	Cassette Tape -						
78	Transmittal letter concerning 77	not to go to Jury	78	Not Jury			DG
78 A	Transcript of tape Ex# 77	" "	78A				DG
79	Cassette Tape - outbound conversations		79		79	79	DG
80	Model of Ship's bridge returned to DA		80		80	80	MD
81	Cousins 2nd mate license		81		81	81	DG
82	Compass observation book		82		82	82	DG
83	Chart drawing - Cousins		83		83	83	DG

Civil Rule 43.1
Criminal Rule 26.1

EXHIBIT LIST CONTINUATION SHEET

Case No. 3AN S89- 7217cr 7218 cR   Name of Party: Joseph Hazelwood

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	COURT USE ONLY Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
84	USCG - master license (Kunkel)		84		84	84	DG
85	Oil record Book 12-1-86 4-8-89		85		85	85	DG
86	Diagram by Kunkel		86		86	86	DG
87	Federal Express Document USCG to Chemwest		87		87	87	DG
88	CompuChem Lab report results on Hazelwood 3-28-89		88		88	88	DG
89	CompuChem Lab report results on Kagan 3-29-89		89		89	89	DG
90	Compuchem Lab report results on Cousins 3-28-89		90		90	90	DG
91	Compuchem Lab report results on Jones 3-28-89		91		91	91	DG
92	[illegible] Location		92		92	[illegible]	[illegible]
93	Hazelwood's master license		93		93	93	DG
94	VCR Tape by dawn		94		94	94	DG
95	Sounding chart		95		95	95	DG
96	SRP operating manual (Copy)		96		96	96	DG
97	Schematic Steering module		97		97	97	DG
98	Page from CR+ display Photo-drawing		98		98	98	DG
99	Drawing/Photo of: alarm & Heading module		99		99	99	DG
100	Key Pad Schematic		100		100	100	DG
101	Status module (Photo)		101		101	101	DG
102	Cassette Tape interview of Hazelwood (Fox & Delozier)		102		102	102	DG
103	Exxon Valdez - Damage to Hull Schematic Drawing - Photos chart		103		103	103	DG
104	immunity grant to myers		104		104	104	DG
105	Oil record book (Copy)		105		105	105	DG
106	Chart by Faulkenstein	106	NOT AD				DG

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Case No. 3AN-S89-7217 / 7218 cr Name of Party: State of Alaska

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
107	Copy of 46 USC 8502		107		107	107	DG
108	Port order 1-80		108		108	108	DG
109	aerial view ~~[illegible]~~ Sawmill Bay		109		109	109	DG
110	" " "		110		110	110	DG
111	aerial Batonrouge / Exxon Valdez		111		111	111	DG
112	Graphs of oil progress 3-30-89		112		112	112	DG
113	" " " 3-29-89		113		113	113	DG
114	" " " 3-26-89		114		114	114	DG
115	[illegible]		115		115	[illegible]	DG
116	" " " 3-24-89		116		116	116	DG
117	Cassette Tape - inbound		117	~~[illegible]~~ Ad w/o Prov 3/16/90	117	117	DG
118	Video cassette (oil on beaches)		118		118	118	DG
119	Bottle of Moussy Beer		119		119	119	DG
120	Cassette tape		120		120	120	DG
121	Cassette tape		121		121	121	DG
122	3-23- 3-24, (Course by Valdez Ship) reconstruction by Greiner (Chart)		122		122	122	DG
123	3-24- tide table -		123		123	123	DG
124	3-23 Tide table -		124		124	124	DG
125	Photos Vessel damage 11-A		125		125	125	DG
126	" " " 9-7-A		126		126	126	DG
127	Photo Vessel damage 1-A		127		127	127	DG
128	Photo vessel damage (7-27)		128		128	128	DG
129	Photo Vessel damage 9		129		129	129	DG

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Case No. 3ANS89-7217 CR
3ANS89-7218 CR
Name of Party: State of Alaska

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
			COURT USE ONLY				
130	Photo Vessel Damage (23)		130		130	130	DG
131	" " " (19)		131		131	131	DG
132	" " " (15)		132		132	132	DG
133	" " " (10)		[illegible]		[illegible]	[illegible]	[illegible]
134	" " " 3A		134		134	134	DG
135	" " " (21A)		135		135	135	DG
136	" " " (23A)		136		136	136	DG
137	Photo Vessel Damage (25A)		137		137	[illegible]	[illegible]
138	Photo Vessel [illegible]		[illegible]		[illegible]	[illegible]	[illegible]
139	19A		139		139	139	DG
140	" " " 13		140		140	140	DG
141	" " " (21)		141		141	141	DG
142	32A		142		142	142	DG
143	" " " 26		143		143	143	DG
144	(34-A)		144		144	144	DG
145	(32)		145		145	145	DG
146	37A		146		146	146	DG
147	" " " (20)		147	–	147	147	DG
148	(36)		148		148	148	DG
149	(5)		149		149	149	DG
X 150	Vessel Damage Photo (9)		150	–	150	150	DG
151	Exxon Shipping Company - 4-26-51-87.		151		151	151	DG
X 152	Memorandum 4-4-89 TO: HR Rouse FR: D.K. Walker		152		152	152	DG

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Case No. 3AN S89-7217 3AN S89-7218 CR. Name of Party: State of Alaska

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	COURT USE ONLY: Withdrawn Date	To Jury	From Jury	To Ex. Stor.
153	Kagan's personel file (copy of)	by stip	Sealed			—	DG
154	model of Exxon Valdez Returned to DA		154		154	154	MP
155	Spread Sheet prepared by Greiner		155		155	155	DG
[redacted]							
157	drawing of Damage to bottom of Exxon Valdez	✓					DG
158	Statistics of wildlife Killed		158		158	158	DG
159	Diagram Shell of Hull chart		159		159	159	DG
160	Stability Diagram chart	x					/
[redacted]							
162	Buoyancy diagrams chart	x					/
163	" " chart	x					/
164	" " chart	x					/
165	Diagram Predicted oil loss water grid chart		165		165	165	DG
166	computer Graph results " chart		166		166	166	DG
167	" " " chart		167		167	167	DG
168	CT inert Gas System diagram chart		168		168	168	DG
169	charts on Stability - progression x0	x					/
170	" " " times 15	x					/
171	" " " " time 30 charts	x					/
172	time 50	x					/
173	time 65	x					/
174	Shiras Walker Resume	x					/
175	Document Summary of conversation @ Paul Myers	x					/

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Case No. 34vS 89-7217 cr 89-7218 cr   Name of Party: State

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
					COURT USE ONLY		
176	6 page document (FACSimile) Suggested Defense Question Hlastala	x					✓
177	Curriculum Vitae of Hlastala	x					✓
178	Bibliography of H Lastala	x					✓
179	12-5-88 Suggested Questions Directed to Hlastala	x					✓
180	93 CFR 95.045		180		180	180	DG

EXHIBIT LIST

Case No. 3AnS89-7217/7218 ☐ Pretrial Hearing ☒ Trial

State of Alaska vs. Joseph Hazelwood

Name of Party: State of Alaska - ☒ Pltf. ☒ Def.
(There must be a separate exhibit list for each party.)

Party's Attorney: Brent Cole, Asst DA

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	COURT USE ONLY Withdrawn Date	To Jury	From Jury	To Ex. Stor.
A	Pilotage Slip -		A		A	A	MD
B	Pilotage Regulation Change. (Bob Arts - letter)		B		B	B	MD
C	Credit card Slip		C		C	C	MD
D	Phone Slips -		D		D	D	MD
E	Diagram Pipeline Club (8 x 11)		E		E	E	MD
F	[redacted]	x				[redacted]	
G	Copy of VTS operating Manual	x					
H	Copy one page VTS (1-2)	x					
I	Copy - VTC manual Promulgation 11-2-88		I		I	I	MD
ok J	Photo - [illegible]		J		J	J	MD
K	Photo - [illegible]		K		K	K	MD
L	Photo Address Hazelwood 1-30-90		L		L	L	MD
M	Photo ~~cut~~ Time Hazelwood 2-3-90		M		M	M	MD
N	Photo Hazelwood 6-13-89		N		N	N	MD
O	Phot Hazelwood 2-11-90		O		O	O	MD

I certify that the exhibits checked in the "To Jury" column on this and all attached pages were given to the jury for deliberation.
Date 3-20-90 In-Ct. Clerk [signature]

I certify that the exhibits checked in the "From Jury" column on this and all attached pages were received from the jury after the verdict.
Date 3-22-90 In-Ct. Clerk [signature]

I certify that the exhibits checked in the "To Exhibit Storage" column on this and all attached pages have been placed in exhibit storage.
Date 3/30/90 Exhibit Clerk Nancy Drake

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Case No. [illegible]89-7217 [illegible]
[illegible]89-7218 [illegible]

Name of Party: Joseph Hazelwood

		COURT USE ONLY					
Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
P	Drawing by Deppe		P		P	P	MD
Q	RTC Log (copy of)		Q		Q	Q	MD
R	Chart - (copy) Valdez Narrows (Scale - 1:20,000)		R		R	R	MD
S	Statute AK - Pilotage		S		S	S	MD
T	Federal Register 46 CFR Part 16 0157 6-24-85	T					MD
U	Federal Register 46 CFR Part 10315 6-6-88	U					MD
V	29-May-89 Request for info. TO: USCG - From Greiner	X					
W	29 May 89 - Requests inform. TO USCG - Fr Greiner	X					
X	20 July 89 Request for info. TO USCG - Fr Greiner	X					
Y	Facsimile Transmission 8-16-89 FROM MEC Greiner to Cole	X					
Z	To Greiner fr USCG 18 Oct. 89	X					
AA	Venue [illegible] [illegible] To: Cole - 9-11-89 -	X					
AB	Chart of vessel - Soundings	X					
AC	[illegible]		AC		AC	AC	MD
AD	Chart		AD		AD	AD	MD
AE	Brockley - Chart -		AE		AE	AE	MD
AF	[illegible]		AF		AF	AF	MD
AG	Ship [illegible] [illegible]	X					
AH	[illegible] [illegible] 3-74	X					
AI	[illegible]	X					
AJ	Summary [illegible]		AJ		AJ	AJ	MD
AK	Summary [illegible]		AK		AK	AK	MD
AL	Memorandum from Sam Adams To [illegible]	X					

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EXHIBIT LIST CONTINUATION SHEET

Case No. [illegible] Name of Party: [illegible]

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	COURT USE ONLY With-drawn Date	To Jury	From Jury	To Ex. Stor.
AM	Letter [illegible] from [illegible] 2-12-96	X					
AN	[illegible]		AN		AN	AN	MO
AO	Blow-up [illegible] System		AO		AO	AO	MO
AP	Blow-up		AP		AP	AP	MO
AQ	Blow-up		AQ		AQ	AQ	MO
AR	[illegible] - one page sheet. Type [illegible] [illegible]		AR		AR	AR	MO
AS	Telephone [illegible] Emily Kaiser		AS		AS	AS	MO
AT	AM Telephone record	AT					MO
AU	affidavit John Kane American Express	X				[redacted]	
AV	Blow-up photos (Bulkhead Rudder Angle)		AV		AV	AV	MO
AW	" " " Rudder Angle Gauge)		AW		AW	AW	MO
AX	Blow-up Photo (Change rate of Turn)		AX		AX	AX	MO
AY	Blow up Photo (Bridge area)		AY		AY	AY	MO
AZ	[illegible]		AZ		AZ	AZ	MO
BA	[illegible]		BA		BA	BA	MO
BB	Hoffman - Report of Damage -	BB					MO
BC	[illegible] Comparison [illegible] Headings		BC		BC	BC	MO
BD	[illegible]		BD		BD	BD	MO
BE	[illegible]		BE		BE	BE	MO
BF	[illegible] chart [illegible]		BF		BF	BF	MO
BG	[illegible]		BG		BG	BG	MO
BH	[illegible]		BH		BH	BH	MO
BI	[illegible]		BI		BI	BI	MO

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EXHIBIT LIST CONTINUATION SHEET

Case No. 3AN S89-7217 CR / 3AN S89-7218 CR   Name of Party: Hazelwood

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	COURT USE ONLY: Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
BJ	10° right rudder overlay		BJ		BJ	BJ	NA
BK	20° right rudder overlay		BK		BK	BK	NA
BL	overlay		BL		BL	BL	NA
BM	Large Diagram w/ overlays - abeam Busby island - chart		BM		BM	BM	NA
BN	overlay transparency		BN		BN	BN	NA
BO	overlay 3° right rudder		BO		BO	BO	NA
BP	overlay 4° right rudder		BP		BP	BP	NA
BQ	overlay - 5° right rudder -		BQ		BQ	BQ	NA
BR	overlay 10°		BR		BR	BR	NA
BS	Overlay 20° right rudder - 23:55		BS		BS	BS	NA
BT	Chart Exxon Valdez Course recorder chart		BT		BT	BT	NA
BU	Chart Sounding chart (one)		BU		BU	BU	NA
BV	Sounding chart (2 tiers)		BV		BV	BV	NA
BW	[illegible]		BW		BW	BW	NA
BX	Computer data [illegible]	X					
BY	Cover letter re: Martineau		BY		BY	BY	NA
BZ	Photos		BZ		BZ	BZ	NA
CA	Photos		CA		CA	CA	NA
CB	Photos		CB		CB	CB	NA
CC	[illegible]	X					
CD		X					
CE		X					
CF	[illegible]	X					

Civil Rule 43.1
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EXHIBIT LIST CONTINUATION SHEET

Case No. [illegible] 7217 CI 7218 CI Name of Party: Joseph Hazelwood

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	COURT USE ONLY Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
CG	diagram by Hkastala	x					
CH	diagram by Hkastala	x					
CI	diagram by Hkastala	x					
CJ	Soundings around Exxon Valdez Chart- (Paper Size)		CJ		CJ	CJ	MC
CK	Soundings around Exxon Valdez Chart (Paper Size)		CK		CK	CK	MO
CL	Chart Schematic of Salvage Principle		CL		CL	CL	MO
Cm	Hudson's calculations	x					
CN	Hudsons calculations	x					
CO	Hudsons calculations	x					

X
X
X

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EXHIBIT LIST

Case No. 3AN S89-7217/7218 CR ☐ Pretrial Hearing ☒ Trial

State of Alaska vs. Joseph Hazelwood

Name of Party: Court's Exhibits ☐ Pltf. ☐ Def.
(There must be a separate exhibit list for each party.)

Party's Attorney: N/A

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
				COURT USE ONLY			
1	List of Items received From Coast Guard.						NO
2	Transcript						NO
3 -	Transcript (outbound Exxon Valdez)						NO
4	Transcript interview of Hazelwood						NO
5.	Letter to Russo from Dr. Papoun plus attachments						NO

I certify that the exhibits checked in the "[redacted]" column on this and all attached pages were given to the jury for deliberation.
Date ~~3/30/90~~ In-Ct. Clerk

I certify that the exhibits checked in the "From Jury" column on this and all attached pages were received from the jury after the verdict.
Date In-Ct. Clerk

I certify that the exhibits checked in the "To Exhibit Storage" column on this and all attached pages have been placed in exhibit storage.
Date 3/30/90 Exhibit Clerk Scott Pender

3/30/90 [signature]

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TF-200 (12/88) (cs)
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LIST OF TABLES

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89-7217 Criminal
89-7218 Cr
(CASE NUMBER)

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CHAPTER 1

GENERAL INFORMATION

1.0 INTRODUCTION

This manual contains operation, operator's maintenance, and installation information for the Sperry SRP 2000 Ship Control System. The manual is organized into three chapters containing the following information:

CHAPTER 1 - GENERAL INFORMATION. Introduces the manual, briefly describes the equipment and system interface requirements.

CHAPTER 2 - OPERATION. Describes the operating controls and indicators found on the Control Console and Rudder Control Unit, and then describes operational modes available.

CHAPTER 3 - OPERATOR MAINTENANCE. Provides operator cleaning procedures and describes operator response to system-generated advisories and faults.

Because of the versatility of the equipment comprising this system, additional operational information on systems specifically designed for installation on a particular vessel or customer specified modes of operation will be attached as Appendices to the back.

1.1 SYSTEM DESCRIPTION

The Sperry SRP 2000 Ship Control System is a centralized multi-computer bridge system with applications comparable to the most sophisticated modular integrated bridge systems. Figure 1-1 is a block diagram showing system interface with shipboard equipment that enables the system to provide automatic steering control, waypoint navigation, and automatic bridge-watch capabilities. Although the Ship Control System is able to operate in normal stand-alone steering modes, its computerized evaluation of various sensor data using advanced mathematical techniques allows it to operate as a fully adaptive autopilot.

The Ship Control System provides precise changes in original heading with minimal rudder movement, thus allowing maneuvers with minimal loss of speed and the most economical operation. Course keeping adaptive capability evaluates ship's yaw and rudder motion and automatically alters mathematical values to optimize rudder activity.

The system permits route planning and continuous readout of ownship's position based on dead reckoning (ship gyro and log) and position fixes from external navigators (Satellite, GPS, Loran). A great circle or rhumb line planned course (up to nine selected waypoints) can be defined by entering an initial position and waypoint coordinates. An audible alarm and video advisory are provided when the computed heading-to-steer changes by more than one degree and when a waypoint is approached. In this automatic bridge-watch function, the heading-to-steer correction must be acknowledged by the operator before the heading change will occur.

The system audible and visual advisories are also employed by the built-in test equipment (BITE) function that identifies system malfunctions and isolates faults. Repair by module and printed wiring board replacement simplifies repair. In addition to the system self-test capabilities, an electronically isolated backup steering system is contained within the console. System automatic bridge watch, course monitoring, and turn rate indication are provided independently of main system operation.

The SRP 2000 Ship Control System is capable of customer-defined functions beyond those described here, and has the versatility to add functions economically.

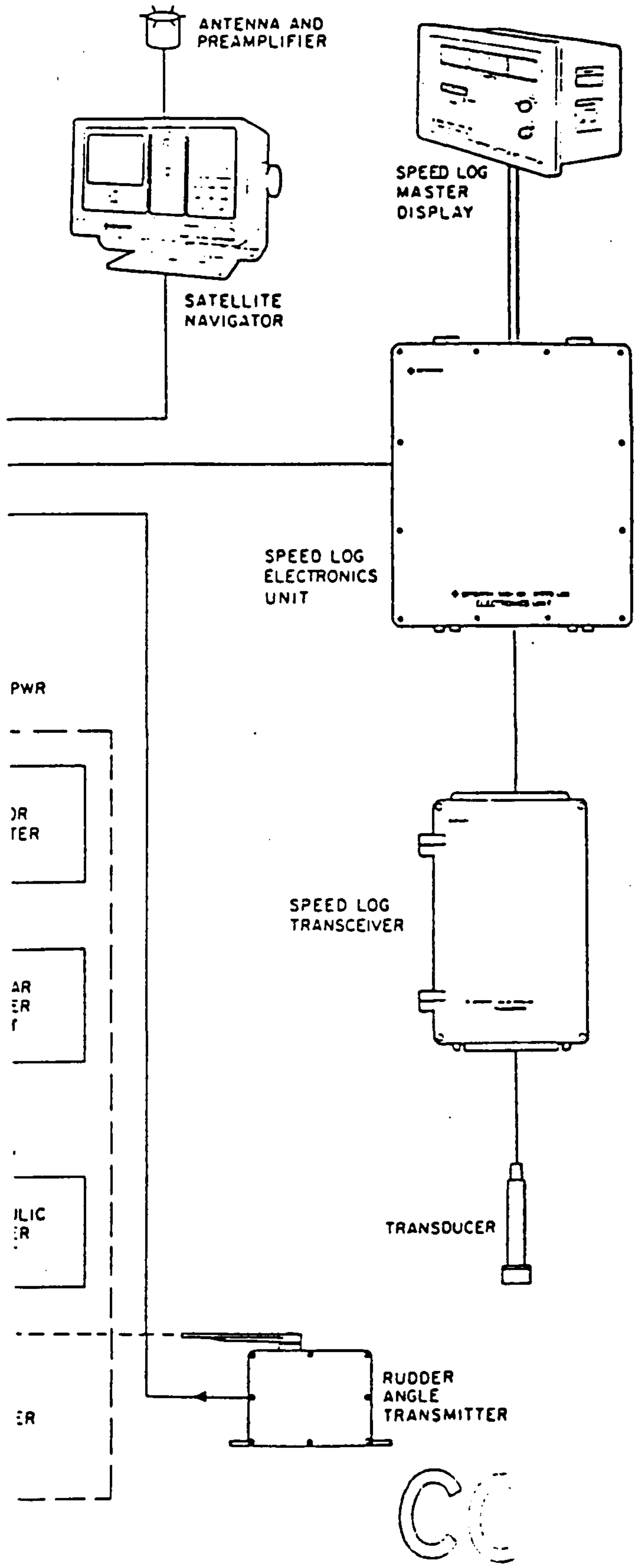

Figure 1-1. SRP 2000 Control
System and Equipment
Interface

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1.2 EQUIPMENT DESCRIPTION

The SRP 2000 Ship Control System is comprised of a Control Console and two to four Rudder Control Units (RCU). The number of RCU's installed depends upon the vessel's type of steering gear.

The Control Console provides the helmsman and navigator ship control and position information on a graphic- and character-formatted CRT display. The presentation includes heading, rate of turn, and rudder angle information on video indicators displayed on the upper half of the CRT. The lower portion of the presentation contains operating instructions, system status, and ship parameter information. The Control Console has a minimum of operating controls and indicators arranged in modular panels by operational use. The modular panels have light colored symbols on dark backgrounds with back panel illumination to ensure rapid light-to-dark adaptation during operation. The Control Console interfaces to ship's steering gear through the Rudder Control Units (RCU).

The RCU is located in the steering gear room and eliminates the need for high current cable runs from the bridge. The RCU converts the rudder command from the Control Console to the proper solenoid control signals for use by the ship's rudder positioning system. The control panel on the RCU allows this unit to be used as an alternate steering station with both full followup and non-followup control capability.

The SRP 2000 Ship Control System can accommodate additional auxiliary steering functions, if desired (optional).

1.3 SHIP CONTROL SYSTEM CONFIGURATION

The SRP 2000 Ship Control System consists of the Control Console and two or more Rudder Control Units. Each of these units is available in several configurations as listed in Tables 1-1 and 1-2. These tables briefly define the capabilities associated with each configuration. This manual is applicable to all configurations of the SRP 2000 Ship Control System.

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Table 1-1. Control Console Configuration

Part Number	Description
1975475-1	Dual Rudder Control Unit capability with PORT-OFF-STBD selection. Three single potentiometer-type helm order output transmitters.
1975475-2	Dual Rudder Control Unit capability with BOTH-PORT-OFF-STBD-BOTH selection. Three single potentiometer-type helm order output transmitters.
1975475-3	Dual Rudder Control Unit capability with PORT-OFF-STBD selection. Two single potentiometers and one dual potentiometer-type helm order output transmitters.
1975475-4	Dual Rudder Control Unit capability with PORT-OFF-STBD selection. Three dual potentiometer-type helm order output transmitters.
1975475-5	Four Rudder Control Unit capability with BOTH-PORT-OFF-STBD-BOTH selection. Three dual potentiometer-type helm order output transmitters.

Table 1-2. Rudder Control Unit Configuration

Part Number	Description
1975660-1	Use with 115 VAC Power Unit solenoids
1975660-2	Use with 115 VDC solenoids
1975660-3	Use with 24 VDC solenoids
1975660-4	For 115 VAC solenoid multispeed (3-stage) hydraulic steering systems
1975660-5	Use with 24 VDC solenoid multispeed (3-stage) hydraulic steering systems
1975660-6	For 115 VAC solenoid multispeed (2-stage) hydraulic steering systems

1.4 SYSTEM SPECIFICATIONS

Table 1-3 lists the physical, electrical and design characteristics of the basic SRP 2000 Ship Control System.

Table 1-3. Ship Control System Specifications

Characteristics	Specifications
Equipment Physical Dimensions:	
Control Console	Height: 47 in. (119 cm) Width: 24 in. (61 cm) Depth: 29 in. (74 cm) Weight: 180 lbs. (82 kg)
Rudder Control Unit	Height: 32 in. (83 cm) Width: 24 in. (61 cm) Depth: 10 in. (26 cm) Weight: 120 lbs. (55 kg)
Power Requirements:	115 VAC + 10% - 15% 47-63 Hz; 3.5A max Console, 1.0A max per RCU plus solenoid current
Environmental Data:	
Operating Ambient Temperature	0-55°C
Relative Humidity	100% condensating
Central Processing Units: (4 each)	
Word Size	8 bit
Memory Capacity	26k ROM per CPU 2K RAM per CPU 2K Common Memory (Battery Backed-up CMOS) 0.25K non-volatile RAM calibration storage 14K Auxiliary RAM

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1.5 SYSTEM INTERFACE REQUIREMENTS

1.5.1 GYROCOMPASS EQUIPMENT

The system requires interface with the ship's gyrocompass to obtain accurate heading reference data. Table 1-4 lists gyrocompass interface requirements. Gyrocompass input is required for CRT displayed heading information and for backup steering reference on the Alarm Module (Figure 2-7). If it is desired to keep the backup steering function provided by the SRP 2000 completely independent, two different ship gyrocompasses are required. On vessels with only one gyrocompass system, the gyrocompass information is paralleled to the two circuits requiring this information.

Table 1-4. Gyrocompass Interface Requirements

Characteristics	Requirements
Step Output:	
Data	4 wire
Voltage	20V to 115V
Rate of Change	10°/sec max
Synchro Output:	
Type	1X (36X, 90X optional) 60-400 Hz 90V line-to-line 115V reference
Type	360X 50-60 Hz 20V to 115V line-to-line 20V to 115V reference

1.5.2 SPEED SOURCE EQUIPMENT

The system requires ownship's velocity for position computations and during autopilot maneuvers. The system offers operator selection of speed data from speed log equipment or manual speed input. Table 1-5 lists the speed source interface requirements for the system.

Table 1-5. Speed Log Interface Requirements

Characteristics	Requirements
Speed Log Source:	Switch closure/pulse
Data	2 wire
Speed Log Pulse Input	3V to 25V
Pulse Rate	200/nm nominal (continuous)

1.5.3 SHAFT SPEED SENSOR

Shaft speed will be displayed on the CRT if a shaft speed sensor is provided. Table 1-6 lists the shaft speed sensor requirements.

Table 1-6. Shaft Speed Sensor Requirements

Shaft Speed	Requirements
Data Type	Contact closure or pulse
Pulse Rate	1/revolution
Pulse Width	10 mS min.-250 mS
Pulse Voltage	3V-25V

1.5.4 NAVIGATION SENSOR EQUIPMENT

The system allows the integration of two external navigational devices as a source of ship's position data. The accuracy of the position information is strictly dependent upon the navigation equipment connected. Table 1-7 lists the navigation sensor interface requirements for the system.

Table 1-7. Navigation Source Interface Requirements

Characteristics	Requirements, Make, Model No.
Loran C:	
Data Output Format	RS-232C compatible, NMEA, 0182
Satellite Navigation:	
Data Output Format	RS-232C Compatible, SRN, 501
GPS (Global Positioning System)	RS-232C Compatible (Future)

NOTE: Other manufacturers can be added as needed, but a programming change may be required.

CHAPTER 2

OPERATION

2.0 INTRODUCTION

Instructions in this chapter describe the operational use of the controls and indicators associated with the Control Console and Rudder Control Unit parts of the SRP 2000 Ship Control System. Information is also included on CRT display interpretation, operator data entry and selected operational mode usage.

2.1 CONTROLS AND INDICATORS

2.1.1 CONTROL CONSOLE

The Control Console is composed of six control and indicator modules, as shown in Figure 2-1. The operator's use of these modules is described in the following paragraphs.

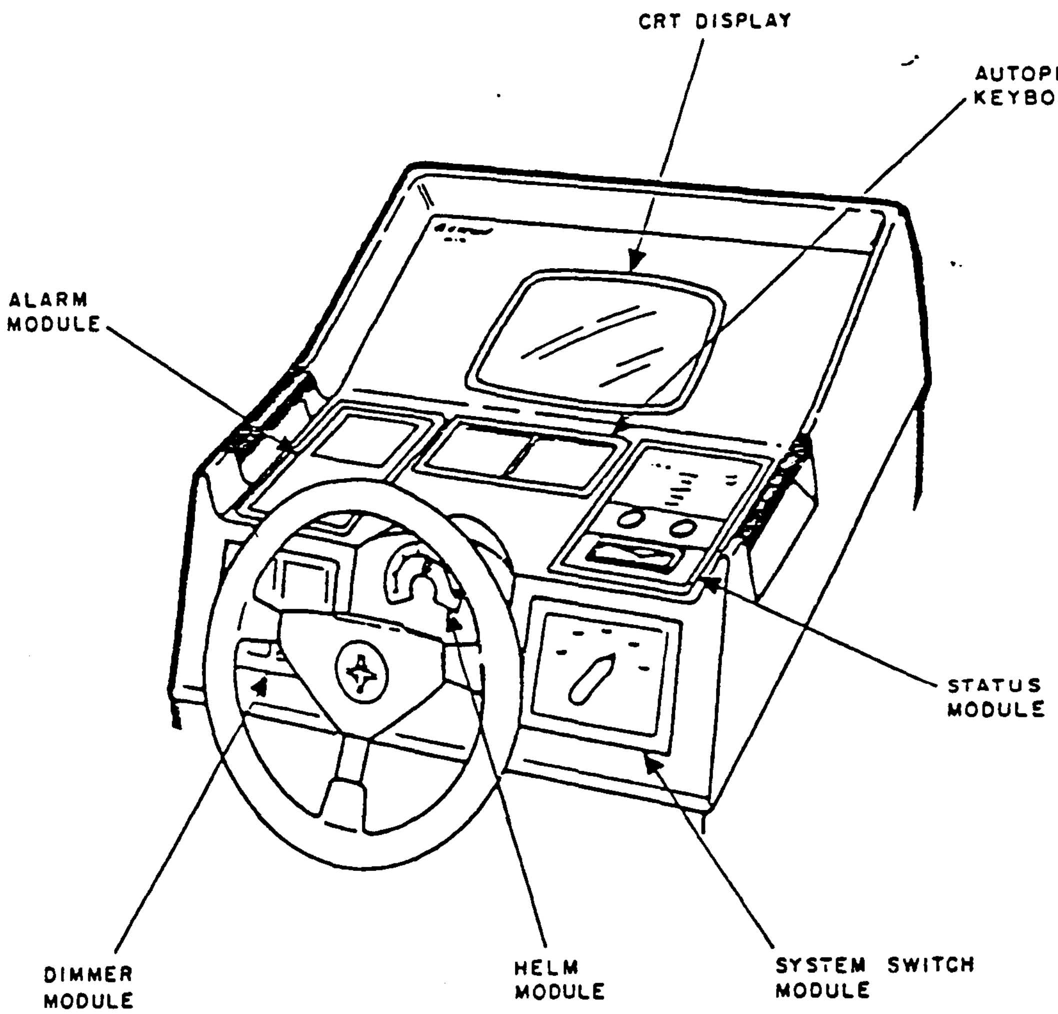

Figure 2-1. Ship Control System, Control Console

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2.1.1.1 AUTOPILOT KEYBOARD

The Autopilot Keyboard contains two border-separated sections of pressure sensitive switches. Each section contains nine switches, as shown in Figure 2-2. The left section allows operator selection of the autopilot modes. The mode selected is indicated by the illumination of a red light emitting diode (LED), shown as dashed circles.

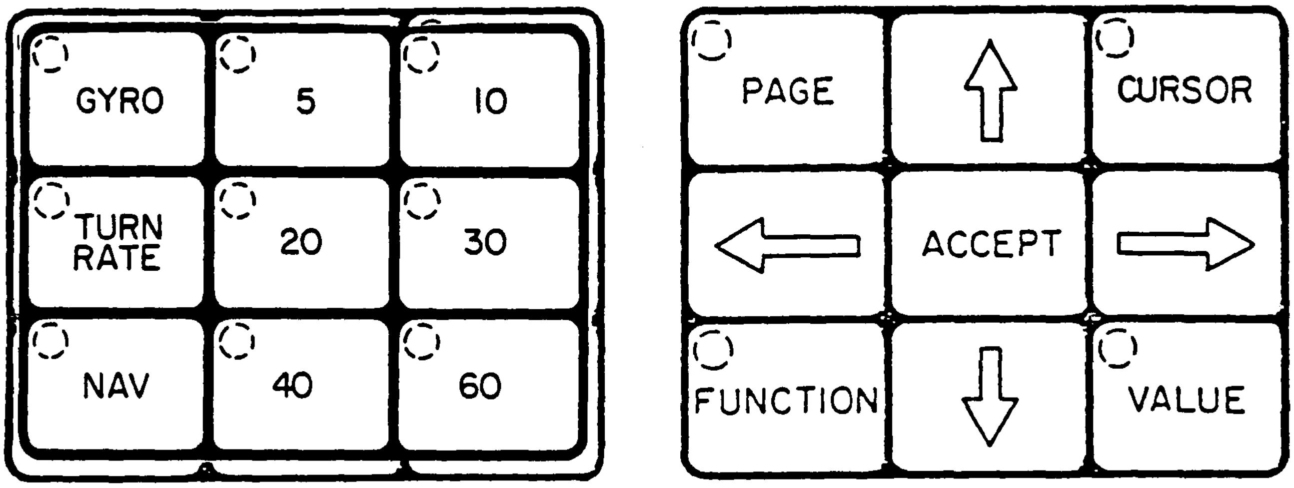

Figure 2-2. Autopilot Keyboard

Three of the pressure sensitive switches select Gyrocompass (GYRO), TURN RATE or Navigation (NAV), autopilot modes. The remaining six switches (A through F) are reserved for future expansion.

The right switch section is for operator data entry to the Ship Control System and page selection of the CRT-displayed operating instructions. The left arrow (←), right arrow (→), up arrow (↑) and down arrow (↓), switches are multi-function switches that simplify system operation by reducing the number of controls required. The current function of these multi-function switches will be indicated by a light appearing on either the PAGE, CURSOR, FUNCTION or VALUE switches. The capability provided by the multi-function switches in these selectable functions is outlined as follows:

PAGE — Depressing the PAGE switch allows the operator to use the multi-function switches to select various CRT pages. In the PAGE mode the left arrow switch selects a page of instructions to the left of the page presentation currently on the CRT. The right arrow switch selects a page to the right of the currently displayed page. The up arrow and down arrow switches allow the operator to "scroll" up or down the alphanumeric lines displayed on the lower half of the CRT presentation (paragraph 2.2.1).

CURSOR — Depressing the CURSOR switch allows the operator to enter data into the Ship Control System. The cursor (■ , symbol, Figure 2-8) is positioned at the end of the CRT-displayed data line through the use of the ↑ and ↓ multi-function switches.

FUNCTION — After correct data line placement of the cursor, the functions contained in brackets ([ ], Figure 2-8) can be operator-selected through use of the FUNCTION mode. Depressing the FUNCTION switch, then depressing ↑ or ↓ switch allows the operator to change the displayed function in this manner: [MANUAL] to [AUTO] speed.

VALUE — After correct data line placement of the cursor, CRT-displayed parameters which require specific values can be altered using the VALUE mode. Press the VALUE switch, and then press ↑ switch to increase value readout or press ↓ switch to decrease value readout (values such as manual speed in knots and Rudder limit in degrees).

ACCEPT — After selecting the data line with the cursor and changing the function or value, the new input must be accepted. The operator-entered function or value is approved by depressing the ACCEPT switch.

NOTE

If more than one parameter is to be changed on a page, the operator must first accept a changed function or value before proceeding to the next data line.

2.1.1.2 STATUS MODULE

The Status Module contains steering system and steering mode indicators along with the controls necessary for helm, remote and emergency operation selection, as shown in Figure 2-3.

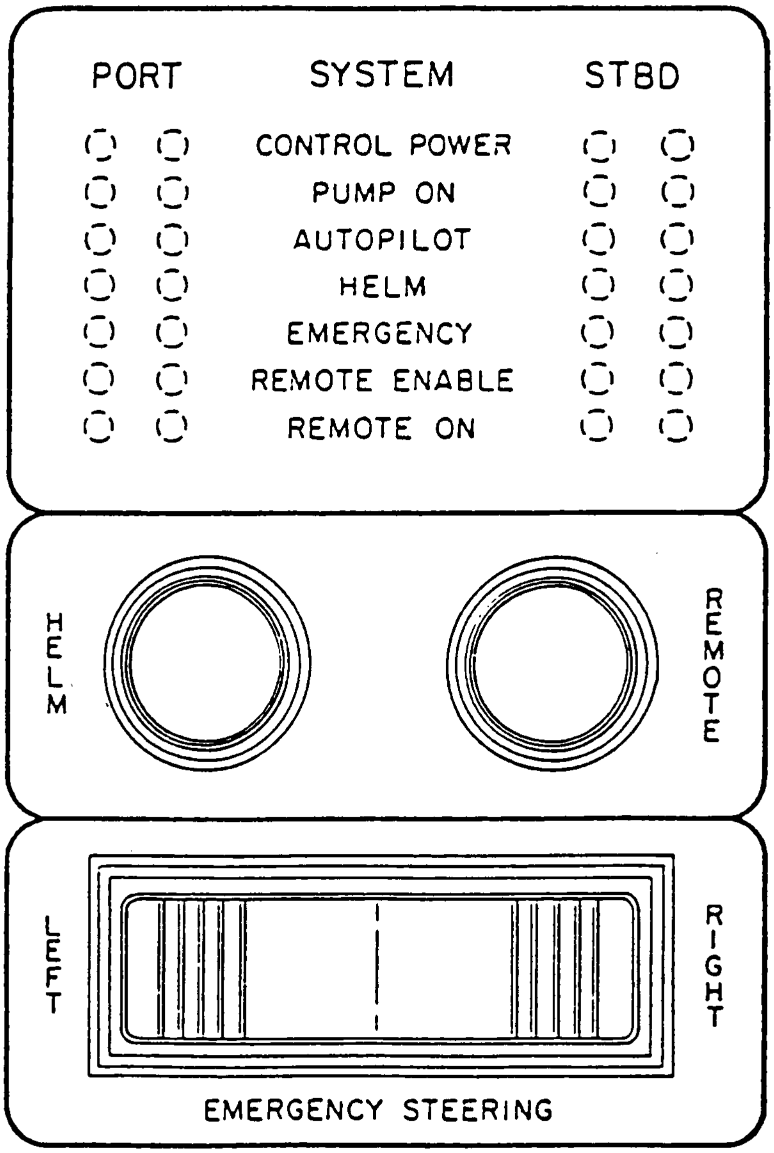

Figure 2-3. Status Module

Each status legend has four indicator lights associated with it, thus allowing on-line status indications of up to four steering pump systems using four RCUs. On applications employing only a dual pump system or two control system pumps, the outer LED indicators are not used.

Control Power indicators light to show which ship supply is supplying power to the Control System. The shipboard power supplied to the pump unit is connected to the +24 VDC power supply in the RCU. The +24 VDC output from the RCU is then supplied to the System Switch on the Control Console as the CONTROL power. The PUMP ON legend is actually a status indication that originates from a pump unit relay which energizes when the unit is running or hydraulic pressure is adequate for operation. In a system equipped with four RCUs, a System Switch selection to the PORT position will cause the inner (PORT) CONTROL POWER and PUMP ON indicators to light. A selection to the (PORT) BOTH position will light both (PORT) CONTROL POWER and PUMP ON indicators.

The AUTOPILOT indicator lights in reference to the proper RCU when any of the autopilot operating modes (GYRO, TURN RATE or NAV) are selected. The AUTOPILOT legend denotes that ship rudder movement is under computer control.

The HELM and EMERGENCY indicators light to show that manual control in either of these two modes has been enabled. Helm mode selection corresponds to the depressing of the HELM switch and EMERGENCY mode selection is the result of toggling the EMERGENCY STEERING switch either left or right. The EMERGENCY STEERING switch is a non-followup (NFU) controller that requires operator monitoring of a rudder angle indicator to determine rudder position.

2.1.1.3 SYSTEM SWITCH MODULE

The System Switch Module contains two coupled rotary switches that are positioned to apply power to the SRP 2000 Ship Control System and to select the particular Rudder Control Unit or Units (BOTH) that will apply the rudder command to the steering gear.

The System Switch Module shown in Figure 2-4 is one of two available configurations. The System Switch not illustrated has only PORT, OFF, STBD positions.

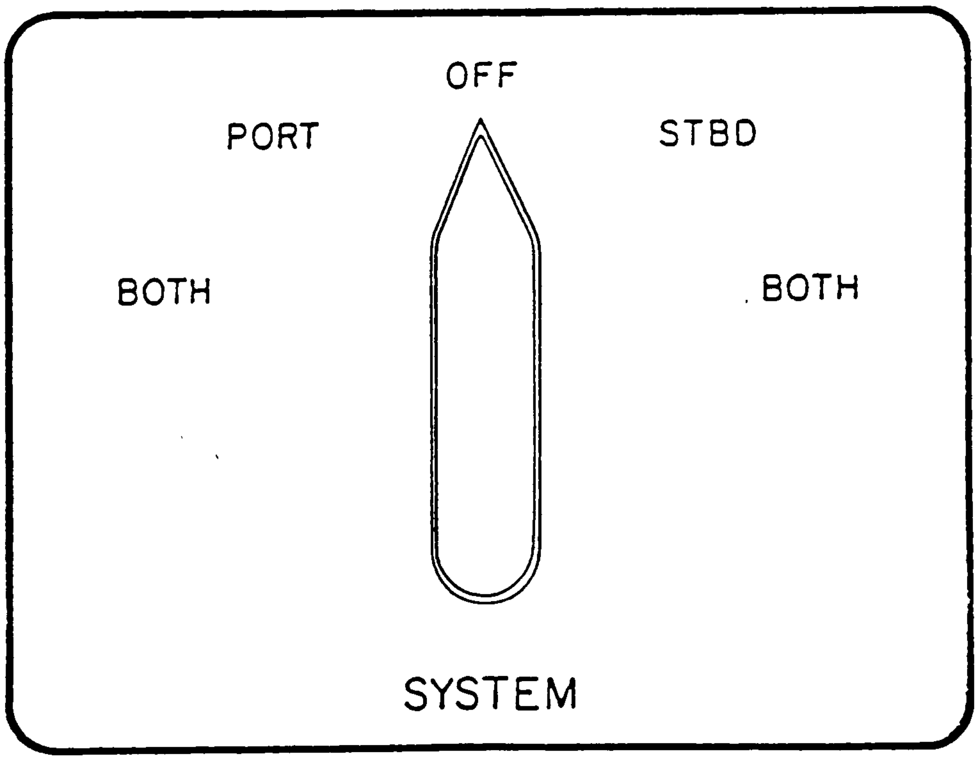

Figure 2-4. System Switch Module

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2.1.1.4 HELM MODULE

The Helm Module (Figure 2-5) contains the rudder order transmitters which are mechanically linked to the wheel. These transmitters transmit the manual rudder order signal to the operator selected Rudder Control Unit and to the electronics which supply the upper pointer of the RUDDER ANGLE IN DEG indicator on the CRT (Figure 2-8). A mechanical Rudder Order dial indicator also displays the rudder order commanded by the helmsman. Each wheel revolution results in approximately 20 degrees of rudder order. The standard mechanical helm limit is 35 degrees, but both indicators provide a graduated display for an optionally selectable 45 degree limit (refer to Service Manual JA19-4137).

Tension in the wheel is adjustable through the drag adjustment shown in Figure 2-5.

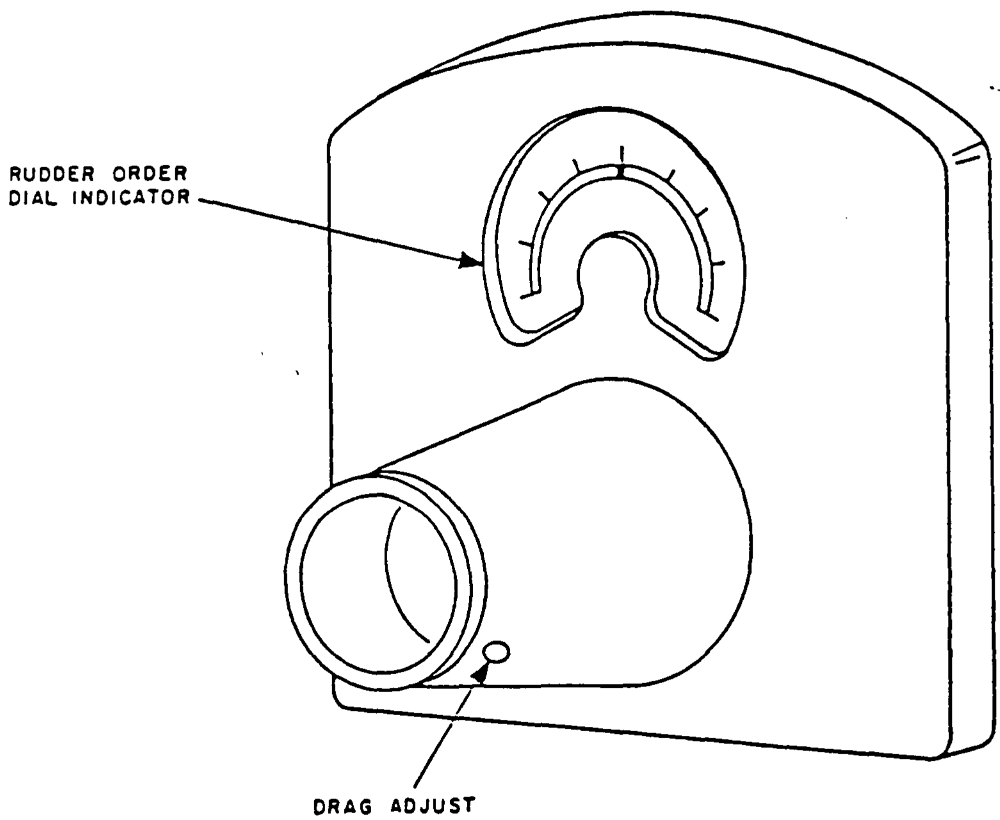

Figure 2-5. Helm Module

2.1.1.5 DIMMER MODULE

The Dimmer Module, as shown in Figure 2-6, contains three potentiometer controls that allow intensity variance of the CRT Display, the LED Status and Alarm indicators, Console panel, and helm lighting.

The STATUS control varies the intensity of the Status and Alarm LEDs contained on the Autopilot Keyboard, Status Module and Alarm Module. In the event a system malfunction is detected, the operator setting of the alarm indicators is overridden and the alarm indicator lights at full intensity. The intensity of the CRT Display is varied through the use of the CRT control. The backlighting designed for night viewing of the Console Control Modules and helm unit is provided by electroluminescent panels under the control of the ILLUM control.

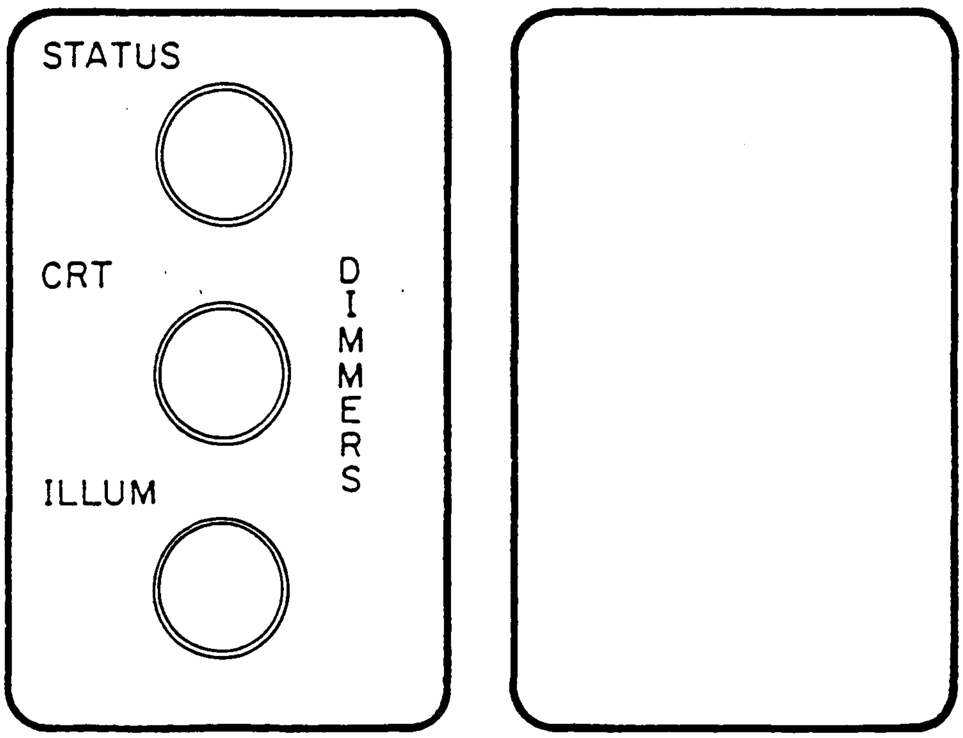

Figure 2-6. Dimmer Module

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2.1.1.6 ALARM MODULE

The Alarm Module is incorporated into the Control Console as a backup steering system and an alarm monitoring system. The two functional operations associated with this module are separated in two bordered areas, as shown in Figure 2-7.

The Alarm Module is independent of the main Control Console circuitry and is supported by separate power supplies, interface circuits and Central Processing Unit. The alarm signals sent to the Alarm Module for display are optically isolated from the main Control Console electronics.

In its backup steering function, the Alarm Module indicators and controls provide the helmsman with heading, course error and rate of turn information. These indicators and controls are contained in the upper bordered area of this module.

The rate of turn indicator (Figure 2-7) lights to indicate the direction and rate of turn. Direction is indicated by the sequential lighting of the LCDs from center to the edge of the module in the direction of turn. Rate is indicated by the time required for this sequential lighting to occur. A slow turn is indicated by a stepping effect whereas a faster rate of turn results in a fast, strobe-like effect.

The course error indicator, directly above the three digit display, provides an indication of course error (one degree error per segment) between actual heading and reference heading. Refer to the Backup Steering Mode (paragraph 2.2.5).

The course error indicator lights towards the right for starboard error and towards the left for port error. The three digit heading display provides a readout in degrees of heading and reference heading. The word HEADING is displayed below the 3-digit heading display when true heading is shown on the Alarm Module. REFERENCE HEADING is displayed for three seconds whenever the RESET switch is depressed and released.

Three heading switches provide the operator with the capabilities of heading synchronization and reference heading setting.

The use of Alarm Module Heading Switches is described in the operation section of this chapter under Backup Steering (paragraph 2.2.5).

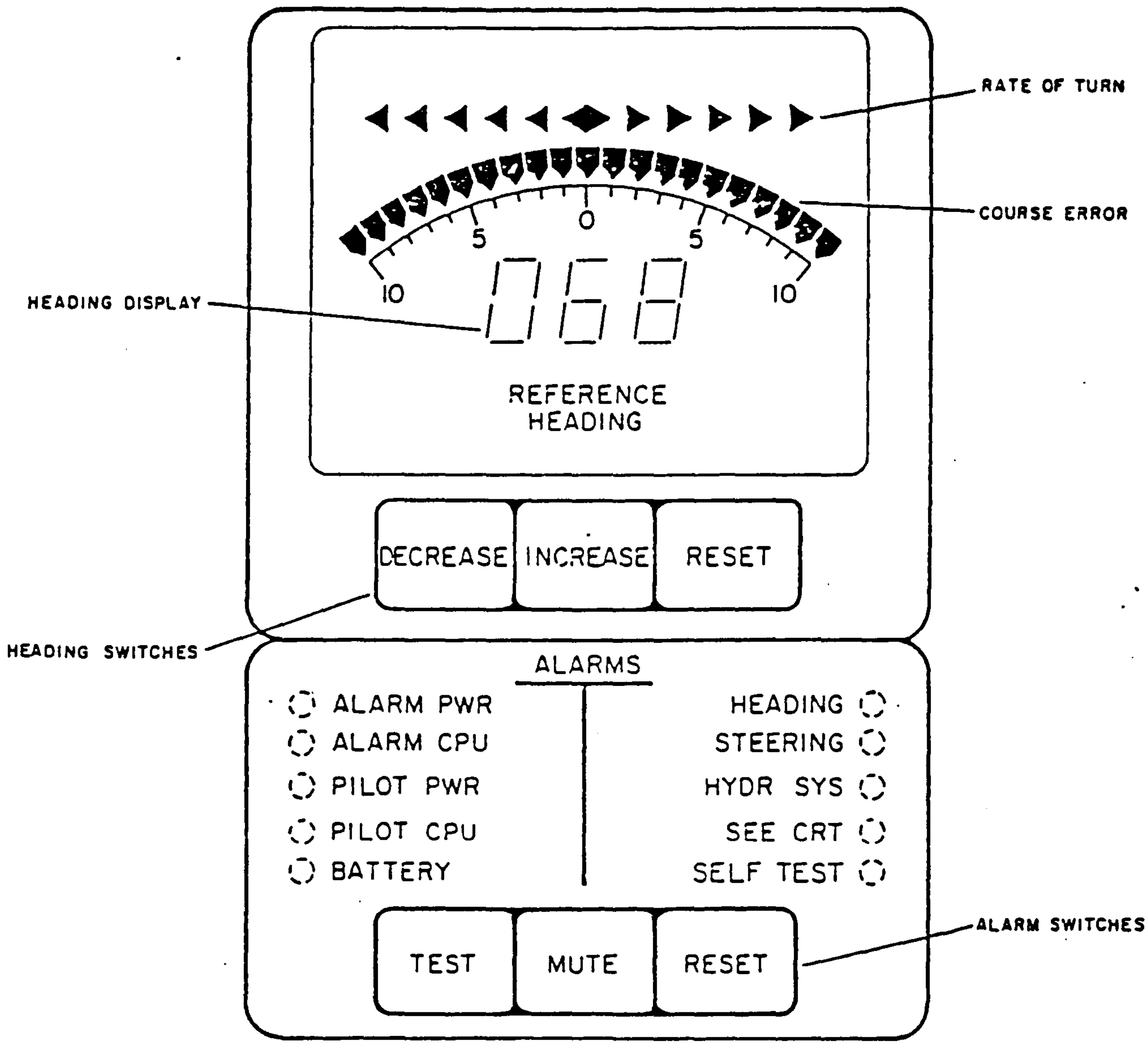


Figure 2-7. Alarm Module

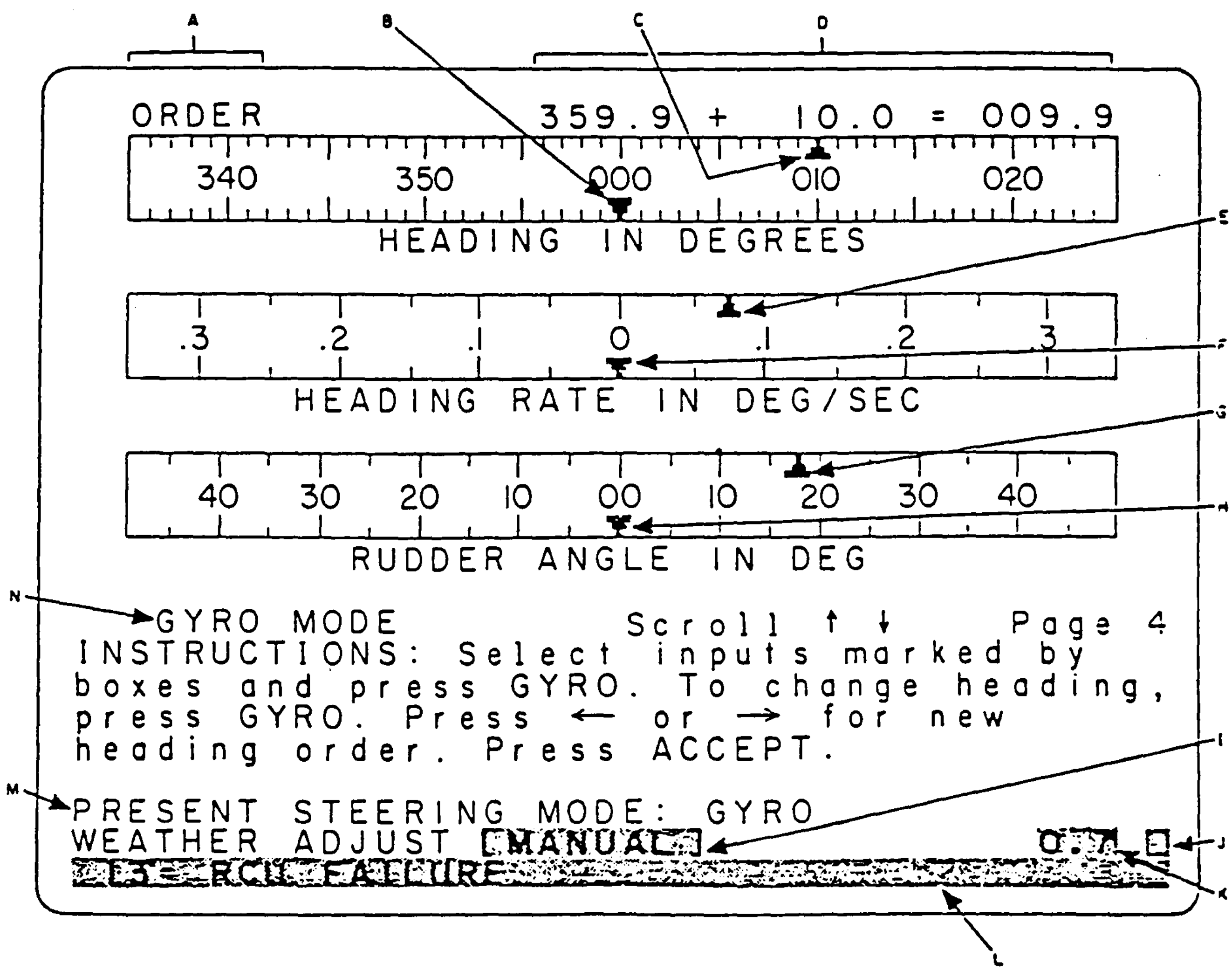


Figure 2-8. CRT Display

The border-separated alarm section of this module contains ten alarm indicators and the TEST, MUTE and RESET alarm switches. The operator response to a lighted alarm indication and the sounding of the audible alarm is included in Chapter 3 of this manual, Operator Maintenance. The Alarm Switches functions are as follows:

TEST	Depressing the TEST switch illuminates all alarm indicators and sounds the audible alarm as long as the switch is depressed.
MUTE	Depressing the MUTE switch silences the audible alarm and changes the alarm indication from its initial flashing state to a continuously lit condition.
RESET	Depressing the RESET switch clears all stored alarm conditions and alarm indicators are turned off. In an alarm condition is still present, the associated indicator will begin flashing and the audible alarm will sound.

2.1.1.7 CRT DISPLAY

NOTE

Letters shown in parentheses in the following discussion reference symbols called out in Figure 2-8.

The CRT Display (Figure 2-8) is the Ship Control System information center. The upper half of the CRT Display presentation is dedicated to three video graphic indicators that provide heading, turn rate and rudder angle information. Each indicator uses a linear scale with two video pointers. The upper video pointer depicts the operator ordered value and the lower video pointer depicts actual or current value. The HEADING IN DEG indicator is presented as a 48 degree segment of a free turning compass rose with the lower pointer (B) appearing as fixed, as shown in Figure 2-8. Above the HEADING indicator are two legends. The words SYNCHRONIZE HEADING appear to the left on systems that receive other than 1X gyrocompass information. Once the heading is synchronized by the operator, the legend changes to ORDER(A). The numeric value of heading in degrees is displayed in the upper right corner of the display (D).

The HEADING RATE IN DEG/SEC and RUDDER ANGLE IN DEG indicators are zero-center scales with linear divisions and fixed numerals. These two indicators may be turned off by the operator (capability provided when calibration mode is selected).

The lower portion of the CRT presentation contains operating instructions, operator selectable parameters and ship data. This portion of the presentation is defined as the "Page". As its name suggests, the "Page" presentation is similar to having an instruction book available. There are introductory materials, a table of contents and instructions for each operational mode on individual instruction pages. The content of each instruction page and the operators selection sequence is described in the Operation Section of this chapter.

Figure 2-8 also illustrates presentation features such as the cursor (J), operator advisory (L), selectable function (I) and variable value (K). The operator advisory displayed is one of 21 possible system messages that will initially appear as a reverse video presentation (background illuminated with black letters). The message illustrated and the other messages that may appear are defined in Chapter 3. If more than one operator advisory is present or if a system fault has resulted in multiple messages that describe the malfunction, these messages will be displayed on the lower portion of the CRT. If the number of messages exceeds the presentation limits, the remaining messages can be scrolled onto the CRT by the operator.

The reverse video format is also employed as a means of distinguishing a function or value that is being changed by the operator. Once the function or value is accepted, the legend displayed will return to its normal display format.

A definite distinction must be observed between the PRESENT STEERING MODE legend (M) and the displayed Page Title (N). Since the page displayed can be selected independently of the current system operating mode, the system operating status is observed at the PRESENT STEERING MODE data line and verified using either the Autopilot Keyboard or Status Module indicators.

For example, if current operation is in the GYRO autopilot mode, the operator can turn the page to the navigation page and set up the displayed data lines. In this case, the Page title will be NAV MODE but PRESENT STEERING MODE will reflect the actual GYRO operating mode.

2.1.2 RUDDER CONTROL UNIT (RCU)

The operator controls on the enclosure of the Rudder Control Unit (RCU) are shown in Figure 2-9 and are divided into three bordered sections.

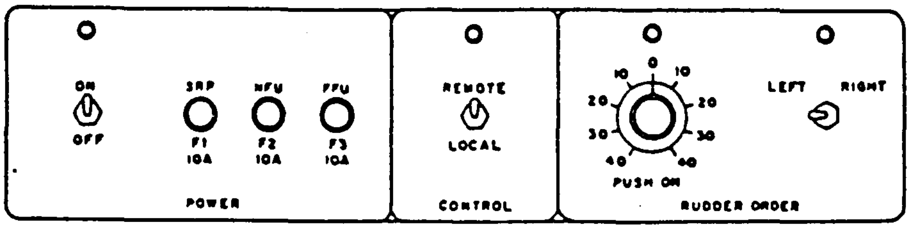


Figure 2-9. Rudder Control Unit, Controls and Indicators

The left section of the RCU Control Panel contains the power switch and three Ship Control system fuses. The legends above the fuses denote the type of circuits they are protecting. The SRP protects systems power supplied to the Control Console through the RCU. The two remaining fuses marked NFU and FFU protect non-followup and full followup steering respectively.

The center and right sections of the panel controls allow operator use of the RCU during system troubleshooting or as an auxiliary steering station. During troubleshooting, the evaluation of the Steering Control System from the RCU serves as a half-split method of fault isolation.

In LOCAL mode operation the RCU is isolated from the Control Console and becomes the Alternate Steering Station with both full followup and non-followup capabilities. In the REMOTE position the RCU rudder order controls can also provide auxiliary steering capability if the system is operating in the remote mode (enabled at the Control Console). The status lamp in the middle or CONTROL section of the panel, lights whenever the RCU is providing the steering gear control signals (the steering control signals are also referenced in this manual as solenoid Value Command and Rudder Error output signals). This lamp should not be associated with the position of the LOCAL/REMOTE switch. When the LOCAL/REMOTE switch is in the LOCAL position, a lit status lamp indicates that full followup and non-followup control are available at the RCU. When the LOCAL/REMOTE switch is in the REMOTE position, a lit status lamp indicates that the RCU is receiving rudder orders from the Control Console and is controlling the rudder positioning system or the RCU is supplying the rudder order and the steering gear control signals in the system remote mode.

The right or RUDDER ORDER bordered section of the Control Panel contains two controls and two indicators. The graduated dial control provides full followup control of the rudder positioning system. The indicator directly above it lights when this control is enabled by pressing the knob inward and then releasing. Rotation of the knob while referencing the scale markings will result in rudder order identical to using the helmsman's wheel in the helm mode. Non-followup or emergency control of the rudder positioning system can be obtained at the RCU through use of the momentary LEFT/RIGHT switch. The operator should note that operating this switch will disable and take control from the graduated dial control. When the ship's rudder positioning system is being controlled at the LEFT/RIGHT switch, this indicator directly above it will be lit.

WARNING

On dual RCU-configured Systems (two RCUs dedicated to port and two RCUs dedicated to starboard steering systems), do not operate the panel mounted controls of two different RCUs simultaneously. If both RCUs are in LOCAL operation and two different rudder commands are given simultaneously, the two may cancel and no rudder movement or slow rudder movement may result. When steering from the RCUs, one or the other should always be turned OFF. When returning to REMOTE control, make sure both RCUs are in REMOTE and turned ON.

2.2 OPERATION

2.2.1 OPERATORS INSTRUCTIONS

After selecting either the PORT or STBD steering system on the System Switch Module, the first page of operator instructions is displayed on the CRT, as shown in Figure 2-10. This illustration presents the initial viewable instruction on the area enclosed by a solid line. The dashed-line enclosured area represents display instructions available to the operator when the scroll function is used.

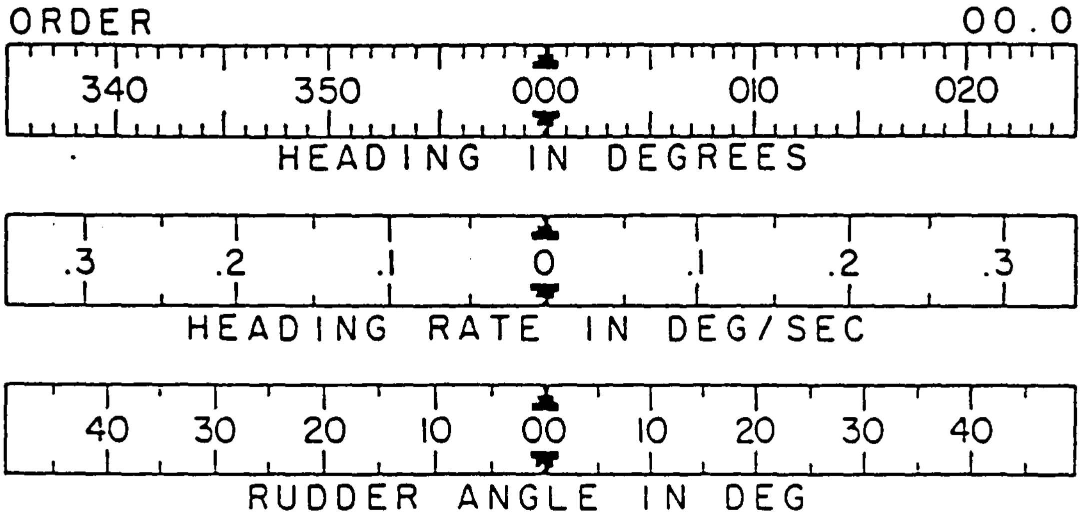
The operating instructions contained on "Page 1" are for the operator's use of the autopilot keyboard to select additional instruction pages and the operator's method of data entry to the system. The "Scroll↑↓" legend adjacent to the page title (instructions) distinguishes a page where more information can be obtained by scrolling up or down. The next subheading (SCROLL:) provides the operator instructions for scrolling the system pages.

When using the scroll function, the up arrow and down arrow legends adjacent to the Scroll legend light to indicate the position of the displayed instructions. The three possible lit states are as follows.

■	↓	Indicates more page information is available if the page is scrolled upwards.
■	■	More information both above and below the position of the page currently presented.
↑	■	More page information is available above the currently presented information (scroll downwards to view).

The next operation instruction describes CURSOR use. Depressing and releasing the CURSOR switch and then the ↑ or ↓ switches allow the operator to move the CRT-displayed cursor to a data line requiring data entry or data variation. The use of the cursor function is necessary in gyro, turn rate, navigation and calibrate modes of operation, as described in later paragraphs of this chapter.

Scrolling the page allows CRT presentation of the FUNCTION, VALUE, and TURN OFF DISPLAY instructions. The FUNCTION switch permits operator changes to system parameters that are not numeric values. The FUNCTION and ↑↓ switches allow the selection of various parameters. Parameters altered through the use of the FUNCTION switch are as follows:



INSTRUCTIONS Scroll ↑ ↓ Page :

SCROLL: Press PAGE. Press ↑ or ↓ for lines off-screen. (Indicated by Scroll ↑ ↓).

PAGE: Press PAGE. Press ← or →.

CURSOR: Press CURSOR. Press ↑ or ↓ .

FUNCTION: Move cursor to line to be changed. Press FUNCTION. Press ↑ or ↓ . Press ACCEPT.

VALUE: Move cursor to line to be changed. Press VALUE. Press ↑ or ↓. Press ACCEPT.

TURN OFF DISPLAY: Press PAGE twice.

Page index follows.

Figure 2-10. CRT Display Operators Instructions (Page ')

SHIP LOAD as LIGHT or LADEN
SPEED LOG as AUTO or MANUAL
WEATHER ADJUST as ADAPTIVE or MANUAL ADJ
NAV MODE as RHUMB LINE or GREAT CIRCLE
NAV SOURCE as MANUAL, LORAN or SAT
Next Waypoint Number as W1 through W9
Rate Display as RATE ON or RATE OFF
Rudder Display as RUDDER ON or RUDDER OFF

When the FUNCTION switch is depressed, the parameter being changed is distinguished on the CRT in a reverse video format. That is, the characters are black and the background surrounding them is brightly lit.

The VALUE instructions displayed on the CRT give the proper sequence of control switch selection to allow operator variation of parameters that must be slewed to the proper numeric value. The following is a list of selectable parameters:

Gyrocompass Synchronization
Ship's Speed
Rudder Limits
Waypoint Pending Latitude
Waypoint Pending Longitude
Present Position Latitude
Present Position Longitude
Autopilot Gain Setting
Weather Helm Rudder Offset

An operator selected VALUE which is being changed also appears on the CRT in a reverse video format until the changed value is accepted by pressing the ACCEPT switch.

The TURN OFF DISPLAY: If the PAGE switch is pressed twice, the page display (lower portion of CRT Display) will be turned off. Depressing the PAGE switch once more will turn the page display on.

2.2.2 INDEX

On the Index Page is the Table of Contents for the system. The operator can see at a glance what modes are available and determine the page location. See Figure 2-11.

NOTE

> Advancing instruction pages manually is not necessary when selecting an operating mode. When a mode selection is made (HELM, GYRO, NAV, etc.), the proper instruction page for that mode is automatically selected by the system.

The Index Page is located any time during system operation through use of the system "PAGE" function (paragraph 2.2.1).

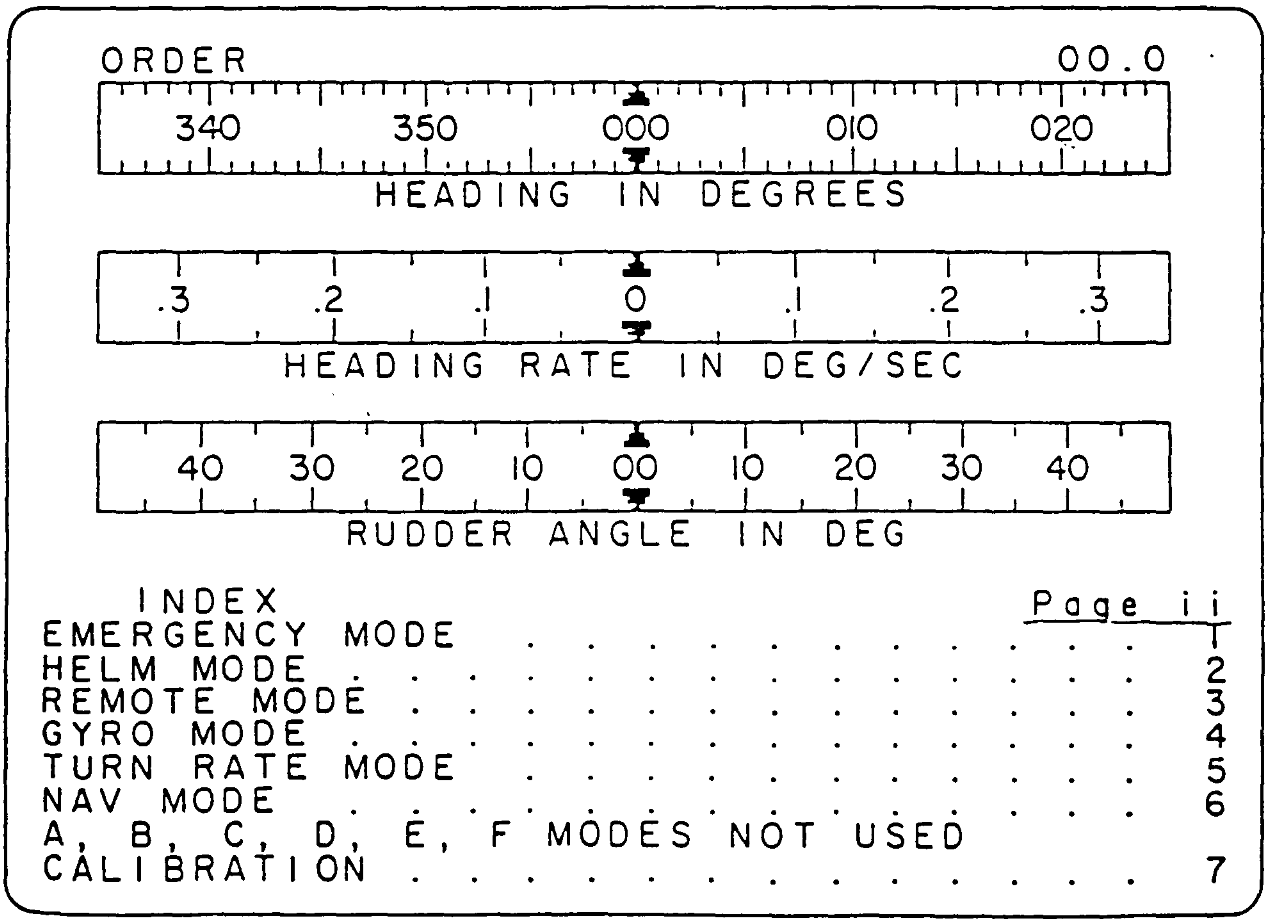


Figure 2-11. CRT Display, Index (Page ii)

2.2.3 EMERGENCY MODE

The emergency mode is selected whenever the EMERGENCY STEERING rocker switch on the Status Module is depressed left or right. This is a non-followup (NFU) system of steering gear control that employs the electrical control signals to the solenoids for directional control rudder speed.

The left and right rudder order in this mode commands direction only. Since the amount of rudder is not specified, the operator must observe the RUDDER ANGLE indicator and release the switch when the rudder moves to the approximate position desired.

The emergency mode (Page 1) display, as shown in Figure 2-12, also includes three data lines along with the mode instructions. The legend to the right of PRESENT STEERING MODE: indicates the current system operating mode.

The SPEED LOG data line provides the operator with ownship's speed on only those systems interconnected with a speed log. If a speed log is not connected and a manually entered speed is being used (SPEED LOG [MANUAL], Figure 2-16) for autopilot mode computations, a SPEED LOG data line will not be displayed. To select a speed source or change the value of ownship's speed, one of the system autopilot modes must be selected, as described in gyro mode (paragraph 2.2.7).

The SHAFT SPEED data line is an optional CRT displayed line and will not appear on systems not equipped with a shaft RPM sensor. A shaft speed indication is useful in providing an idea of time elapse between engine order and observable change in ship's behavior. Also, an alteration in propeller revolutions can affect a heading change considerably. An increase in propeller revolutions during a turn can decrease the radius of turn.

The system will remain in the emergency mode of operation until an alternate mode is selected.

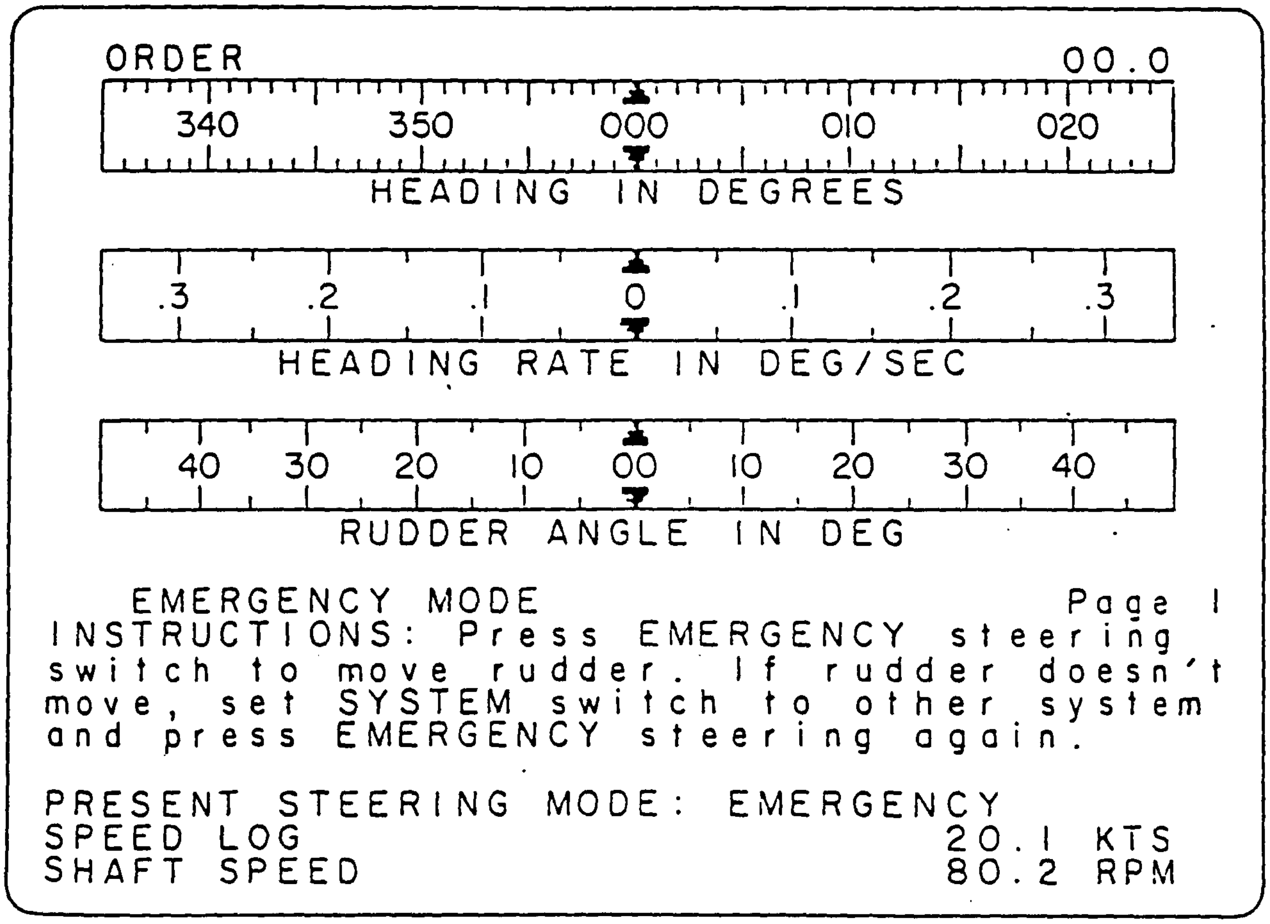


Figure 2-12. CRT Display, Emergency Mode (Page 1)

2.2.4 HELM MODE

The helm mode is selected by depressing the HELM switch on the Status Module and the CRT presentation changes as shown in Figure 2-13.

The helm mode is a full followup (FFU) control mode that enables the operator to introduce the amount and direction of rudder movement desired from the Control Console Wheel.

In the helm mode the SPEED LOG and SHAFT SPEED data lines are present if the system is connected to external sensors providing this information.

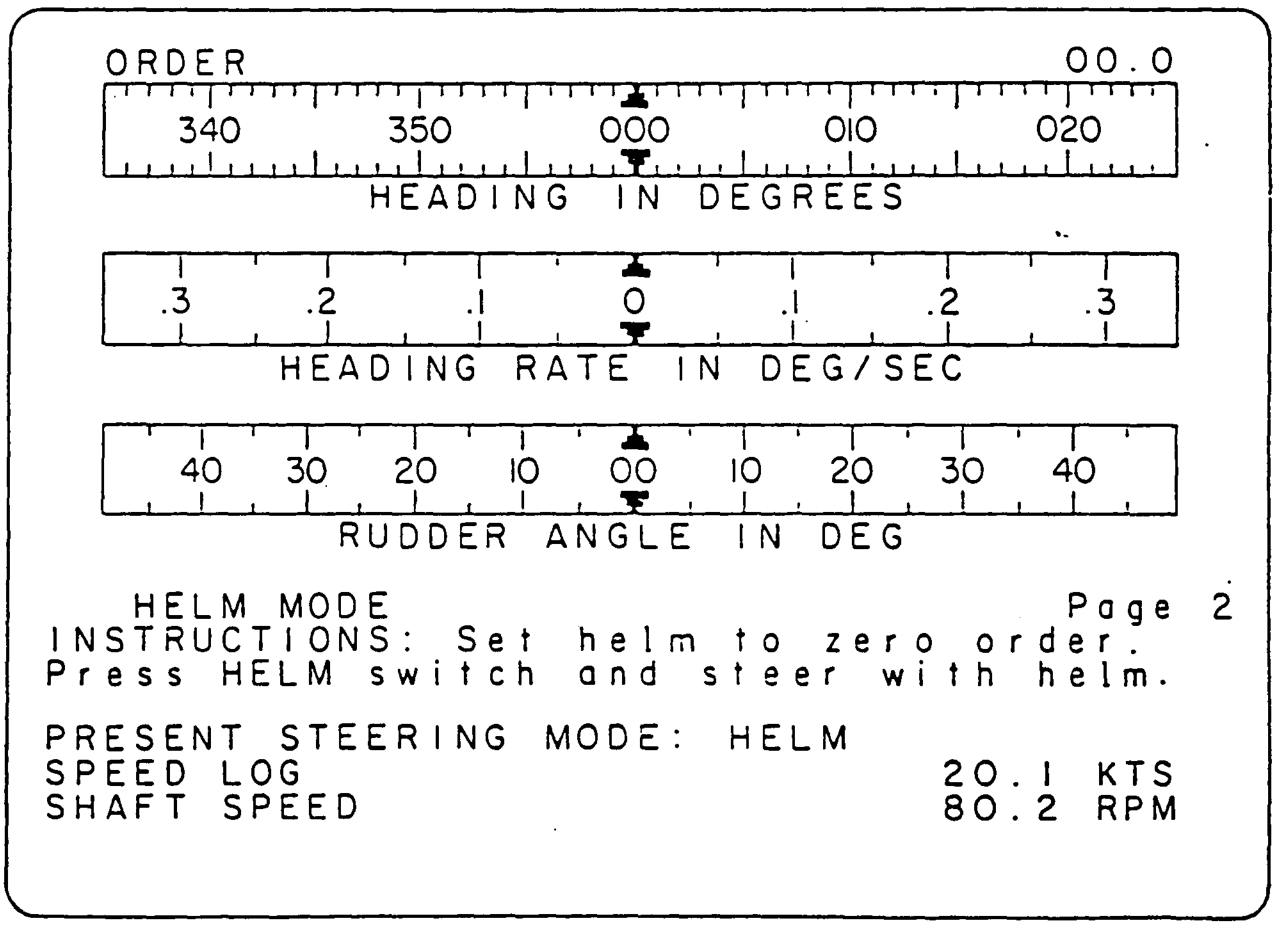


Figure 2-13. CRT Display, Helm Mode

2.2.5 BACKUP STEERING MODE

The heading portion of the Alarm Module provides backup heading and course keeping information in the event of a CRT Display failure.

The three switches contained within the upper bordered area of this module allow heading synchronization and reference heading selection (Figure 2-7).

On systems receiving other than 1X gyrocompass information, a flashing heading readout indicates that synchronization is required. Synchronize the Alarm Module as follows:

1. Depress and hold the RESET switch.

2. Use the DECREASE or INCREASE switches to match the numeric readout with own ship's heading.

3. Release the RESET switch.

The capacity to set a reference heading is available at this module. If ownship's heading changes more than a predetermined amount from the reference heading, an audible alarm will sound.

The REFERENCE HEADING is entered by depressing and then releasing the RESET switch. Whenever the RESET switch is released, the HEADING legend changes to REFERENCE HEADING for three seconds. The operator then uses the DECREASE and INCREASE switches to set the numeric value of reference heading. The system will time-out of the reference heading mode after three seconds without operator use of the DECREASE, INCREASE or RESET switches.

2.2.6 REMOTE MODE

Remote mode operation allows control of the ship's rudder positioning system from one of the RCU control panels or, if equipped, an auxiliary steering station. The type of steering control provided in this mode depends on the remote steering station. Both NFU and FFU steering modes can be used. The remote mode CRT Display presentation appears as shown in Figure 2-14.

The operator enables and maintains control status of remote mode operation at the Status Module. Depressing the REMOTE switch enables auxiliary takeover of the steering system, and the indicators adjacent to the REMOTE ON legend (Figure 2-3) provide a status indication when an auxiliary station has taken system control. An optional steering station is considered a peripheral to the RCU and an RCU can be interfaced with as many as three auxiliary stations.

A remote steering station should also have the additional capacity to monitor rudder angle and heading.

The SPEED LOG data line provides the operator with the current value of ownship speed and the source of speed information currently in use. The operator can place the cursor at the end of this line and change both function and value. The function select either AUTO speed from ship speed sensing equipment or MANUAL speed. If MANUAL is selected as the source of speed information, the VALUE switch is depressed to allow the operator to set the current speed value through use of up arrow and down arrow switches. The manually entered value of ownship's speed is used by the system Autopilot Processors in GYRO, TURN RATE and NAV operating modes, but this manual value of ship's speed is not displayed in the system manual modes of EMERGENCY, HELM or REMOTE.

The Ship Control System processes the rudder order signal, provided in gyro mode, in accordance with the operator setting of the WEATHER ADJUST data line. Two Weather Adjust functions are selectable: MANUAL and ADAPTIVE.

Manual rudder order compensation utilizes the calibrated settings of RATE, FILTER and INTEGRAL along with an operator selectable gain value between ~~0.1~~ and ~~1.0~~.7 The set gain value controls the sensitivity of the system to bring ownship back to the selected heading when it yaws from that heading. A low gain value is best for calm seas; an increased gain value increases compensation for rough seas.

Selecting ADAPTIVE as the function associated with WEATHER ADJUST enables the Adaptive Steering Mode (ASM). Adaptive compensation is designed to increase fuel savings by reducing drag caused by excessive rudder motion due to varying speed, sea states and different ship loading. In manual weather adjust the helmsman must select and alter the gain setting and then evaluate ownship's response; whereas, in adaptive weather adjust the system monitors the rudder motion, while keeping a steady course and automatically changes the gain values for optimum ship control. Adaptive compensation also automatically selects a different set of compensating gains to provide for ship maneuvers greater than three degrees.

The next data line, WEATHER HELM, is updated by the system to show left (L) or right (R) heading offset in degrees that counteracts any heading deviations caused by external forces (winds, etc.). The value of left or right heading offset can also be adjusted by the operator through use of the CURSOR and VALUE switches.

The RUDDER LIMIT data line permits operator setting of the starboard and port rudder movement limits through use of the CURSOR and VALUE functions. The operator can set a rudder limit between 5.0 and 35.0 degrees.

2.2.7 GYRO MODE

In the gyro mode the system compares the heading information received from the gyrocompass with the operator selected heading value and generates a rudder order signal. This rudder order signal is routed to the RCU where it is compared with a rudder repeatback signal (rudder angle). Any difference in the two signals results in a rudder error signal to the hydraulic power unit controlling rudder movement.

The gyro mode is selected by depressing the GYRO switch on the Autopilot Keyboard. The CRT Display presentation appears as shown in Figure 2-15. In addition to the PRESENT MODE SELECTED and SPEED LOG data line, the WEATHER ADJUST data line is displayed in this mode.

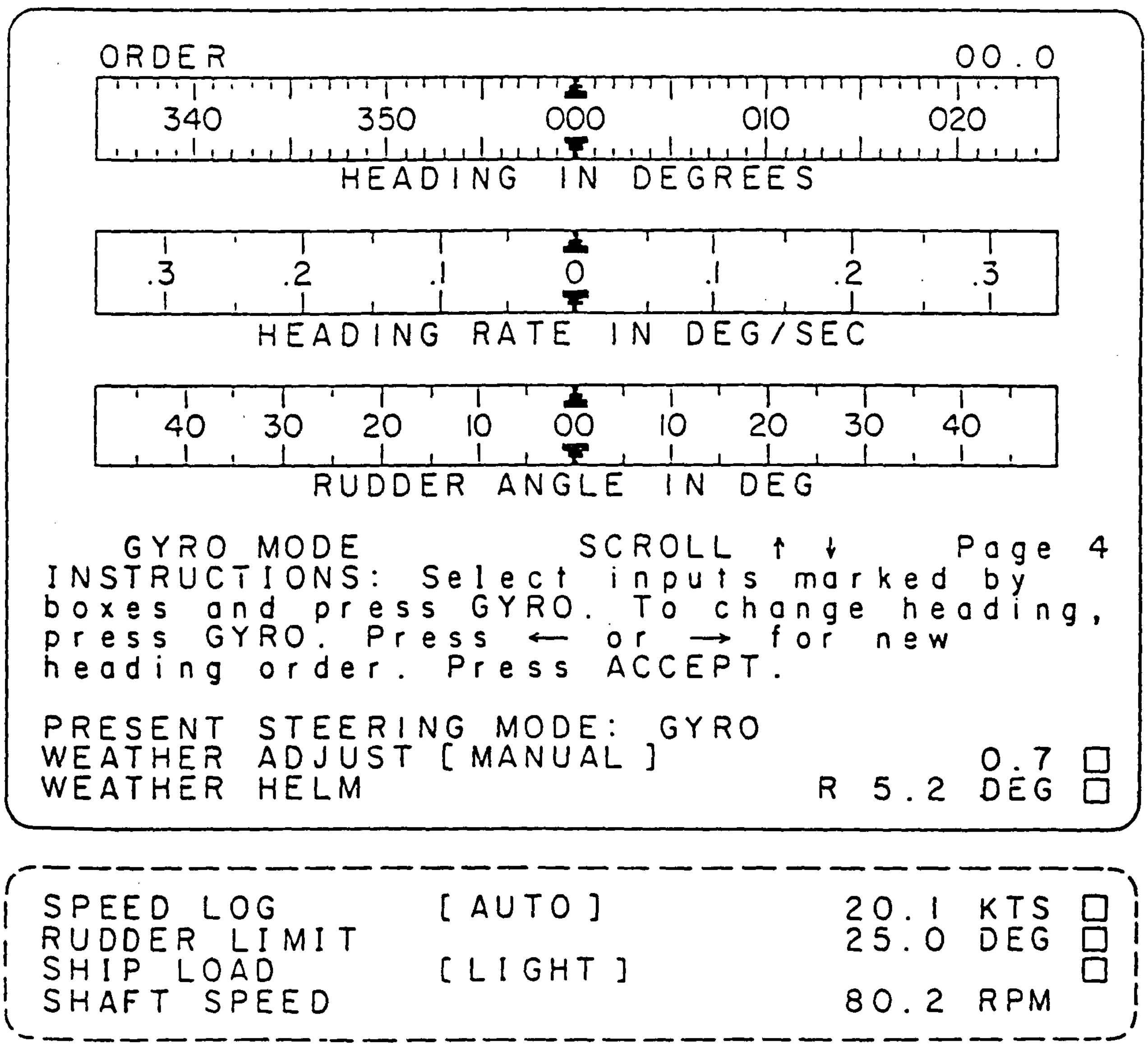


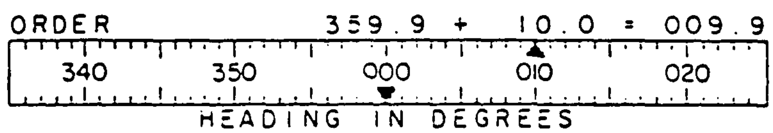
Figure 2-15. CRT Display, Gyro Mode

With the cursor at the end of the SHIP LOAD data line, the operator selects either LIGHT or LADEN depending on ownship's present load condition. The ship load selection affects both MANUAL and ADAPTIVE autopilot compensation.

To change heading in the gyro mode:

1. Depress the GYRO switch even if gyro is the presently selected mode of operation. This enables heading slew by the operator.

2. Slew the desired compass heading by the ← → or ↑↓ switches. When implementing a heading change, the upper pointer on the HEADING IN DEG indicator will deflect in the direction of the selected heading and the upper right legend will change to indicate current heading ± the number of degrees which must be traveled to = the desired heading.



The changing right-hand legend is necessary since only 43 degrees of the 360 degree heading indicator is displayed at any one time.

3. When the new heading is set on the CRT, depress the ACCEPT switch. The heading indicator will appear to rotate towards the desired heading value. The turn rate and rudder angle indicators will provide the current values being used to achieve the heading change. When the new heading is reached, the upper right legend will revert to a single value readout of heading command and both pointers will align on the heading indicator displayed value of heading (mid-scale).

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2.2.8 TURN RATE MODE

The turn rate mode provides a method of giving a helm order in degrees per second. The turn rate mode is useful in the following applications:

Rate of turn stays constant and compensates for the effects of external forces on ownship.

One smooth turn instead of a series of sharp turns.

A reduced loss of speed and economical (small rudder angle) maneuver.

Depressing the TURN RATE switch on the Autopilot Keyboard selects the turn rate mode. The CRT Display presentation for the turn rate mode is shown in Figure 2-16. Once the turn rate mode is initiated, the rate and direction of turn can be set on the HEADING RATE indicator through use of the upper scale pointer and the left arrow and right arrow switches, or up arrow and down arrow switches.

An ownship maneuver in turn rate mode is performed as follows:

1. Depress the TURN RATE switch on the Autopilot Keyboard.
2. Slew the upper pointer on the HEADING RATE indicator to the desired rate of turn using the ← → or ↑↓ switches.
3. Depress the ACCEPT switch. The rudder angle and rate indicators will start to change.
4. The turn rate pointer will align with the turn rate order pointer within a few minutes.
5. To exit turn rate, depress TURN RATE switch and again slew the top pointer on the HEADING RATE indicator to zero. Accept the zero turn rate and then select the desired operating mode.

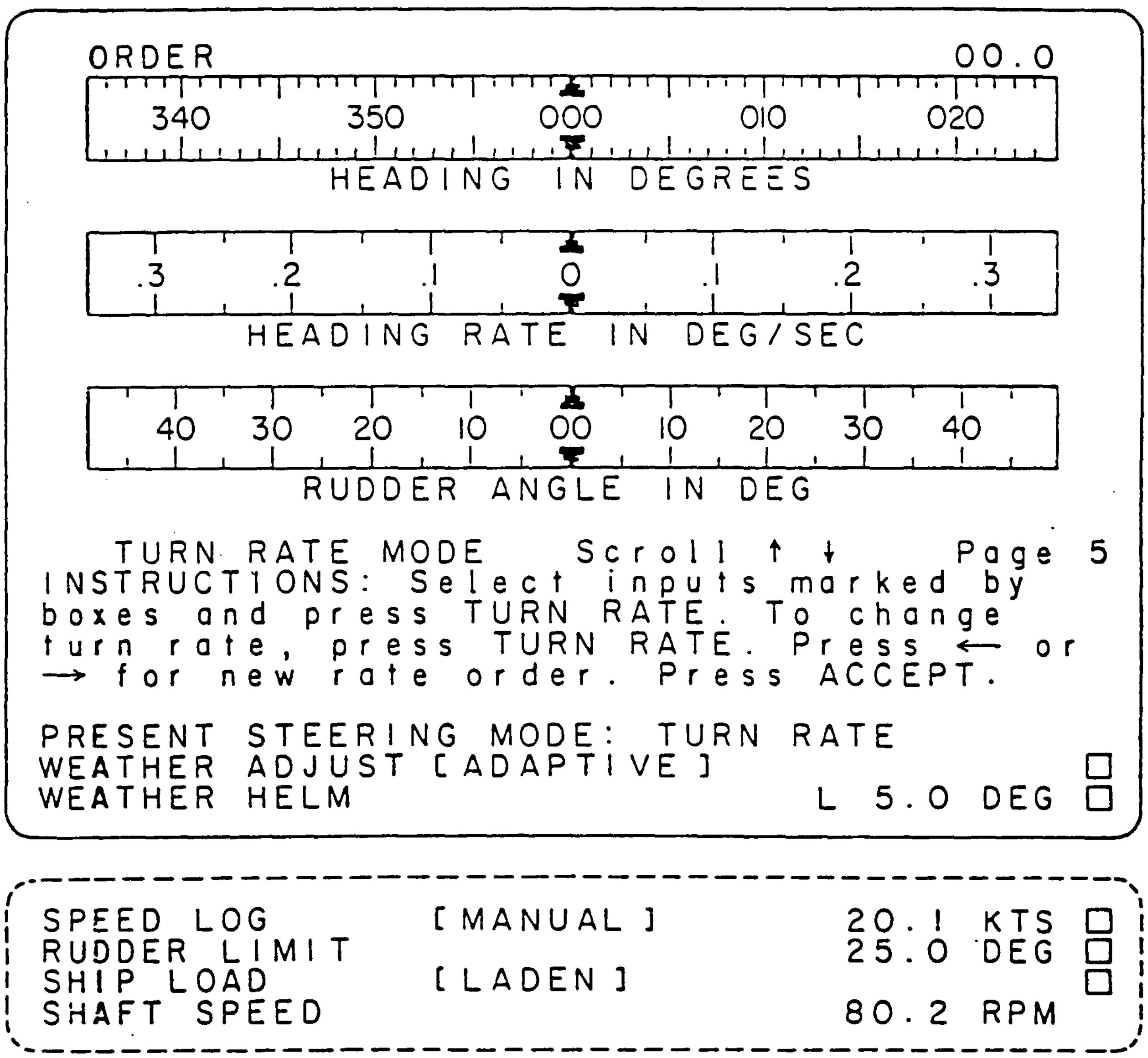

Figure 2-16. CRT Display, Turn Rate Mode

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2.2.9 NAV MODE

The navigation (NAV) mode is an autopilot mode that provides computer-controlled path guidance up to nine selected waypoints. Ownship's tracking and positioning information can be obtained from either externally connected navigation receivers or entered manually. With manual entry of latitude and longitude positioning is based on ownship's heading input from the gyrocompass, ship's speed derived from the speed source equipment and the set and drift values determined by the system or manually set by the operator. The navigation mode also allows operator selection of an interfaced navigation receiver capable of acquiring signals from passing satellites or fixed shore stations and presenting the position data as a digital output ready for computer processing. The system will accept position information from any one of the following sources:

a. Satellite Navigation (SAT). An interfaced satellite receiver can be used to provide longitude and latitude data accurate to within a few hundred feet (300 feet at satellite fix).

b. Loran C (LORAN). Interfacing the SRP 2000 Ship Control System with a Loran C receiver can provide latitude and longitude data accurate to within a few hundred feet (50-300) feet repeatability).

c. Global Positioning System (GPS). The NAV STAR GPS is a developmental satellite navigation system that can continuously provide highly accurate position, speed and time information at any point on the earth's surface. It is proposed to deploy a constellation of 18 satellites which will enable the user to calculate position at any location or time.

d. OMEGA. Low frequency fixed station system providing position-fixing information.

Operation in the navigation mode is selected using either of two approaches. The operator can select the NAV PAGE and initialize a present position and desired waypoints while still operating in another Ship Control System mode or the navigation mode can be selected prior to present position and waypoint initialization. The system does not actually start operating in the navigation mode until the system-computed heading between present position and the next waypoint is verified and then accepted by the operator. The system advisory "HEADING CHANGE FOR WAYPOINT" will appear on the CRT Display as a notification to the operator. The operator accepts the new heading by pressing the NAV switch and then the ACCEPT switch. The system re-evaluates its computed heading once a minute and if a heading variation of over one degree from the last operator-accepted heading is required to maintain a course to the next waypoint, the system will alert the operator with both the visually displayed advisory and an audible alarm. Again the operator must verify and accept the new heading before a heading change will be performed by the system.

If the navigation mode is selected by depressing the NAV switch on the Autopilot Keyboard the CRT Display presentation will appear as shown in Figure 2-17. The operator now selects the navigation parameters by scrolling the presentation upwards until the NAV SOURCE data line is at the top of the instruction section of the CRT Display. Through use of the Autopilot Keyboard CURSOR and FUNCTION switches the operator selects the desired source of position information from the following available sources:

MANUAL: Navigator entered ownship position (Dead-Reckoned) combined with ship's heading and velocity will be the basis of navigation accuracy. If system SET, DRIFT CORRECTION is ON (last displayable data line, Figure 2-17), a system computation of operator entered values of set and drift between manually entered fixes will be included in the autopilot generated rudder commands to increase track accuracy.

LORAN: Enables Loran receiver input of latitude and longitude. The display readout of PRESENT position in latitude (LAT) and (LON) will be from the Loran Receiver.

SAT: Enables Satellite Receiver input of latitude and longitude into the system.

Positioning the cursor on the next data line allows the selection of either RHUMB LINE or GREAT CIRCLE as the course of travel to be followed by the system.

Ownship's position is entered through the use of the PRESENT data line and the waypoints are selected using the PEND (Pending) data line. After placing the CURSOR at the end of the PRESENT line, enter ownship's position through use of the VALUE and all four of the arrow keys. The left and right arrow keys are used to select the degree, minute, second and geographic location of latitude or longitude to be entered or change; whereas, the up and down arrow keys allow slewing of the value or location. For example, if ownship is located LAT 40 20.00N and LON 073 50.00W, the operator will slew the LAT degrees to read 40 with the up and down arrow switches. Then, by depressing the right arrow switch once, the LAT minutes can be slewed to read 20. The value being changed is highlighted through the use of reverse video illumination of that value. By continuing to use the right arrow switch the operator can sequentially change the LAT seconds, the LAT geographic location (N or S) and then enter the 073 50.00W longitude a step at a time.

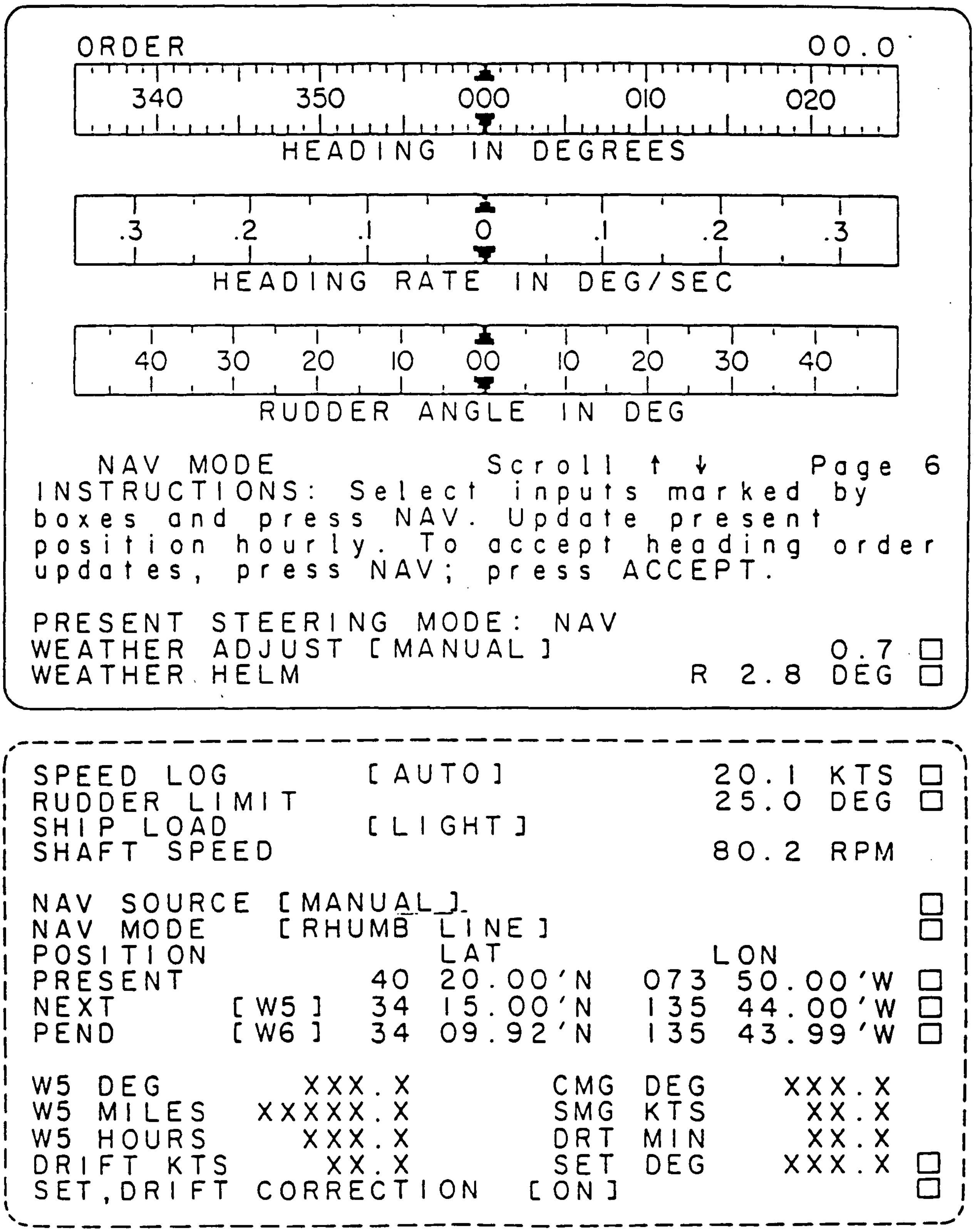

Figure 2-17. CRT Display, NAV Mode

NOTE

> If the CURSOR is moved to the PEND line to input waypoint before the operator accepts the entered present position, the PRESENT data line readout will revert to the last value of LAT on LON displayed and not the newly entered present position.

The only difference in waypoint entry from that of present position is the selection of the waypoint being entered (W1-W9) through use of the FUNCTION and arrow switches. Placing the CURSOR at the end of the PEND line and depressing FUNCTION will illuminate the waypoint selection box and will allow W1 through W9 selection using any of the arrow keys. The LAT and LON of the selected waypoint is entered identically to the procedure described for ownship's present position. Be sure to accept the current waypoint entry before proceeding to the next waypoint.

The NEXT data line is used to set the waypoint retrieval sequence for the system. Using the FUNCTION switch, the operator can designate any of the nine programmed waypoints as the next waypoint for heading-to-steer computations. Once a waypoint is selected, the remaining waypoints are updated automatically in numerical sequence, either increasing or decreasing in number. For example, if W1 is selected, the system will step through W1 to W9 in order, whereas if present position is W9 and the operator wishes to use the same route but in reverse order, he will select W8 and the system will step back in sequence (W8, W7, W6, ..., W1).

Once present position and waypoint locations are entered, the operator checks the system computed heading. Accepting the generated heading places ship's rudder command generation under navigation mode control.

By scrolling the page upwards the current navigational information will be displayed on the CRT Display. This information locates the NEXT waypoint to be reached in degrees (DEG), nautical miles (MILES) and the time until the waypoint is reached in HOURS at present speed. Also displayed is Course Mode Good (CMG) in degrees (DEG), Speed Mode Good in knots (SMG KTS) and the time from the last position fix (manual or external sensor) in minutes as Dead-Reckon Time (DRT MIN).

The next data line is a display line for system computed set and drift between waypoints and also a data line that will allow operator entry of set and drift. The last display line determines if set and drift values are used during system navigation mode computations. If the OFF function is selected, no set and drift correction is included in navigation rudder command generation.

2.2.10 CALIBRATION

The calibration page is selected through operator use of the PAGE function and is not automatically selected with any mode selection. During system installation this instruction page allows the data entry of information peculiar to the vessel on which it is installed. Once the system initial installation procedures have been completed, the calibration page presentation appears as shown in Figure 2-18. The operator functions available in this mode are heading synchronization and removal of the Heading Rate and Rudder Angle CRT indicators.

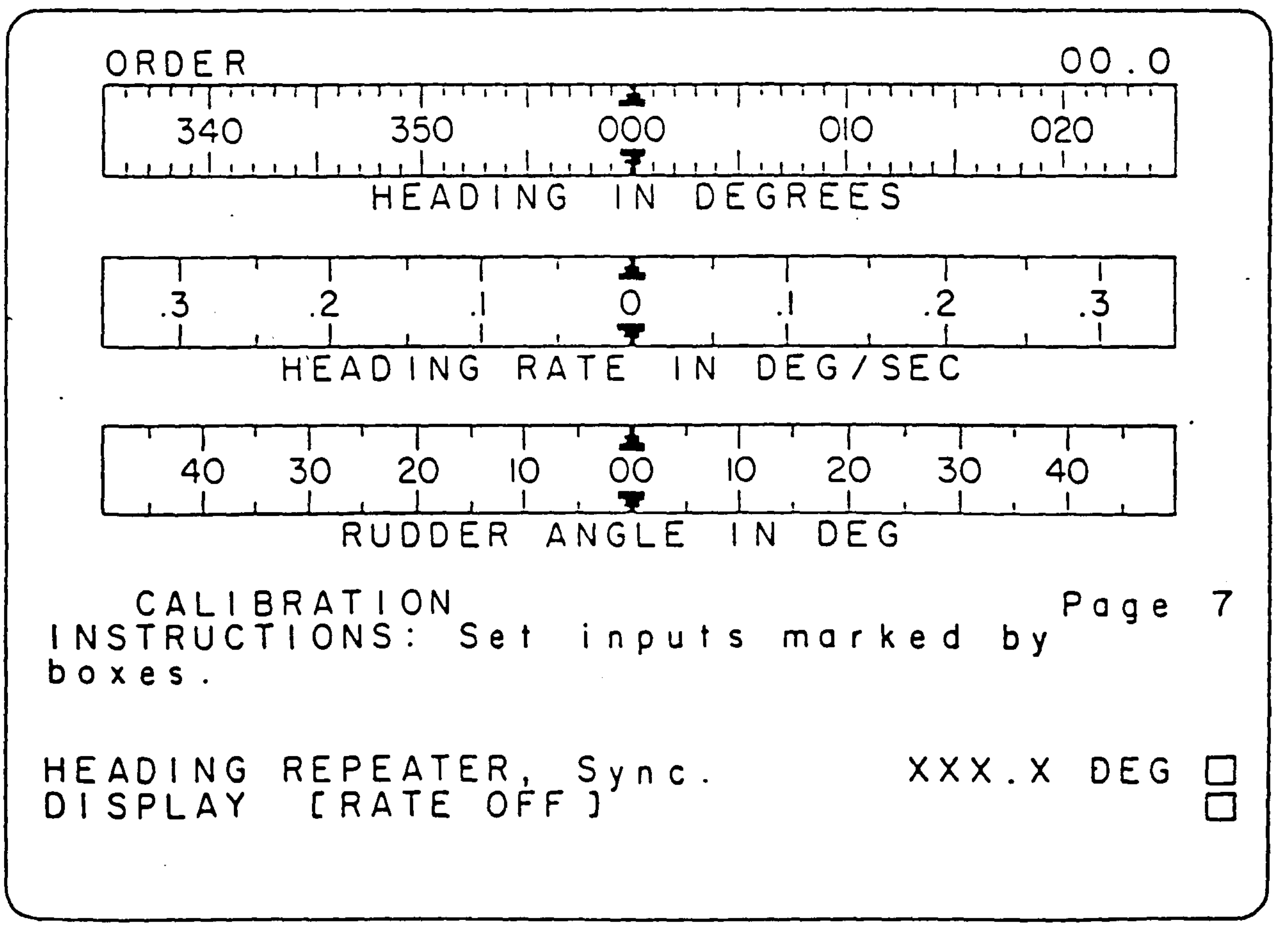

Figure 2-18. CRT Display, Calibration

After placing the cursor at the end of the HEADING REPEATER line, the operator increases or decreases the heading readout to agree with the gyrocompass using the ↑ ↓ switches. If gyrocompass input data is 1X synchro, synchronization of heading is not needed. Once the ship's heading is synchronized, the operator will not need to make any further adjustment in heading as long as the system remains energized. The system will use its input from the gyrocompass and keep the HEADING indicator aligned with ownship's heading.

The operator can elect to display or not display the HEADING RATE and RUDDER ANGLE indicators through use of the DISPLAY data line.

The selection is made by first moving the cursor to the end of the data line and then depressing the FUNCTION switch to present the RATE ON, RATE OFF, RUDDER ON and RUDDER OFF legends.

Figure 2-19 shows the various states of indicator selection. As the legend is brought into the data line box, the operator decides if the indicated status is the condition he wants. If, as an example, the RATE OFF legend is displayed and the operator elects to remove the HEADING RATE indication, the selection is made by depressing the ACCEPT switch. Selecting the RATE ON legend and then depressing the ACCEPT switch will bring the indicator back on the display. The two legends for the RUDDER ANGLE indicator work identically to that described for the HEADING RATE indicator.

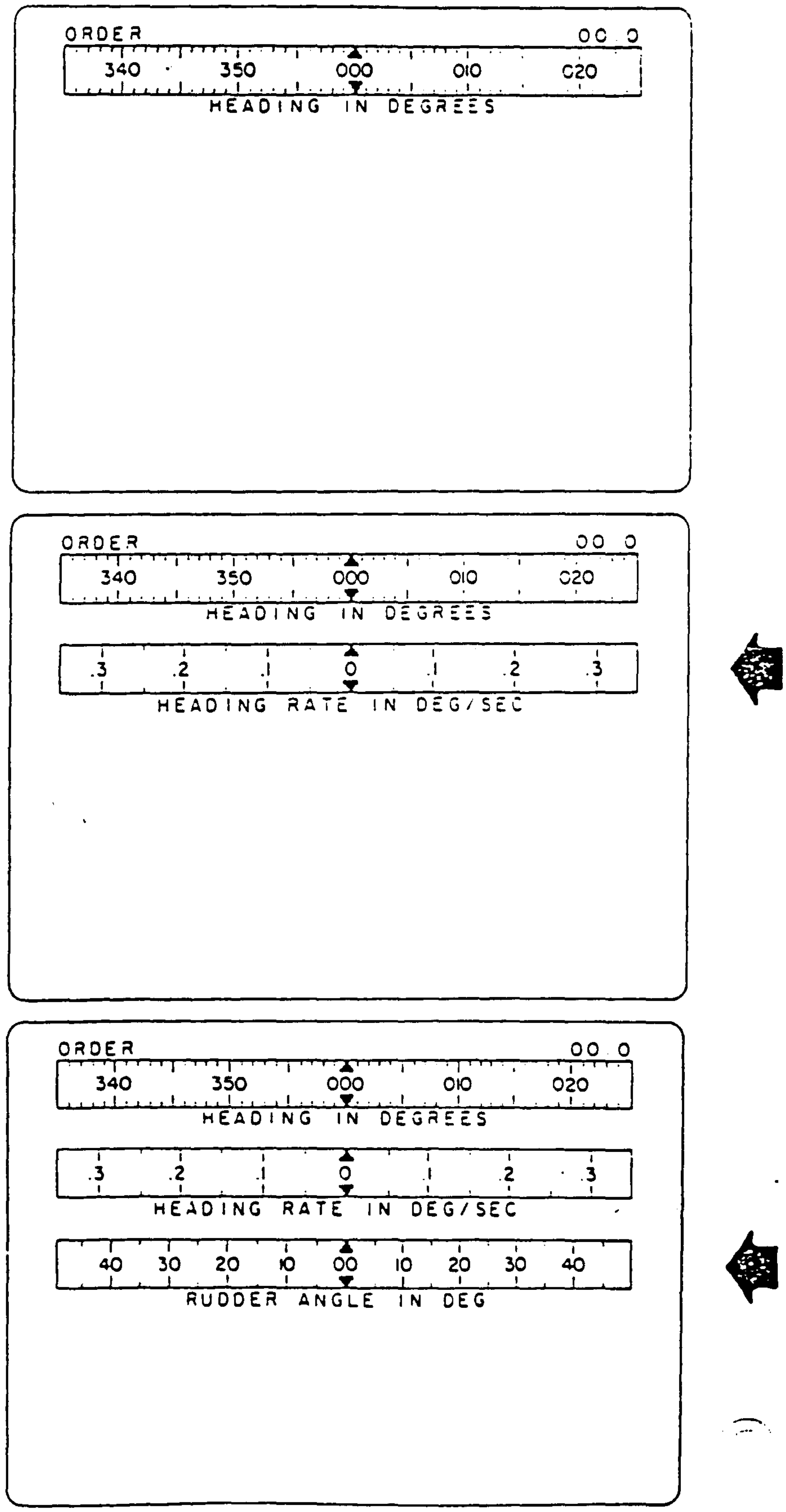

Figure 2-19. CRT Display, Indicator Removal

2.2.11 RUDDER CONTROL UNIT OPERATION

The panel mounted control (Figure 2-9) on the Rudder Control Unit can provide steering gear room control of ship's rudder. A complete Control Console failure or a system interconnection wiring problem are examples of circumstances where RCU control panel operation would provide emergency steering system takeover. System control at the RCU does require a heading indicator and rudder angle indicator located near the RCU.

Table 2-1 defines the function of the RCU controls used during steering gear room control of ship's rudder.

Table 2-1. Rudder Control Unit Operating Controls

Control	Function
REMOTE/LOCAL Switch	REMOTE - Normal system operation with RCU selection under the control of the Control Console LOCAL - Disconnects RCU from Control Console. The RCU becomes the priority rudder control element.
Graduated Dial Control	Push and release to enable control which provides full followup control of ship's rudder.
LEFT/RIGHT Switch	Provides Emergency (non-followup NFU) operation from the RCU. Rudder movement stops when this switch is released.

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2.3 OPERATING PROCEDURES

Table 2-2 provides abbreviated operating procedures for an operator already familiar with the operating controls, indicators and displays previously described in this chapter.

Table 2-2. SRP 2000 Operating Procedures

SYSTEM TURN-ON AND INITIALIZATION	CONSOLE TURN-ON AND SETUP
A. Ensure ship's power is available to SRP 2000 equipment and ship steering gear.	A. Rotate the console SYSTEM SWITCH to select the operational steering system (STBD, PORT or BOTH).
B. Set Rudder Control Unit power switches to ON.	B. Set STATUS, CRT and ILLUM controls for proper console illumination levels.
C. Individually place each RCU in LOCAL operation and check for proper FFU and NFU operation.	C. Check for and note any system advisories that appear at start up.
D. Set all RCUs for REMOTE operation.	D. Depress TEST switch and check console CRT Display presentation, alarm indicators and audible alarm.
	E. (IF REQUIRED) Select CALIBRATION PAGE and synchronize heading.
	F. Synchronize Alarm Module Heading Indicator.
	G. Check Status Module indicators for proper system operation and RCU selection.
	H. Select desired operating mode.

Table 2-2. SRP 2000 Operating Procedures (Cont)

EMERGENCY MODE	HELM MODE
A. Press EMERGENCY STEERING rocker switch on the Status Module to move rudder.	A. Rotate wheel to zero degree rudder order.
B. Observe rudder movement on RUDDER ANGLE indicator. Release switch when rudder is at desired angle.	B. Press HELM switch on the Status Module.
C. If rudder does not respond, set system switch to another steering system.	C. Steer with Helm Wheel.
D. If rudder does not respond, local emergency operation from the RCU panel is available.	

Table 2-2. SRP 2000 Operating Procedures (Cont)

GYRO MODE	TURN RATE MODE
A. Select SPEED LOG function: • AUTO - Accepts ship's speed log input • MANUAL - Operator-entered speed using VALUE.	A. Select SPEED LOG function. • AUTO - Accepts ship's speed log input • MANUAL - Requires operator entry of speed using VALUE switch
B. Set RUDDER LIMIT between 5-35 degrees.	B. Set RUDDER limit between 5-35 degrees.
C. Select SHIP LOAD function: • LIGHT • LADEN	C. Select SHIP LOAD function: • LIGHT • LADEN
D. Select WEATHER ADJUST function: • ADAPTIVE - Adaptive Steering Mode. Minimum rudder order for heading changes and course keeping • MANUAL - Operator controlled rudder order compensation. Set gain value between ~~0.1-1.0~~ 1 - 7	D. Select WEATHER ADJUST function: • ADAPTIVE - Rudder command compensation under computer control • MANUAL - Operator controlled rudder command compensation. Set gain value between 0.1-3.0
E. Set Weather Helm: (Operator setting is optional) Setting a left or right degree reading will offset gyro heading order.	E. Press TURN RATE and then slew upper pointer on the CRT HEADING RATE IN DEG/SEC indicator.
F. Depress GYRO switch on the Autopilot Keyboard.	F. Press ACCEPT to enact turn. Observe lower pointer on HEADING RATE IN DEG/SEC indicator for turn rate of ownship.

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Table 2-2. SRP 2000 Operating Procedures (Cont)

GYRO MODE (cont)	NAV MODE
G. Slew heading using left and right arrow switches. NOTE Pressing GYRO switch enables the slew function. GYRO switch must be pressed to allow heading change.	A. Select SPEED LOG function. ● AUTO - Accepts ship's speed log input ● MANUAL - Requires operator entry of speed using VALUE switch B. Set RUDDER limit between 5-35 degrees. C. Select SHIP LOAD function: ● LIGHT ● LADEN D. Select WEATHER ADJUST function: ● ADAPTIVE - Rudder command compensation under computer control (fuel saving mode) ● MANUAL - Operator controlled rudder command compensation. Set gain value between 0.1-1.0 E. Select NAV SOURCE function: ● SAT - Present position from Satellite Receiver displayed on PRESENT data line. Accept fix if correct

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Table 2-2. SRP 2000 Operating Procedures (Cont)

NAV MODE (cont)

- LORAN – Present position from Loran Receiver displayed on PRESENT data line. Accept position if correct
- MANUAL – Enter ownship's present LAT and LON on PRESENT data line

F. Select and enter waypoints on PEND data line.

G. Select either ON or OFF for SET, DRIFT CORRECTION.

NOTE

Operator can enter set and drift if known; otherwise set and drift are computed between system position fixes.

H. Press NAV switch on Autopilot Keyboard.

I. Verify system-generated heading to steer and press ACCEPT.

BACKUP STEERING

A. Select HELM MODE operation and steer to desired heading using heading display on the Alarm Module.

B. Depress the RESET switch on the heading section of the Alarm Module.

NOTE

REFERENCE HEADING will appear below the three digit heading display.

C. Slew a reference heading using the DECREASE or INCREASE switches.

NOTE

Reference heading setting mode will time-out after three seconds without operator use of the heading switches.

D. Maintain desired heading using HEADING display, course error indicator and rate of turn indicator on the Alarm Module.

Table 2-2. SRP 2000 Operating Procedures (Cont)

REMOTE MODE	
A. Remote mode selection, by depressing the REMOTE switch, allows the RCU or Auxiliary Steering Station control of ship's steering gear. B. Observe ship control status by monitoring indicators on Status Module. The indicators adjacent to the REMOTE ON legend will denote which Alternate Steering Station has accepted control. C. Return control to the Console by selecting any Console steering mode.	

CHAPTER 3

OPERATOR MAINTENANCE

3.0 INTRODUCTION

SRP 2000 Ship Control System operator maintenance procedures involve responding to system operator advisories. This section also includes the instructions and intervals for periodic maintenance actions (cleaning).

3.1 SURFACE CLEANING

The operating panels and outer cabinet surfaces of the Control Console should be cleaned using mild detergent and a damp cloth on a monthly basis.

3.2 OPERATOR ADVISORY RESPONSE

The SRP 2000 Ship Control System contains 32 operator advisory messages that identify system malfunctions and advise the operator when action is required. Table 3-1 briefly describes the advisories contained in the system.

An operator advisory will appear on the CRT Display as a highlighted message and will be announced by a pulsed audible alarm. Depressing the MUTE switch on the Alarm Module will turn off the audio alarm and remove the highlighted video background on the CRT Display. The operator advisory will remain on the CRT until a malfunction condition is corrected and then RESET or a pure advisory condition is acknowledged through use of the ACCEPT switch.

Table 3-1. Operator Advisory Messages

Number	Message	Description	Operator Action
0	POWER FAILURE	Alarms upon power up after a true power failure (does not occur when system switch is turned off) to let operator know a power failure has just occurred.	Notify service personnel.
1	NO ASM HEARTBEAT	The ASM Central Processing Unit has been lost. This fault affects WEATHER ADJUST [ADAPTIVE] operation shaft sensor and speed log reliability.	Switch to HELM mode operation and notify service personnel.
2	NO CRT HEARTBEAT	A technical problem in the CRT Central Processing Unit has been detected. Complete loss of system CRT Display may follow a 4 message.	Attempt reset and if message persists, notify service personnel. If CRT goes blank, use Alarm Module Display.
3	NO MAIN HEARTBEAT	A technical problem in the MAIN Central Processing Unit has been detected.	Attempt reset. If message persists, switch to HELM mode operation and notify service personnel.

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Table 3-1. Operator Advisory Messages (Cont)

Number	Message	Description	Operator Action
4	HYDRAULIC SYSTEM 1 FAILURE	These alarms are forwarded from external user supplied or optional alarm panels.	See CRT for advisory.
5	HYDRAULIC SYSTEM 2 FAILURE		
6	HYDRAULIC SYSTEM 3 FAILURE		
7	HYDRAULIC SYSTEM 4 FAILURE		
8	STEERING SYSTEM 1 FAILURE		
9	STEERING SYSTEM 2 FAILURE		
10	RCU FAILURE	Monitors the mode repeatbacks (RB) from the RCU. Alarms if any of the following occur: (a) no mode is selected; (b) more than one mode is selected at a time; (c) if an AUTO mode is selected and AUTO RB does not return; (d) if two RCUs are being used and the mode RBs do not agree.	On systems with one RCU for PORT operation and one RCU for STBD operations, switch to alternate system, PORT or STBD. On systems with dual RCUs for PORT and STBD operation, switch to alternate system or single pump mode. If advisory was not caused by improper RCU selection, notify service personnel.

Table 3-1. Operator Advisory Messages (Cont)

Number	Message	Description	Operator Action
11	A/D CONVERTER FAILURE	Denotes an analog I/O Board failure.	Notify service personnel for replacement.
12	15V SUPPLY FAILURE	Main console 15V power supply has failed.	Use backup steering capabilities until service personnel can correct malfunction.
13	NAV SOURCE OUT OF RANGE	For engineering purposes only.	
14	NAV MESSAGE FORMAT ERROR	An information format error exists in the latitude/ longitude being received from a navigation receiver.	Try to reset advisory; otherwise check the following: (a) navigation receiver operation, (b) has the type of navigation receiver been changed since installation, (c) select an alternate method of present position updating and notify service personnel.
15	NAV MESSAGE TIME OUT	For engineering purposes only.	
16	NAV TYPE NOT VALID	Navigation data received is not in the format of the type configured.	Select a different external receiver or enter and update present position manually.

Table 3-1. Operator Advisory Messages (Cont)

Number	Message	Description	Operator Action
17	SHIP SPEED OUT OF RANGE	When using WEATHER ADJUST [ADAPTIVE] in any autopilot mode, ownship speed must be between 5 to 35 knots. Speeds above and below this range will result in a "17" message.	Bring ship's speed to within specified limits. If speed log is faulty, switch to MANUAL speed.
~~18~~ 20	INVALID COMPASS STEP DATA	Alarms if (a) step inputs are all low or all high or (b) a greater than 7 degree change occurs in 0.2 seconds.	Check gyrocompass for proper operation. Notify service personnel.
19	SYNCHRO CONVERTER ERROR	Synchro-to-digital converter on compass data card A1 is faulty.	Operation using heading information on Alarm Module is possible. Notify service personnel.
~~20~~ ?	REPLACE EEPROM	The EEPROM containing the calibration page information has exceeded programming life (1,000 stores).	Notify service personnel.
21	EEPROM CHECKSUM FAILURE	An error is detected in computer memory.	Rely on system manual operating modes only. Do not use GYRO, TURN RATE or NAV modes.
22	COMMON MEMORY CHECKSUM FAILURE	Indicates a failure in common memory.	Rely on system manual operating modes only. Do not use GYRO, TURN RATE or NAV modes.

Table 3-1. Operator Advisory Messages (Cont)

Number	Message	Description	Operator Action
23	HEADING CHANGE FOR WAYPOINT	Indicates a heading change greater than one degree has been computed to maintain course to the next waypoint.	If the navigator agrees, press NAV followed by ACCEPT. Heading change will not occur until accepted.
24	HALF MILE TO WAYPOINT	Ownship is within 0.5 miles of the next waypoint.	No operator action required.
25	EXCESSIVE DRIFT COMPUTED	A drift from fix-to-fix of more than 10 knots is computed. May be a possible indication that a manual or automatic fix is incorrect.	Navigator checks for present latitude and longitude.
26	WAYPOINT REQUIRED	When ownship is within one half mile of the last waypoint, this advisory will appear.	The operator can: (a) enter continued waypoints, (b) change the next waypoint to allow return by the same route, (c) select a different mode of operation.
27	WAYPOINT CANNOT BE REACHED	Speed is not sufficient to overcome drift to reach a waypoint.	New waypoint must be set.
28	ASM BUILT-IN TEST FAILURE	Self-test performed at turn-on.	Notify service personnel.
29	CRT BUILT-IN TEST FAILURE	Self-test performed at turn-on.	Notify service personnel.

Table 3-1. Operator Advisory Messages (Cont)

Number	Message	Description	Operator Action
30	MAIN BUILT-IN TEST FAILURE	Self-test performed at turn-on.	Notify service personnel.
31	HARDWARE INITIALIZATION FAILURE	Internal test for engineering purposes only.	No operator action required.

3.3 OPERATOR ALARMS

The SRP 2000 Ship Control System contains ten operator alarms (located on the Alarm Module), which identify steering system malfunctions. An operator alarm is indicated by a flashing alarm indicator adjacent to an alarm heading(s) and an audible alarm. The audible alarm may be muted by pressing the MUTE switch. The alarm indicator will remain illuminated until the failure has been corrected and the RESET switch has been pressed. If the RESET switch is pressed when an alarm condition is present, the associated alarm indicator will begin flashing and the audible alarm will sound. Table 3-2 describes the alarms contained in the system.

Table 3-2. Operator Alarms

Alarm	Description	Action
ALARM PWR	Indicates a failure in power supply to Alarm CPU.	Requires technical action. Notify service personnel. Normal mode operation continues.
ALARM CPU	Indicates an Alarm CPU failure.	Requires technical action. Notify service personnel. Normal mode operation continues.
PILOT PWR	Indicates a failure in power supply to the three pilot CPUs (Main, CRT or ASM).	Switch to manual mode of operation. Notify service personnel.
PILOT CPU	Indicates one of the three pilot CPUs (Main,CRT or ASM) has failed.	Switch to manual mode of operation. Notify service personnel.
BATTERY	Indicates a failure in batteries which supply power to the three pilot CPUs (Main, CRT or ASM)	Notify service personnel for replacement.
HEADING	Indicates a heading error that exceeds the Heading Alarm Threshold that has existed for a specified time. See paragraph 1.3.2.	Bring ownship back on course.
STEERING	Associated with Operator Advisory Messages 8 and 9 which are user-defined. Indicates a steering system failure.	See CRT for advisory message.
HYDR SYS	Associated with Operator Advisory Messages 4, 5, 6 and 7 which are user-defined. Indicates a hydraulic system failure.	See CRT for advisory message.

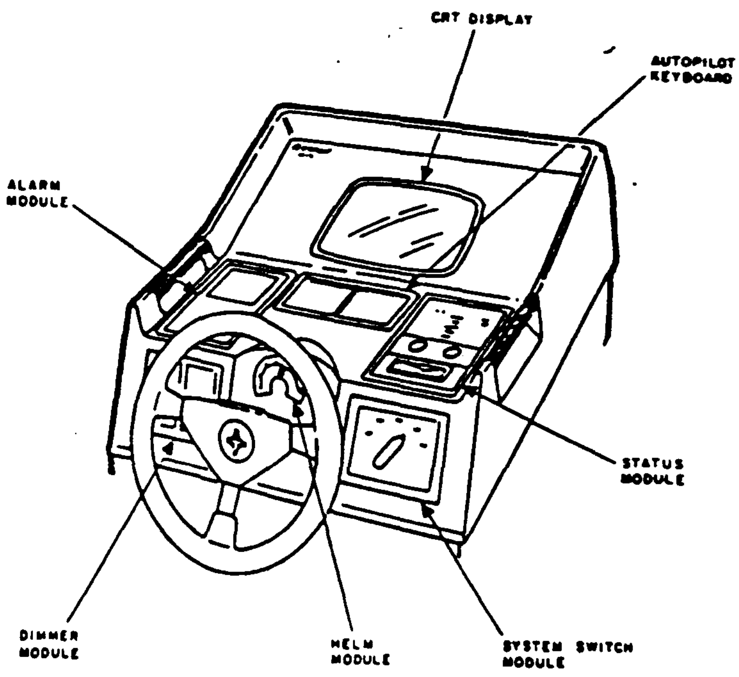
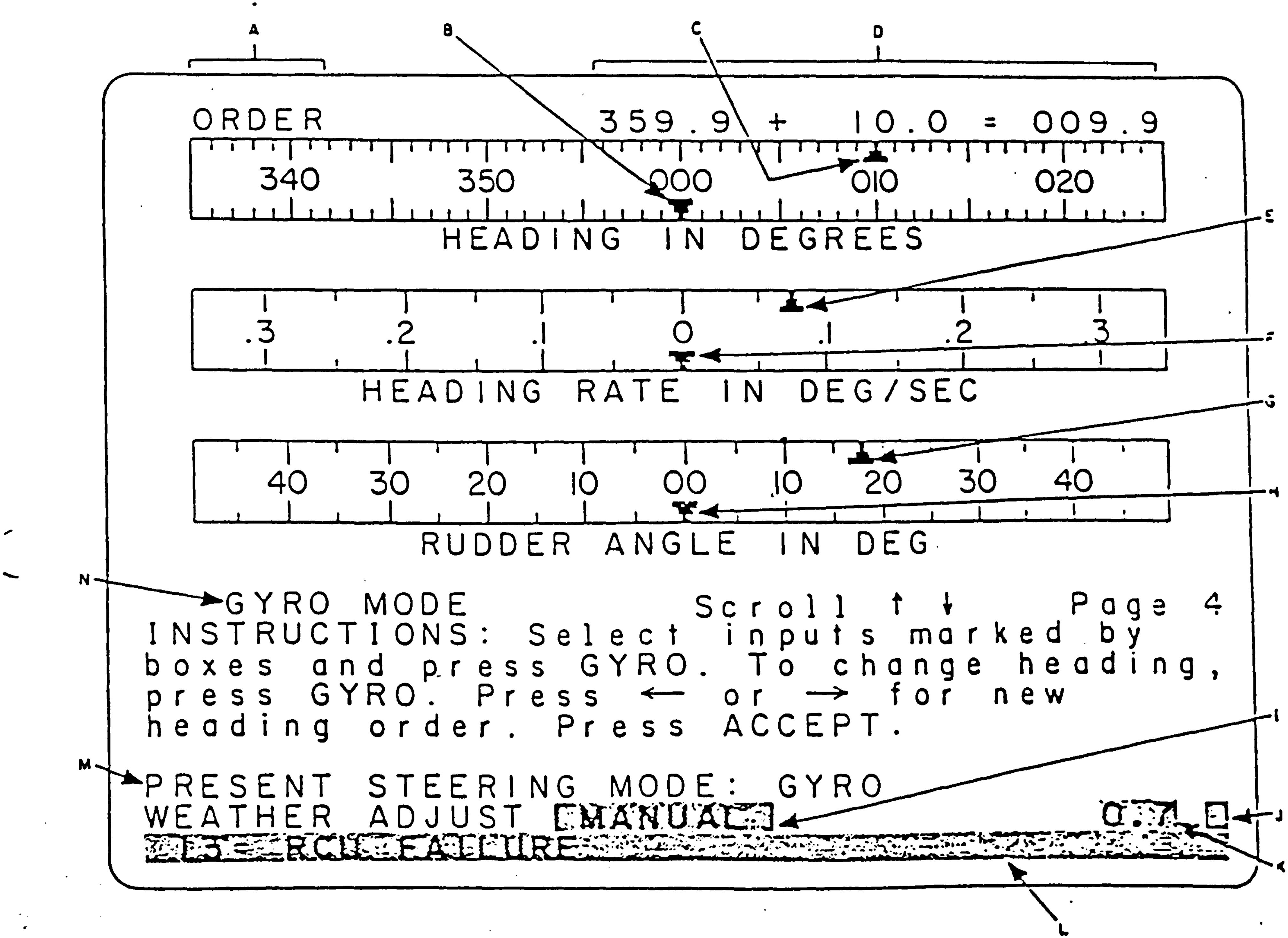
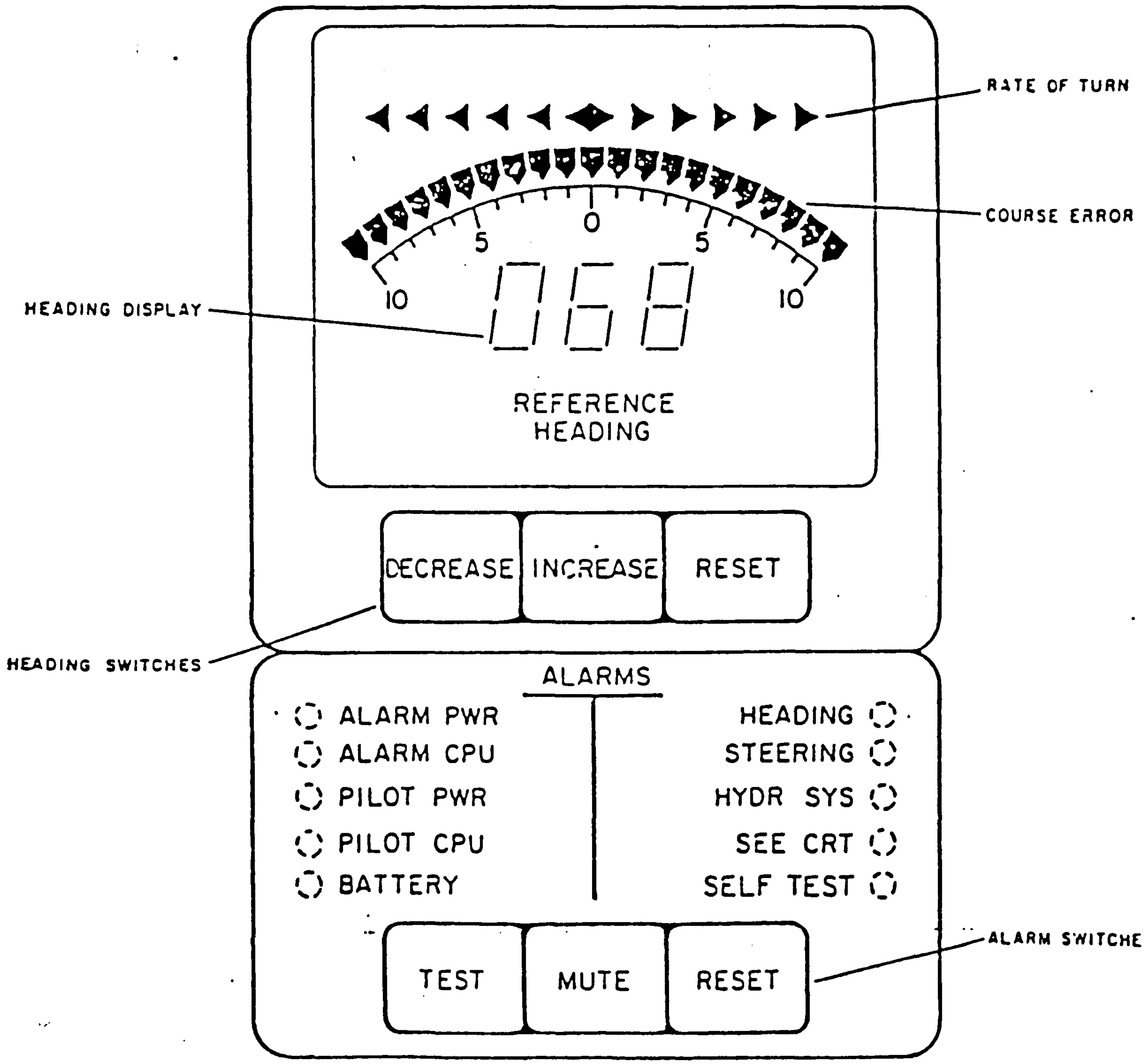

CRT DISPLAY
AUTOPILOT
KEYBOARD
ALARM
MODULE
STATUS
MODULE
DIMMER
MODULE
HELM
MODULE
SYSTEM SWITCH
MODULE

Exhibit # 97

PLAINTIFF
XHIBIT NO. 98
DMITTED ☒
91-7217 Ci
91-7218 Cr. trial
(CASE NUMBER)

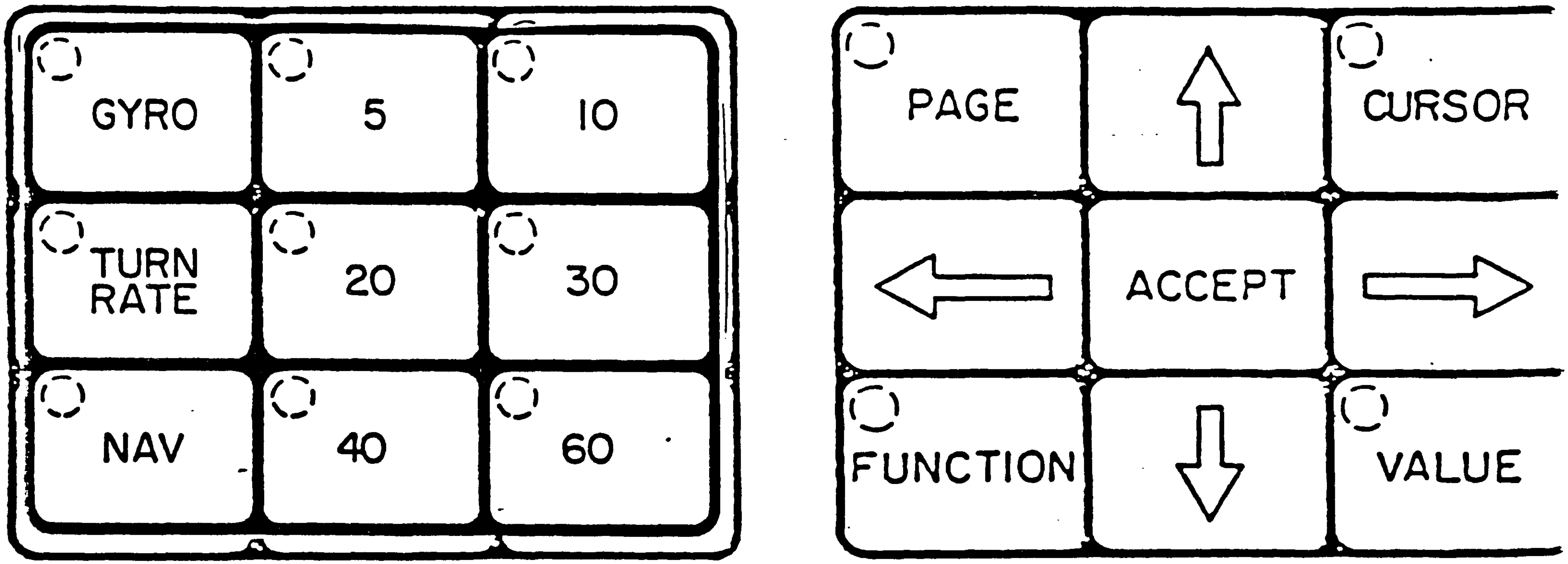

A
B
C
D
ORDER 359.9 + 10.0 = 009.9
340
350
000
010
020
HEADING IN DEGREES
E
.3
.2
.1
0
.1
.2
.3
F
HEADING RATE IN DEG/SEC
G
40
30
20
10
00
10
20
30
40
H
RUDDER ANGLE IN DEG
N
GYRO MODE
Scroll ↑ ↓
Page 4
INSTRUCTIONS: Select inputs marked by boxes and press GYRO. To change heading, press GYRO. Press ← or → for new heading order. Press ACCEPT.
M
PRESENT STEERING MODE: GYRO
WEATHER ADJUST [MANUAL]
0.7
I
J
K
13 = RCU FAILURE
L

PLAINTIFF
EXHIBIT NO. 99
ADMITTED ☒
89-7217cv
89-7218cv trial



RATE OF TURN
COURSE ERROR
0
5
5
10
10
HEADING DISPLAY
REFERENCE HEADING
DECREASE
INCREASE
RESET
HEADING SWITCHES
ALARMS
ALARM PWR
ALARM CPU
PILOT PWR
PILOT CPU
BATTERY
HEADING
STEERING
HYDR SYS
SEE CRT
SELF TEST
TEST
MUTE
RESET
ALARM SWITCHE

PLAINTIFF
EXHIBIT NO 100
ADMITTED
89-7217C
89-7218C


GYRO
5
10
TURN RATE
20
30
NAV
40
60
PAGE
CURSOR
ACCEPT
FUNCTION
VALUE

PLAINTIFF
EXHIBIT NO. 101
ADMITTED ☒
89-7217 cr. Trial
89-7218 [illegible]

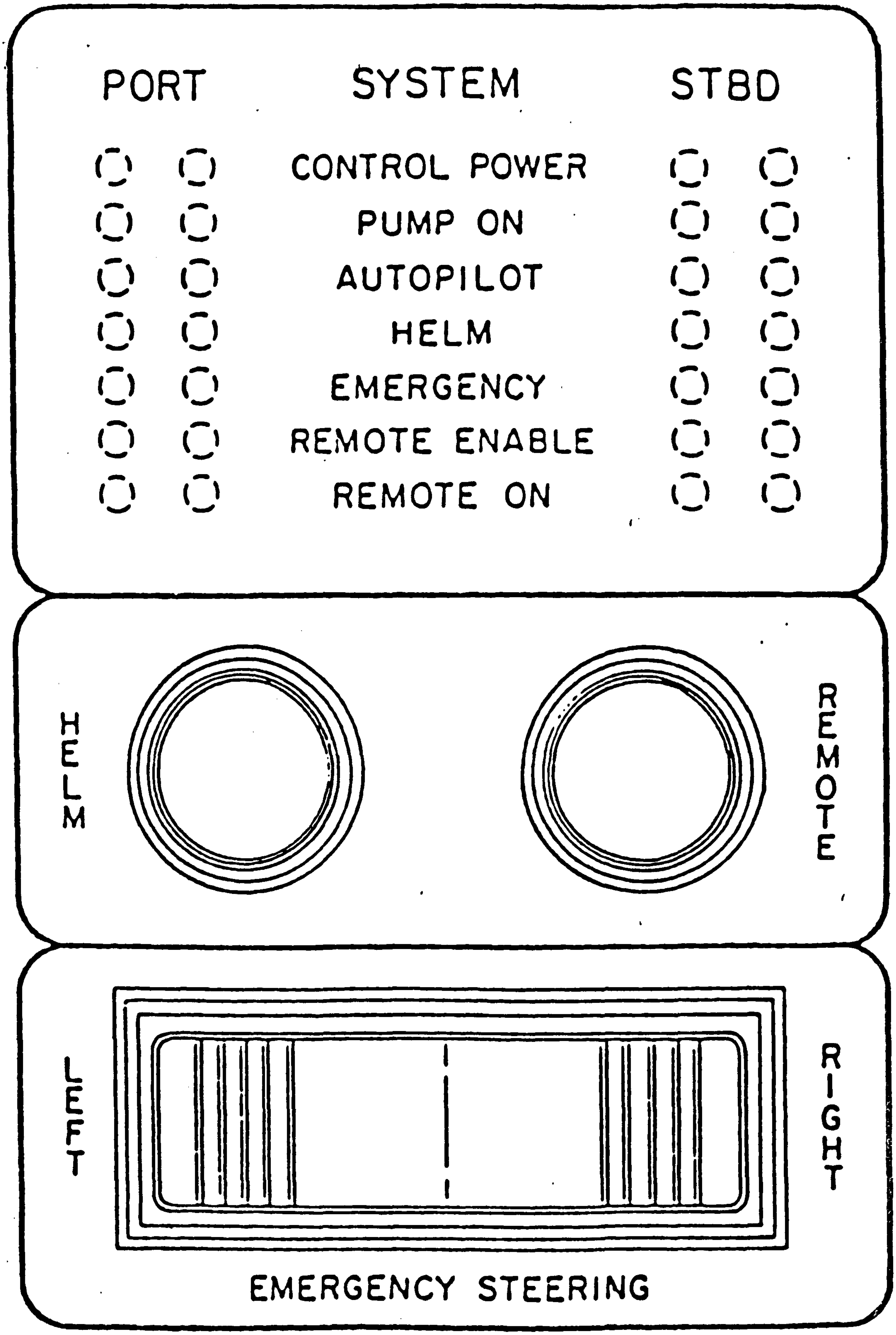
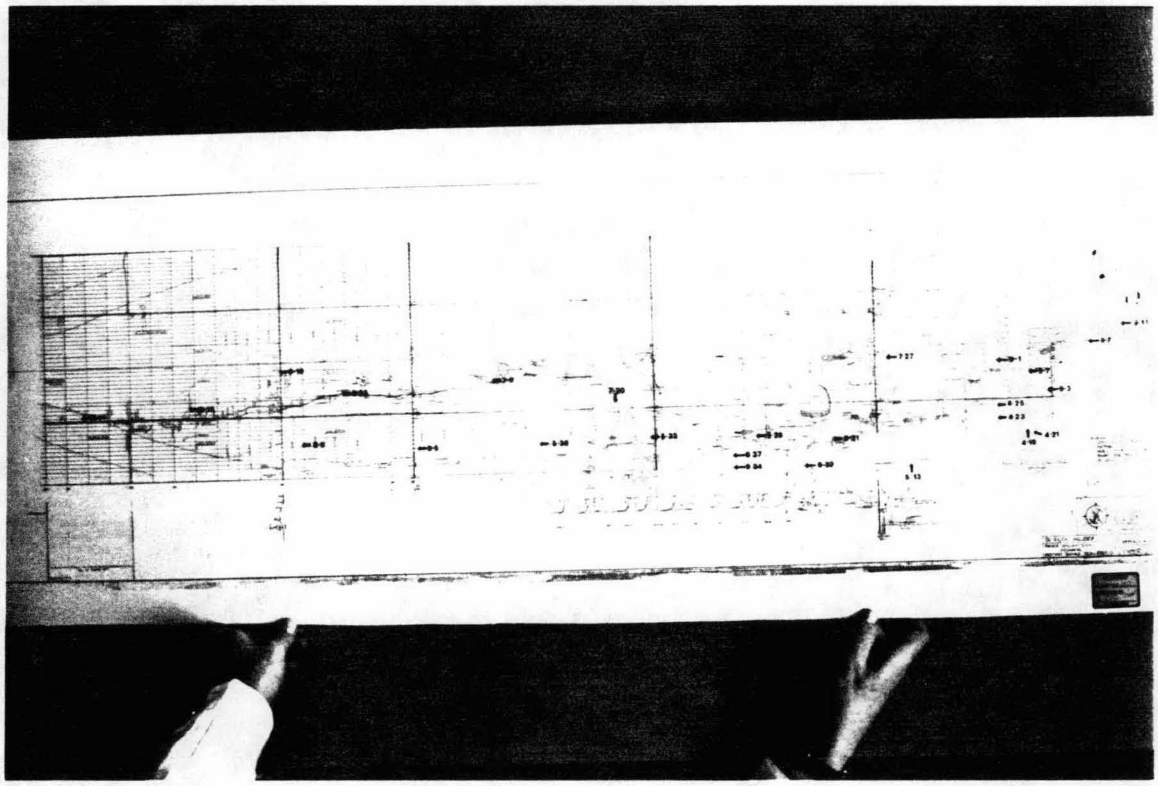

PORT
SYSTEM
STBD
CONTROL POWER
PUMP ON
AUTOPILOT
HELM
EMERGENCY
REMOTE ENABLE
REMOTE ON
HELM
REMOTE
LEFT
RIGHT
EMERGENCY STEERING

EXHIBIT 102

IS AN AUDIO CASSETTE



Damage Diagram by Mech Lity & Assoc

Exhibit 103

STATE OF ALASKA

DEPARTMENT OF LAW

CRIMINAL DIVISION/THIRD JUDICIAL DISTRICT

OFFICE OF THE DISTRICT ATTORNEY

STEVE COWPER, GOVERNOR

REPLY TO:

☑ 1031 WEST 4th AVENUE, SUITE 520
ANCHORAGE, ALASKA 99501-5906
PHONE: (907) 277-8622

☐ P.O. BOX 470
DILLINGHAM, ALASKA 99576-0470
PHONE: (907) 842-2482

☐ 145 MAIN STREET LOOP, ROOM 201
KENAI, ALASKA 99611-9998
PHONE: (907) 283-3131

☐ 326 CENTER AVE, SUITE 205
KODIAK, ALASKA 99615-9998
PHONE: (907) 486-5744

☐ 809 S. CHUGACH ST., SUITE 3
PALMER, ALASKA 99645-9998
PHONE: (907) 745-5027

☐ P.O. BOX 671
VALDEZ, ALASKA 99686-0671
PHONE: (907) 835-2462

January 18, 1989

Gordon Greenberg
Attorney at Law
Sheppard, Mullin, Richter and Hampton
333 S. Hope, 43rd Floor
Los Angeles, California 90071

Re: Immunity for Paul Meyers

Dear Mr. Greenberg:

As counsel for Mr. Meyers you indicated on January 16, 1990 that you were requesting on behalf of your client that the State provide you with a letter granting your client immunity from prosecution.

It is not the policy of the Anchorage District Attorney's Office to lightly grant requests for immunity, however, after weighing the competing interests involved and in order to obtain Mr. Meyers' testimony, the State of Alaska grants Mr. Paul Meyers use immunity from prosecution for any acts committed in connection with the grounding of the <u>Exxon</u> <u>Valdez</u> that occurred on March 23 and 24, 1989. I must inform you that this immunity letter does not provide immunity for perjury or for the giving of false statements.

This grant is made on the condition that the defendant cooperate fully with the District Attorney's Office in interviews and that he make himself available to testify in the trial of <u>State of Alaska v. Joseph Hazelwood</u> and that he testify truthfully in connection with these proceedings.

PLAINTIFF
EXHIBIT NO. 104
ADMITTED ☒
89-7217
89-7218 Trial
(CASE NUMBER)

018408

03 C29LH

If I can be of any further assistance, please feel free to contact me at your convenience.

Sincerely,

DOUGLAS B. BAILY
ATTORNEY GENERAL

DWAYNE W. MCCONNELL
DISTRICT ATTORNEY

DWM/lek

018409

FORM APPROVED
OMB - 2115-0025

U.S. Department
of Transportation
United States
Coast Guard

OIL RECORD BOOK
FOR
SHIPS

CHECK ONE:

☐ This book is for Machinery Space Operations (Part I - All Ships)
☒ This book is for Cargo/Ballast Operations (Part II - Oil Tankers)

Name of Ship: M/V EXXON VALDEZ Gross Tonnage: ~~95150~~ to 94999

Owner: EXXON

Period From: 12-1-86 To: 4/8/89 Official Number: 692966

This record book is issued by the Secretary of Transportation and is distributed by the United States Coast Guard to ships of American registry. It remains the property of the United States Government and each owner/operator is responsible to maintain and surrender it in accordance with the Secretary's regulations. Note that the Oil Record Book is one book with two parts; Machinery Space Operations is under Part I and Cargo/Ballast Operations is under Part II.

An Oil Tanker of 150 gross tons or above must maintain Parts I and II of the Oil Record Book; Machinery Space Operations (Part I), and Cargo/Ballast Operations (Part II). A ship of 400 gross tons or above, other than an oil tanker, and any other ship required by 33 CFR Part 151 must maintain Machinery Space Operations (Part I) in the Oil Record Book.

A non-tanker that carries more than 200 cubic meters of oil must fill in the Oil Record Book used for oil tankers. (Reference: MARPOL 73/78, Regulation 2(2)).

PLAINTIFF
T NO. 105
ADMITTED ☒
89-7217 CR Trial
89-7218 CR
(CASE NUMBER)

008437

Dept. of Transp., USCG, CG-4602A (Rev. 10-83) Replaces CG-4601 and CG-4602

SN 7530-01-GF3-0660

Extract of MARPOL 73/78 Regulations

MARPOL 73/78, Annex I, Chapter II, Regulation 9

Subject to the provisions of Regulations 10 and 11 of this Annex and paragraph (2) of this Regulation, any discharge into the sea of oil or oily mixtures from ships to which this Annex applies shall be prohibited except when all the following conditions are satisfied:[1]

(a) for an oil tanker, except as provided for in sub-paragraph (b) of this paragraph:

- (i) the tanker is not within a special area;
- (ii) the tanker is more than 50 nautical miles from the nearest land;
- (iii) the tanker is proceeding en route;
- (iv) the instantaneous rate of discharge of oil content does not exceed 60 litres per nautical mile;
- (v) the total quantity of oil discharged into the sea does not exceed for existing tankers 1/15,000 of the total quantity of the particular cargo of which the residue formed a part, and for new tankers 1/30,000 of the total quantity of the particular cargo of which the residue formed a part; and
- (vi) the tanker has in operation, except as provided for in Regulation 15(5) and (6) of this Annex, an oil discharge monitoring and control system and a slop tank arrangement as required by Regulation 15 of this Annex;[2]

(b) from a ship of 400 tons gross tonnage and above other than an oil tanker and from machinery space bilges excluding cargo pump room bilges of an oil tanker unless mixed with oil cargo residue:

- (i) the ship is not within a special area;
- (ii) the ship is more than 12 nautical miles from the nearest land;
- (iii) the ship is proceeding en route;
- (iv) the oil content of the effluent is less than ~~100 parts per~~ million; and
- (v) the ship has in operation an oil discharge monitoring and control system, oily-water separating equipment, oil filtering system or other installation as required by Regulation 16 of this Annex.[3]

NOTES:
1. Regulation 10 is titled "Methods for the Prevention of Oil Pollution from Ships while operating in Special Areas." Regulation 11 is titled "Exceptions."
2. Regulation 15 is titled "Retention of Oil on Board."
3. Regulation 16 is titled "Oil Discharge Monitoring and Control System and Oily-Water Separating Equipment."

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OIL RECORD BOOK ENTRY REQUIREMENTS

MARPOL 73/78, Annex I, Chapter ~~II~~, Regulation 20

(1) Every oil tanker of 150 tons gross tonnage and above and every ship of 400 tons gross tonnage and above other than an oil tanker shall be provided with an Oil Record Book Part I (Machinery Space Operations). Every oil tanker of 150 tons gross tonnage and above shall also be provided with an Oil Record Book Part II (Cargo/Ballast Operations). The Oil Record Book(s), whether as a part of the ship's official log book or otherwise, shall be in the Form(s) specified in Appendix III to this Annex.

(2) The Oil Record Book shall be completed on each occasion, on a tank to tank basis if appropriate, whenever any of the following operations take place in the ship:

(a) for machinery space operations (all ships):

(i) ballasting or cleaning of oil fuel tanks;
(ii) discharge of dirty ballast or cleaning water from tanks referred to under (i) of the sub-paragraph;
(iii) disposal of oily residues (sludge);
(iv) discharge overboard or disposal otherwise of bilge water which has accumulated in machinery spaces.

(b) for cargo/ballast operations (oil tankers):

(i) loading of oil cargo;
(ii) internal transfer of oil cargo during voyage;
(iii) unloading of oil cargo;
(iv) ballasting of cargo tanks and dedicated clean ballast tanks;
(v) cleaning of cargo tanks including crude oil washing;
(vi) discharge of ballast except from segregated ballast tanks;
(vii) discharge of water from slop tanks;
(viii) closing of all applicable valves or similar devices after slop tank discharge operations;
(ix) closing of valves necessary for isolation of dedicated clean ballast tanks from cargo and stripping lines after slop tank discharge operations;
(x) disposal of residues.

(3) In the event of such discharge of oil or oily mixture as is referred to in Regulation 11 of this Annex or in the event of accidental or other exceptional discharge of oil not excepted by that Regulation, a statement shall be made in the Oil Record Book of the circumstances of, and the reasons for, the discharge.

(4) Each operation described in paragraph (2) of this Regulation shall be fully recorded without delay in the Oil Record Book so that all the entries in the book appropriate to that operation are completed. Each completed operation shall be signed by the officer or officers in charge of the operations concerned and each completed page shall be signed by the master of

008439

the ship. The entries in the Oil Record Book shall be in an official language of the State whose flag the ship is entitled to fly, and, for ships holding an International Oil Pollution Prevention Certificate, in English or French. The entries in an official national language of the State whose flag the ship is entitled to fly shall prevail in case of a dispute or discrepancy.

(5) The Oil Record Book shall be kept in such a place as to be readily available for inspection at all reasonable times and, except in case of unmanned ships under tow, shall be kept on board the ship. It shall be preserved on board the ship for a period of three years after the last entry has been made.

(6) The competent authority of the Government of a Party to the Convention may inspect the Oil Record Book on board any ship to which this Annex applies while the ship is in its port or offshore terminals and may make a copy of any entry in that book and may require the Master of the ship to certify that the copy is a true copy of such entry. Any copy so made which has been certified by the Master of the ship as a true copy of an entry in the ship's Oil Record Book shall be made admissible in any judicial proceedings as evidence of the facts stated in the entry. The inspection of an Oil Record Book and the taking of a certified copy by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

008440

OIL RECORD BOOK PART I - MACHINERY SPACE OPERATIONS

INSTRUCTIONS FOR ALL SHIPS*

The following pages of this section show a comprehensive list of items of machinery space operations which are, when appropriate, to be recorded in the Oil Record Book in accordance with Regulation 20 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). The items are grouped into operational sections, each of which is denoted by a letter code.

When making entries in the Oil Record Book, the date, operation code and item number shall be inserted in the appropriate columns and the required particulars shall be recorded chronologically in the blank spaces. All quantities should be consistantly recorded throughout the Oil Record Book as cubic meters, gallons, or barrels.

Each completed operation shall be signed for and dated by the officer or officers in charge. Each completed page shall be signed by the master of the ship.

* Note: **Oil Record Book Part I is provided to every oil tanker of 150 tons gross tonnage and above and every ship of 400 tons gross tonnage and above, other than oil tankers, to record relevant machinary space opereations. For oil tankers, Oil Record Book Part II is also provided to record relevant cargo/ballast operations.**

008441

CODE AND ITEM NUMBER TO BE RECORDED FOR ALL SHIPS
400 GROSS TONS AND ABOVE

(A) BALLASTING OR CLEANING OF OIL FUEL TANKS

1. Identity of tank(s) ballasted.
2. Whether cleaned since they last contained oil and, if not, type of oil previously carried.
3. Position of ship at start of cleaning.
4. Position of ship at start of ballasting.

(B) DISCHARGE OF DIRTY BALLAST OR CLEANING WATER FROM OIL FUEL TANKS REFERRED TO UNDER SECTION (A)

5. Identity of tank(s).
6. Position of ship at start of discharge.
7. Position of ship on completion of discharge.
8. Ship's speed(s) during discharge.
9. Method of discharge:
   .1 Through 100 ppm equipment;
   .2 Through 15 ppm equipment;
   .3 To reception facilities (identify port).
10. Quantity discharged .

(C) DISPOSAL OF OIL RESIDUES (SLUDGE)

11. Quantity of residue retained on board for disposal .
12. Methods of disposal of residue:
   .1 To reception facilities (identify port);
   .2 Mixed with bunkers;
   .3 Transferred to another (other) tank(s) (identify tank(s));
   .4 Other method (state which).

(D) NON-AUTOMATIC DISCHARGE OVERBOARD OR DISPOSAL OTHERWISE OF BILGE WATER WHICH HAS ACCUMULATED IN MACHINERY SPACES

13. Quantity discharged.
14. Time of discharge. (position of ship at start and end of discharge)
15. Method of discharge or disposal:
   .1 Through 100 ppm equipment;
   .2 Through 15 ppm equipment;
   .3 To reception facilities (identify port);
   .4 To slop or collecting tank (identify tank).

(E) AUTOMATIC DISCHARGE OVERBOARD OR DISPOSAL OTHERWISE OF BILGE WATER WHICH HAS ACCUMULATED IN MACHINERY SPACES

16. Time when the system is put into automatic mode of operation for discharge overboard.
17. Time when the system is put into automatic mode of operation for transfer of bilge water to collecting (slop) tank (identify tank).
18. Time when the system is put to manual operation.

008442

19. Method of discharge overboard:
   .1 Through 100 ppm equipment;
   .2 Through 15 ppm equipment.

(F) CONDITION OF OIL DISCHARGE MONITORING AND CONTROL SYSTEM

20. Time of system failure.
21. Time when system has been made operational.
22. Reasons for failure.

(G) ACCIDENTAL OR OTHER EXCEPTIONAL DISCHARGES OF OIL

23. Time of occurrence.
24. Place or position of ship at time of occurrence.
25. Approximate quantity and type of oil.
26. Circumstances of discharge or escape, the reasons therefore and general remarks.

(H) ADDITIONAL OPERATIONAL PROCEDURES AND GENERAL REMARKS

EXAMPLE

Name of Ship: M/V NOT AN OIL TANKER

Official Number or Call Sign: XXX

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
8/1/82	D	13	4 barrels
		14	1000 hrs
		15.4	to collecting tank
			8/1/82 J. Johnson
8/3/82	D	13,14,15	75 barrels 8/82 D. Black
8/4/82	E	16	0-300 hrs
		19.2	15 ppm
			8/4/82 D. Black
8/7/82	A	1	No.5 DB Port and Stbd
		2	Yes
		4	79-47N x 26-01W
			8/7/82 J. Johnson

Signature of Master ______________________

008443

OIL RECORD BOOK PART II - CARGO/BALLAST OPERATIONS

ADDITIONAL INSTRUCTIONS FOR OIL TANKERS

The following pages of this section show a comprehensive list of items of cargo and ballast operations which are, when appropriate, to be recorded in the Oil Record Book in accordance with Regulation 20 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). The items are grouped into operational sections, each of which is denoted by a letter.

When making entries in the Oil Record Book, the date, operation code and item number shall be inserted in the appropriate columns and the required particulars shall be recorded chronologically in the blank spaces. All quantities should be consistantly recorded throughout the Oil Record Book as cubic meters, gallons, or barrels.

Each completed operation shall be signed for and dated by the officer or officers in charge. Each completed page shall be signed by the master of the ship.

In respect of the oil tankers engaged in specific trades in accordance with Regulation 13C of Annex I of MARPOL 73/78, appropriate entry in the Oil Record Book shall be endorsed by competent Port State authority (United States Coast Guard).

Note: Every oil tanker of 150 tons gross tonnage and above is provided with Oil Record Book Part II to record relevant cargo/ballast operations. Such a tanker is also provided with Oil Record Book Part I to record relevant machinary space operations.

CODE AND ITEM NUMBER TO BE RECORDED FOR TANKERS

(A) LOADING OF OIL CARGO

1. Place of loading.
2. Type of oil loaded and identity of tank(s).
3. Total quantity of oil loaded.

(B) INTERNAL TRANSFER OF OIL CARGO DURING VOYAGE

4. Identity of tank(s)
   .1 From:
   .2 To:
5. Was (were) tank(s) in 4(1) emptied?

(C) UNLOADING OF OIL CARGO

6. Place of unloading.
7. Identity of tank(s) unloaded.
8. Was (were) tank(s) emptied?

(D) CRUDE OIL WASHING (COW TANKERS ONLY)
(To be completed for each tank being crude oil washed)

9. Port where crude oil washing is carried out or ship's position if carried out between two discharge ports.
10. Identity of tank(s) washed.[1]
11. Number of machines in use.
12. Time of start of washing.
13. Washing pattern employed.[2]
14. Washing line pressure.
15. Time completed or stopped washing.
16. State method of establishing that tank(s) was (were) dry.
17. Remarks.[3]

(E) BALLASTING OF CARGO TANKS

18. Identity of tank(s) ballasted.
19. Position of ship at start of ballasting.

NOTES: 1 When an individual tank has more machines than can be operated simultaneously, as described in the Operations and Equipment Manual, then the section being crude oil washed should be identified, e.g. No. 2 center, forward section.

2 In accordance with the Operations and Equipment Manual, enter whether single-stage or multi-stage method of washing is employed. If multi-stage method is used, give the vertical arc covered by the machines and the number of times that arc is covered for that particular stage of the program.

3 If the methods given in the Operations and Equipment Manual are not followed, give the reasons under Remarks.

008445

(F) BALLASTING OF DEDICATED CLEAN BALLAST TANKS (CBT TANKERS ONLY)

20. Identity of tank(s) ballasted.
21. Position of ship when water intended for flushing, or port ballast is taken into dedicated clean ballast tank(s).
22. Position of ship when pump(s) and lines are flushed to slop tank.
23. Quantity of oily water resulting from line flushing transferred to slop tank(s) (identify slop tank(s)).
24. Position of ship when additional ballast water is taken into dedicated clean ballast tank(s).
25. Time and position of ship when valves separating the dedicated clean ballast tanks from cargo and stripping lines were closed.
26. Quantity of clean ballast taken on board .

(G) CLEANING OF CARGO TANKS

27. Identity of tank(s) cleaned.
28. Port or ship's position.
29. Duration of cleaning.
30. Method of cleaning.[4]
31. Tank washings transferred to:
    .1. Reception facilities;
    .2 Slop tank(s) or cargo tank(s) designated as slop tank(s) (Identity of tank(s)).

(H) DISCHARGE OF DIRTY BALLAST

32. Identity of tank(s).
33. Position of ship at start of discharge into the sea.
34. Position of ship on completion of discharge into the sea.
35. Quantity discharged into the sea.
36. Ship's speed(s) during discharge.
37. Was the discharge monitoring and control system in operation during the discharge?
38. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?
39. Quantity of oily water transferred to slop tank(s) (identify slop tank(s)).
40. Discharge to shore reception facilities (identify port if applicable).

J (I) DISCHARGE OF WATER FROM SLOP TANKS INTO THE SEA

41. Identify slop tank(s).
42. Time of settling from last entry of residues, or,
43. Time of settling from last discharge.
44. Time and position of ship at start of discharge.
45. Ullage of total contents at start of discharge.
46. Ullage of oil/water interface at start of discharge.
47. Bulk quantity discharged and rate of discharge.

NOTES: 4 This includes hand hosing, machine washing and/or chemical cleaning. Where chemically cleaned, state the chemical concerned and amount used.

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48. Final quantity discharged and rate of discharge.
49. Time and position of ship on completion of discharge.
50. Is the discharge monitoring and control system in operation during the discharge?
51. Ullage of oil/water interface on completion of discharge.
52. Ship's speed(s) during discharge.
53. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?
54. Confirm that all applicable valves in the ship's piping system have been closed on completion of discharge from the slop tanks.

(J) DISPOSAL OF RESIDUES AND OILY MIXTURES NOT OTHERWISE DEALT WITH

55. Identity of tank(s).
56. Quantity disposed of from each tank.
57. Method of disposal:
   .1 To reception facilities (identify port);
   .2 Mixed with cargo;
   .3 Transferred to another tank(s) (identify tank(s));
   .4 Other method (state which).

(K) DISCHARGE OF CLEAN BALLAST CONTAINED IN CARGO TANKS

58. Position of ship at start of discharge of clean ballast.
59. Identity of tank(s) discharged.
60. Was (were) the tank(s) empty on completion?
61. Position of ship on completion if different from 58.
62. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?

(L) DISCHARGE OF BALLAST FROM DEDICATED CLEAN BALLAST TANKS (CBT TANKERS ONLY)

63. Identity of tank(s) discharged.
64. Time and position of ship at start of discharge of clean ballast into the sea.
65. Time and position of ship on completion of discharge into the sea.
66. Quantity discharged.
   .1 Into the sea; or
   .2 To reception facility (identify port)
67. Was there any indication of oil contamination of the ballast water before or during the discharge into the sea?
68. Was the discharge monitored by an oil content meter?
69. Time and position of ship when valves separating dedicated clean ballast tanks from the cargo and stripping lines were closed on completion of deballasting.

(M) CONDITION OF OIL DISCHARGE MONITORING AND CONTROL SYSTEM

70. Time of system failure.
71. Time when system has been made operational.
72. Reasons for failure.

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(N) ACCIDENTAL OR OTHER EXCEPTIONAL DISCHARGES OF OIL

73. Time of occurrence.
74. Port or ship's position at time of occurrence.
75. Approximate quantity and type of oil.
76. Circumstances of discharge or escape, the reasons therefore and general remarks.

(O) ADDITIONAL OPERATIONAL PROCEDURES AND GENERAL REMARKS

ADDITIONAL CODES FOR TANKERS ENGAGED IN SPECIFIC TRADES

(P) LOADING OF BALLAST WATER

77. Identity of tank(s) ballasted.
78. Position of ship when ballasted.
79. Total quantity of ballast loaded.
80. Remarks.

(Q) REALLOCATION OF BALLAST WATER WITHIN THE SHIP

81. Reasons for reallocation.

(R) BALLAST WATER DISCHARGE TO RECEPTION FACILITY

82. Port(s) where ballast water was discharged.
83. Name or designation of reception facility.
84. Total quantity of ballast water discharged.
85. Date, signature and stamp of port authority official.

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EXAMPLE

Name of Ship: M/V TANKER

Official Number or Call Sign: XXXXX

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS) (circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge.
8/11/82	G	27	NO. 5 port tank
		28	Port Shaw, California
		29	1 hour
		31.1	8/11/82 J.B. Smith
8/14/82	A	1	Port Shaw, California
		2	Heavy fuel oil 1-5 C, 1-5 SB and 1-5 P
		3	1500 barrels 8/14/82 J.B. Smith
8/16/82	C	6	Port Pine, Texas
		7	1 C 3 C and 5 C
		8	yes
8/18/82	B	4.1	2 C
		4.2	5 C
		5	No 8/18/82 D.B. Miller

Signature of Master ____________________

008449

List of Oils* (Appendix I to Annex I of MARPOL 73/78)

Asphalt Solutions:

Blending stocks
Roofers flux
Straight run residue

Oils:

Clarified
Crude oil
Mixtures containing crude oil
Diesel oil
Fuel oil No. 4
Fuel oil No. 5
Fuel oil No. 6
Residual Fuel oil
Road oil
Transformer oil
Aromatic oil (excluding vegetable oil)
Lubricating oils and Blending stocks
Mineral oil
Motor oil
Penetrating oil
Spindle oil
Turbine oil

Distillates:

Straight run
Flashed feed stocks

Gas Oil:

Cracked

Gasoline Blending Stocks:

Alkylates - fuel
Reformates
Polymer - fuel

Gasolines:

Casinghead (natural)
Automotive
Aviation
Straight run
Fuel oil No. 1 (kerosene)
Fuel oil No. 1-D
Fuel oil No. 2
Fuel oil No. 2-D

Jet Fuels:

JP - 1 (kerosene)
JP - 3
JP - 4
JP - 5 (kerosene, heavy)
Turbo fuel
Kerosene
Mineral spirit

Naphtha:

Solvent
Petroleum
Heartcut Distillate oil

*This list of oils is not meant to be comprehensive, but suggest the most common types of oil carried.

METRIC AND UNITED STATES LIQUID MEASURE EQUIVALENTS

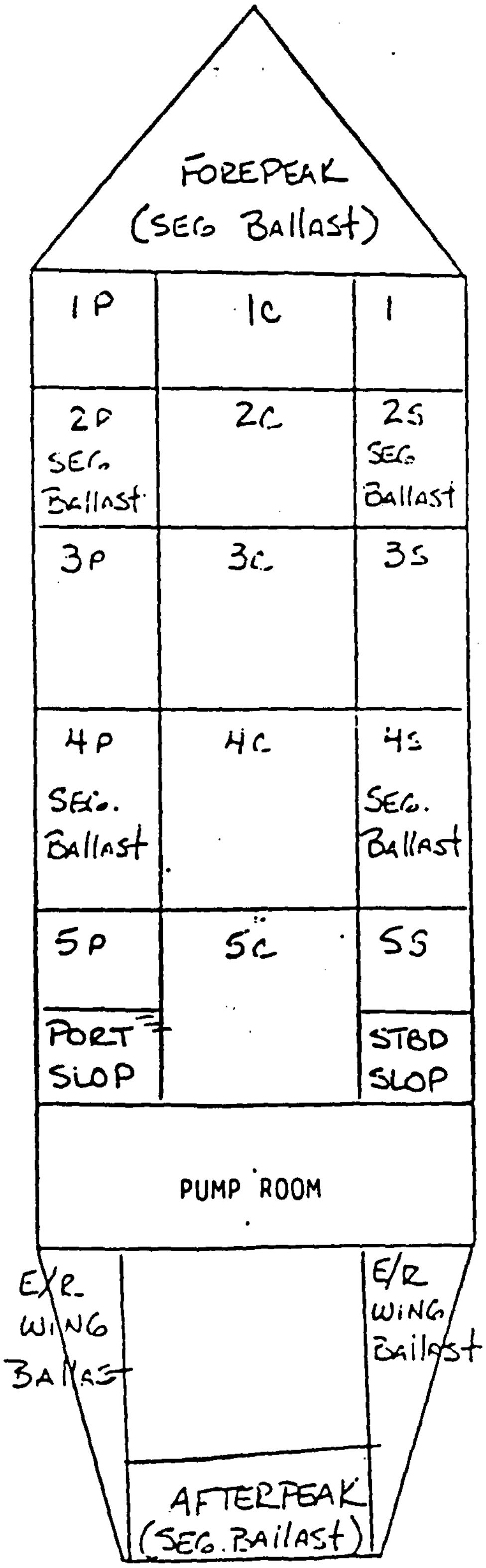
U.S. UNIT		METRIC UNIT
1 gallon	=	3.7854 liters
1 barrel (42 gal.)	=	119.2401 liters
0.26417 gallon	=	1 liter
1 cubic foot	=	0.028317 cubic meter
35.315 cubic feet	=	1 cubic meter

008450

IDENTIFICATION OF SHIP'S TANKS

Name of Ship: M/V EXXON VALDEZ
Official Number or Call Sign: 692966 WHCB
Lloyds Number:

Plan View of Cargo and Slop Tanks (complete on board ship)



Identification of Ship's Tank	Capacity 98% Full
1C	152987.2
2C	196740.3
3C	216414.3
4C	118044.3
5C	210518.3
1P	67670.5
3P	119771.9
5P	74102.4
PORT SLOP	33517.9
1S	67670.5
3S	119771.9
5S	74102.4
STBD SLOP	33517.9

Depth of Slop Tank(s): PORT SLOP TK 82.7'
STBD SLOP TK 82.7

(Give the capacity of each tank and the depth of each slop tank(s)).

008451

Name of ship: EXXON VALDEZ
Official number or letters: 192766

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
1/12/89	A	3	1112600 GB (50' DRAFT - ST)
1/18/89	C	6	SAN FRANCISCO BAY A-9 LT12
		7	ALL TANKS
		8	NONE EMPTIED
1/18/89	C	6	SAN FRANCISCO BAY A-9
		7	ALL TANKS.
		8	NONE EMPTIED
1/19/89	C	6	SAN FRANCISCO BAY A-9
		7	ALL TANKS
		8	NONE EMPTIED
1/20/89	C	6	SAN FRANCISCO BAY A-9
		7.	ALL TANKS
		8	ALL EMPTIED. [signature]
1/21/89	E	18	1C 3C, 5C
		19	SAN FRAN BAY L 37-44N λ 122-20W
1/26/89	H	32	1C, 3C, & 5C GK
		40	BERTH #5, ALYESKA DOCKS, VALDEZ AK.
1/27/89	A	1	BERTH #5, ALYESKA DOCKS, VALDEZ, AK.
		2	ANS CRUDE, ALL CARGO TANKS
		3	1093704 G. BBLS GK
2/1/89	C	6	San Francisco Bay, A#9, Light #1
		7	1P, 1S, 5C
		8	No GK

Master's Signature [signature]

008452

Name of ship: Exxon Valdez
Official number or letters: 692966

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
2/2/89	B	4	.1 From: 1P & 1S
			.2 To: 5Ctr
		5	No. GK
2/3/89	C	6	ANCHORAGE #9, LIGHTER #2 SAN FRANCISCO BAY
		7	1CTR, 2CTR, 3CTR, 4CTR, 5X
		8	NO. GK.
2/3/89	B	4	.1 From: 1P & 1S
			.2 To: P & S Slop tanks
		5	Yes GK.
2/4/89	C	6	ANCHORAGE #9, LIGHTER #3 SAN FRANCISCO BAY
		7	ALL CARGO TANKS EXCEPT 1W'S.
		8	NO. GK.
2/4/89	C	6	ANCHORAGE #9, S.F. BAY, LIGHTER #4
		7	ALL CARGO TANKS EXCEPT 1W'S.
		8	NO. GK.
2/5/89	C	6	ANCHORAGE #9, S.F. BAY, LIGHTER #5
		7	ALL
		9	YES. GK.
2/6/89	E	18	1CTR, 3CTR, 5CTR
		19	ANCHORAGE #9 SAN FRANCISCO BAY GK.
2/11/89	A	1	BERTH #4 ALYESKA TERMINAL VALDEZ ALASKA
		2	ANS CRUDE ALL CARGO TANKS
		3	1,100,000 G. BBLS GK

Master's Signature [signature]

008453

Name of ship: EXXON VALDEZ
Official number or letters: 692966

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
2/16	C	6	ANCHORAGE #9, S.F. BAY, LIGHTER #1
		7	1X, 2C, 3C, 4C, 5X, P & S SLP.
		8	NO, EXCEPT 1W'S. GK
2/18	C	6	ANCHORAGE #9, S.F. BAY, LIGHTER #2
		7	ALL EXCEPT 1W'S
		8	NO. GK.
2/19	E	18	1P & 1S
		19	ANCHORAGE #9, SAN FRANCISCO BAY GK
2/20	C	6	ANCHORAGE #9, S.F. BAY, LIGHTER #3
		7	ALL EXCEPT 1W'S
		8	NO GK.
2/21	D	9	ANCHORAGE #9 SAN FRANCISCO BAY, CA.
		10	2CTR, 3W'S
		11	12 ~~machines at once~~ GK
		12	2/21/89 1515
		13	TOP & BOTTOM WASH
		14	130 PSI
		15	1745
		16	MMC type
		17	NONE GK

Master's Signature [signature]

-08454

Name of ship: EXXON VALDEZ
Official number or letters: 692966

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
2/21/89	C	6	ANCHORAGE #9, S.F. BAY, CA.
		7	ALL CARGO TKS.
		8	YES EXCEPT P&S SLOP TKS. GK
2/28/89	H	32	1C, 3C, 5C
		40	ALYESKA TERMINAL VALDEZ, AK GK
2/28/89	A	1	ALYESKA TERMINAL, VALDEZ, AK
		2	ANS CRUDE, ALL CARGO TANKS
		3	1,280,000 G. BBLS GK
3/7/89	C	6	Arco berth #121, Long Beach, Ca.
		7	All cargo tanks
		8	No GK
3/8/89	C	6	L.A. Berth #46, L.A. Ca.
		7	All cargo tanks
		8	No GK
3/10/89	C	6	Anchorage #9, S.F. Bay, Ca LTR #1
		7	All cargo tanks
		8	No GK
3/11/89	C	6	Anchorage #9, S.F. Bay, Ca. LTR #2
		7	All cargo tanks
		8	No GK
3/12/89	C	6	Anchorage #9, S.F. Bay, Ca LTR #3
		7	All cargo tanks
		8	No GK

Master's Signature [signature]

008455

Name of ship: Exxon Valdez
Official number or letters: 692966

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
3/12/89	D	9	Anch #9, S.F. Bay
		10	1P, 1C, 1S
		11	4 mach/tank, 12 machines total
		12	2110
		13	Single-stage
		14	130 PSI
		15	2300
		16	SAAB meters
		17	NONE GK
3/12/89	D	9	Anch #9, S.F. Bay
		10	3Ctr
		11	4 machines
		12	2310
		13	Single-stage
		14	130 PSI
		15	3/13/89 0050
		~~16+17~~ 16	SAAB meters
		17	none GK
3/12/89	C	6	Anchorage #9, S.F. Bay LTR #4
		7	All cargo tanks
		8	yes GK
3/13/89	E	18	3C & 5C
3/13/89		19	⚓ #9 S.F. Bay [signature]

Master's Signature [signature]

008456

Name of ship: Exxon Valdez
Official number or letters: 692966

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
3/23/89	A	1	Valdez Alaska
		2	ANS All
		3	1 286 738 Gross Bbls [signature] 3/24/89
3/23/89	H	32	3C 5C, Sluice all other Tanks
Late entry		33-39	N/A
		40	Valdez, Alaska [signature] 3/24/89

FOR JJ Hazelwood
Master's Signature [signature]

008457

Name of ship: Exxon Valdez
Official number or letters: 692966

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
_______(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge
3/24/89	N	73	Approx 0005
		74	off Bligh Reef Prince William Sound Alaska
		75	Approx 200,000 - 240,000 Bbls ANS Crude
		76	Grounding [illegible] 4/6/89
3/25/89 3/29/89	C	6	Bligh Reef Lighter to Exxon Baton Rouge
		7	All except 2P & 4P
		8	No [illegible] 4/6/89
3/30/89 4/21 89	C	6	Bligh Reef Lighter to Exxon San Francisco
		7	All except 2P & 4P
		8	No [illegible] 4/6/89
4/2/89 4/4/89	C	6	Bligh Reef Lighter to Exxon Baytown
		7	All except 2P & 4P
		8	No [illegible] 4/6/89
4/5/89	N	73	Approx 1030 — 1700 ~~[illegible]~~ (Throughout Transit)
		74	Transit under Tow to Naked Island
		75	Light Sheen ANS Crude
	=	76	Appeared to be hull clingage due to
			Grounding of 3/24/89 [illegible] 4/6/89
4/5/89	Vessel Anchored off Naked Island. Boomed and		
	undergoing survey & Temp. Repairs. [illegible] 4/6/89		

Master's Signature ____________________

008458

Name of ship: ____________________

Official number or letters: ____________________

CARGO/BALLAST OPERATIONS (OIL TANKERS) / MACHINERY SPACE OPERATIONS (ALL SHIPS)
(Circle one)

DATE	CODE (letter)	ITEM (number)	Record of operations/signature of officers in charge

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Master's Signature ____________________

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Notes from the Inspection of the MT EXXON VALDEZ on Sep. 6, 1989 as she laid drydocked at NASSCO yard in San Diego.

Attendance: Mr. Michael Chalos, Attorney, Chalos, English & Brown
Mr. Thomas Russo, Attorney, Chalos, English & Brown
Mr. Dick Madson, Attorney (Alaska)
Mr. Joseph Weiner, Consulting Engineer
Capt. Michael (Shiras) Walker, Consulting Mariner, Navigation
Mr. Edward Hoffman, Naval Architect

Mr. H. Naughton, Exxon representative

The team inspected the MT EXXON VALDEZ (Length between Perpindiculars 945ft, Beam 166ft, Depth 88ft, Summer Draft 64.57ft with a Deadweight of 211,469LT) as follows:

A. Wheelhouse, including navigational equipment, chart space, cargo control room and accommodations.

B. Deck spaces, including ondeck piping layout and bow arrangement.

C. Engine Room, including engine control room, machinery rooms and steering gear space.

D. Hull plating, including fore peak, starboard wing tanks and center tanks.

A. WHEELHOUSE: The navigational space was neatly laid out with all the required navigational aides, data, charts and documents (refer to pictures attached P.8 thru P.12).

The navigational control 'island' was arranged (from port to starboard) with a Raytheon Radar (X-Band), Cargo Monitoring Display, Sperry Steering Helm System, Bridge-Engine Control System and the ARPA Raytheon (S-Band) radar (pictures P.9 & P.10). On the Cargo Monitoring stand, sound powered telephones were fitted (picture P.10).

The steering control system was a SPERRY SRD 2000 including a CRT display unit (picture P.9). The course recorder, located in the chart space was a SPERRY unit connected to the steering control system (picture P.11). The echo depth sounder was a RAYTHEON unit, R8220, located in the chart space with recording paper and a remote digital display was located at bridge front.

The radars, RDR CKT 2R-ER (S-Band) and CKT 1R-ER (X-Band) were RAYTHEON units including the RAYCAS ARPA unit for collision avoidance connected to the S-Band radar. The radio direction finder was a FURUNO make. The satellite navigator was a RAYTHEON make (RAYSAT 200). The Bridge-Engine control system for the main engine was a SULZER SBC3.1 control system (picture P.12).

On the port bulkhead at the wheelhouse door was the vessel's manuvering characteristics including turning circles, at full load and ballast load for both full speed and half speeds. Also included within the data was the following manuvering characteristics:

	RPM	SPEED
Full Sea Speed	87.6	15.96
Full Nav. Speed	55	10.8
Half Ahead Speed	40	7.9
etc.		

Also included in the table was the following elapsed times with the stopping distances considering the rudder angle at zero degrees (this is the distance the vessel travels from ahead to stop condition at the various speed conditions):

Speed Condition	Time	Distance
Full Sea Speed	10min	1.65 miles
Full Nav. Speed	6.2min	0.78 miles
Half Speed	5.3min	0.56 miles
Slow Ahead	4.9min	0.42 miles

It is important to note that all the data above was CORRECTED after a Rudder Modification in June 1988. The reasons for this rudder modification should be thoroughly explained.

On the separation bulkhead between the Navigation Bridge and the Chart Space, the Safety Plan (including Fire Stations), the Steering Gear System Operation Plan and also the General Arrangement Plan of the vessel were fitted.

The Navigation Bridge forward bulkhead (above the forward Wheelhouse windows) was fitted with the following navigational aides: Turning Speed Log, Gyro Repeater, Speed Log (AMETEK MRO-0100), Rudder Angle Indicator, Main Engine RPM Indicator, Sperry SR0331 Master Display, Depth Sounder, Rate of Turn (Deg. per min.) Meter, Anemometer and Anemonscope (wind speed and direction indicators) (picture P.10). Also at the forward bulkhead, various VHF telephone sets were fitted.

Installed below the overhead, just ahead of the helm to the starboard side of the centerline, was the reflector for the Magnetic Compass which was fitted, as usual, on the Compass Deck above the Wheelhouse. Also fitted below the overhead, just starboard of the Magnetic Compass, was a 'three-faced' rudder angle indicator (picture P.9). If one were to view this three-faced rudder angle indicator from the port side of the wheelhouse, depending upon where one was standing, the Magnetic Compass would obstruct the view to the rudder angle indicator.

The outside Bridge wings (port and starboard) were fitted with Gyro Repeators (picture P.8). On the weather deck side (outside of the wheelhouse), located above the Wheelhouse exit/entrance doors to the Bridge wings were a Rudder Angle and Main Engine RPM indicators (picture P.8). They were fitted with light dimmer switches for nightime viewing.

The arrangement of the Chart Space (aft of the Navigation Bridge space) was neat and tidy with charts tables, course recorder, echo sounder, satellite navigator instruments etc. clearly displayed without any obstructions (picture P. 11).

B. DECK SPACES: The on-deck piping layout including cargo piping, inert gas, electrical conduit piping, tank cleaning piping etc. were in good condition (picture P.8 & P. 14).

There was no indication of any buckling, sagging, hogging, cracking or any noticable deformations of the main deck plates or piping systems. All systems seemed to be in good operational order.

In the accommodations, the CARGO CONTROL ROOM was inspected and found to be in satisfactory condition although the cargo control computer was removed from the space (makers could not be determined) (picture P. 13).

The steam turbine driven Shinko Make Cargo Pumps are controlled from this space. The tank gaging system was a SAAB radar type system which incorporates the level gaging as well as the level alarms (high and low). The segregated ballast control and level gaging system were also located in this space.

C. ENGINE ROOM SPACES: The engine room was inspected and considered to be in good condition with no evidence of any buckling, cracking or deformations in the machinery or bilge space, as far as could be determined (pictures P.15 & P.16).

The Engine Control Room was fitted with the ususal machinery control gear as well as two CRT displays for main and auxiliary propulsion monitoring (picture P. 16). The SULZER slow speed RTA type engine is considered a good reliable make and model.

The steering gear spaces were inspected and found in good condition. The KAWASAKI make steering gear, rapson slide system, with two independent hydraulic pumping systems is a reliable and dependent system (picture P.16).

D. HULL PLATING: The port side plating as viewed from the top of the dock was considered in good condition and there was no indication of plate deformations throughout the parallel sides of the vessel.

On inspection, the bottom plates were obviously in poor condition. Basically from the centerline of the vessel to the starboard bilge keel all cargo as well as ballast tanks were ruptured, penetrated, cracked or deformed in some manner. The port side wing tanks were considered to be intact. The ruptured tanks would include the following:

Fore Peak Ballast Tank
No. 1 Starboard Wing Cargo Tank
No. 1 Center Cargo Tank
No. 2 Starboard Wing Ballast Tank
No. 2 Center Cargo Tank
No. 3 Starboard Wing Cargo Tank
No. 3 Center Cargo Tank
No. 4 Starboard Wing Ballast Tank
No. 4 Center Cargo Tank
No. 5 Starboard Wing Cargo Tank
No. 5 Center Cargo Tank

FORE PEAK BALLAST TANK: The bottom plating as well as the bottom longitudinal frames on the starboard side of the tank from the centerline were either missing, distorted, buckled, cracked and bent in such a way that total replacement would be necessary (picture P. 17). Between web frames 3 and 5 the bottom plate was set up into the tank about 6feet. It is evident that most of this severe damage was caused by the explosive impact of the vessel with the reef. The reasons for the steel being distorted in such a way was due to the force of the 210,000 ton vessel travelling at about 12 knots slamming into the rocky reef.

NO. 1 STARBOARD WING CARGO TANK (web frame space numbers 5 thru 13) (picture P.17 & P.18): Transverse Web Frame Space No. 5 thru 13, damage was evident from the longitudinal bulkhead separating the wing tank from the No. 1 Center Cargo Tank to the bilge strake plate (at the side of the vessel), part of the bottom plate was missing and the bottom longitudinal frames were distorted and bent with web frames buckled and deformed up and in the aft direction. The buckling and deformation of the steel web frames in the aft direction indicates a severe impact collision damage by the vessel with the hard rock reef formation. The distorted steel members were set up into the tank approximately 7feet. Also, in this tank, two rock boulders, one in the vicinity of web frame 10 and one at web frame 11, approximately 6 feet in diameter each, were wedged into the steel structure (picture P.18). It is evident that the necessary force required to wedge the hard rocks into the steel tank could only be attributable to the initial impact of the vessel slamming into the reef at 12knots.

NO. 1 CENTER CARGO TANK (web frame space numbers 5 thru 13): Transverse Web Frame Space No. 5 thru 13 from the centerline longitudinal frame to the starboard side of tank at the longitudinal bulkhead between the Center Tank and the Wing Tank, part of the bottom plate was missing, either sheared off or cut-off after the accident. The web frames as well as longitudinal frames were also buckled and deformed up into the tank, pushed in the aft direction from the initial collision with the reef. At the aft part of the Center Tank in some areas of the starboard side of the tank, the bottom plate was intact but longitudinal cracks and separations were evident. The longitudinal bulkhead between the Center Tank and No. 1 Starboard Wing Cargo Tank was buckled and deformed up into the tank. On the port side of the centerline longitudinal frame, the structural members seemed intact with no buckling or cracks evident. The intact slightly deformed bottom plates were deeply scratched running in the longitudinal direction indicating the rocky reef scraping the vessel's steel plate bottom during intial impact before the vessel came to rest. THESE DEEP SCRATCHES WERE EVIDENT THROUGHOUT THE VESSEL (picture P.19).

NO. 2 STARBOARD WING BALLAST TANK (web frame space numbers 13 thru 23): Transverse Web Frame Space No. 13 thru 23 from the longitudinal bulkhead to bilge strake (turn of bilge), bottom plate as well as most bottom longitudinal frames were either missing, buckled, deformed or distorted. The transverse web frames were buckled at the lower face connecting to the bottom plate and distorted bottom longitudinals in an aft direction. The vertical deformation of the longitudinal frames into the tank was estimate to be about 7 feet in some areas. The longitudinal bulkhead separating the No. 2 Wing and No. 2 Center Cargo tanks was deformed and buckled. This type of buckling of the longitudinal bulkhead as well as the deformation of the longitudinal and transverse webs frames is attributable to the initial collision of the vessel with the reef.

NO. 2 CENTER CARGO TANK (web frame space numbers 13 thru 23): Transverse Web Frame Space No. 13 thru 20 from the longitudinal centerline frame for six longitudinal frame spaces to the starboard side of tank, the bottom plate was missing and the six longitudinal frames were deformed, bent and buckled up into the tank about 6 feet. The bottom of the transverse web frames were buckled in the aft direction at the bottom plate connection. The bottom plate was missing, either being sheared off or cut off after the accident. Further starboard of the six longitudinal frame spaces, the bottom plate was intact but cracks and frame separations were evident. Deep longitudinal scratches were evident on the bottom plate. From Web Frame Space No. 21 thru 23, bottom shell plate was mostly missing for the entire starboard side and the bottom longitudinal frames were deformed and distorted upward and pointing aft into the tank. The remaining longitudinal frames were also distorted and cracked in some areas. There also was buckling of the longitudinal bulkhead between the center tank and No. 2 Starboard Wing Ballast Tank (see NO. 2 STARBOARD WING WATER BALLAST TANK, above). On the port side of the centerline longitudinal frame, the structural members seemed mostly intact but with some evidence of cracks and separation of the longitudinal frames from the bottom shell plate.

NO. 3 STARBOARD WING CARGO TANK (web frame space numbers 23 thru 34): (SAME AS NO. 2 STARBOARD WING BALLAST TANK): (picture P.20): Transverse Web Frame Space No. 23 thru 34 from the longitudinal bulkhead to bilge strake (turn of bilge), most of the bottom plate as well as the bottom longitudinal frames were either missing or totally bent, deformed and distorted. The transverse web frames were buckled at the lower face connecting to the bottom plate and bottom longitudinal frames pushed in an aft direction. The shell plate at the turn of the bilge was heavily set-up and pushed outward of the vertical side of the ship. This type of damage could have been caused by either impact of the vessel hitting the reef or the sitting on the reef and the subsequent high and low tides. The longitudinal bulkhead between No. 3 Stbd. Wing and No. 3 Center Cargo Tank was buckled at the forward part of the tank. This is an extension of the damage from No. 2 Wing and Center Tank longitudinal bulkhead and is caused by the propagation of the collision with the reef before the vessel came to rest.

NO. 3 CENTER CARGO TANK (web frame space numbers 23 thru 34): Transverse Web Frame Space No. 23 thru 26 from the longitudinal centerline frame to the longitudinal bulkhead of the No. 3 Starboard Wing Tank, the bottom plate was missing and the longitudinal frames were distorted, deformed and twisted in a concave manner. The transverse web frames were buckled at the bottom connections in an aft direction. From Transverse Web Frame Space No. 27 thru 34, for about three longitudinal frame spaces to the starboard of the centerline, the bottom plate as well as frames were intact with no indication of damage. For the rest of the longitudinal frame spaces to the starboard longitudinal bulkhead, the bottom plate was either missing, deformed or set-in and the longitudinal frames were distorted and buckled, same type of damages as stated for No. 3 Starboard Wing Cargo Tank above. It is evident that the propagation of the damages were caused by the impact of the vessel with the reef before the vessel came to rest. On the port side of the centerline longitudinal frame, the structural members seemed mostly intact.

NO. 4 STARBOARD WING BALLAST TANK (web frame space numbers 34 thru 40): Transverse Web Frame Space No. 34 thru 40 from the longitudinal bulkhead to bilge strake (turn of bilge), the bottom plate was set-in and distorted with cracks evident throughout the tank space. There were deep scratches running longitudinally on the bottom plate, evidence of the vessel scraping the reef before coming to rest.

NO. 4 CENTER CARGO TANK (web frame space numbers 34 thru 40) (picture P.21): Transverse Web Frame Space No. 34 thru 40, for a distance of about 3-4 longitudinal frame spaces on the starboard side of tank from the centerline vertical keel frame, the structural members (transverse web frames, bottom plate and longitudinal frames) seemed intact with slight set-ins and deformations. For the other starboard side longitudinal frame spaces to the No. 4 Wing Ballast Tank longitudinal bulkhead, the bottom plate was cracked and set into the tank and the longitudinal frames were deformed, cracked and buckled. The web frames were also buckled in this area at the bottom connections pushed in an aft direction, indicating that the damage was caused by the initial contact of the vessel with the reef. On the port side of the centerline longitudinal frame, the structural members seemed mostly intact.

NO. 5 STARBOARD WING CARGO TANK (web frame space numbers 40 thru 47): Transverse Web Frame Space No. 40 thru 50 from the longitudinal bulkhead to bilge strake (turn of bilge), bottom plate as well as most bottom longitudinal frames were intact with some cracks and bottom plate set-ins and deformations were evident.

NO. 5 CENTER CARGO TANK (web frame space numbers 40 thru 51) (picture P.21): (SAME AS NO. 4 CENTER CARGO TANK): Some of the starboard side longitudinal frame spaces throughtout the tank were intact while at the longitudinal bulkhead cracks or separations were evident. Set-in and buckling of the web frames as well as the longitudinal frames were also evident. To the port side of the centerline of the tank, the structural members seemed intact.

CONCLUSION:
===========

From inspecting the bottom of the vessel, the indication is that the bottom damage was caused by two phenomena:

1. The initial impact damage of the 210,000 ton vessel travelling at about 12 knots hitting the reef and the subsequent stopping momentum after the onset of the grounding.
2. The sitting or waiting period after the grounding and the subsequent high and low tides causing further damage.

For the writing of this report, I have referred to copies of the following documents: General Arrangement, Midship Plan, Transverse Frame Plan and Constructions plans.

Very truly yours,

POURNARAS & HOFFMAN, INC.

Edward F. Hoffman

EXHIBIT 106

WAS NOT ADMITTED INTO EVIDENCE

PLAINTIFF
EXHIBIT NO. 107
ADMITTED ☒ Trial
89-7217
89-7218
(CASE NUMBER)

cut pilot licenses were not valid to traverse the waters of Block Island Sound en route to a Connecticut port. Warner v. Dunlap, C.A.R.I.1976, 532 F.2d 767.

Gen.Laws § 46-9.1-1 et seq. were permissible under U.S.C.A.Const.Art. 1, § 8, cl. 3, so long as they fell within ambit of former section 211 of this title which permitted states to regulate pilotage in certain waters. Warner v. Replinger, D.C.R.I.1975, 397 F.Supp. 350, affirmed 532 F.2d 767.

State laws concerning pilotage are regulations of commerce and fall within class of powers which may be exercised by states until Congress sees fit to act otherwise. People by Lefkowitz v. MacDonald, 1972, 330 N.Y.S.2d 85, 69 Misc. 2d 456.

7. Persons liable for acts of pilot

When vessel is required by compulsion of state or federal law to employ pilot in certain waters, and allision results which is sole fault of the pilot, owners of vessel are not liable in personam, but vessel itself is liable in rem. Hogge v. SS Yorkmar, D.C.Md.1977, 434 F.Supp. 715.

Owner and operator of vessel was liable for negligent acts of pilot employed by them, in causing vessel to run aground with resulting injuries to person and boat on the shore. Blanchard v. American Commercial Barge Line Co., D.C.La.1972, 343 F.Supp. 920, affirmed 468 F.2d 950.

Ocean-going tug and not tanker midsection in tow of tug in a North Carolina harbor in which tanker midsection collided with moored United States Coast Guard cutter was liable in rem for acts of North Carolina state pilot whose services were required under G.S.N.C. § 76-33 because ocean-going tug was of foreign registry. U.S. Tug Parris Island, D.C.N.C.1963, 215 F.Supp. 144.

Owners of vessels which are boarded by qualified pilots who are experienced inland pilots and take vessels over and pilot them to or from port are liable for acts of such pilots. Cabins Tanker Industries, Inc. v. The Rio Maracana, D.C. Va.1960, 182 F.Supp. 811, affirmed 285 F.2d 592, certiorari denied 81 S.Ct. 1902, 366 U.S. 948, 6 L.Ed.2d 1241.

8. Three-judge court

Connecticut pilots' claim that Gen. Laws § 46-9.1-1 et seq. which required Rhode Island license of pilots in Block Island Sound violated U.S.C.A.Const. Art. 1, § 8, cl. 3 and conflicted with former section 211 of this title presented only question under U.S.C.A.Const. Art. 6, cl. 2 which did not require convening of three-judge court. Warner v. Replinger, D.C.R.I.1975, 397 F.Supp. 350.

9. Scope of judicial review

In action by pilot who was licensed for sound lying between port and open sea for statutory pilotage fees on ground that second pilot, who had piloted ships across sound as well as within port, was licensed only for the port, once it was represented by the Coast Guard that second pilot had been properly examined for crossing sound between sea and port, district court erred in going behind second pilot's license, actively reviewing on its own pilot's examination, and rejecting Coast Guard's representation. Campos v. Puerto Rico Sun Oil Co., Inc., C.A.Puerto Rico 1976, 536 F.2d 970.

§ 8502. Federal pilots required

(a) Except as provided in subsection (g) of this section, a coastwise seagoing vessel shall be under the direction and control of a pilot licensed under section 7101 of this title if the vessel is—

(1) not sailing on register;

(2) underway;

(3) not on the high seas; and

(4)(A) propelled by machinery and subject to inspection under part B of this subtitle; or

(B) subject to inspection under chapter 37 of this title.

(b) The fees charged for pilotage by pilots required under this section may not be more than the customary or legally established rates in the States in which the pilotage is performed.

(c) A State or political subdivision of a State r
pilot licensed under this subtitle an obligation t
other license, or adopt any other regulation t
pilot in the performance of the pilot's duties u
United States.

(d) A State or political subdivision of a Stat
charges on a vessel lawfully piloted by a pilot
section.

(e) The owner, charterer, managing operat
individual in charge of a vessel operated in vi
or a regulation prescribed under this section
States Government for a civil penalty of $5C
liable in rem for the penalty.

(f) An individual serving as a pilot witl
required by this section or a regulation
section is liable to the Government for a

(g) The Secretary shall designate by regu
approaches to and waters of Prince Willi
which a vessel subject to this section is not r
direction and control of a pilot licensed ur
title.

(Pub.L. 98-89, Aug. 26, 1983, 97 Stat. 553; Pul
Oct. 30, 1984, 98 Stat. 2874; Pub.L. 99-307, § 1(
446.)

Historical Notes

1986 Amendment. Subsec. (a)(4)(A). Pub.L. 99-307 substituted "part" for "Part".

1984 Amendment. Subsec. (a). Pub. L. 98-557, § 29(f)(1), substituted

"(a) Except as provided in subsection (g) of this section, a coastwise seagoing vessel shall be under the direction and control of a pilot licensed under section 7101 of this title if the vessel is—

"(1) not sailing on register;

"(2) underway;

"(3) not on the high seas; and

"(4)(A) propelled by machinery and subject to inspection under Part B of this subtitle; or

"(B) subject to inspection under chapter 37 of this title." for

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p. 4
U.S.

West's Federal

Penalties, jurisdiction and procedure, see
Process in rem, see § 11177 et seq.

(c) A State or political subdivision of a State may not impose on a pilot licensed under this subtitle an obligation to procure a State or other license, or adopt any other regulation that will impede the pilot in the performance of the pilot's duties under the laws of the United States.

(d) A State or political subdivision of a State may not levy pilot charges on a vessel lawfully piloted by a pilot required under this section.

(e) The owner, charterer, managing operator, agent, master, or individual in charge of a vessel operated in violation of this section or a regulation prescribed under this section is liable to the United States Government for a civil penalty of $500. The vessel also is liable in rem for the penalty.

(f) An individual serving as a pilot without having a license required by this section or a regulation prescribed under this section is liable to the Government for a civil penalty of $500.

(g) The Secretary shall designate by regulation the areas of the approaches to and waters of Prince William Sound, Alaska, on which a vessel subject to this section is not required to be under the direction and control of a pilot licensed under section 7101 of this title.

(Pub.L. 98-89, Aug. 26, 1983, 97 Stat. 553; Pub.L. 98-557, § 29(f)(1), (2), Oct. 30, 1984, 98 Stat. 2874; Pub.L. 99-307, § 1(13), May 19, 1986, 100 Stat. 446.)

Historical Notes

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"(1) not sailing on register;

"(2) underway;

"(3) not on the high seas; and

"(4)(A) propelled by machinery and subject to inspection under Part B of this subtitle; or

"(B) subject to inspection under chapter 37 of this title." for

"(a) A coastwise seagoing vessel, when not sailing on register and when underway (except on the high seas), shall be under the direction and control of a pilot licensed under section 7101 of this title if the vessel is—

"(1) propelled by machinery and subject to inspection under part B of this subtitle; or

"(2) subject to inspection under chapter 37 of this title."

Subsec. (g). Pub.L. 98-557, § 29(f)(2), added subsec. (g).

Legislative History. For legislative history and purpose of Pub.L. 98-557, see 1984 U.S.Code Cong. and Adm.News, p. 4831. See, also, Pub.L. 99-307, 1986 U.S.Code Cong. and Adm.News, p. 1308.

West's Federal Forms

Penalties, jurisdiction and procedure, see § 10698 Comment.
Process in rem, see § 11177 et seq.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS
Commanding Officer
Marine Safety Office
P.O. Box 486,
Valdez, Alaska 99686
(907) 835-4791

25 FEB 1980

CAPTAIN OF THE PORT ORDER NO. 1-80

SUBJECT: Prince William Sound Pilotage

AUTHORITY: 33 CFR 160

DISCUSSION: Since establishment of the Trans-Alaska Pipeline System (TAPS) all tankers operating in this trade have been required to have a federally licensed pilot onboard between Cape Hinchinbrook and Valdez, Alaska. This requirement has been under considerable reevaluation and proposed rulemaking is pending to revise or rescind the requirement. Further, on 7 January 1980 the M/V BLUE MOON, which had been employed as a pilot vessel for boarding at Hinchinbrook Entrance, foundered and sank. Attempts by the Southwest Alaska Pilots Association and vessel agents to temporarily employ a suitable replacement vessel have been unsuccessful. Long term commitments are also hampered by the pending rulemaking change. Use of a helicopter is deemed unsafe due to unstable weather conditions and further limited by reliable availablity. Therefore, to facilitate orderly TAPS tanker traffic, and to continue to preserve the safe and incident free transit from Hinchinbrook Entrance to the Valdez Pilot Station, the following order has been established.

ORDER: Each TAPS tanker when conducting the required three hour preliminary report, (33 CFR 161.334) prior to entering Hinchinbrook Entrance, or 30 minute initial report, (33 CFR161.336) from Alyeska Terminal prior to departure, will be queried if an officer is on board holding applicable federal pilotage for Prince William Sound. If a pilot will not be aboard for the transit between Hinchinbrook and the Pilot Station, inbound or outbound, the following will apply:

1. Status of all machinery, personnel, charts, publications and navigation equipment required by 33 CFR 164 will be reported.

2. Based upon satisfactory condition, entry of the vessel into Prince William Sound will be permitted providing transit to or from the pilot station can be completed during daylight hours and during a period of predictably good visibility.

3. Further, a licensed officer, in addition to the licensed officer on watch, will be employed as a navigator to continuously plot the position of the vessel during the transit of Hinchinbrook Entrance and Prince William Sound. This position will be reported on request to Valdez VTC.

4. Further, the Valdez Port Pilot will board or depart the vessel at the entrance to Valdez Arm, off Bligh Reef, in lieu of the established pilot station at Busby Island.

5. Further, transit to the anchorage area off Knowles Head, during other then emergency conditions, will be evaluated on a case basis, considering weather, vessel traffic, and operating conditions.

PLAINTIFF
IBIT NO. 108
ADMITTED # Trial
89-7217 cl
89-7218 cl
(CASE NUMBER)

25 FEB 1980

CAPTAIN OF THE PORT ORDER NO. 1-80 (Page Two)

SUBJECT: Prince William Sound Pilotage

6. Further, an English speaking officer will be on watch during the entire Prince William Sound Transit period.

APPLICATION: The above policy will apply until modified by rulemaking, or on a special case basis by the Captain of the Port, Valdez. This policy does not apply to TAPS tankers who have an officer aboard with federal pilotage for Prince William Sound, or who obtain the services of a pilot prior to transit of Prince William Sound.

J. K. WOODLE
Commander, U. S. Coast Guard
Captain of the Port
Valdez, Alaska

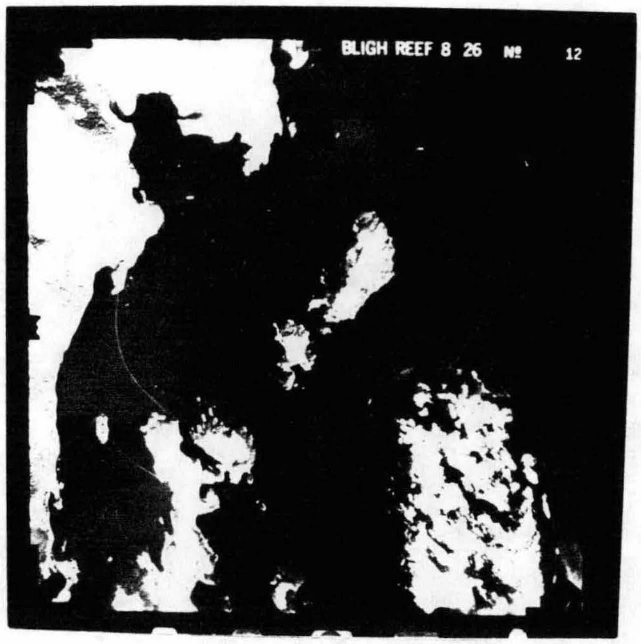
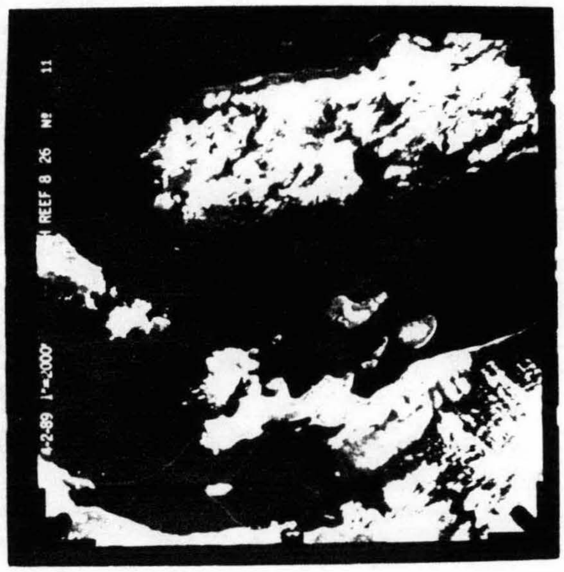


Exhibit #109



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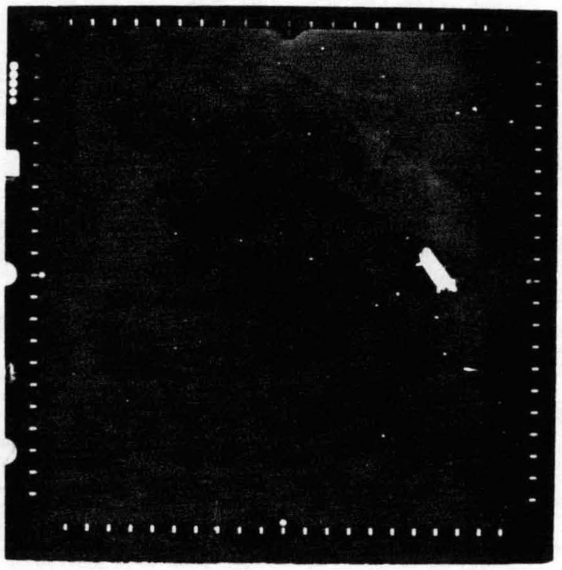
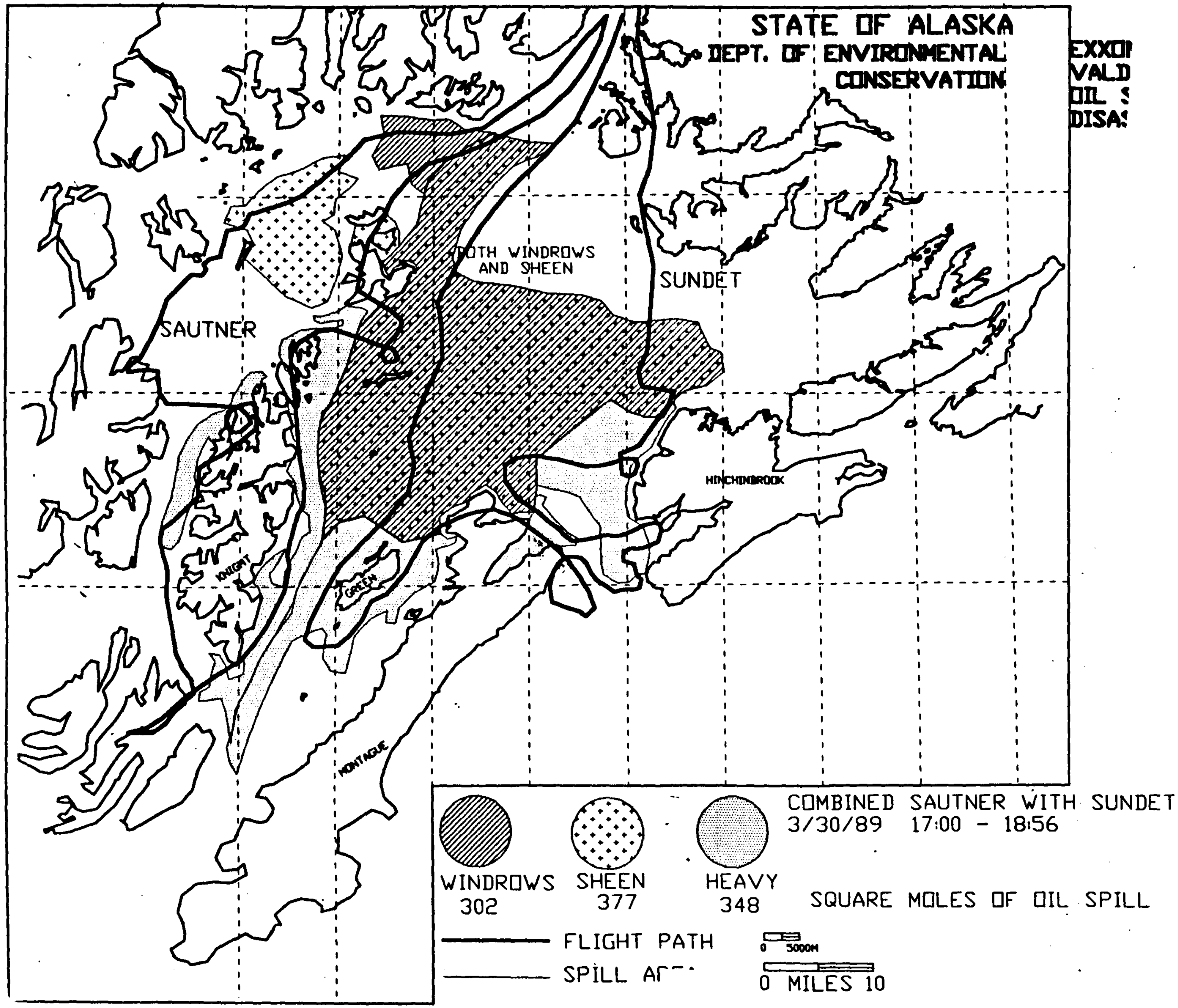


Exhibit 111

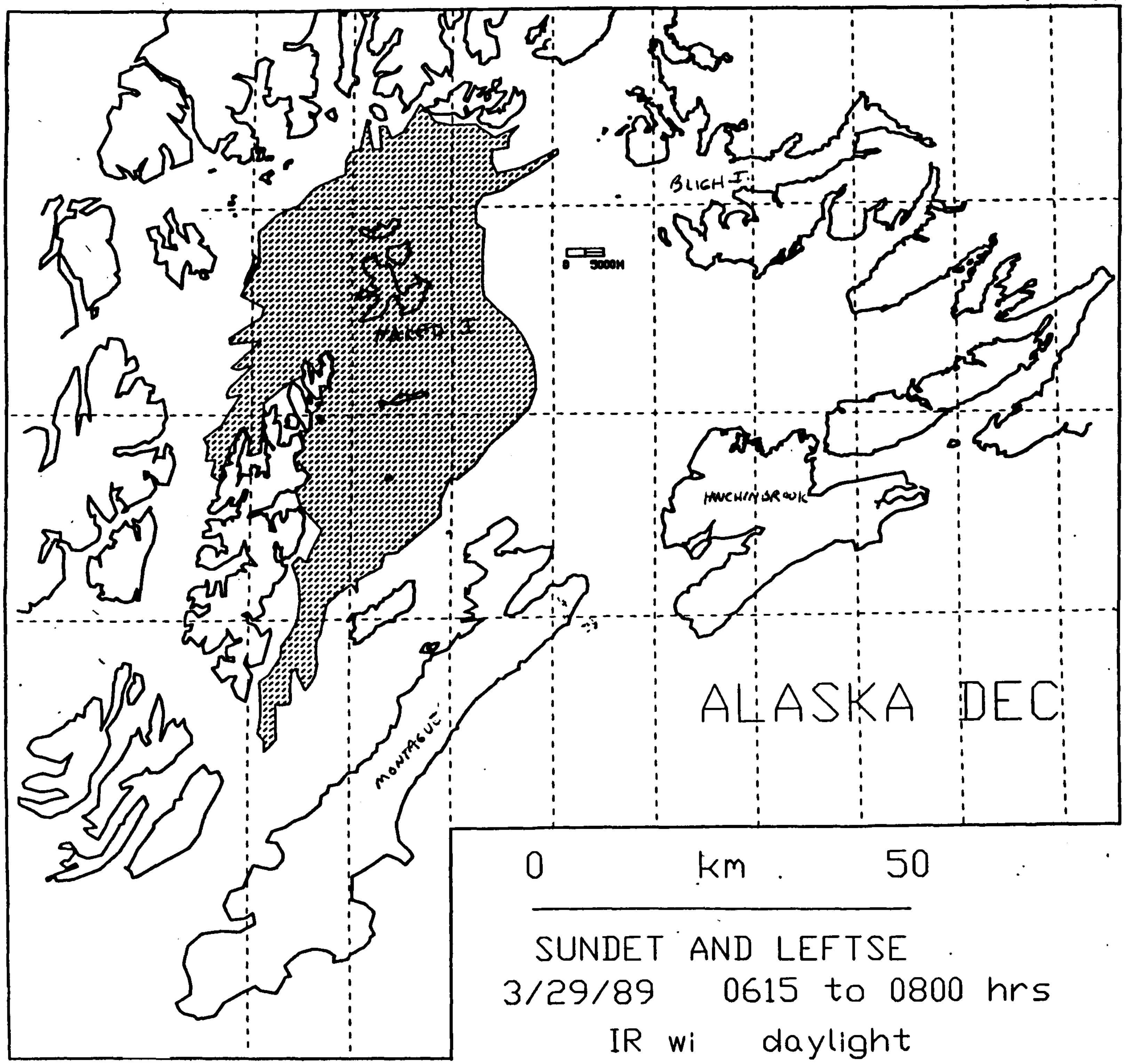
COMB330P

112



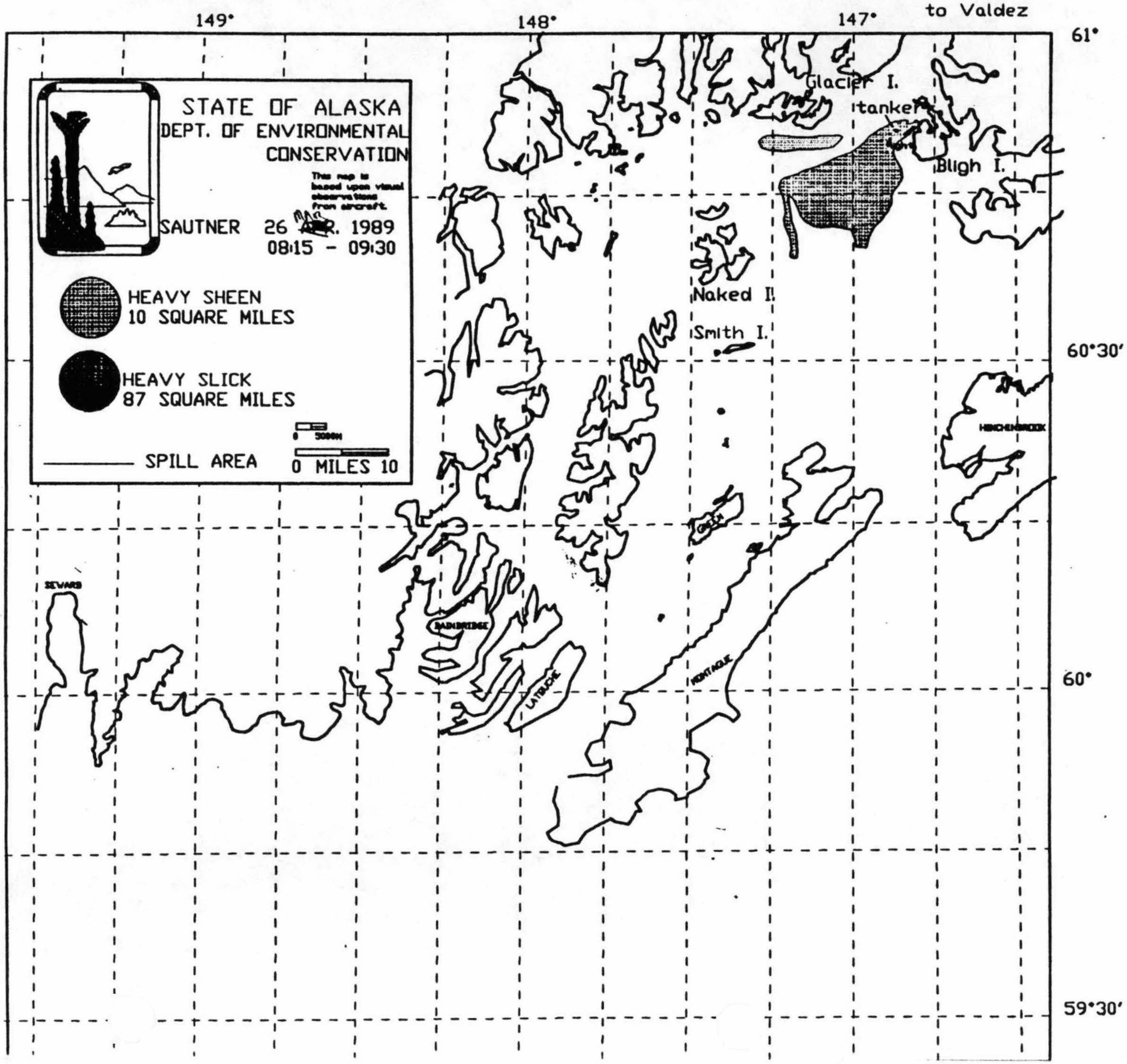
SUN329AM.PLT

113

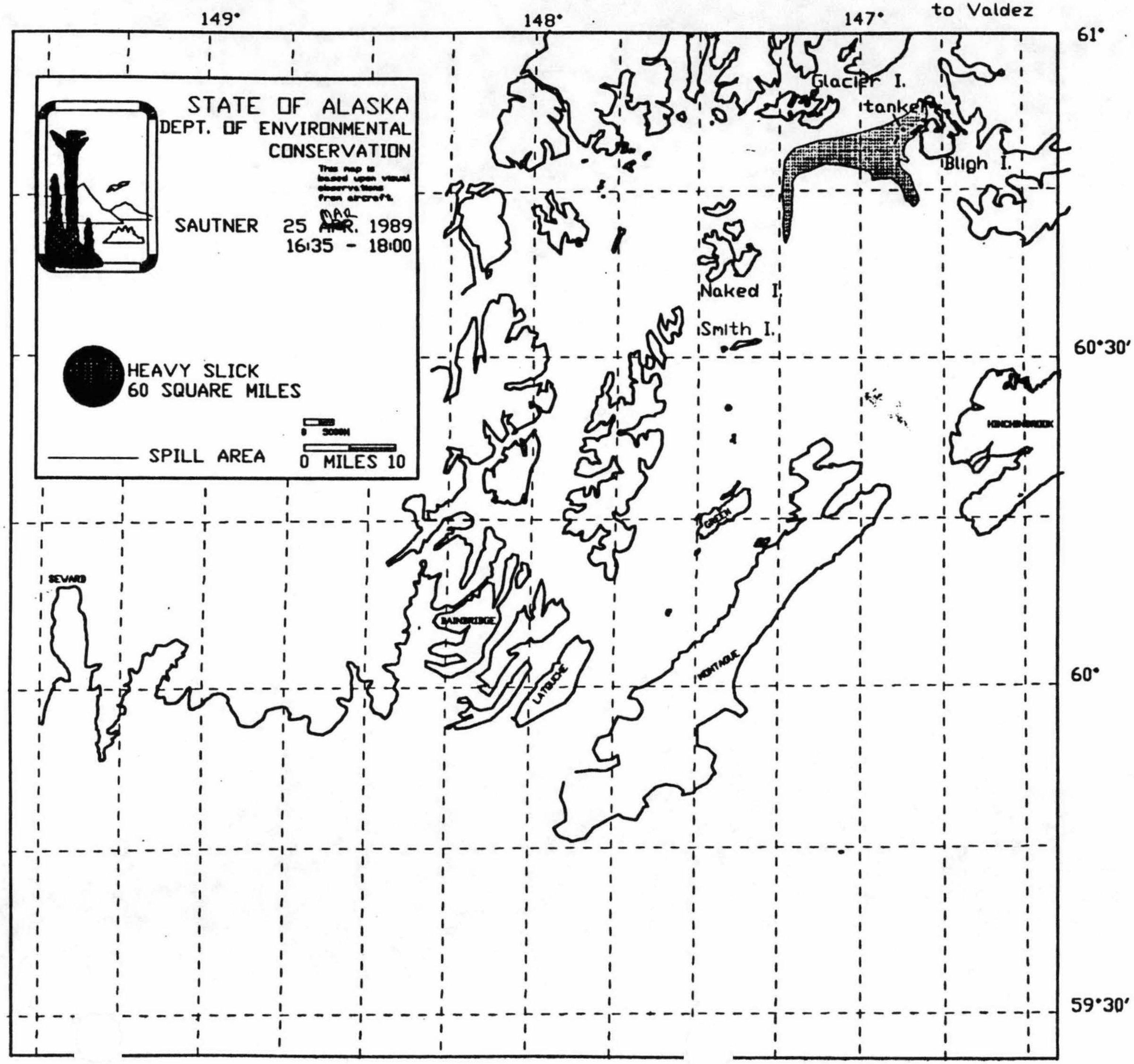


EXXON VALDEZ OIL SPILL

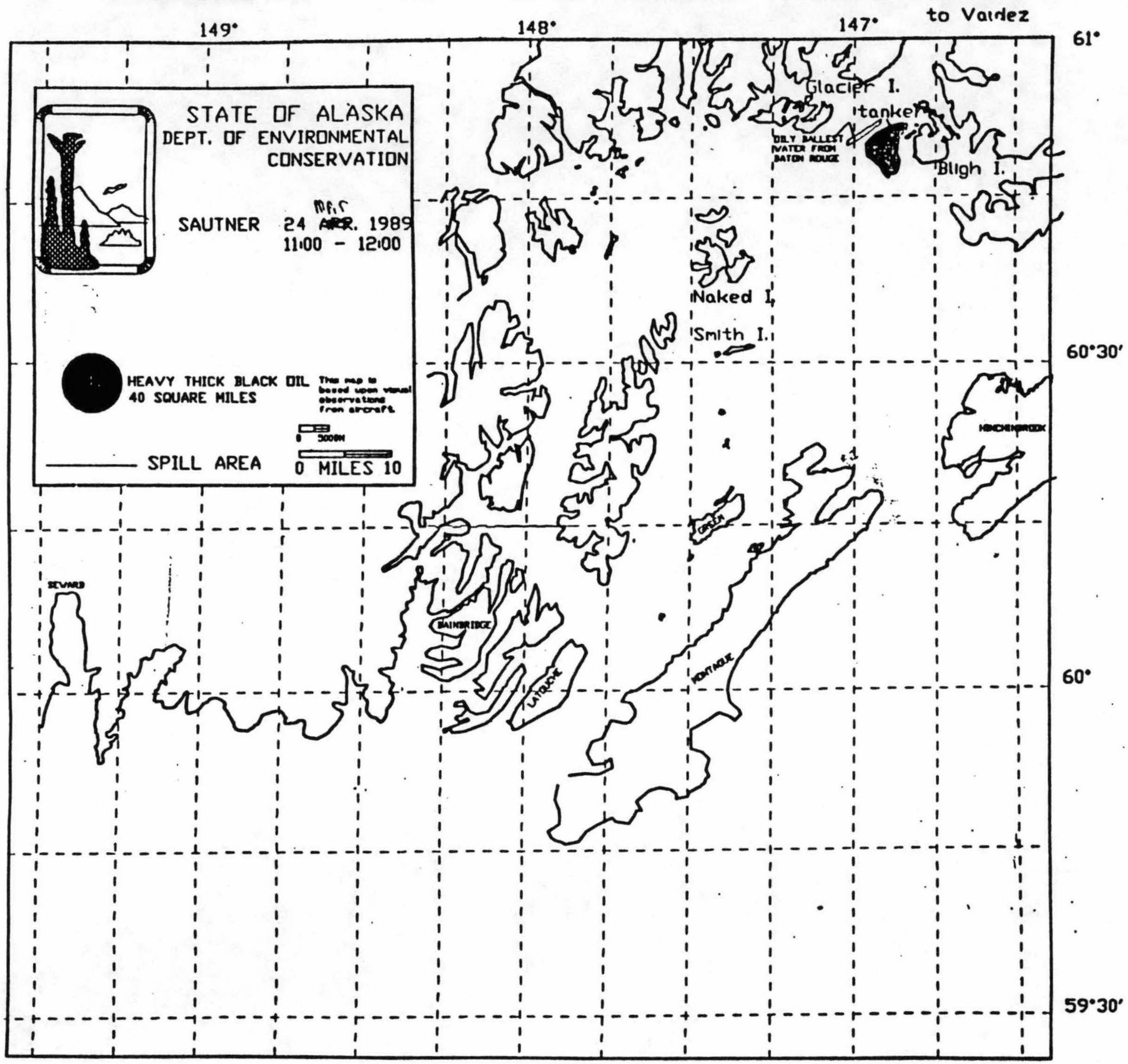
114



EXXON VALDEZ OIL SPILL



115



to Valdez
149°
148°
147°
61°
60°30′
60°
59°30′
STATE OF ALASKA
DEPT. OF ENVIRONMENTAL
CONSERVATION
SAUTNER 24 MAR ~~APR~~. 1989
11:00 - 12:00
HEAVY THICK BLACK OIL
40 SQUARE MILES
This map is based upon visual observations from aircraft.
SPILL AREA
0 MILES 10
Glacier I.
tanker
OILY BALLAST WATER FROM BATON ROUGE
Bligh I.
Naked I.
Smith I.
HINCHINBROOK
GREEN
MONTAGUE
LATOUCHE
BAINBRIDGE
SEWARD

016513

116

EXHIBIT 117

IS AN AUDIO CASSETTE

EXHIBIT 118

IS A VIDEO TAPE

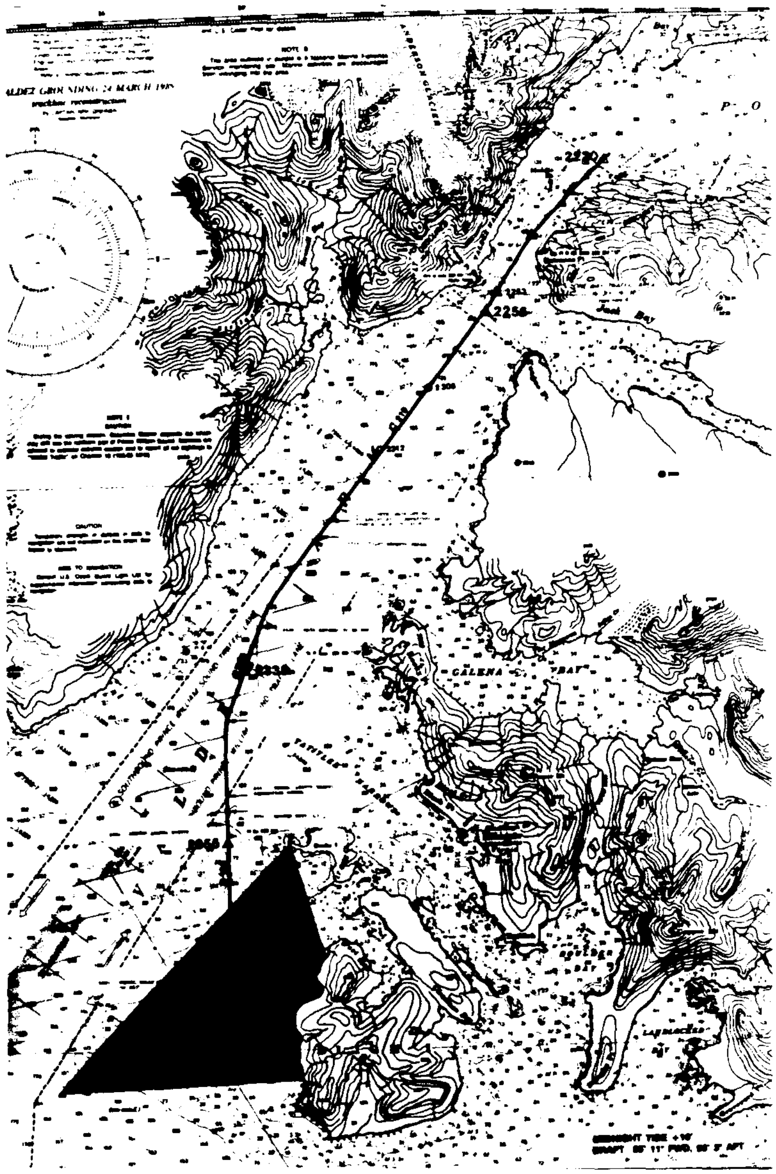
Exhibit 119

EXHIBIT 120

IS AN AUDIO CASSETTE

EXHIBIT 121

IS AN AUDIO CASSETTE

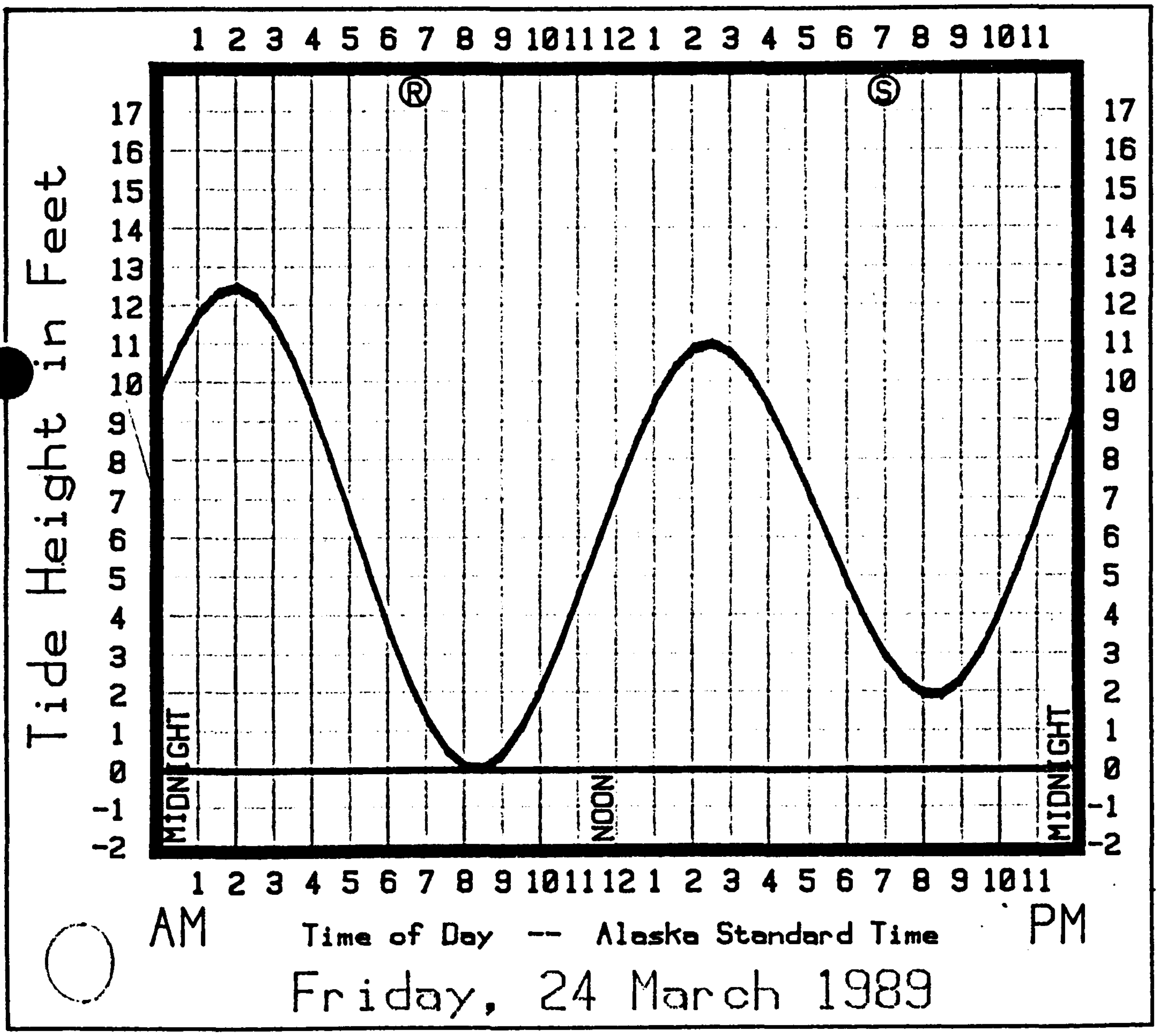


Valdez Grounding 24 March '89
trackline reconstruction

EX.# 122

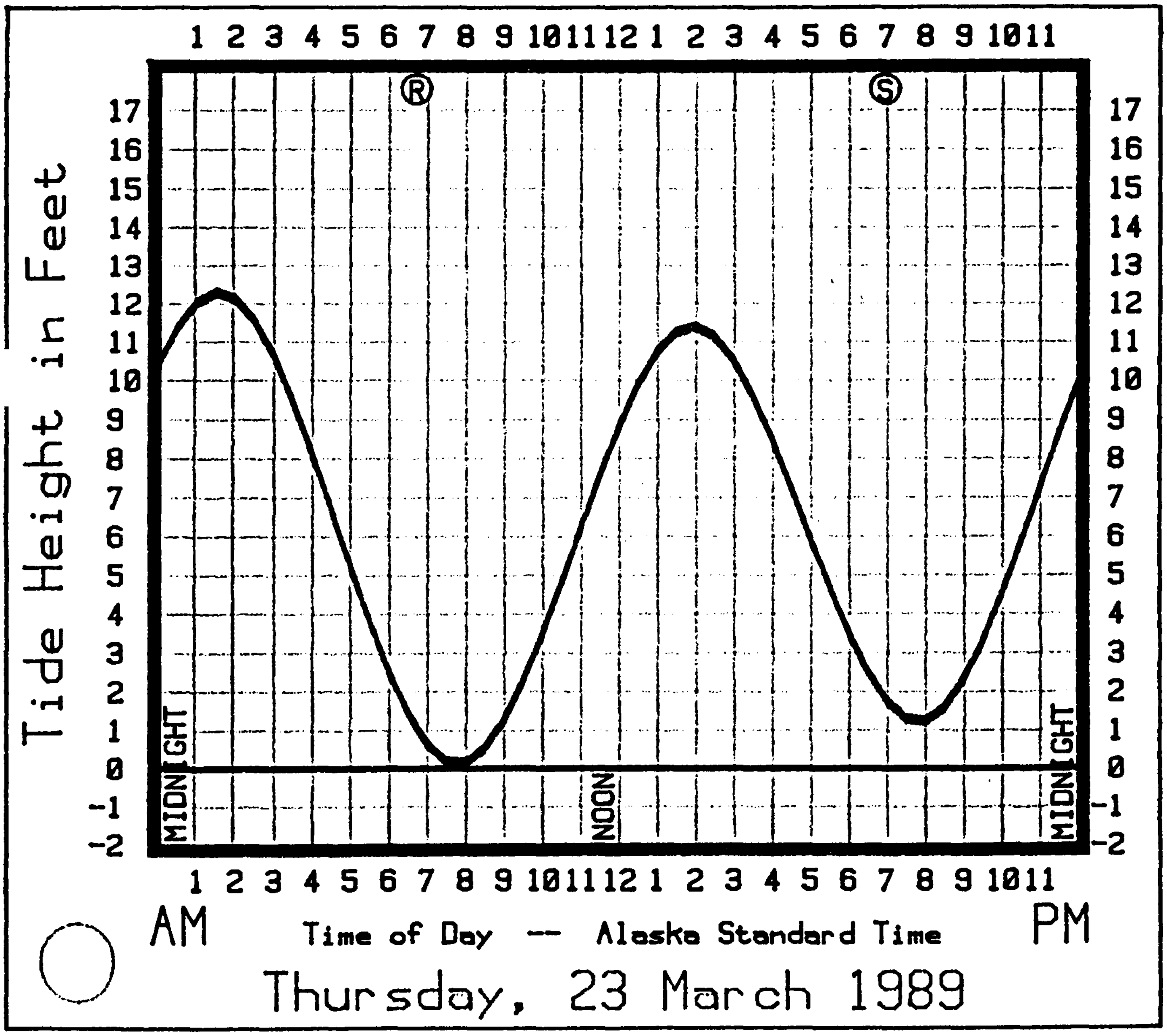
PLAINTIFF
EXHIBIT NO. 123
ADMITTED ☒ Trial
89-7217 cc
89-7218 cr
(CASE NUMBER)

Tideplot by: Tidegraph International, Inc.
1780 S. Windy Bend Drive
Lincoln City, Oregon 97367
(503) 994-7395



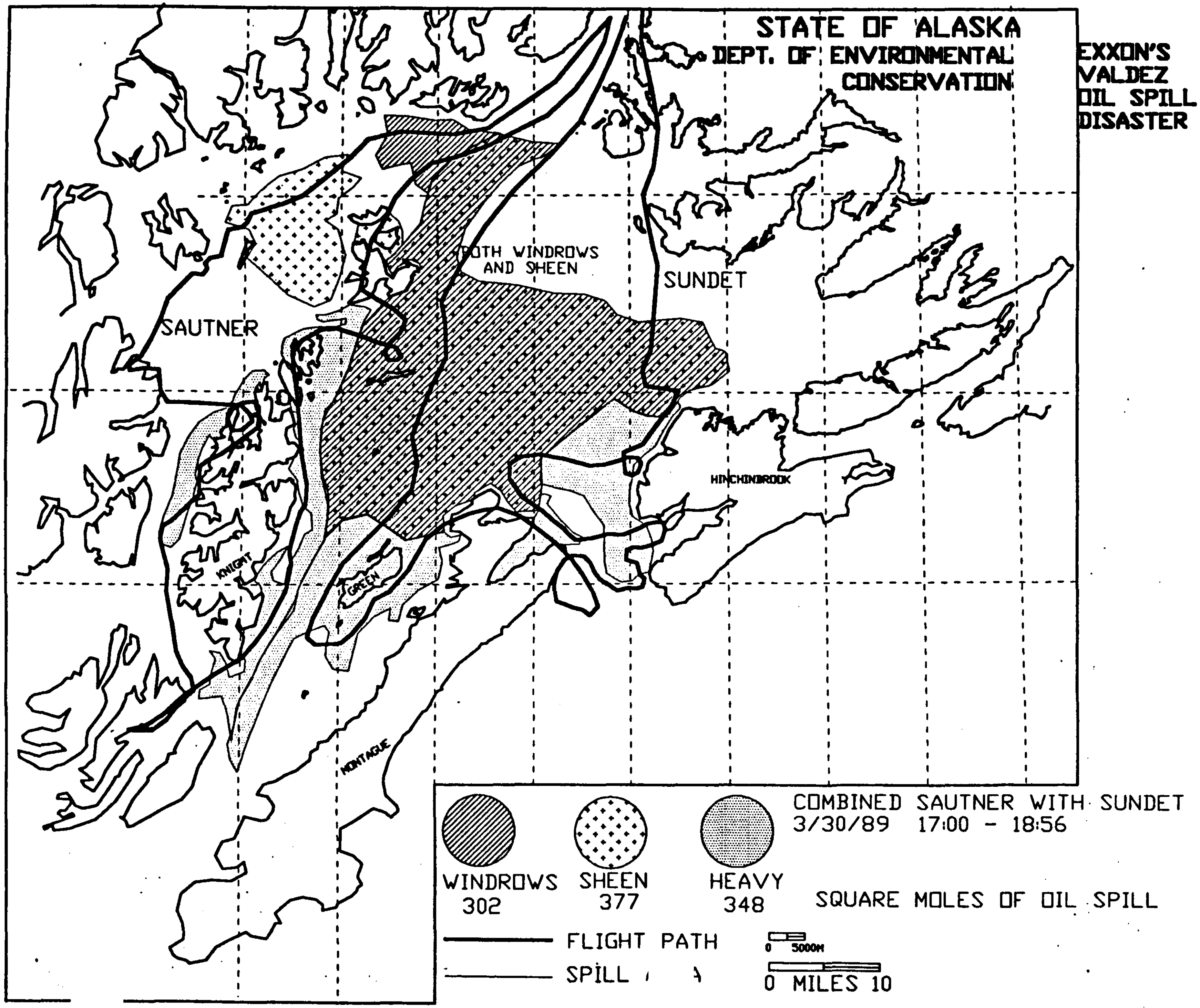
Tides for Rocky Point, Valdez, Alaska

Tideplot by: Tidegraph International, Inc.
1780 S. Windy Bend Drive
Lincoln City, Oregon 97367
(503) 994-7395

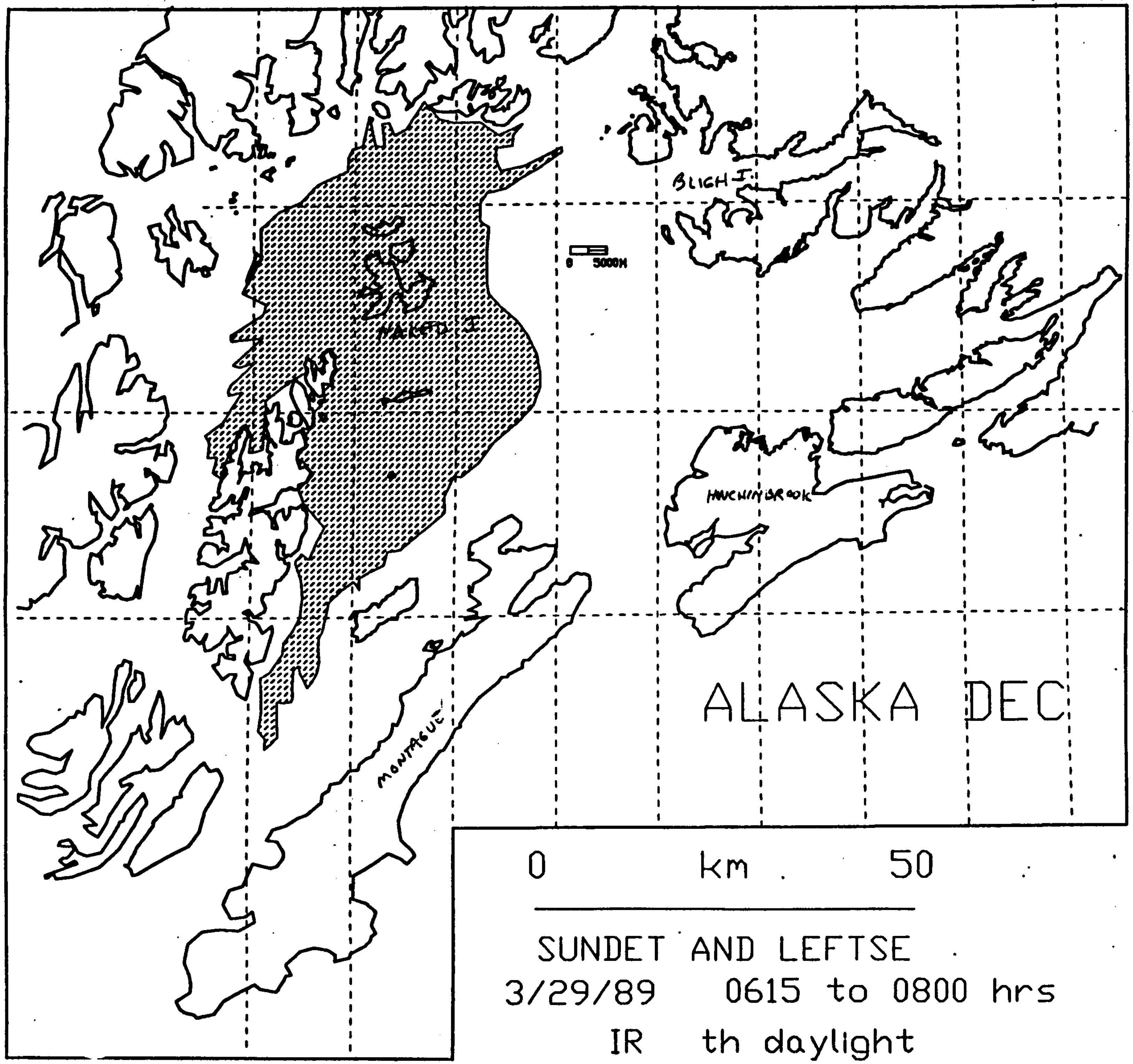


Tides for Rocky Point, Valdez, Alaska

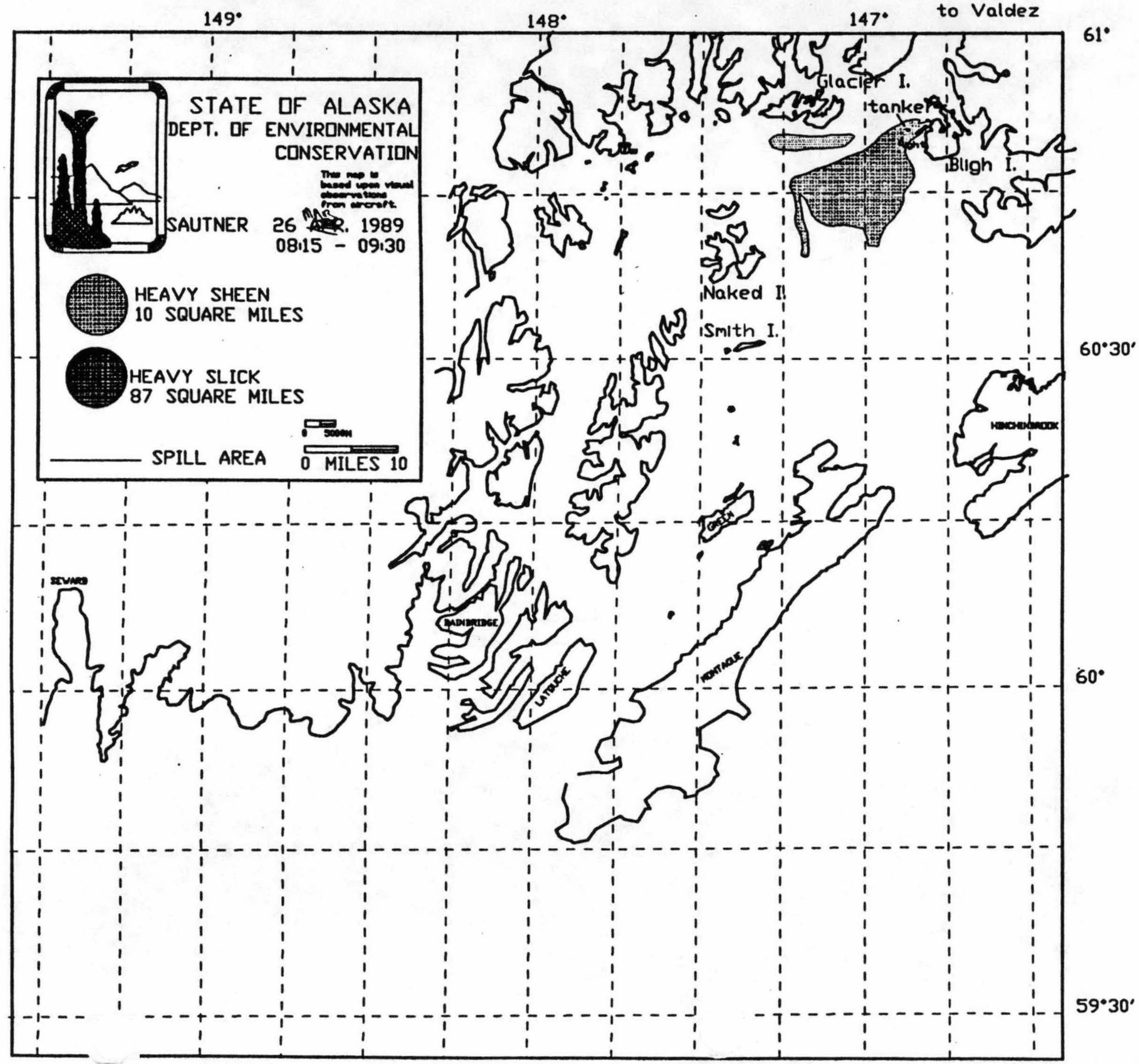
COMB330P

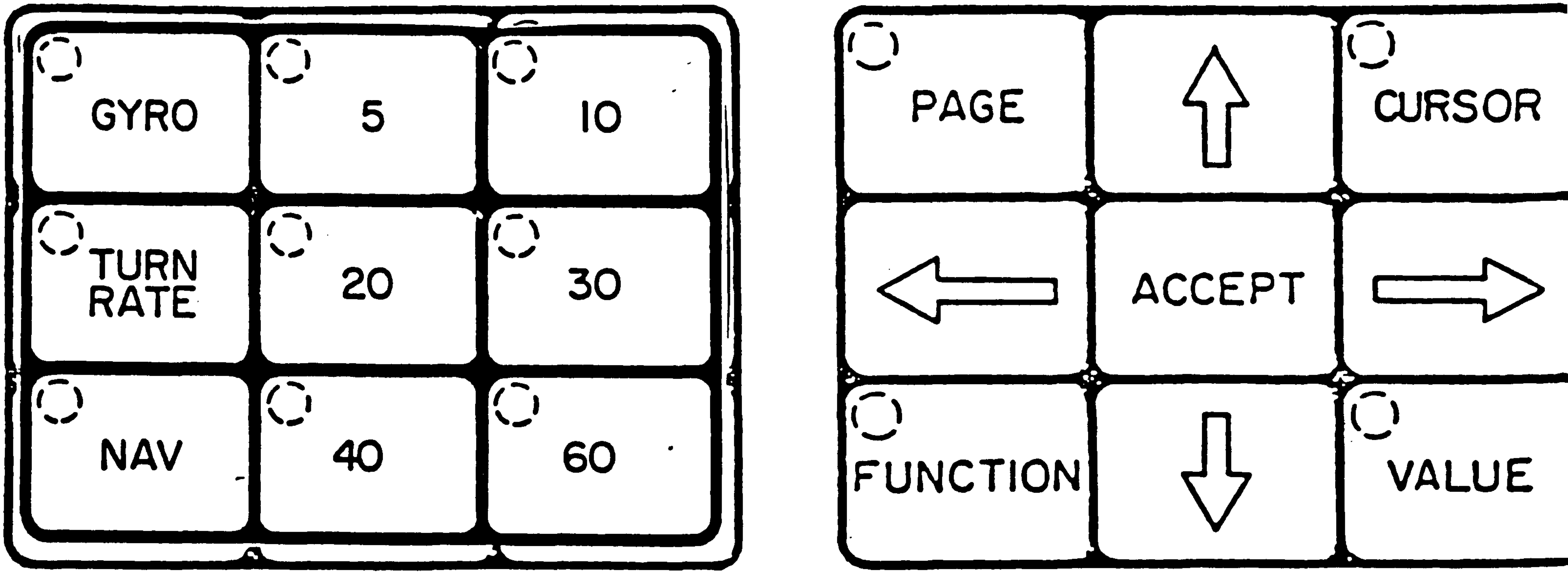

STATE OF ALASKA
DEPT. OF ENVIRONMENTAL CONSERVATION
EXXON'S VALDEZ OIL SPILL DISASTER
BOTH WINDROWS AND SHEEN
SAUTNER
SUNDET
HINCHINBROOK
KNIGHT
GREEN
MONTAGUE
COMBINED SAUTNER WITH SUNDET
3/30/89 17:00 - 18:56
WINDROWS 302
SHEEN 377
HEAVY 348
SQUARE MOLES OF OIL SPILL
FLIGHT PATH
SPILL
0 5000M
0 MILES 10

SUN329AM.PLT



EXXON VALDEZ OIL SPILL




GYRO
5
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TURN RATE
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30
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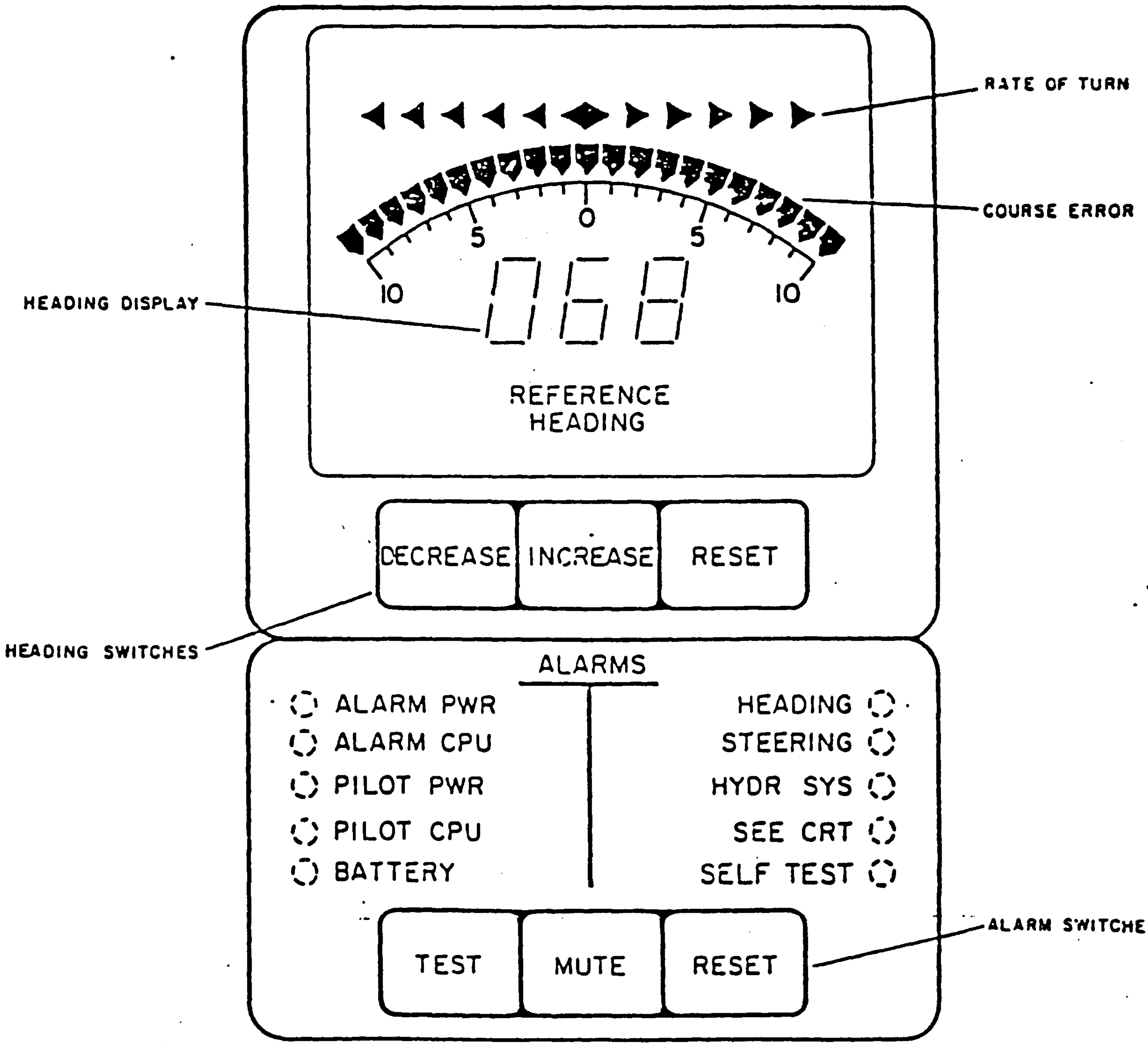
40
60
PAGE
CURSOR
ACCEPT
FUNCTION
VALUE


RATE OF TURN
COURSE ERROR
5
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5
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10
HEADING DISPLAY
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REFERENCE
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HEADING SWITCHES
ALARMS
ALARM PWR
ALARM CPU
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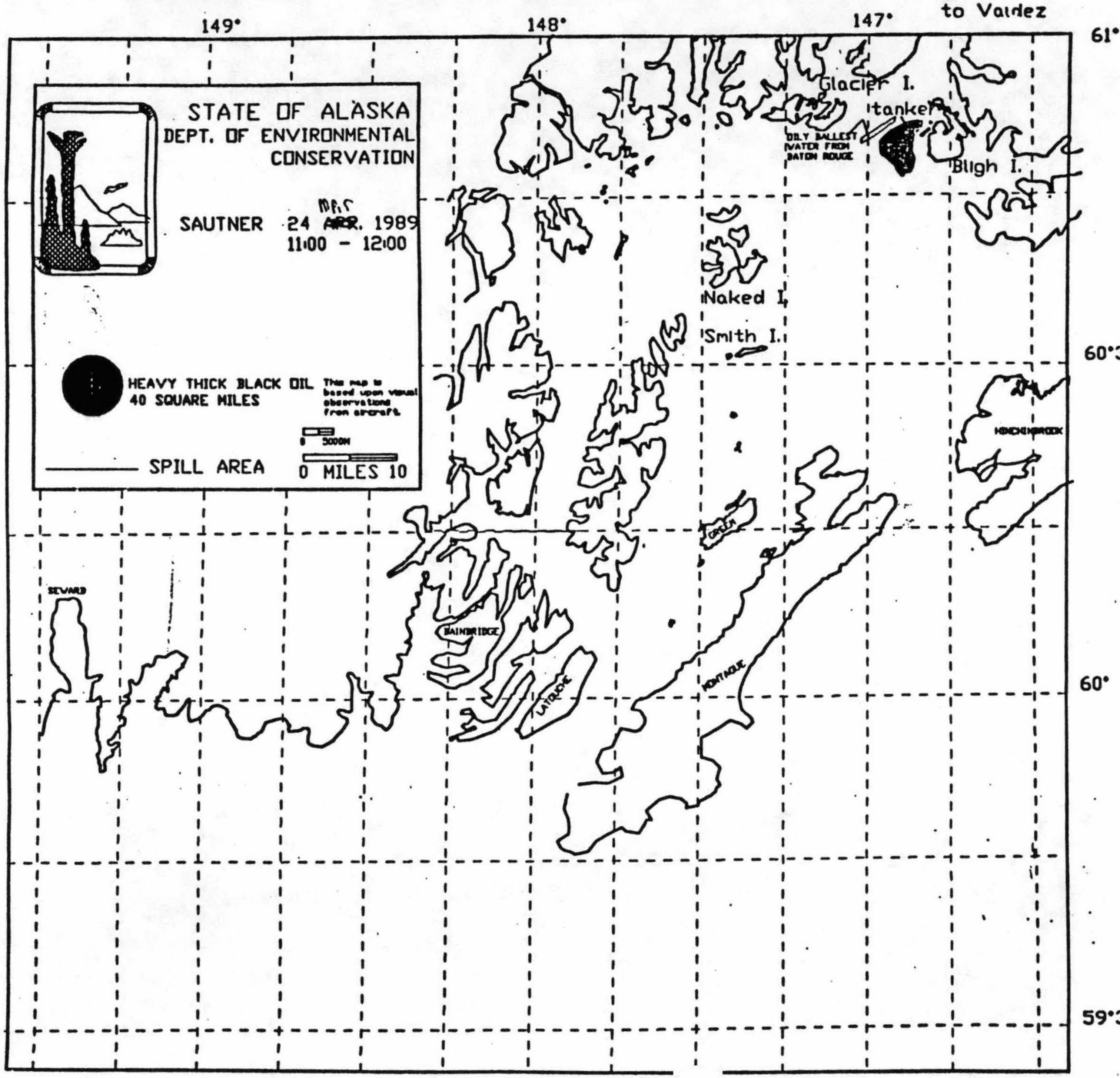
EXXON VALDEZ OIL SPILL



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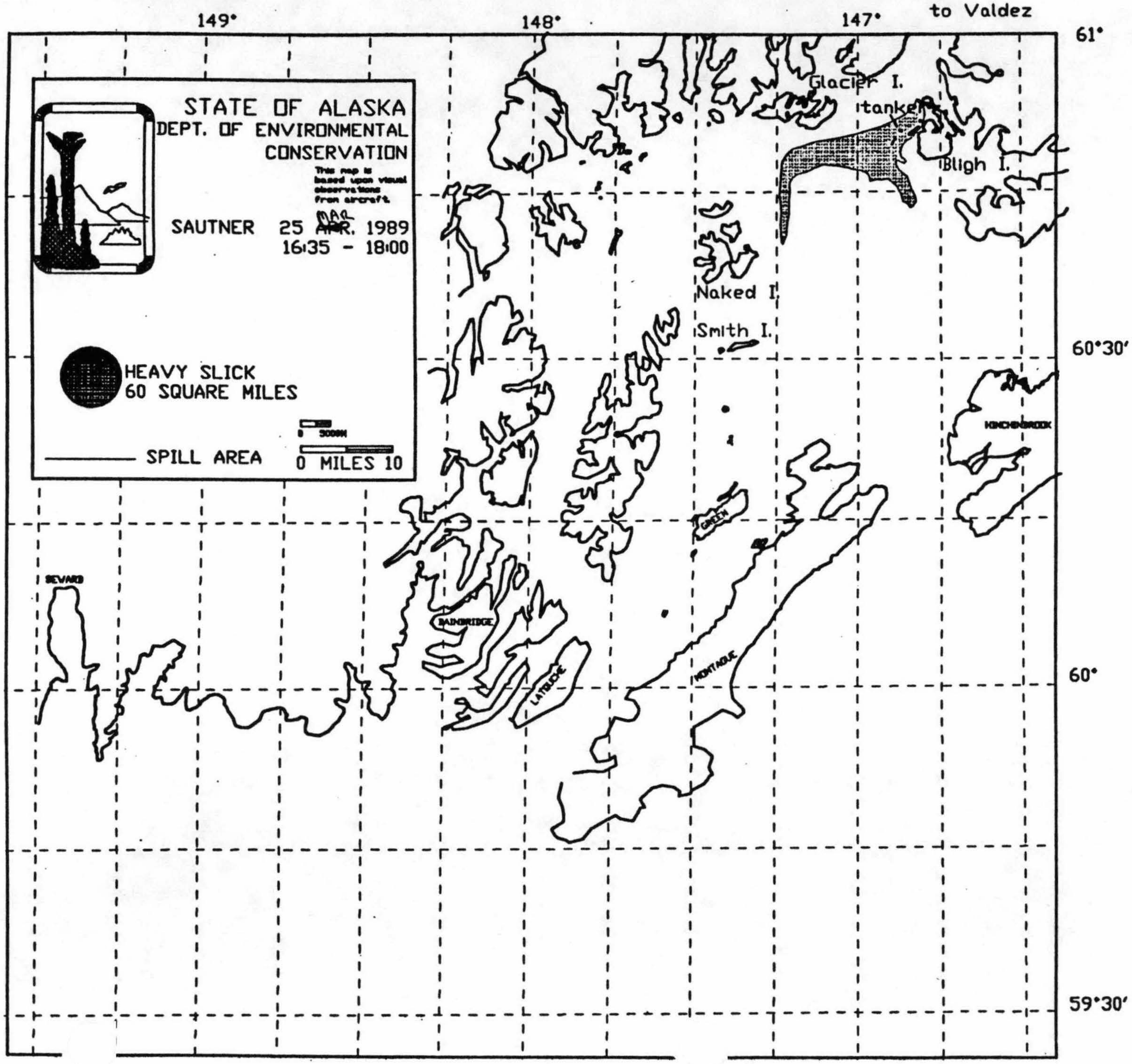
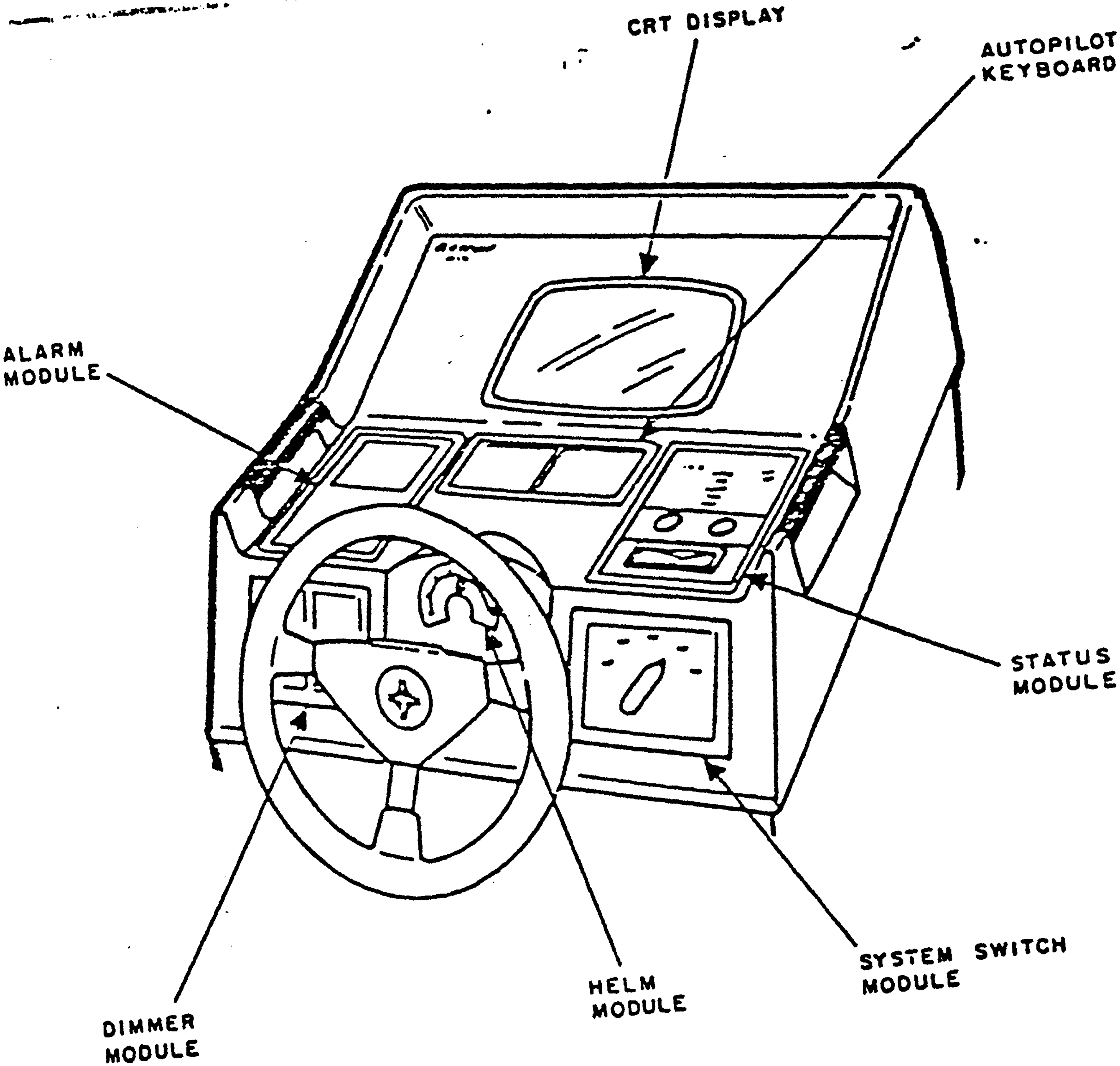
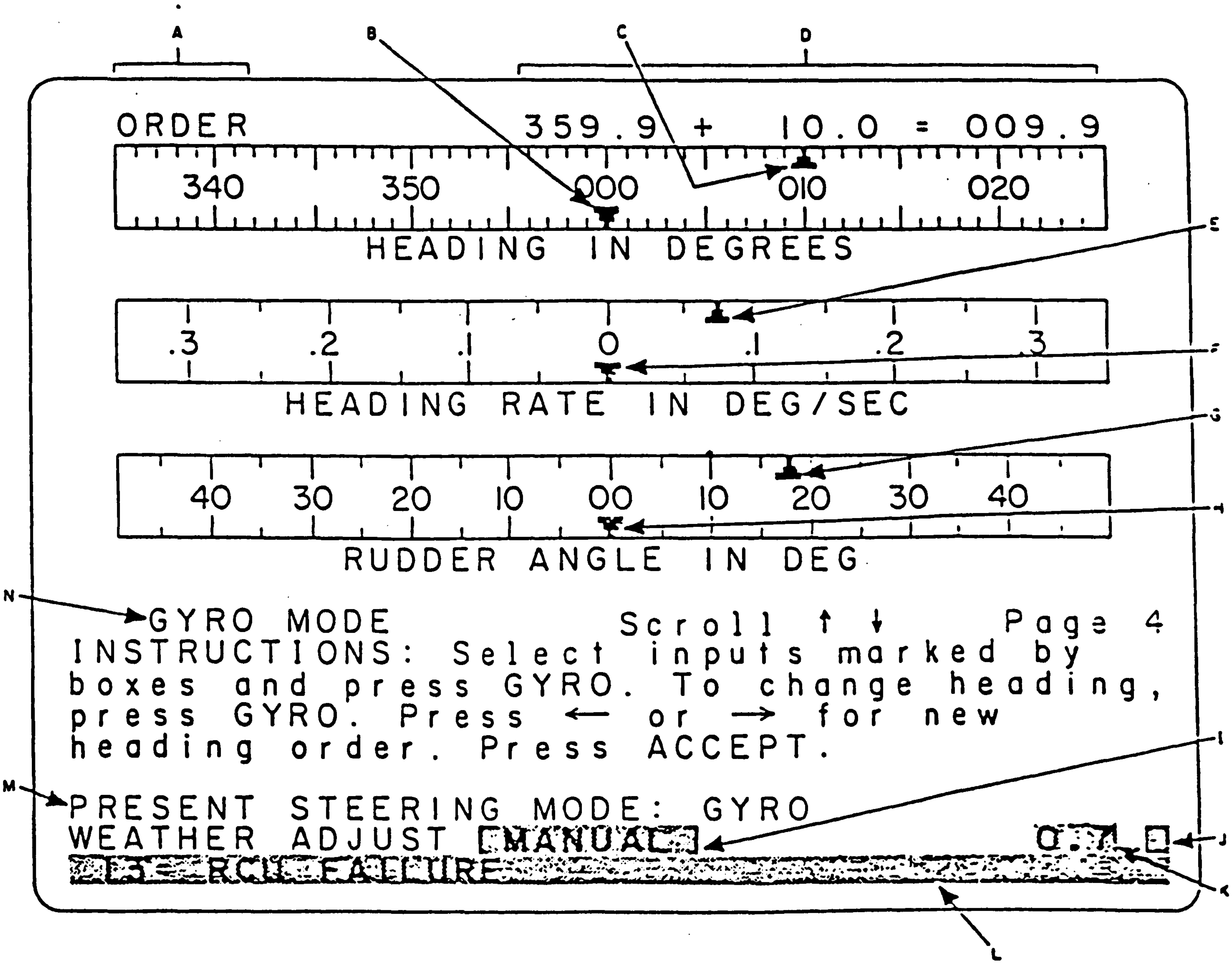



CRT DISPLAY
AUTOPILOT KEYBOARD
ALARM MODULE
STATUS MODULE
SYSTEM SWITCH MODULE
HELM MODULE
DIMMER MODULE


A
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D
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HEADING RATE IN DEG/SEC
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H
RUDDER ANGLE IN DEG
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GYRO MODE Scroll ↑ ↓ Page 4
INSTRUCTIONS: Select inputs marked by boxes and press GYRO. To change heading, press GYRO. Press ← or → for new heading order. Press ACCEPT.
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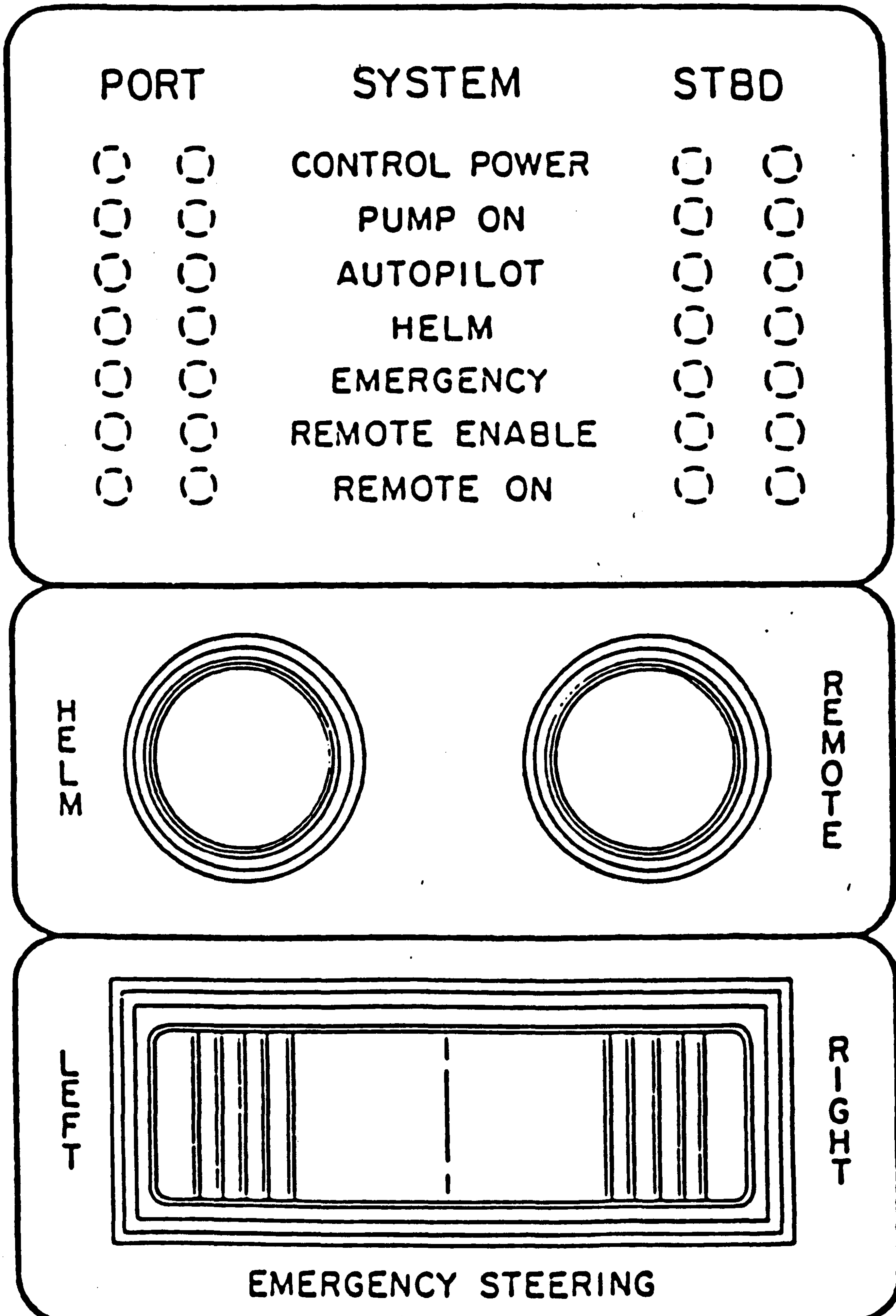
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Chris

Thursday March 23 (82)

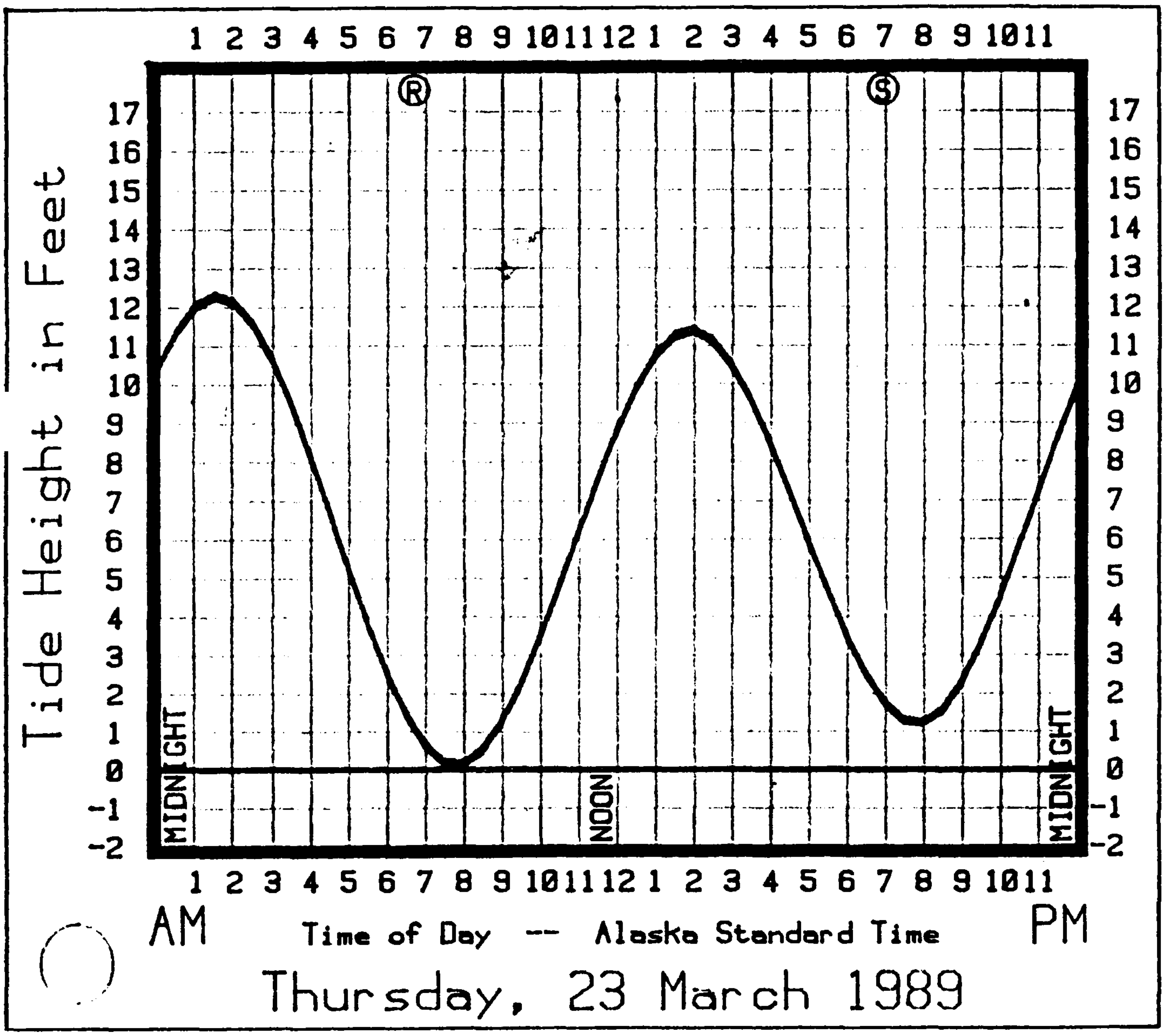
- 8:00 [illegible] J.
- 8:15 S² P19
- 9:00 4841 Susan Anderson 7781 Scale
- 10:00 Peri Larson PC "Tried" 10:30
- 11:00 Rich Neilsen Consultation - appt.
- 11:30 Teresa Smith
- 12:00 Roger Kulstad [illegible]
- 12:15 -X-
- 12:30 Ray Smith temp filling
- 1:00–2:45 lunch
- 3:15 Kristie Kennedy 3:[illegible] Jennifer Hoyer
- 3:30 loose flg 2527
- 4:00 Ed Holtness Gretchen Taylor
- 4:15 S, Ashley
- 4:30 Toothy
- 4:45 4:30 Vicki Hoyman
- 5:00 [illegible] 44
- 5:30 (3)

Friday March 24 (83)

- 8:00 Kami Dusenberg
- 8:15 224
- 8:30 (16) Carol
- 8:45 Exam & PX
- 9:00 Bob McCloy
- 9:15 PX
- 9:30 money
- 10:00 11
- 10:15 Justin McCaw
- 10:30 1 2 2186 10:30
- 10:45 Jessie 4 McCaw
- 11:15 Tony Buzzard [illegible]
- 11:30 4610
- 12:00 Donna Baumgarten
- 1:00 Sandy Smith
- 1:15 4240
- 1:30 Perio
- 2:30 Dianna Sarich
- 3:30 Julie Sarich
- 3:45 (17) 5191
- 4:15 Jason Sarich
- 4:30 141
- 5:00 Alan S
- 5:15 13
- 5:30 Shawn Merritt

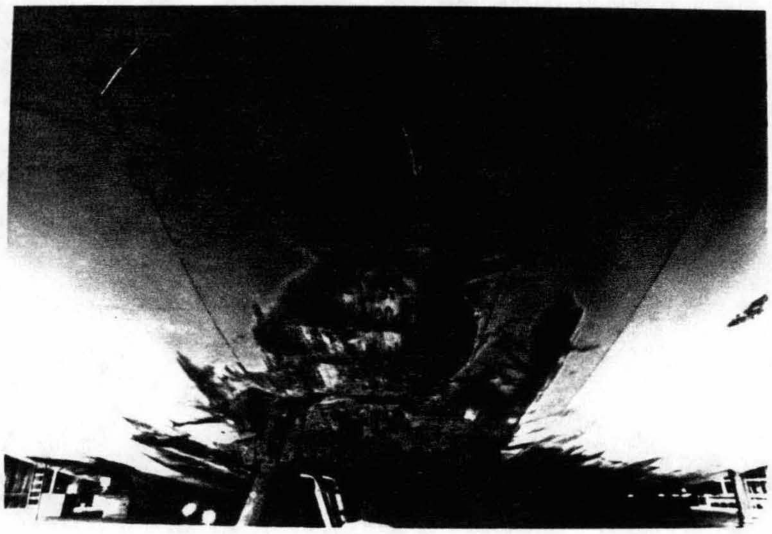
PLAINTIFF
EXHIBIT NO. 124
ADMITTED
89-7217 cr Trial
89-7218 cr
(CASE NUMBER)

Tideplot by: Tidegraph International, Inc.
1780 S. Windy Bend Drive
Lincoln City, Oregon 97367
(503) 994-7395



Tides for Rocky Point, Valdez, Alaska

Exhibit #125



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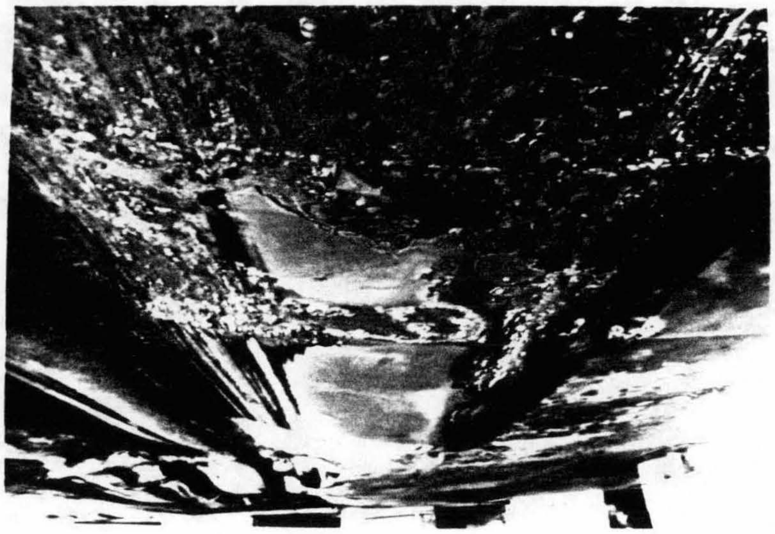


Exhibit 127

Exhibit 128

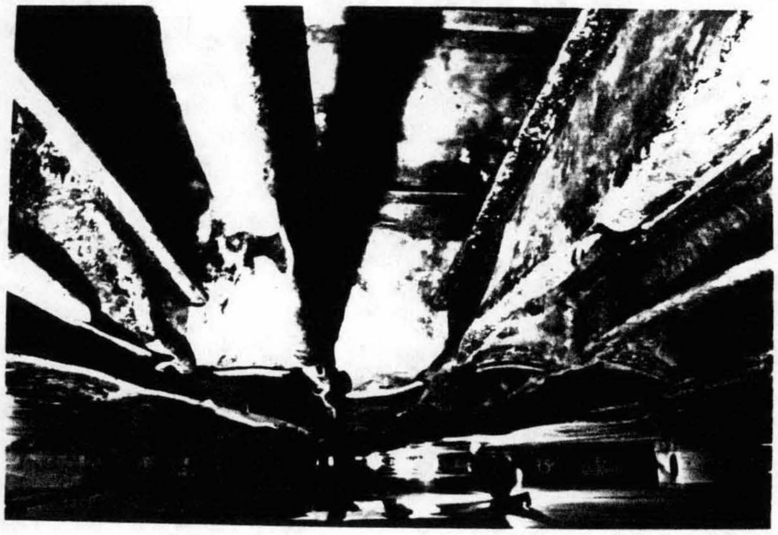
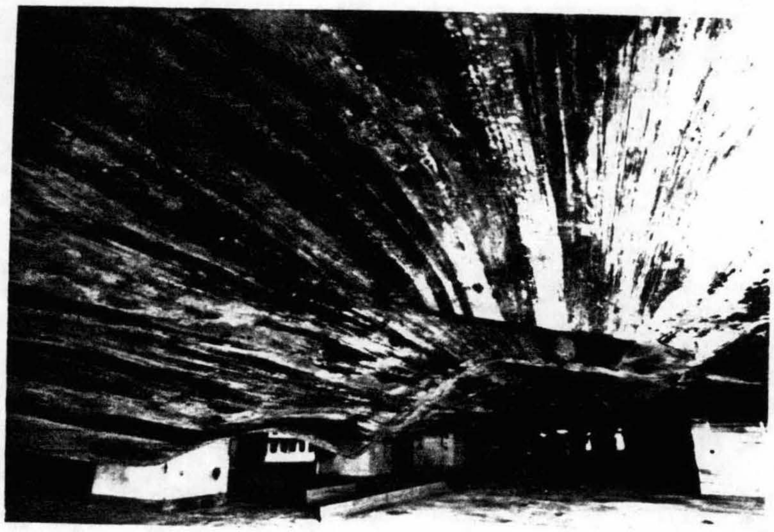


Exhibit 129

Exhibit 130



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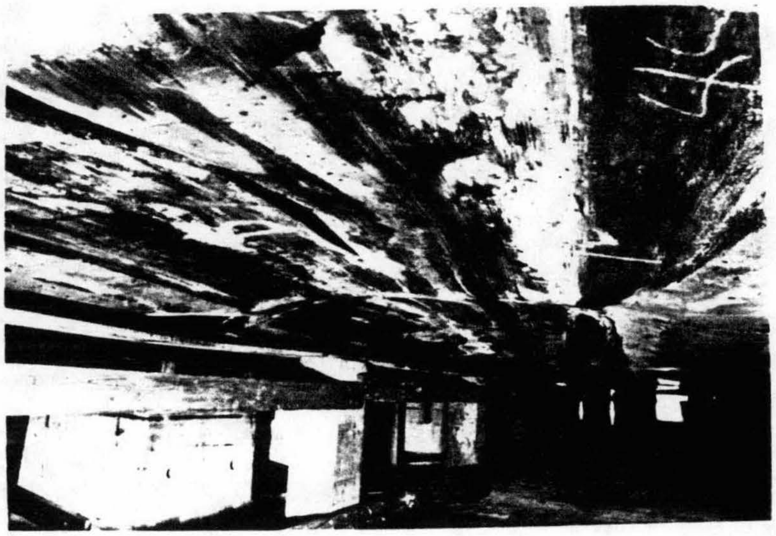
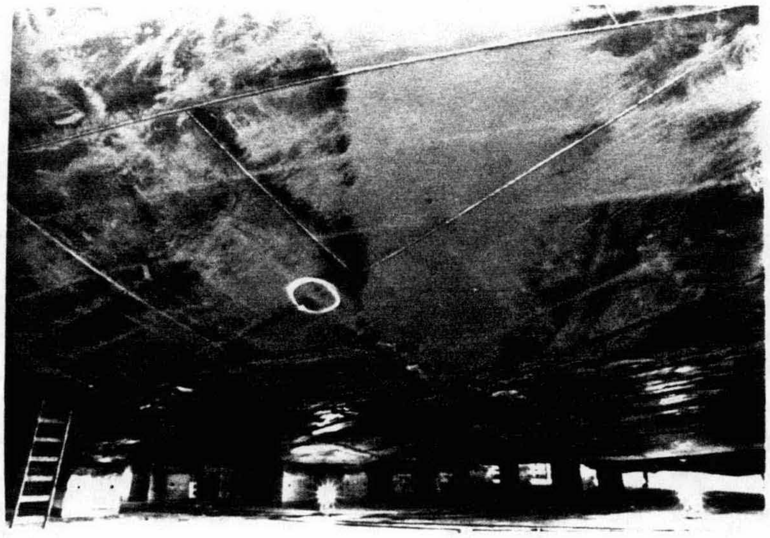


Exhibit 132

Exhibit 133

Exhibit 134



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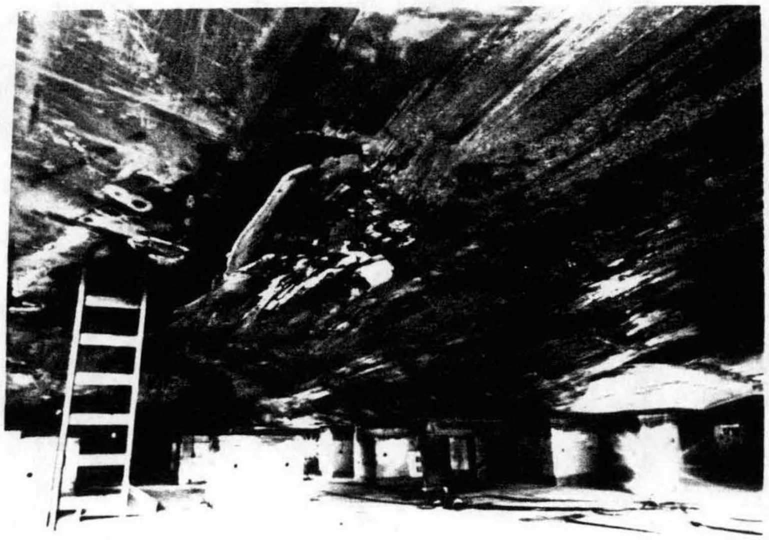

Exhibit 136

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Exhibit 138

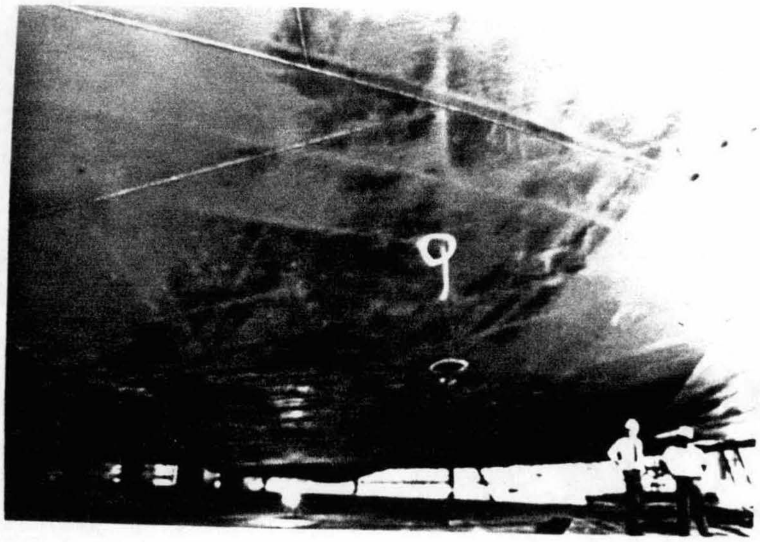


Exhibit 139

Exhibit 140

Exhibit 141

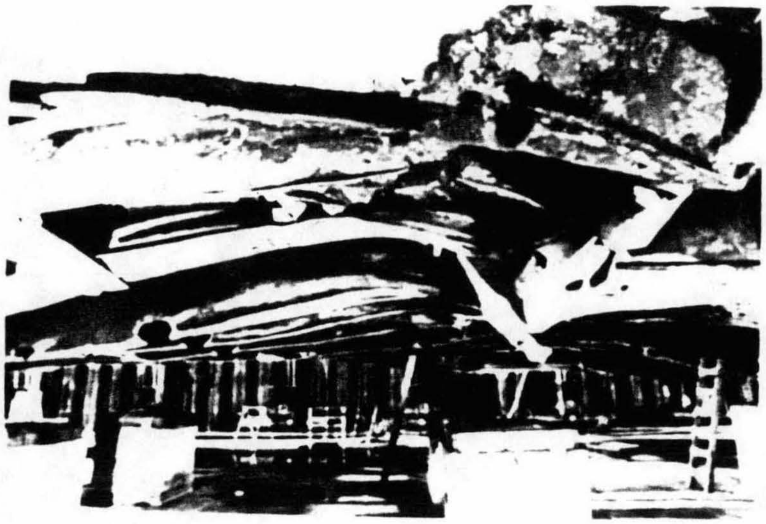
Exhibit 142

Exhibits 143

Exhibits 144

Exhibito 145

Exhibit 146



Exhibits 147

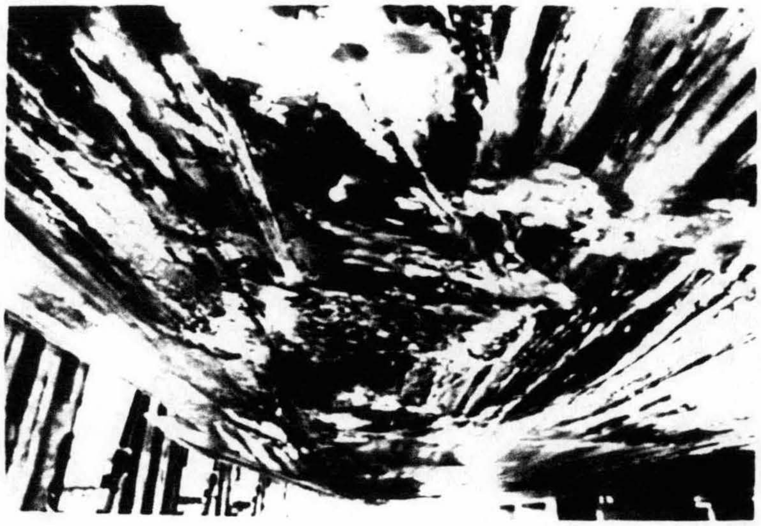


Exhibit 148

Exhibit 149

Exhibit # 150

EXXON SHIPPING COMPANY
1987 FLEET MANAGEMENT CONFERENCE
MEETING #3 - APRIL 26 - MAY 1, 1987

ATTENDEES

OCEANGOING:

1. ARNOLD, Stan - CE
2. BARRY, Matt - 1A
3. BERCOVICI, David - CM
4. BOTTE, John - CE
5. BROOKS, Roger - CE
6. BUCK, Frank - CE
7. CAVANAUGH, Paul - CE
8. CHENEY, Fred - CM
9. DAVIS, Hal - CM
10. DENGEL, Brian -1A
11. DEPPE, Bill - M
12. DUNNE, Andy - CE
13. DURSO, Bob - 1A
14. FAUVELL, Mike - 1A
15. FERRONE, Gary - CM
16. GOMEZ, Buz - 1A
17. GUSTAFSON, Kyle - 1A
18. HALUSKA, Mike - 1A
19. HAMILTON, Mike - CM
20. HARRISON, Chuck - 1A
21. HAYWARD, Andy - CM
22. HAZELWOOD, Joe - M
23. HENRY, Doug - 1A
24. JONES, Ray - 1A
25. KASTNER, Jerry - 1A
26. KELLEY, Tom - M
27. KROUSOULOUDIS, John - CE
28. LARESE, John - 1A
29. MCDONNELL, Mike - 2M
30. MEISSNER, Norman - CE
31. MINNETTE, Bruce - CE
32. NICHOLAS, Richard - M
33. O'DONNELL, Brian - 2A
34. O'DONNELL, Mark - 1A
35. O'DELL, Kevin - 2M
36. SEYMORE, Bill - 1A
37. SPEAR, John - M
38. SPEAR, Rob - M
39. STEGLE, Ed - M
40. WALLACE, Bill - M
41. WILLIAMSON, Chris - 2A

6334d/1

E7200042990-1

PLAINTIFF
EXHIBIT NO. 151
ADMITTED ☒ Tried
89-7217
89-7218
(CASE NUMBER)

MEMORANDUM

April 4, 1989

TO: Mr. J. J. Rouse

FROM: D. K. Walker D.K. Walker

SUBJECT: ESC Drug/Alcohol Training

In March 1987, senior shore based staff from our Inland Waterways, Oceangoing and Houston office attended the Headquarters Employee Relations Supervisory Training Program. In April and May 1987, during our Fleet Management Conferences, our senior officers and shore managers and supervisors were trained. Upon returning to their respective vessels and offices, the policy was presented to all employees.

Captain Joseph Hazelwood, Captain of the Exxon Valdez was trained in April 1987. Our records indicate the following personnel received training:

	Trained	Total Employed
Oceangoing Senior Officers:		
Master	32	32
Chief Mate	39	39
Second Mate	43	43
Chief Engineer	36	36
First Asst. Eng.	8	8
Second Asst. Eng.	6	6
Inland Waterways Fleet Officers:		
Captains	44	44
Chief Engineers	21	21
Gulf Coast Fleet Office:		
Fleet Manager	1	1
Ship Group Coord.	3	3
Supervisors	3	3
West Coast Fleet Office:		
Fleet Manager	1	1
Ship Group Coord.	1	1
Supervisors	3	3
Inland Fleet Office:		
Fleet Manager	1	1
Supervisors	9	9

The attached letter dated June 30, 1988 summarizes ESC's implementation of the Drug/Alcohol Policy.

In addition to the Company Policy, the USCG implemented regulations on "Operating a Vessel While Intoxicated" in January 1988. ESC's Human Resources Manager and Labor Relations Coordinator conducted training for our Fleet Managers and Ship Group Coordinators. They followed up with small group training sessions on each vessel with the fleet officers.

In September 1988, a communication was sent to all employees re-emphasizing the Company Policy, the USCG regulations and recent arbitration opinion. A copy of that letter is attached.

If you need additional information, please let me know.

DKH/jb
34431

Attachment 4

ALCOHOL AND DRUG POLICY TRAINING SUMMARY
EXXON SHIPPING COMPANY ESC)

- ESC adopted Corporation's alcohol and drug use policy on March 11, 1987
    - This policy superseded an ESC policy on alcohol/drug use implemented April 24, 1985
    - 1985 policy attached (Attachment 5A)
- ESC conducted training sessions April 1987 for all seagoing officers
- Captain Joseph Hazelwood (captain of Exxon Valdez) was trained in April 1987
- Esso Seaman's Union (ESU) originally rejected policy in bargaining
    - Concerned about application of policy by supervisors
    - Distrusted testing procedures
- Company bargained issue to impasse with ESU and implemented policy on April 1, 1988
- Follow-up letter on alcohol and drug policy as well as Coast Guard alcohol/drug regulations sent to all members of oceangoing fleet on September 27, 1988 (Attachment 5B)

4-4-89

004455

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Attachment 4B

EXXON SHIPPING COMPANY

POST OFFICE BOX 1512 • HOUSTON, TEXAS 77251-1512 "EXXSHIP HOUSTON"
J. PAUL
HUMAN RESOURCES MANAGER

September 27, 1988

TO ALL OCEANGOING EMPLOYEES OF
EXXON SHIPPING COMPANY

Recent developments by Exxon Shipping Company, the United States Coast Guard, the United States Customs Service, and Labor Arbitrators have focused a renewed emphasis on our commitment to providing a safe, healthy and productive work place by ensuring that drug, alcohol or other substance abuse is eliminated. The purpose of this communication is to ensure that all employees are aware of the various rules, regulations and company policies regarding substance abuse in the work place and to give notice that enforcement will be more stringent in the future.

Exxon Shipping Company Employee Alcohol and Drug Use Policy

On March 11, 1987, the Exxon Shipping Company Policy on Alcohol and Drug use became effective for all non-represented employees and was mailed to all employees. The Exxon Radio Officers Association accepted the policy during our 1987 contract negotiations. On April 1, 1988, we implemented the Alcohol and Drug Use Policy for all unlicensed Oceangoing employees. A copy of this policy was again mailed to all unlicensed employees as a part of the total implementation package at the conclusion of bargaining with the Exxon Seamen's Union.

The Company Policy specifically prohibits the misuse of legitimate drugs or the use, possession, distribution, or sale of illicit or unprescribed controlled drugs on Company business or premises. Possession, use, distribution, or sale of alcoholic beverages on Company premises is prohibited. Being unfit for work because of use of drugs, or alcohol is strictly prohibited and is grounds for termination of employment. Exxon Shipping Company may from time-to-time conduct unannounced searches for drugs and alcohol on owned or controlled property. The Company also has the right to require employees to submit to medical evaluation or alcohol and drug testing where cause exists to suspect alcohol or drug misuse. A positive test result or refusal to submit to a drug test is grounds for disciplinary action, including dismissal. The guidelines for Supervisors, which were bargained with the Exxon Seamen's Union, are essential to the administration of this policy and should be familiar to every employee.

1. At the discretion of the President or Fleet Manager, the Company may conduct unannounced alcohol and drug searches on owned or controlled property where there is reasonable cause to suspect that these

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substances may be present. Reasonable cause may include searches in operations where use of these substances could create an unsafe situation.

2. The decision to require an employee to submit to testing for drugs and alcohol requires the advance endorsement of the Human Resources Manager. Prior to any testing, the employee must sign an Informed Consent form. In cases where a medical evaluation is deemed appropriate, medical personnel should be asked to collect a urine and/or blood sample for testing to determine the presence of alcohol and/or drugs. Blood tests will not be taken on board ship by vessel personnel. If circumstances prevent medical evaluation from being conducted soon after the "for cause" incident, Management may collect and properly process the urine sample.

3. Employees who acknowledge they have either an alcohol or drug dependency and who desire rehabilitation and are willing to cooperate by participating in a treatment program are encouraged to seek assistance through the Employee Health Advisory Program (EHAP) or the Medical Department.

   No employee with an alcohol or drug dependency will be terminated or; otherwise, disciplined due solely to a request for help in overcoming that dependency or involvement in a rehabilitation effort.

   However, if an employee's request for rehabilitation is made after the Company's discovery of a violation of the policy, the Company will take disciplinary action which may include termination. Such disciplinary action cannot be avoided by a request for treatment or rehabilitation at that time.

DEPARTMENT OF TRANSPORTATION, U.S.C.G., 33 CFR Operating a Vessel While Intoxicated

Effective January 13, 1988, the U.S.C.G. Regulations governing operation of a vessel while intoxicated became final. These regulations are far more explicit and stringent than previous rules. For commercial vessels, a blood alcohol content (BAC) of .04% is considered intoxicated. When an intoxicant, either alcohol or drugs, affects a person's manner, disposition, speech, muscular movement, general appearance or behavior, the employee is considered intoxicated and in violation of the regulations. The regulations also require that while on a commercial vessel, a crew member shall not be intoxicated at any time and shall not perform or attempt to perform any scheduled duties within four hours of having consumed alcohol. The penalty for being intoxicated while on board a vessel is a fine of up to $5000, imprisonment for up to one year, or both.

Copies of these regulations are on board all vessels for your review and information. These rules place the primary burden for detecting, reporting, and reducing the incidence of intoxicated behavior on marine employers.

United States Customs Service "Sea Carrier Initiative Agreement"

The United States Customs Service has recently adopted a "zero tolerance" policy with respect to illegal drugs found on board vessels. A vessel on which nominal amounts of illegal drugs are found may be subject to seizure and forfeiture, even if the drugs are in the possession of a crew member for personal use. As a result, the management of Exxon Shipping Company has a responsibility to take appropriate action. Toward that end, we have entered into a voluntary agreement of cooperation with the United States Customs Service to reduce our liability in the event illegal drugs are found on one of our vessels. This 15 point agreement is called the "Sea Carrier Initiative Agreement." A complete copy of the Agreement has been sent to the Master of each vessel, the elected union officials of all represented employees and to each shore based manager.

Labor Arbitrators Awards

Over the last several years, licensed and unlicensed employees have been terminated for use and possession of alcohol or drugs while on board a vessel. Several employees have been suspended for alcohol "possession only." Four unlicensed employees terminated for use or possession of alcohol or illegal drugs were reinstated by arbitrators for various reasons.

With respect to violation of the Company's Policy on the prohibition of use or possession of alcohol and illegal drugs, arbitrators have been critical of management when the discipline is inconsistent. For example, in the matter of arbitration between the Exxon Seamen's Union and Exxon Shipping Company, case no. 18 30 0062 85N, Arbitrator, Daniel F. Brent, stated in part:

> "...It must be emphasized that the Company is entitled to prohibit alcohol and drugs and to police its work force in order that it may insure the safety of its workers and protect the general public from harm by the Company's vessels or product. To this end, the Company may promulgate rules reasonably designed to insure that no alcohol or habit forming drugs enter its premises. If in the past the Company has permitted a variety of penalties to be imposed for similar infractions, <u>the Company is entitled to give notice to the bargaining unit and to the Association that it will impose stronger penalties in the future</u> (emphasis added) than it has in the past in order to guarantee that its prohibition against alcohol and habit forming drugs is universally observed..."

This letter will serve as the notice stated in the arbitrator's award.

Conclusion

004458

In view of Management's responsibility to enforce the Company Policy, the USCG regulations on "Operating a Vessel While Intoxicated," our liability under the "zero tolerance" policy of the U. S. Customs and the USCG as well as clear direction from Labor Arbitrators, we must aggressively ensure that our employees are not using or in possession of alcohol or illegal drugs while on board a vessel. This document serves as another <u>official notice</u> that violation of the Company Alcohol and Drug Use Policy, or regulations governing alcohol or drug use in the work place will result in immediate termination from the vessel. While we must continue to thoroughly investigate the facts of each individual case and make a final determination on a case-by-case basis, termination of employment is the penalty for violation of these standards. We will continue unannounced alcohol and drug searches on owned or controlled property where there is reasonable cause to suspect that these substances may be present or in operations where use of the substances could create an unsafe situation. The tradition of providing wine at holiday meals will reluctantly be discontinued hereafter in order to ensure compliance with the new USCG regulations.

These actions will assist in providing a safe work environment free of alcohol and drug use and help assure uniform Company actions. If you have any questions or concerns regarding Management's position on alcohol or drug use while on Company property, please consult with the Master. You are urged to become familiar with all provisions to avoid placing your job in jeopardy.

Dan Paul

DJP:mdg
02061

Attachment 2

EXXON SHIPPING COMPANY
POST OFFICE BOX 1512 • HOUSTON, TEXAS 77251-1512 "EXXSHIP HOUSTON"

D. J. PAUL
HUMAN RESOURCES MANAGER

June 30, 1988

R. A. Harrill
ER Project and Planning

Exxon Shipping Company has fully implemented the Employee Alcohol and Drug Use Policy. In response to your recent request, the following describes our implementation process and results:

1. WHAT METHODS WERE USED TO INTRODUCE THE ALCOHOL AND DRUG USE POLICY TO THE EMPLOYEES IN YOUR FUNCTION(S)? HOW WAS IT COMMUNICATED? WHAT KIND AND HOW MUCH TRAINING WAS PROVIDED?

   Prior to the March 11, 1987 introduction of the corporation drug and alcohol policy, ESC had a similar policy that was effective April 24, 1985. On March 11, 1987, we adopted the corporation policy. A copy of the new policy along with a cover letter signed by Mr. Iarossi was mailed to all employees. Copies were posted on all bulletin boards both ashore and on board our vessels.

   Key members of our Inland Waterways, Oceangoing and Houston office staff attended the supervisory training conducted by your Headquarters Employee Relations Training Group. Once thoroughly familiar with the policy, these key staff members presented the supervisory program to the supervisors in their respective units. The supervisors discussed the policy in small employee group meetings.

2. HAS THE POLICY BEEN ADOPTED IN ALL OF YOUR BARGAINING UNITS? IF NOT, WHAT KINDS OF LABOR RELATIONS ISSUES HAVE COME UP WHICH HAVE IMPEDED IMPLEMENTATION?

   The policy has been adopted by all ESC bargaining units except the Exxon Seamen's Union. However, the policy does apply to the ESU as a result of bargaining to impasse and Management's implementation, effective April 1, 1988.

   Our Inland Waterways unions, the Exxon Bargemens Union, the Exxon Marine Association, the Independent Unlicensed Marine Union, and the Association of Gulf Coast Inland Marine Employees were all supportive of our efforts. Each of these unions accepted the policy during the initial discussion and policy review.

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In our ocean fleet, the Exxon Radio Officers agreed to the policy during our 1987 contract negotiations. It became effective December 1, 1987.

The Exxon Seamen's Union rejected the policy. During our 1987 contract negotiations, extensive discussions were held with the Union bargaining committee.

The ESU officers were not supporting the use of drugs and alcohol in the work place by refusing to accept our policy. They had concerns of abuse by supervisors, distrust of our testing procedures, and a general aversion to agreeing to any form of discipline to represented employees. During our negotiations, they indicated that if some of their concerns were addressed they would not publicly oppose the policy. We, in turn, modified our procedures to ensure Human Resources would be contacted before any searches or testing was conducted. Additionally, our Masters and Captains would not be allowed to conduct blood testing on our vessels. (They are permitted to conduct probable cause urine testing.) The ESU did not join with the Bayway Teamsters in the recent ULP on the policy; however, they may take some action in the future.

3. * SINCE THE POLICY WAS PUT IN PLACE, WHAT DRUG OR ALCOHOL-RELATED INCIDENTS HAVE YOU EXPERIENCED (E.G., SEARCHES, INVESTIGATIONS, NUMBER OF "FOR CAUSE" TESTS, NUMBER OF POSITIVE TEST RESULTS, DISCIPLINE CASES INVOLVING DRUGS OR ALCOHOL, AND ACCIDENTS OR NEAR-MISSES WHERE DRUGS OR ALCOHOL WERE IMPLICATED)? HAVE THESE DECREASED OR INCREASED SINCE THE POLICY HAS ADOPTED (PROVIDE DATA, IF AVAILABLE)?

During this period, ESC has conducted eight (8) probable cause searches on board our tankers or tug boats. In five (5) of these searches, contraband (alcohol or drugs) was discovered. This resulted in four terminations and one suspension. Included in these figures was a September 1987 case where marijuana was discovered on the EXXON NASHVILLE (a tug boat). The crew (8 EMPLOYEES) was tested with one employee testing positive. This employee was terminated. Our Masters routinely conduct searches for contraband when vessels leave port in compliance with U.S. Customs and United States Coast Guard (USCG) regulations.

We have no evidence that drugs or alcohol were directly involved in any accidents or near misses.

Overall, disciplinary incidents involving drugs and alcohol are lower than in past years in our ocean fleet. There was a slight increase in our inland fleet shortly after the policy's implementation in 1987. Our experience in 1988 indicates the policy is having the desired effect.

4. IF THE DATA ARE READILY AVAILABLE, PLEASE ESTIMATE THE COST OF THE ALCOHOL AND DRUG PROGRAM (E.G., TRAINING COSTS, COST OF SEARCHES, COST OF TESTS, ETC.).

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Data is not readily available; however, the majority of the expenses associated with the program have been fixed operating costs (employee's wages, etc.).

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* • SINCE 6/88 ONE ADDITIONAL (TOTAL SHIP) SEARCH (EXXON BALTIMORE), NO CONTRABAND WAS DISCOVERED - (1/89) - NO ONE TESTED (UN-LICENCED SAILOR)

+ ONE INDIVIDUAL SEARCHED WHEN COMING ABOARD EXXON YORKTOWN - CONTRABAND WAS DISCOVERED - EMPLOYEE TERMINATED (1/89) - WAS NOT TESTED

5. WHAT ARE YOUR PLANS FOR FUTURE ACTIVITIES IN THIS AREA (E.G., TRAINING AND COMMUNICATIONS, SURVEILLANCE AND SEARCH, ETC.)?

Prior to implementing the policy in our Ocean and Inland Fleets, we conducted training for our senior officers. We are contemplating providing training information (video tapes, books, etc.) to each vessel for use by the entire crew. We remain alert to possible violations of the policy and are prepared to conduct "for cause" searches as necessary.

It should be noted that earlier this year, the USCG implemented their new, more stringent, policy on drug and alcohol on board U.S. commercial and pleasure vessels. In most cases, our policy is consistent with that of the USCG. The major area of difference is that the USCG is now prohibiting consumption of any alcohol less than four (4) hours prior to a crew member being on duty even if the alcohol is being consumed off the vessel (company property).

6. WHAT IS YOUR OVERALL ASSESSMENT OF THE ALCOHOL AND DRUG PROGRAM? IS IT EFFECTIVE? WHAT, IF ANY, CHANGES WOULD YOU MAKE TO IT?

We do not have any recommendations for improvements at this time. We continue to monitor arbitrator decisions and court cases which show tolerance toward first time offenders. This may impact our policy prohibition to offering treatment to a first time offender in lieu of discipline for a policy infraction. However, we do not believe this requires a policy modification at this time.

D. K. Walker
Labor Relations Coordinator

DKH:mdg
87391

c: F. J. Iarossi
D. J. Paul
R. S. Wunder

Overall, disciplinary incidents invo[illegible]

ATTACHMENT 3b

GUIDELINES FOR IMPLEMENTATION OF
EXXON SHIPPING COMPANY
EMPLOYEE ALCOHOL AND DRUG USE POLICY
GUIDELINES FOR MASTERS, CAPTAINS, MANAGERS AND SUPERVISORS

1. At the discretion of the President or Fleet Manager, the Company may conduct unannounced alcohol and drug searches on owned or controlled property where there is reasonable cause to suspect that these substances may be present. Reasonable cause may include searches in operations where use of these substances could create an unsafe situation.

2. The decision to require an employee to submit to testing for drugs and alcohol requires the advance endorsement of the Human Resources Manager. Prior to any testing, the employee must sign an Informed Consent form. In cases where a medical evaluation is deemed appropriate, medical personnel should be asked to collect a urine and/or blood sample for testing to determine the presence of alcohol and/or drug. Blood tests will not be taken on board ship by vessel personnel. If circumstances prevent medical evaluation from being conducted soon after the "for cause" incident, the Management may collect and properly process the urine sample.

3. Employees who acknowledge they have either an alcohol or drug dependency and who desire rehabilitation and are willing to cooperate by participating in a treatment program are encouraged to seek assistance through the Employee Health Advisory Program (EHAP) or the Medical Department.

   No employee with an alcohol or drug dependency will be terminated or otherwise disciplined due solely to a request for help in overcoming that dependency or involvement in a rehabilitation effort.

   However, if an employee's request for rehabilitation is made after the Company's discovery of a violation of the policy, the Company will take disciplinary action which may include termination. Such disciplinary action cannot be avoided by a request for treatment or rehabilitation at that time.

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EXXON SHIPPING COMPANY

Policy Statement on Employee Alcohol and Drug Use

Exxon Shipping Company is committed to a safe, healthy, and productive work place for all employees. The Company recognizes that alcohol, drug, or other substance abuse by a few employees will impair their ability to perform properly and can have serious adverse effects on the safety, efficiency, and productivity of other employees and the Company as a whole. The misuse of legitimate drugs or the use, possession, distribution, or sale of illicit or unprescribed controlled drugs on Company business or premises is strictly prohibited and is grounds for termination. Possession, use, distribution, or sale of alcoholic beverages on Company premises is not allowed without prior approval of appropriate senior management. Being unfit for work because of use of drugs, or alcohol is strictly prohibited and is grounds for termination of employment. While this policy refers specifically to alcohol and drugs, it is intended to apply to all forms of substance abuse.

The Company recognizes alcohol or drug dependency as a treatable condition. Employees who suspect they have an alcohol or drug dependency are encouraged to seek advice and to follow appropriate treatment before it results in job performance problems. Employee Health Advisory Program or medical professional staff will advise and assist in securing treatment. Those employees who follow approved treatment will receive disability benefits in accordance with the provisions of established benefit plans and medical insurance coverage consistent with existing plans.

No employee with alcohol or drug dependency will be terminated or otherwise disciplined solely due to a request for help in overcoming that dependency or because of involvement in a rehabilitation effort. If, however, an employee violates provisions of the Employee Alcohol and Drug Use Policy, appropriate disciplinary action will be taken. Such action cannot be avoided by a request at that time for treatment or rehabilitation. If an employee suffering from alcohol or drug dependency refuses rehabilitation or fails to respond to treatment or fails to meet satisfactory standards of effective work performance, appropriate disciplinary action, up to and including termination, will be taken. This policy does not require and should not result in any special regulations, privileges, or exemptions from normal job performance requirements.

Exxon Shipping Company may from time to time conduct unannounced searches for drugs and alcohol on owned or controlled property. The Company also has the right to require employees to submit to medical evaluation or alcohol and drug testing where cause exists to suspect alcohol or drug misuse. A positive test result or refusal to submit to a drug test is grounds for disciplinary action, including dismissal.

Contractor, common carrier, and vendor personnel are also covered by paragraph one and the search provisions of paragraph four of this policy. Those who violate the policy will be removed from Company premises and may be denied future entry.

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Exxon Shipping Company
Employee Alcohol and Drug Use Policy
Guidelines for Masters, Captains, Managers and Supervisors

Purpose

Exxon Shipping Company is committed to providing for all employees a safe, efficient, and productive workplace. The Company recognizes that the misuse of alcohol and/or drugs can have serious adverse effects in the workplace. In addition to the implementation of the Employee Alcohol and Drug Use Policy, the Company has taken many related steps to ensure employees a safe and efficient workplace. These include company-wide expansion of the Medical Department's Employee Health Advisory Program which includes confidential assistance in securing treatment and rehabilitation for alcohol and/or drug dependency, alcohol and drug detection efforts, clarification of work rules and disciplinary guidelines, and preemployment drug testing.

These guidelines have been developed to assist in the implementation of the Employee Alcohol and Drug Use Policy and are intended to help assure uniform Company actions. While the guidelines refer specifically to drugs and alcohol, they are intended to apply to all forms of substance abuse.

Guidelines

A. The misuse of legitimate drugs or the use, possession, distribution, or sale of illicit or unprescribed controlled drugs or the misuse of other substances on Company business or premises is strictly prohibited. Possession, use, distribution, or sale of alcoholic beverages on Company premises is not permitted without the prior approval of the President. Being unfit for work because of use of drugs or alcohol is strictly prohibited.

B. All applicants offered employment must pass a drug test as part of the preemployment process. The details of this program are described in the guidelines for preemployment drug testing.

C. Employees who acknowledge they have either an alcohol or drug dependency and who desire rehabilitation and are willing to cooperate by participating in a treatment program are encouraged to seek assistance through the Employee Health Advisory Program (EHAP) or the Medical Department.

No employee with an alcohol or drug dependency will be terminated or otherwise disciplined due solely to a request for help in overcoming that dependency or involvement in a rehabilitation effort.

However, if an employee's request for rehabilitation is made after the Company's discovery of a violation of the policy, the Company will take disciplinary action which may include termination. Such disciplinary action cannot be avoided by a request for treatment or rehabilitation at that time.

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Observable physical signs might include but are not limited to: difficulty in maintaining normal balance, poor coordination, slurred speech, illogical and/or unrelated responses to questions, inability to understand and connect thoughts, or smell of alcohol on breath. These observable signs may occur from either a sudden impairment of the employee's behavior, a more gradual deterioration over time, or other indications that an employee is unfit for work. In such instances or where there is other reason to believe an employee's unfitness for work results from the use of alcohol or drugs, the employee should immediately be relieved of his/her duties.

Typical incidents supporting alcohol and drug testing include but are not limited to: uncharacteristic behavior, a pattern of frequent unexplained absences, otherwise inexplicable accidents or near misses, or unusual damage to property.

With the effective date of this policy, management may require drug and/or alcohol tests or a more complete medical evaluation of any employee under the conditions described in this section as a condition of continued employment. A positive test result or refusal to submit to a drug and/or alcohol test is grounds for disciplinary action, including dismissal.

Employees should recognize that there are over-the-counter and prescription drugs which when taken may result in impairment to safe, effective performance. The employee has the obligation to notify his/her supervisor, in advance of beginning work, when he/she is taking one of these drugs. This will allow for any needed adjustments to work assignments. The employee should be prepared to provide evidence that the drug being taken is prescribed or otherwise legitimate.

G. In cases where a medical evaluation is deemed appropriate, the physician should be asked to collect a urine and/or blood sample for testing by the American Institute for Drug Detection, Inc. to determine the presence of alcohol and/or drugs. In cases onboard ship where a licensed practicing physician is unavailable, blood tests will not be taken. If circumstances prevent medical evaluation from being conducted soon after the "for cause" incident, the Supervisor may collect and properly process the urine sample. The decision to require an employee to submit to testing for drugs and alcohol requires the advance endorsement of the Human Resources Manager. Prior to any testing, the employee must sign an Informed Consent form (Exhibits I and II).

Time off required for medical evaluation will be at Company expense unless the circumstances merit suspension without pay.

H. At no time should an employee suspected of being in an unfit condition be permitted to drive a Company vehicle, and every effort should be made to discourage the employee from driving a private vehicle. If the employee insists on driving his/her private vehicle, arrangements should be made to have a coworker or Security representative drive the vehicle from Company property. Once off Company property, if the employee continues to insist on driving his/her vehicle, the appropriate law enforcement agency will be called and advised of the Company's reasonable belief that he/she is unfit to drive. (Call the law enforcement agency dispatcher to give description, license number of vehicle, and destination, if known.)

I. In cases of apparent violation of the policy, the Company will investigate thoroughly and will consider all relevant information. In all cases involving unfit condition, management has the discretion to either terminate the employee or impose a lesser discipline as warranted by the circumstances of the individual case. If disciplinary action other than termination is determined appropriate, the disciplinary steps described in the Progressive Disciplinary Guidelines for Employee Misconduct (in particular the section headed "Important Notes") are appropriate. All cases involving disciplinary action should be reviewed with the Personnel Relations Committee who will consult the Law Department and forward its recommendation according to the Approval Authority Guidelines.

J. While drug and alcohol abuse can cause severe problems in the workplace and must be dealt with accordingly, sound judgment must be used in executing this policy, with due consideration of guarding the reputation, privacy, and dignity of all employees.

Because of the potentially serious consequences of falsely accusing an employee of drug or alcohol abuse, any employee taken to one of the progressive discipline steps may introduce evidence supportive of his/her position, including voluntarily requesting a drug and/or alcohol test.

K. Contract personnel, common carrier, and vendor personnel violating the policy will be expelled from Company premises and will be denied future entry.

March 11, 1987

EXHIBIT 153

WAS NOT ADMITTED INTO EVIDENCE

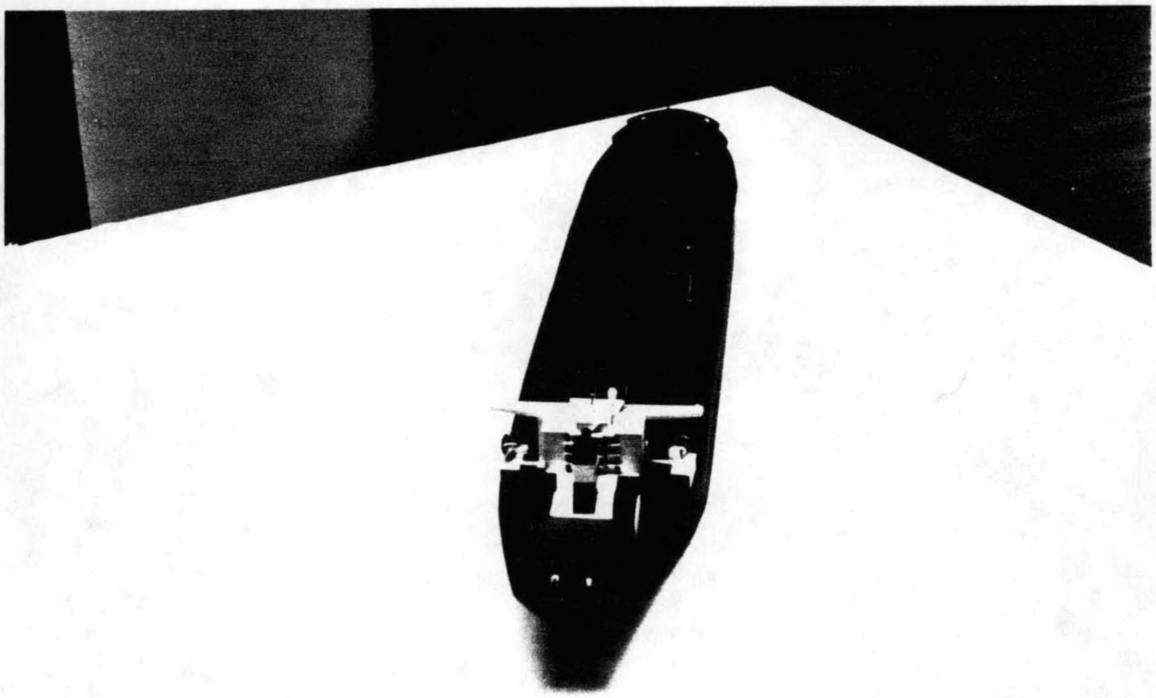


Exhibit #154

Model of the Exxon Valdez

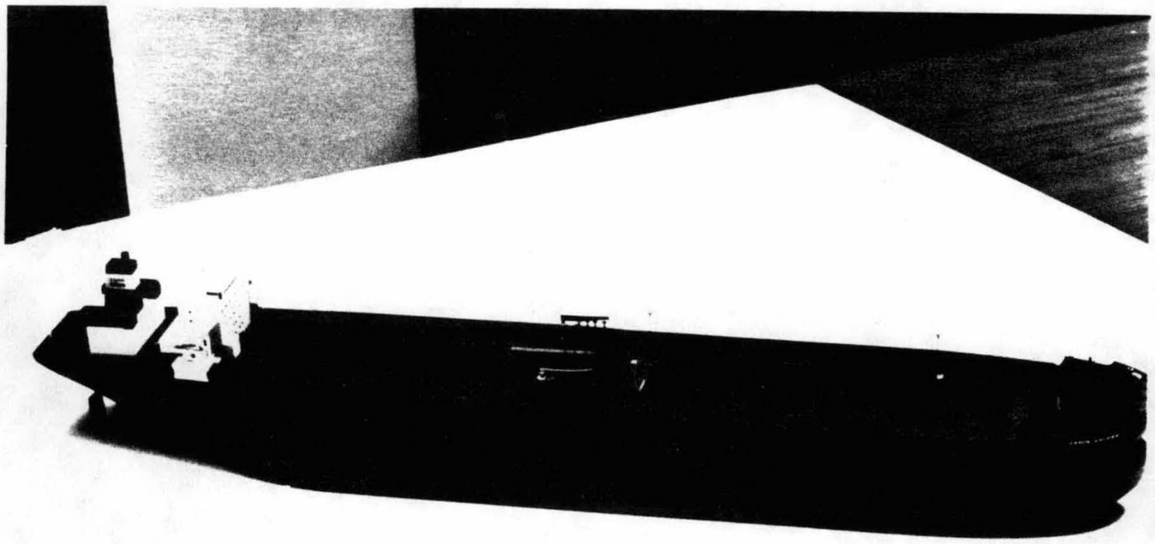
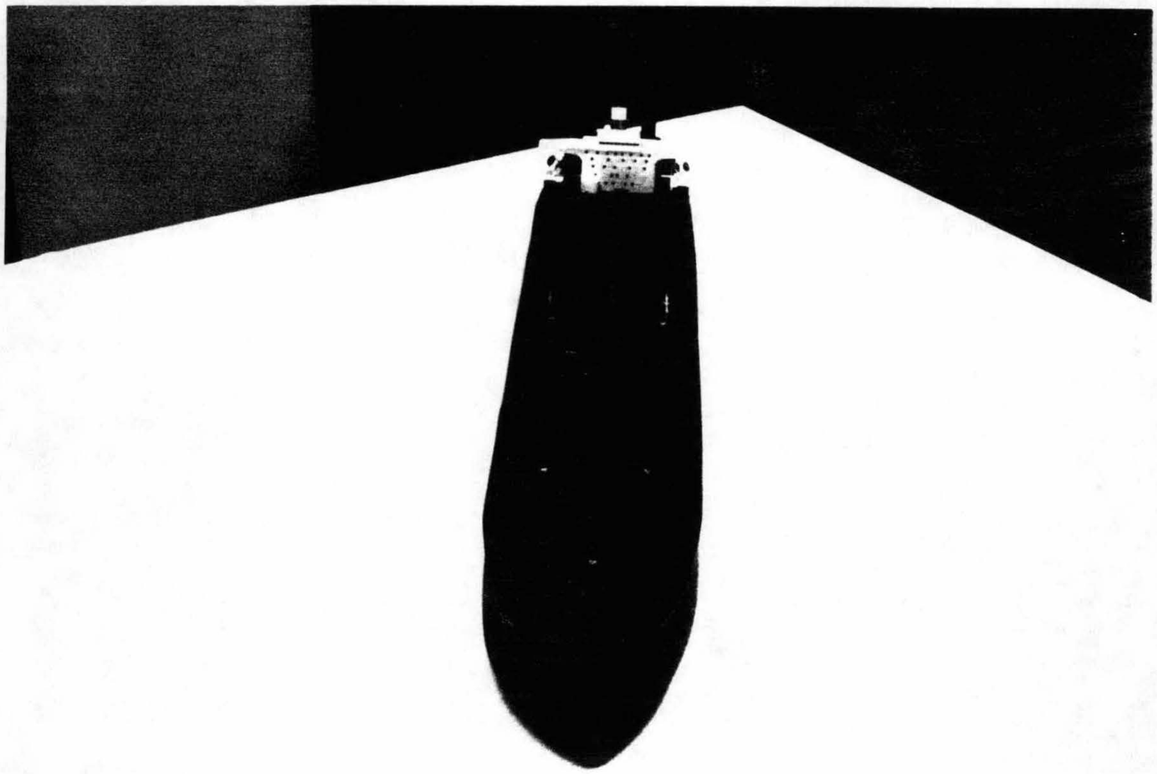


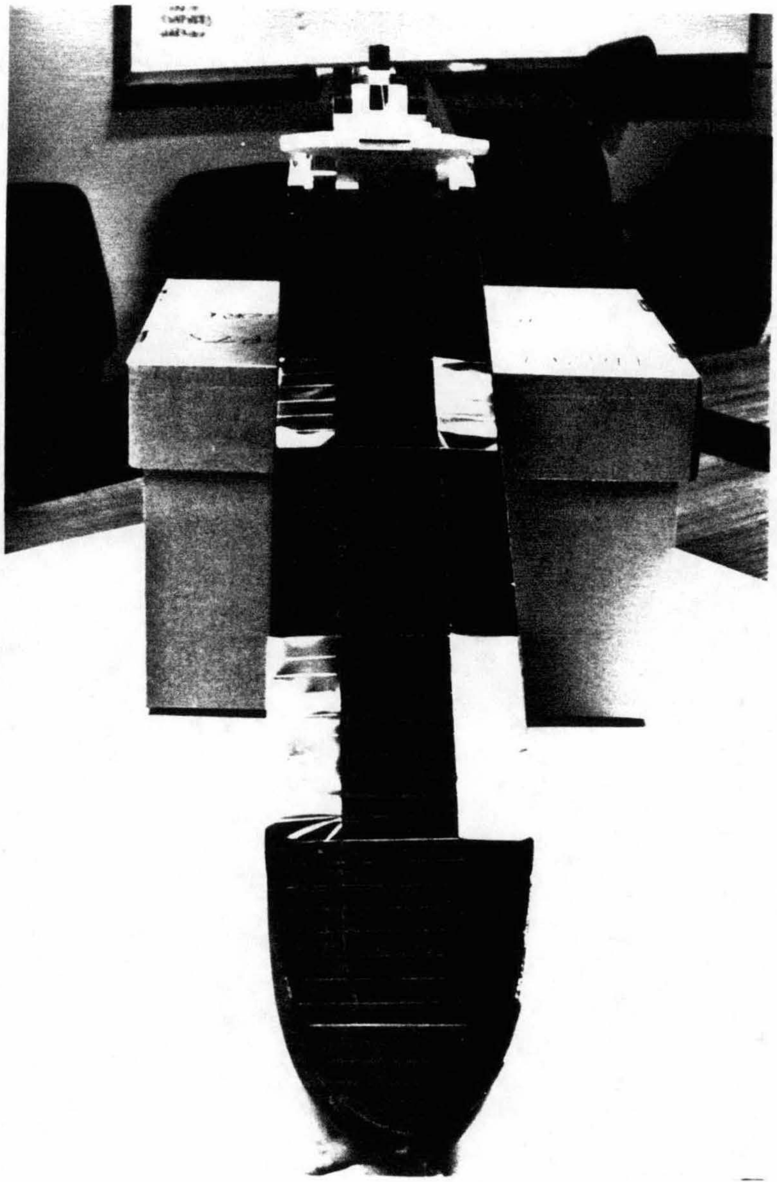
Exhibit #154

Model of the Exxon Valdez



Exh. #154

MODEL of the Exxon Valdez



Exh. 154

EXXON VALDEZ MODEL

PLAINTIFF
EXHIBIT NO. 155
ADMITTED ☒ Trial
89-7217 ce
89-7218 ce
(CASE NUMBER)

EXXON VALDEZ Reconstruction by Captain Greiner 12:12 PM 6/18/89

TIME GMT	TIME LOCAL	HEADING GYRO	Rate of Turn	BELL LOG	BELL RECORDER	RPM	Speed from Graph	Speed Correction	Speed thru Water	Current effect	SPEED OVER BOTTOM	COMMENTS
	Departed the dock at Alyeska Valdez Alaska at 0553 GMT, 2053 local 23 March 1989											
0700	2200	270			D Slo Ahd	24	5.15		5.15		5.15	
0701	2201	270	0			24	5.15		5.15		5.15	
0702	2202	270	0			24	5.15		5.15		5.15	
0703	2203	264	-6			24	5.15	-0.2	4.95		4.95	
0704	2204	254	-10			24	5.15	-0.3	4.85		4.85	Speed correction for turn
0705	2205	243	-11			24	5.15	-0.4	4.75		4.75	
0706	2206	233	-10			24	5.15	-0.4	4.75		4.75	
0707	2207	224	-9			24	5.15	-0.3	4.85		4.85	
0708	2208	222	-2			24	5.15	-0.2	4.95		4.95	
0709	2209	222	0			24	5.15	-0.1	5.05		5.05	
0710	2210	222	0			24	5.15	0	5.15		5.15	
0711	2211	223	1			24	5.15		5.15		5.15	
0712	2212	224	1			24	5.15		5.15		5.15	
0713	2213	225	1			24	5.15		5.15	-0.01	5.14	Start of current effect
0714	2214	225	0			24	5.15		5.15	-0.02	5.13	
0715	2215	225	0			24	5.15		5.15	-0.03	5.12	
0716	2216	225	0			24	5.15		5.15	-0.04	5.11	
0717	2217	225	0			24	5.15		5.15	-0.05	5.10	
0718	2218	225	0			24	5.15		5.15	-0.06	5.09	
0719	2219	225	0			24	5.15		5.15	-0.07	5.08	
0720	2220	225	0			24	5.15		5.15	-0.08	5.07	Entrance Is. Abeam Port 0.36 nm
0721	2221	226	1			24	5.15		5.15	-0.09	5.06	
0722	2222	226	0			24	5.15		5.15	-0.1	5.05	
0723	2223	226	0			24	5.15		5.15	-0.11	5.04	
0724	2224	226	0			24	5.15		5.15	-0.12	5.03	
0725	2225	226	0			24	5.15		5.15	-0.13	5.02	
0726	2226	226	0			24	5.15		5.15	-0.14	5.01	
0727	2227	226	0			24	5.15		5.15	-0.15	5.00	
0728	2228	226	0			24	5.15		5.15	-0.16	4.99	
0729	2229	226	0			24	5.15		5.15	-0.17	4.98	
0730	2230	225	-1			24	5.15		5.15	-0.18	4.97	
0731	2231	224	-1			24	5.15		5.15	-0.19	4.96	
0732	2232	224	0			24	5.15		5.15	-0.2	4.95	Middle Rock abeam Stbd .26 nm
0733	2233	224	0			24	5.15		5.15	-0.2	4.95	
0734	2234	225	1			24	5.15		5.15	-0.2	4.95	
0735	2235	225	0			24	5.15		5.15	-0.2	4.95	
0736	2236	225	0			24	5.15		5.15	-0.2	4.95	
0737	2237	225	0			24	5.15		5.15	-0.2	4.95	
0738	2238	222	-3			24	5.15		5.15	-0.2	4.95	
0739	2239	218	-4			24	5.15		5.15	-0.2	4.95	
0740	2240	214	-4			24	5.15		5.15	-0.2	4.95	
0741	2241	211	-3			24	5.15		5.15	-0.2	4.95	
0742	2242	208	-3	Slo Ahd		24	5.15		5.15	-0.2	4.95	
0743	2243	207	-1	Half Ahd		24	5.15	0	5.15	-0.2	4.95	
0744	2244	207	0		Slow Ahead	24	5.15		5.15	-0.2	4.95	
0745	2245	207	0	Full Ahd	Half Ahead	32	6.67	-0.3	6.37	-0.2	6.17	Logged Entrance Point, abeam port 0.26 n
0746	2246	207	0			40	8.33	-0.5	7.83	-0.2	7.63	
0747	2247	207	0		Full Ahead	52	10.75	-2	8.75	-0.2	8.55	
0748	2248	207	0			55	11.25	-1	10.25	-0.2	10.05	
0749	2249	210	3			55	11.25	-0.5	10.75	-0.2	10.55	
0750	2250	214	4			55	11.25		11.25	-0.2	11.05	
0751	2251	215	1			57	11.25		11.25	-0.2	11.05	
0752	2252	216	1			55	11.25		11.25	-0.2	11.05	[redacted]
0753	2253	217	1			55	11.25		11.25	-0.19	11.06	Logged Potato Pt. abeam stbd 0.37 nm
0754	2254	218	1			55	11.25		11.25	-0.18	11.07	

012103

TIME GMT	TIME LOCAL	HEADING GYRO	Rate of Turn	BELL LOG	BELL RECORDER	RPM	Speed from Graph	Speed Correction	Speed thru Water	Current effect	SPEED OVER BOTTOM	COMMENTS
0755	2255	218	0			55	11.25		11.25	-0.17	11.08	
0756	2256	218	0			55	11.25		11.25	-0.16	11.09	
0757	2257	218	0			55	11.25		11.25	-0.15	11.10	
0758	2258	218	0			55	11.25		11.25	-0.14	11.11	
0759	2259	218	0			55	11.25		11.25	-0.13	11.12	
0800	2300	218	0			55	11.25		11.25	-0.12	11.13	
0801	2301	218	0			55	11.25		11.25	-0.12	11.13	
0802	2302	218	0			55	11.25		11.25	-0.11	11.14	
0803	2303	218	0			55	11.25		11.25	-0.11	11.14	
0804	2304	218	0			55	11.25		11.25	-0.1	11.15	
0805	2305	218	0			55	11.25		11.25	-0.1	11.15	
0806	2306	218	0			55	11.25		11.25	-0.09	11.16	
0807	2307	218	0			55	11.25		11.25	-0.09	11.16	
0808	2308	218	0			55	11.25		11.25	-0.08	11.17	
0809	2309	218	0			55	11.25		11.25	-0.08	11.17	
0810	2310	218	0			55	11.25		11.25	-0.07	11.18	
0811	2311	218	0			55	11.25		11.25	-0.07	11.18	
0812	2312	218	0			55	11.25		11.25	-0.06	11.19	
0813	2313	218	0			55	11.25		11.25	-0.06	11.19	
0814	2314	218	0	Slo Ahd		55	11.25		11.25	-0.05	11.20	
0815	2315	218	0		Slow Ahead	45	9.3	1.7	11	-0.05	10.95	
0816	2316	218	0			36	7.5	2	9.5	-0.04	9.46	
0817	2317	218	0			32	6.67	1	7.67	-0.04	7.63	
0818	2318	218	0			32	6.67	0.5	7.17	-0.03	7.14	
0819	2319	218	0			32	6.67		6.67	-0.03	6.64	
0820	2320	218	0			32	6.67		6.67	-0.02	6.65	
0821	2321	218	0			32	6.67		6.67	-0.02	6.65	
0822	2322	218	0			32	6.67		6.67	-0.01	6.66	
0823	2323	218	0			32	6.67		6.67	-0.01	6.66	Curent negligible
0824	2324	218	0	Full Ahd	Full Ahead	51	10.5	-3	7.5		7.50	Pilot off
0825	2325	218	0			55	11.25	-2	9.25		9.25	
0826	2326	218	0			55	11.25	-1	10.25		10.25	
0827	2327	218	0			55	11.25	-0.5	10.75		10.75	
0828	2328	217	-1			55	11.25		11.25		11.25	
0829	2329	217	0			55	11.25		11.25		11.25	
0830	2330	210	-7			55	11.25	-0.2	11.05		11.05	
0831	2331	202	-8			55	11.25	-0.3	10.95		10.95	
0832	2332	200	-2			55	11.25	-0.1	11.15		11.15	
0833	2333	199	-1			55	11.25		11.25		11.25	
0834	2334	199	0			55	11.25		11.25		11.25	
0835	2335	199	0			55	11.25		11.25		11.25	
0836	2336	199	0			55	11.25		11.25		11.25	
0837	2337	198	-1			55	11.25		11.25		11.25	
0838	2338	198	0			55	11.25		11.25		11.25	2 line fix - Buoy 9 brg 290. rng 1.1nm
0839	2339	199	1			55	11.25		11.25		11.25	
0840	2340	198	-1			55	11.25		11.25		11.25	
0841	2341	192	-6			55	11.25	-0.1	11.15		11.15	
0842	2342	188	-4			55	11.25	-0.2	11.05		11.05	
0843	2343	185	-3			55	11.25	-0.1	11.15		11.15	
0844	2344	180	-5			55	11.25	-0.1	11.15		11.15	
0845	2345	181	1			55	11.25		11.25		11.25	
0846	2346	181	0			55	11.25		11.25		11.25	
0847	2347	181	0			55	11.25		11.25		11.25	
0848	2348	181	0			55	11.25		11.25		11.25	
0849	2349	180	-1			55	11.25		11.25		11.25	[redacted]
0850	2350	180	0			55	11.25		11.25		11.25	
0851	2351	180	0			55	11.25		11.25		11.25	

012104

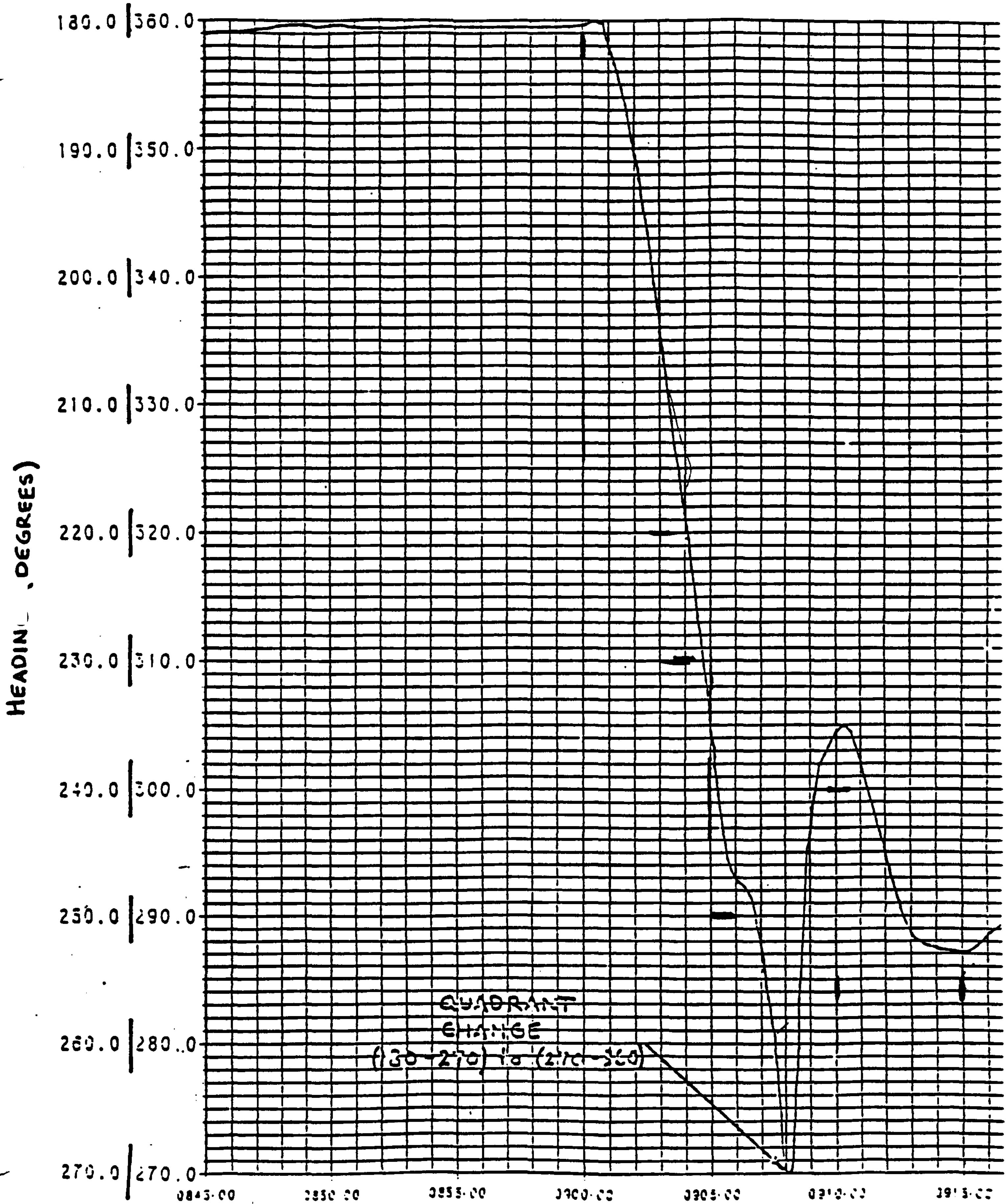
TIME GMT	TIME LOCAL	HEADING GYRO	Rate of Turn	BELL LOG	BELL RECORDER	RPM	Speed from Graph	Speed Correction	Speed thru Water	Current effect	SPEED OVER BOTTOM	COMMENTS
0852	2352	180	0			55	11.25		11.25		11.25	
0853	2353	180	0			55	11.25		11.25		11.25	
0854	2354	180	0			56	11.45		11.45		11.45	
0855	2355	180	0			56	11.45		11.45		11.45	Rdr Rng 1.1 nm, brg 090 to Busby Is. Lt.
0856	2356	180	0			57	11.66		11.66		11.66	
0857	2357	180	0			57	11.66		11.66		11.66	
0858	2358	180	0			58	11.85		11.85		11.85	
0859	2359	180	0			58	11.85		11.85		11.85	
0900	0000	180	0			59	12.05		12.05		12.05	
0901	0001	180	0			59	12.05		12.05		12.05	
0902	0002	180	0			60	12.24		12.24		12.24	
0903	0003	184	4			60	12.24		12.24		12.24	
0904	0004	197	13			61	12.43	-0.3	12.13		12.13	
0905	0005	218	21			61	12.43	-0.6	11.83		11.83	
0906	0006	232	14			61	12.43	-1	11.43		11.43	
0907	0007	248	16			62	12.63	-2	10.63		10.63	
0908	0008	255	7			62						
0909	0009	280	25			62						
0910	0010	296	16			62						
0911	0011	305	9			62						
0912	0012	303	-2			62						
0913	0013	299	-4			62						
0914	0014	294	-5			62						
0915	0015	288	-6			62						
0916	0016	287	-1			62						
0917	0017	288	1			62						
0918	0018	290	2			64						
0919	0019	291	1		Half/Slow A	42						
0920	0020	292	1		Stop	0						
0921	0021	292	0			0						
0922	0022	292	0			0						
0923	0023	291	-1			0						
0924	0024	291	0			0						
0925	0025	291	0			0						
0926	0026	291	0			0						
0927	0027	291	0			0						
0928	0028	290	-1			0						
0929	0029	290	0			0						
0930	0030	290	0			0						
0931	0031	290	0			0						
0932	0032	290	0			0						
0933	0033	290	0			0						
0934	0034	290	0			0						
0935	0035	288	-2	D Slo Ahd		0						
0936	0036	286	-2		D Slo Ahd	24						
0937	0037	285	-1			24						
0938	0038	284	-1	Slo Ahd		24						
0939	0039	284	0			24						
0940	0040	283	-1		Slow Ahead	31						
0941	0041	283	0			31						
0942	0042	283	0			31						
0943	0043	283	0			31						
0944	0044	283	0			31						
0945	0045	282	-1			31						
0946	0046	282	0			31						
0947	0047	281	-1	Half Ahd		31						[redacted]
0948	0048	281	0			32						

012105

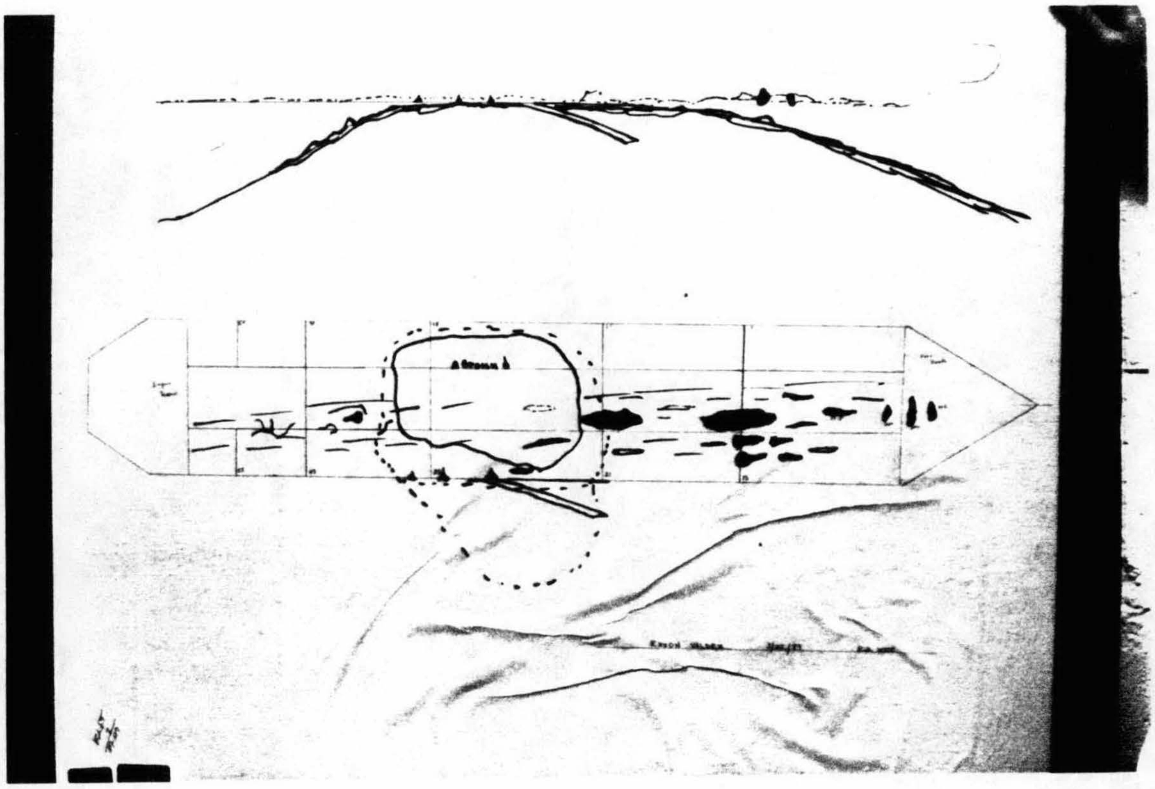
TIME GMT	TIME LOCAL	HEADING GYRO	Rate of Turn	BELL LOG	BELL RECORDER	RPM	Speed from Graph	Speed Correction	Speed thru Water	Current effect	SPEED OVER BOTTOM	COMMENTS
0949	0049	280	-1		Half Ahead	41						
0950	0050	281	1			40						
0951	0051	282	1			40						
0952	0052	282	0			40						
0953	0053	283	1			40						
0954	0054	283	0			40						
0955	0055	281	-2			40						
0956	0056	280	-1		Full Ahead	50						
0957	0057	282	2			54						
0958	0058	286	4			55						
0959	0059	281	-5			55						
1000	0100	281	0			55						
1001	0101	282	1			55						
1002	0102	281	-1			55						
1003	0103	279	-2			55						
1004	0104	277	-2			55						
1005	0105	278	1			55						
1006	0106	279	1			55						
1007	0107	271	-8			55						
1008	0108	285	14			55						
1009	0109	287	2			55						
1010	0110	288	1			55						
1011	0111	286	-2			55						
1012	0112	284	-2			55						
1013	0113	281	-3			55						
1014	0114	276	-5			55						
1015	0115	276	0			55						
1016	0116	276	0			55						
1017	0117	276	0			55						
1018	0118	277	1			55						
1019	0119	278	1			55						
1020	0120	278	0			55						
1021	0121	283				55						
1022	0122	290				55						
1023	0123	288				55						
1024	0124	289				55						
1025	0125	286				55						
1026	0126	284				55						
1027	0127	284				55						
1028	0128	285				55						
1029	0129	284				55						
1030	0130	283				55						
1031	0131	281				55						
1032	0132	280				55						
1033	0133	280				55						
1034	0134	278				55						
1035	0135	278				55						
1036	0136	278				55						
1037	0137	278				55						
1038	0138	278				55						
1039	0139	278		Stop		55						
1040	0140	278				56						
1041	0141	278			Stop	0						
												[redacted]
		NOTE - It is apparent that the clock used for recording the bells in the written log										
			is approximately two minutes slower than the clock of the automatic bell recorder.									

012106

PLAINTIFF
EXHIBIT NO. 156
ADMITTED ☒ Trial
89-7217CC
89-7218CR
(CASE NUMBER)


HEADING (DEGREES)
180.0 | 360.0
190.0 | 350.0
200.0 | 340.0
210.0 | 330.0
220.0 | 320.0
230.0 | 310.0
240.0 | 300.0
250.0 | 290.0
260.0 | 280.0
270.0 | 270.0
0845:00
0850:00
0855:00
0900:00
0905:00
0910:00
0915:00
QUADRANT
CHANGE
(180-270) to (270-360)

014804



Exh. # 157

Drawing of Damage to Bottom of Exxon Valdez

PLAINTIFF
EXHIBIT NO. 158
ADMITTED Tried
89-7217 CK
89-7218 CK
(CASE NUMBER)

Table 1. Cumulative migratory bird and sea otter deaths accounted for by the Fish and Wildlife Service and summary of wildlife rehabilitation efforts (October 12 – October 18, 1989). Number in parenthesis is tally change from previous week's briefing report.

	Kodiak	Homer	Seward	Valdez
BIRDS				
A. Rehabilitation Center				
1. Rec. live directly from field	221	190*	1099	382
2. Transf. in from other Centers	0	0	11	36
3. Transferred out from Center	172	141*	69	9
4. Deaths at Center / # euthanized	46/0	30/3*	386/89	289/71
5. Released	3	19	655	120
6. Presently holding	0	0	0	0
B. Dead from field to FWS	22578	5797	3248	3173
C. Cumulative dead: (4+B)	22624 (+0)	5827 (+3)*	3634 (+0)	3462 (+0)
		*Correction in previous data		
SEA OTTERS				
A. Rehabilitation Center				
1. Rec. live directly from field	24	17	184	139
2. Transf. in from other Centers	0	99	0	34
3. Wild otters captured near rehab pen	0	5	0	1
4. Births	0	4	7	3
5. Transferred out from Center	22	14	142	25
6. Deaths at Center / # euthanized	1/0	3/0	30/12	82/9
7. Released	1	103	19	70
8. Presently holding	0	0	0	0
B. Dead from field to FWS	195	103	99	490*
C. Cumulative dead: (6+B)	196 (+0)	106 (+0)	129 (+0)	572 (+1)*
			*State crews recovered 1 dead otter which has been sent to Anchorage for necropsy	
EAGLES				
A. Rehabilitation Center				
1. Rec. live directly from field	19	1	22	12
2. Transf. in from other Centers	6	0	1	0
3. Transferred out from Center	18	1	10	11
4. Deaths at Center / # euthanized	1/0	0/0	0/0	1/0
5. Released	6	0	13	0
6. Presently holding	0	0	0	0
B. Dead from field to FWS	61	15	20	46
C. Cumulative dead: (4+B)	62 (+0)	15 (+0)	20 (+0)	47 (+0) 144
D. Cumulative dead other raptors	4 (+0)	6 (+0)	2 (+0)	6 (+0) 58

EAGLE REHAB. CENTER, ANCHORAGE

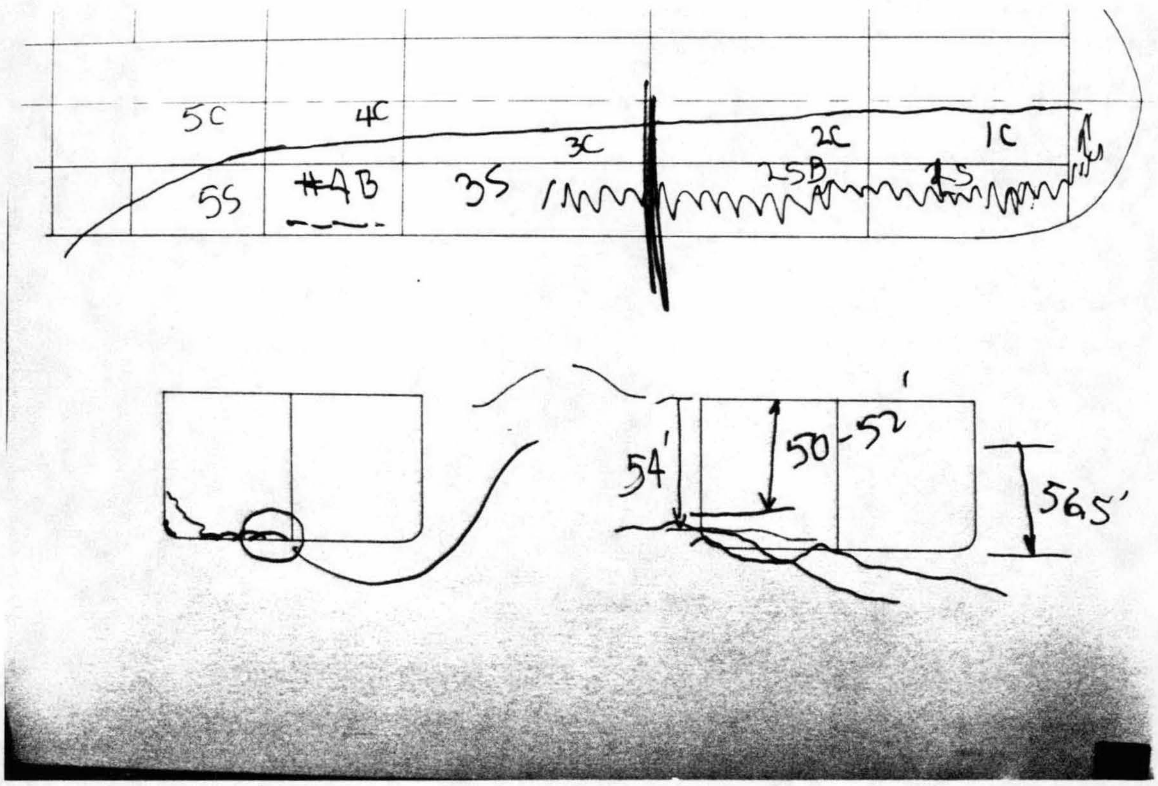
A. Received live . . . . 21 (+0)
B. Deaths at Center / # euthanized . . . . 7/2 (+0/+0)
C. Released . . . . 0 (+0)
D. Holding . . . . 12 (+0)
E. Transferred out . . . . 2 (+0)
(One eagle subsequently died.)

MISCELLANEOUS CATEGORY

Gore Pt. . . . 631 birds
King Salmon . . 23 birds, 2 otters
Puale Bay . . . 100 birds

SELECT CUMULATIVE GRAND TOTALS:

All dead birds	36471	(+5); corrects arithmetic error of two birds.
All live birds held	13	(+0); includes one eagle transferred to facility in lower 48.
All birds released	816	(+0)
Dead otters	1016	(+1); includes 11 deaths at other facilities.
Live otters held	22	(+0); includes 22 held at other facilities.
Otters released	193	(+0)



Ex #159

DIAGRAM of Shell Hull

EXHIBIT 160

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 161

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 162

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 163

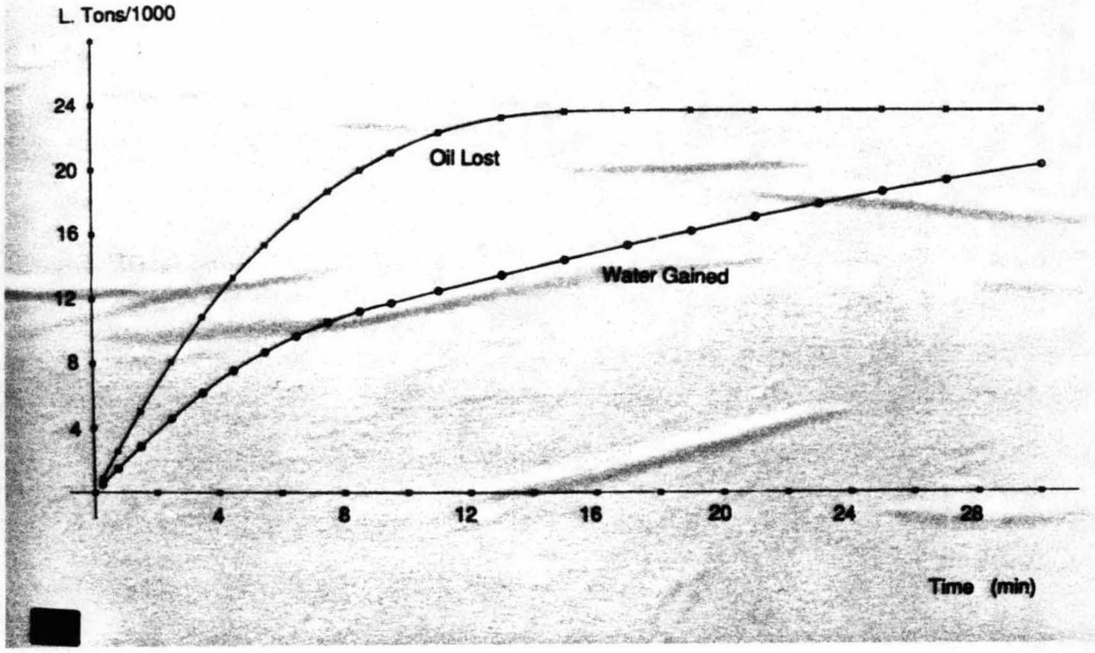
WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 164

WAS NOT ADMITTED INTO EVIDENCE

EXXON VALDEZ GROUNDED ON REEF

PREDICTED OIL LOSS AND WATER GAIN VERSUS TIME



Ex #165

Diagram of predicted oil loss and water gain versus time

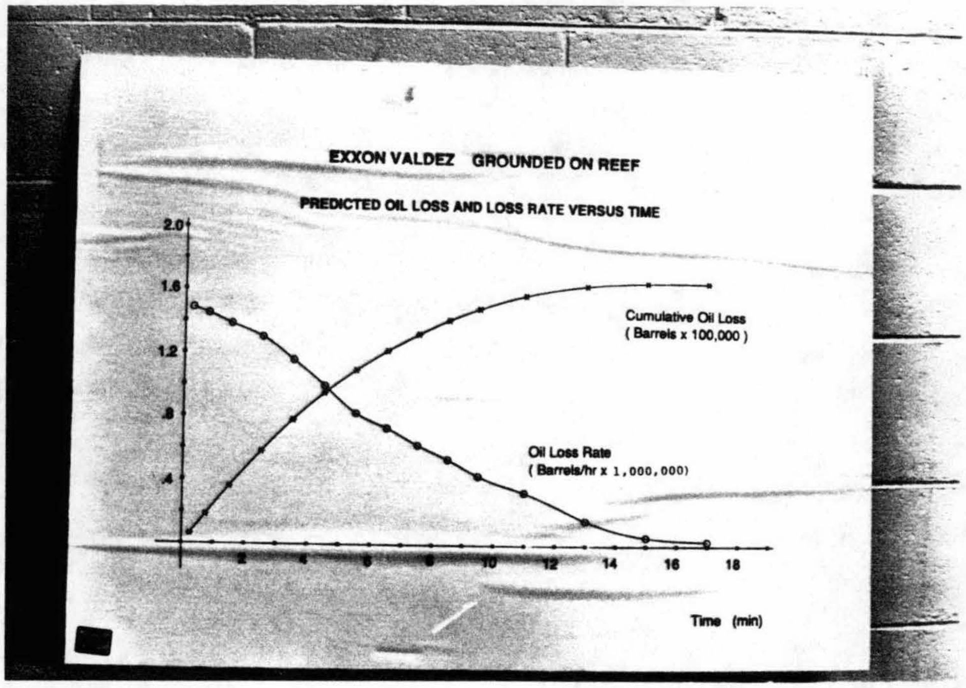
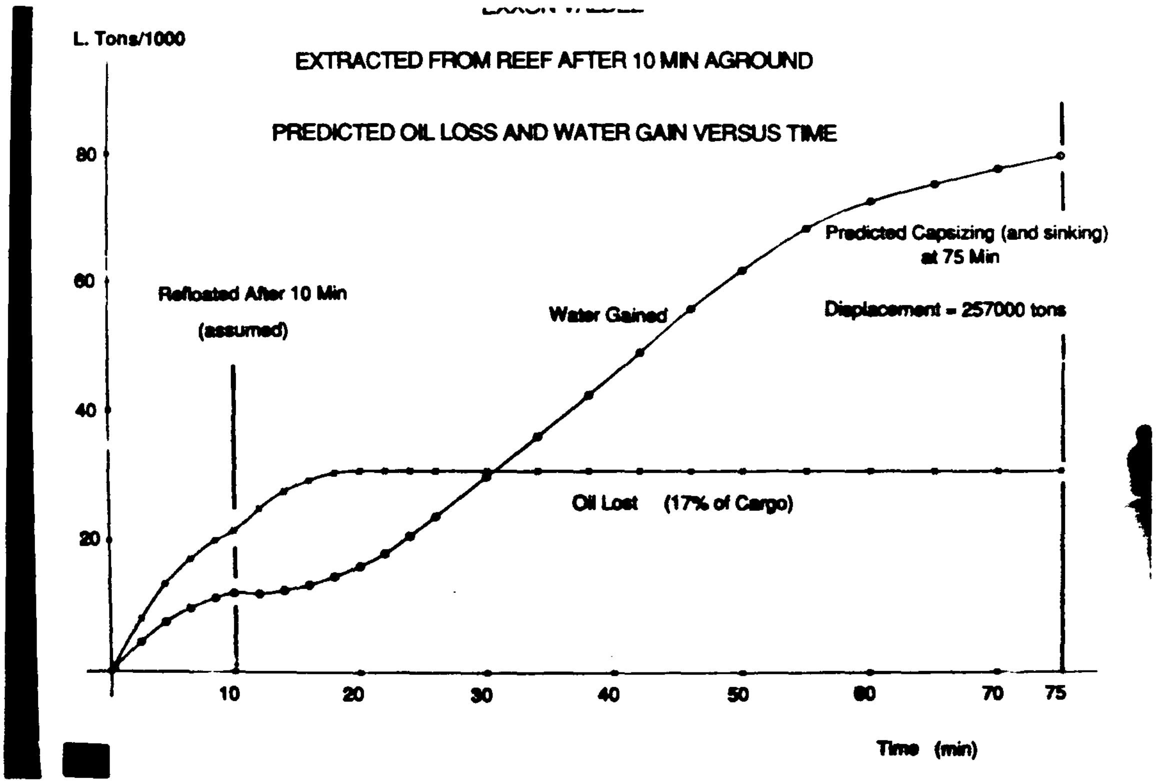
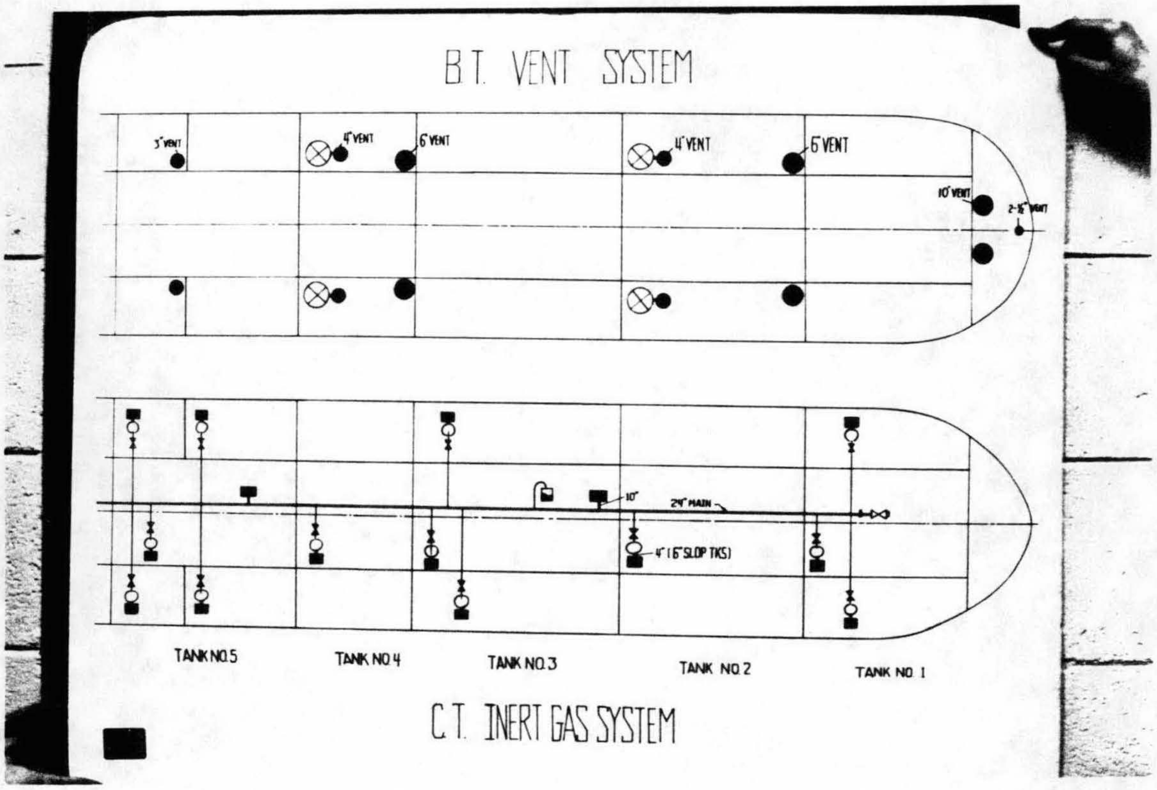

EXXON VALDEZ GROUNDED ON REEF
PREDICTED OIL LOSS AND LOSS RATE VERSUS TIME
2.0
1.6
1.2
.8
.4
Cumulative Oil Loss
(Barrels x 100,000)
Oil Loss Rate
(Barrels/hr x 1,000,000)
2
4
6
8
10
12
14
16
18
Time (min)

Exhibit # 166



Computer Graph Results

EX 167



C.T. inert Gas System diagram

EX 168

EXHIBIT 169

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 170

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 171

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 172

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 173

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 174

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 175

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 176

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 177

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 178

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT 179

WAS NOT ADMITTED INTO EVIDENCE

§ 95.045 General operating rules for vessels inspected, or subject to inspection, under Chapter 33 of Title 46 United States Code.

While on board a vessel inspected, or subject to inspection, under Chapter 33 of Title 46 United States Code, a crewmember (including a licensed individual), pilot, or watchstander not a regular member of the crew:

(a) Shall not perform or attempt to perform any scheduled duties within four hours of consuming any alcohol;

(b) Shall not be intoxicated at any time;

(c) Shall not consume any intoxicant while on watch or duty; and

(d) May consume a legal non-prescription or prescription drug provided the drug does not cause the individual to be intoxicated.

PLAINTIFF
EXHIBIT NO. 180
ADMITTED Trial
89-7217 CR
89-7218 CR
(CASE NUMBER)

SECA

EXHIBIT LIST

Case No. 3AN-S89-7217 / 7218 ☐ Pretrial Hearing ☒ Trial

State of Alaska vs. Joseph Hazelwood

Name of Party: State of Alaska - ☒ Pltf. ☒ Def.
(There must be a separate exhibit list for each party.)

Party's Attorney: Brent Cole, Asst DA

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	COURT USE ONLY With-drawn Date	To Jury	From Jury	To Ex. Stor.
A	Pilotage Slip -		A		A	A	MD
B	Pilotage Regulation Change. (Bob Arts - Letter)		B		B	B	MD
C	Credit card Slip		C		C	C	MD
D	Phone Slips -		D		D	D	MD
E	Diagram Pipeline Club (8 x 11)		E		E	E	MD
F	[redacted]	x				[redacted]	/
G	Copy of VTS operating Manual	x					/
H	Copy one page VTS (1-2)	x					/
40 I	Copy - VTC manual Promulgated 11-2-88		I		I	I	MD
J	Photo - [illegible]		J		J	J	MD
K	Photo - [illegible]		K		K	K	MD
L	Photo [illegible] Hazelwood 1-30-90		L		L	L	MD
M	Photo ~~coat~~ Temp Hazelwood 2-3-90		M		M	M	MD
N	Photo Hazelwood 6-13-89		N		N	N	MD
O	Phot Hazelwood 2-11-90		O		O	O	MD

I certify that the exhibits checked in the "To Jury" column on this and all attached pages were given to the jury for deliberation.
49 Date 3-20-90 In-Ct. Clerk [illegible signature]

I certify that the exhibits checked in the "From Jury" column on this and all attached pages were received from the jury after the verdict.
Date 3-22-90 In-Ct. Clerk [illegible signature]

I certify that the exhibits checked in the "To Exhibit Storage" column on this and all attached pages have been placed in exhibit storage.
Date 3/30/90 Exhibit Clerk Nancy Drake

TF-200 (12/88) (cs)
EXHIBIT LIST

Civil Rule 43.1
Criminal Rule 26.1
Admin. Bulletin No. 9

EXHIBIT LIST CONTINUATION SHEET

Case No. 3AN-S89-7217 Cr
3AN-S89-7218 Cr

Name of Party: Joseph Hazelwood

	Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	COURT USE ONLY: Withdrawn Date	To Jury	From Jury	To Ex. Stor.
	P	Drawing by Deppe		P		P	P	MW
1	Q	RTC Log (copy of)		Q		Q	Q	MW
1	R	Chart - (copy) Valdez Narrows (Scale - 1:20,000)		R		R	R	MW
2	S	Statute AK - Pilotage		S		S	S	MW
5	T	Federal Register 46 CFR (6-24-85) [illegible]	T					MO
5	U	Federal Register 46 CFR (6-6-88) [illegible]	U					MO
	V	29-May-89 Request for info. TO: USCG - From Greiner	X					
	W	29 May 89 - Requests inform. TO USCG - FEI Greiner	X					
	X	20 July 89 Request for info. TO USCG FEI Greiner	X					
	Y	Facsimile Transmission 8-16-89 FROM MEC Greiner to [illegible]	X					
	Z	To Greiner [illegible] USCG [illegible] 18 Oct 89	X					
	AA	[illegible] To Cole - 9-11-89 -	X					
	AB	Chart of vessel - Soundings	X					
2	AC	[illegible]		AC		AC	AC	MW
	AD	Chart		AD		AD	AD	MW
2	AE	Brochure - Chart -		AE		AE	AE	MW
2	AF	[illegible]		AF		AF	AF	MW
	AG	Ship regime [illegible]	X					
	AH	[illegible] 9-74	X					
	AI	[illegible]	X					
2	AJ	[illegible]		AJ		AJ	AJ	MW
	AK	[illegible]		AK		AK	AK	MW
	AL	Memorandum from Sam Greiner To [illegible]	X					

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Page of
TF-201 (12/88) (cs)
EXHIBIT LIST CONTINUATION SHEET

Civil Rule 43.1
Criminal Rule 26.1
Admin. Bulletin No. 9

EXHIBIT LIST CONTINUATION SHEET

Case No. [illegible] Name of Party: [illegible]

	COURT USE ONLY							
	Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
	AM	Letter To [illegible] From [illegible] 2-12-91	X					
	AN	[illegible]		AN		AN	AN	MD
	AC	Blow-up [illegible] System		AC		AO	AO	MD
	AP	Blow-up		AP		AP	AP	MD
	AQ	Blow-up		AQ		AQ	AQ	MD
	AR	Copy - one page sheet. Type [illegible]		AR		AR	AR	MD
2	AS	Telephone [illegible]		AS		AS	AS	MD
1	AT	AM Telephone record	AT					MD
	AU	affidavit John Kane American Express	X				[redacted]	
	AV	Blow-up photos (Bulkhead Rudder Angle)		AV		AV	AV	MD
	AW	" " " (Rudder Angle Gauge)		AW		AW	AW	MD
	AX	Blow up Photo (Change rate of Turn)		AX		AX	AX	MD
	AY	Blow up Photo (Bridge area)		AY		AY	AY	MD
	AZ	[illegible]		AZ		AZ	AZ	MD
	BA	[illegible]		BA		BA	BA	MD
2	BB	Hoffman - Report of Damage	BB					MD
	BC	[illegible]		BC		BC	BC	MD
	BD	[illegible]		BD		BD	BD	MD
	BE	[illegible]		BE		BE	BE	MD
	BF	[illegible] - large chart [illegible]		BF		BF	BF	MD
	BG	[illegible]		BG		BG	BG	MD
	BH	[illegible]		BH		BH	BH	MD
	BI	[illegible]		BI		BI	BI	MD

25

Civil Rule 43.1
Criminal Rule 26.1
Admin. Bulletin No. 9

EXHIBIT LIST CONTINUATION SHEET

Case No. 3AN-S89-7217 CR / 3AN-S89-7218 CR   Name of Party: Hazelwood

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	Withdrawn Date (COURT USE ONLY)	To Jury	From Jury	To Ex. Stor.
BJ	10° right rudder overlay		BJ		BJ	BJ	MD
BK	20° right rudder overlay		BK		BK	BK	MD
BL	overlay		BL		BL	BL	MD
BM	Large Diagram w overlays - abeam Busby island - Chart		BM		BM	BM	MD
BN	overlay transparency		BN		BN	BN	MD
BO	overlay 3° right rudder		BO		BO	BO	MD
BP	overlay 4° right rudder		BP		BP	BP	MD
BQ	overlay - 5° right rudder -		BQ		BQ	BQ	MD
BR	overlay 10°		BR		BR	BR	MD
BS	Overlay 20° right rudder - 23:55		BS		BS	BS	MD
BT	Chart Exxon Valdez course [illegible] chart		BT		BT	BT	MD
BU	Chart Grounding chart (one)		BU		BU	BU	MD
BV	Grounding chart (2 tier)		BV		BV	BV	MD
BW	[illegible] photo [illegible]		BW		BW	BW	MD
BX	Computer data [illegible]!	X					
BY	[illegible] letter re Martineau		BY		BY	BY	MD
BZ	Photo		BZ		BZ	BZ	MD
CA	Photo		CA		CA	CA	MD
CB	Photo		CB		CB	CB	MD
CC	[illegible]	X					
CD		X					
CE		X					
CF	[illegible]	X					

Page ___ of ___
TF-201 (12/88) (cs)
EXHIBIT LIST CONTINUATION SHEET

Civil Rule 43.1
Criminal Rule 26.1
Admin. Bulletin No. 9

EXHIBIT LIST CONTINUATION SHEET

Case No. 3AN 89 7217 CR / 7218 CR   Name of Party: Joseph Hazelwood

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	With-drawn Date	To Jury	From Jury	To Ex. Stor.
			COURT USE ONLY				
CG	diagram by Hlastala	X					
CH	diagram by Hlastala	X					
CI	diagram by Hlastala	X					
CJ	Soundings around Exxon Valdez Chart - (Paper Size)		CJ		CJ	CJ	MD
CK	Soundings around Exxon Valdez Chart (Paper Size)		CK		CK	CK	MD
CL	Chart Schematic of Salvage Principle		CL		CL	CL	MD
CM	Hudson's calculations	X					
CN	Hudsons calculations	X					
CO	Hudsons calculations	X					

Page ___ of ___
TF-201 (12/88) (cs)
EXHIBIT LIST CONTINUATION SHEET

Civil Rule 43.1
Criminal Rule 26.1
Admin. Bulletin No. 9

SOUTHWEST ALASKA PILOTS ASSOCIATION

Telephone (907) 235-8783 Cable Homerpilot
P.O. Box 977 • Homer, Alaska 99603

Telex: 090-626-359 S.W.A. PILOTS Radio Call Sign: KCE-203

31110

NAME OF VESSEL	NATIONALITY
M/V Exxon Valdez	E R U.S.

DRAFT	GROSS TONS	AGENT
~~55-11"~~ 56-01"	94,999	Alamar

BOARDED	DISEMBARKED	EXPENSE REPORT NO.
2020 3/23	2320 3/23	

PLACE		DATE	TIME
From Alyeska #5		3/23/89	SBE 2054 LL 2112
To Valdez Pilot		"	2320
From			
To			
From			
To			

PILOT SIGNATURE	LIC. NO.
[signature]	051
MASTER SIGNATURE [signature]	DATE 3-23-89
SECOND PILOT 50% OF TARIFF	$

	HOUR	DAY	TOTAL
OVERTIME	____ @ ____	____ @ ____	$
STAND BY	____ @ ____	____ @ ____	$
TRAVEL	____ @ ____	____ @ ____	$
DELAYED SAILING	____ @ ____	____ @ ____	$
BRIDGE WATCH	____ @ ____	____ @ ____	$
RIDE SHIP	____ @ ____	____ @ ____	$
SCENIC CRUISING	____ @ ____	____ @ ____	$

$________ Prorated — See Attached

DEFENDANT
HIBIT NO. A
ADMITTED ☑ trial
89-7217 CR
89-7218 CR
(CASE NUMBER)

(1)

RECEIVED
KJN H.J. GORDON NRM
SEP 29 1986
EXXON SHIPPING COMPANY
WEST COAST FLEET OFFICE
APM JOK RGP GWP DPL KIP AGT JMK KJC GTS
CIRC PLS RTN LAST COPY FILE

September 19, 1986

To: Whom it may concern

Fm: Alaska Maritime Agencies

RE: New Pilotage Requirements

Effective Sept. 1, 1986 the USCG requirement for daylight passage in Prince William Sound for vessels without pilotage has been waived. All non-pilotage vessel will be able to transit from Cape Hinchinbrook to the pilot station at all hours as long as visibility remains at 2 miles or greater. The same remains true for the outbound leg from the pilot station to Cape Hinchinbrook.

The USCG will require each vessel to advise them of the visibility prior to arrival at Cape Hinchinbrook on the inbound leg and just prior to dropping the pilot on the outbound leg.

Please note that the Coast Guard is treating each instance on a case by case basis. Events such as oil spills, severe weather, traffic within the VTS and a vessels past operating record may dissuade the USCG from granting permission to transit Prince William Sound without pilotage.

All other requirements for vessels in the TAPS trade remain the same:

1. Notify USCG 3 hours prior to arriving Cape Hinchinbrook.
2. Full complement of crew to be onboard, all navigation equipment to be in working order.
3. A bridge navigation team consisting of an extra watchstander under the direction of a deck officer (other than the one on watch), must report the vessels position every 10 minutes while navigating from Cape Hinchinbrook to Montague point.

We hope this information is of assistance to you.

Sincerely,

Bob Arts

Alaska Maritime Agencies

DEFENDANT
EXHIBIT NO. B
ADMITTED
89-7217 CR
89-7218 CR
(CASE NUMBER)

4844 961 215 644 5195429

CE/89 CV

ROBERT J ARTS

PIZZAPALACE 032289
670030678
VALDEZ AK

Exxon Valdez
ROR/J. Hazelwood
CH. ENG. Ed Murphy

PURCHASER SIGN HERE
X Robert

Cardholder acknowledges receipt of goods and/or services in the amount of the Total shown hereon and agrees to perform the obligations set forth in the Cardholder's agreement with the issuer.

QUAN.	CLASS	DESCRIPTION	PRICE	AMOUNT
		Lunch		47 20
				6 —

DATE 3-22-89 | AUTHORIZATION | REFERENCE NO. | CLERK

SUB TOTAL

TAX

SALES SLIP | TOTAL 53 20

SAFEPERF® U.S. Pat. 4,403,793

IMPORTANT: RETAIN THIS COPY FOR YOUR RECORDS

CUSTOMER COPY

DEFENDANT
EXHIBIT NO. C
ADMITTED Trial
89-7217 CR
89-7218 CR
(CASE NUMBER)

RECORD OF LONG DISTANCE CALL

DATE 3-23-89 TIME 11:30 A.M. P.M.

CITY CALLED Houston, Tx

PHONE 713 (AREA CODE) 656-2988 (NUMBER)

FIRM CALLED Exxon Shipping Co. Station ☐ Person ☐

TALKED WITH J. McDermott

CALLED BY J. Hazelwood - Master Exxon Valdez

SUBJECT MATTER OF CALL Vessel Business
Personnel Department.
Houston, Texas

RESULT

CHARGES

TAX

MINUTES TOTAL COST $

TOPS FORM 1209 LITHO IN U.S.A.

RECORD OF LONG DISTANCE CALL

DATE 3-23-89 TIME 11:00 A.M. P.M.

CITY CALLED Benicia / Exxon Shipping

PHONE 707 (AREA CODE) 445-7401, 7785 (NUMBER)

FIRM CALLED Exxon Shipping Co. Station ☐ Person ☐

TALKED WITH T. Shearer, W. Cass

CALLED BY J. Hazelwood

SUBJECT MATTER OF CALL Vessel Business
M.V. Exxon Valdez

RESULT

CHARGES

TAX

MINUTES TOTAL COST $

TOPS FORM 1209 LITHO IN U.S.A.

RECORD OF LONG DISTANCE CALL

DATE 3-23-89 TIME 11:58 A.M. P.M.

CITY CALLED Houston, Tx.

PHONE 713 (AREA CODE) 656-2796 (NUMBER)

FIRM CALLED Exxon Shipping Co Station ☐ Person ☐

TALKED WITH

CALLED BY J. Hazelwood / Master Exxon Valdez

SUBJECT MATTER OF CALL
Ship's Business -

RESULT

CHARGES —

TAX —

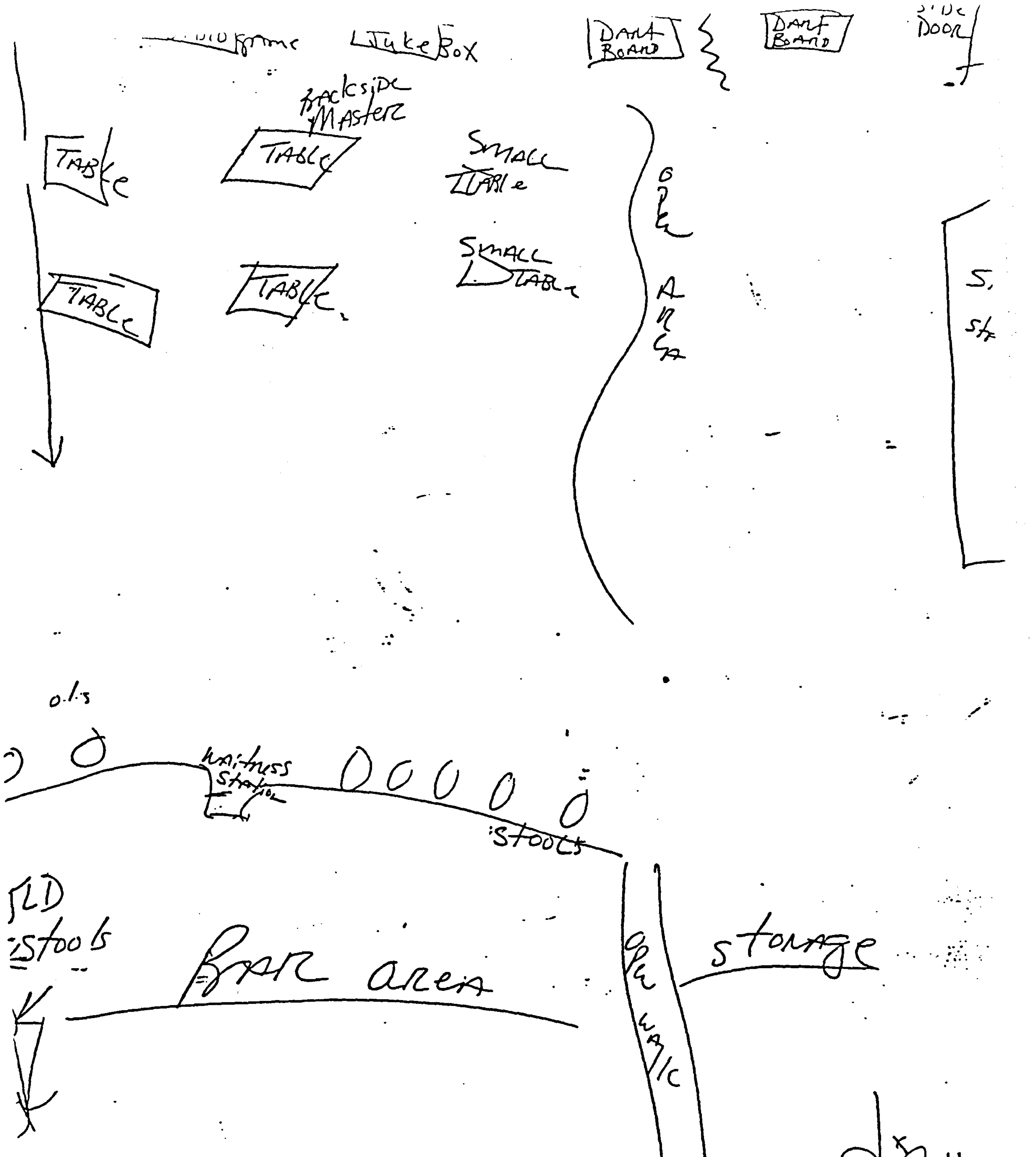
MINUTES TOTAL COST $ —

DEFENDANT

EXHIBIT NO. D

ADMITTED ☒ Trial

89-7217 CR
89 7218 CR
(CASE NUMBER)



005201

Jamie DeLozie
4-4-01
1412 HRS

DEFENDANT
EXHIBIT NO. E
ADMITTED ☒ trial
89-7217 CR
89-7218 CR

EXHIBIT F

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT G

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT H

WAS NOT ADMITTED INTO EVIDENCE

/

U.S. Department of Transportation
United States Coast Guard

Commanding Officer
United States Coast Guard
Marine Safety Office

P.O. Box 486
Valdez, Alaska 99686
Phone: 835-4791

5401
02 NOV 1988

From: Commanding Officer, Marine Safety Office, Valdez, Alaska
To: Distribution

Subj: PRINCE WILLIAM SOUND VESSEL TRAFFIC CENTER MANUAL; PROMULGATION OF

1. Purpose. The Prince William Sound Vessel Traffic Center Manual dated 06 AUGUST 1986 is hereby superseded.

2. Discussion. This manual provides instructions for the operation of the Vessel Traffic Center. It shall be used in conjunction with the MSO Valdez Organization and Regulations Manual; and the Prince William Sound Vessel User's Manual Second Edition 1984. Nothing in this manual shall be construed as contravening or superseding U.S. Coast Guard Regulations (COMDTINST M5000.3A). Conflicts between the provisions of this manual and other effective directives issued by competent authority shall be referred to the Commanding Officer.

3. Action. All Personnel assigned to the Prince William Sound Vessel Traffic Center shall insure they are thoroughly familiar with the provisions of this manual. Each person to whom a copy of this manual is issued shall be accountable for its custody, the entry of changes as necessary, and proper maintenance. The OOD shall insure that a copy of this manual, complete and up-to-date in every respect, is maintained in the traffic center for the ready use of on-watch personnel.

S.A. McCALL

Encl: (1) Prince William Sound VTC Manual

DISTRIBUTION:
COMDT (G-NSS) (2)
CCGD17(m) (o)
Commanding Officer
Executive Officer
Operations Officer
Marine Safety Department
Vessel Traffic Center
All VTC Watchstanders
VTC copy

DEFENDANT
EXHIBIT NO. I
ADMITTED ☒ trial
89-7217
89-7218
(CASE NUMBER)

TABLE OF CONTENTS

5

6

CHAPTER 1

GENERAL

1.1 PURPOSE: This manual promulgates instructions for the operation of the Prince William Sound Vessel Traffic Center. Except as specifically provided herein, Coast Guard Directives, Instructions, and matters of standard practice and tradition within the service shall be observed. In the event of conflict between the provisions of this manual and other unit directives, immediately consult the Operations Officer.

1.2 CONCEPT OF OPERATIONS

1.2.1. BACKGROUND: The Ports and Waterways Safety Act of 1972 authorizes the Coast Guard to establish and operate vessel traffic systems in order to prevent damage to, or the destruction or loss of any vessel, bridge, or other structure, on or in the navigable waters of the United States, or any land structure of shore area immediately adjacent to those waters; and to protect the navigable waters and the resources therein from environmental harm resulting from vessel or structure damage, destruction, or loss.

The Trans-Alaska Pipeline Authorization Act, passed in November of 1973, amended the Ports and Waterways Safety Act to specifically require the Coast Guard to establish and operate a vessel traffic service in Prince William Sound.

1.2.2 DISCUSSION; Prince William Sound is an area of great natural beauty which attracts a large number of tourists and sport fishermen each year. The waters of the sound, relatively untouched by pollution, support a large commercial fishery. The operation of the Trans-Alaska Pipeline Terminal in Valdez, creates a considerable increase in vessel traffic in the area, most of which is carrying crude oil from the North Slope. The presence of large oil tankers has resulted in a potential for environmental damage, as well as loss of life and property, due to marine disasters. Although the amount of anticipated traffic through the Valdez Narrows is small in comparison to other ports served by vessel traffic systems, the nature of the cargo and the possibility of severe and unpredictable weather in the area dictates that every possible precaution be taken to avoid irreversible damage to the environment. Public awareness and concern for protection of the environment led to the requirement for a vessel traffic service in the Prince William Sound. To insure that the VTC was able to carry out its responsibilities, it was given broad authority to independently regulate vessel traffic in Prince William Sound.

1.2.3 AREA DESCRIPTION:

A. The VTS area consists of the navigable waters of the United States north of a line drawn from Cape Hinchinbrook Light to Schooner Rock Light, between longitude 146-40 W and 147-20 W, and includes Valdez narrows and Port Valdez. This covers the waters of Prince William Sound, including the Port of Valdez, but excluding the ports of Cordova and Whittier. The principal areas of potential vessel traffic congestion are at Hinchinbrook Entrance in the south, and Valdez Narrows in the north.

B. The waters of the Prince William Sound, although somewhat protected by the surrounding land mass, are subject to frequent changes of weather, ie. high winds, and reduced visibility due to fog and heavy precipitation. The weather to seaward of Hinchinbrook Entrance is often markedly different from that within the sound. The Port Valdez area may have weather entirely different from that of the sound. The high, rugged cliffs surrounding the sound provide excellent characteristics for radar navigation.

C. Most of the traffic in the VTS area will be bound to or from Port Valdez, the northernmost deep water year-round ice-free port in Alaska. Port Valdez, a deep-water fjord, is approximately 12 miles long and 2.5 miles wide. steeply rising mountains which surround the Port prevent direct radio unications outside it. The approach to Port Valdez is by way of Valdez . A deep-water channel with a minimum usable width at Valdez Narrows of ut 900 yards (between Middle Rock and the southern edge of the channel). The City of Valdez, located on the northern shore of Port Valdez, has various commercial dock facilities for general and dangerous cargo. There is a small boat harbor with over 200 vessels, including commercial fishing and charter vessels.

D. Cordova, located in the eastern part of the sound, has commercial piers for general cargo, a fuel dock, and a State Ferry Terminal. A fleet of over 500 fishing vessels support several sea food canneries. The U.S. Coast Guard Buoy Tender SWEETBRIER is home ported there. The existing VTS traffic lanes were designed to minimize interference with fishing grounds used by Cordova vessels.

E. The Valdez Marine Terminal, operated by Alyeska Pipeline Service Company, is located on the southern shore of Port Valdez. Most of the traffic required to use the VTS are the tankers carrying oil from this terminal. The Valdez Marine Terminal consists of four berths described below:

BERTH	TYPE	TANKER SIZE	MAXIMUM FLOW RATE
1	FLOATING	16,000-120,000 DWT	80,000 BBLS/HR
3	FIXED	16,000-250,000 DWT	110,000 BBLS/HR
4	FIXED	16,000-250,000 DWT	110,000 BBLS/HR
5	FIXED	16,000-250,000 DWT	110,000 BBLS/HR

sels of less than 45,000 DWT will normally be handled at Berth No.1 No er facilities are available at this berth.

1.3 GLOSSARY OF TERMS:

VESSEL TRAFFIC SERVICE (VTS): The VTS is operated in accordance with regulations published in title 33, Code of Federal Regulations, Subchapter P, Part 161. It consists of: a Vessel Traffic Center located in Valdez, a radar surveillance system, a VHF-FM communications system covering the entire sound and its approaches, and a Traffic Separation Scheme.

VESSEL TRAFFIC CENTER (VTC): The Vessel Traffic Center, located in the Marine Safety Office at Valdez, is manned 24 hours a day. The National Weather Service is located in the same building.

RADAR SURVEILLANCE SYSTEM: Two radar systems located at Potato Point and at the Valdez Spit, provide coverage of Port Valdez, Valdez Arm, and part of Prince William Sound. Microwave links relay the radar signals from both locations to the VTC, where they are displayed on the radar consoles.

COMMUNICATIONS SYSTEM: The VTC guards VHF-FM Channels 13 and 16 continuously. Channel 13 is designated the Vessel Traffic Frequency. One 30 watt transceiver at the Valdez Spit site provides direct coverage of Port Valdez. Remote 50 watt transceivers at Potato Point, Naked Island, and Cape Hinchinbrook, provide complete VHF-FM coverage of the VTS area. Signals to and from the remote sites are relayed by microwave links to the VTC. A remote HF site at Hinchinbrook Island provides HF coverage of the VTS Area, with the exception of Port Valdez. HF signals are relayed by microwave to Valdez. Additional VHF-FM capability is available for contingency operations via the Naked Island tertiary site.

TRAFFIC SEPARATION SCHEME (TSS): The Traffic Separation Scheme provides inbound and outbound traffic lanes to separate traffic to and from Valdez via Hinchinbrook Entrance. Vessels utilizing the TSS must keep the separation zone to port. A description of the TSS is contained in Title 33 CFR 161.383 and 161.385. The regulations also provide for a one-way traffic area in the Valdez Narrows (33 CFR 161.387).

USER'S MANUAL: A detailed Prince William Sound VTS User's Manual has been prepared which contains the detailed VTS regulations, amplifying information and supplemental information of use to mariners entering or operating within the system.

OFFICER OF THE DAY: Direct representative of the Commanding Officer after hours.

TRAFFIC WATCHSTANDER: Person assigned to the radar watch in the VTC.

RADIO WATCHSTANDER: Person assigned to the communications portion of the VTC.

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CHAPTER 2

ORGANIZATION AND STANDARD PROCEDURE

2.1 COMMAND RELATIONSHIPS:

2.1.1 RELATIONSHIPS WITH OTHER COAST GUARD COMMANDS:

A. Commanding Officer, Marine Safety Office, Valdez is responsible directly to Commander, Seventeenth Coast Guard District for operation of the Vessel Traffic Center, and operates directly under his operational and administrative control.

B. Command relationships involved in other support missions (SAR, ATON) are as specified in Chapter 7 of this manual.

2.1.2 MSO ORGANIZATION:

A. The Prince William Sound Vessel Traffic Service is organized as part of the Operations Department within the Marine Safety Office, Valdez. Command relationships are in accordance with the MSO Valdez Organization and Regulations Manual.

B. The Operations Department Head is responsible, under the Commanding Officer, for the collection, evaluation and dissemination of operational information required for the assigned missions and tasks of the VTC and required planning functions.

C. The OOD is the direct representative of the Commanding Officer. One of his responsibilities is to ensure that the performance of the watch, in the VTC, is in accordance with all applicable instructions. With respect to these responsibilities, his instructions carry the force and authority of the Commanding Officer. The OOD shall be guided by the provisions of this manual in carrying out his assigned duties. For supervision of the watch, he shall be guided by the provisions of Part II, Chapter 6 of U.S. Coast Guard Regulations (COMDTINST M5000.3A).

2.1.3 OPERATIONS CENTER WATCH: The watch shall consist of two watchstanders, one on the traffic side and one on the radio side.

2.2 GENERAL WATCH PROCEDURES

2.2.1 WATCH CONDUCT STANDARDS: The VTC watch shall at all times be conducted in an efficient, professional manner, and unless specifically instructed to the contrary by this manual, shall be conducted in accordance with the customs and traditional standards of Coast Guard watches. The Vessel Traffic Center Watch corresponds to the Bridge Watch on a commissioned vessel of the Coast Guard. The provisions of USCG Regulations (COMDTINST M5000.3A) hall govern the conduct and appearance of all personnel.

A. At least one of the two personnel assigned to the watch must be in the VTC at all times. When particapating vessels are transiting the Narrows, the traffic watchstander will be in the traffic center. During radio broadcasts both watchstanders will be in the traffic center. During periods when hazardous circumstances exist, or are anticipated any-where in the VTC

2.2.1.B. Watch personnel shall normally be occupied with the routine of the watch. During periods when little or no traffic is present in the VTS area, personnel may perform routine administrative work or engage in correspondence courses or other related matters within the VTC. However, at no time shall watchstanders allow themselves to be distracted, or permit conditions to develop, to the extent which would degrade their ability to fulfill the requirements of the watch. Watchstanders will remain in the VTC for the duration of the watch with the exception of brief periods for smoke, head, and meal breaks.

2.2.2 INABILITY TO STAND WATCH: If, for any reason or under any circumstances, a person assigned watch in the VTC feels that he is unable to stand the watch or feels that his ability to fulfill the requirements of the watch is in anyway impaired, he shall immediately notify the OOD or Operations Department Head and arrange for appropriate relief. Should the OOD consider any watchstander incapable of standing a proper watch for any reason he should contact the Operations Department Head and arrange for appropriate relief.

2.2.3 WATCH ROUTINE:

A. One watchstander shall be assigned to the radar console at all times. This watchstander shall monitor the radar, maintain contact identification and plots, and conduct communications with vessels as prescribed by this manual.

B. One watchstander shall be assigned as the communications watchstander. He shall be responsible for communication on VHF-FM, HF-SSB, and teletype. He shall also be cross-trained in some VTC requirements, and shall assist the radar watchstander as necessary. The radio watchstander may answer the radio for the traffic watchstander and acknowledge for the information received. Under no circumstances will the radio watchstander be permitted to pass information about traffic or information concerning clearance for the Valdez Narrows. The traffic watchstander is responsible for this watch and must pass his own information.

C. The OOD shall monitor the performance of the Radar/VTC watchstander and the communications watchstander. When necessary, he shall personally take charge of vessel communications.

2.2.4 VISITORS; Visitors requesting a tour of the VTC, will be considered on a case by case basis. Only the OOD, or a higher ranking official from MSO Valdez may authorize the tour. Should a tour be authorized, all classified material, FOUO messages, etc., will be covered and/or secured from view, prior to any visitors entering the VTC. No visitors are allowed in the VTC when the Parkhill Secure Voice radio is operating.

2.3 RELIEF PROCEDURES:

2.3.1 OFFICER OF THE DAY RELIEF; The OOD shall relieve the watch in accordance with the published watch list. The OOD shall not relieve the watch until he is thoroughly familiar with the existing situation in the VTC, and shall require the person being relieved to brief him concerning the events for the past watch and what may be expected on the next watch. The following additional requirements shall be completed by the OOD prior to relief:

2.3.1.A. Be familiar with any unusual activity entered in the station log since his/her last watch.

B. Read the file of Local Notice to Mariners and the Broadcast Notice to Mariners since his last watch.

C. Check the listing of vessels due to arrive and depart during the watch and ensure such a listing is posted and current.

D. Check all display, communications and other equipment for proper operation. If not operating properly, insure that the Commanding Officer has been notified, along with the appropriate personnel responsible for the repair of the equipment.

E. Check all status boards to insure that information is accurate and up-to-date.

F. Determine the state of the weather in Prince William Sound and in the Valdez Narrows, and the predicted weather for the next 24 hours.

G. Determine the status of the watch section in the VTC and the MSO, and the status of any orders that remain unexecuted.

H. Upon relief at 0900 advise the Commanding Officer of the condition of all equipment and significant scheduled movements or activities.

2.3.2 RADAR/VTC WATCHSTANDER: The oncoming watchstander shall relieve the watch between fifteen minutes prior to the hour, (ie. 0745, 1545, and 2345) and no later than on the hour. He shall be guided by the following procedure during his relief:

A. Positively identify all contacts held on radar which have been identified by the off going watchstander. The watchstander being relieved shall point out all contacts representing vessel traffic, indicating the vessels location, intentions, ETA's, and any other information concerning vessels in the system.

B. Determine the information that has been provided to vessels underway in the VTS area by the off going watchstander.

C. Check all plotting sheets and status boards to insure a complete knowledge of the existing situation.

D. Determine from the off going watchstander, the vessels with which communications have been established and the frequency used.

E. Read the latest information in the VTC passdown log and initial each entry.

2.3.3 COMMUNICATIONS WATCHSTANDER: The Communications watchstander shall relieve in accordance with the published watch list, division instructions, and standard operating procedures as contained in the Communications Manual (COMDTINST M2000.3).

2.3.4 NON-RELIEF OF THE WATCH: The oncoming OOD shall decline to relieve the watch if discrepancies of an unusual and not easily remedied nature exist or have existed in the conduct of the watch he is preparing to relieve. He shall decline to relieve if in his judgement such discrepancies may lead to a potentially dangerous situation with respect to Vessel Traffic within the VTS area. The Commanding Officer is to be notified immediately whenever the oncoming OOD declines to relieve the watch.

2.3.5 STANDBY WATCH SECTIONS: The assigned dayworkers are the standby watch sections. If needed the Operations Officer shall make such a determination as soon as practicable during the day. The Commanding Officer shall be advised each time the standby watch section is used. Watch rotation should be adjusted for TAD or normally scheduled leave. The standby watch is used for emergency leave or if the personnel on watch become incapacitated.

2.4 WATCHSTANDER QUALIFICATION:

2.4.1 INITIAL QUALIFICATION: Watchstanders shall be required to satisfactorily complete various tests and familiarization rides on vessels in the VTS area prior to being qualified as a watchstander. Subjects shall include, Rules of the Road, local geography, VTS Regulations, VTC Operation, local weather and currents, navigation practices, and shiphandling. Qualification and training will be administered in accordance with the Vessel Traffic Center Standing Orders.

2.4.2 REQUALIFICATION: Every twelve months, watchstanders shall be required to take a series of rides through the VTS area, for refamiliarization with navigational and operational aspects of vessels utilizing the VTS:

A. One deep draft ride through the Valdez Narrows.

B. One tug escort ride

2.4.3 TRAINEES: Trainees will be assigned to watch sections for indoctrination and training. However, the trainee shall not substitute for any required member of the duty section. The watchstander shall allow the trainee actual experience in equipment operation when the person has shown sufficient knowledge of the system. Trainees manning an operating position shall be closely supervised by a qualified watchstander at all times.

2.4.4 ADDITIONAL DUTIES: Watchstanders will be assigned various administrative duties, by the VTC Senior Watchstander subject to the approval of the Operations Officer.

CHAPTER 3

COMMUNICATIONS INSTRUCTIONS

3.1 GENERAL

3.1.1 COMMUNICATIONS DOCTRINE. Vessel Traffic Center communications shall be conducted in accordance with the Communications Manual (COMDTINST M2000.3) and the Communications Division Standing Orders.

3.1.2 COMMUNICATIONS SYSTEM. The VTS communications system provides VHF-FM radiotelephone coverage of the entire VTS area, using four sites: MSO Valdez, Potato Point, Cape Hinchinbrook, and Naked Island. High Power (50 WATTS) transceivers are available at each site. HF communications are maintained by the VTC through remote sites at Cape Hinchinbrook and Cape Yakataga. HF communications will routinely be handled by the radio watchstander.

3.1.3 TRANSCEIVER SELECTION. Each site can be operated on a main or standby transceiver, and on either high or low power. Select the site which proves most effective and reliable for communications with a vessel in a ticular area.

3.1.4 FREQUENCY PLAN: VTS communications equipment is crystallized for ; following frequencies:

TRANSCEIVER CHANNEL	FREQUENCY	USE
6	156.3 MHZ	Ship-to-Ship, Ship-to-Shore
13	156.65 MHZ	Bridge-to-Bridge, VTS Working
16	156.8 MHZ	Distress and Calling
21	157.05 MHZ	Coast Guard Working
22	157.1 MHZ	Coast Guard Liason
81	157.075 MHZ	Coast Guard Pollution Abatement

Two guard receivers at each site, separate from the transceiver, are crystallized for Channels 13 and 16. They provide a continuous guard on these frequencies regardless of selected primary frequencies. HF communications are maintained by the VTC. A radio scanner in the VTC provides spot monitoring capabilities for certain VHF-FM and UHF frequencies. (ie: terminal operations, pilots, and general communications throughout the port)

3.1.5 COMMUNICATIONS FILES. The RMIC will maintain the communication center file as required by the Communications Manual (COMDTINST M2000.3). Copies of messages relating to VTS operations will be maintained by the VTC watch.

A. The OOD shall initial all priority and above messages or messages for h MSO Valdez is an action addee, and shall initiate any further action or ow-up as necessary to ensure proper action is taken.

3.1.6 RADIOTELEPHONE LOG. The VTC will not be required to maintain a written radiotelephone log. All communications made by the VTC will be recorded by the 30 Channel recorder located in the VTC. These tapes will be retained for 30 days. Any tapes involving SAR or which must be retained for other record purposes will be identified and stored as appropriate.

SECTION 3.2 RADIOTELEPHONE COMMUNICATIONS PROCEDURES

3.2.1 COMMUNICATIONS DISCIPLINE. It is essential that information provided to vessels be transmitted in a logical, easy-to-understand manner. The information must not be subject to misinterpretation on the part of the pilot or master, and it is to this end that communications format and procedure have been standardized throughout this manual. As a general rule, information relating to vessel navigation safety is the only type authorized for VTS operations (other than EMERGENCY communications). Communications shall be conducted in a professional manner.

3.2.2 BREVITY PROCEDURES Channel 13 is the International Bridge-to-Bridge radiotelephone frequency. Use of this frequency by VTS is specifically provided for in statute and regulations. However, the primary intended use is for the exchange of navigational safety information between the persons in control of vessels.

A. Limit radiotelephone communications on Channel 13 between the VTC and vessels to the exchange of navigational safety information.

B. Reduce all transmission to essential information. Think of what you want to say and compose the message in your mind before keying the transmitter.

C. Communications between the VTC and other stationary shore stations are not permitted except for responding to a request for a communications check, and within other Commandant guidelines.

3.2.3 PHONETICS AND NUMBERS USAGE. Emphasize appropriate digits, letters and similar sounding words to aid in distinguishing between them, to insure that no misinterpretation is likely. Use the phonetic alphabet when appropriate to clarify individual letters or groups of letters. Pronounce numerals or groups of numerals as separate digits when necessary to insure clarity. Pronounce the numeral "0" as "ZERO"; use the word "DECIMAL" to indicate a decimal point in a group of numerals.

3.2.4 CALL SIGNS The call sign "VALDEZ TRAFFIC" shall be used to identify the VTC. When conducting communications with vessels, the vessel's name shall be used. Do not use the vessel's international call sign.

Example: "ALASKA STANDARD, This is VALDEZ TRAFFIC, Over"

3.2.5 CALLING PROCEDURES Conduct voice radio communications with vessels using the following call-up and reply procedures:

A. Initial call-up/reply to initial call-up:

Example: "ARCO JUNEAU, this is VALDEZ TRAFFIC, OVER"

B. Avoid unnecessarily frequent call-ups and replies.

3.2.6 PROCEDURE WORDS (Prowords). In addition to the phraseology prescribed throughout this manual, use the following prowords:

A. OVER - My transmission is ended and I am awaiting a response.
B. OUT - My transmission is ended; no response is required.
C. ROGER - I receipt for your message.
D. WAIT - I must delay temporarily before replying.
E. WAIT, OUT - I must delay for an indefinite period before replying.
F. SAY AGAIN - Repeat your message (or portion indicated).
G. I SAY AGAIN - I repeat my message (or portion indicated in request) usually in response to "SAY AGAIN".
H. CORRECT - (instead of "affirmative").
I. WRONG - (instead of "negative")
J. RADIO CHECK (instead of "how do you read me", etc.)
K. NOTHING HEARD - I have received no reply to my call.

3.2.7 "READ BACK" PROCEDURE. To insure accuracy of information from vessels, a read-back of a report received, in the same words and format, may be used to clarify any discrepancies due to poor communications or obviously wrong information.

Example: "VALDEZ TRAFFIC, this is ARCO JUNEAU departing Knowles Head anchorage for sea, over"
"This is VALDEZ TRAFFIC, roger, ARCO JUNEAU departing Knowles head anchorage for sea, out"

3.2.8 REPORTING RADAR-DERIVED INFORMATION. Report radar-derived information in the following manner:

A. Report radar-observed traffic, identified or unidentified, to pilots of vessels with the specific indication that it is radar-observed by using the words "THE RADAR SHOWS" proceeding the information. Insert the words "THE RADAR SHOWS" frequently during lengthy messages.

Example: "ARCO FAIRBANKS, this is VALDEZ TRAFFIC, the radar shows Coast Guard Cutter Sweetbrier passing Rocky Point bound for Cordova, over"

B. Traffic which is not radar-observed may only be reported as tlined in Paragraph 3.2.9

3.2.8.C. Insure that no transmissions are made concerning the performance of VTS equipment, particularly the radar system. If the radar equipment is not operating normally, notify the OOD and responsible maintenance personnel.

3.2.9 REPORTING COMMUNICATIONS SYSTEM-DERIVED INFORMATION. Report communications system derived information concerning vessel traffic conditions with the specific indication that such information is derived from this source. Identify the source of this information using the word "REPORTED" immediately preceding reported positions. Insert the word "REPORTED" frequently during lengthy messages to insure that the pilot is aware that the information is derived from this source. In addition, include the time for which the reported position is valid as an element of the report; normally, this will be the time of receipt of the reported position from the pilot providing the information.

Example: "...EXXON BENICIA reported passing Naked Island abeam at time 1246, southbound for Hinchinbrook Entrance, Over"

3.2.10 TRAFFIC INFORMATION FORMAT. Use the following message format when describing vessel traffic conditions as prescribed by this chapter:

* Call-up
* Source of information - "the radar shows... "or reported"
* Description of traffic
* Position of traffic
* Direction of traffic movement
* Speed of traffic
* Route/destination of traffic

3.2.11 DESCRIPTION OF TRAFFIC. Describe traffic to pilots using the following terminology as appropriate

A. IDENTIFIED TRAFFIC. Describe identified traffic by using the vessel's name (and type of vessel; if known).

Example: "...radar shows the tug MARS passing Entrance Island inbound, over".

B. UNIDENTIFIED TRAFFIC Describe unidentified traffic in the following terms:

(1) Use the word "contact" (instead of "vessel" or "traffic", etc.) to avoid confusion with identified traffic.
Phraseology: "UNIDENTIFIED CONTACT"

(2) Describe the relative size of unidentified contacts.
Phraseology: "SMALL" "MEDIUM" "LARGE"

(3) If appropriate, describe the relative number of contacts composing the unidentified traffic.

Phraseology: "MANY" "SEVERAL" "FEW"

(Note: Relative number of contacts is generally used when describing concentrations of small recreational-type craft.)

Example: "this is VALDEZ TRAFFIC, the radar shows many small contacts one mile south of Potato Point over."

3.2.12 POSITION OF TRAFFIC. Describe position of traffic in the following terms;

A. Direction (in compass points) and distance (in miles and fractions of miles) from points of reference that are familiar to the pilot and which can be identified on the radar display.

Example: "One and one-half miles north of Johnstone Point"

B. Direction (in compass points) and distance (in miles and fractions of miles from the vessel of the pilot or master being provided the information.

Example: "one mile west of you"

3.2.13 DIRECTION OF MOVEMENT OF TRAFFIC. Describe direction of movement of traffic in terms of compass points, or, if no confusion will result, in terms of movement to or from sea.

Example: "The radar shows Arco Juneau passing Reef Island, northbound, over"
-or- "the radar shows Golden Bear west of Rocky Point Light one mile, inbound, over"

(Note: The description of direction of movement in terms of "INBOUND" and "OUTBOUND" should be restricted to traffic in the traffic lanes.)

3.2.14 SPEED OF TRAFFIC. Describe speed of traffic in relative terms only. Do not, attempt to describe speed of traffic in specific terms of knots or miles per hour. In general, use description of speed of traffic to aid in describing unidentified traffic.

Phraseology: "SLOW MOVING" "FAST MOVING" "HIGH SPEED"

Example: "...the radar shows a large unidentified contact one mile west of Glacier Island, north bound, at slow speed, over"

(NOTE: Avoid using description of speed of traffic in describing vessels with which you have already established communications. The pilot may not agree with your estimate of his vessel's speed, particularly if you categorized his speed as "high speed" under restricted visibility conditions.)

3.2.15 ROUTE/DESTINATION OF TRAFFIC. Describe the destination and/or route of traffic in logical, easy-to-understand terms which will most accurately identify vessel's intended routes. Usually, description of a vessel's destination will infer that it must follow the route that is most commonly used in transiting from its point of entry to its destination. This alone will suffice if no confusion will result. However, should there be a reasonable uncertainty that use of destination alone will not accurately identify the vessel's route, request from the pilot of the vessel such additional amplifying information as will permit you to accurately describe its route.

Example: "...The radar shows the TUG PATHFINDER east of Glacier Island, outbound, to Whittier, he will remain in traffic lanes southbound until south of Glacier Island, then turn west ,over."

3.2.16 NEGATIVE TRAFFIC. If there is no traffic shown on the radar displays that is meaningful to a vessel DO NOT inform the pilot of the vessel of this fact unless he specifically requests traffic information:

A. If traffic information is not specifically requested, terminate your response to a position report after acknowledging the report.

B. If a pilot specifically requests traffic information and there is no traffic shown on the radar display, inform him of this condition after carefully re-checking the radar display to be sure that this is in fact the case.

Example: "...the radar shows negative traffic for your route, over"

3.2.17 VTC DIRECTIONS. When it is necessary to give specific orders to a vessel regarding its movement, insure that the terminology clearly indicates that the orders are mandatory.

Examples: "ARCO PRUDHOE BAY, THIS IS VALDEZ TRAFFIC, you are DIRECTED to reduce speed to pass Bligh Reef no earlier than 0700 this date, over".

" EXXON NEW ORLEANS, THIS IS VALDEZ TRAFFIC, the Narrows are closed to navigation at this time. You are DIRECTED to proceed to anchor at Knowles Head anchorage, over."

"TRINTON, THIS IS VALDEZ TRAFFIC, our radar shows you 100 yards to the left of the traffic lane, inside the separation zone. You are DIRECTED to take corrective action, over."

VTC watchstanders shall not argue with or try to "convince" a master that the orders are necessary. The reason for them can be given, such as "due to outbound tanker in the Narrows" or "high winds in the Narrows", etc. However, if the master disagrees, no further attempts should be made to justify the action taken, and the OOD shall be contacted.

3.2.18 COMMUNICATIONS WITH VESSELS. Communications with vessels in the one-way area, in particular between Rocky Point and Entrance Island shall be confined to essential navigational information only.

CHAPTER 4

VESSEL TRAFFIC SERVICE OPERATION

Section 4.1 CONCEPT OF OPERATIONS.

4.1.1 FUNCTION. The primary responsibility for the safe navigation of a vessel rests with the master. Our mission is to provide navigational and collision avoidance information that the master can then use to navigate his own vessel. The master's principal concern, however, is completing his mission in the most rapid and practicable manner, and he may not evaluate the potential consequences of his actions from the same safety standards with which the Coast Guard is concerned. The VTC should recognize potential trouble spots and recommend against any practice which could result in danger of collision or grounding. In certain circumstances, recommendations will not be sufficient, and it will be necessary for the VTC to direct or prohibit vessel movement.

4.1.2 APPLICATION. The VTS regulations consist of both mandatory and voluntary application. "Radio Act Vessels", those vessels subject to the Vessel Bridge to Bridge Radiotelephone Regulations, must comply with all VTS regulations. Radio Act vessels are:

a. Each vessel of 300 or more gross tons that is propelled by :hinery.

b. Each vessel of 100 or more gross tons that is carrying one are more passengers for hire.

c. Each commercial vessel of 26 feet or over in length engaged in towing another vessel astern, alongside, or by pushing ahead, except commercial fishing vessels towing skiffs or workboats.

d. Each dredge and floating plant.

For other vessels, participation is voluntary. However, all vessels are required to comply with certain rules. The VTC has authority to issue directions to any vessel in the VTS area during hazardous circumstances. All vessels using or crossing the TSS, whether radio act vessels or not, must comply with the rules for operation in the TSS [33 CFR 161.348 through 161.354 and 161.356(b) and (c)]

4.2 IDENTIFICATION

4.2.1 GENERAL. The first step in providing meaningful information and/or direction to vessels in the VTS area is identifying the vessels in the system. The VTC has various sources of information which can be used in this identification: Vessel Movement Reports, company schedules, participating vessel observations, radar contacts, visual observation, etc.

4.2.2 VESSEL MOVEMENT REPORTS. In accordance with Federal Regulations (33 CFR 124.10), vessels are required to report their intention to arrive in a particular port 24 hours in advance. The specific regulations for the Prince William Sound VTS established the additional reporting requirements described in section 161.334 through 161.342. The VTC watchstander receiving the report will record the information in the Vessel Arrival Log provided by the Marine Safety Office. This information will be posted upon receipt on the ETA section of the traffic display board.

4.2.3. SCHEDULES. Schedules for ferries, charter boats and other vessels which arrive and depart on a scheduled basis will be maintained in the VTC.

4.2.4 VESSEL OBSERVATIONS. Vessels transiting the area are in a position to provide information on the positions of non-participating vessels and also to report activities (such as fishing concentrations, etc.) which may not be known to the VTC. In the area of radar coverage, efforts should be made to determine the identity of radar contacts which represent non-participating vessels, by questioning those vessels who are in the vicinity and with whom we have communications. In the course of routine operations; all vessels should be encouraged to report unusual activities and any transits of the area which are obviously unknown to the VTC.

4.2.5 RADAR CONTACTS. Participating vessels within the area of radar coverage shall be identified. The reported position of a vessel entering the radar coverage area shall be correlated with the contact observed on radar. Ensure that position, course, and speed are reasonably in correlation, taking into consideration such factors as other vessels in the area, set and drift, etc. Any significant inconsistencies should be resolved using all means available. Vessels can and should be required to provide additional position reports when identification is uncertain due to conflicting position reports, merging contacts, precipitation, sea clutter, or for any other reason.

4.2.6 PLOTTING REQUIREMENTS Participating vessels shall be plotted with the Raytheon Data Logger from a position one nautical mile prior to entering the Valdez Narrows and until the vessel has departed the One Way Zone. Normally the interval of marks shall be every three minutes within the Narrows unless conditions (high winds, poor visibility, excessive traffic etc.) dictate a need for an increased number of marks. Plotting intervals outside of the Valdez Narrows shall be six minutes. Slow moving vessels may be plotted at ten minute intervals when necessary.

A. Traffic watchstanders are to insure that all the information requested on the Vessel Data Sheets and Data Logger Sheets are complete.

B. The Middle Rock bearing and range should be checked at least once per 24-hr. period, and recorded in the unit log by the mid-watch. The standard is bearing 041.0 degrees true, range 1.97 nautical miles from the Potato Point radar site, using the three mile range scale. Any errors should be reported to the OOD and the duty ET. The discrepancy shall be noted in the unit log and the VTC Pass-Down Log for the relieving watchstanders.

4.2.6.C. The VTC Watchstander shall determine the speed of tank vessels prior to their entry into the One Way Traffic Zone. If it appears that the tanker is not slowing sufficiently to enter the one way zone at less than the maximum speed allowed, advise him of this. If the tanker's speed in the Narrows is in excess of the speed limit, advise the vessel, and direct it to take corrective action.

D. With the addition of the Raytheon Data Logger, watchstanders are now available to devote additional time to vessel communications, telephone calls, and other matters. This does not release the watchstander from the responsibility of ensuring the vessel is in compliance with applicable speed restrictions. During the vessels transit of the Narrows the watchstander shall make at least one manual speed check to ensure the printout is accurate.

E. Operating instructions for the Raytheon Data Logger shall be filed in the VTC file draw.

4.3 TRAFFIC SEPARATION.

4.3.1 GENERAL INFORMATION. The Traffic Separation Scheme (TSS) consists of two parallel one-way traffic lanes with a separation zone between them. It extends from Hinchinbrook Entrance to the vicinity of Rocky Point in Valdez Arm, and is indicated on the published charts of the area (16700, 16708, 16709). All "Radio Act Vessels" must utilize the TSS when enroute to or from Valdez via Hinchinbrook Entrance or navigating any portion of that route. Those vessels, and any others which choose to voluntarily utilize the traffic lanes, must comply with all TSS rules in section 161.348 through 161.356 of 33 CFR.

4.3.2 OPERATING OBJECTIVES. The principal objective of the TSS is to prevent collisions. The rules themselves are sufficient to control vessel movement within the traffic lanes during routine transits. Active control should be kept to a minimum unless deviations or potential conflicts are observed:

4.3.3 TRAFFIC LANE DISCIPLINE.

a. The intentions of a vessel, moving or intending to move within the VTS area shall be assumed to be in compliance with the TSS rules, unless the vessel specifically requests a deviation.

b. Due to the types of vessel traffic which are required to use the TSS, vessels without a radio, and small vessels with radios, are encouraged to remain clear of the TSS whenever possible. During periods of inclement weather small craft may not be readily visible or easily detected on radar. Small vessels should not impede the passage of radio act vessels in the TSS.

c. Regardless of the TSS rules, vessels must comply with all Federal regulations, such as the Rules of the Road, Federal Boating Safety Act, and the Bridge-to-Bridge Radiotelephone Act. Of particular significance is RULE 9(c) and 10(i) of the Navigation Rules for International Waters, which provides in part that a vessel engaged in fishing does not have the right to obstruct a fairway used by other vessels. (i.e. with nets or by anchoring) The traffic lanes are "Fairways" within the meaning of this rule.

4.3.3.d. Vessels will not normally be given authorization to deviate from the TSS on a continuing basis. Such authorization must be approved by Commander, Seventeenth Coast Guard District.

e. The VTC may, upon request, issue an authorization to deviate from the TSS rules on a "one-time" basis. Except for minor deviations not involving other traffic, the VTC shall refer all such requests to the Commanding Officer as per his standing orders. Deviations shall not be authorized for major vessel traffic except in unusual circumstances, and shall not be authorized strictly for convenience of the vessel (ie. saving time, fuel economy, etc.) at any time.

f. In an emergency, any vessel may deviate from any VTS rule to the extent necessary to avoid endangering persons, property, or the environment. The master or pilot must report the deviation to the VTC as soon as possible. An example might be a tug and tow in heavy weather, where in the interest of safety, the tug would want to run in close to a lee.

4.3.4 CONFLICTING TRAFFIC. When it appears that, due to vessels crossing, entering, or departing the traffic lanes, there exists a potential conflict of traffic, the VTC shall take necessary action to inform the vessels involved of the conflict.

a. Normally, the Rules of the Road and other Federal regulations will be sufficient for vessels crossing or overtaking to arrange their own safe passage. The VTC shall monitor the communications of such vessels to insure suitable arrangements are made between the vessels involved. Not withstanding this, the VTC shall advise vessels in the system of positions of other vessels which are or will be in close proximity to them during their voyage, and the nature of any potential conflict.

b. In cases of vessel congestion, it may be preferable for vessels to slow down or wait prior to entering an area of congestion where numerous conflicts may arise. The VTC shall direct such action when necessary well before danger of collision exists, keeping in mind that the primary desire is to facilitate, not hinder, the flow of traffic.

c. Speed adjustments to avoid conflicts should be given in terms of a specific time prior to which the vessel should not arrive at a point of reference, never in terms of a specific speed to be made good over ground or through the water. (ie. "adjust your speed to arrive off Rocky Point no earlier than 2200").

d. Changes should be directed or authorized by the VTC only after consideration is given to the vessel's maneuverability, wind and currents, vessel draft, and the effect of the change on other traffic in the area.

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4.3.5. VTC DIRECTIONS. It is imperative that orders from the VTC be given in a simple, direct manner, in sufficient time to ensure receipt and compliance. Since most orders of this nature will concern Valdez Narrows traffic, they should be given to the vessel after the pilot goes aboard. They should be incorporated into the exchange of information, when giving clearance to enter the Valdez Narrows One-way Traffic Area (see 161.370).

a. If a vessel is determined to be in violation of any regulation or order, the master or pilot shall be promptly and politely advised of the situation and if corrective action is required. The incident shall be logged in the station log. The OOD, the MSO Duty Inspector, and the Commanding Officer shall be advised in accordance with current standing orders.

b. The following generally apply to violation situations.

(1) OPERATIONAL OR SAFETY VIOLATIONS. Advise the master or pilot of the violation which has occurred. Request he/she take specific corrective action and advise the VTC of what these actions were. Log the incident in the station log.

(2) TECHNICAL OR PROCEDURAL VIOLATIONS. Advise the master of the vessel the nature of the violation and request compliance. Log the incident in the station log for future reference. If the violation does not impair the safety of the vessel, its cargo, crew or the environment do not pursue the matter further by radio. The follow-up should be done by letter. The OOD shall be advised and will pass the information to the MSO Duty Inspector.

(3) RADAR POSITIONING VIOLATIONS. Generally if a vessel is not in the proper traffic lane the procedure cited in paragraph (a) above should be utilized.

(4) OPTIMUM TRACK LINE VIOLATIONS. Vessels normally will be expected to remain within 150 yards either side of the Optimum Track Line between Entrance Point Light and Entrance Island. Should the vessel exceed the 150 yard limit, the pilot or master shall be notified of the occurrence, and then instructed to advise the VTC of what corrective action will be taken. Should the vessels distance from the track line continue to increase, or if no corrective actions are observed by the VTC, the watchstander shall update the vessel on his observation and DIRECT them to take corrective action immediately. Certain weather conditions may preclude a ship from complying with the Optimum Track Line. This should be kept in mind and such conditions considered before directing corrective action. It may be necessary to inform the master or pilot that failure to follow VTC directions may result in penalty action (33CFR 161.307). Under NO CIRCUMSTANCES will the master or pilot be directed to comply with a specific HELM ORDER or SPEED ORDER from the VTC. The master or pilot is directly responsible for the safety of his vessel and crew. The VTC will not attempt to CONN the vessel at any time.

(a) In the event a master or pilot becomes uncooperative or does not properly respond to guidance or orders from the VTC, the incident should be immediately reported to the OOD, and logged in the station log. The OOD shall notify the IO there is a violation of VTC orders.

4.3.5.4(b) Remember the objective of the VTS is to ensure the safe transit of the system by all vessels.

4.4 SPECIAL AREAS

4.4.1 VTS CONTROL AREAS. The VTS control areas are described in the VTS operating manual following section 161.387 of 33 CFR. Basically they cover the Narrows, Valdez Arm, and Hinchinbrook Entrance. The instructions in paragraphs 4.3.4 and 4.3.5 apply.

a. At certain times of year, vessel wakes may present a problem to fisherman in Valdez Arm and the Narrows. It may be necessary for the VTC to regulate vessel speeds through these areas. Since wakes depend more upon the underwater structure of the vessel than the speed, no set guidelines can be established.

b. Reduced visibility, inclement weather and other circumstances may require operating restrictions within the control areas which are not specifically discussed in this manual. The VTC should retain sufficient flexibility in vessel control to adapt to rapidly changing circumstances and unforeseen situations.

c. During periods of reduced visibility or other adverse weather, vessel congestion, or other hazardous conditions, radio act vessels may be required to make position reports every 15 minutes.

4.4.2 VALDEZ NARROWS ONE-WAY TRAFFIC AREA. Valdez Narrows one-way traffic area shall be restricted to one-way traffic whenever a tank vessel over 20,000 DWT is navigating therein. Other radio act vessels shall not enter the one-way traffic area at these times, unless: (1) The other vessel is proceeding in the same direction as the tank vessel, (2) Specific permission to enter the one-way traffic area is obtained from the VTC, (3) the vessel maintains such separation from the tank vessel as is specified by the VTC.

a. Vessels other than radio act vessels are not specifically required to comply with one-way traffic rules. However, conditions (low visibility, adverse weather, etc.) may warrant the restriction of voluntary participants (those who can be contacted on VHF-FM).

b. The minimum acceptable separation for radio act vessels proceeding in the same direction shall be a minimum of 2000 yards. Greater separation may be requested at the discretion of the VTC.

c. The VTC shall clear vessels to enter Valdez Narrows when the vessel is at Rocky Point (for northbound passage), or when the vessel notifies the VTC that they are underway (southbound passage).

d. Once a vessel has passed through the Narrows and is maneuvering near the pier, there is little assistance the VTC can offer. However, watchstanders shall be alert for possible problems (severe weather, traffic, etc.) which may interfere with mooring operations. If necessary, it may be desirable for the vessel to anchor or heave to prior to passage through the Narrows until the problem has cleared up.

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4.4.2.e. CONFLICTS IN THE ONE-WAY TRAFFIC AREA: Two tankers proceeding in opposite directions shall not be allowed in the one-way traffic area at the same time. However, the OOD may permit a tanker and another participant, other than a tanker, to be in the one-way area at the same time (on a case-by-case basis). Tankers proceeding in the same direction may be in the one-way traffic area at the same time, but one shall not be permitted to overtake the other, and shall maintain a separation of at least 2000 yards.

(1) When a conflict develops concerning the one-way traffic area, it should be resolved in a manner which will cause the least inconvenience to the vessels involved. Factors to be considered include, but are not limited to: vessel speeds, ETAs at the one-way area, speed limits imposed, weather, type of vessels involved, vessel deficiencies or malfunctions, and other hazardous conditions. Actions which may be taken to avoid conflicts include: delaying the departure of a vessel or instructing a vessel not to arrive at the one-way zone before a certain time. When a conflict at the Narrows exists, the OOD will make the decision on which vessel receives their clearance first. Decisions which may adversely impact on availability of the pilot should be "cleared" with the duty pilot or pilot boat to avoid issuing an order which cannot be complied with.

(2) To avoid undue inconvenience, vessels shall be advised as to whether or not they will be cleared to transit the narrows as soon as possible after the decision is made. The decision as to how a conflict will be resolved should be made as early as possible, once all the relevant information is available.

(3) Insure that instructions given to vessels to avoid conflicts (or concerning corrective actions to maintain track, etc) are indicated on the data sheet with the time. If complaints are made, we must be able to reconstruct our actions.

4.5 VESSEL RESTRICTIONS.

4.5.1 ALL VESSELS. All vessels must comply with certain rules contained in 161.354 and 161.356(b) and (c) of the VTS Regulations. Vessels of 1600 or more gross tons must comply with 33 CFR 164 concerning navigation safety requirements.

4.5.2 RADIO ACT VESSELS. The VTC shall restrict radio act vessels from entering the Narrows if:

(1) The vessel is unable to communicate with the VTC.

(2) The vessel is experiencing any condition which may impair its navigation or restrict its maneuverability. Specific permission may be given for such a vessel to enter the Narrows with approval of the Commanding Officer, MSO Valdez, and after specific requirements, ie. tugs standing by, calm weather, etc. have been met.

(3) The radar on a vessel equipped with radar is not in operation or manned.

4.5.3 SPECIAL REQUIREMENTS FOR TANK VESSELS.

a. Each tank vessel 20,000 DWT or more operating in the VTS must:

(1) Have two separate marine radars systems for surface navigation, one of which is operating and the other either operating or capable of immediate operation;

(2) Have an operating Loran-C receiver;

(3) Have an operating rate of turn indicator; and

(4) Have at least two radiotelephones capable of operating on the designated VTS frequency, one of which is capable of battery operation.

b. If while in the VTS area, the master of a tank vessel of 20,000 DWT or more is unable to comply with paragraph (a), he shall immediately notify the VTC.

c. Each tank vessel of 20,000 DWT or more must use tug assistance when docking and undocking.

4.5.4 VALDEZ NARROWS RESTRICTIONS.

A. Laden tank vessels of 20,000 or more DWT shall not exceed a speed of 6 knots between Middle Rock and Potato Point.

B. Unladen tank vessels of 20,000 or more DWT shall not exceed a speed of 12 knots in the Valdez Narrows one-way traffic area. (The term "unladen" refers to those tankers which are in ballast or with empty tanks. Some tankers arrive at Valdez with a portion of their previous trips cargo still in their tanks, or with a large amount of petroleum product residue. If such amount exceeds 10 percent of the dead weight tonnage of the vessel, it will be considered "laden" for the purpose of imposing speed limits.)

C. No outbound (or inbound laden) tank vessels of 20,000 or more DWT may transit the Valdez Narrows without a tug escort present in the vicinity.

D. Tank vessels may not be permitted to transit Valdez Narrows if the average hourly wind speed at Middle Rock exceeds 40 knots, or gusts in excess of 55 knots are observed. Whether a particular vessel shall be permitted to transit will be decided on a case-by-case basis by the OOD.

E. The requirement to conform to the "Optimum Track Line" will be imposed on all tank vessels.

4.5.5 ADVERSE WEATHER Under adverse weather conditions, only one participating vessel may be allowed to transit Hinchinbrook Control area at a time.

4.6 VESSEL CASUALTY PROCEDURES.

a. If a vessel experiences a casualty in the VTS area, the Traffic Watchstander shall determine the extent to which it may endanger other vessels, marine facilities, or the environment. The Radio Watchstander shall take such action as is necessary to minimize loss of life, property and damage to the environment, and notify the OOD as soon as possible. Actions may include:

1. Notifying other vessels in the area.

2. Notifying the Alyeska Marine Terminal Operations Office on the "Hot Line" or direct line.

3. Assisting the vessel in contacting tug assistance

4. Alerting RCC Juneau of a potential SAR case.

5. Directing available resources (including commercial and merchant vessels) to the scene of distress.

6. Directing traffic away from a vessel unable to maneuver, or in a condition dangerous to surrounding vessels.

b. The Commanding Officer shall be notified of <u>all casualties immediately!</u>

c. For tank vessels over 20,000 DWT which experience a maneuvering casualty in the Narrows:

1. Notify the OOD.

2. Assist the OOD in the following as necessary:

a. Notify the Commanding Officer.

b. Notify Alyeska Marine Terminal Operation and OCC of the difficulty and the possibility of an oil spill.

c. Recall the duty boat crew and get it underway to assist as needed.

d. Close the Narrows to all traffic until the situation is resolved.

e. Consider utilizing the duty boat and any Coast Guard Auxiliary vessels in the vicinity to clear the area of small vessels not normally under VTS control.

f. Arrange for additional personnel to augment the watch as necessary.

4.7 TRAFFIC INFORMATION SERVICES.

4.7.1 GENERAL INFORMATION. Providing information about traffic conditions to vessels transiting the VTS area is a basic service of the traffic center. Information concerning movement of vessels (identity, route, etc.) is obtained by the VTC from the persons in control of the vessels by radiotelephone and from other sources.

4.7.2 TRAFFIC INFORMATION COMMUNICATIONS. Information shall be provided in accordance with the radiotelephone procedures in section 3.2 of this manual.

a. Vessels entering the system shall be provided all information available which is considered helpful to the vessel concerned. This will normally include: Any adverse weather conditions expected along the track; other vessels in the system which may cross, meet, overtake, or will be overtaken by the vessel; hazards to navigation; aids to navigation discrepancies; and other significant information.

b. The VTC shall always reply to specific requests for information.

c. Maximum utilization should be made of the "broadcast effect". If it can be reasonably assumed that a vessel in the system has monitored the "broadcast" report of another vessel. (Fishing vessels will not routinely monitor Channel 13.)

d. Watchstanders should avoid giving information which is based on supposition or educated guesses. All information should be factual, clear and concise.

e. As information changes, vessels already within the system should be provided with the updated information when it is significant to their transit.

4.7.3 FISHERIES ACTIVITY. The majority of fishing vessels are not required to participate in the VTS. When fishing activity is expected or has previously been reported in the VTS area, the VTC shall actively solicit reports on fishing vessels when the vessel's track will go through the fishing area. Information received shall be confirmed, if possible with other sources and reports, and revised information provided to vessels as necessary.

4.7.4 NAVIGATIONAL ASSISTANCE. The capabilities of the VTC radar should be made available to the mariner who is having navigational difficulty. However, a vessel in need of navigational assistance should seldom be considered capable of proceeding any further than necessary. (Radio Act vessels are regulated by specific regulations of the VTS in this regard. Other vessels may not be subject to any particular requirements.) A vessel without radar in conditions of severely limited visibility, would almost always be better off at anchor than underway with or without VTS assistance. Also, the VTC should be extremely careful to ensure that information provided is factual navigational data for use by the master or pilot. The VTC does not have the advantage of immediate "on scene" information which the master or pilot has, and will not attempt to "conn" the vessel. It should be remembered that most small vessels have only a magnetic compass.

4.7.4 (cont.) In any case, watchstanders providing information should be careful to specify whether the bearings are true or magnetic.

4.8 RECREATIONAL RACES, REGATTAS, AND MARINE EVENTS.

4.8.1 GENERAL. Concentrations of small craft associated with various marine events are of great concern to pilots and masters of commercial vessels. The recreational boater is just as concerned about the dangers represented by large commercial vessels, since in a conflict the small boat operator is subject to the greatest danger. Mutual knowledge in advance of planned movements greatly reduces the possibility of conflict.

4.8.2 MARINE EVENT FILE. Upon notification that a marine event will take place in the Prince William Sound Area, the following procedure will be followed:

a. The marine event name will be entered on each applicable date in the VTC calendar.

b. The correspondence concerning the event will be stapled together and placed in the marine event file, in chronological order by initial date of event. Information received via telephone shall be documented in writing and placed in the file.

c. The relieving OOD shall review this in accordance with the ›visions of section 2.3 of this manual.

4.8.3 COMMUNICATIONS. Every effort will be made to encourage race/regatta committee boats and other participants to monitor Channel 13 VHF-FM during these events. VTC watchstanders shall provide information concerning vessel traffic movements to the participants, and shall insure that major vessels are aware of the event. Major vessel traffic should be provided the following information:

a. Location, route.

b. Number and type of recreational craft.

c. Starting time.

d. Estimated point of encounter with recreational craft concentration.

e. Estimated time that craft will clear route of vessel.

4.9 WEATHER INFORMATION.

4.9.1 GENERAL. The National Weather Service Office, located in the MSO Valdez Building, receives continious weather information from remote monitors at Middleton Island, and Potato Point. They also receive hourly facsimile weather from Anchorage and Maryland covering the entire country. Regular ---ather reports are sent out every hour, and special reports every 20 minutes.

4.9.2 VTC WEATHER COLLECTION. Weather information shall be obtained from vessels in the traffic system and from National Weather Service sources. This information will be recorded in the weather logs and shall be made available to the National Weather Service Office upon receipt. At each of the following locations, (inbound) 1 hour outside of Cape Hinchinbrook, (outbound) Schooner Rock, abeam Naked Island, and abeam Rocky Point, weather will be requested from every participating vessel, both inbound and outbound. The NWS at Offit AFB in Nebraska provides advisories daily at 1130Z and 2230Z over the Coast Guard teletype circuits for broadcast to requesting vessels. The VTC may also obtain updated weather information from the NWS in Valdez upon request.

a. During periods of reduced visibility and or severe weather, weather reports shall be requested from every participating vessel, regardless of vessel location(except as provided below). However care should be exercised to avoid interfering with communications or the navigation of a vessel during critical operations, such as maneuvering near piers, or transiting Valdez Narrows.

b. Reports will not normally be requested from two or more vessels which are in close proximity, or who pass the same reporting point within minutes of each other, unless the weather received from one is of doubtful validity.

4.9.3 VTC WEATHER DISSEMINATION.

a. The radio watchstander will broadcast regular weather reports on the following frequencies:

Channel 22 VHF-FM (Channel 16 Call-up)	2670 KHZ (2182 advisories and warnings only)
1315Z	1333Z
2115Z	2133Z
0115Z	0133Z
0715Z	0733Z

b. The VTC shall provide weather information at any time to participating vessels upon request. Additionally, during periods of adverse weather or reduced visibility, the VTC shall provide vessels entering the system the expected weather to be encountered along their track. Any changes during transit should be provided to the vessels as they occur.

4.9.4 ICE REPORTS:

a. Ice conditions change rapidly and there is a continuing need to have up-to-the-minute information. Ice reports should be requested from any vessel transiting the area where ice conditions may exist. Ice reports should be received from any vessel if the latest ice report is over 2 hours old.

b. Ice reports shall be passed to vessels upon request and when an inbound vessel reports at Naked Island, and when an outbound vessel reports underway from Valdez.

4.9.4.c. All ice reports will be logged on the Vessel Data Sheets. The report should list the area congested by ice, any concentrations and approximate size of the ice reported. Should any vessel have to alter course, speed, or depart from the normal traffic routes, it also should be noted in the report. Advise the OOD when a vessel deviates due to ice in the lanes.

4.10 REPORT OF VIOLATIONS.

4.10.1 GENERAL. All violations of federal regulations shall be reported: FCC Communications, Rules of the Road, Prince William Sound VTS, Bridge to Bridge Radiotelephone Act, and other applicable regulations.

4.10.2 RECORD OF VIOLATION.

A. MINOR: A minor violation is where a verbal warning is sufficient to correct the problem. Minor violations committed by vessels in the VTS area shall be noted on the vessels data sheet. The traffic watchstander will then notify the Officer Of The Day of the incident. An example of a minor violation would be one vessel following another vessel less than the recommended 2000 yards in the Narrows. The OOD will then notify the Commanding Officer if necessary.

B. SERIOUS VIOLATIONS: Violations which create situations that seriously degrade the safety of vessels transiting the VTS area shall be immediately reported to the OOD, who will notify the Commanding Officer. The VTC shall advise the offending vessel of the violation, and shall direct appropriate action to correct the situation. The vessel will normally be boarded (if arriving) by Marine Safety Department personnel. Form CG-2636 (report of violation) and supporting evidence will be used to document serious offenses, in accordance with Appendix II to Annex J, CCGD17 1-FY.
It may be desirable to direct an outbound vessel to anchorage, for boarding, when a violation has occurred. This would be considered by the OOD and Commanding Officer in determining whether this action will be necessary. The traffic watchstander will log all information pertaining to the violation in the unit log.

4.11 LEGAL CONSIDERATIONS The Coast Guard derives authority to perform its operations from various federal statutes. Once a task is undertaken, it is the responsibility of the Coast Guard to do it properly. In the past the Coast Guard has been held liable for negligent conduct involving buoy positioning and SAR. The Federal Tort Claims Act, and the Admiralty Act, could provide a suit against the Coast Guard for negligence in operating a VTS. A VTC watchstander could be held personally liable for actions that he or she took which were without authority or beyond the scope of his or her authority. Watchstanders should insure that their actions are in accordance with their responsibilities and authority.

a. Advisories are made to vessels concerning weather conditions, movement of other vessels, status of aids to navigation, etc. Reasonable efforts should be made to ensure the information passed is correct. If conflicting information is received, the conflict should be resolved before the information is passed; or the reliability of the information should be indicated in the advisory.

4.11.b. Watchstanders should not recommend "courses to steer" except in a legitimate emergency, and this would come from the OOD. We do not have the benefit of resources available to the pilot/master: depthfinder, proper lookout, actual weather conditions, set, drift, access to vessel maneuvering characteristics, and experience in handling the particular type of vessel.

4.12 EMERGENCIES. Checklists have been developed for various emergency situations that may arise. They are contained as enclosures and all watchstanders shall review these checklists and insure they are familiar with their use.

CHAPTER 5

SYSTEM EQUIPMENT

5.1 GENERAL: Operation of system equipment is covered in several publications provided by contractors:

A. ESI technical/operating instructions for Valdez vessel traffic center.

B. RAYTHEON 'OPERATORS HANDBOOK' for the VTC CONSOLE.

C. RAYTHEON 'FAIRWAYS OPERATION AND INSTALLATION' manual.

5.2 SPECIFIC OPERATING PROCEDURES:

A. Communications console equipment: Chapter 2 ESI manual.

B. Fault Sense Panel: Chapter 3, ESI manual

C. Magnasync Tape Recorder: Instructions in VTC file drawer.

D. Radar VTS CONSOLE RAYCAS OPERATION: section 3 Operators Handbook (RAYTHEON)

E. Raytheon Data Logger: Instructions in VTC File drawer.

REALISTIC PRO-2003 SCANNER

A. See instruction booklet in VTC file drawer.

5.4 RAYTHEON TRANSCEIVER (RAY-78)

A. See instruction booklet in VTC file draw.

CHAPTER 6

CASUALTY PROCEDURES

6.1 GENERAL. The Coast Guard is required to operate a Vessel Traffic Service on a 24 hour basis by federal statute. It is important that immediate steps be taken to correct any loss of capability in the VTS system. Any loss of capability shall be reported to the Commanding Officer, and CCGD17 to facilitate issuance of Notices to Mariners if appropriate.

6.2 RADAR SYSTEM CASUALTIES.

6.2.1 PPI FAILURE. Switch to the tertiary PPI using the master indicator and video selection controlers and notify the duty ET.

6.2.2 COMMERCIAL POWER FAILURE IN VALDEZ. The emergency generator should come on the line, and the radar picture may return after a 30 second delay. After any power loss, the operator must place the radar indicators in the off position until the emergency generator is on the line and emergency power has been established. Radars may then be placed back into operation. The warm-up period of five minutes will be necessary before the radars come back up. Check all equipment for any failures. All equipment failures should be verified. Notify the duty ET to reset the heading on the indicators.

6.2.3 TRANSCEIVER FAILURE. Notify the duty ET. The ET will determine if the watchstander should switch to the alternate MTR, and after a five minute warm-up period, place it on line.

6.2.4 MICROWAVE LINK FAILURE. Switch to the alternate link using the push-button link controls on the supervisor's console under the Moore fault sense panel. Notify the duty ET.

6.2.5 POWER FAILURE AT POTATO POINT SITE. There are 3 generators at Potato Point, one on line and two others in standby status which are capable of coming on line automatically in event of failure of the on-line generator. If a communications failure occurs at Potato Point, power failure is most likely the problem. Notify the Officer Of the Day, the Public Works Department, and the duty ET. After power has been restored, the radar will have to be reset by going to the 'OFF' position, on the master indicator, and then to 'STAND-BY' for the five minute warm-up period. After the warm-up period, the radar can be returned to transmit on.

6.2.6 POWER FAILURE AT VALDEZ SPIT SITE. The Valdez Spit Site normally runs on commercial power. An emergency generator automatically comes on the line when commercial power is lost. If the emergency generator fails or does not come on the line, notify the Officer Of the Day and the duty ET. After power has been restored, the radar will have to be reset. Go to the 'OFF' position on the master indicator, then to 'STANDBY'. After the five minute warm-up period, the radar can be returned to transmit on.

6.3 COMMUNICATIONS SYSTEM CASUALTIES

6.3.1 COMMUNICATIONS CONSOLE FAILURE. Use the other console. Notify the duty ET, do not use the console until the problem is identified and corrected.

6.3.2 CONSOLE SWITCH FAILURE. For failure not involving the entire console, such as a switch, notify the duty ET. Determine the extent of the problem by making communication checks on various frequencies, transceivers, etc. Determine if the problem is limited to the one console or if both of the consoles are effected.

6.3.3 COMMERCIAL POWER FAILURE IN VALDEZ. The emergency generator should come on the line automatically. If not, notify the Public Works Department.

6.3.4 TRANSCEIVER FAILURE. Switch to the standby transceiver at the site using the switches on the communications console. Notify duty ET.

6.3.5 MICROWAVE LINK FAILURE. This will normally be indicated by an audible alarm and LED indicator on the fault sense panel at the supervisor's console. Each site has two microwave transceivers. Use the command encoder on the fault sense panel to switch to the alternate transceivers. Notify the duty ET.

6.3.6 POWER FAILURE AT NAKED ISLAND. The Naked Island site relays communications and microwave signals from the Naked Island, and Cape Hinchinbrook sites. Complete power failure at this site would result in loss of all communications capabilities except from the MSO building, the Naked Island tertiary site and Potato Point sites. Normal power is provided by 2 thermo-electric generators in parallel, powered by propane fuel. Back-up batteries automatically provide power for 48-72 hours after loss of generators. Notify the duty ET as soon as possible after failure. Communications will still be available via the Naked Island tertiary site.

6.3.7 POWER FAILURE AT POTATO POINT. One of the two standby generators will come on the line automatically in the event of failure of the on-line generator. For complete power failure, notify the Public Works Department, and the duty ET.

6.3.8 POWER FAILURE AT CAPE HINCHINBROOK. Power is provided by 2 diesel generators which cycle automatically, and a back-up Cat generator used for maintenance. Complete loss of power will result in failure of light, radiobeacon, fog signal, and monitor link, as well as VTC communications capability. Loss of this site will have limited impact on VTC operations, since the Cordova AirFac, Naked Island, and Potato Point sites will provide coverage over most of the area. Equipment failure or power loss at this site requires notification of the OOD and the duty ET who will notify ANT SEVENTEEN.

6.4 ALTERNATE SYSTEM CAPABILITIES When loss of radar or communications capability will continue for a considerable period, the watch shall take steps to provide alternate capability by any appropriate means, such as:

A. Use the MSO boat or other Coast Guard vessels for communications relay/radar platform, if available.

B. Installing alternate radar or communications equipment at MSO Valdez, or at Valdez spit site and or Potato Pt.

C. Use Naked Island tertiary VHF-FM site.

6.5 FIRE PROCEDURES In the event of a fire, fire fighting procedures will be in accordance with station instructions. (Watch Quarter and Station Bill) Notify the duty ET, and the duty EM. They are to determine the extent of damage to the VTC.

6.5.1 CO2 SYSTEM The Kidde CO2 Fire Extinguisher system controls are located on the west wall of the VTC. The system consists of fifty feet of hose with a nozzle, two activating pressure bottles, and four 100 lb CO2 bottles contained in the boiler room. Operating instructions are posted with the equipment.

6.5.2 FIRE ALARM SYSTEM The fire (Heat and Smoke) detector alarms are located on the south wall of the VTC.
The alarm panel is designed to indicate two types of alarms. In the event of a fire, fire alarm bells will sound throughout the station, and the panel will display a red light indicating the location of the fire. The other alarm is a trouble alarm which indicates the location of a smoke/heat detector in need of repair. The alarms are silenced by pressing the reset buttons on the alarm panel. Black for fire, and the White for trouble. Follow the unit's emergency check off list in the event of a fire, And for trouble indications, notify the duty EM for repairs.

6.6 PERSONNEL CASUALTIES

6.6.1 ELECTRICAL SHOCK Shut off power to the equipment, administer first aid to the victim, and notify the Valdez Department of Emergency Services (phone-911) as necessary. Notify the OOD. Notify the duty ET and EM and have them check for electrical hazards prior to re-energizing equipment. All VTC personnel should be familiar with the power shut-off points described below.

6.6.2 POWER SHUT OFF. If there is an electrical hazard, de-energize the console at the main breaker box.

Panel	Location	Circuit
C	West wall of VTC (room 208)	all ckts room 208,209
D	East (rear) wall room 207	all ckts room 207
B	South wall of hallway outside room 201	all ckts room 201,206

6.6.3 MEDICAL FACILITIES Medical facilities in Valdez include a hospital, clinic, and an emergency medical van operated by the Valdez Department of Emergency Services.

CHAPTER 7

SUPPORT MISSIONS

7.1 SEARCH AND RESCUE Search and rescue shall be conducted in accordance with ANNEX I CCGD17 OPLAN 1-FY.

7.1.1 SAR ORGANIZATION CCGD17, as Northern Pacific SAR Coordinator (NORPACSARCORD) is responsible for the Northern Pacific Subregion of the Pacific Maritime Subregion, covering the entire coast of Alaska. Valdez is in the Juneau SAR sector, which is under the control of NORPACSARCOORD.

7.1.2 CONCEPT OF OPERATIONS Distress or emergency signals received by the VTC shall be immediately reported to Juneau RCC. Within Port Valdez, the VTC shall, if possible, provide response to SAR cases using the station's small boats. All SAR cases shall be reported to the Commanding Officer as soon as possible. The SAR Incident Forms maintained in the VTC shall be used to record the required information.

7.2 AIDS TO NAVIGATION

7.2.1 GENERAL

a. The master of a vessel in the VTS area has a variety of navigational aids to assist him. Loran C has been implemented throughout the Gulf of Alaska. The high, rugged cliffs in the area provide good visual tangents. At Hinchinbrook Entrance and at Valdez Narrows, there are numerous Coast Guard maintained Aids to Navigation for both day and night navigation.

b. Watchstanders shall make reasonable efforts to detect aids to navigation which are not "watching properly". Vessel reports of ATON discrepancies shall obtain the following information from the informant:

(1) Name and address of the person (or name and number of the vessel) reporting the discrepancy. If possible, obtain a telephone number where the reporting party may be contacted, or in the case of a vessel, the next port of call and ETA of the vessel.

(2) Name and light list number of the aid to navigation. If the light list number is not known, obtain sufficient data on the location of the aid to permit positive identification.

(3) Conditions under which the sighting was made: date, day or night, weather, visibility, distance from the aid when discrepancy observed.

(4) When a report is received concerning an aid which is extinguished, an attempt shall be made to obtain information from the informant as to the status of other lighted aids in the vicinity at the time the discrepancy was observed.

7.2.1.b(5) The method used to determine that the aid is off station (if applicable). When all of the above information, or as much as possible, is obtained, transmit to CCGD17 by priority message. If the responsible servicing unit is known, include that unit as an information addressee. The existence of ATON discrepancies shall be passed to all vessels in the VTS area which will be operating within usable range of the aid. Reports of ATON discrepancies should be confirmed by other vessel observations. The OOD shall be notified of all ATON discrepancies.

7.2.2 MAJOR AUTOMATED LIGHT STATIONS Cape Hinchinbrook has a light, fog horn, and radiobeacon. The monitoring equipment is located at ANT SEVENTEEN and indicates proper operation of the system. Should ANT SEVENTEEN call and request the VTC to reset their relay equipment. (Aid Control Monitor System Equipment), notify the duty ET and he will do this from the VTC equipment room.

7.2.3 NAVIGATIONAL HAZARDS: Information on navigational hazards received by VTC watchstanders shall be passed to the Officer Of the Day and the Commanding Officer immediately. Vessels in the system which may be affected should also be advised of the hazard. The information should be sent by priority message to the district and a request for broadcast notice to mariners should be made as appropriate.

7.3 MARINE SAFETY

a. Marine Safety laws and regulations shall normally be administered and enforced by Marine Safety Department personnel. VTC watchstanders should familiarize themselves on a continuing basis with various marine safety laws in order to deal with inquiries made after normal working hours. The following references apply:

1. ANNEX J to CCGD17 OPLAN 1-FY (Commercial Vessel Safety)

2. ANNEX F to CCGD17 OPLAN 1-FY (Port Safety and Security)

3. MERCHANT MARINE SAFETY MANUAL (COMDTINST M16000)

b. The MSO Valdez Inspection Zone and the Prince William Sound Captain of the Port Area comprise the portion of the State of Alaska that falls within the following boundary line: a line which starts at Cape Puget; thence northerly to 61-30N, 148-26W; thence easterly to 61-30N, 145-30W, thence southerly to the sea at 145-30N; thence westerly along the coast line to Pt Whitshed; thence southwesterly along the line of demarcation for Prince William Sound to Cape Puget.

7.4 MARINE ENVIRONMENTAL PROTECTION This mission is particularly important in view of the potential for catastrophic oil spills as a result of the operation of the Valdez Marine Terminal. ANNEX C to CCGD17 OPLAN 1-FY deals with the general requirements for enforcement of laws pertaining to water pollution. All VTC watchstanders shall be familiar with the following publications:

a. MSO Valdez Pollution Contingency Plan.

7.4.b. Oil Spill Contingency Plan- Alyeska Pipeline Service Co., for Port Valdez and Prince William Sound

7.5 ANCHORAGE. An anchorage area has been designated for vessels transiting the VTS area as follows:

1. The navigable waters of Prince William Sound, Alaska bounded by the following points: 60-40N 146-40W, thence to 60-38N 136-40W, thence to 60-38N 146-30W, thence to 60-39N 146-30W, thence to the beginning point.

a. The anchorage grounds lie just south of Knowles Head, extending eastward to just south of Red Head, about one half mile offshore. The anchorage is intended to provide a safe haven for vessels of all types (particularly pipeline trade tankers) when there are adverse weather conditions, shipboard navigation problems, or delays in Port Valdez. Vessels shall not anchor so as to obstruct the passage of other vessels proceeding to or from available anchorage spaces.

b. Unless specifically authorized by the VTC, vessels proceeding to or from the anchorage area in the VTS traffic separation scheme shall utilize the least possible distance in transiting the area between.

6 PILOTAGE.

7.6.1 GENERAL REQUIREMENTS. All U.S. seagoing vessels under license and enrollment are required to have a federal pilot in control of the vessel while in inland waters. U.S. vessels sailing under registry must comply with State of Alaska Pilotage Regulations.

7.6.2 TANKERS. Tankers bound for Alyeska Marine Terminal should have a master who is qualified to pilot the vessel from Cape Hinchinbrook to Rocky Point. State Pilots will board the tankers in the vicinity of Rocky Point.

7.6.3 NON-PILOTAGE Some of the tank vessels in the TAPS trade do not have a master or mate with the necessary pilotage endorsement for the Prince William Sound. There has been much discussion on this subject. Until the question is resolved, MSO Valdez will continue to enforce the COTP ORDER 2-81, dealing with NON-PILOTAGE vessels. Under the Authority of 33CFR 160 Each tank vessel will be queried if an officer is on board holding applicable federal pilotage for Prince William Sound. If a pilot will not be aboard for the transit between Cape Hinchinbrook and the Pilot Station, inbound or outbound, the following will apply:

1. Status of all machinery, personnel, charts, publications and navigation equipment required by 33 CFR 164 will be reported.

2. Based on satisfactory condition, entry of the vessel into Prince 'lliam Sound will be permitted pro/ided the visibility at Cape Hinchinbrook two nautical miles or greater. Visibility can be determined by requesting ather reports from participating vessels, at regular intervals. Based on .e information received, a decision can be made whether to allow the vessel to enter PWS.

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7.6.3.3. Further, a licensed officer in addition to the licensed officer on watch, will be employed as a navigator to continuously plot the position of the vessel during the transit of Hinchinbrook Entrance and Prince William Sound. This position will be reported on request to VALDEZ TRAFFIC. (usually every 10 minutes from Hinchinbrook Entrance to abeam Montague Pt., but not limited to)

4. Further, the Valdez Port Pilot will board or depart the Vessel at the entrance to Valdez Arm, off Bligh Reef, in lieu of the established pilot station at Rocky point.

5. Further, transit to the anchorage area off Knowles Head, during other than emergency conditions, will be evaluated on a case basis, considering weather, vessel traffic, and operating conditions.

6. Further, an English speaking officer will be on watch during the entire Prince William Sound transit.

7.7 PUBLIC INFORMATION

All requests for statements and/or information from the news media shall be referred to the Public Information Officer, Commanding Officer, or Executive Officer. Requests for information after hours will be referred to the OOD.
COMDTINST 5212.6B and CCGD17 INST. 52521A concern availability of records to the public. In general, the public is entitled to information from the records of the VTC and copies of any records including audio tapes. However, the public should not be allowed to interfere with the conduct of the VTC nor to rummage through records at random. A written request for an appointment to view records is required.

7.7.1 <u>REQUESTS FOR INFORMATION:</u> VTC watchstanders may provide answers to immediate questions concerning: vessels in the system, their locations, and VTS capabilities. VTC watchstanders will not discuss policy with the public. News media questions shall be referred to the Commanding Officer, Executive Officer, or the PIO. Watchstanders shall not provide analysis or interpretation of any situation.

7.7.2 <u>REQUESTS FOR COPIES OF RECORDS:</u> The Freedom of Information Act (FOIA) provides for making government information available to the public to the greatest extent possible. Telephone inquiries and written requests for information should be routed to the FOIA officer for disposition.

CHAPTER 8

RECORDS

8.1 DATA SHEETS

8.1.1 GENERAL: A data sheet will be prepared for each vessel that checks into the system. The primary function of the sheet is to provide the operator a means of recording information about a vessel to which he must have immediate access in the normal routine of traffic center operations. The sheet also permits the compilation of significant operational statistics of VTS operations. The Data Sheet information is to be retained, and may be used as evidence in a violation report.

8.1.2 COMPLETION OF DATA SHEETS. It is important that both sides of the sheet be completed for each vessel. The remarks section should be used for vessel reports and comments. Any waivers, ice reports, and towing information should be recorded in the additional information section. Complete the Plotting / Non-Pilotage information on side two of the data sheets as required. Staple the data logger printouts to the back of these sheets.

8.1.3 FILING. Once a vessel checks out of the traffic system, enroute their next port of call, place the Vessel Data Sheet on the Plot clip board. l-watch personnel will record the daily statistics in the Statistics Log. n the weekly vessel movement report is completed, (Monday mid watch 0000-)00) remove all the sheets from the Plot clip board and file in the VTC day worker's in-box.

8.2 VTC STATION LOG. The VTC station log shall be used to record significant events which occur during the day, such as:

a. Violations of VTS or other Federal Regulations.

b. Changes in VTS equipment status.

c. Vessel Casualties.

d. Pollution incidents.

e. Aids to Navigation discrepancies .

f. Vessel distress

g. Name of the Officer of the Day (OOD), and the person standing the traffic center watch.

h. Any events that occur which affect normal operations.(ie. tsunami warnings, natural disasters, personnel injuries, UCMJ judgement, or fire)

OPERATIONAL SUMMARY. An operational summary will be kept of the number vessels using the system. This summary will be prepared in the prescribed ormat using the vessel data sheets to compile the statistics.

Exhibit J

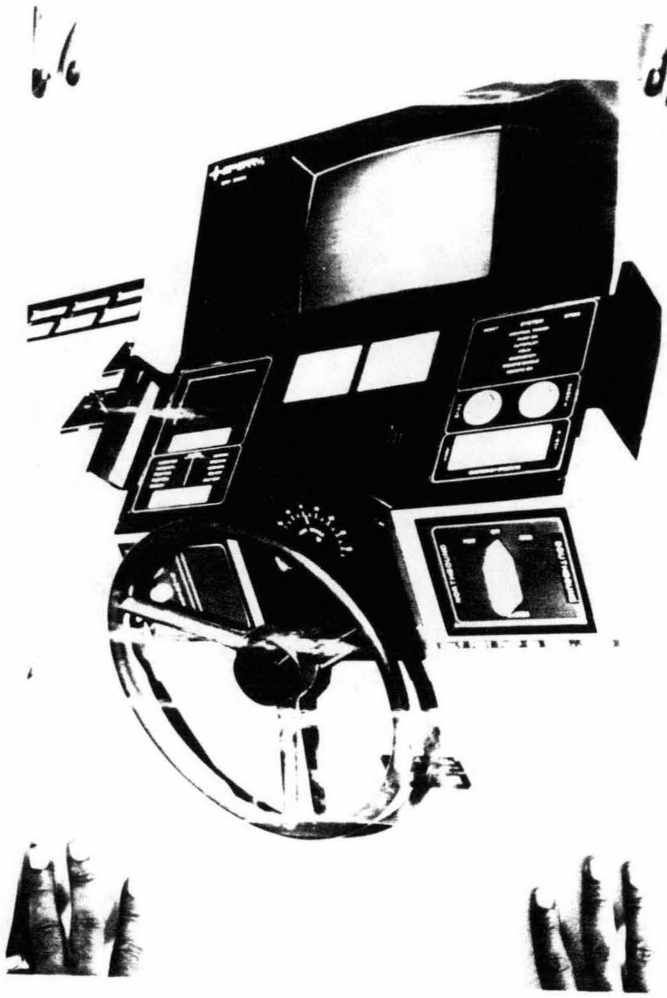
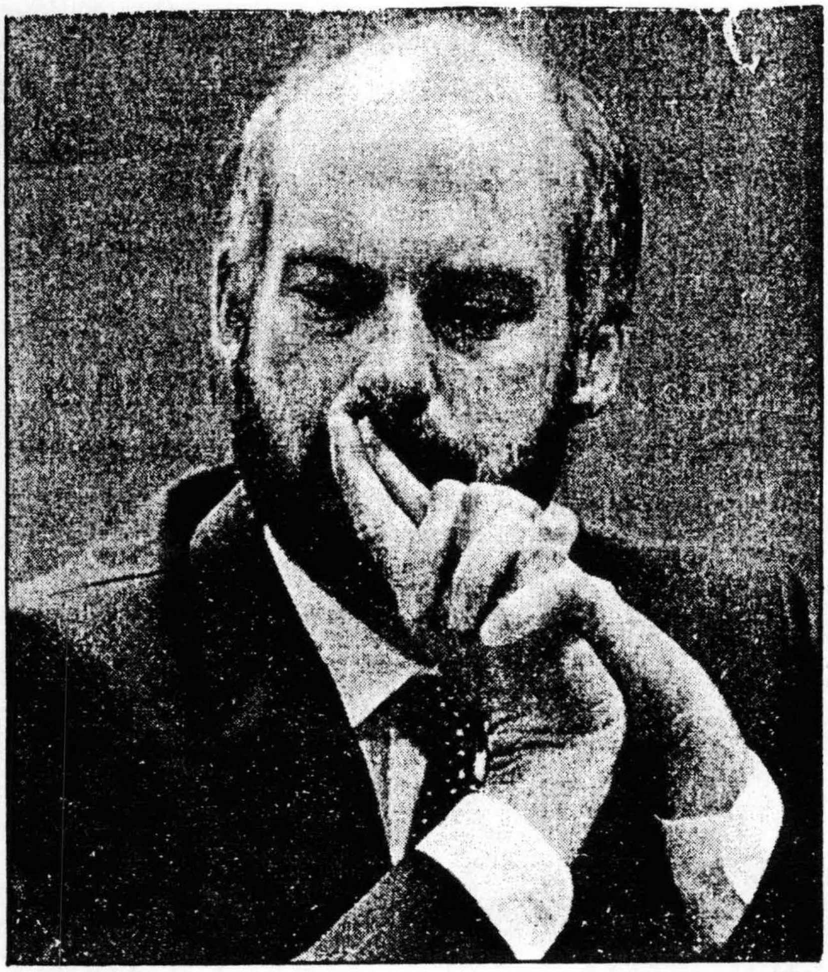


Exhibit # K

ANCHORAGE TIMES -- January 30, 1990



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89-7217 CR
89-7218 CR
(CASE NUMBER)

The Anchorage Times

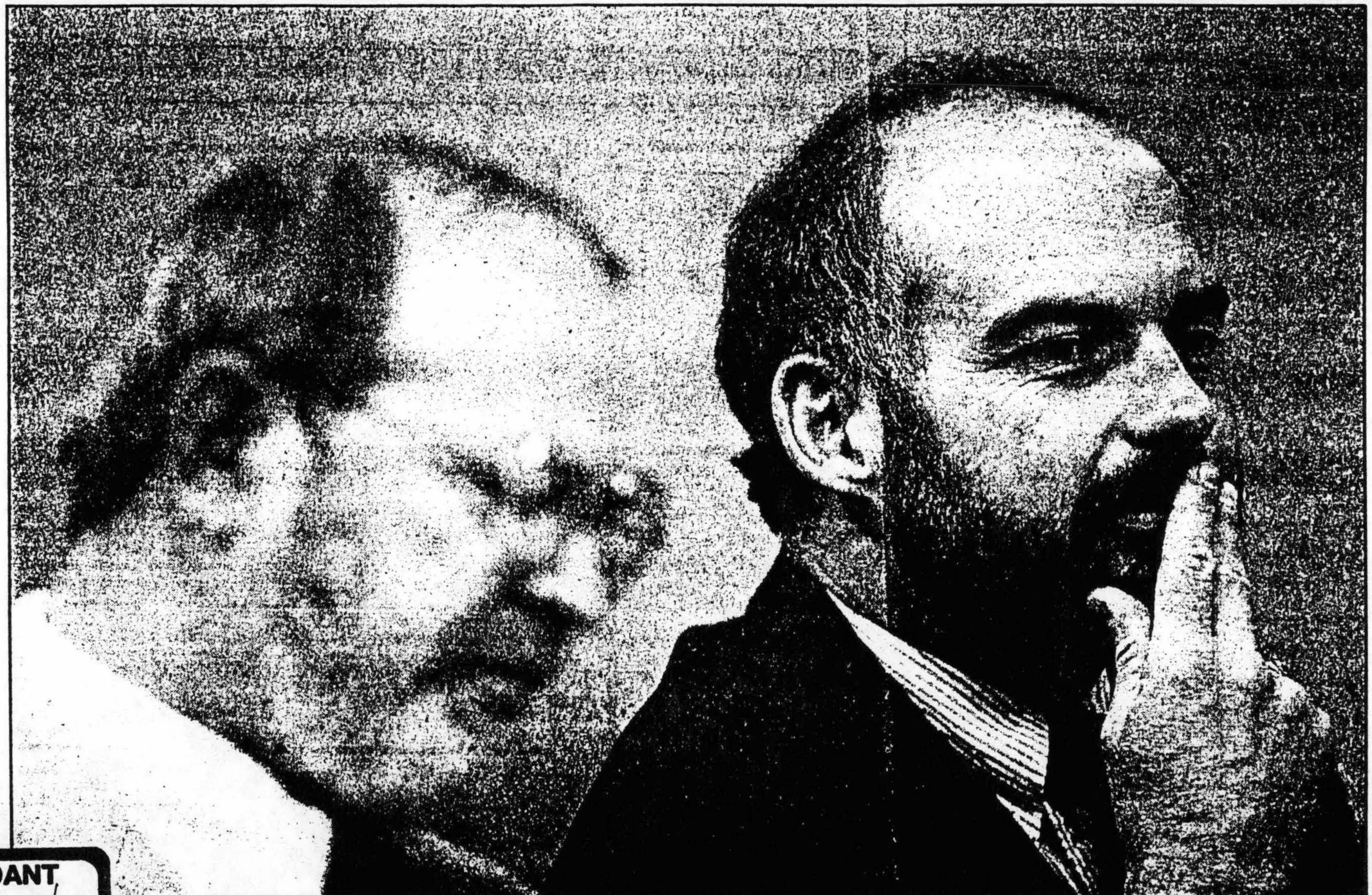
SATURDAY MORNING, FEBRUARY 3, 1990

Times photo by ROB LAYMAN

DEFENDANT
EXHIBIT NO. M
ADMITTED ☒ Trial
89-7217 CR
89-7218 CR
(CASE NUMBER)

ANCHORAGE DAILY NEWS

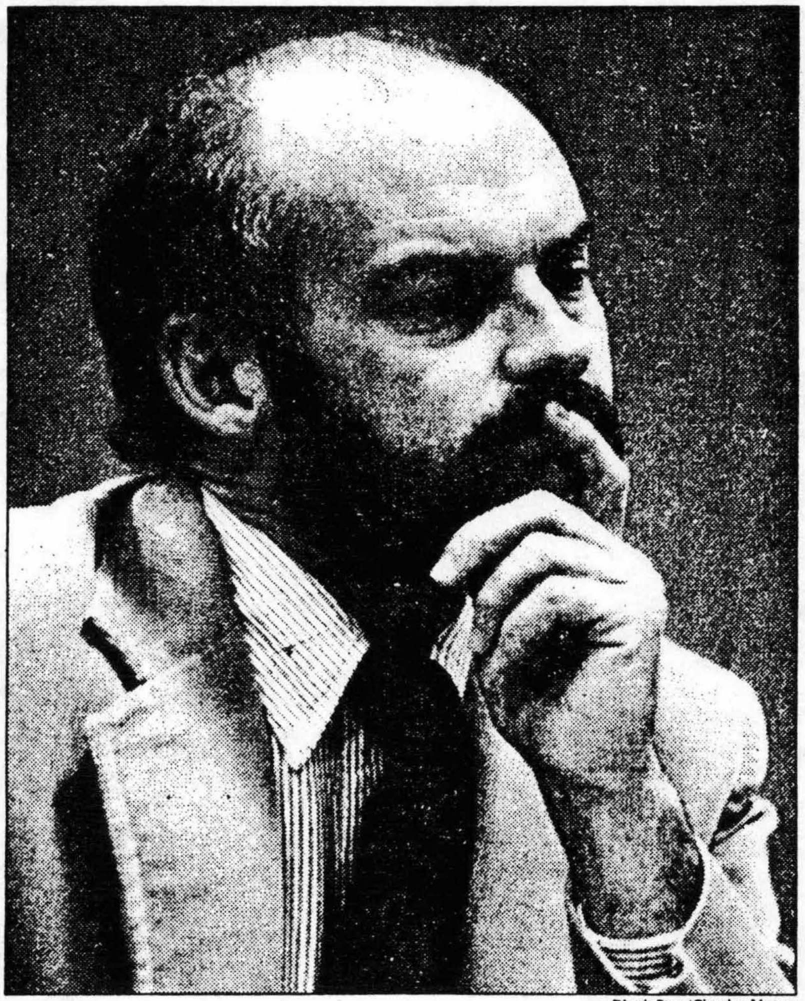
TUESDAY
SECTION B June 13, 1989



Anchorage Daily News/Fran Durner

DEFENDANT
EXHIBIT NO. N
ADMITTED ☒
89-7217 CR Trial
89-7218 CR
(CASE NUMBER)

THE NEW YORK TIMES, SUNDAY, FEBRUARY 11, 1990



Black Star/Charles Mason

DEFENDANT

EXHIBIT NO. O

ADMITTED ☒ Trial

89-7217 CR

89-7218 CR

(CASE NUMBER)

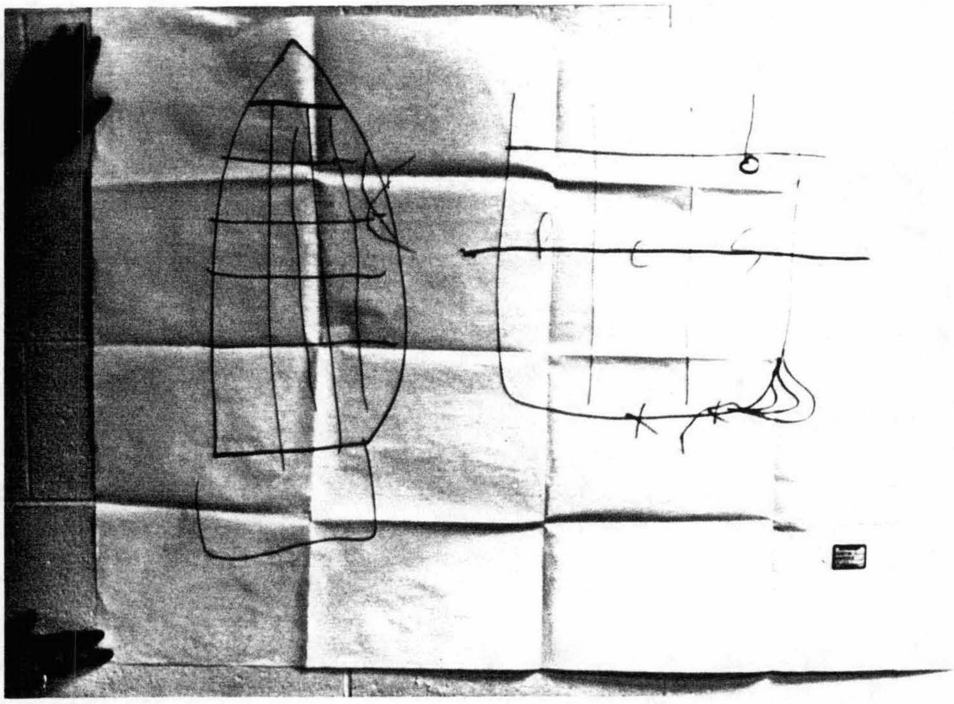


Exhibit # P

UT Bms 23 MAR

EXXON VALDEZ O/B (Gu. — 23 MAR

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RTC LOG START DATE:

LOG START TIME 2214   LOG INTERVAL  3 MIN

TIME 2214                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>* 1      3.55   048          6        225         0.19     35.0

TIME 2217                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      3.25   048          5        227         0.09     42.1

TIME 2220                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      2.98   048          5        227         0.08     38.4

TIME 2223                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      2.69   049          6        225         0.19     28.6

TIME 2226                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      2.44   049          5        228         0.05     28.3

TIME 2229                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      2.19   049          5        229         0.02     25.8

TIME 2232                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      1.92   049          5        225         0.14     24.3

TIME 2235                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      1.69   050          5        223         0.20     20.9

TIME 2238                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      1.45   051          4        229         0.06     20.8

TIME 2241                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      1.20   052          5        224         0.16     15.6

TIME 2244                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      1.00   055          4        214         0.36     14.2

TIME 2247                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      0.80   062          5        20[illegible]  0.44      7.7

TIME 2250                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      0.56   080          6        208         0.45      3.6

TIME 2253                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
>  1      0.42   124          6        215         0.44      0.0

TIME 2256                                            RNG SCALE 3 NM

 LINE   RNG(NM) BRG(DEG)    SPD(KTS) CSE(DEG)    CPA(NM) TCPA(MIN)
   1      [illegible]
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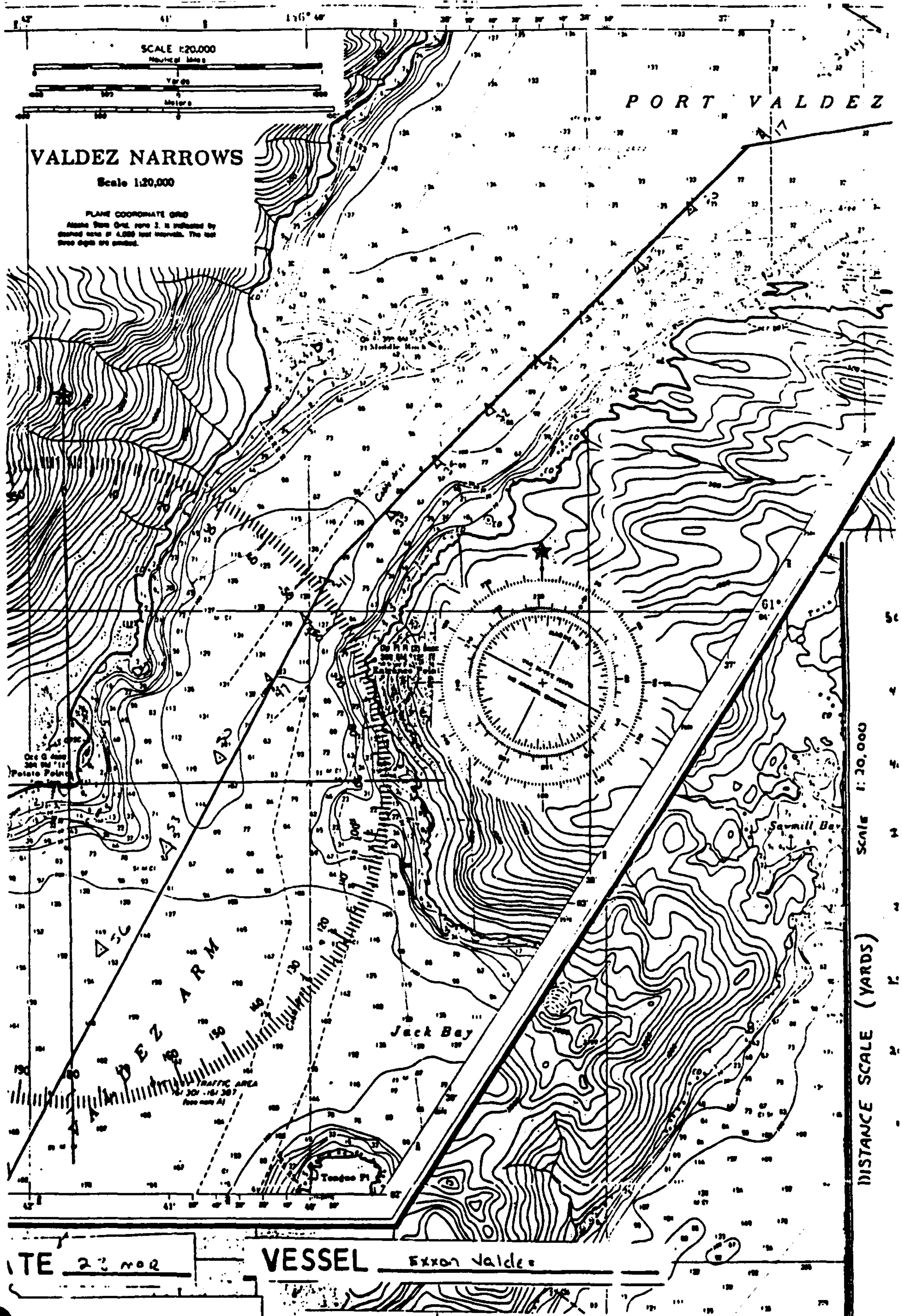
I HAVE SEEN THE ORIGINAL AND COMPARED
THE COPY WITH IT AND FOUND IT TO BE A
TRUE COPY. [signature]
MARK J. DELOZIER, CW03, USCG
MARINE INVESTIGATOR/INSPECTOR
MARINE SAFETY OFFICE, VALDEZ, AK. USCG

DEFENDANT
EXHIBIT NO. Q
ADMITTED ☒
89-7217 CR Trial
89-7218 CR
(CASE NUMBER)



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ADMITTED ☒ Trial
89-7217 CE
89-7217 CR
(CASE NUMBER)

I HAVE SEEN THE ORIGINAL AND COMPARED THE COPY WITH IT AND FOUND IT TO BE A TRUE COPY.

MARK J. DELOZIER, CW03, USCG
MARINE INVESTIGATOR/INSPECTOR

MARINE SAFETY OFFICE, VALDEZ, AK. USCG

Sec. 08.62.185. Certain licensed pilots required for oil tankers. (a) Any oil tanker, whether enrolled or registered, of 50,000 dead weight tons or greater, shall, when navigating in state waters beyond Alaska pilot stations either

(1) employ a pilot licensed by the state under this chapter, or

(2) utilize a federally licensed pilot whose duty station has been on that tanker throughout that specific voyage.

(b) The pilot required in (a) of this section shall control the vessel during all docking operations. (§ 3 ch 78 SLA 1977)

DEFENDANT
EXHIBIT NO. S
ADMITTED ☒ Trial
89-7217 cr
89-7218 cr
(CASE NUMBER)

DEFENDANT
EXHIBIT NO. T
ADMITTED ☐ Trial
89-7217
89 7218
(CASE NUMBER)

DEPARTMENT OF TRANSPORTATION

Coast Guard

46 CFR Parts 10 and 157

[CGD 84-060]

Licensing of Pilots; Manning of Vessels—Pilots

AGENCY: Coast Guard, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Coast Guard is proposing additional amendments to the regulations regarding the licensing of pilot and the manning of vessels—pilots. This proposal would: (1) Increase the gross tonnage authorization of licensed officers to serve as pilots on self-propelled coastwise seagoing vessels from 1,000 gross tons to 1,600 gross tons, (2) require first class pilots to have experience on vessels of more than 40,000 gross tons in order to be authorized to pilot vessels of more than 50,000 gross tons, (3) define "coastwise seagoing vessel" for pilotage purposes, (4) define "pilotage waters," (5) require pilots on Great Lakes vessels, and (6) allow a written test alternative to the chart sketch for a first class pilot's license restricted to tug and barge only. This proposal supplements the Supplemental Notice of Proposed Rulemaking (48 FR 3912) regarding the Licensing of Pilots; Manning of Vessels—Pilots. These proposals are closely related to but not within the scope of the Final Rule (CGD 77-084) being published simultaneously with the Notice.

DATES: Comments must be received on or before September 23, 1985.

ADDRESSES: Comments should be mailed to Commandant (G-CMC/21) (CGD 84-060), U.S. Coast Guard, Washington, D.C. 20593. Between 7:30 a.m. and 3:30 p.m., Monday through Friday, comments may be delivered to and will be available for inspection or copying at the Marine Safety Council (G-CMC/21), Room 2110, U.S. Coast Guard Headquarters, 2100 Second Street, S.W., Washington, D.C. 20593, (202) 426-1477.

FOR FURTHER INFORMATION CONTACT: Mr. John J. Hartke, Office of Merchant Marine Safety (G-MVP/12), Room 1210, U.S. Coast Guard Headquarters, 2100 Second Street, S.W., Washington, D.C. 20593, (202) 426-2985.

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this rulemaking by submitting written data, views, or arguments. Written comments should include the docket number (CGD 84-060), the name and address of the person submitting the comments, and the specific section of the proposal to which each comment is addressed. Persons desiring to acknowledgement that their comment has been received should enclose a stamped, self-addressed postcard or envelope. All comments received will be considered before final action is taken on this proposal. No public hearings are planned, but they may be held if written requests for a hearing are received and it is determined that the opportunity to make oral presentations will aid the rulemaking process.

Drafting Information

The principal persons involved in drafting this proposal are: Mr. John J. Hartke, Project Manager, Office of Merchant Marine Safety and Commander Ronald C. Zabel, Project Attorney, Office of the Chief Counsel.

Discussion of the Proposed Regulations

The Coast Guard is proposing to increase the tonnage authorization of licensed officers to serve as pilot on self-propelled coastwise seagoing vessels subject to inspection from 1,000 gross tons to 1,600 gross tons, and adding the requirement that, in order to be authorized to do so, the individual must have four round trips, 1 of which must be made during the hours of darkness, over the route to be traversed. This requirement would be self enforcing due to the consequences of acting as a pilot on an invalid license. This is proposed in order to conform with various other proposed licensing regulations dealing with all licensed officers, and the internationally accepted standard contained in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978.

There are three statutes under which the Coast Guard requires federal pilots.

(1) 46 U.S.C. Chapter 93 concerns foreign vessels and U.S. registered vessels operating on the Great Lakes. This proposal does not deal with pilots required by this statute. They are the subject of a separate set of regulations.

(2) 46 U.S.C. 8502 requires a coastwise seagoing vessel propelled by machinery and subject to inspection for certification, sailing under a coastwise license, when underway, except on the high seas, to be under the direction and control of a pilot licensed by the Coast Guard. Pilots required under this statute are dealt with in the final rule (CGD 77-084) being published simultaneously with this document, and in 46 CFR 157.20-40 (a) and (d) of this notice of proposed rulemaking.

(3) 46 U.S.C. 8101 concerns the complement of inspected vessels. While Pub. L. 98-378 amended section 4426 of the Revised Statutes by replacing the word "pilot" with "deck officer," the Coast Guard is authorized under 46 U.S.C. 8101 to determine the complement of licensed individuals, including pilots, considered necessary for a vessel's safe operation. Under 46 U.S.C. 8101, the Coast Guard continues to require pilots on certain vessels subject to inspection operating exclusively on pilotage waters of the United States. Pilots required under this statute are dealt with in this notice of proposed rulemaking under 46 CFR 157.20-40 (a), (b) and (f).

The Coast Guard is continuing the present requirement for masters and mates, and first class pilots, on vessels subject to inspection, in excess of 1,600 gross tons, upon the Great Lakes, and rivers, or lakes, bays and sounds other than the Great Lakes. The Coast Guard feels that it is important for these inland route vessels to have on board individuals who possess broader deck officer type of knowledge, for example, cargo handling, stability, lifesaving & firefighting, in addition to pilot type of skills (shiphandling & local knowledge). There is no requirement for a pilot on these inland route vessels of less than 1,600 gross tons. Therefore, the requirements of 21 years of age, the annual physical examination, currency of knowledge provisions, and round trips do not apply to the individuals on these vessels of less than 1,600 gross tons. In addition, inland route tank barges are excluded from the requirements of this regulation. A Supplemental Notice of Proposed Rulemaking regarding Licensing of Officers and Operators and Registration of Staff Officers (CGD 81-059) will be published in the Federal Register in the near future dealing with changes to the requirements for all masters and mates. It is suggested that individuals with an interest in the licensing of officers also participate in the above identified rulemaking.

The Coast Guard is also proposing that no first class pilot may serve as pilot on any vessel of more than 50,000 gross tons unless the individual pilot has made 12 round trips as pilot or observer over the route to be traversed on vessels of more than 40,000 gross tons. This is proposed in order to satisfy the concern of Congress and several commenters as to insuring that individuals have experience on vessels of a relatively substantial size. A number of comments received on the supplemental notice of proposed rulemaking (48 FR 3912) pointed out that a vessel of 1,000 gross tons or even 4,000 gross tons is really not considered to be a very large vessel. The Coast Guard agrees with those comments that something additional is necessary in order to insure that pilots have experience on larger vessels. Comments are requested not only on this general concept but also with regard to the gross tonnage figures for the round trip requirement (50,000 GT and 40,000 GT in this proposal). This proposal, that no pilot may operate under the authority of his pilot's license on vessels of more than 50,000 gross tons unless he has made 12 round trips over the route on vessels of more than 40,000 gross tons, will be self enforcing due to the consequences of acting as a pilot on an invalid license.

The Coast Guard required a pilot on vessels operating on the Great Lakes under the authority of the old 46 U.S.C. 404. While Pub. L. 96–378 amended section 4426 of the Revised Statutes by replacing the word "pilot" with "deck officer," the Coast Guard is authorized under 46 U.S.C. 8101 to determine the complement of licensed individuals, including pilots, considered necessary for a vessel's safe operation. The Coast Guard is proposing that pilots continue to be required on vessels operating on the Great Lakes. As already indicated, this will not change the requirement for a pilot on vessels operating on the Great Lakes.

The Coast Guard has not published a definition of what a coastwise seagoing vessel is for pilotage purposes. Seagoing has been defined in the statutes for other purposes, but not with regard to pilot requirements. For the applicability of vessel inspection, 46 U.S.C. 2101 (32) and (33) define "seagoing barge" and "seagoing motor vessel" by reference to "Boundary Lines" established by the Coast Guard under 33 U.S.C. 151. Since the statute governing Federal pilotage does not refer to 33 U.S.C. 151, the "Boundary Lines" are not applicable. The Coast Guard has interpreted "seagoing" in former 46 U.S.C. 364 (now 46 U.S.C. 8502) as proceeding beyond the headlands. Because of the widespread misunderstanding of the effect of "Boundary Lines" and to clarify when a vessel is required to have a pilot, or a person acting as a pilot, the Coast Guard is now proposing to define coastwise seagoing vessel for pilotage purposes as follows: A "coastwise seagoing vessel," for purposes of the manning of vessels by pilots or for individuals acting as pilots, means a vessel that at any time is authorized by its Certificate of Inspection to proceed beyond the headlands.

The Coast Guard has not published a definitive statement as to where pilotage waters begin, and at least one commenter states that pilotage waters should be more clearly defined. Our present position is that the line delineating pilotage waters from non-pilotage waters is a line drawn across the headlines at the entrance to bays, rivers, or harbors. The Coast Guard is now proposing to define pilotage waters as follows:

"Pilotage waters" as used in Subpart 157.20–40 interprets the phrase "except on the high seas" appearing in 46 U.S.C. 8502 and means generally the navigable waters of the United States shoreward of the ten (10) fathom sounding line depicted on charts except in the following cases:

(1) When the 10 fathom line is beyond the territorial sea, pilotage waters will be the waters shoreward of the territorial sea boundary.

(2) When the 10 fathom line is inside the headlands at the entrance to bays, rivers, or harbors, pilotage waters will be shoreward of a line drawn between the headlands.

(3) The navigable waters of the United States east of a line drawn from the northernmost point of Angeles Point, Washington, to the Traffic Lane Separation Lighted Buoy JA, Latitude 48°14.2′ N., Longitude 123°28.9′ W in the Strait of Juan de Fuca, are pilotage waters.

There are a number of other lines which are used for various other purposes, however, they are not appropriate to delineate pilotage waters and are not identified on all charts. The Coast Guard is proposing that the 10 fathom line be used to delineate pilotage waters because it closely conforms to present practice and it is clearly shown on all large scale charts. In some areas, such as where there are numerous offshore islands, use of the 10 fathom line alone may not be practical. Comments are invited identifying these areas and suggesting alternative delineating lines.

Public Law 98–557 amended 46 U.S.C. 8502 by adding that the Secretary shall designate by regulation the areas of the approaches to and waters of Prince William Sound, Alaska, on which a vessel subject to 46 U.S.C. 8502 is not required to be under the direction and control of a pilot licensed under 46 U.S.C. 7101.

The Coast Guard is therefore proposing the following additional exceptions to the general definition of Federal pilotage waters:

(1) Pilotage waters for the navigable waters of the United States within Prince William Sound, Alaska, are [illegible] as follows:

(a) Northeast of a line drawn from Point Freemantel (Latitude 60°55.7′ N, Longitude 146°58.3′ W) to Rocky Point Light 10 (Latitude 60°57.1′ N, Longitude 146°46.0′ W) in Valdez Arm.

(b) East of a line drawn from Sheep Point (Latitude 60°36.9′ N, Longitude 146°00.5′ W) to position Latitude 60°[illegible] N, Longitude 145°58.2′ W on the headlands of Windy Bay, Hawkins Island.

(c) West of a line drawn from Point Pigot (Latitude 60°48.1′ N, Longitude 148°21.3′ W) to Point Cochrane (Latitude 60°46.0′ N, Longitude 148°21.7′ W).

(2) Pilotage waters for the navigable waters of the United States within Southeast Alaska are as follows: the navigable waters within the territorial sea between Dixon Entrance and Cape Spencer.

The Final Rule (CGD 77–084) published simultaneously with this notice contains a requirement for licensed pilots on tank barges subject to 46 U.S.C. 8502 and exceeding 10,000 gross tons. The segment of the towing industry involved with such tank barges over 10,000 gross tons would be required to have first class pilots for their vessels. An individual from a segment of the towing industry requested that the Coast Guard explore an alternative to the chart sketch required in order to obtain the first class pilot's license.

In response to this request, the Coast Guard is proposing an alternative to sketching a chart of the route and waters applied for in connection with a first class pilot's license restricted to tug and barge combinations. The existing examination includes the requirement for a chart sketch and the license is not restricted to tug/barge combinations.

A written test fully discerning of the candidate's ability could be requested by an applicant as an alternative to the chart sketch, however, the license issued would be restricted to "tug and barge only."

The knowledge requirements would be the same, only the method of testing for that knowledge would be different. It is not intended that the test be made easier, as a matter of fact, some individuals would find this type of test more difficult than the chart sketch.

Additionally, there would be a tonnage limitation based on the largest combined gross tonnage of the vessels on which the applicant has the required round trip experience, up to a maximum of 30,000 gross tons.

The following table outlines the pilot requirements for various types of vessels and may assist in clarifying the

...posals contained in this notice of ...d rulemaking:

...VESSEL PILOT REQUIREMENTS

	Maximum route on certificate of inspection	
	Coastwise and Great Lakes	Inland
[illegible]propelled vessels 1,600 GT and over	First Class Pilot (FCP) (§ 157.20-40(a))	First Class Pilot (§ 157.20-40(b)).
[illegible]propelled vessels less than 1,600 GT	FCP, or license as master or mate with 4 round trips (§ 157.20-40 (a), (c), and (d))	No pilot requirement.
[illegible] barges [illegible] more than 10,000 GT [illegible]	First Class Pilot (§ 157.20-40(a))	No pilot requirement.
[illegible] barges [illegible] not more than [illegible] GT	FCP, or license as master, mate, or operator with 12 round trips and 6 months towing experience (§ 157.20-40(a), (c), and (e))	No pilot requirement.
[illegible]propelled vessels over [illegible] GT	FCP plus 12 round trips on vessels over 40,000 GT (§ 157.20-40(f))	N/A—no vessel greater than 50,000 GT is likely to have an inland route on its COI.

...The pilot requirements for these tank barges are con... in the Final Rule (CGD 77-084), appearing elsewhere ... issue of the Federal Register.

...*tion:* This proposal concerns ...ters which are closely related to but ...were not contained in the ...ental notice of proposed ...making published in the Federal Register on January 27, 1983 (48 FR ...).

These proposed regulations are ...dered to be non-major under Executive Order 12291. The original proposal and the final rule appearing ...where in this issue of the Federal Register were considered to be ...ificant under the then existing Department of Transportation guidelines because they were likely to be controversial. As this proposal is related to the final rule, it is classified as significant, however, it is not expected to have a significant economic impact or be particularly controversial.

As discussed below, the economic ...ect of this proposal has been found to be so minimal that further evaluation is unnecessary. Since the impact of this proposal is expected to be minimal, the Coast Guard certifies that it will not have a significant economic impact on a ...tantial number of small entities.

The proposal to increase the gross tonnage authorization of licensed ...cers to serve as pilot on self-propelled coastwise seagoing vessels from 1,000 to 1,600 gross tons, will ...he burden on some vessel ...d individuals by increasing ...of vessels on which a licensed individual, meeting the requirements identified in the proposal, may serve as a pilot, thereby eliminating the requirement for the individual to obtain a pilot's license or requiring the vessel to employ an independent pilot. Approximately 20 vessels are affected by this proposal.

The requirement to have experience on vessels of more than 40,000 gross tons in order to be authorized to pilot vessels of more than 50,000 gross tons is proposed in order to insure experience on large vessels. There are only a limited number of U.S. ports which can accommodate vessels of that size. It is a normal practice to assign the more experienced pilots to the larger ships. Pilots that normally provide services in those ports would have acquired more than 12 round trips on vessels over 40,000 gross tons, so this proposal should not have an impact on them. Pilots that do not normally provide services in one of those particular ports and do not have experience on larger vessels would have to obtain 12 round trips on vessels of more than 40,000 gross tons in order to be authorized to pilot vessels of over 50,000 gross tons. It is not possible to estimate the number of pilots that would fall in this latter category.

The proposals dealing with defining coastwise seagoing vessels and pilotage waters do not significantly change the present practice, therefore, there will be little or no impact associated with these proposals.

The proposal requiring pilots on Great Lakes vessels simply continues that requirement. The statute authorizing pilots on Great Lakes vessels was amended and the Coast Guard is proposing to continue the requirement under the authority of a different statute. The requirements for pilots on these vessels is required by the restricted navigation in many areas of the Great Lakes and is supported by the Great Lakes shipping industry, including the pilots.

The proposal to allow an applicant to request a written test alternative to the chart sketch for a first class pilot's license will have no impact other than giving an applicant the choice between a written test and a chart sketch. The Coast Guard would have to develop the substitute written test as it does not presently exist.

List of Subjects

46 CFR Part 10

Seamen, Marine safety, Navigation (water), Passenger vessels.

46 CFR Part 157

Seamen, Vessels.

In consideration of the foregoing it is proposed that Part 10 and Part 157 of Title 46 of the Code of Federal Regulations be amended as follows:

PART 10—LICENSING OF OFFICERS AND MOTORBOAT OPERATORS AND REGISTRATION OF STAFF OFFICERS

1. The authority citation for Part 10 reads as follows:

Authority: 46 U.S.C. 7101; 49 CFR 1.46(b).

2. By adding a new paragraph (d) to § 10.07-7 to read as follows:

§ 10.07-7 Required examination for first class pilots.

* * * * *

(d) An applicant for an original license, extension of route or endorsement may, upon request, take a written test concerning the route and waters applied for in lieu of the chart sketching required in paragraph (a)(2) of this section. Licenses, extensions or endorsements obtained by taking the substitute written test are restricted to "tug and barge only" and have a tonnage limitation based on the largest combined gross tonnage of the vessels on which the applicant has the required round trip experience, up to a maximum of 30,000 gross tons.

PART 157—MANNING REQUIREMENTS

3. The authority citation for Part 157 reads as follows:

Authority: 46 U.S.C. 3703, 8105, 9102; 50 U.S.C. 198; 46 CFR 1.46(b).

4. By adding new §§ 157.10-89 and 157.10-91 as follows:

§ 157.10-89 Coastwise seagoing vessel.

"Coastwise Seagoing Vessel," for purposes of the manning of vessels by pilots or for individuals acting as pilots, means a vessel that at any time is authorized by its Certificate of Inspection to proceed beyond the headlands.

§ 157.10-91 Pilotage waters.

"Pilotage Waters" means the navigable waters of the United States shoreward of the ten (10) fathom sounding line depicted on charts except in the following cases:

(a) When the 10 fathom line is beyond the territorial sea, pilotage waters will be the waters shoreward of the territorial sea boundary.

(b) When the 10 fathom line is inside the headlands at the entrance to bays, rivers, or harbors, pilotage waters will be shoreward of a line drawn between the headlands.

(c) The navigable waters of the United States east of the line drawn from the northernmost point of Angeles Point, Washington, to the Traffic Lane Separation Lighted Buoy JA (Latitude 48°14.2′ N, Longitude 123°28.9′ W) in the Strait of Juan de Fuca, are pilotage waters.

(d) Pilotage waters for the navigable waters of the United States within Prince William Sound, Alaska, are only as follows:

(1) Northeast of a line drawn from Point Freemantel (Latitude 60°55.7′ N, Longitude 146°58.3′ W) to Rocky Point Light 10 (Latitude 60°57.1′ N, Longitude 146°46.0′ W) in Valdez Arm.

(2) East of a line drawn from Sheep Point (Latitude 60°36.9′ N, Longitude 146°00.5′ W) to position Latitude 60°34.4′ N, Longitude 145°58.2′ W on the headlands of Windy Bay, Hawkins Island.

(3) West of a line drawn from Point Pigot (Latitude 60°48.1′ N, Longitude 148°21.3′ W) to Point Cochrane (Latitude 60°46.0′ N, Longitude 148°21.7′ W).

(e) Pilotage waters for the navigable waters of the United States within Southeast Alaska are as follows: the navigable waters within the territorial sea between Dixon Entrance and Cape Spencer.

3. By revising paragraphs (a), (c), (d), and (g), and adding paragraphs (b), (f) and (i) of § 157.20–40 to read as follows:

§ 157.20–40 Pilots.

(a) The following vessels, when underway and not sailing on register, must be under the direction and control of a pilot:

(1) Coastwise seagoing vessels propelled by machinery and subject to inspection under 46 U.S.C. Chapter 33, and seagoing tank barges subject to inspection under 46 U.S.C. Chapter 37, except when seaward of pilotage waters.

(2) Vessels operating on the Great Lakes, if propelled by machinery, or tank barges subject to inspection under 46 U.S.C. Chapter 37.

(b) Every vessel in excess of 1,600 gross tons propelled by machinery and subject to inspection for certification, operating exclusively on pilotage waters of the United States, must be under the direction and control of a pilot licensed by the Coast Guard.

(c) The requirements of paragraph (a) of this section are satisfied when the vessel is under the direction and control of either:

(1) A First Class Pilot holding a valid license issued by the Coast Guard, acting within the restrictions of his or her license, or

(2) An individual holding a valid license issued by the Coast Guard as master, mate, or operator, employed aboard a vessel, within the restrictions of his or her license and the limitations of paragraphs (d) and (e) of this section, provided he or she:

(i) Has reached the age of 21 years;

(ii) Complies with the currency of knowledge provisions of 46 CFR 10.07–13, and

(iii) Complies with the physical examination requirements of 46 CFR 10.07–9.

(d) A licensed individual qualifying under subparagraph (c)(2) of this section may serve as pilot of a coastwise seagoing vessel or a Great Lakes vessel of not more than 1,600 gross tons propelled by machinery and subject to inspection for certification, provided the individual has four round trips, over the route to be traversed, 1 of which must be made during the hours of darkness if the route is to be traversed during darkness, while in the wheelhouse as watchstander or observer.

* * * * *

(f) No first class pilot may serve as pilot on any vessel of more than 50,000 gross tons unless the individual pilot has twelve round trips, 3 of which must be made during the hours of darkness, as pilot or observer over the route to be traversed on vessels of more than 40,000 gross tons.

(g) In any instance when the qualifications of a person discharging the requirements for pilotage through the provisions of this section are questioned by the Coast Guard, the individual shall provide the Coast Guard with documentation proving compliance with paragraph (c) and the applicable portion(s) of paragraphs (d), (e) or (f) of this section.

* * * * *

Dated: June 18, 1985.

J.S. Gracey,

Admiral, U.S. Coast Guard, Commandant.

[FR Doc. 85–15027 Filed 6–21–85; 8:45 am]

BILLING CODE 4910–14–M

33 USC, Section 1223 — implemented 33 CFR, part 160... port + waterways safety act...

DEPARTMENT OF TRANSPORTATION

Coast Guard

46 CFR Parts 10 and 15

[CGD 84-060]

Licensing of Pilots; Manning of Vessels-Pilots

AGENCY: Coast Guard, DOT.

ACTION: Supplemental notice of proposed rulemaking.

SUMMARY: The Coast Guard is changing its original proposal (50 FR 26117) of June 24, 1985, to amend the regulations concerning the Licensing of Pilots and the Manning of Vessels-Pilots. This proposal would: (1) Delineate when certain inspected vessels are required to be under the direction and control of a pilot, (2) describe first class pilotage areas where local pilotage expertise is warranted, (3) allow licensed individuals to serve as pilot in areas not identified as first class pilotage areas on vessels that they are otherwise qualified to control, and (4) permit individuals with 5 years service on towing vessel combinations of at least 5,000 gross tons while acting under the authority of a license as master, mate, or operator of uninspected towing vessels, with a minimum of 2 of the 5 years having been on towing vessel combinations of at least 10,000 gross tons, to obtain without a written examination, an endorsement as first class pilot, restricted to tug and barge combinations only, for those routes over which they have made the required number of round trips prior to (the effective date of the final rule). The applicant is required to have the same number of round trips that the respective OCMIs require of other applicants for an endorsement as first class pilot, and ⅔ of the required number of round trips must have been on towing vessel combinations greater than 1,600 gross tons.

These changes are necessary to eliminate confusion over where and on what vessels pilotage expertise over and about that held by licensed masters, mates, and operators is warranted. They will also provide relief to tank barge operators who have demonstrated experience in performing this function.

DATES: Comments must be received on or before September 6, 1988.

ADDRESSES: Comments must be mailed to Commandant (G-CMC/21) (CGD 84-060), U.S. Coast Guard, Wasington, DC 20593-0001. Between 7:30 a.m. and 3:30 p.m., Monday through Friday. Comments may be delivered to and will be available for inspection or coping at the Marine Safety Council (G-CMC/21), Room 2110, U.S. Coast Guard

DEFENDANT
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89-7218 cr
(CASE NUMBER)

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Headquarters, 2100 Second Street SW., Washington, DC 20593-0001, (202) 267-1477.

FOR FURTHER INFORMATION CONTACT: Mr. John Hartke, Merchant Vessel Personnel Division (G-MVP/12), Room 1210, U.S. Coast Guard Headquarters, 2100 Second Street SW., Washington, DC 20593-0001, (202) 267-0214.

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this rulemaking by submitting written data, views or arguments. Written comments should include the docket number (CDG 84-606), the name and address of the person submitting the comments, and the specific section of th e proposal to which each comment is addressed. Persons desiring acknowledgment that their comment has been received should enclose a stamped, self-addressed postcard or envelope. All comments received will be considered before final action is taken on this proposal. No public hearings are planning, but they may be held if written requests for a hearing are received and it is determined that the opportunity to make oral presentations will aid the rulemaking process. As background, an original notice of proposed rulemaking vas published in 1980. That proposal was modified and republished as a supplemental notice in 1983. The comment period was subsequently extended twice, and the final rule was published June 24, 1985. Since some of the issues, those identified in the summary of this proposal, were not within the scope of the previous rulemaking, a separate notice of proposed rulemaking addressing those issues was published simultaneously with the final rule. The comment period was originally scheduled to end on September 23, 1985. However, a Notice of Extension of Comment Period (50 FR 38557), published in the Federal Register on September 23, 1985, extended the comment period to December 22, 1985.

The Coast Guard received 172 written comments, and two public meetings were held, one meeting in New York, hosted by the Maritime Association Port of New York, on Novermber 12, 1985, and the second was a Towing Safety Advisory Committee Subcommittee on Personnel Manning and Licensing meeting held at Coast Guard Headquarters in Washington, DC., on December 12, 1985.

Drafting Information

The principal persons involved in drafting this proposal are: Mr. John J. Hartke, Project Manger, Merchant Vessel Personnel Division, and, Commander Ronald C. Zabel and Commander Gerald A. Gallion, Project Attorneys, Office of Chief Counsel.

Discussion of the Proposed Regulations

Some of the matters contained in the proposals for the rulemaking have been disposed of. Two of these: (1) increasing the tonnage authorization of licensed officers to serve as pilot on self-propelled coastwise seagoing vessels subject to inspection from 1,000 gross tons to 1,600 gross tons, and (2) requiring pilots on Great Lakes Vessels received no negative comments and were included in the Interim Final Rule published on October 16, 1987 (52 FR 38614).

The proposal regarding the requirement that first class pilots must have experience on vessels of more than 40,000 gross tons in order to be authorized to pilot vessels of more than 50,000 gross tons is withdrawn. The comments received were almost universally negative, indicating that the proposal is unworkable because, in most ports, there are not enough larger vessels to provide the proposed number of round trips for a sufficient number of pilots to quality to handle the larger vessels. Additionally, commenters questioned the need for this particular proposal. The Coast Guard agrees with those comments and that specific proposal is withdrawn. The Coast Guard Guard presently has sufficient authority regarding the limitations on licenses as contained in 46 CFR 10.701.

Pilotage Requirements

In response to the written and oral comments received on the remaining items in the proposal, the Coast Guard is now proposing significant changes to that Notice of Proposed Rulemaking.

In this action the following changes to the prior notice are proposed: (1) Instead of specifically defining "pilotage waters" and "coastwise seagoing vessel", this proposal would accomplish the same purpose by delineating when certain inspected vessels are required to be under the direction and control of a pilot. These provisions will address inspected mechanically propelled vessels and seagoing tank barges inspected under 46 U.S.C. Chapter 37, (2) In conjunction with this, the proposal describes first class pilotage areas where additional local piloting expertise is warranted, and (3) Individuals with 5 years service on towing vessel combinations of at least 5,000 gross tons while acting under the authority of a license as master, mate, or operator of uninspected towing vessels, with a minimum of 2 of the 5 years having been on towing vessel combinations of at least 10,000 gross tons, may receive, without a written examination, an endorsement as first class pilot, restricted to tug and barge combinations only, for those routes over which they have made the required number of round trips prior to (the effective date of the final rule). The applicant is required to have the same number of round trips that the respective OCMIs require of other applicants for an endorsement as first class pilot.

In the June 24, 1985 notice of proposed rulemaking we proposed to define pilotage waters as the navigable waters shoreward of the 10 fathom line, with exceptions for when that line is inside the headlands or beyond the territorial sea. There was very little support for, and considerable opposition to, use of the 10 fathom line. A number of commenters characterized it as a squiggly line and stated that you cannot determine whether or not you are actually in pilotage waters.

46 U.S.C. 8502 requires that certain inspected vessels be under the direction and control of a pilot when "not on the high seas." The clear implication of this language is that pilots are required for those vessels on all the navigable waters of the United States, which includes the territorial seas and internal waters. Limiting the scope of the applicability of the statute by defining pilotage waters as some lesser area is, on the surface, inappropriate. However, there are many large portions of our coastline where there are no navigational risks to vessels proceeding along the coast within the territorial seas. In view of this, the Coast Guard has a long history of only licensing individuals as pilots for a portion of the navigable waters of the United States, primarily harbor areas, high traffic areas, rivers, and the Great Lakes. Conversely, there are some areas outside the territorial seas of the United States, such as Block Island Sound, where pilots have been traditionally required.

46 U.S.C. 8502 is not the Coast Guard's only authority to require an individual with pilotage expertise to be in control of the vessel. Under the Coast Guard's authority to set manning levels on inspected vessels in 46 U.S.C. 8101, and authority to increase the number of licensed individuals required on a vessel in 46 U.S.C. 8301, the Coast Guard may require pilots on inspected vessels when deemed appropriate. In this action the Coast Guard is proposing a rule that would eliminate any conflict or confusion over where an individual holding a license or endorsement as pilot is required, when a licensed

individual with specific local experience required, and where just the expertise [o]f a licensed master, mate or operator is [suf]ficient.

In the June 24, 1985 notice of proposed rulemaking we proposed to define "coastwise seagoing vessel" as a vessel that at any time is authorized by its Certificate of Inspection to proceed beyond the headlands. A number of commenters stated that they were opposed to the proposed definition because a vessel with Lakes, Bays and Sounds routes on its Certificate of Inspection can proceed beyond the headlands which would then make Lakes, Bays and Sounds vessels coastwise seagoing vessels for pilotage purposes. Some commenters suggested that the definition of coastwise seagoing vessel be tied to the particular voyage that the vessel happens to be on at that time rather than tie it to the route authorized by its Certificate of Inspection. It seems clear that the language of the statute (46 U.S.C. 8502 (a)) is meant to identify a type or class of vessel rather than a vessel's voyage.

Instead of defining "coastwise seagoing vessel" and using the phrase "vessels operating exclusively on pilotage waters of the United States" as [or]iginally proposed, this proposal simply [app]lies pilotage requirements to vessels [bas]ed on the waters on which the [ve]ssels are certificated to operate. The Coast Guard believes that this approach will avoid confusion and ease administration of the rule. There are only two categories in this proposal, as the requirement for pilots on vessels operating on the Great Lakes is contained in the Interim Final Rule on the Licensing of Maritime Personnel (CGD 81-059) published in the Federal Register October 16, 1987 (52 FR 38655). These categories are: (1) Inspected, mechanically propelled vessels and tank barges subject to inspection under 46 U.S.C. Chapter 37, that are authorized by their certificate of inspection to proceed beyond the Boundary Line specified in 46 CFR Part 7, and (2) Inspected, mechanically propelled vessels that are not authorized by their certificate of inspection to proceed beyond the Boundary Line specified in 46 CFR Part 7.

The pilotage requirements proposed for these vessels vary depending on the gross tonnage of the vessel and the specific waters the vessel is being operated on. This proposal is not [in]tended to make a significant change in [the] areas where pilots have been [trad]itionally required. Rather, it is [int]ended that our regulations recognize the broad statutory requirement for pilots for certain vessels on the navigable waters and provide an appropriate means of satisfying the statutory requirements. In this proposal, the existing manning regulations in 46 CFR 15.812 would continue to apply to areas that have been traditionally covered by first class pilot route endorsements. For areas of the navigable waters of the United States that are not covered by first class pilot endorsements, this proposal would allow the master, mate or operator of a vessel to serve as pilot for that vessel. However, the statutory requirements of being 21 years of age and, for those individuals serving as pilot on vessels greater than 1,600 gross tons, having an annual physical exam would apply. The statutory requirement to maintain adequate knowledge of the waters to be navigated would be met by requiring the individual to have served on that route within the previous 60 months.

Officers in Charge, Marine Inspection, would locally delineate those waters within their zone where additional pilotage expertise is warranted and the qualifications that are necessary for serving as pilot on those waters. This delineation of recognized pilotage routes and the qualifications for them would also facilitate the understanding by individuals authorized to serve as pilots under 46 CFR 15.812 of where they are required and qualified. At the outset, these waters are intended to encompass the areas where pilots have traditionally been required.

While this proposal may appear to impose additional pilot requirements for certian vessels operating in the navigable waters, it is actually a reduction because it makes it easier for a member of the crew to act as the pilot required by law. 46 U.S.C. 8502 requires coastwise, seagoing, inspected, mechanically propelled vessels and inspected, seagoing, tank barges to be under the direction and control of a pilot when not on the high seas. For mechanically propelled vessels of over 1,600 gross tons, and tank barges over 10,000 gross tons, there is currently one class of pilot that is licensed to perform this function. This proposal would add another class of pilot that could perform this function on waters not traditionally covered by first class pilotage endorsements.

The statutory requirements for performing this function differ from those for master, mate and operator licenses primarily in that they require the individual to be 21 years of age, to obtain an annual physical exam, and to maintain adequate knowledge of the waters to be navigated. The Coast Guard is not required to publish regulations to implement the pilotage requirements of 46 U.S.C. 8502. However, without these regulations the statutory requirements are difficult to comply with fully.

Examination Requirements

In the previous notice the Coast Guard proposed the following alternative to the chart sketch for a first class pilot's license: An applicant for an original license, extension of route or endorsement may, upon request, take a written test concerning the route and waters applied for in lieu of the required chart sketching. Licenses, extensions or endorsements obtained by taking the substitute written test would be restricted to "tug and barge only" and have a tonnage limitation based on the largest combined gross tonnage of the vessels on which the applicant has the required round trip experience, up to a maximum of 30,000 gross tons. The intention of the proposal was to allow those who have demonstrated their abilities to pilot tug and barge combinations in various ports, through having done it many times, to obtain an endorsement as first class pilot without completing the chart sketch. This is in keeping with the Coast Guard's traditional practice of providing a "grandfather" clause applicable to those who have been performing an activity that became the subject of a regulatory action.

The comments received regarding that proposal were non-supportive, and additionally, the Coast Guard would have to develop an alternative written test to the chart sketch, as such a test does not presently exist. Many of the comments questioned whether a written test fully discerning of the candidates ability and comparable to the chart sketch could, in fact, even be developed.

The Coast Guard is therefore withdrawing that proposal and is replacing it with the proposal that individuals with 5 years service on towing vessel combinations of at least 5,000 gross tons while acting under the authority of a license as master, mate, or operator of uninspected towing vessels, with a minimum of 2 of the 5 years having been on towing vessel combinations of at least 10,000 gross tons, may obtain, without a written examination, an endorsement as first class pilot, restricted to tug and barge combinations only, for those routes over which they have made the required number of round trips prior to (the effective date of the final rule). The applicant is required to have the same number of round trips that the

4

respective OCMIs require of other applicants for an endorsement as first class pilot, and ⅔ of the required number of round trips must have been on towing vessel combinations greater than 1,600 gross tons.

This proposal requires applicants from the towing industry to have experience and round trips equal to other applicants for an endorsement as first class pilot. The elimination of the written examination, including the chart sketch, is the only lessening of the general requirements. Applicants obtaining an endorsement under these provisions will be restricted to tug and barge combinations. This provision would allow those persons who have been performing the task of operating relatively large tug and barge combinations in the past to obtain the necessary endorsements to continue to serve in the same capacity. It is, in effect, a grandfather provision that allows those already engaged in the trade to continue without having to obtain another license. This method of obtaining an endorsement would be available only for service and round trips obtained prior to (the effective date of the final rule).

Prince William Sound Pilotage

46 U.S.C. 8502(g) states that the Secretary shall designate by regulation the areas of the approaches to and waters of Prince William Sound, Alaska, on which a vessel is not required to be under the direction and control of a pilot licensed under 46 U.S.C. 7101. The Coast Guard is proposing the following exceptions to the pilotage requirements: (1) Vessels are excluded from pilotage requirements when entering or departing Prince William Sound, Alaska, via Hinchinbrook Entrance, and:

(a) Proceeding directly to or from the established Valdez/Whittier pilot station at Rocky Point (Latitude 60°57.1' N., Longitude 146°46.0' W), or

(b) Proceeding directly to or from the established Cordova pilot station at Sheep Point (Latitude 60°37.0' N., Longitude 146°00.0' W), or

(c) Proceeding directly to or from a designated anchorage described in 33 CFR Part 110.

This proposal regarding pilotage requirements for Prince William Sound has been changed from the prior notice based on the written comments we received, and no longer includes matters not appropriate to the requirement of 46 U.S.C. 8502(g).

Information Collection

This proposed rule contains no new information collection requirements. The information collection requirements for the issuance of marine licenses have been submitted to the Office of Management and Budget for review under the Paperwork Reduction Act (44 U.S.C. 3501 *et seq*) and have been approved by OMB. The OMB approval numbers are listed in 46 CFR 10.107.

Evaluation

Based on the comments received, the proposals contained in the notice of proposed rulemaking of June 24, 1985 (50 FR 26117) have been changed and are republished in this supplemental notice.

These proposed regulations are considered to be non-major under Executive Order 12291, and non-significant under DOT regulatory policies and procedures (44 FR 11034; February 26, 1979). The economic impact of this supplemental proposal has been found to be so minimal that further evaluation is unnecessary. Since the impact of this proposal is expected to be minimal, the Coast Guard certifies that it will not have a significant economic impact on a substantial number of small entities. The principle cost is associated with the basic annual physical examination required to qualify as a pilot, and the magnitude of this cost would be proportionate to the number of individuals qualified. The proposals concerning when and on which vessels a pilot is required do not significantly change the present practice, therefore, there will be little or no impact associated with these proposals.

The proposal to permit individuals with 5 years experience on towing vessel combinations of at least 5,000 gross tons while acting under the authority of a license as master, mate, or operator of uninspected towing vessels, with a minimum of 2 of the 5 years having been on towing vessel combinations of at least 10,000 gross tons, to obtain, without a written examination, an endorsement as first class pilot, restricted to tug and barge combinations only, for those routes over which they have made the required number of round trips prior to (the effective date of the final rule), would accommodate the more experienced operators and would not compromise safety. It would be available to allow those individuals currently qualified by their experience to obtain a limited license. The applicant would be required to have the same number of round trips that the respective OCMIs require of other applicants for an endorsement as first class pilot.

Federalism

This rulemaking proposal has been analyzed in accordance with the principles and criteria contained in Executive Order 12612, and it has been determined that the proposed rulemaking does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

List of Subjects

46 CFR Part 10

Seamen, Marine Safety, Navigation (water), Passenger vessels.

46 CFR Part 15

Seamen, Vessels.

In consideration of the foregoing it is proposed that Part 10 and Part 15 of Title 46 of the Code of Federal Regulations be amended as follows:

PART 10—LICENSING OF MARITIME PERSONNEL

1. The authority citation for Part 10 continues to read as follows:

Authority: 46 U.S.C. 2103, 7101; 43 U.S.C. 1333(d); 49 CFR 1.46(b) and (z).

2. Section 10.707 is amended by revising paragraph (b), and adding a new paragraph (c) to read as follows:

§ 10.707 Examination requirements.

* * * * *

(b) An applicant for an extension of route or an endorsement as first class pilot, except as provided for in paragraph (c) of this section, is required to pass those portions of the examination described in Subpart I of this part that concern the specific route for which endorsement is sought.

(c) An applicant for an endorsement as first class pilot for a particular route, restricted to tug and barge combinations only, is not required to pass an examination, provided the applicant has 5 years service on towing vessel combinations of at least 5,000 gross tons while acting under the authority of a license as master, mate, or operator of uninspected towing vessels, with a minimum of 2 of the 5 years having been on towing vessel combinations of at least 10,000 gross tons, for those routes over which the applicant has made the required number of round trips prior to (the effective date of the final rule). For an applicant exempt from examination under this paragraph, the minimum number of round trips to be required is contained in § 10.705 (c).

PART 15—MANNING REQUIREMENTS

3. The authority citation for Part 15 continues to read as follows:

Authority: 46 U.S.C. 2103, 3703, 8105, 8901, 8902, 8903, 8904, 9102; 50 U.S.C. 198; 49 CFR 1.46(b).

5

Section 15.812 is amended by revising raphs (a) introductory text, (a)(1), roductory text, (c)(2), (d), and (e) uctory text, by redesignating graph (g) as paragraph (f), and by ng paragraphs (a)(3), (b), (c)(3), and (g) to read as follows:

§ 15.812 Pilots.

(a) The following vessels, not sailing on register, when underway on the navigable waters of the United States, except as provided in paragraph (g) of this section, and such other waters identified as first class pilotage waters, must be under the direction and control of an individual qualified to serve as pilot under paragraph (c) of this section as appropriate:

(1) Vessels propelled by machinery and subject to inspection under 46 U.S.C. Chapter 33, and tank barges subject to inspection under 46 U.S.C. Chapter 37, that are authorized by their Certificates of Inspection to proceed beyond the Boundary Line established in Part 7 of this chapter.

* * * * *

(3) Vessels in exces of 1,600 gross tons, propelled by machinery and subject to inspection under 46 U.S.C. Chapter 33, that are not authorized by Certificates of Inspection to d beyond the Boundary Line shed in Part 7 of this chapter, and are not underway on the Great s.

(b) First class pilotage waters are designated by the Officer in Charge, Marine Inspection (OCMI) for those waters within the OCMI's zone, where, in the OCMI's direction, local expertise is necessary. The waters determined to be first class pilotage waters within a particular Marine Inspection Zone and the specific requirements for qualifying to serve as pilot on those waters may be obtained from the OCMI concerned.

(c) The following individuals are qualified to serve as a pilot:

* * * * *

(2) For a vessel underway on those navigable waters of the United States not designated as first class pilotage waters, an individual holding a valid license issued by the Coast Guard as master, mate, or operator, employed aboard a vessel within the restrictions of his or her license provided he or she:

(i) Has reached the age of 21 years;

(ii) Complies with the currency of knowledge provisions of 46 CFR 10.713 of this chapter; and,

(iii) Has a current physical nation in accordance with the ons of 46 CFR 10.709; or,

or a vessel underway on the navigable waters of the United States designated as first class pilotage waters or other waters designated as first class pilotage waters, an individual qualifying under paragraph (c)(2) of this section, subject to the limitations of paragraphs (d) and (e) of this section.

(d) A licensed individual qualifying under paragraph (c)(3) of this section may serve as pilot of a vessel of not more than 1,600 gross tons propelled by machinery, described in paragraphs (a)(1) or (a)(2) of this section, provided the individual has four round trips over the route to be traversed while in the wheelhouse as watchstander or observer. One of the round trips must be made during the hours of darkness if the route is to be traversed during darkness.

(e) A licensed individual qualifying under paragraph (c)(3) of this section may serve as pilot of tank barges totaling not more than 10,000 gross tons, described in paragraphs (a)(1) or (a)(2) of this section, provided the individual:

* * * * *

(g) Vessels are excluded from pilotage requirements when entering or departing Prince William Sound, Alaska, via Hinchinbrook Entrance, and:

(1) Proceeding directly to or from the established Valdez/Whittier pilot station at Rocky Point (Latitude 60°57.1′ N., Longitude 146°46.0′ W.), or

(2) Proceeding directly to or from the established Cordova pilot station at Sheep Point (Latitude 60°37.0′ N., Longitude 146°00.0′ W.), or

(3) Proceeding directly to or from a designated anchorage described in 33 CFR Part 110.

Dated: March 29, 1988.

J.W. Kime,

Rear Admiral, U.S. Coast Guard, Chief, Office of Marine Safety, Security and Environmental Protection.

[FR Doc. 88-12664 Filed 6-3-88; 8:45 am]

BILLING CODE 4910-14-M

EXHIBIT V

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT W

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT X

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT Y

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT Z

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT AA

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT AB

WAS NOT ADMITTED INTO EVIDENCE

recognized ship routes; it shall avoid, as far as practicable, the fishing banks of Newfoundland, north of latitude forty-three degrees north during the fishing season; and shall, as far as circumstances will permit, pass outside of the regions reported or known to be endangered by ice.

(b) If the owner, or operating agent, of any such passenger vessel fails to comply with this section, he shall for each offense be liable to a fine not exceeding $100.

June 25, 1936, c. 807, § 3, 49 Stat. 1923.

Historical Note

Transfer of Functions. Secretary of Transportation has been substituted for Secretary of the Treasury pursuant to Pub. L. 89-670, Oct. 15, 1966, 80 Stat. 931, which created the Department of Transportation and transferred all functions, powers, and duties, relating to the Coast Guard, of the Secretary of the Treasury and of other offices and officers of the Department of the Treasury to the Secretary of Transportation. See section 1655(b)(1) of Title 49, Transportation. Section 1655(b)(2) of Title 49, however, provided that notwithstanding such transfer of functions, the Coast Guard shall operate as part of the Navy in time of war or when the President directs as provided in this section.

Library References

Shipping ⚿11. C.J.S. Shipping § 5.

Code of Federal Regulations

Notice provisions, see 33 CFR 105.01 et seq.

§ 738c. Speed of vessel in ice region; penalty

(a) The master of every vessel of the United States, when ice is reported on or near his course, shall proceed at a moderate speed or alter his course so as to go well clear of the danger zone.

(b) If the master of any such ship fails to comply with this section, he shall for each offense be liable to a fine not exceeding $500.

June 25, 1936, c. 807, § 4, 49 Stat. 1923.

Library References

Shipping ⚿ 11, 16. C.J.S. Shipping §§ 5, 11.

§ 738d. Publication of rules and regulations in Federal Register

All rules and regulations, except such as have no general applicability and legal effect or are effective only against Federal agencies or persons in their capacity as officers, agents, or employees thereof, issued, prescribed, or promulgated pursuant to authority contained in sections 738 to 738d of this title, shall be forwarded forthwith to the Division of the Federal Register in The National Archives for filing and publishing in the Federal Register.

June 25, 1936, c. 807, § 5, 49 Stat. 1924.

[redacted]

[redacted]

§ 738c. Speed of vessel in ice region; penalty

(a) The master of every vessel of the United States, when ice is reported on or near his course, shall proceed at a moderate speed or alter his course so as to go well clear of the danger zone.

DEFENDANT

EXHIBIT NO. AC

ADMITTED ☒ Trial

89-7217 CR
89-7218 CR

(CASE NUMBER)

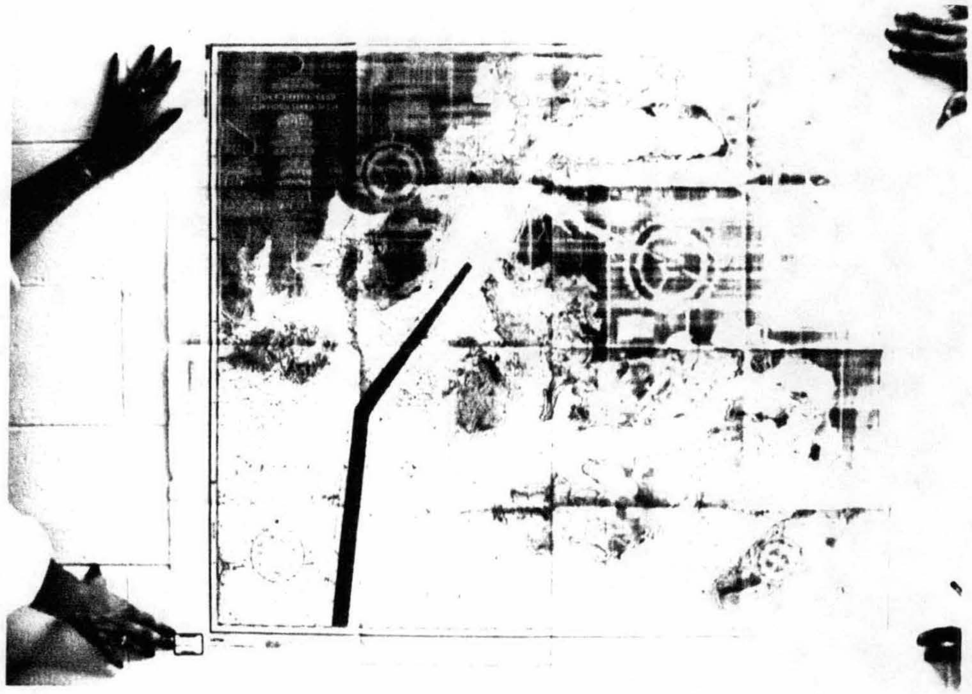


Exhibit # AD

DEFENDANT

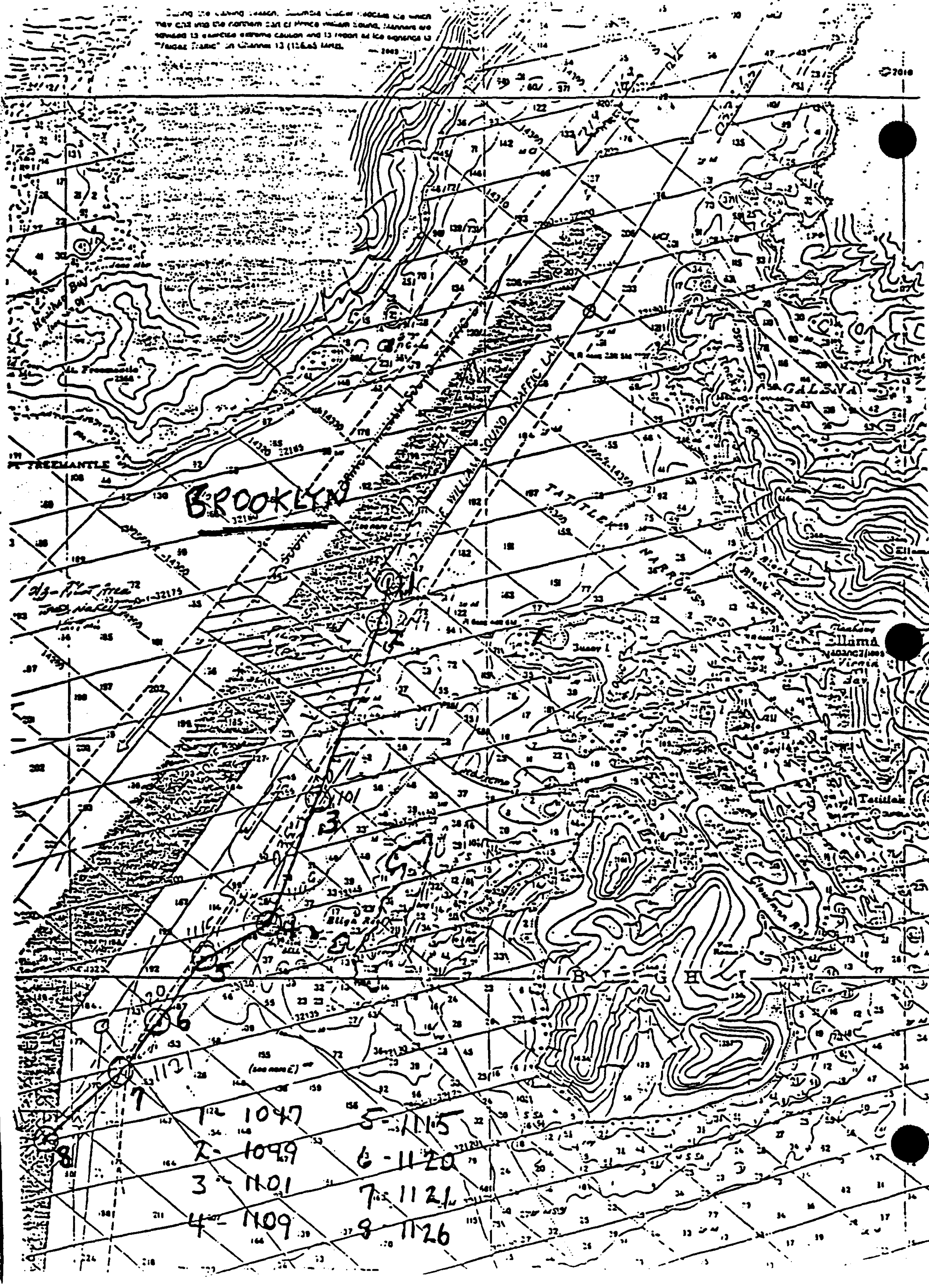
EXHIBIT NO. AE

ADMITTED ~~D~~ Trial

89-7217 CR

89-7218 CR

(CASE NUMBER)



BROOKLYN
Pt. FREEMANTLE
Mt. Freemantle
TATITLEK NARROWS
PRINCE WILLIAM SOUND TRAFFIC LANE
GALENA
Ellamar
Busby I
Bligh Rf
B I G H T
1 - 1047
2 - 1049
3 - 1101
4 - 1109
5 - 1115
6 - 1120
7 - 1121
8 - 1126

DEPT. OF TRANSP., U.S. COAST GUARD, CG-5208 (4-79) FILE NO. gch

SERIAL NUMBER ISSUE NO. 2-5

008453

UNITED STATES COAST GUARD

MASTER

LICENSE

This is to certify that *** GREGORY C. KNOWLTON ***

having been duly examined and found competent by the undersigned, is licensed to serve as Master of United States Steam or Motor Vessels of any Gross Tons upon Oceans

ALSO; RADAR OBSERVER (UNLIMITED) EXPIRES 24 JULY 1990. ALSO FIRST CLASS PILOT OF STEAM OR MOTOR VESSELS OF ANY GROSS TONS UPON THE WATERS OF PRINCE WILLIAM SOUND BETWEEN HINCHINBROOK ENTRANCE AND BUSBY ISLAND, ALASKA *******************************

for the term of five years from this date.

Given under my hand this 16TH *day of* MARCH, 19 88.

MIAMI, FLORIDA — *Port*

BY DIRECTION OF THE

C.L. RUSSELL — *Officer in Charge of Marine Inspection*

STATES COAST GUARD 1790

DEFENDANT EXHIBIT NO. AF
ADMITTED Trial
89-7217 CR
89-7218 CR
(CASE NUMBER)

'90 11:42 FOSS MARITIME VALDEZA P.2/3

Additional Endorsements: ____________________

Signature of Licensee ____________________ LEFT THUMB PRINT

Z or Book Number SSN# 004-48-5455

Date of Birth 11/21/51

Place of Birth PORTLAND, MAINE

Present Address 4118 FLORAL DRIVE BOYNTO ACH, FLORIDA 33436

EXHIBIT AG

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT AH

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT AI

WAS NOT ADMITTED INTO EVIDENCE

Upon arriving on board the Exxon Valdez on April 2, 1989 during PM hours the following positions of the ship was ascertained as follows;

A- Position as laid down on chart 16708 by ship's Officers.
Lat. 60° 51.4' N; Lo. 146°52.4' W;

B- At 1540 position using radartaking following coordinates.
Bearing tangent to west end of Busby Island- 033°, 2.95 mi. off.
Bearingtangent to SW point of Reef Island- 129°, .96 mi. off.
Lat. 60° 51.35 N. Lo. 146° 52.1 W.

C- Position as read from SATNAV unit at 1545 LT
Lat 60°-51.29 N. Lo.- 146° 52.35 W.

D- Position using starboard bridge wing repeater and Azimuth Circle.
Busby Island light, bearing 032°
A tangent to SW corner of Reef Island, bearing 129°.
A tangent to North side of unnamed rock to the north of Reef Island bearing 072°.
Lat; 60°-51.35' N., Lo. 146°-52.1 W.

The four different positions, taken by different methods and in one case by a different person (a ship's Officer) are within .1 of a nautical mile and all show the vessel to be grounded on Bligh Reef.

At the times of positions B,C,and D the ship's gyro heading was 294°, all repeaters were 294°., radars were used in a North up presentation.

The closeness of the 4 fixes indicate that the ships equipment that was used is in operable condition and could be used to determine an accurate position.

Robert Beevers
Captain Robert Beevers

COPY

DEFENDANT
EXHIBIT NO. AJ
ADMITTED ☑ Trial
89-7217 CR
89-7218 CR
(CASE NUMBER)

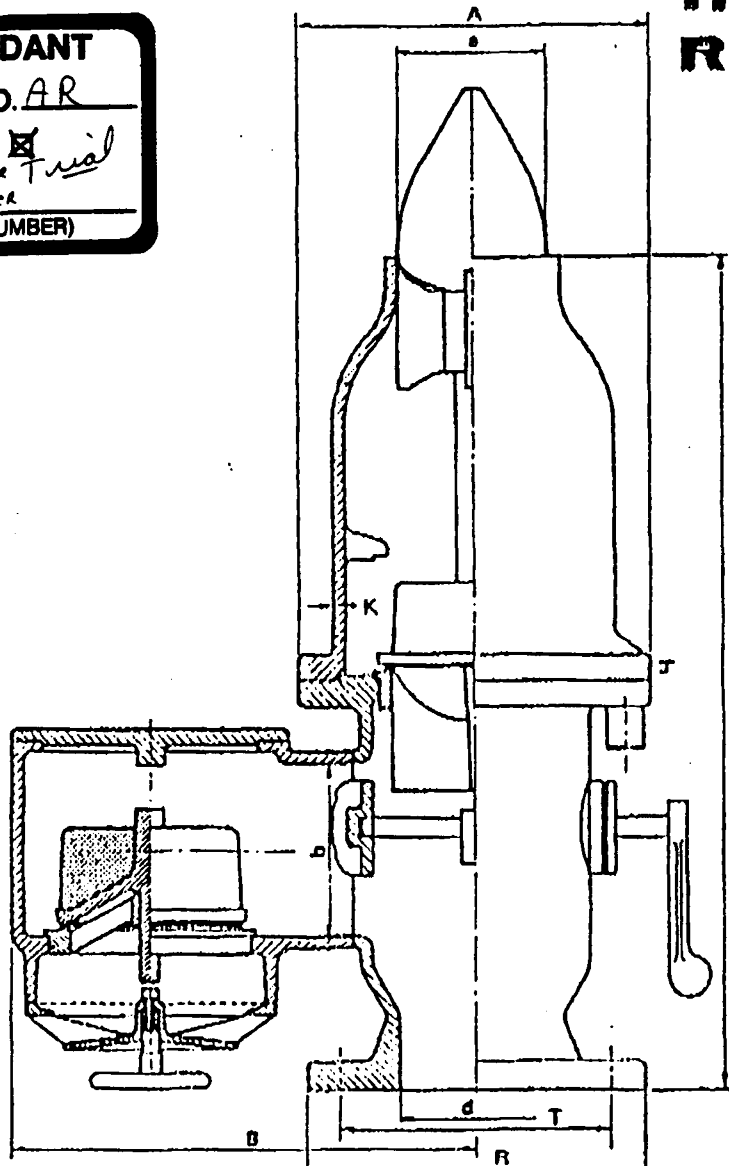
~~001428~~

001032

4/5/89 1:50am JM
Rec'd. From [illegible]

DEFENDANT
EXHIBIT NO. AR
ADMITTED ☒ Trial
89-7217 cr
89-7218 cr
(CASE NUMBER)

TYPE HS-M High Speed Relief Valve



Material — Bronze, Cast Iron or Stainless Steel

All dimensions are in inches. MM dimensions are available upon request. Valves with 3, 5, 7, or 12 inch diameters are available upon request. B.C. designates Bolt Circle.

a (dia.)	b (dia.)	d (dia.)	A (dia.)	H	B	R (dia.)	T (B.C.)	Holes (qty.-dia.)	Wt. (lbs.)
2-1/2	2-1/2	2-1/2	7	18	14	7	5-1/2	(4) - 3/4	100
4	4	4	9	21	17	9	7-1/2	(8) - 3/4	170
6	6	6	12-1/2	23	18-1/2	11	9-1/2	(8) - 7/8	200
8	8	8	16	32-1/2	21	13-1/2	11-3/4	(8) - 7/8	500
10	10	10	19	35	24	16	14-1/4	(12) - 1	680

Approved by U.S. Coast Guard

Waukesha PRES-VAC

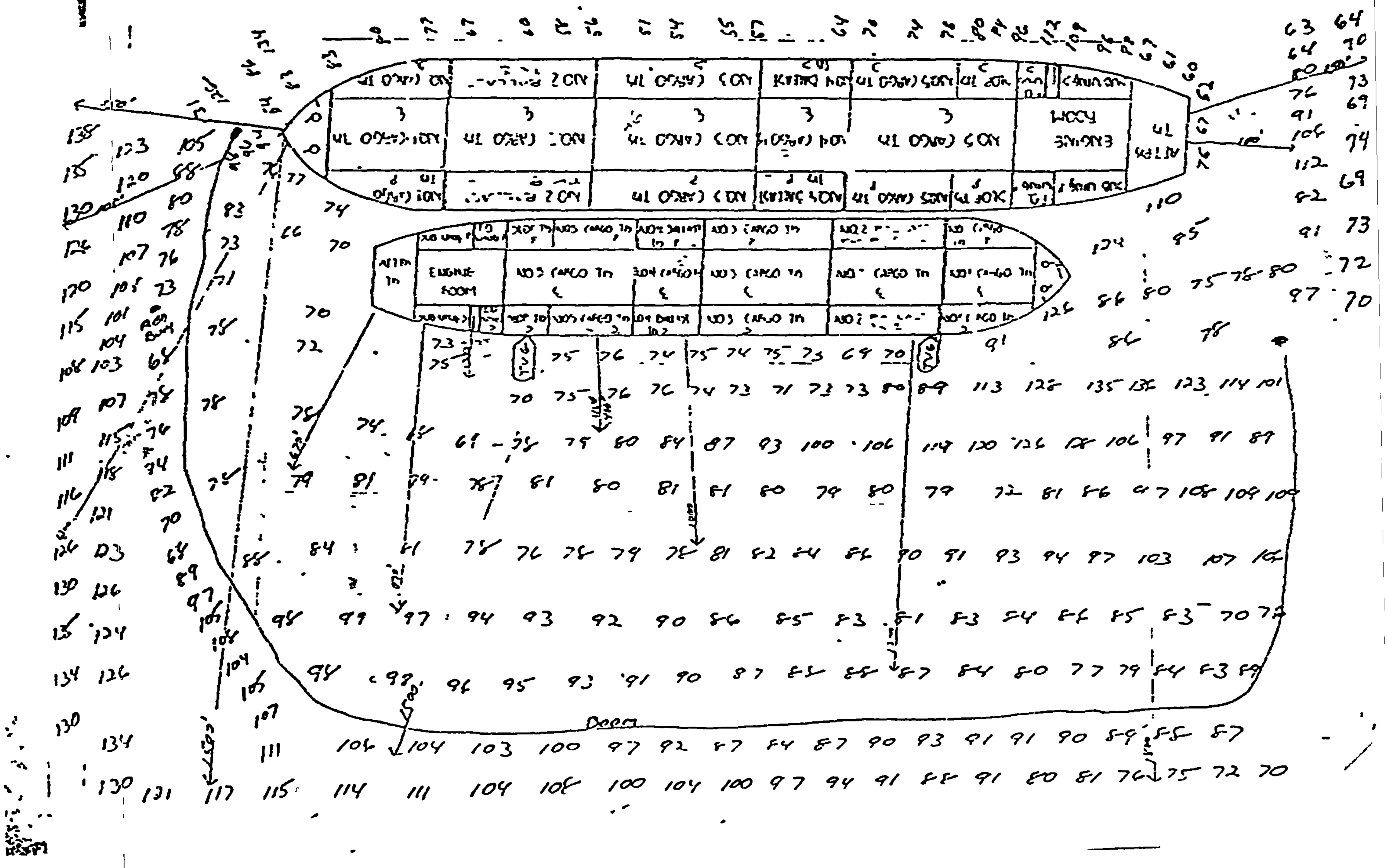
P. O. Box 798 ▪ Waukesha, Wisconsin 53186 ▪ Phone: 414-547-3381

Readings take 0930 - 4/2/69 ... All soundings in feet

Drafts = P ... Fwd S ...

Drafts = P 46 Midship S 60 6" 60'6"

Draft Aft P ... S ...



DEFENDANT EXHIBIT NO AK ADMITTED Trial

...9-7217... ...9-7218...

(CASE NUMBER)

EXHIBIT AL

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT AM

WAS NOT ADMITTED INTO EVIDENCE

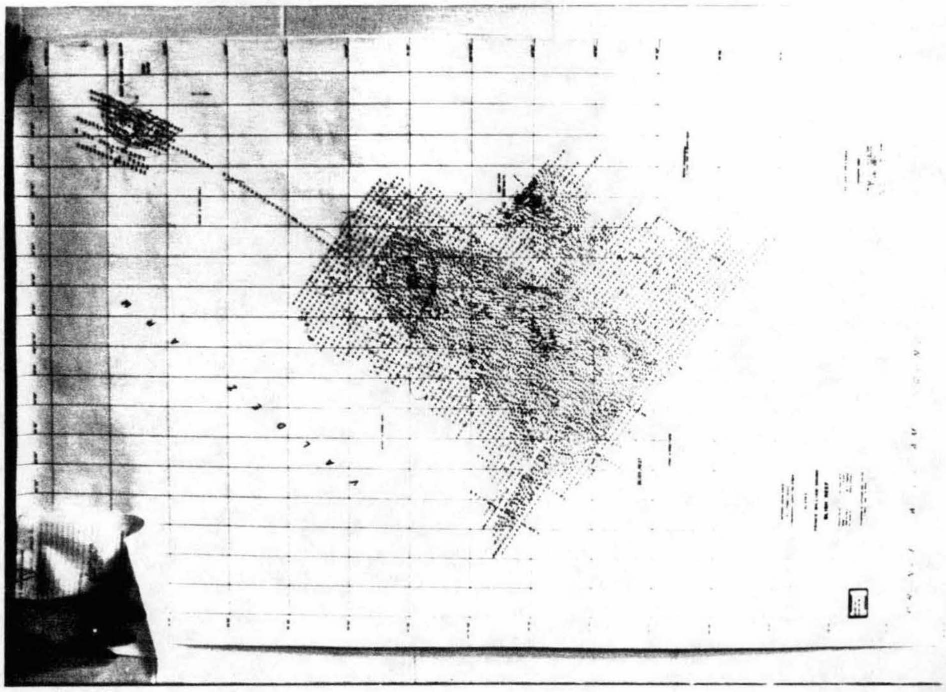


Exhibit # AN

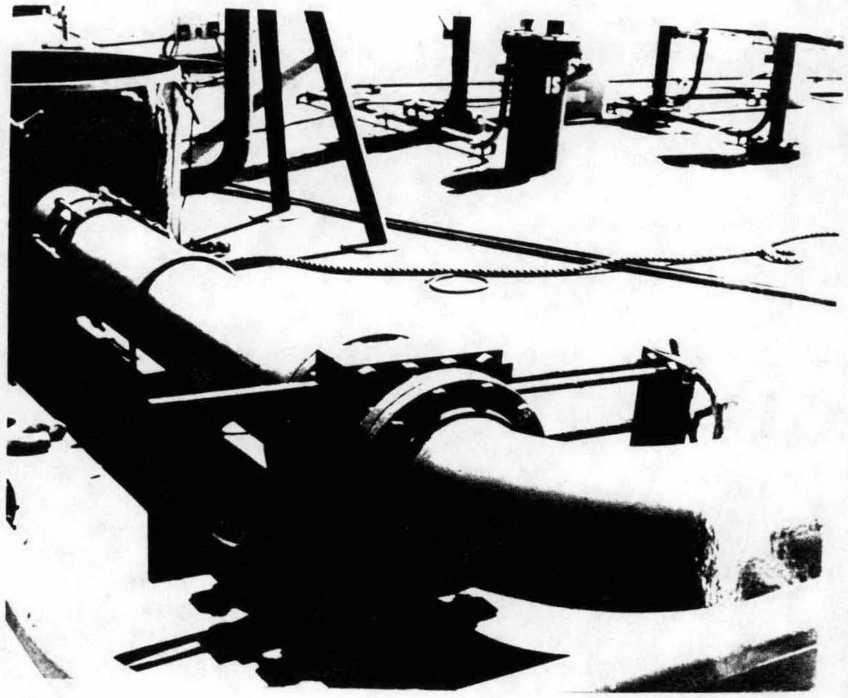


Exhibit # AO

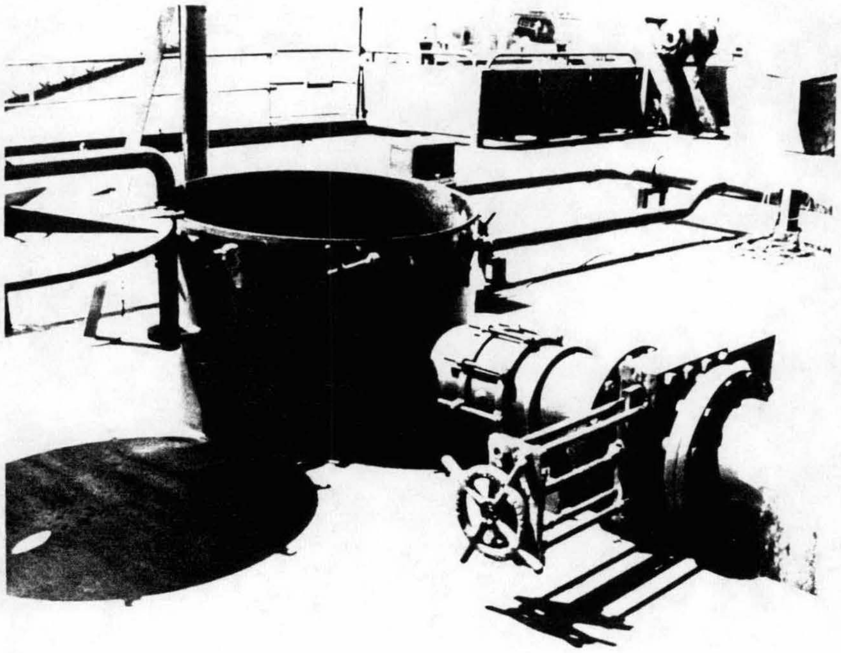


Exhibit # AP

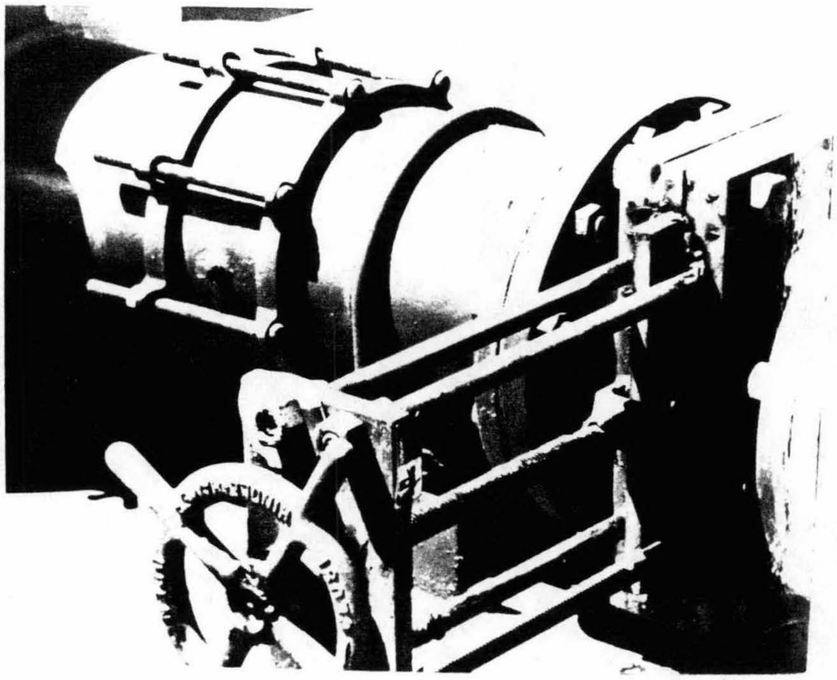
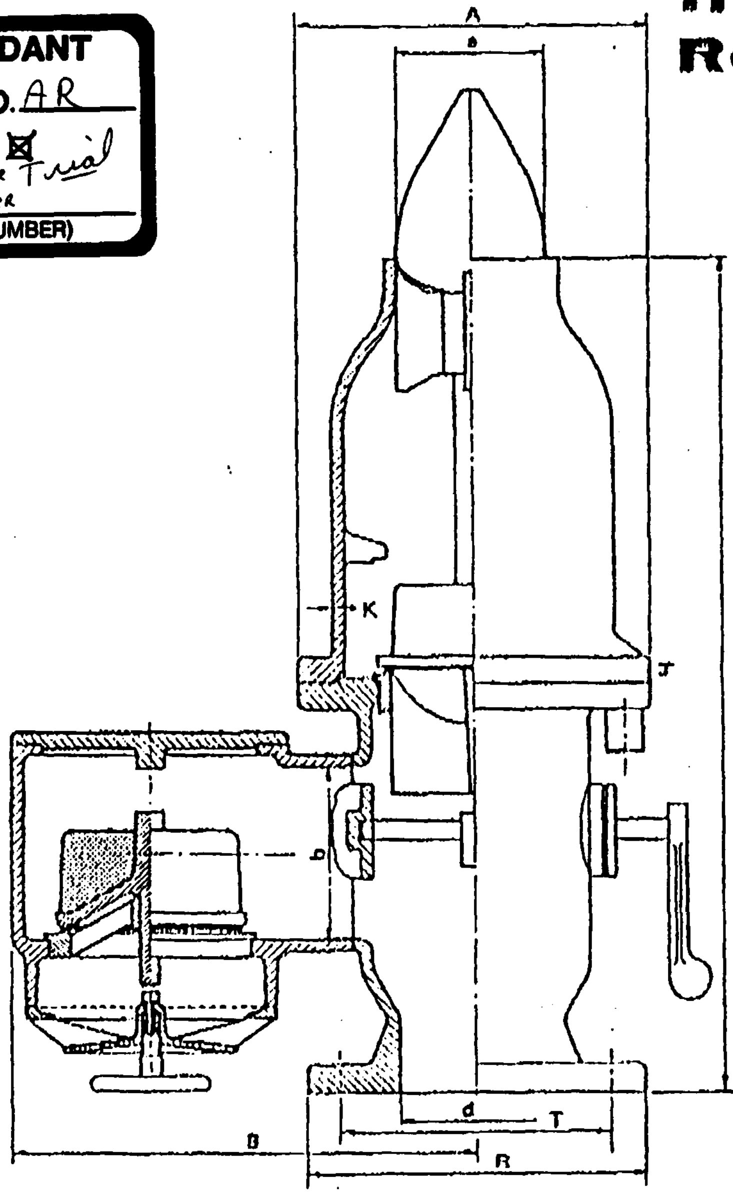


Exhibit AQ

DEFENDANT
EXHIBIT NO. AR
ADMITTED ☒ Trial
89-7217cr
89-7218cr
(CASE NUMBER)

TYPE HS-M High Speed Relief Valve



Material — Bronze, Cast Iron or Stainless Steel

All dimensions are in inches. MM dimensions are available upon request. Valves with 3, 6, 7, or 12 inch diameters are available upon request. B.C. designates Bolt Circle.

a (dia.)	b (dia.)	d (dia.)	A (dia.)	H	B	R (dia.)	T (B.C.)	Holes (qty.-dia.)	Wt. (lbs.)
2-1/2	2-1/2	2-1/2	7	18	14	7	5-1/2	(4) - 3/4	100
4	4	4	9	21	17	9	7-1/2	(8) - 3/4	170
6	6	6	12-1/2	23	18-1/2	11	9-1/2	(8) - 7/8	200
8	8	8	16	32-1/2	21	13-1/2	11-3/4	(8) - 7/8	500
10	10	10	19	35	24	16	14-1/4	(12) - 1	680

Approved by U.S. Coast Guard

Waukesha PRES-VAC

P. O. Box 798 ▪ Waukesha, Wisconsin 53186 ▪ Phone: 414-547-3381

DEFENDANT
EXHIBIT NO. A5
ADMITTED Trial
89-7217 CR
89-7218 CR
(CASE NUMBER)

05/01/89 PAGE 1 DETAILS OF ITEMIZED CALLS 835-4483 2230

FROM NUMBER TO NUMBER RATE PERIOD
DATE FROM PLACE TO PLACE R ST MR AMOUNT C TP MINS CTIME LIB/SERL

03/23 907/835-4483 907/563-5566 DAY 0.90 4 1A 1 [redacted]
VALDEZ AK ANCHORAGE AK 1 3 4 Q4
03/21 [redacted] DAY 0.70 4 1A 2 [redacted]
[redacted] 1 8 4 Q4
03/23 [redacted] DAY 0.90 4 1A 3 [redacted]
[redacted] 1 3 4 Q4
03/21 [redacted] DAY 0.86 4 1A 3 [redacted]
[redacted] 4 Q4
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03/23 [redacted] 1.86 4 1A 7 [redacted]
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[redacted] CA 1 8 4 Q4 [redacted]

M26

05/01/89 PAGE 2 DETAILS OF ITEMIZED CALLS 835-4483 2230

[redacted] RATE PERIOD
DATE [redacted] AMOUNT C TP MINS CTIME [redacted]

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[redacted] 4 Q4
03/21 [redacted] 1.45 4 1A 5 [redacted]
[redacted] 4 Q4
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[redacted] 4 Q4
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03/22 [redacted] 0.82 4 1A 3 [redacted]
[redacted] 4 Q4
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[redacted] 1.18 4 1A 2 [redacted]
[redacted] 4 1A 33 [redacted]
[redacted] 0.47 4 1A 5 [redacted]

K

CAS DETAIL TRANSACTION REPORT

******CREDIT REQUEST ATTRIBUTES****** TXN ATTRIBUTES * ACCT ATTRIBUTES

CARDMEMBER NUMBER	S/E NUMBER	S E TYPE	AMOUNT	RESULT	AUTH ID	A TIME	P CNTR	TYPE SPC	DAY	TIME	AA S#	ACCT ATTRIBUTES
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3728-344397-41002								AS SPOC	083	13:00		AIR WARN SUPPORT
3728-344397-41002*	MULTI ACCT ATTRIBUTES											NEG CRDT MON
3728-344397-61000	631-102-081-2	C-DINING	140	23				CR POS PAD	078	13:57	00000	
3728-344397-81008	321-501-743-5	A-SHOPS	93	15				CR ENVOY	083	17:08	00000	
3728-344397-91008*	321-570-278-8	I-DEPT	35	21				CR JLHUDSO	084	11:24	00000	CM-1 00093
3728-344398-01004	631-452-942-9	A-SHOPS	50	19				CR POS PAD	078	14:06	00000	CM-1 00718
3728-344398-01004*	631-450-659-3	A-SHOPS	53	APPR	A		SPOC	PA VALIDPN	078	15:09	00000	CM-1 00768 SE-- 00050
3728-344398-01004*	504-671-046-3	J-MAIL	12	23				CR WLSTARG	081	16:53	00000	CM-2 00827
3728-344398-01004*	229-670-136-0	J-MAIL	35	21				CR DMKTG	082	18:44	00000	CM-2 00839 SE- 00012
3728-344398-51009	699-362-000-4	M-CAR RNT	1	23				CR VLIDATA	082	12:51	00000	CM-2 00484 SE-1 00100
3728-344398-61024	799-270-010-4	D-TRAVEL	278	APPR	A		SPOC	PA ARINC	081	15:59	00000	
3728-344398-61024*	105-390-021-3	M-CAR RNT	1	APPR	[illegible]		SPOC	PA VALIDPN	081	20:25	00000	CM-1 00278
3728-344398-61024*	105-397-667-6	M-CAR RNT	350	21				CR NATL DT	081	21:12	00000	CM-1 00279 SE-- 00001
3728-344398-61024*	105-010-725-9	B-ACCOM	1	23				CR POS PAD	081	22:08	00000	CM-- 00629
3728-344398-93001	631-530-027-7	A-SHOPS	97	15				CR EROC	061	13:40	00000	CM-2 00231 SE-1 00107
3728-344399-01002	990-562-140-6	A-SHOPS	65	18				CR B AIRES	079	11:14	00000	BANK SUSP
3728-344399-01002*		CURRENCY CONVERSION		CODE : ARP		AMOUNT :		2,555.00				
3728-344399-01002*	990-100-497-8	C-DINING	122	23				CR ARG/POS	081	11:02	00000	BANK SUSP CM-- 00065
3728-344399-01002*		CURRENCY CONVERSION		CODE : ARP		AMOUNT :		4,770.00				
3728-344400-11015	3[illegible]2-670-271-1	J-MAIL	39	2[illegible]				CR SPEIGEL	084	14:34	00000	CM-1 00063 SE-1 00063
3728-344400-22004	410-570-426-6	I-DEPT	103	23				CR VLIDATA	083	14:36	00000	BANK SUSP
3728-344400-22004*	410-103-237-3	C-DINING	20	22				CR POS PAD	084	17:08	00000	BANK SUSP CM-- 00103
3728-344400-51011	220-450-310-6	A-SHOPS	19	23				CR MABANCO	084	14:25	00000	
3728-344401-41010	237-650-511-1	A-SHOPS	197	23				CR EROC	082	11:47	00000	
3728-344401-61000	631-531-717-2	A-SHOPS	51	19				CR POS PAD	081	12:03	00000	
3728-344401-61000*	631-576-110-6	I-DEPT	85	16				CR JCPCOLB	082	15:42	00000	CM-1 00751
3728-344402-11003	899-590-000-8	A-SHOPS	200	22				CR VISA	080	17:38	00000	CM-3 01587
3728-344402-11003*	229-050-039-6	B-ACCOM	1	23				CR POS PAD	080	20:29	00000	CM-2 01787
3728-344402-11003*	722-382-004-4	M-CAR RNT	1	23				CR NATLCAR	083	13:11	00000	CM-4 01788
3728-344402-61008	899-590-000-8	A-SHOPS	167	23				CR VISA	079	06:30	00000	CM-4 00656 SE-1 00053
3728-344402-61008*	631-010-682-8	B-ACCOM	125	23				CR POS PAD	079	19:02	00000	CM-1 00823 SE-- 00021
3728-344402-61008*	799-270-049-6	D-TRAVEL	238	APPR	A		SPOC	PA ARINC	063	04:25	00000	CM-4 00874 SE-2 00561
3728-344402-82004	312-590-271-8	A-SHOPS	88	16				CR POS PAD	083	12:08	00000	
3728-344402-82004*	312-590-271-8	A-SHOPS	33	21				CR POS PAD	084	13:25	00000	CM-1 00088 SE-1 00088
3728-344402-91005	237-670-507-5	J-MAIL	86	16				CR POS PAD	079	09:49	00000	
3728-344403-31009	334-657-094-2	A-SHOPS	31	FENR	U	00:00	WPOC	CR EFT DS	078	16:17	00000	LOST NEG
3728-344404-53001	504-052-464-7	B-ACCOM	50	19				CR F DATA	079	16:01	00000	
3728-344405-81017								CU SPOC	082	08:54		LOST
3728-344406-22001	410-101-380-3	C-DINING	12	23				CR POS PAD	081	11:36	00000	CM-- 00050
~~3728-344408-91004*~~	~~799-410-001-4~~	~~A-SHOPS~~	~~55~~	~~19~~				~~CR NATL DT~~	~~082~~	~~16:01~~	~~00000~~	~~CM-- 00099 SE-[illegible]~~
3728-344409-61003	527-019-014-3	B-ACCOM	1	APPR	A		SPOC	PA VALIDPN	079	15:32	00000	
3728-344410-01015	409-570-133-0	I-DEPT	60	18				CR MERCSTR	084	11:44	00000	
3728-344410-41003	799-270-000-5	D-TRAVEL	390	APPR	A		SROC	PA ARINC	079	10:47	00000	CM-- 00050
3728-344411-32000	699-370-000-4	M-CAR RNT	1	23				CR AVIS	079	12:42	00000	CM-3 00353
3728-344411-32000*	699-370-000-4	M-CAR RNT	1	23				CR AVIS	079	12:43	00000	CM-3 00354 SE-- 00001
3728-344411-32000*	899-590-000-8	A-SHOPS	395	21				CR VISA	079	13:10	00000	CM-3 00355
3728-344411-32000*	899-590-000-8	A-SHOPS	431	20				CR VISA	079	15:14	00000	CM-4 00750 SE-1 00395

DEFENDANT EXHIBIT NO. AT
ADMITTED ☐ trial
89-7217 cr
89-7218 cr
(CASE NUMBER)

EXHIBIT AU

WAS NOT ADMITTED INTO EVIDENCE

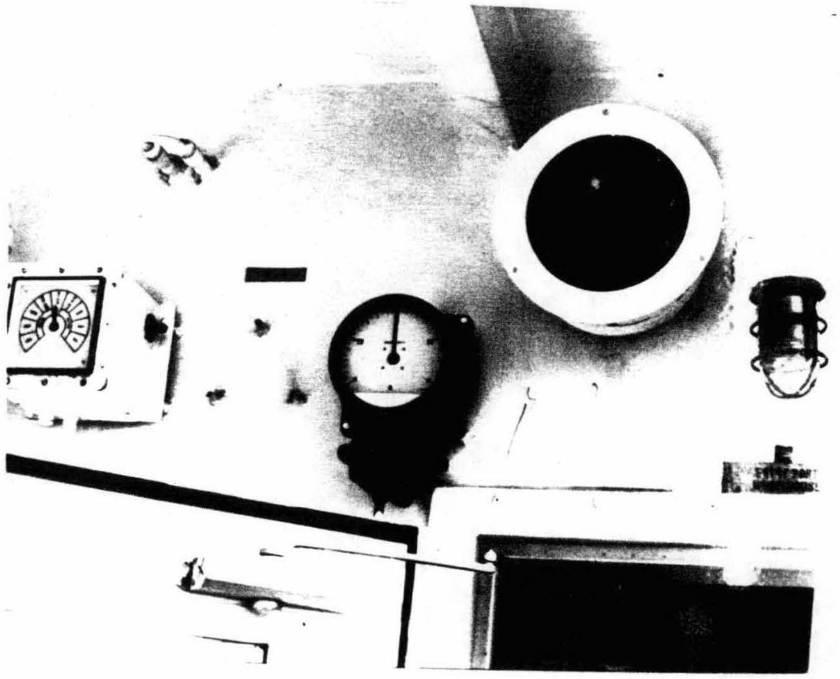


Exhibit # AV

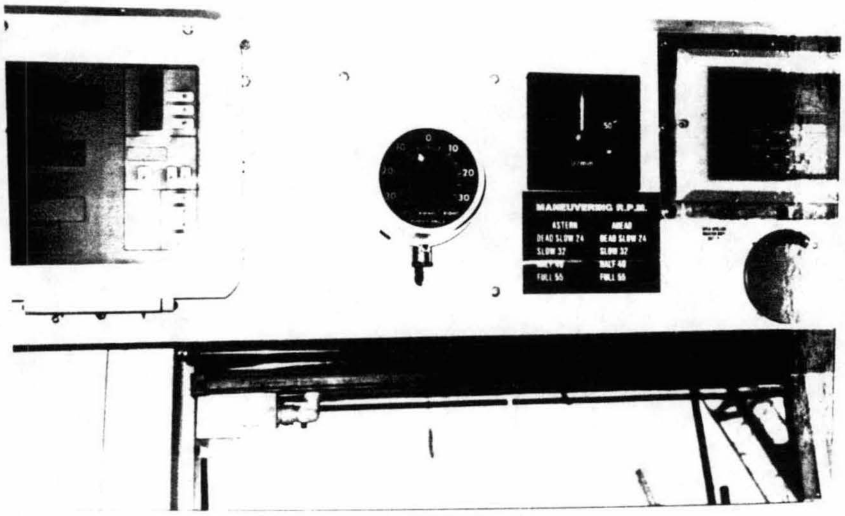
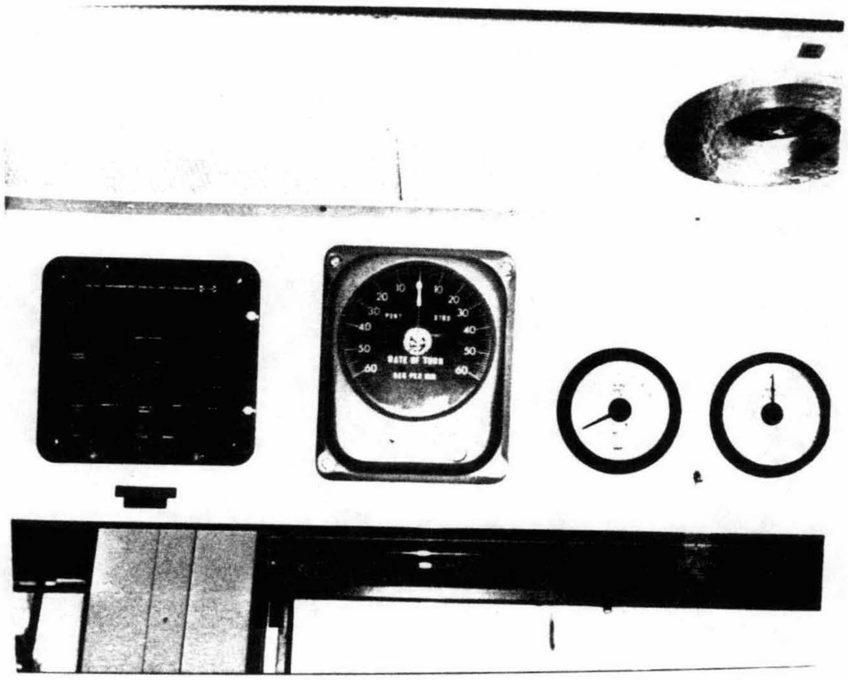

MANEUVERING R.P.M.
ASTERN
AHEAD
DEAD SLOW 24
DEAD SLOW 24
SLOW 32
SLOW 32
HALF 40
FULL 55
FULL 55

Exhibit # AW



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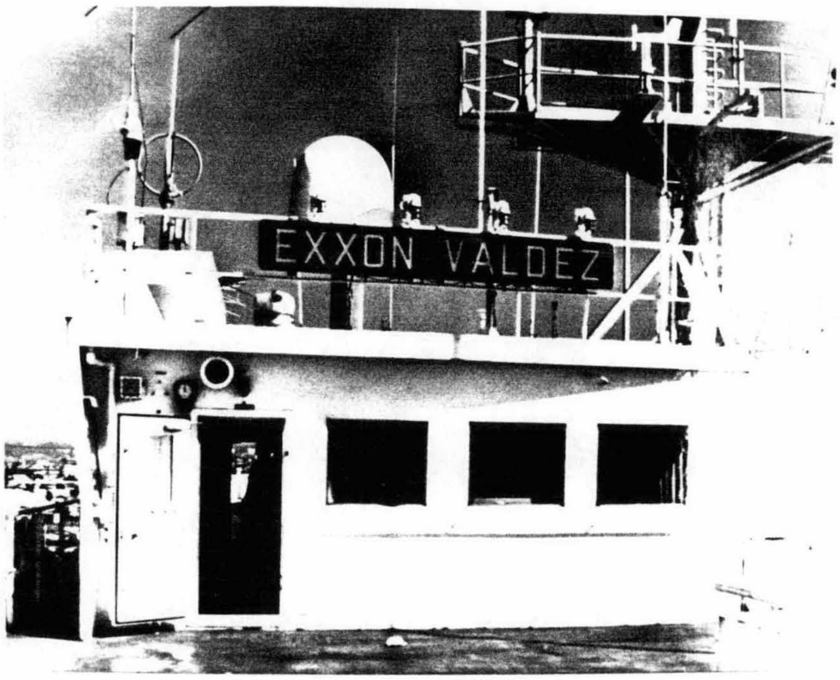

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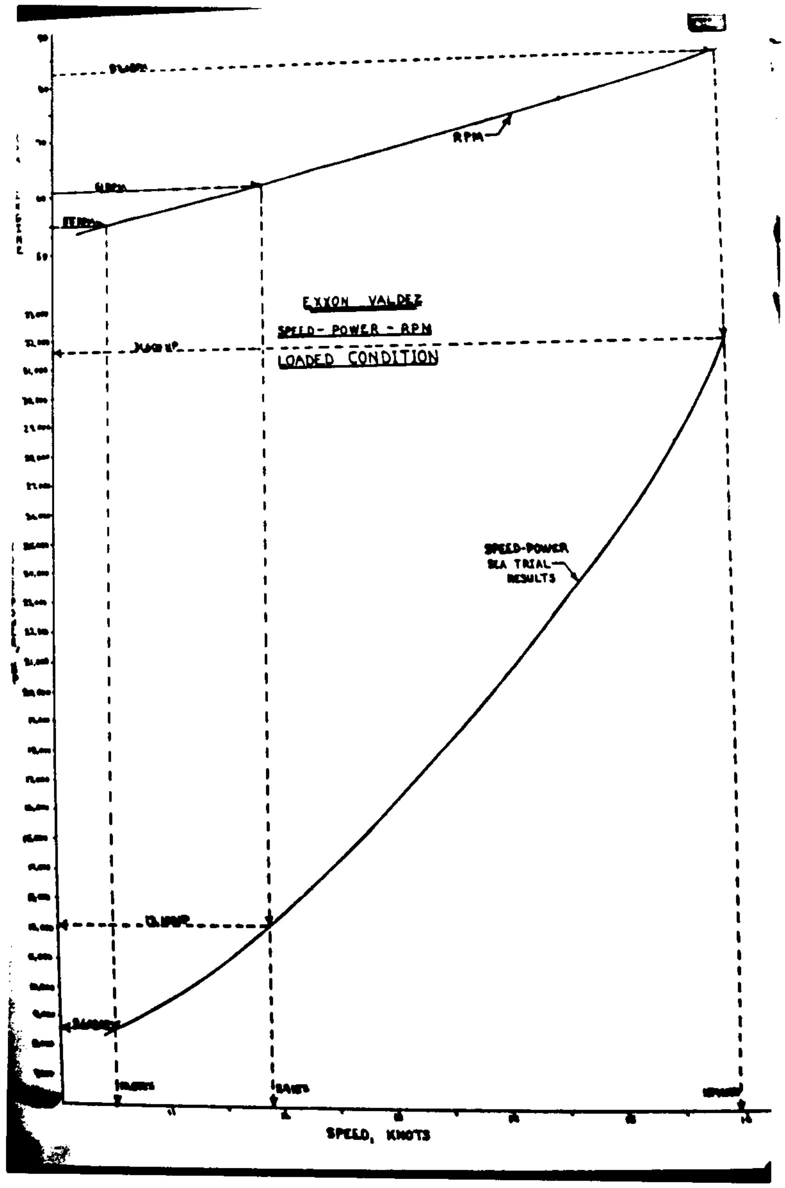


DEF Exhibit AZ

Large Chart Speed Power Curve

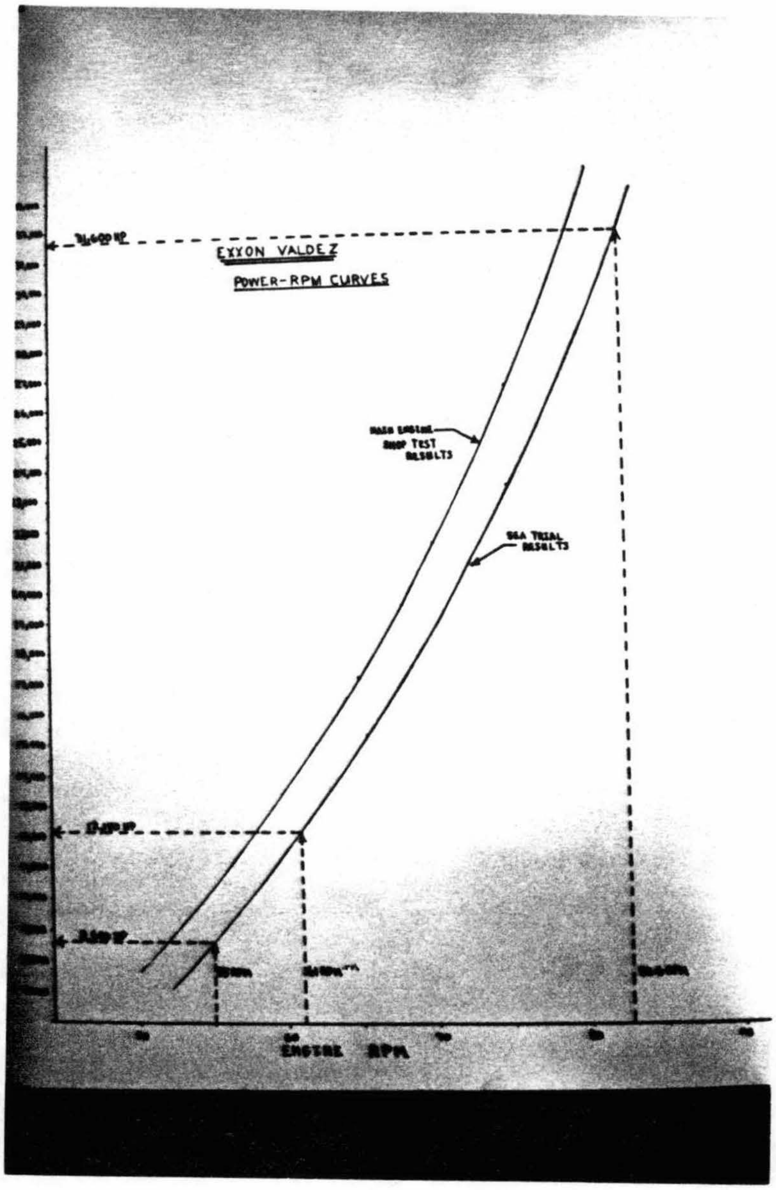
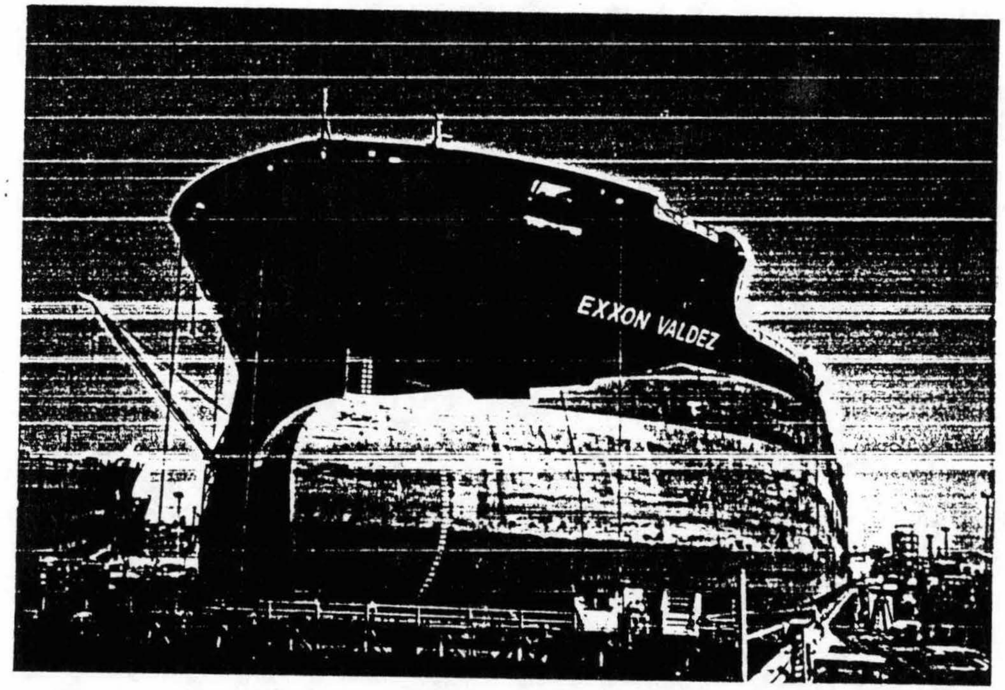


EXHIBIT-8A

LARGE chart POWER/RPM CURVES of Exxon Valdez

MT EXXON VALDEZ

INSPECTION REPORT - VESSEL AT NASSCO DRYDOCK, SAN DIEGO
Sep. 6, 1989



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(212) 980-6624
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telefax (516) 379-5809

Notes from the Inspection of the MT EXXON VALDEZ on Sep. 6, 1989 as she laid drydocked at NASSCO yard in San Diego.

Attendance: Mr. Michael Chalos, Attorney, Chalos, English & Brown
Mr. Thomas Russo, Attorney, Chalos, English & Brown
Mr. Dick Madson, Attorney (Alaska)
Mr. Joseph Weiner, Consulting Engineer
Capt. Michael (Shiras) Walker, Consulting Mariner, Navigation
Mr. Edward Hoffman, Naval Architect

Mr. H. Naughton, Exxon representative

The team inspected the MT EXXON VALDEZ (Length between Perpindiculars 945ft, Beam 166ft, Depth 88ft, Summer Draft 64.57ft with a Deadweight of 211,469LT) as follows:

A. Wheelhouse, including navigational equipment, chart space, cargo control room and accommodations.

B. Deck spaces, including ondeck piping layout and bow arrangement.

C. Engine Room, including engine control room, machinery rooms and steering gear space.

D. Hull plating, including fore peak, starboard wing tanks and center tanks.

A. WHEELHOUSE: The navigational space was neatly laid out with all the required navigational aides, data, charts and documents (refer to pictures attached P.8 thru P.12).

The navigational control 'island' was arranged (from port to starboard) with a Raytheon Radar (X-Band), Cargo Monitoring Display, Sperry Steering Helm System, Bridge-Engine Control System and the ARPA Raytheon (S-Band) radar (pictures P.9 & P.10). On the Cargo Monitoring stand, sound powered telephones were fitted (picture P.10).

The steering control system was a SPERRY SRD 2000 including a CRT display unit (picture P.9). The course recorder, located in the chart space was a SPERRY unit connected to the steering control system (picture P.11). The echo depth sounder was a RAYTHEON unit, R8220, located in the chart space with recording paper and a remote digital display was located at bridge front.

The radars, RDR CKT 2R-ER (S-Band) and CKT 1R-ER (X-Band) were RAYTHEON units including the RAYCAS ARPA unit for collision avoidance connected to the S-Band radar. The radio direction finder was a FURUNO make. The satellite navigator was a RAYTHEON make (RAYSAT 200). The Bridge-Engine control system for the main engine was a SULZER SBC3.1 control system (picture P.12).

On the port bulkhead at the wheelhouse door was the vessel's manuvering characteristics including turning circles, at full load and ballast load for both full speed and half speeds. Also included within the data was the following manuvering characteristics:

	RPM	SPEED
Full Sea Speed	87.6	15.96
Full Nav. Speed	55	10.8
Half Ahead Speed	40	7.9
etc.		

Also included in the table was the following elapsed times with the stopping distances considering the rudder angle at zero degrees (this is the distance the vessel travels from ahead to stop condition at the various speed conditions):

Speed Condition	Time	Distance
Full Sea Speed	10min	1.65 miles
Full Nav. Speed	6.2min	0.78 miles
Half Speed	5.3min	0.56 miles
Slow Ahead	4.9min	0.42 miles

It is important to note that all the data above was CORRECTED after a Rudder Modification in June 1988. The reasons for this rudder modification should be thoroughly explained.

On the separation bulkhead between the Navigation Bridge and the Chart Space, the Safety Plan (including Fire Stations), the Steering Gear System Operation Plan and also the General Arrangement Plan of the vessel were fitted.

The Navigation Bridge forward bulkhead (above the forward Wheelhouse windows) was fitted with the following navigational aides: Turning Speed Log, Gyro Repeater, Speed Log (AMETEK MRO-0100), Rudder Angle Indicator, Main Engine RPM Indicator, Sperry SR0331 Master Display, Depth Sounder, Rate of Turn (Deg. per min.) Meter, Anemometer and Anemonscope (wind speed and direction indicators) (picture P.10). Also at the forward bulkhead, various VHF telephone sets were fitted.

Installed below the overhead, just ahead of the helm to the starboard side of the centerline, was the reflector for the Magnetic Compass which was fitted, as usual, on the Compass Deck above the Wheelhouse. Also fitted below the overhead, just starboard of the Magnetic Compass, was a 'three-faced' rudder angle indicator (picture P.9). If one were to view this three-faced rudder angle indicator from the port side of the wheelhouse, depending upon where one was standing, the Magnetic Compass would obstruct the view to the rudder angle indicator.

The outside Bridge wings (port and starboard) were fitted with Gyro Repeators (picture P.8). On the weather deck side (outside of the wheelhouse), located above the Wheelhouse exit/entrance doors to the Bridge wings were a Rudder Angle and Main Engine RPM indicators (picture P.8). They were fitted with light dimmer switches for nightime viewing.

The arrangement of the Chart Space (aft of the Navigation Bridge space) was neat and tidy with charts tables, course recorder, echo sounder, satellite navigator instruments etc. clearly displayed without any obstructions (picture P. 11).

B. DECK SPACES: The on-deck piping layout including cargo piping, inert gas, electrical conduit piping, tank cleaning piping etc. were in good condition (picture P.8 & P. 14).

There was no indication of any buckling, sagging, hogging, cracking or any noticable deformations of the main deck plates or piping systems. All systems seemed to be in good operational order.

In the accommodations, the CARGO CONTROL ROOM was inspected and found to be in satisfactory condition although the cargo control computer was removed from the space (makers could not be determined) (picture P. 13).

The steam turbine driven Shinko Make Cargo Pumps are controlled from this space. The tank gaging system was a SAAB radar type system which incorporates the level gaging as well as the level alarms (high and low). The segregated ballast control and level gaging system were also located in this space.

C. ENGINE ROOM SPACES: The engine room was inspected and considered to be in good condition with no evidence of any buckling, cracking or deformations in the machinery or bilge space, as far as could be determined (pictures P.15 & P.16).

The Engine Control Room was fitted with the ususal machinery control gear as well as two CRT displays for main and auxiliary propulsion monitoring (picture P. 16). The SULZER slow speed RTA type engine is considered a good reliable make and model.

The steering gear spaces were inspected and found in good condition. The KAWASAKI make steering gear, rapson slide system, with two independent hydraulic pumping systems is a reliable and dependent system (picture P.16).

D. HULL PLATING: The port side plating as viewed from the top of the dock was considered in good condition and there was no indication of plate deformations throughout the parallel sides of the vessel.

On inspection, the bottom plates were obviously in poor condition. Basically from the centerline of the vessel to the starboard bilge keel all cargo as well as ballast tanks were ruptured, penetrated, cracked or deformed in some manner. The port side wing tanks were considered to be intact. The ruptured tanks would include the following:

Fore Peak Ballast Tank
No. 1 Starboard Wing Cargo Tank
No. 1 Center Cargo Tank
No. 2 Starboard Wing Ballast Tank
No. 2 Center Cargo Tank
No. 3 Starboard Wing Cargo Tank
No. 3 Center Cargo Tank
No. 4 Starboard Wing Ballast Tank
No. 4 Center Cargo Tank
No. 5 Starboard Wing Cargo Tank
No. 5 Center Cargo Tank

FORE PEAK BALLAST TANK: The bottom plating as well as the bottom longitudinal frames on the starboard side of the tank from the centerline were either missing, distorted, buckled, cracked and bent in such a way that total replacement would be necessary (picture P. 17). Between web frames 3 and 5 the bottom plate was set up into the tank about 6feet. It is evident that most of this severe damage was caused by the explosive impact of the vessel with the reef. The reasons for the steel being distorted in such a way was due to the force of the 210,000 ton vessel travelling at about 12 knots slamming into the rocky reef.

NO. 1 STARBOARD WING CARGO TANK (web frame space numbers 5 thru 13) (picture P.17 & P.18): Transverse Web Frame Space No. 5 thru 13, damage was evident from the longitudinal bulkhead separating the wing tank from the No. 1 Center Cargo Tank to the bilge strake plate (at the side of the vessel), part of the bottom plate was missing and the bottom longitudinal frames were distorted and bent with web frames buckled and deformed up and in the aft direction. The buckling and deformation of the steel web frames in the aft direction indicates a severe impact collision damage by the vessel with the hard rock reef formation. The distorted steel members were set up into the tank approximately 7feet. Also, in this tank, two rock boulders, one in the vicinity of web frame 10 and one at web frame 11, approximately 6 feet in diameter each, were wedged into the steel structure (picture P.18). It is evident that the necessary force required to wedge the hard rocks into the steel tank could only be attributable to the initial impact of the vessel slamming into the reef at 12knots.

NO. 1 CENTER CARGO TANK (web frame space numbers 5 thru 13): Transverse Web Frame Space No. 5 thru 13 from the centerline longitudinal frame to the starboard side of tank at the longitudinal bulkhead between the Center Tank and the Wing Tank, part of the bottom plate was missing, either sheared off or cut-off after the accident. The web frames as well as longitudinal frames were also buckled and deformed up into the tank, pushed in the aft direction from the initial collision with the reef. At the aft part of the Center Tank in some areas of the starboard side of the tank, the bottom plate was intact but longitudinal cracks and separations were evident. The longitudinal bulkhead between the Center Tank and No. 1 Starboard Wing Cargo Tank was buckled and deformed up into the tank. On the port side of the centerline longitudinal frame, the structural members seemed intact with no buckling or cracks evident. The intact slightly deformed bottom plates were deeply scratched running in the longitudinal direction indicating the rocky reef scraping the vessel's steel plate bottom during intial impact before the vessel came to rest. THESE DEEP SCRATCHES WERE EVIDENT THROUGHOUT THE VESSEL (picture P.19).

NO. 2 STARBOARD WING BALLAST TANK (web frame space numbers 13 thru 23): Transverse Web Frame Space No. 13 thru 23 from the longitudinal bulkhead to bilge strake (turn of bilge), bottom plate as well as most bottom longitudinal frames were either missing, buckled, deformed or distorted. The transverse web frames were buckled at the lower face connecting to the bottom plate and distorted bottom longitudinals in an aft direction. The vertical deformation of the longitudinal frames into the tank was estimate to be about 7 feet in some areas. The longitudinal bulkhead separating the No. 2 Wing and No. 2 Center Cargo tanks was deformed and buckled. This type of buckling of the longitudinal bulkhead as well as the deformation of the longitudinal and transverse webs frames is attributable to the initial collision of the vessel with the reef.

NO. 2 CENTER CARGO TANK (web frame space numbers 13 thru 23): Transverse Web Frame Space No. 13 thru 20 from the longitudinal centerline frame for six longitudinal frame spaces to the starboard side of tank, the bottom plate was missing and the six longitudinal frames were deformed, bent and buckled up into the tank about 6 feet. The bottom of the transverse web frames were buckled in the aft direction at the bottom plate connection. The bottom plate was missing, either being sheared off or cut off after the accident. Further starboard of the six longitudinal frame spaces, the bottom plate was intact but cracks and frame separations were evident. Deep longitudinal scratches were evident on the bottom plate. From Web Frame Space No. 21 thru 23, bottom shell plate was mostly missing for the entire starboard side and the bottom longitudinal frames were deformed and distorted upward and pointing aft into the tank. The remaining longitudinal frames were also distorted and cracked in some areas. There also was buckling of the longitudinal bulkhead between the center tank and No. 2 Starboard Wing Ballast Tank (see NO. 2 STARBOARD WING WATER BALLAST TANK, above). On the port side of the centerline longitudinal frame, the structural members seemed mostly intact but with some evidence of cracks and separation of the longitudinal frames from the bottom shell plate.

NO. 3 STARBOARD WING CARGO TANK (web frame space numbers 23 thru 34): (SAME AS NO. 2 STARBOARD WING BALLAST TANK): (picture P.20): Transverse Web Frame Space No. 23 thru 34 from the longitudinal bulkhead to bilge strake (turn of bilge), most of the bottom plate as well as the bottom longitudinal frames were either missing or totally bent, deformed and distorted. The transverse web frames were buckled at the lower face connecting to the bottom plate and bottom longitudinal frames pushed in an aft direction. The shell plate at the turn of the bilge was heavily set-up and pushed outward of the vertical side of the ship. This type of damage could have been caused by either impact of the vessel hitting the reef or the sitting on the reef and the subsequent high and low tides. The longitudinal bulkhead between No. 3 Stbd. Wing and No. 3 Center Cargo Tank was buckled at the forward part of the tank. This is an extension of the damage from No. 2 Wing and Center Tank longitudinal bulkhead and is caused by the propagation of the collision with the reef before the vessel came to rest.

NO. 3 CENTER CARGO TANK (web frame space numbers 23 thru 34): Transverse Web Frame Space No. 23 thru 26 from the longitudinal centerline frame to the longitudinal bulkhead of the No. 3 Starboard Wing Tank, the bottom plate was missing and the longitudinal frames were distorted, deformed and twisted in a concave manner. The transverse web frames were buckled at the bottom connections in an aft direction. From Transverse Web Frame Space No. 27 thru 34, for about three longitudinal frame spaces to the starboard of the centerline, the bottom plate as well as frames were intact with no indication of damage. For the rest of the longitudinal frame spaces to the starboard longitudinal bulkhead, the bottom plate was either missing, deformed or set-in and the longitudinal frames were distorted and buckled, same type of damages as stated for No. 3 Starboard Wing Cargo Tank above. It is evident that the propagation of the damages were caused by the impact of the vessel with the reef before the vessel came to rest. On the port side of the centerline longitudinal frame, the structural members seemed mostly intact.

NO. 4 STARBOARD WING BALLAST TANK (web frame space numbers 34 thru 40): Transverse Web Frame Space No. 34 thru 40 from the longitudinal bulkhead to bilge strake (turn of bilge), the bottom plate was set-in and distorted with cracks evident throughout the tank space. There were deep scratches running longitudinally on the bottom plate, evidence of the vessel scraping the reef before coming to rest.

NO. 4 CENTER CARGO TANK (web frame space numbers 34 thru 40) (picture P.21): Transverse Web Frame Space No. 34 thru 40, for a distance of about 3-4 longitudinal frame spaces on the starboard side of tank from the centerline vertical keel frame, the structural members (transverse web frames, bottom plate and longitudinal frames) seemed intact with slight set-ins and deformations. For the other starboard side longitudinal frame spaces to the No. 4 Wing Ballast Tank longitudinal bulkhead, the bottom plate was cracked and set into the tank and the longitudinal frames were deformed, cracked and buckled. The web frames were also buckled in this area at the bottom connections pushed in an aft direction, indicating that the damage was caused by the initial contact of the vessel with the reef. On the port side of the centerline longitudinal frame, the structural members seemed mostly intact.

NO. 5 STARBOARD WING CARGO TANK (web frame space numbers 40 thru 47): Transverse Web Frame Space No. 40 thru 50 from the longitudinal bulkhead to bilge strake (turn of bilge), bottom plate as well as most bottom longitudinal frames were intact with some cracks and bottom plate set-ins and deformations were evident.

NO. 5 CENTER CARGO TANK (web frame space numbers 40 thru 51) (picture P.21): (SAME AS NO. 4 CENTER CARGO TANK): Some of the starboard side longitudinal frame spaces throughtout the tank were intact while at the longitudinal bulkhead cracks or separations were evident. Set-in and buckling of the web frames as well as the longitudinal frames were also evident. To the port side of the centerline of the tank, the structural members seemed intact.

CONCLUSION:

From inspecting the bottom of the vessel, the indication is that the bottom damage was caused by two phenomena:

1. The initial impact damage of the 210,000 ton vessel travelling at about 12 knots hitting the reef and the subsequent stopping momentum after the onset of the grounding.
2. The sitting or waiting period after the grounding and the subsequent high and low tides causing further damage.

For the writing of this report, I have referred to copies of the following documents: General Arrangement, Midship Plan, Transverse Frame Plan and Constructions plans.

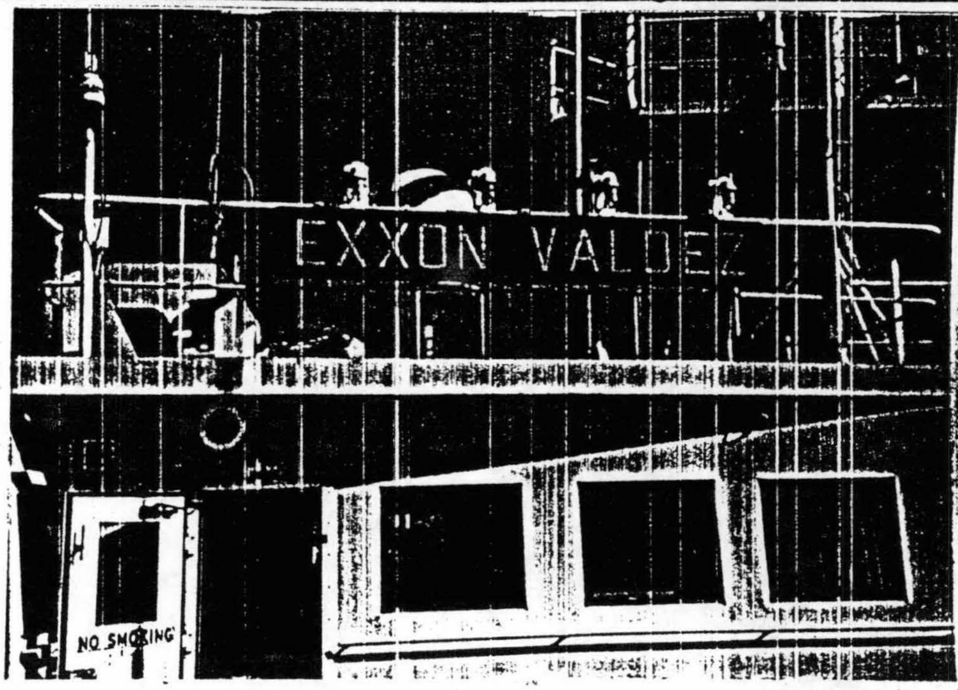
Very truly yours,

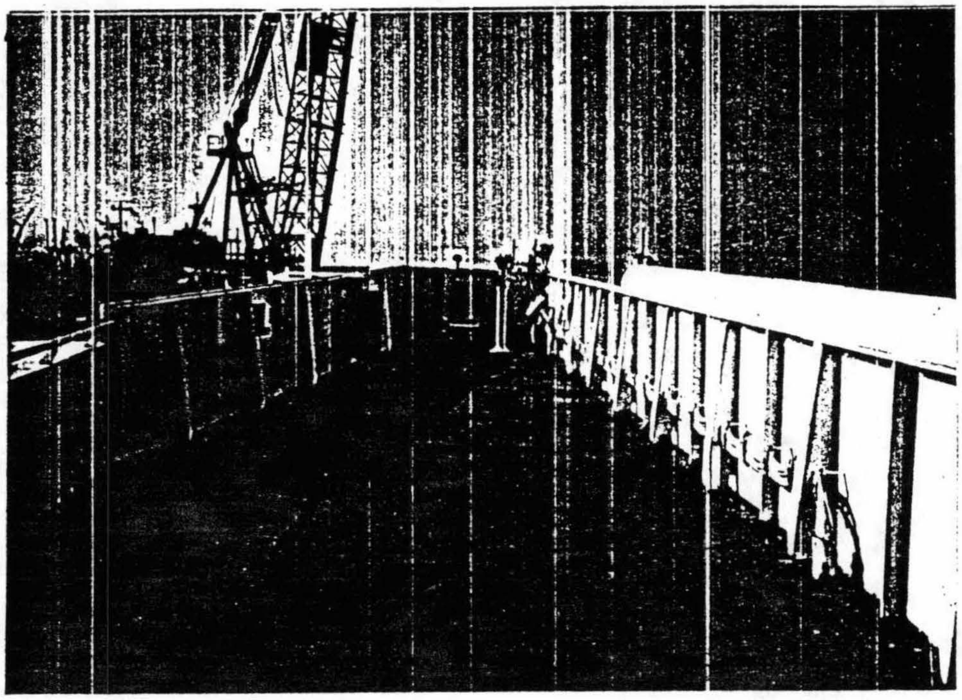
POURNARAS & HOFFMAN, INC.

Edward F. Hoffman

Outside Wheelhouse
(looking to Stbd. Side)

Rudder Angle Indicator and
RPM Indicator located
above Door

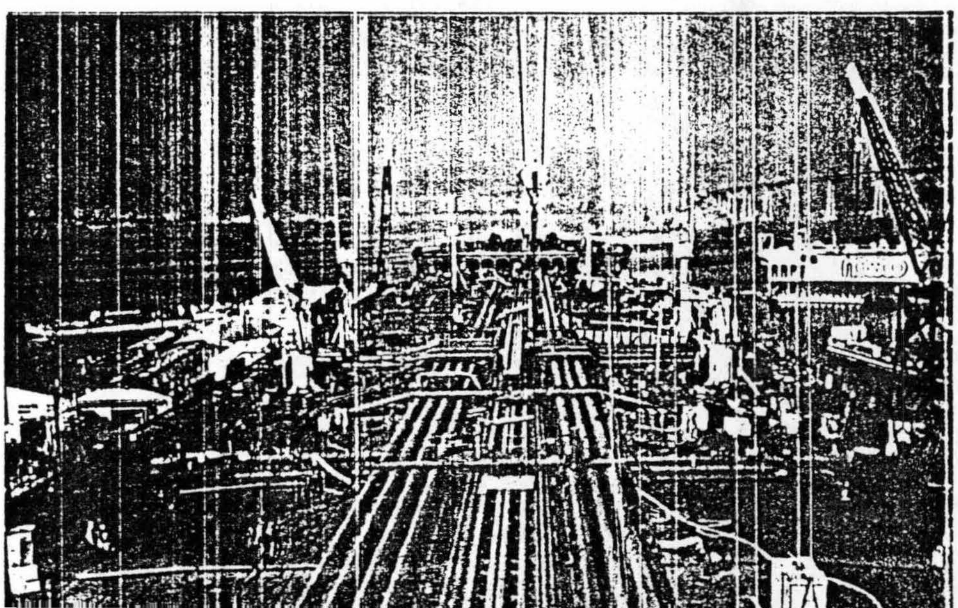




Bridge Wing
looking Port Wing

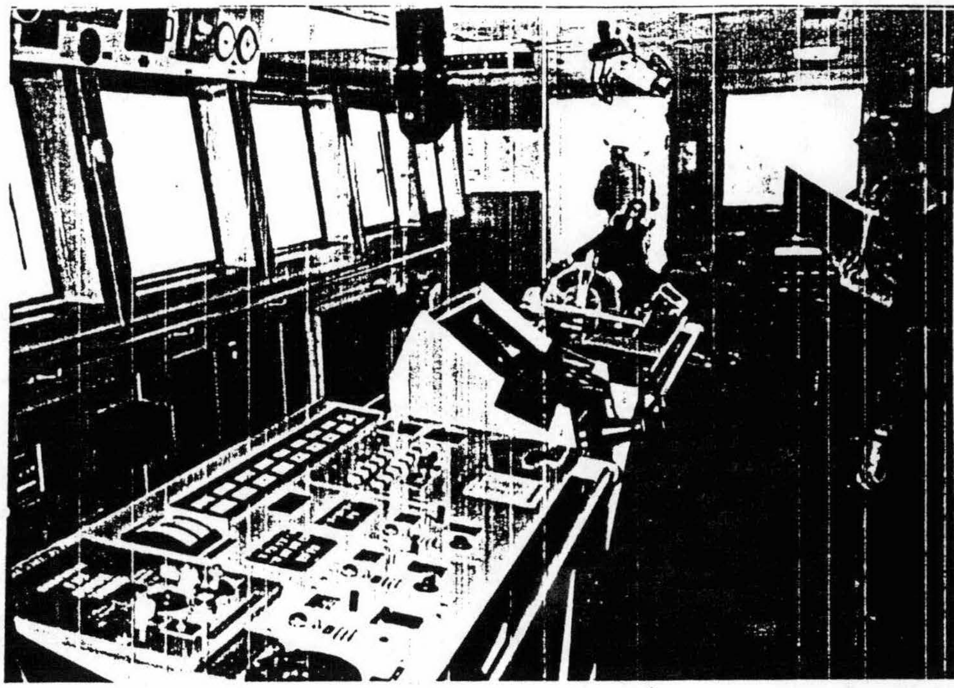
Magnetic Compass at
Bridge Wing

Upper Deck Forward

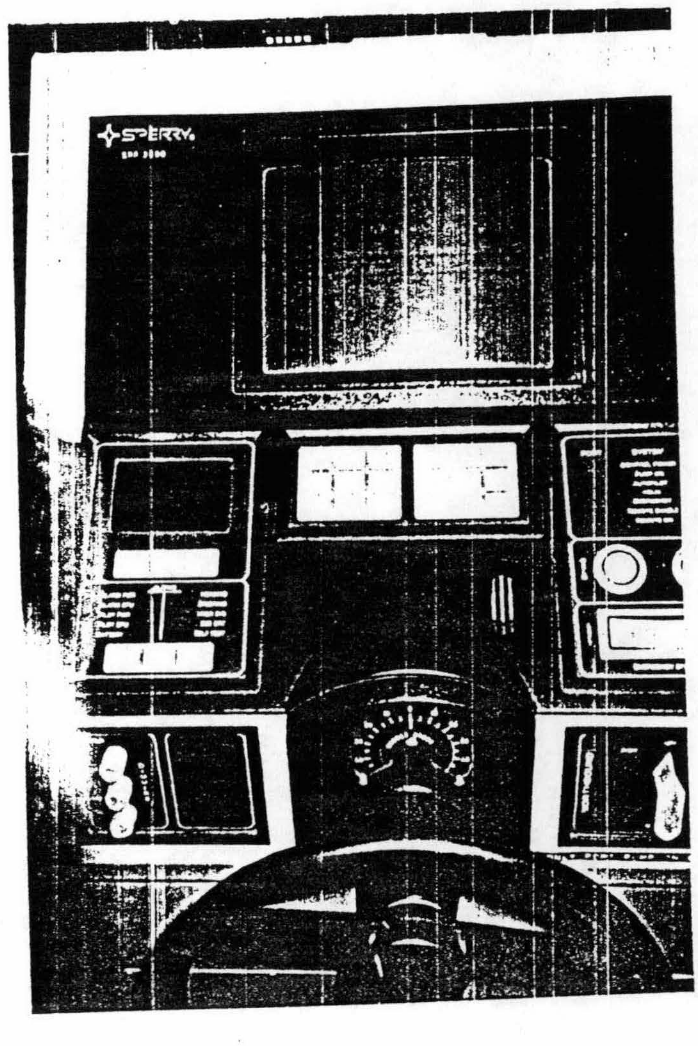


Navigational
Bridge
Island
(Note Magnetic Compass
Obstruction of
3-faced Rudder
Angle Indicator)

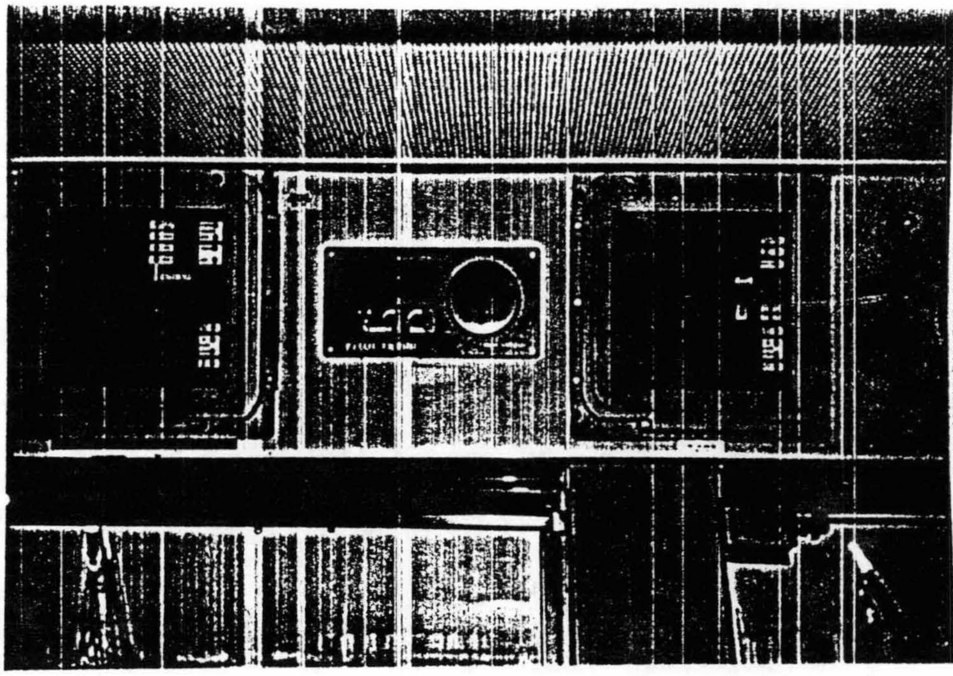
At Port side, looking Stbd.

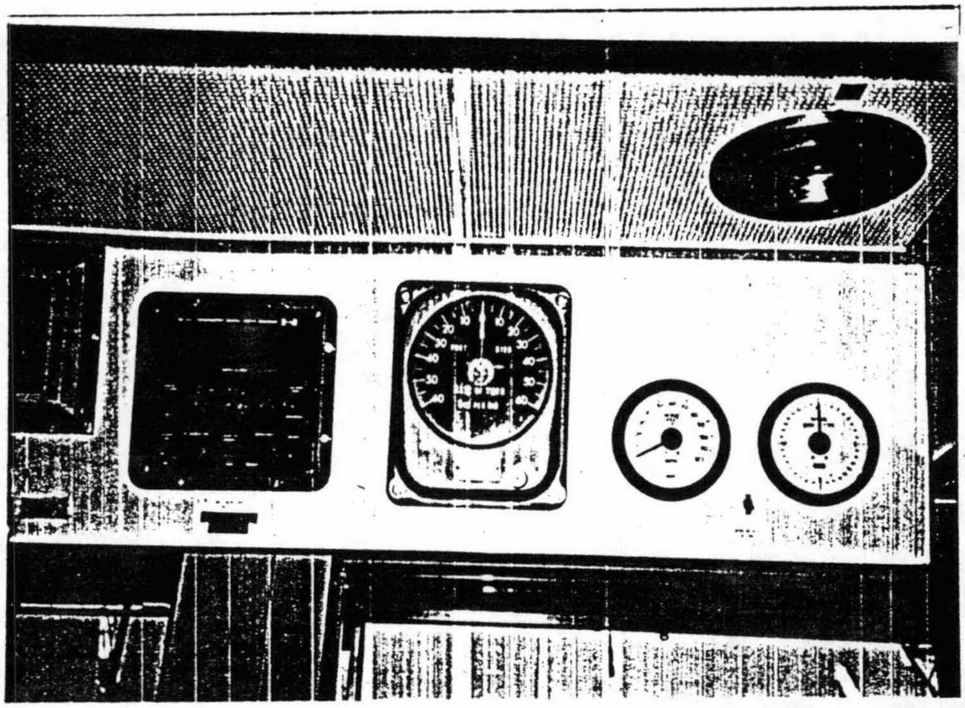


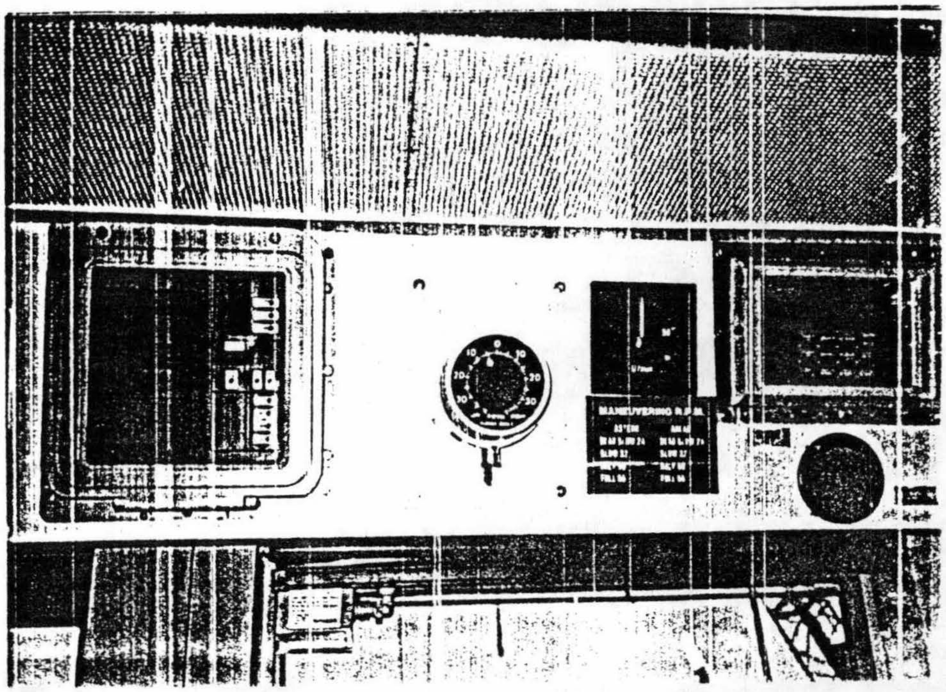
Sperry
Helm System



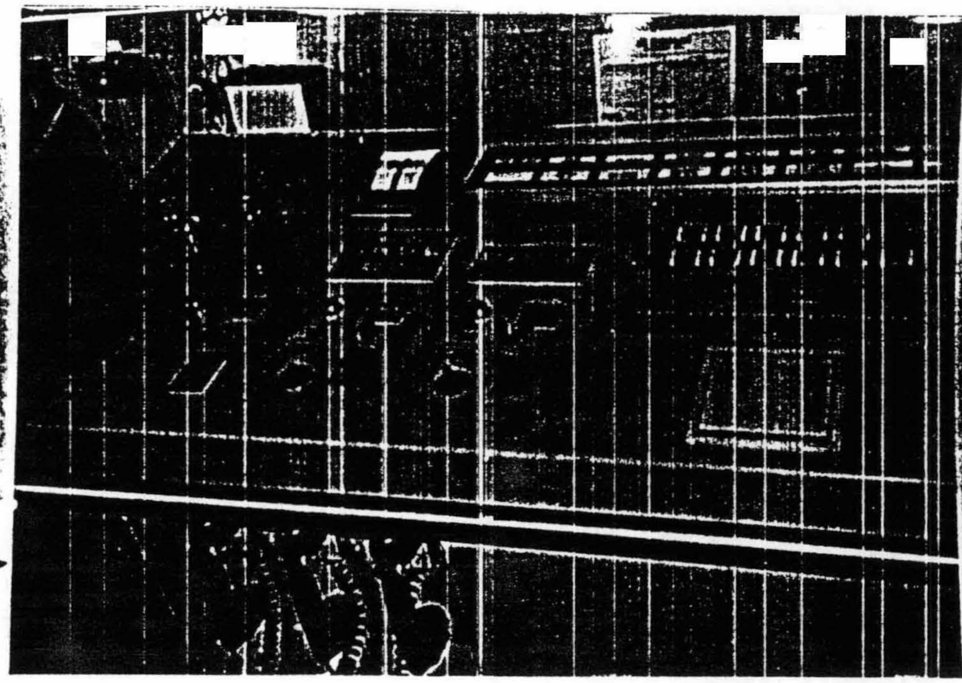
Wheelhouse Navigational
Instruments
at
Forward Bulkhead
(above forward windows)







Bridge Monitor



Sound Powered Telephones

Course Recorder

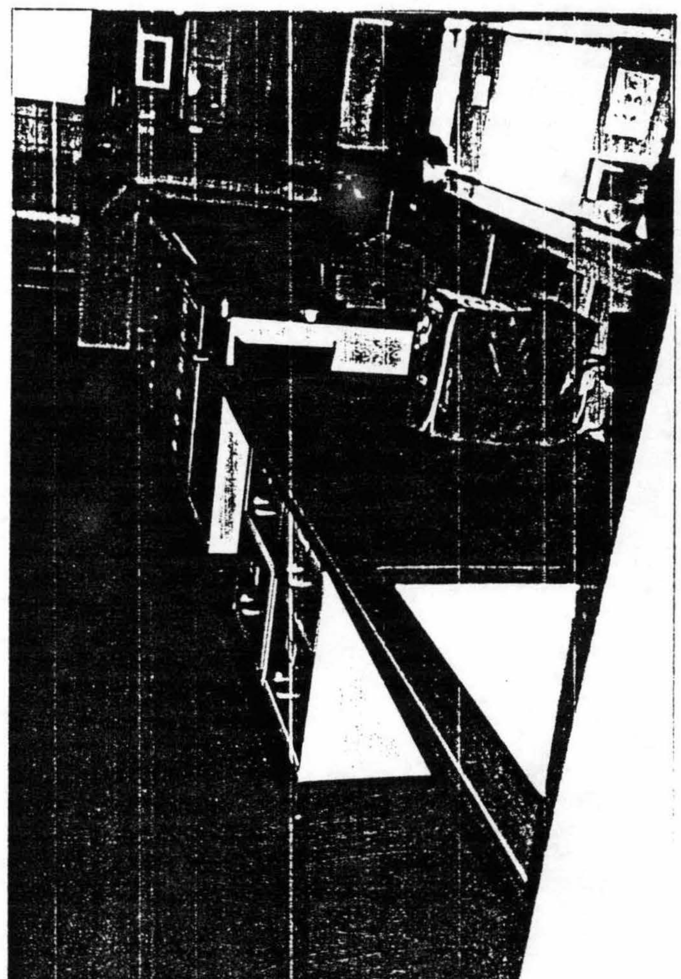
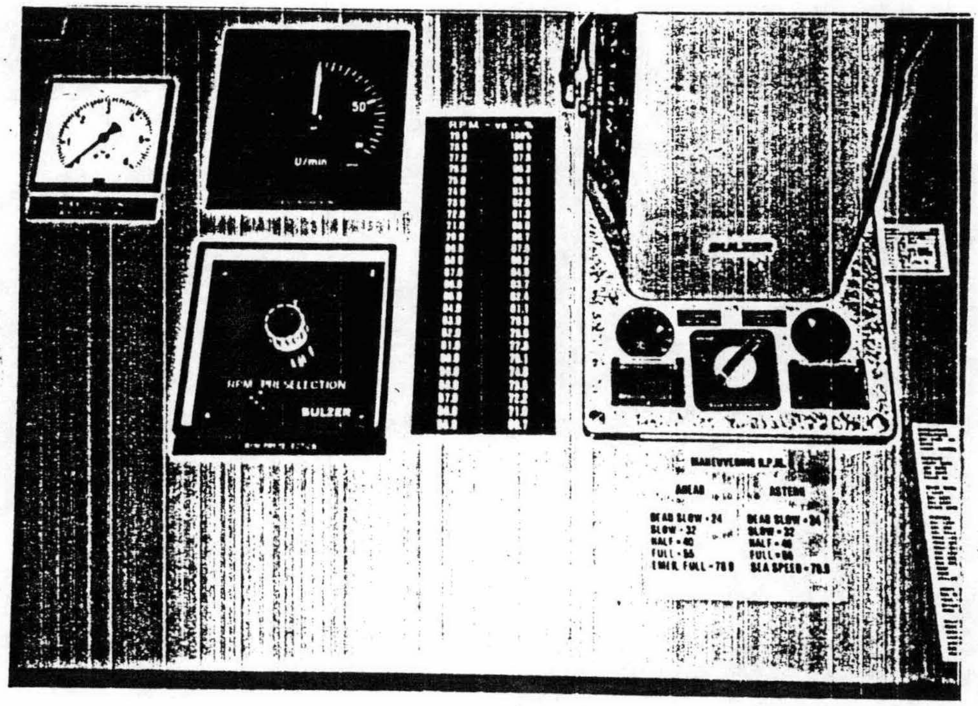


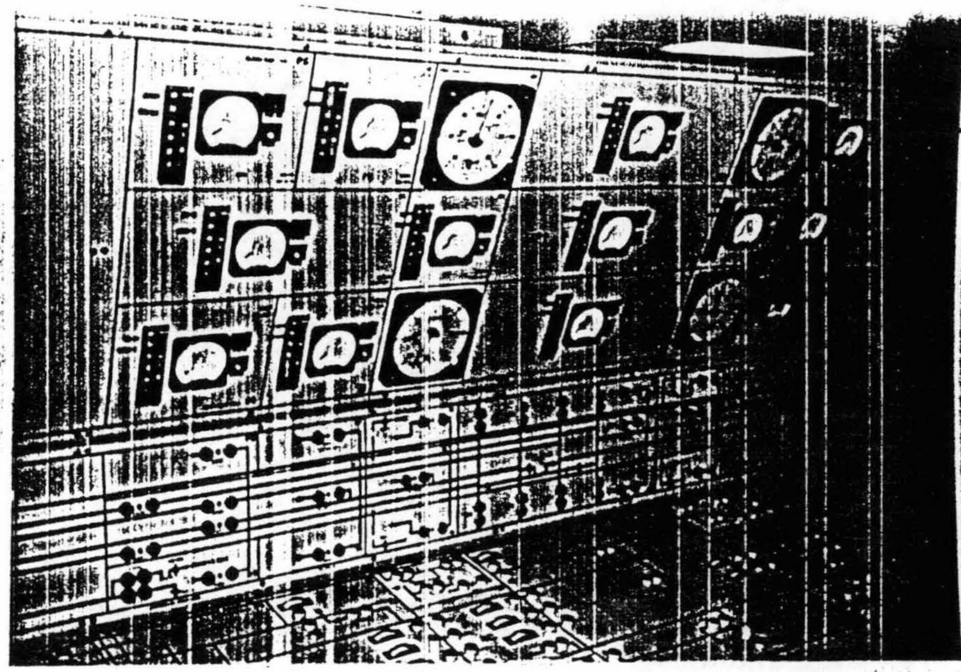
Chart Space

Bridge Control
Main Engine Telegraph

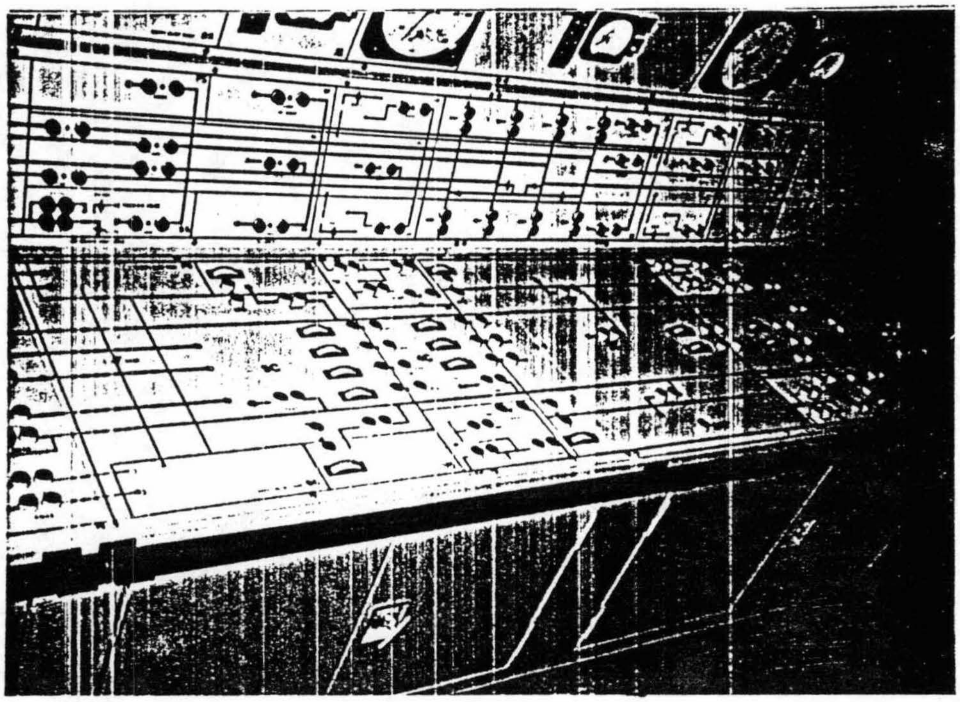


P.

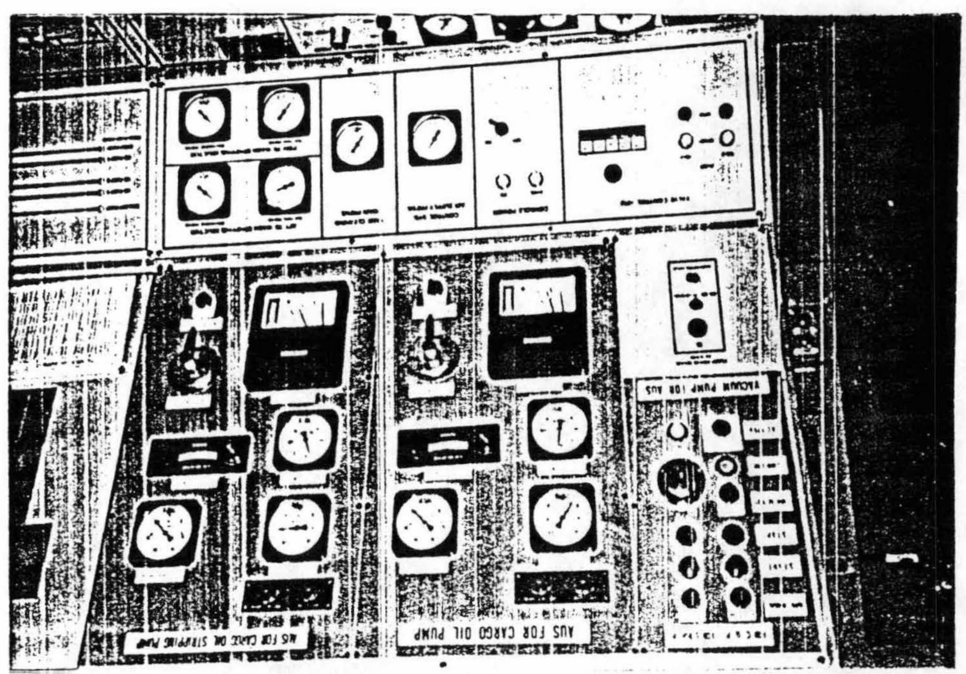
Cargo Tank Gasing System



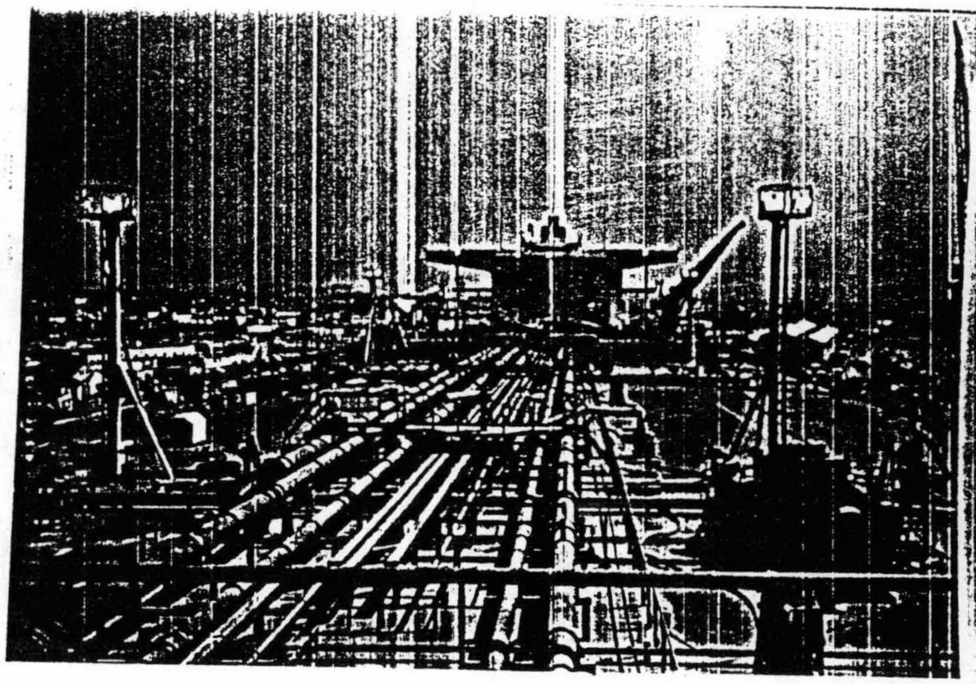
Cargo Control Console



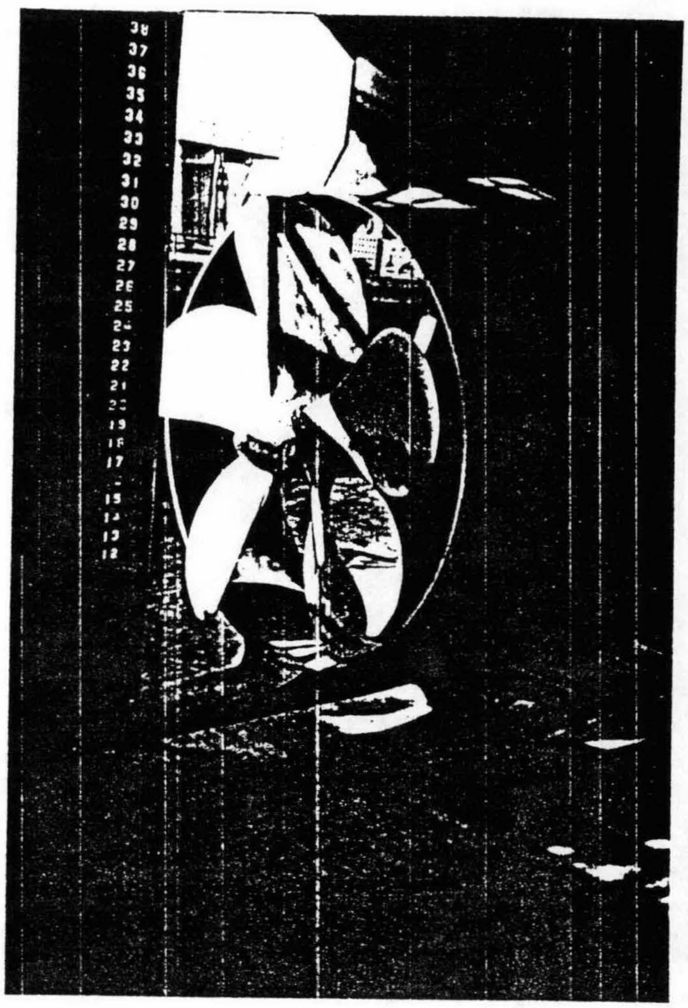
Cargo Pump Control System

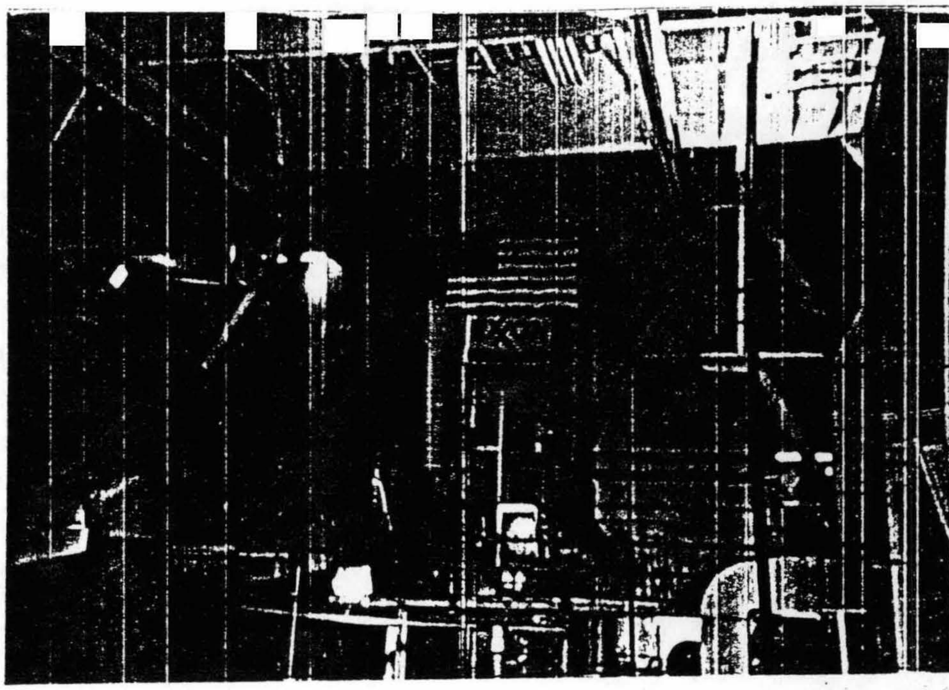


Main Deck
(looking aft)
Hull Deflection not
Noticeable



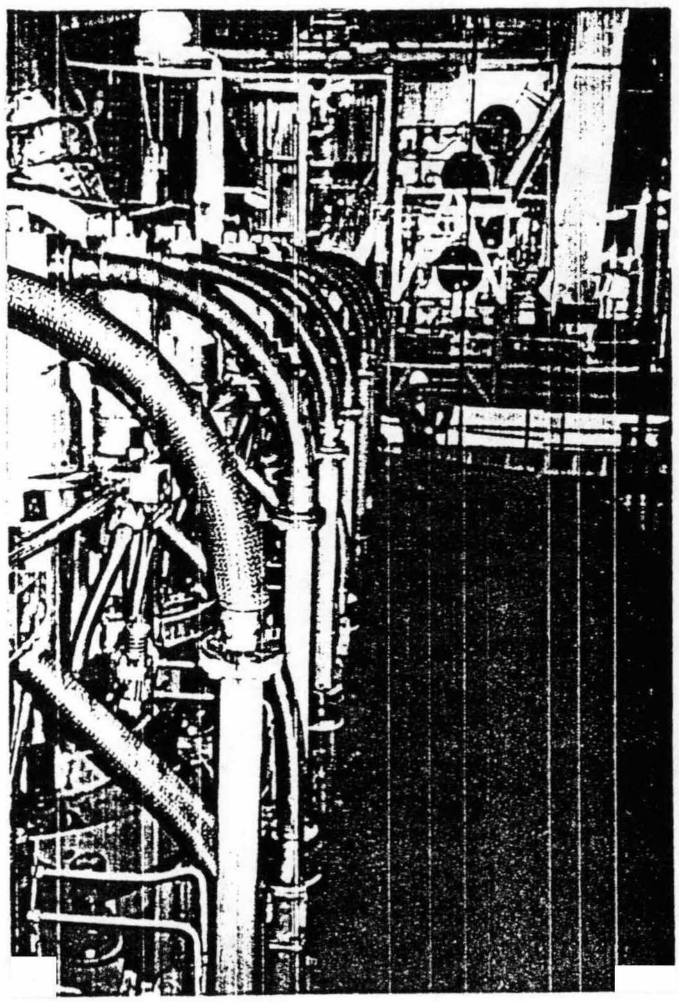
Propeller, Duct and
Rudder
(no damage)



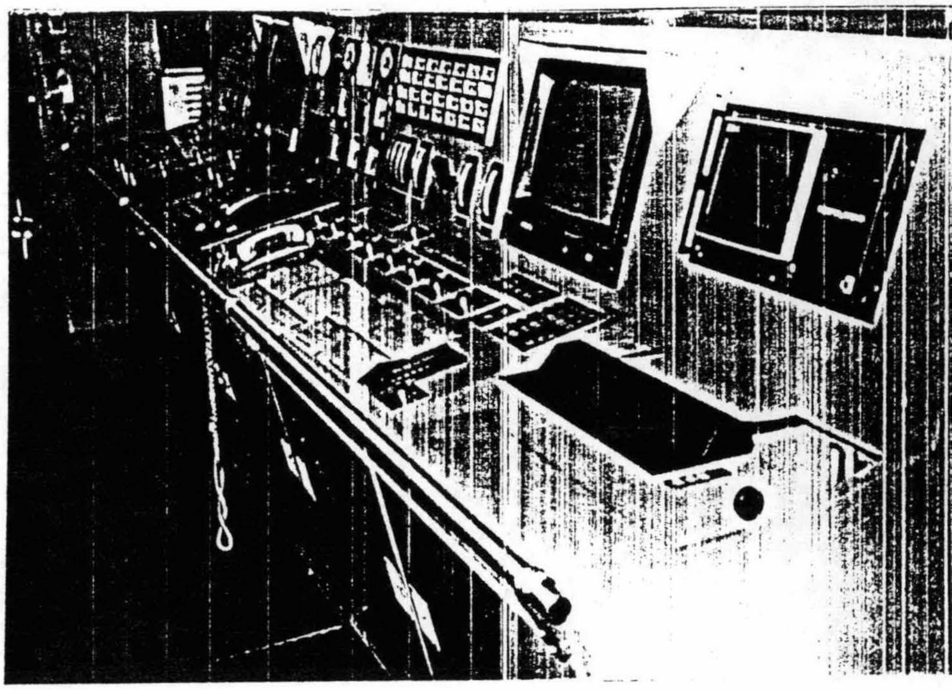


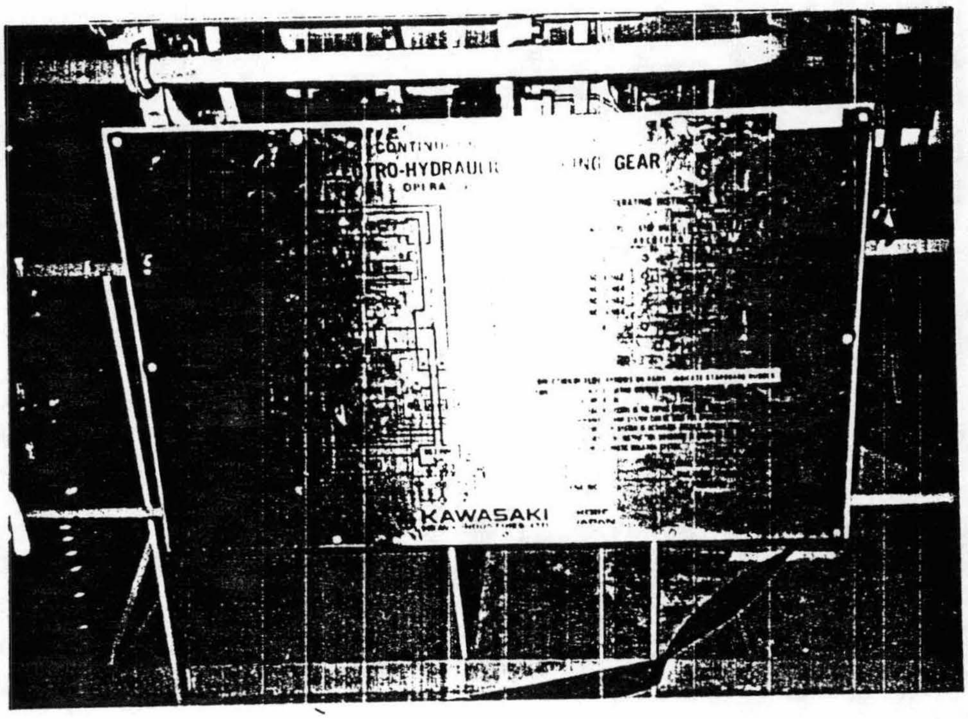
Engine Room Spaces

Main Engine
Sulzer RTA



Engine Control Room
Telegraph and
Monitoring System

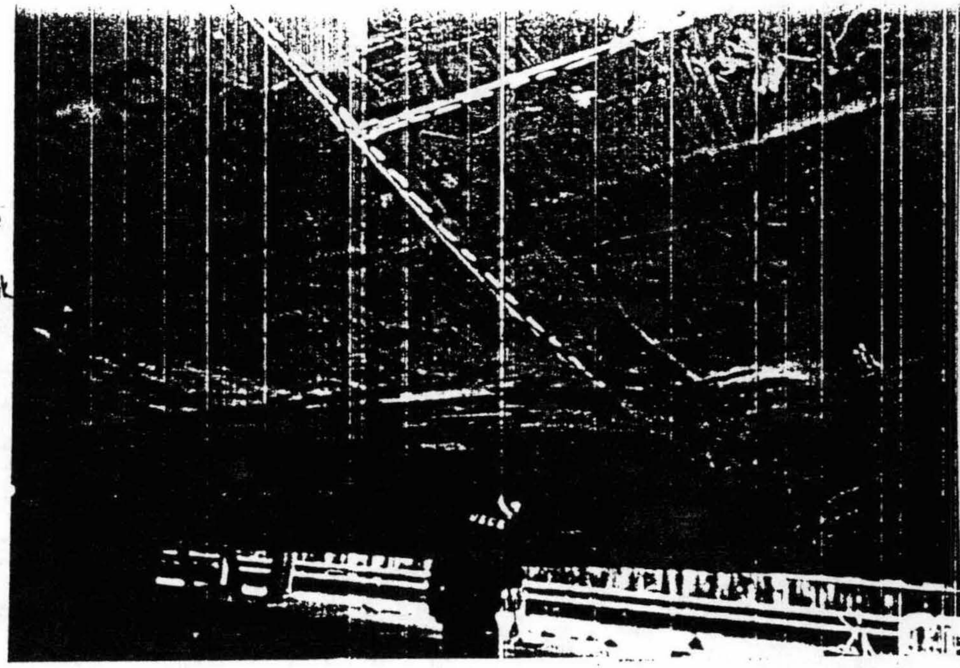


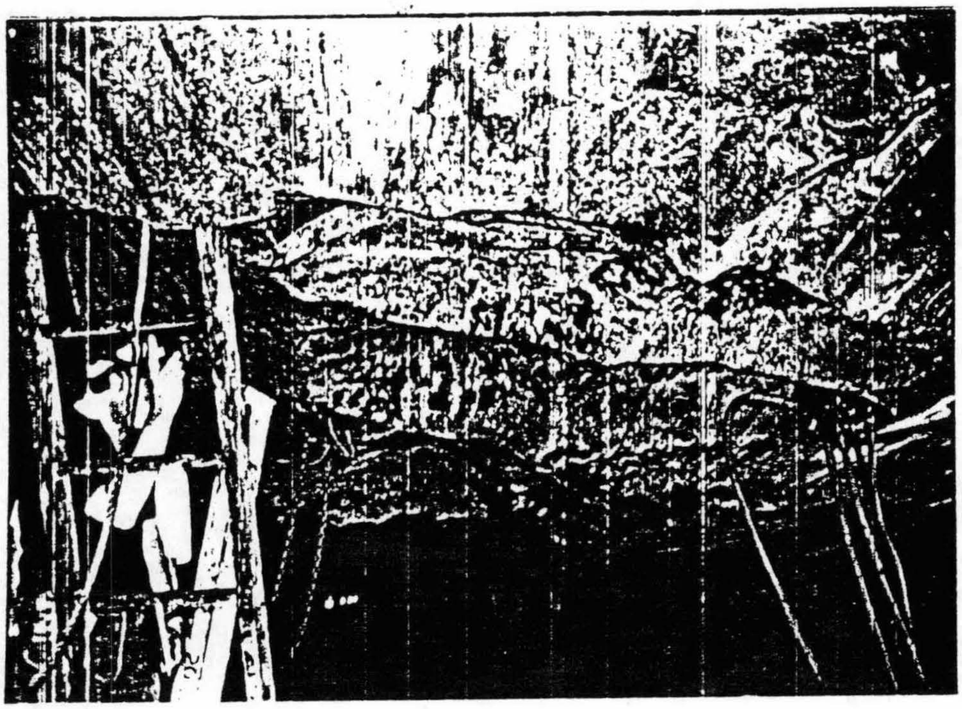


Steering Gear
Room
Operation Diagram

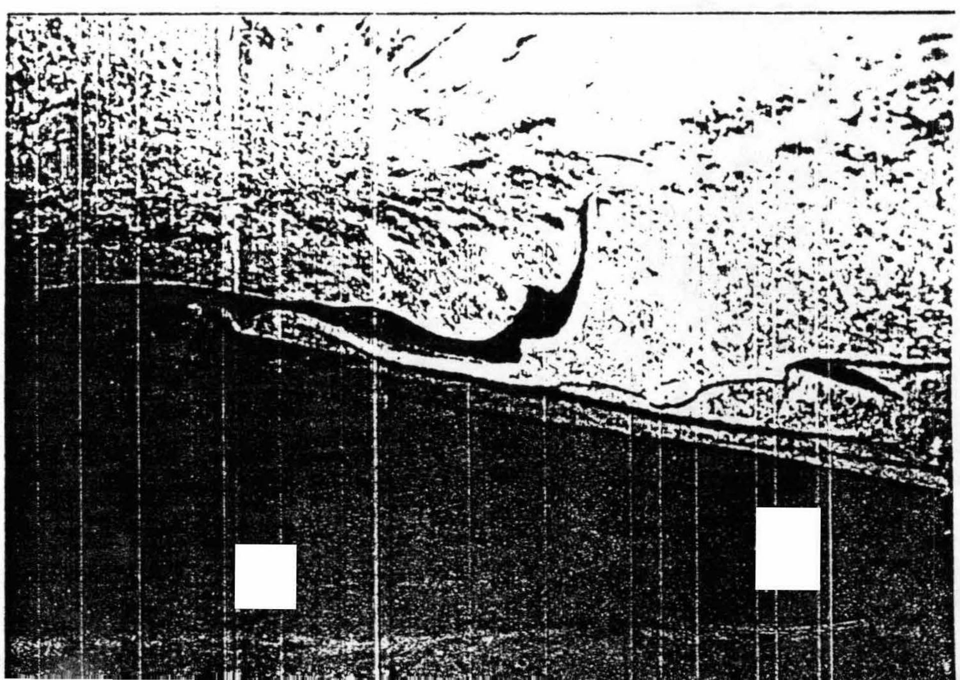
P.

Stbd. Side between
Fore Peak and
No. 1 Wing Cargo Tank



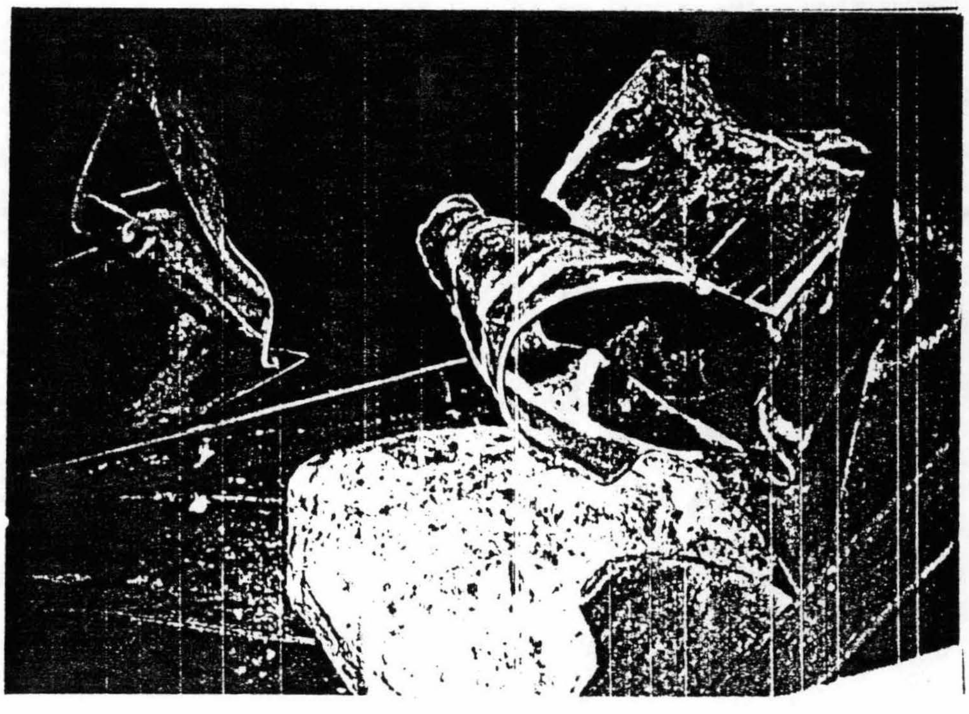


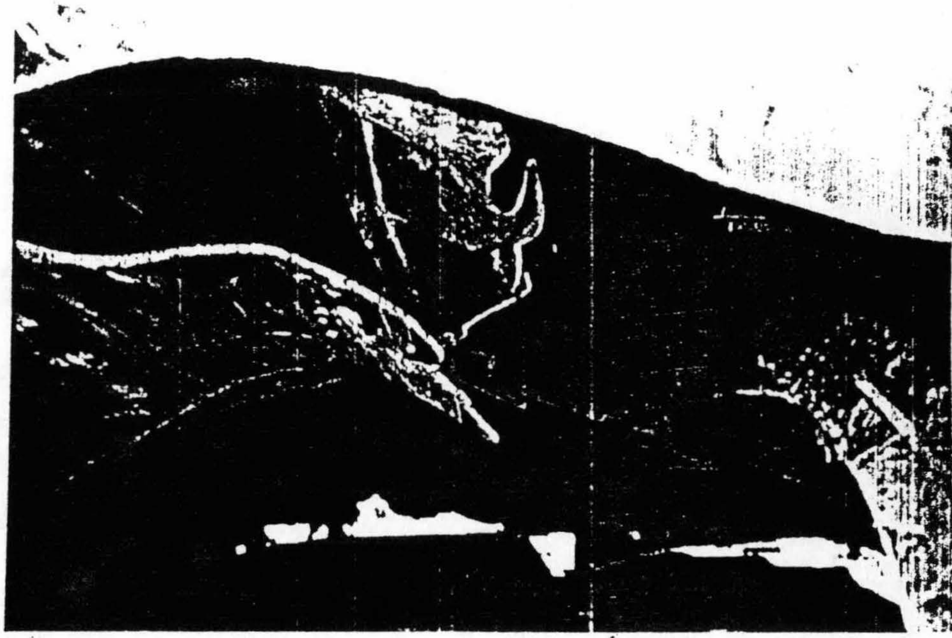
Fore Peak Tank
(looking aft)
Shell Plate Damage



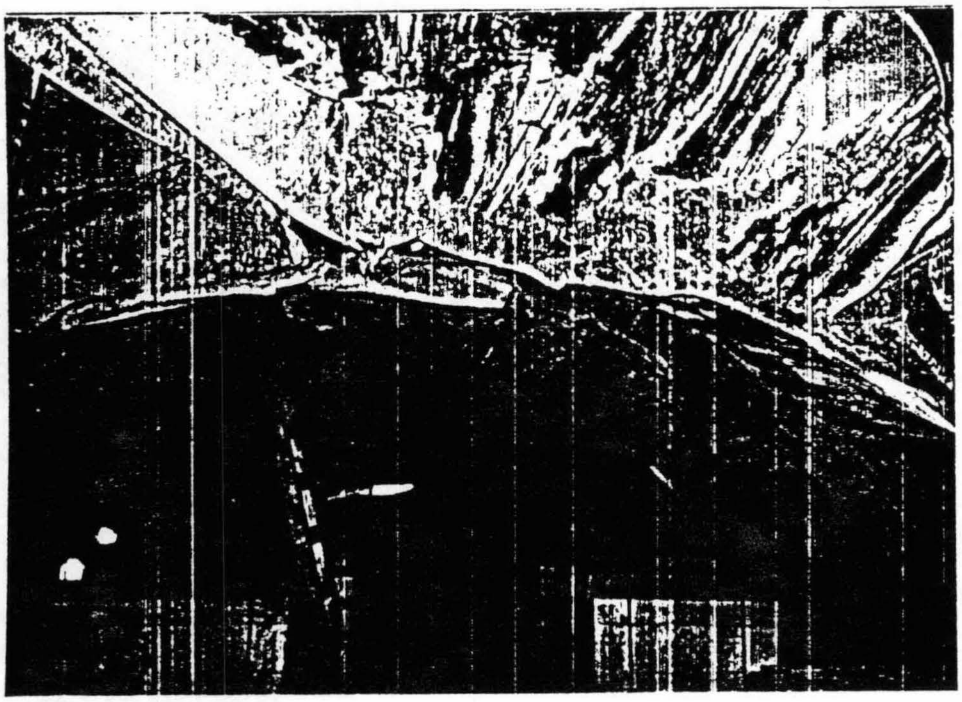
No 1 Wing Cargo Tank
Starboard
Reef Rock wedged into tank

Transverse Web Frame
Buckled in Aft Direction
Bottom Plate Missing

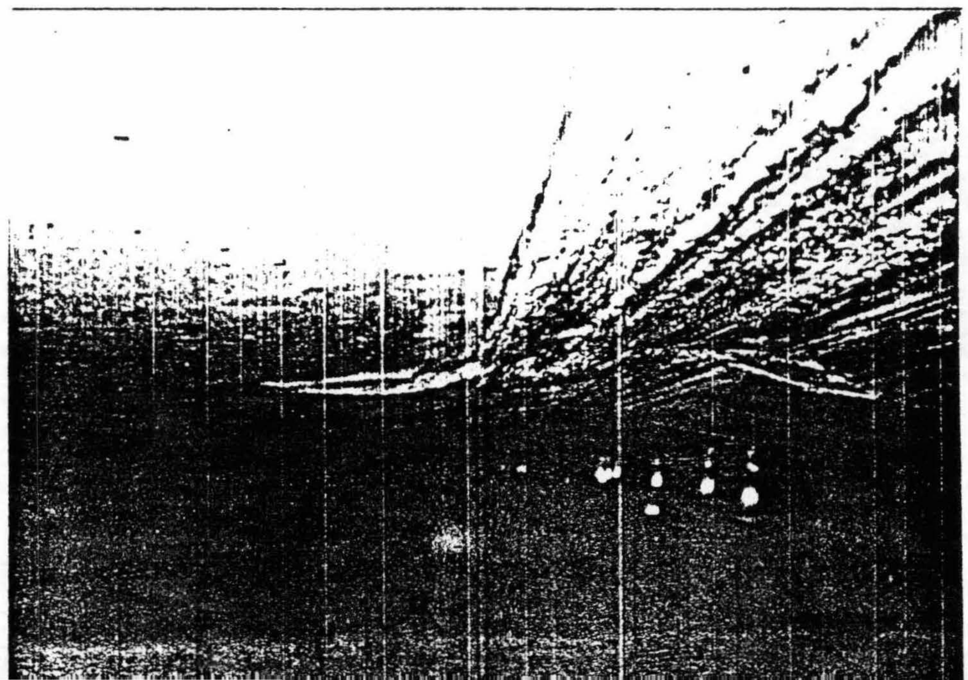




No. 1 Wing Stbd.
Cargo Tank
(looking Port)
Buckling Deformation

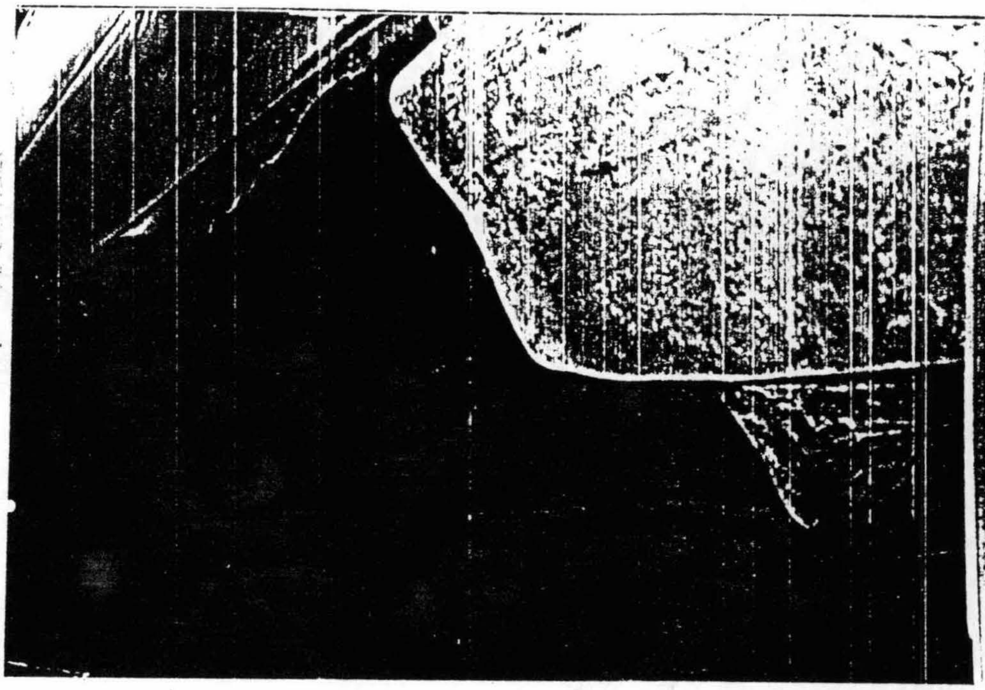


Stbd. Side Forward Wing
(looking Aft)
Bottom Plate Deformed
(including longitudinal frames)



Centerline
Forward
(looking aft)

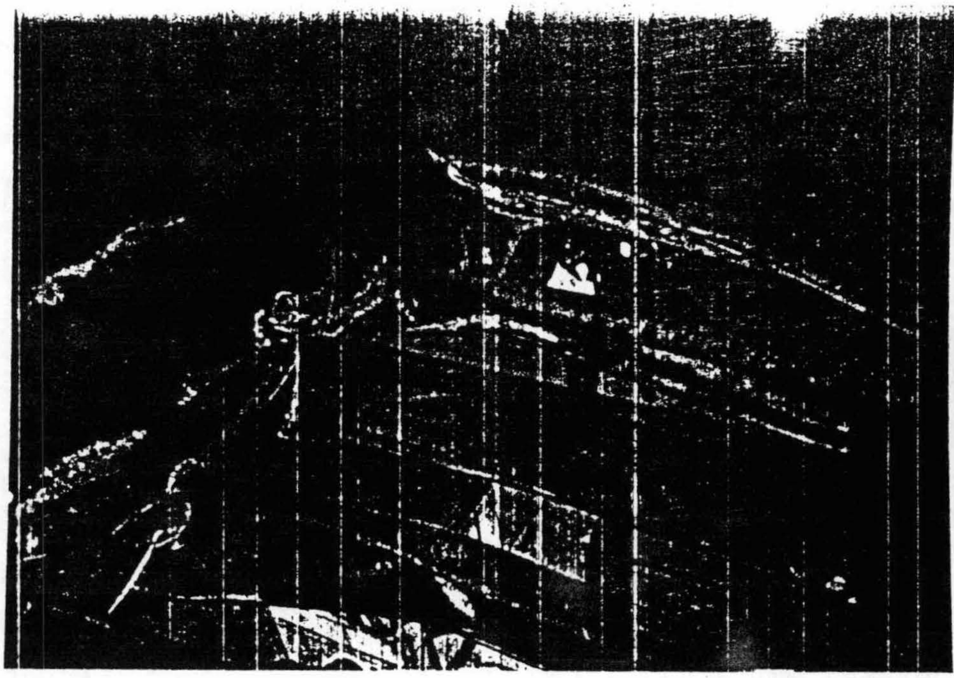
Bottom Shell Plate
Missing
Internal Structure
Buckled Aft



No. 3 Stbd. Wing
Cargo Tank

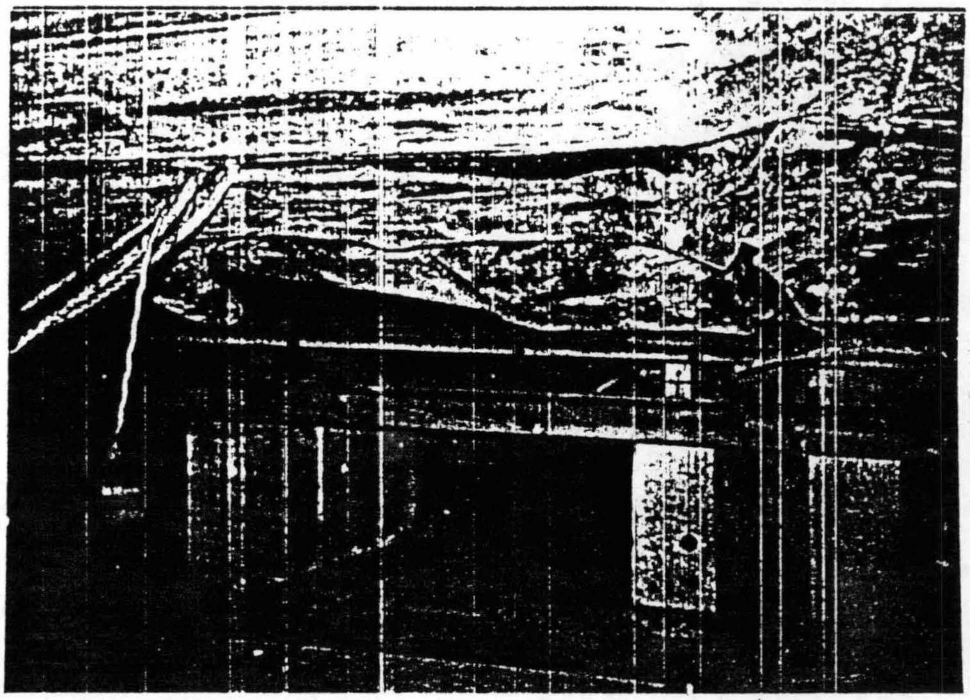
Side Shell Buckled

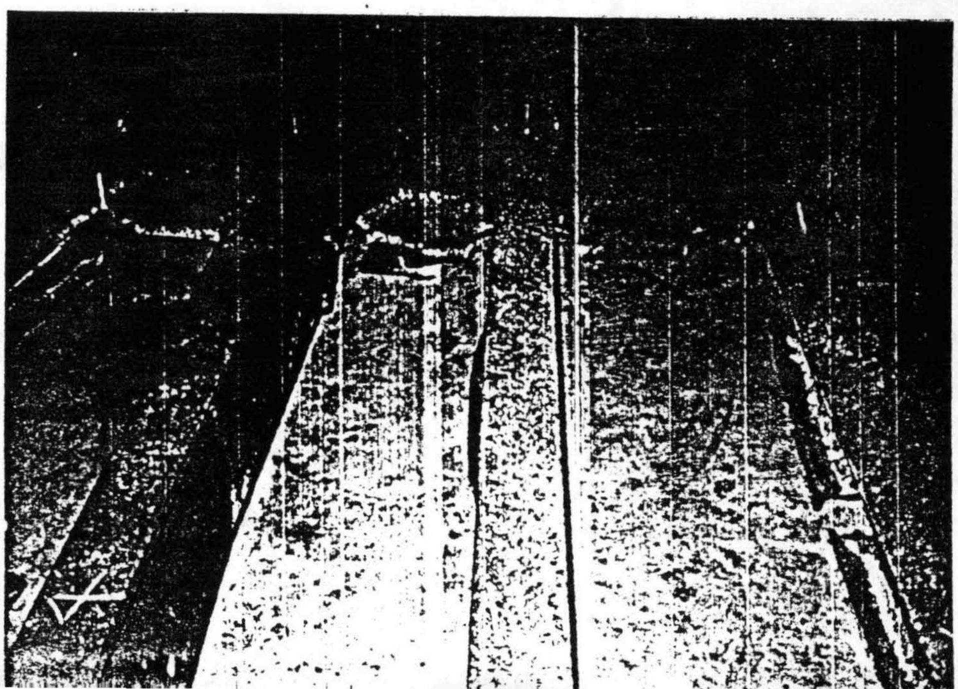
Transverse Web Frame Buckled in
Aft Direction



No. 3 Stbd. Wing Cargo Tank (looking to stbd.) Bottom Plate Missing Transverse web Frame Buckled Aft Longitudinal Frames Buckled and Deformed

No. 4 Center Cargo Tank





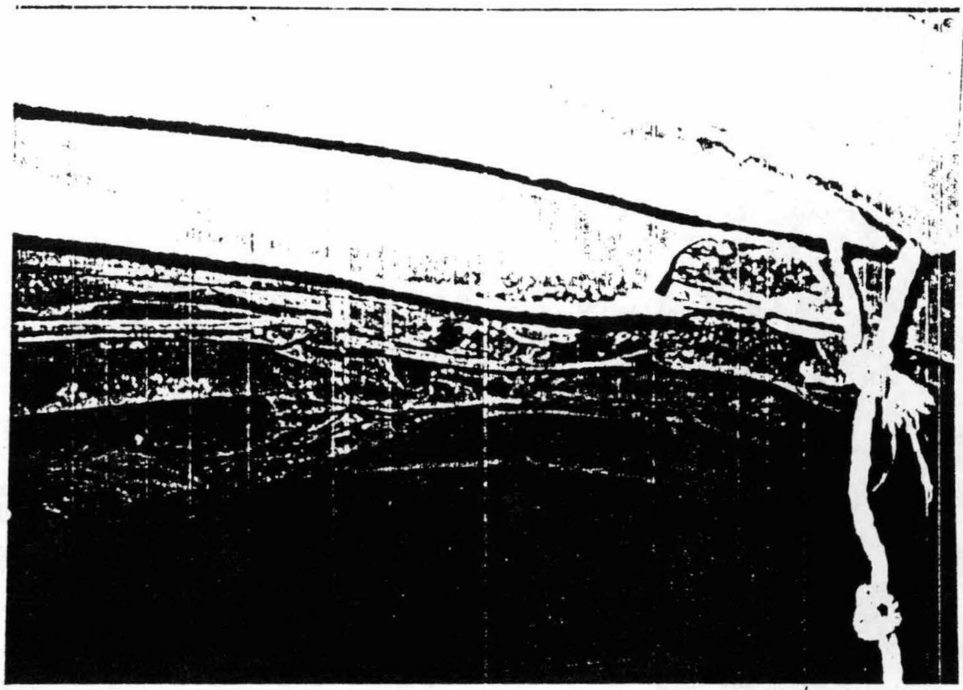
No. 5 Center Cargo Tank (looking at bottom) (forward to web)

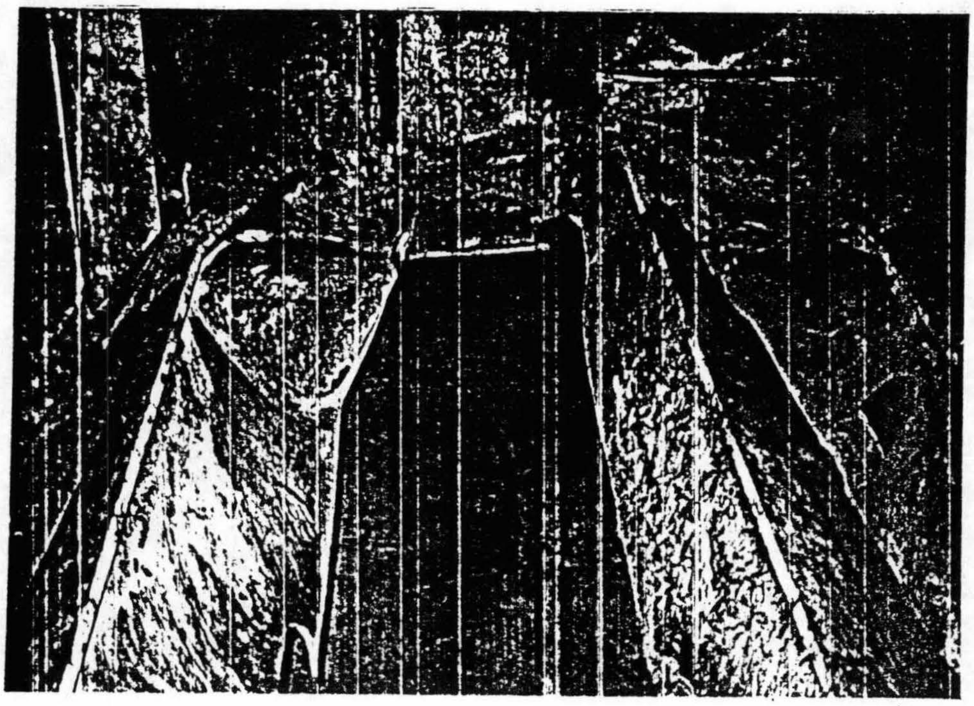
Transverse Web Frame Buckled in Aft Direction

No. 2 Center
Cargo Tank
(looking Starboard)

Internal Structure
Deformed

Shell Bottom Plate
Missing





No. 3 Center Cargo Tank
(looking to bottom)
Forward

Transverse Web Frame
Buckled in Aft
Direction

Longitudinal Frames
Buckled and Deformed

TABLE 2. Comparison of Positions and Headings at Check Points

AST (GMT)*	Position				Heading	Remarks
	x_o	y_o	Latitude, N	Longitude, W	ψ	
10:20 (0720)	5.3850	3.7127	61°05'21.0"	146°37'22.5"	224.9°	Recorded
	5.3780	3.7162	61°05'21.8"	146°37'22.1"	224.9°	Simulation
10:53 (0753)	3.1641	1.8706	61°03'09.3"	146°41'09.5"	217.8°	Recorded
	3.1624	1.8614	61°03'09.2"	146°41'10.7"	217.7°	Simulation
11:39 (0839)	-3.2880	-2.6760	60°56'43.3"	146°50'29.7"	198.8°	Recorded
	-3.3157	-2.6831	60°56'41.6"	146°50'30.6"	198.8°	Simulation
11:55 (0855)	-6.3564	-2.8583	60°53'39.7"	146°50'52.2"	180.5°	Recorded **
	-6.3585	-2.8551	60°53'39.7"	146°50'51.8"	180.5°	Simulation

* Anchorage Standard Time (AST)
Greenwich Mean Time (GMT)
** Third Mate Testimony

Exh. 13C

COMPARISON of POSITIONS AND HEADINGS

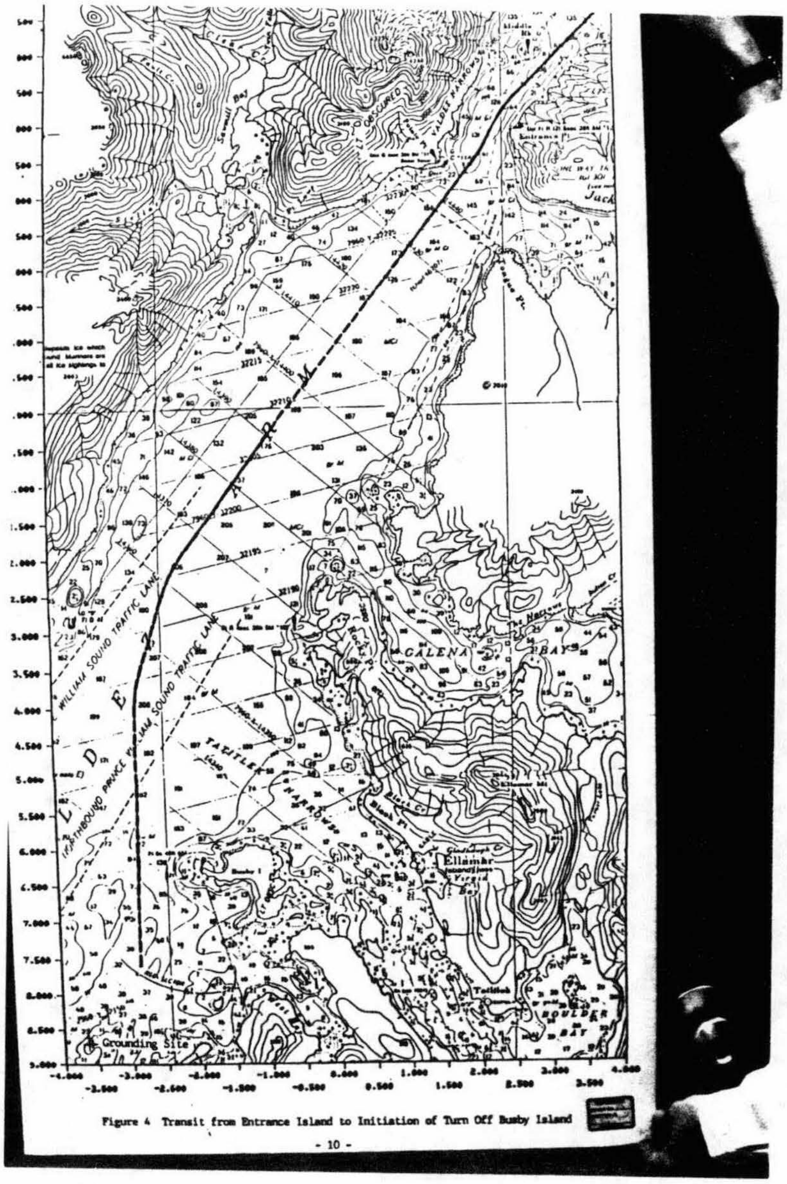


Figure 4 Transit from Entrance Island to Initiation of Turn Off Busby Island

- 10 -

LARGE Chart - Simulated Trackline

EX. #30

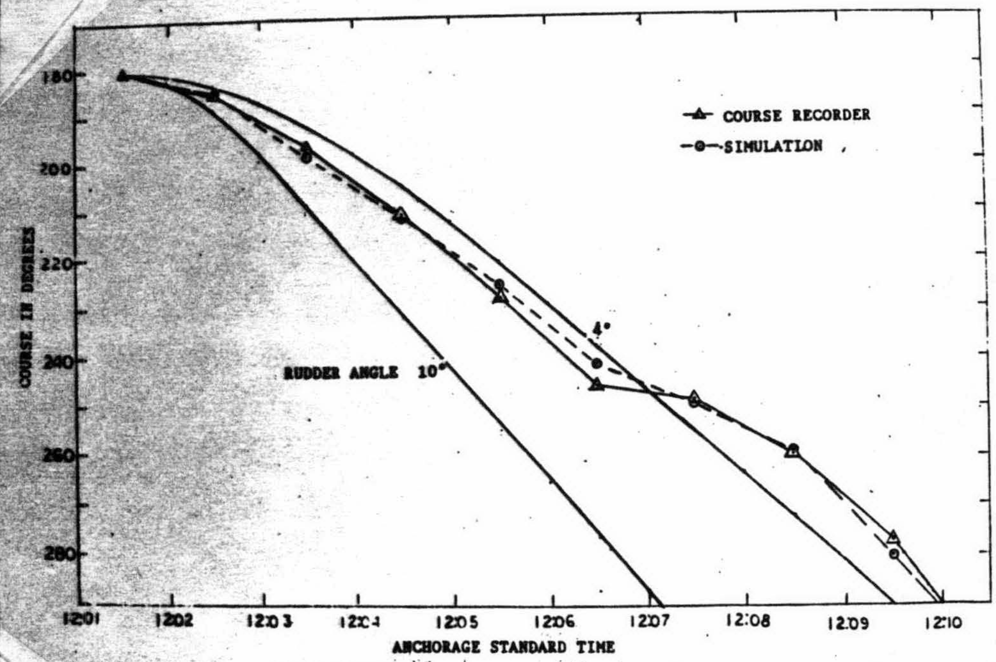


FIGURE 6 COURSE VS TIME

EXHIBIT # BE

SMALL chart shizome
FIGURE 6 COURSE VS TIME

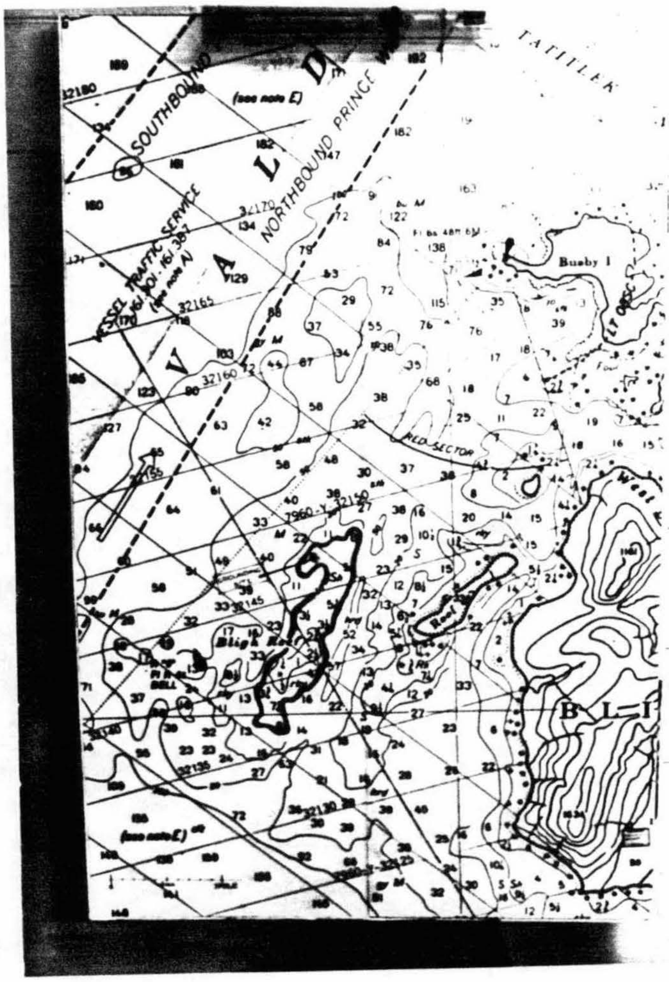
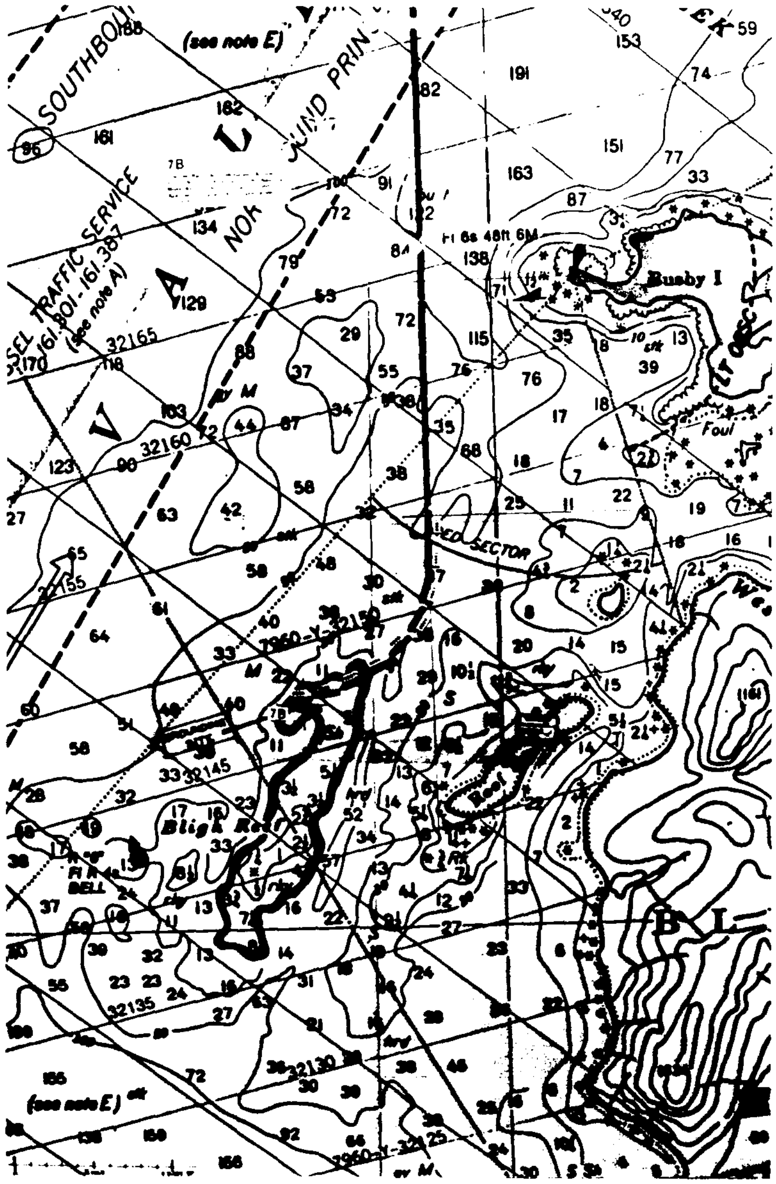
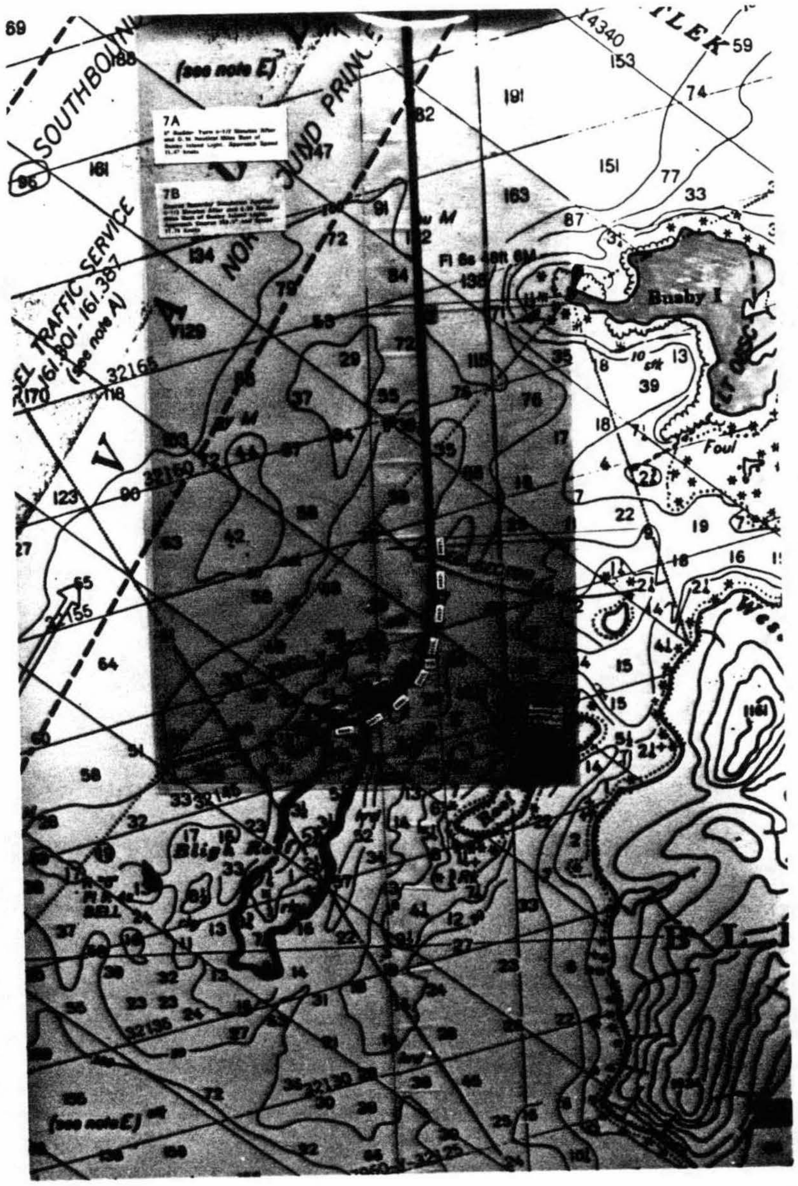

SOUTHBOUND
NORTHBOUND
VESSEL TRAFFIC SERVICE
RED SECTOR
Busby I
Bligh Reef
BELL

Exhibit BF



Overlay – Course Recorder Simulation

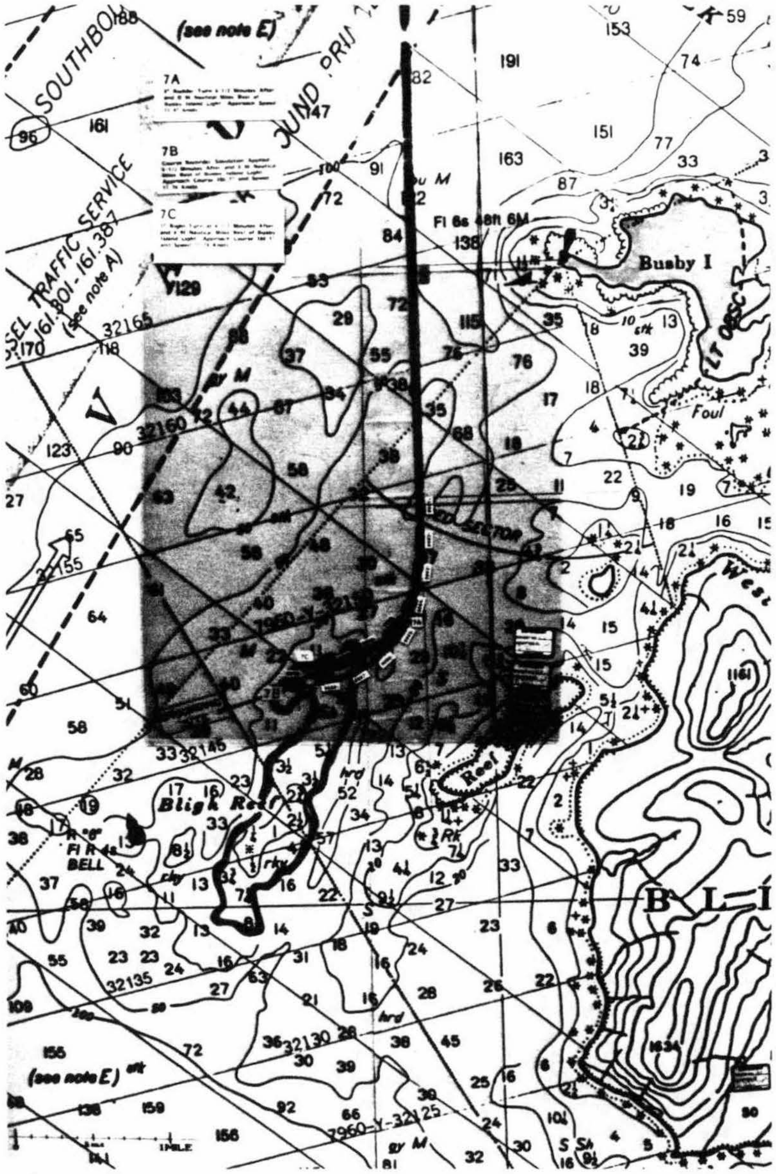
Exhibit BG



Exh. BG
BH

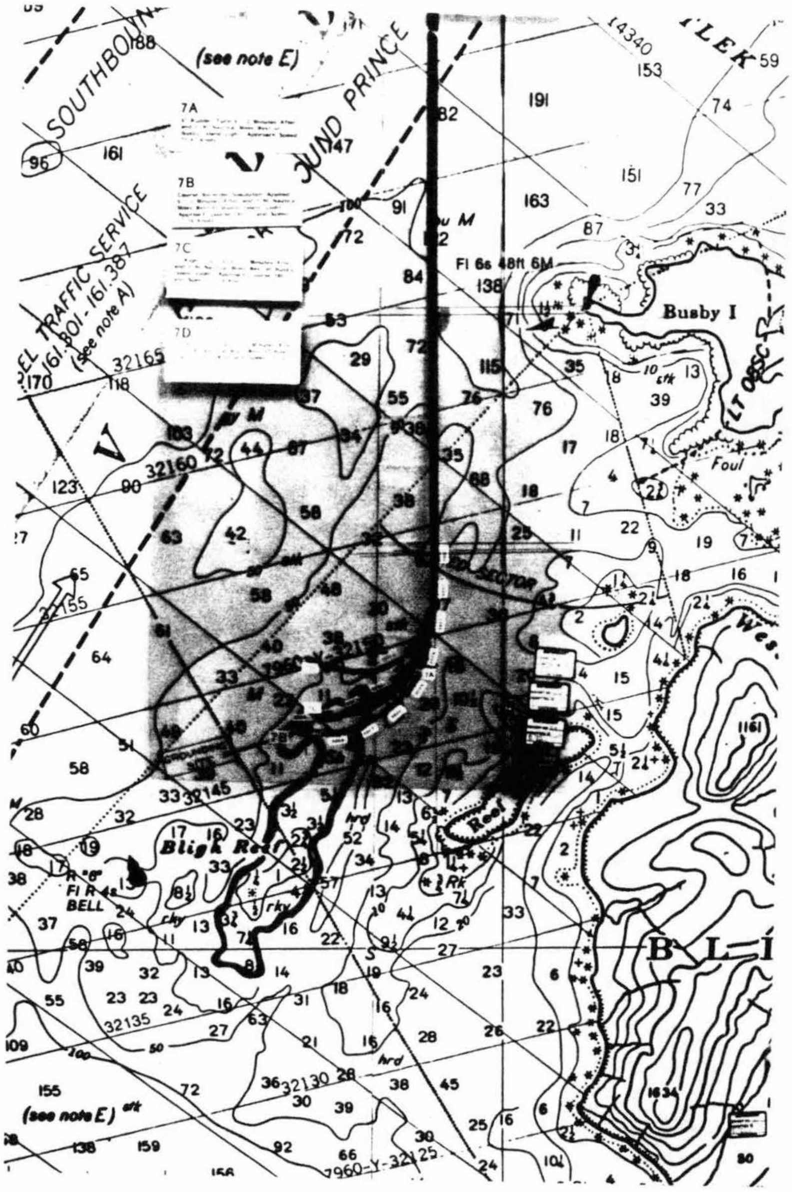
Overlay - Course recorder simulation

Overlay - Consistent 4° rudder



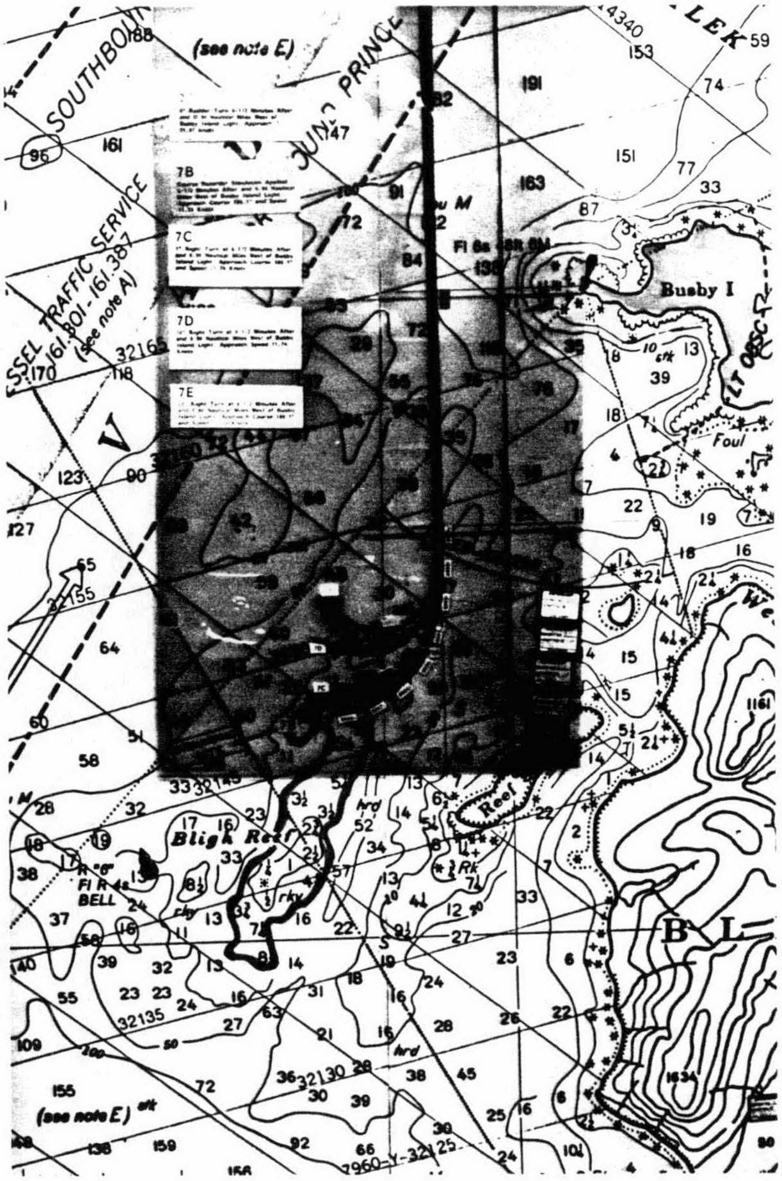
Overlay 5° turn on rudder

Exhibit B.I



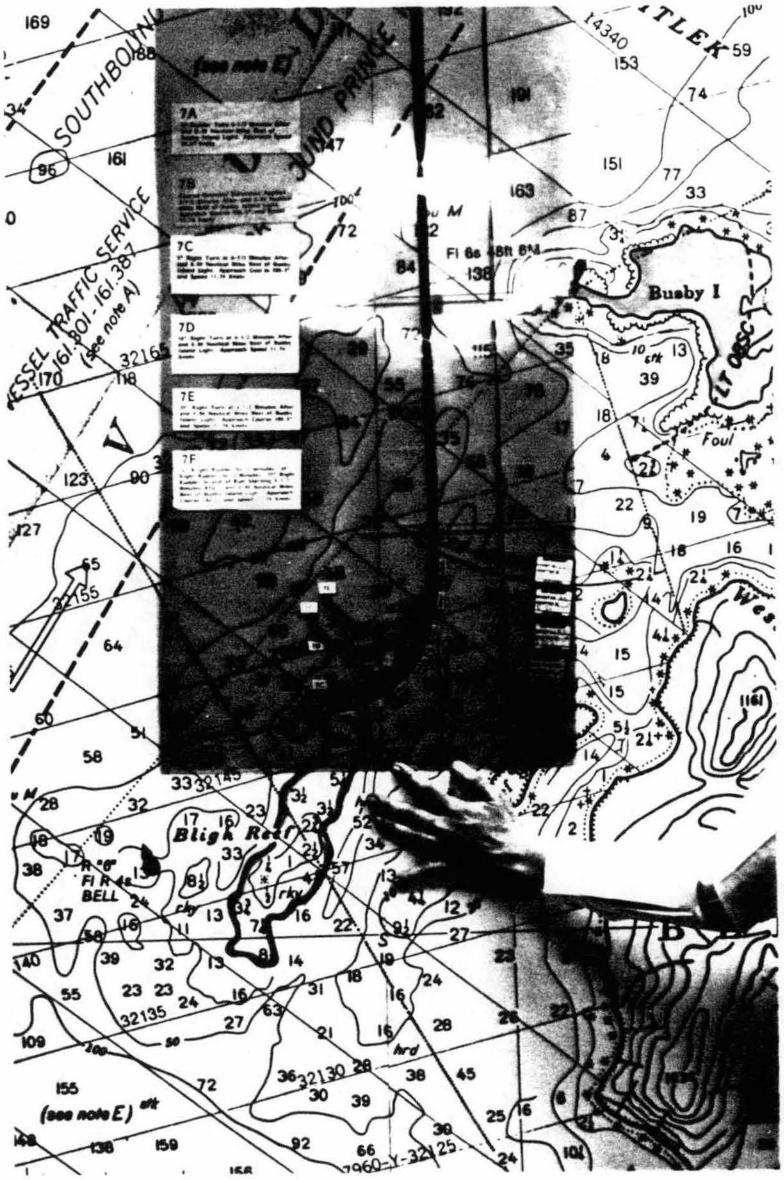
10° right rudder overlay

Exhibit BJ



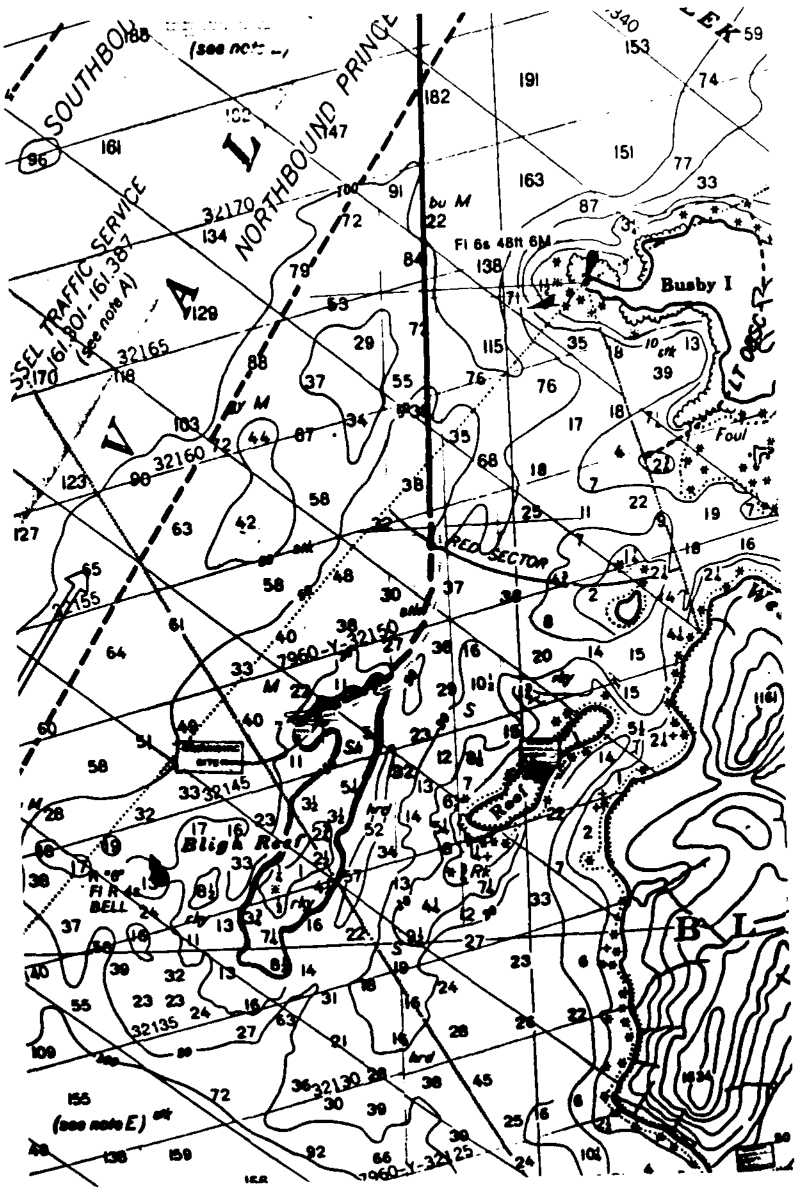
20° right rudder overlay

Exhibit Bk



Overlay

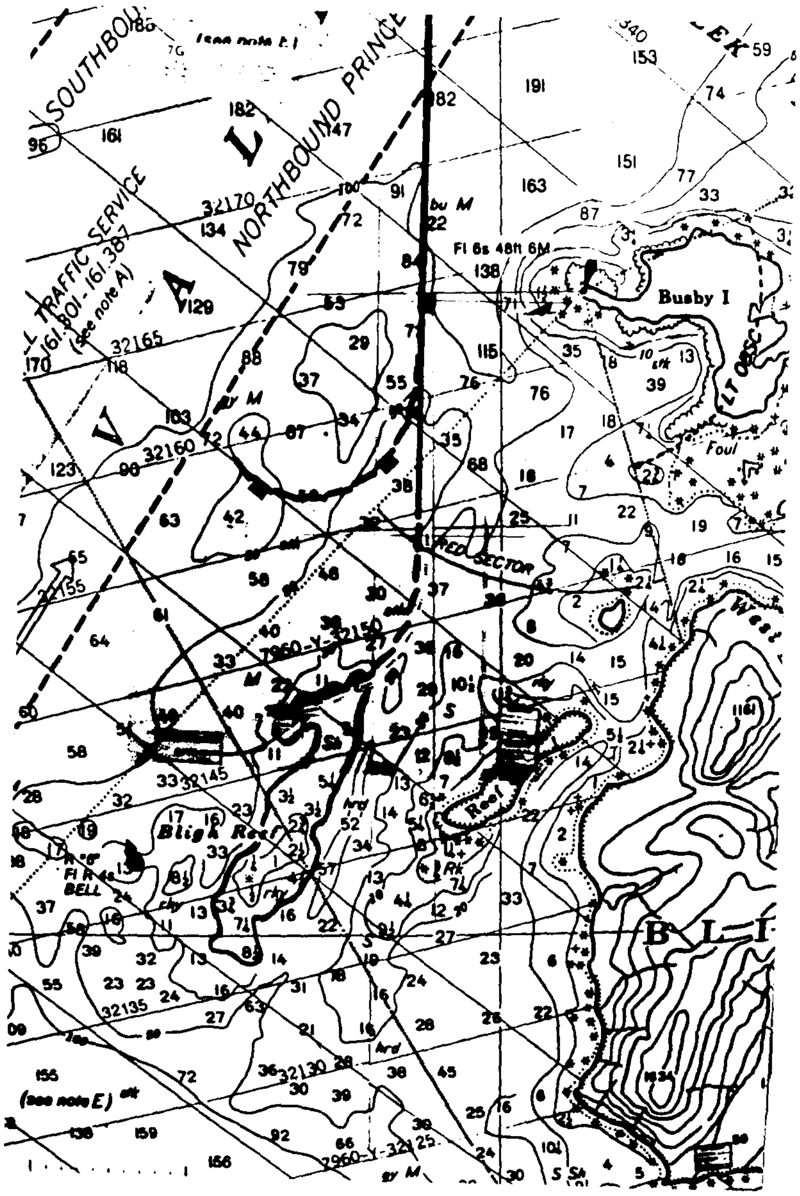
Exhibit BL



Large Chart with overlays abeam Busby island chart

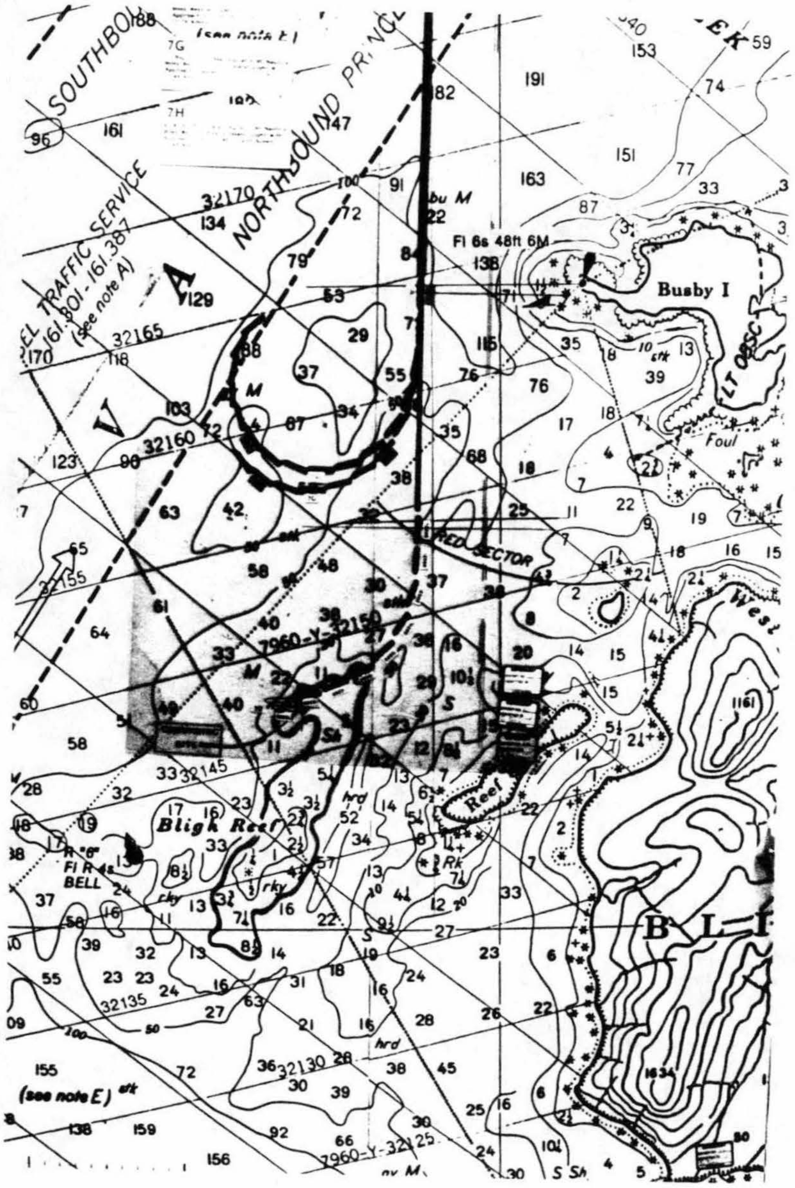
Exhibit BM

Overlay BN



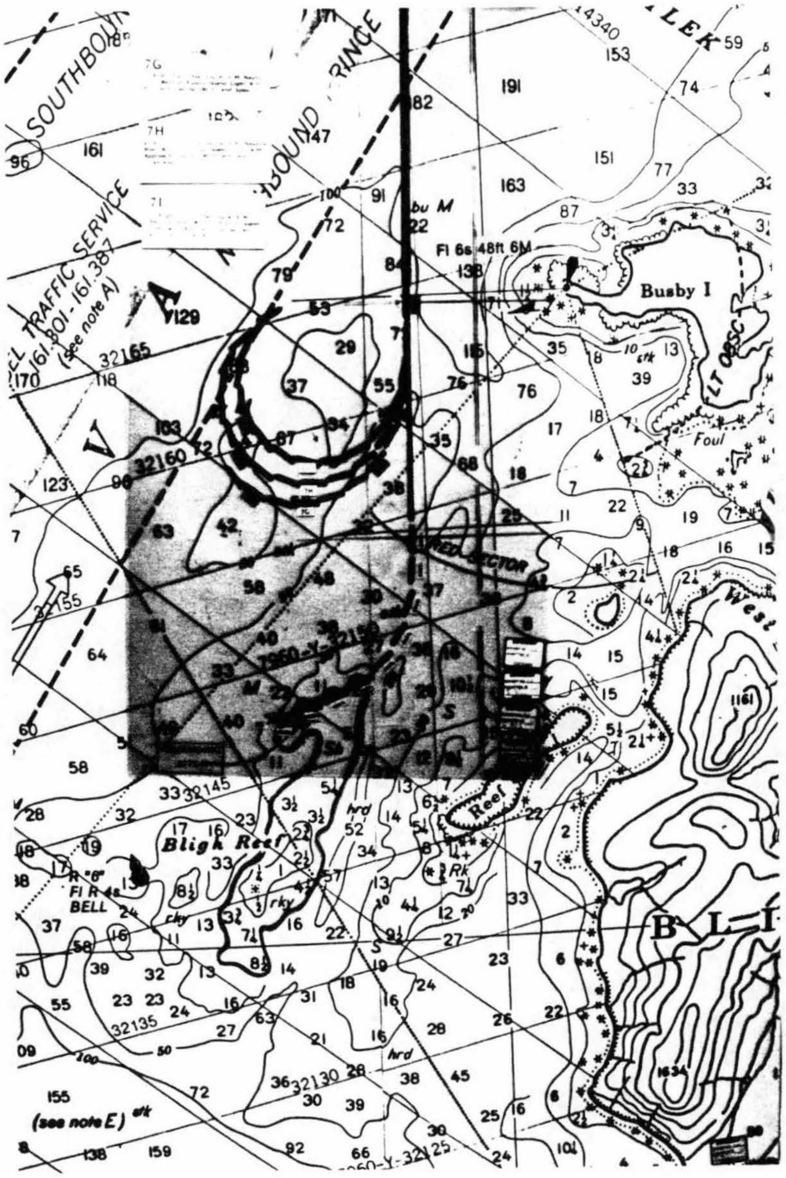
Overlay 3° right rudder

Exhibit 60



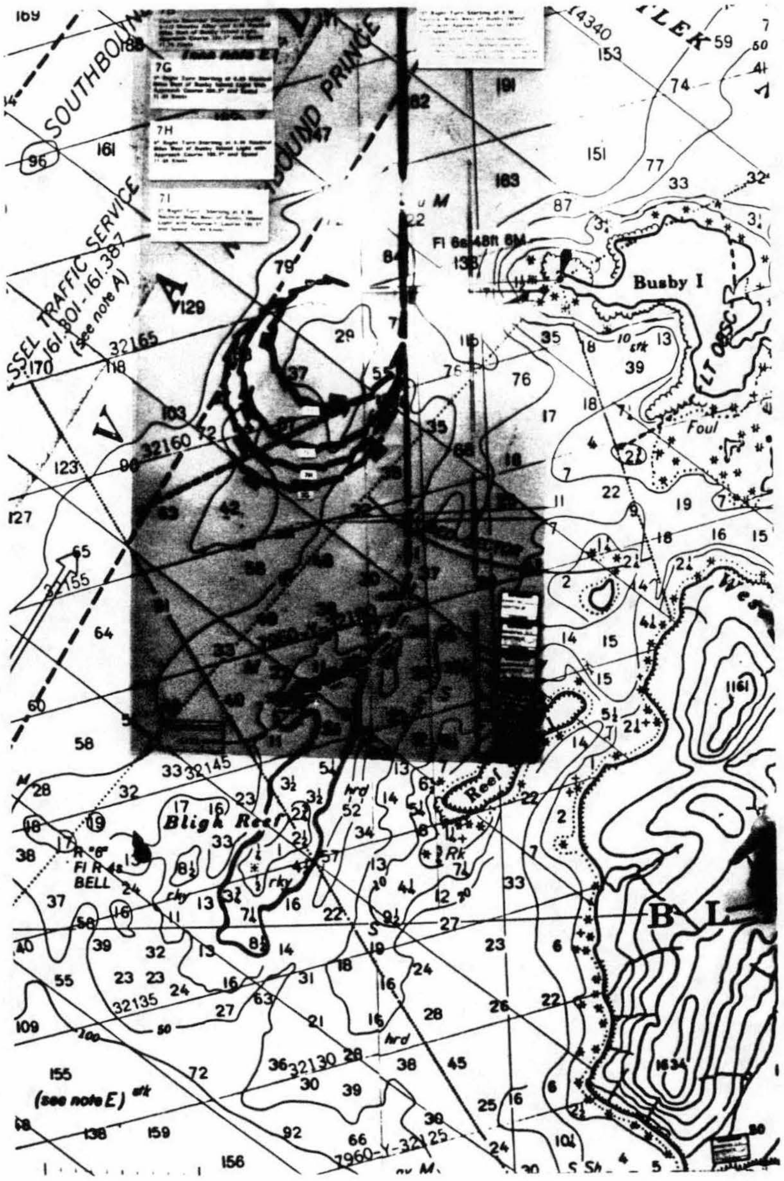
Overlay 4° right rudder

Exhibit BP



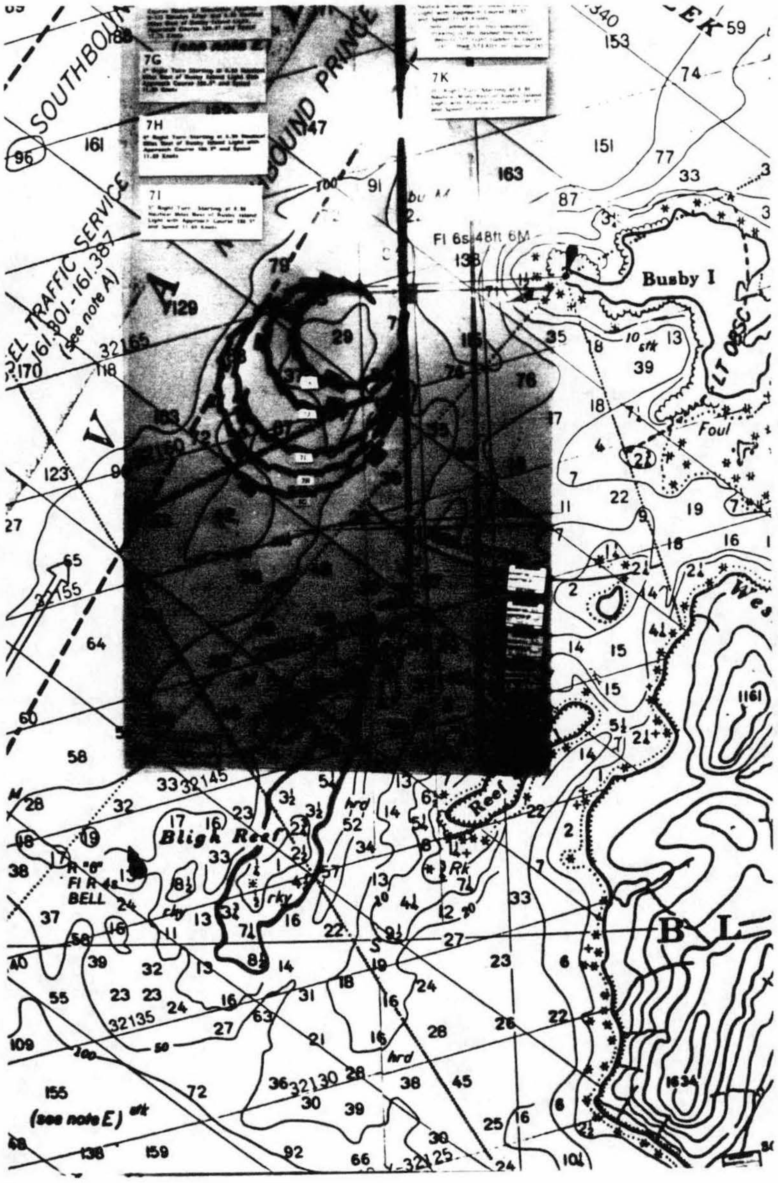
Overlay 5° right rudder

Exhibit BQ



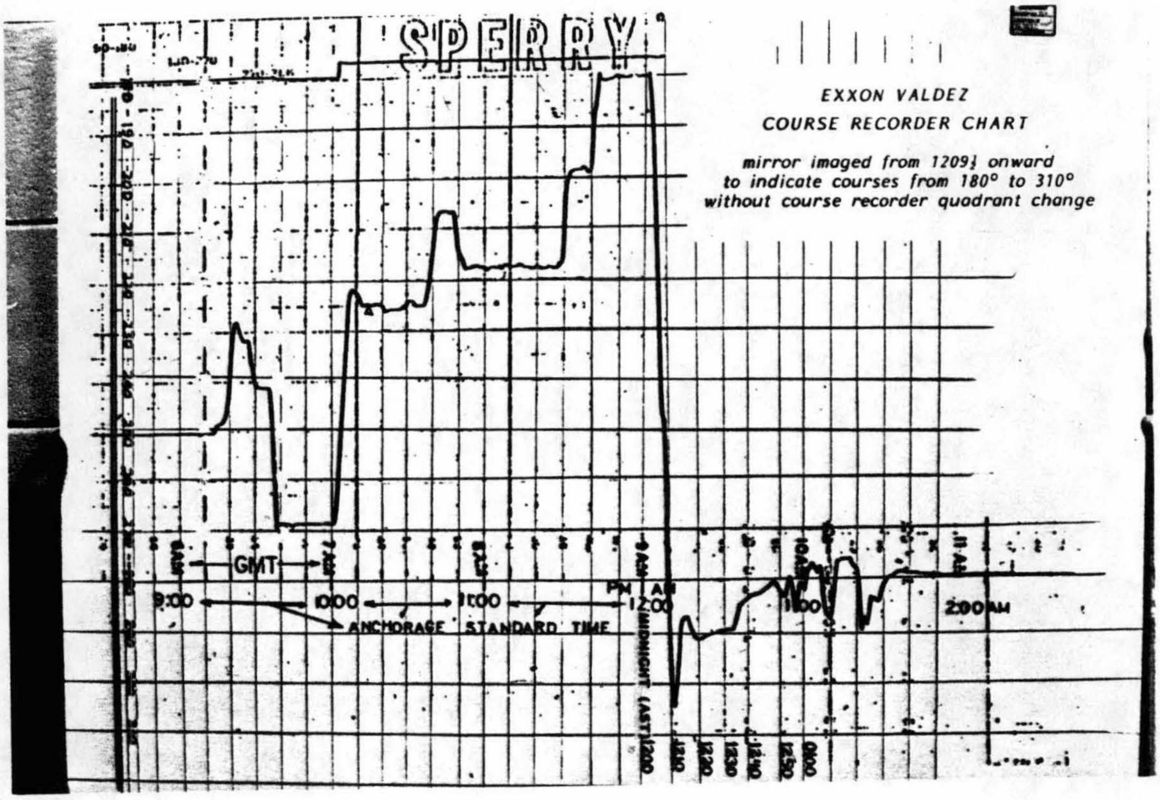
Overlay 10° right rudder

Exhibit BR



Overlay 20° right rudder 23:55

Exhibit 15S



Exxon Valdez Course Recorder Chart
Exhibit BT

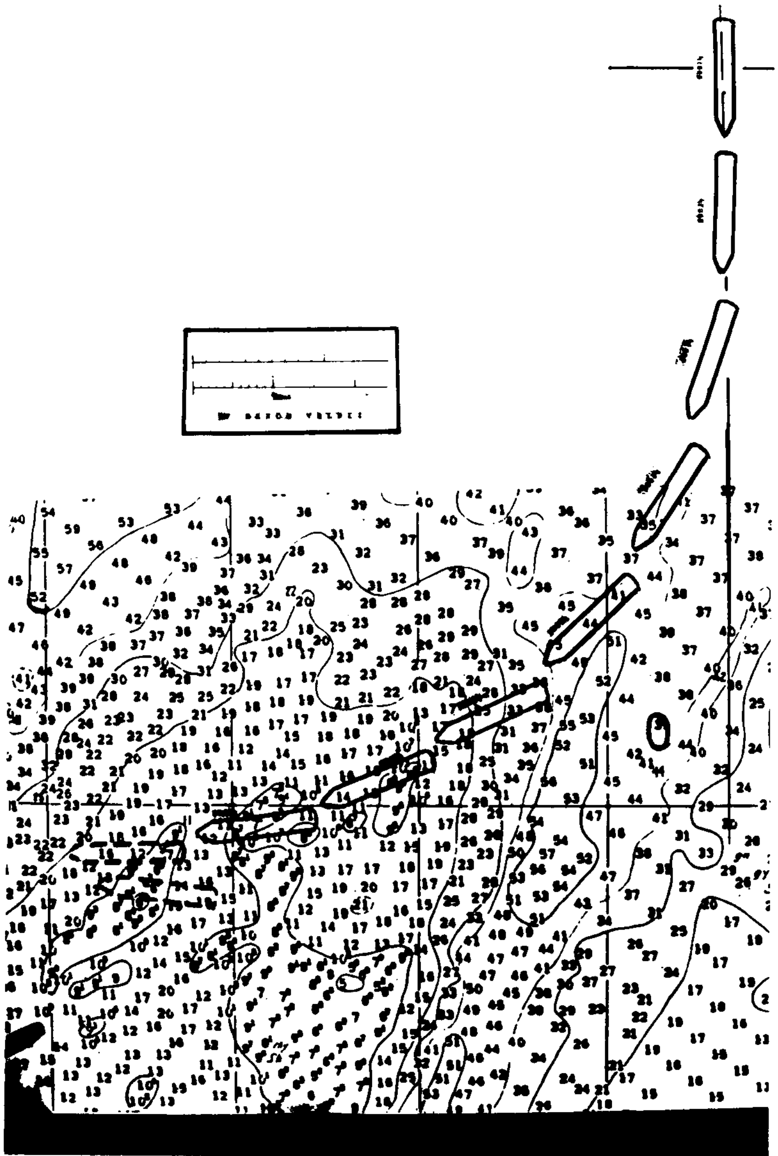


Exhibit VB12

Grounding Chart

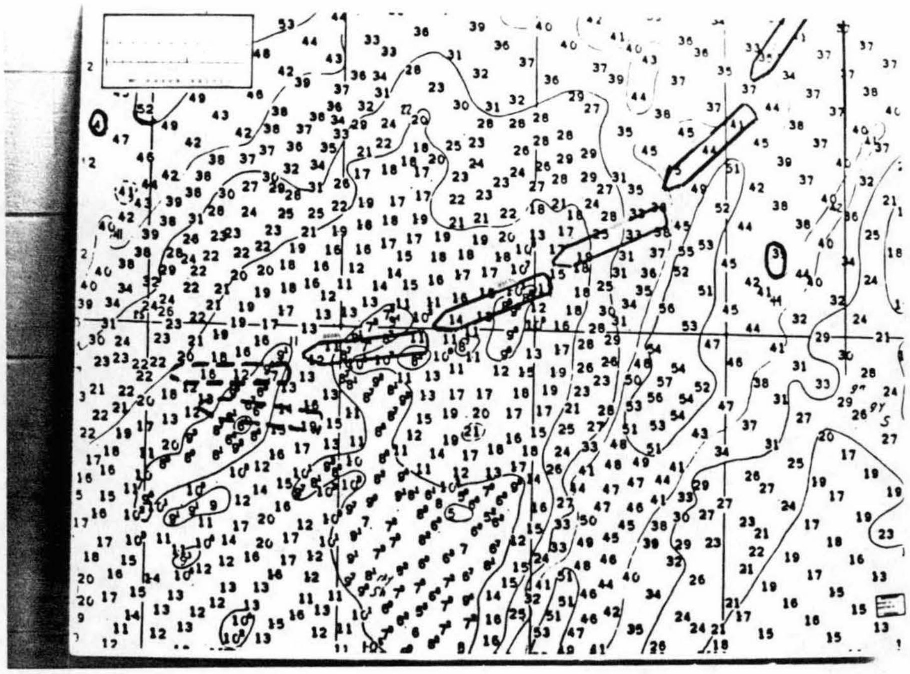


Exhibit OV

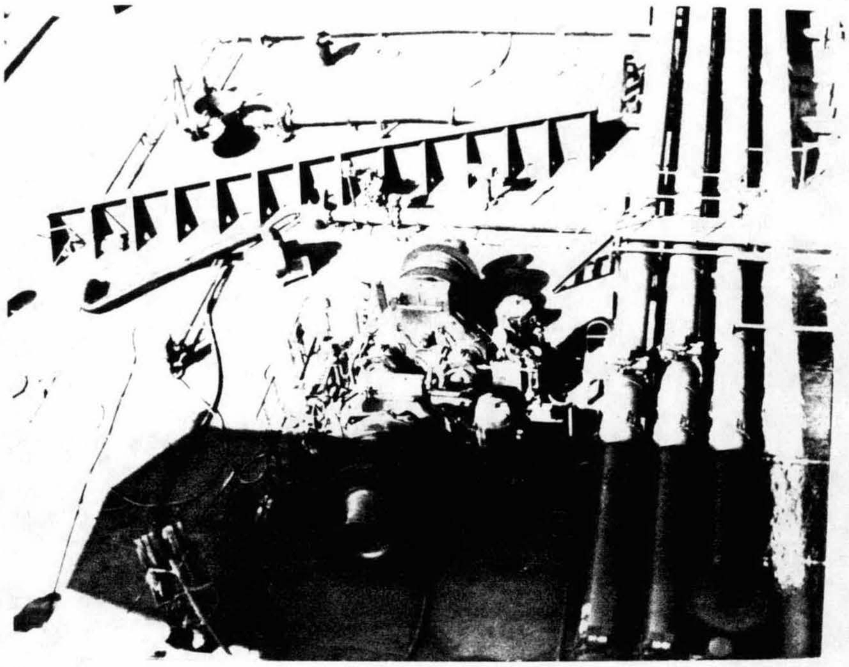


Exhibit # BW

EXHIBIT BX

WAS NOT ADMITTED INTO EVIDENCE

EXXON SHIPPING COMPANY

3400 EAST SECOND STREET • BENICIA, CALIFORNIA 94510-1006 • (707) 746-7414 "STANSHIP SAN FRANCISCO"

WEST COAST FLEET OFFICE

W.J. BORGEN
MANAGER

A.P. MARTINEAU
PORT CAPTAIN

K.I. PETERS
PORT ENGINEER

1

October 16, 1986

WEST COAST FLEET LETTER No. 1686
Prince William Sound
New Pilotage Requirements

MASTERS OF EXXON SHIPPING COMPANY WEST COAST FLEET OWNED VESSELS:

The attached letter from Alaska Maritime Agencies explains the new pilotage requirements for Prince William Sound, Alaska. Please review this letter with your relief and officers. If you have any questions regarding these new requirements please feel free to call on me.

Very Truly Yours,

André P. Martineau

APM/jr

c - H. J. Borgen
W. G. Duncan
J. C. Klepper
D. H. Koops
D. P. Larsen
J. L. Lloyd
A. P. Martineau
K. I. Peters
W. P. Sheehy
J. A. Tompkins

MISC2/apm

DEFENDANT
EXHIBIT NO. B4
ADMITTED ☒ Tried
89-7217 CR
89-7218 CR
(CASE NUMBER)

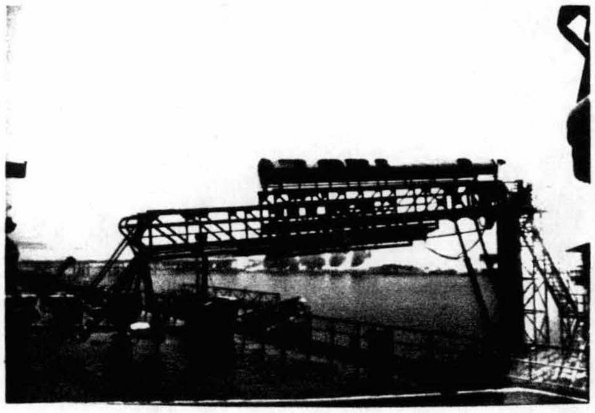


Exhibit BZ

Exhibit CA

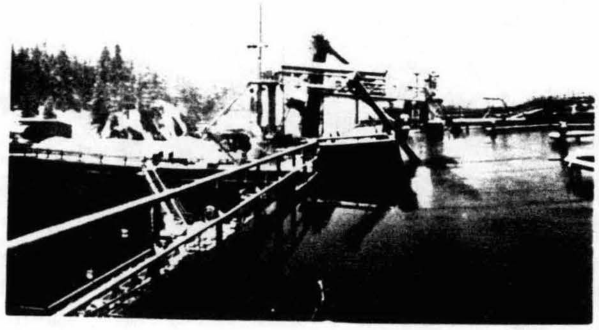


Exhibit CB

EXHIBIT CC

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CD

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CE

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CF

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CG

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CH

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CI

WAS NOT ADMITTED INTO EVIDENCE

AS SEEN

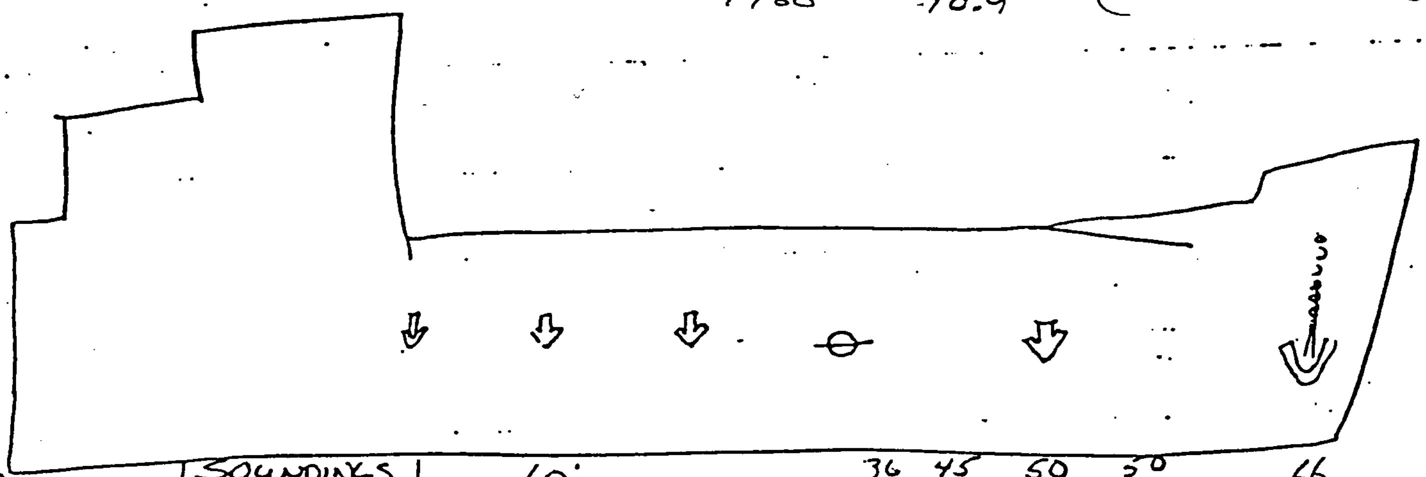
0945

3-24-89

TIDE

0749 0.00

1400 -10.9 (APPROX + 2.5')



DISTANCE OFF

SOUNDINGS

0' — 80 60' 36 45 50 50 66

45 36 45 50 50 60

50' — 100' 80 70

80

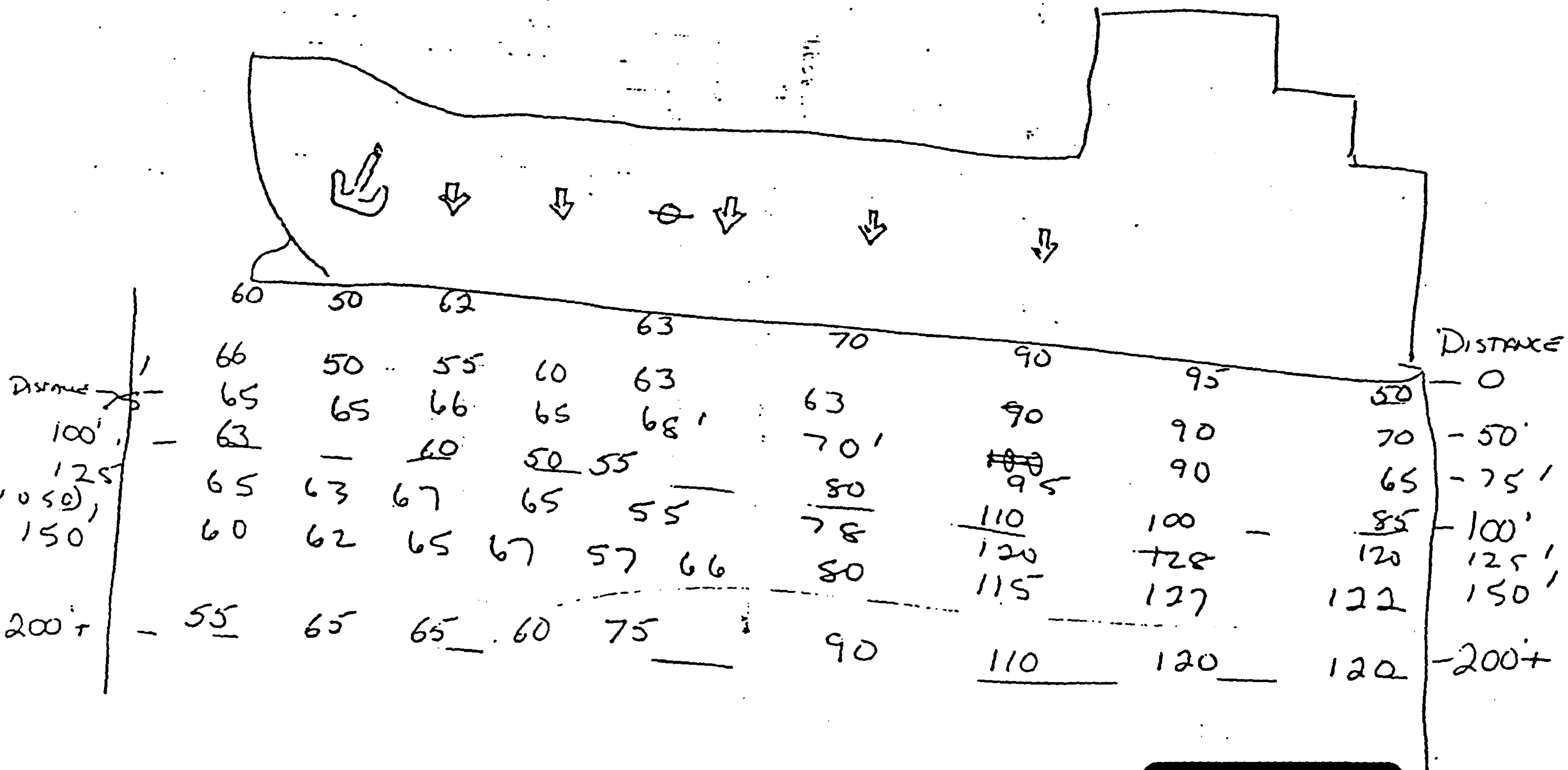
100' — 70 75 35 48 50 55

200' — 75 36 38 45 55 80 75

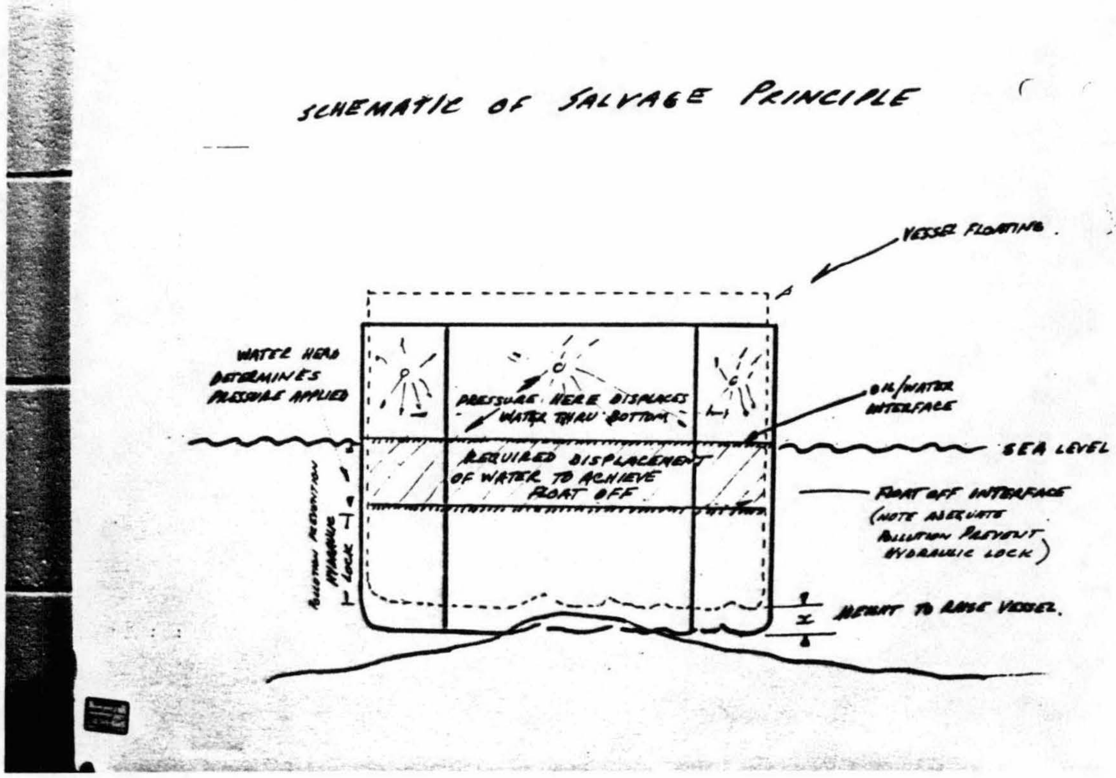
250-300 — 70 40 45

PORT SIDE

0445



DEFENDANT
EXHIBIT NO. CK
ADMITTED
89-7217 CR
89-7218 CR
(CASE NUMBER)



DEF. Exhibit CL

EXHIBIT CM

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CN

WAS NOT ADMITTED INTO EVIDENCE

EXHIBIT CO

WAS NOT ADMITTED INTO EVIDENCE

SEC A

EXHIBIT LIST

C. No. 3AN S89-7217/7218 CR ☐ Pretrial Hearing ☒ Trial

State of Alaska vs. Joseph Hazelwood

Name of Party: Court's Exhibits ☐ Pltf. ☐ Def.
(There must be a separate exhibit list for each party.)

Party's Attorney: N/A

Exhibit No. Marked for ID (Write No.)	BRIEF DESCRIPTION OF EXHIBIT	Off.	Ad.	COURT USE ONLY With-drawn Date	To Jury	From Jury	To Ex. Stor.
1	List of Items received From Coast Guard.						
2	Transcript						RD
3	Transcript (outbound Exxon Valdez)						RD
4	Transcript interview of Hazelwood						RD
5.	Letter to Russo from Dr. Papoun plus attachments						RD

I certify that the exhibits checked in the "[illegible]" column on this and all attached pages were given to the jury for deliberation.
Date 3/30/90 In-Ct. Clerk ______

I certify that the exhibits checked in the "From Jury" column on this and all attached pages were received from the jury after the verdict.
Date ______ In-Ct. Clerk ______

I certify that the exhibits checked in the "To Exhibit Storage" column on this and all attached pages have been placed in exhibit storage.
Date 3/30/90 Exhibit Clerk Scott Pender

3/30/90 [signature]

Page of
TF-200 (12/88) (cs)
EXHIBIT LIST

Civil Rule 43.1
Criminal Rule 26.1
Admin. Bulletin No. 9

ITEMS RECEIVED FROM COAST GUARD

1. DELOSIER LIST OF ITEMS OBTAINED AND YET TO BE OBTAINED
2 RADAR MAINTENANCE RECORDS OF EXXON VALDEZ
3. SUBPOENAS ISSUED DURING INVESTIGATION
4. MEDICAL RECORDS OF MAUREEN JONES FROM EXXON VALDEZ
5. " " " ROBERT KAGAN " " "
6 " " " GREGORY COUSINS " " "
7. SEA CARRIER SEARCH GUIDELINES FOR DRUG - U.S. CUSTOMS
8 EXXON SHIPPING POLICY ON ALCOHOL
9 EXXON VALDEZ LOG BOOK
10 AUTOPILOT MANUAL
11. TABLES OF EXXON VALDEZ PHYSICAL CHARACTERISTICS
12 EXXON VALDEZ NIGHT ORDER BOOK
13 EXXON VALDEZ COMPUTER RECORDS
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19. VTC REPORT FORM - EXXON VALDEZ
20 INTERNATIONAL OIL POLLUTION PREVENTION CERTIFICATE - EXXON VALDE

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[illegible]
(2-1-90)

21. CARGO SAFETY SHIP CONSTRUCTION CERTIFICATE - EXXON VALDEZ
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23. CERTIFICATE OF INSPECTION - EXXON VALDEZ
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39. GATE LOG FOR ALYESKA TERMINAL
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47. COURSE RECORDER - EXXON VALDEZ
48. CALEB - BRETT VESSEL'S ULLAGE/SOUNDING REPORT - EXXON VALD
49. DIAGRAM OF ALYESKA TERMINAL

KAISER	AST	3/29/89
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LEVY, PATRICK	AST	3/30/89
SHIER, LARRY	SAVAGE	4/6/89
SARNACKI, PETE	SAVAGE	4/7/89
RUNNELS, JOHN	SAVAGE	4/7/89
BARNUM, DAVID	SAVAGE	4/7/89
BALDRIDGE, JOHN	SAVAGE	4/7/89

OTHER DOCUMENTS AND RECORDS

1 PERFORMANCE RECORDS OF EXXON ON HAZELWOOD
2 MEDICAL RECORDS OF EXXON ON KAGAN
3 MEDICAL RECORDS OF EXXON ON HAZELWOOD
4 " " " " ON COUSINS
5. TRANS-ALASKA PIPELINE PORT INFORMATION MANUAL BY ALYESKA
6 MINUTES OF ALYESKA EMERGENCY CENTER 3/24/89 → 3/31/89
7. NOTES OF VESSEL PATHFINDER 3/24/89 → 3/26/89
8 ALYESKA EMPLOYEE ATTENDANCE RECORDS 3/23/89 → 4/10/89
9 ALYESKA CONTRACT EMPLOYEE LIST 3/24/89
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11. PERSONNEL RECORDS OF EXXON ON HAZELWOOD
12 " " " " " COUSINS
13. " " " " " KAGAN
14. EXXON VALDEZ ALASKA PILOTAGE BOOK
15. MEMORANDA OF LEBEAU, ADEC

The EXXON VALDEZ.

VALDEZ. VALDEZ. EXXON VALDEZ. Valdez Traffic. Yeah. Any update captain?

We're ah, still surveying ah, tanks ah, trying to assess the damage. Over.

Roger. Do you have capacity on board to internally transfer if you need to? Over.

Yes, we could do that.

Okay. That's -- obviously, you know better than I do, but that's highly recommended if once you determine which tanks are holed, to drop the head if you can. Over.

Yes, roger that.

Courts Exhibit #2

And you're still working at trying to get off? Over.

No. Our engines are stopped right now. We're going to wait ah, until a little more water underneath us.

Ah, roger on that. We've got a negative further. Standing by. Out.

VALDEZ clear.

[redacted]

Valdez Traffic. EXXON BA ah VALDEZ.

EXXON VALDEZ traffic.

Valdez Traffic. Go ahead.

Yes. We've ah departed the pilot or disembarked the pilot. Excuse me. And this time hooking up to sea speed and ETA Naked Island 0100. Over.

Roger that, sir. Request an updated ice report when you get down through there. Over.

Okay. I was just about to tell you that, ah, judging by our radar, I we'll probably divert from ah, the TSS and end up in the, ah, inbound lane if there's no conflicting traffic. Over.

No reported traffic. I've got the CHEVRON CALIFORNIA one hour out. Then the ARCO ALASKA is right behind them, but they're an hour out from Cape Hinchinbrook. Ah how on that. Over.

That'd be fine. Yeah. We we may end up over in the, ah, inbound lane, outbound transit. Ah, we'll notify you when we leave the, ah, TSS and, ah, cross over the separation zone. Over.

Roger that. Be waiting your call. Traffic out.

Okay. EXXON VALDEZ over. Standing by 13 and 16.

Ah, Valdez Traffic. EXXON VALDEZ. W-H-C-B. Over.

Valdez Traffic. Over.

Yeah, at the present time, I'm going to alter my course to two, zero, zero and reduce speed to about 12 knots to, ah, wind my way through the ice, and, ah, Naked Island ETA might be a little out of whack but, ah, once we're clear of the ice out of Columbia Gla...Bay, we'll give you another shout. Over.

Roger that, sir. Be awaiting your call. Traffic standing by.

DATE: MARCH 24, 1989

Calling Valdez Traffic. CHEVRON CALIFORNIA.

CHEVRON CALIFORNIA. Valdez Traffic.

CHEVRON CALIFORNIA to Valdez Traffic. Abeam Cape Hinchinbrook at 0015, estimating Naked Island about 0200.

CHEVRON CALIFORNIA. Valdez Traffic. Roger. We have the EXXON VALDEZ outbound estimating Naked Island, Naked Island 0100, and he should be able to give you a pretty good ice report. Over.

Yeah. Okay. Sounds good. we'll talk to him on his way out then. Thank you very much.

Traffic out.

Yeah, Valdez Traffic. EXXON VALDEZ. Over.

EXXON VALDEZ. Valdez traffic.

Yeah. Ah, it's VALDEZ back. Ah, we've--ah, should be on your radar there -- we've fetched up, ah, hard aground north of, ah, Goose Island off Bligh Reef. And, ah, evidently, ah, leaking some oil, and, ah, we're gonna be here for awhile. And, ah, if you want, ah, so you're notified. Over.

EXXON VALDEZ. Valdez traffic. Roger. Are you just about ah about a mile north of Bligh Reef?

Yeah. That's correct. Over.

Roger that.

Okay. I'll give you a status report, ah, ascertain the situation. Over.

Standing by.

Tug STALWART. Valdez Traffic.

The STALWART back to Valdez traffic. Go ahead.

We have the EXXON VALDEZ aground at Bligh Reef. Request you proceed for possible assist. Over.

Roger, roger. We'll be underway in just a few minutes.

CHEVRON CALIFORNIA. Valdez Traffic.

CHEVRON CALIFORNIA back to Valdez Traffic. Go ahead.

Yes sir. Good morning. Pending disposition of the EXXON VALDEZ sir - as soon as we get his situation resolved. The Captain of the Port has closed the port to all traffic in and out. Over.

Okay. Roger, copy that. Any idea on expected reopening of the port there? Over.

Not at this time. We'll have to get some further information. Traffic out.

Okay. Roger. We'll go down to a slow bell then, and we'll probably be proceeding over towards Knowles Head then. CHEVRON CALIFORNIA W-C-G-N.

CHEVRON CALIFORNIA. Valdez Traffic

[redacted]

Roger. Okay.

BERING Traffic. Coast Guard dock okay?

Yeah. Roger. That'd be just fine.

Traffic out.

Valdez Traffic. ARCO ALASKA K-S-B-K.

ARCO ALASKA. Valdez Traffic. Over.

We will depart the lanes in 10 minutes.

Traffic. Roger. Out.

EXXON VALDEZ. ...CHIRIKOF.

VALDEZ back. Over.

Yeah. This is CHIRIKOF back. I'm just about a mile away heading in your direction. Do you want to send a man down for any kind of a visual?

Ah, not at this time. Ah, you gonna pile aboard us? Over.

Ah, okay. I'll be there in just a second.

Ah, okay. ah, we'll ... there'll be a ladder on the port side. Over.

Is it my understanding you have a pilot on board?

Ah, no. Not at this time. Ah, I do have the pilotage for this area, but, ah, no pilot, ah, Southwest Pilot on board. Over.

Yeah. Roger. I neither have a pilot on board myself. So, I'll be there in just a minute.

Very well, EXXON VALDEZ standing by thirteen and sixteen.

EXXON VALDEZ. This is Valdez Traffic. Channel 13. Over.

[redacted]

Roger on that. Yeah, I've got -- we've got all our plan mechanisms in way to give you what assistance we can. Ah, you know take it slow and easy, and you know I'm telling you the obvious, but take it slow and easy and we're getting help out as fast as we can. And I'd appreciate when you get around, if you can give me a fairly good -- if you can give me an update whenever as to the general location where you suspect it might be and of the stability info. Over.

Okay. We're, ah, pretty good shape right now stability-wise. We're, ah, just trying to extract her off the, ah, shoal here, and, ah, you can probably see me on your radar and, ah, once we get underway, I'll let you know. Do another, ah, damage control assessment. Over.

Roger. Yeah. And let me know again, before you make any drastic attempt to get underway, you make sure you don't start doing any ripping. You got a rising tide. You got about another -- about an hour and a half worth of tide in your favor. Once you hit that max, I wouldn't recommend doing much wiggling. Over.

Okay. Yeah, I think it's, ah, major damage is kinda been done. We kinda rock and rolled over it, and, ah, we're just kinda hung up in the stern here. We're just, ah, we'll drift over it. I'll get back to ya. We'll be standing by thirteen sixteen. EXXON VALDEZ clear.

Captain of the Port. Out.

Valdez Traffic. BERING.

BERING Traffic.

Yeah, how many personnel are you going to have coming out?

Two Coast Guard and one ADEC.

[redacted]

CHEVRON CALIFORNIA traffic.

CHEVRON CALIFORNIA. I just want to confirm the port is closed, and we are to proceed to Knowles Head. Is that correct?

Roger that.

Roger. We'll be ah -- we'll ah ... Knowles Head. We'll get up on the track line there, and we'll let you know when we get up there.

Roger that. Traffic out.

Yeah, roger, okay. We'll do that and I guess you can figure that there'll be somebody in there within the hour. Okay?

Roger that. Thank you very much, and we'll be standing by on 13. Traffic out.

Out BERING

EXXON VALDEZ. This is the Captain of the Port on channel 13. Over

EXXON VALDEZ back. Over.

EXXON VALDEZ. This is the Captain of the Port, Commander McCall. Good evening. Do you have anymore of an estimate as to your situation at this time? Over.

Ah, not at the present, ah, Steve. Joe Hazelwood here...or ah, a little problem here with the third mate but, ah, we are working our way off the reef. We've, ah, the vessel's been holed and, ah, we're ascertaining - right now we're trying to just to get her off the reef and, ah, we'll get back to you as soon as we can. Over.

[redacted]

0026.41	EV	Yeah, Valdez Traffic. EXXON VALDEZ. Over.
0026.46	VTC	EXXON VALDEZ. Valdez traffic.
0026.55	EV	Yeah. Ah, it's VALDEZ back. Ah, we've--ah, should be on your radar there--we've fetched up, ah, hard aground north of, ah, Goose Island off Bligh Reef. And, ah, evidently, ah, leaking some oil, and, ah, we're gonna be here for awhile. And, ah, if you want, ah, so you're notified. Over.
0027.44	VTC	EXXON VALDEZ. Valdez traffic. Roger. Are you just about ah about a mile north of Bligh Reef?
0027.57	EV	Yeah. That's correct. Over.
0028.01	VTC	Roger that.
0028.03	EV	Okay. I'll give you a status report, ah, ascertain the situation. Over.
0028.10	VTC	Standing by.
0031.35	VTC	Tug STALWART. Valdez Traffic.
	ST	The STALWART back to Valdez Traffic. Go ahead.
	VTC	We have the EXXON VALDEZ aground at Bligh Reef. Request you proceed for possible assist. Over.
	ST	Roger, Roger. We'll be underway in just a few minutes.
	VTC	EXXON VALDEZ. Valdez Traffic.
	EV	EXXON VALDEZ back. Over.
	VTC	Yes sir. Could you give me the on-scene weather down there?
0038.47	EV	Ah, it's blowing, ah, northerly a little bit, ah, drizzle, visibility, ah, two miles. Over.
	VTC	Roger. What was the wind speed?
	EV	Ah, ten knots right now. Over.
	VTC	Roger that. Slight sea?
	EV	Yeah, it's kinda indeterminate, ah, right now. It's ... ah, slight sea. Over.

Court exhibit #3

	VTC	Roger that. Thank you very much. Traffic out.
	VTC	CHEVRON CALIFORNIA. Valdez traffic.
	CC	CHEVRON CALIFORNIA back to Valdez traffic. Go ahead.
0041.55	EV	Yes sir. Good morning. Pending disposition of the EXXON VALDEZ sir--as soon as we get his situation resolved. The Captain of the Port has closed the port to all traffic in and out. Over.
	CC	Okay. Roger, copy that. Any idea on expected reopening of the port there? Over.
	VTC	Not at this time. We'll have to get some further information. Traffic out.
	CC	Okay. Roger. We'll go down to a slow bell then, and we'll probably be proceeding over towards Knowles Head then. CHEVRON CALIFORNIA W-C-G-N.
	VTC	CHEVRON CALIFORNIA. Valdez traffic.
	VTC	CHEVRON CALIFORNIA traffic.
0048.00	CC	CHEVRON CALIFORNIA. I just want to confirm the port is closed, and we are to proceed to Knowles Head. Is that correct?
	VTC	Roger that.
	CC	Roger. We'll be ah--we'll ah ... Knowles Head. We'll get up on the track line there, and we'll let you know when we get up there.
	VTC	Roger that. Traffic out.
	ST	Valdez traffic. The STALWART.
0053.27	VTC	STALWART traffic. Go ahead.
	ST	We're underway heading toward the VALDEZ now.
	VTC	Traffic. Roger.
	VTC	Pilot boat BERING. Valdez traffic.
	BE	Traffic. BERING.
	BE	Valdez Traffic. BERING.

	VTC	Bravo. BERING. Valdez Traffic. Shift to channel two two, please.
	BE	Roger.
	BE	BERING on 22.
	VTC	Bravo BERING. Valdez traffic. Have you been copying the EXXON VALDEZ?
	BE	Yea, that's a roger. Understand STALWART's on their way out and the port is closed until further notice.
0059.41	VTC	Roger, we'd like you to get underway in the--either the BARONOV or CHIRIKOV or whatever you have, and do a little reconnaissance of the situation for us, if you could?
	BE	Ah, yea. Any particulars? Yea, we'll head out there. Okay. I'll go wake everybody up and we'll head out.
	VTC	Roger that. Do you also have enough people on board to possibly send the SILVER BULLET in to pick up some Coast Guard personnel?
	BE	Yeah. When? ASAP on that?
	VTC	Roger that. Yeah, if you could get the SILVER BULLET underway and send her into town and pick up a couple of Coast Guard people to go to the scene, and if you could give us a recon report on the amount of oil, particularly that might be leaking out. Over.
	BE	Yeah. Roger that. I'll get right back to you. Okay? Stand by. Are they pretty hard aground? They are leaking oil?
	VTC	Roger. At first report that seems to be the situation.
	BE	Okay. Stand by. I'll get back to you in a couple of minutes. Okay.
	VTC	Roger that. Swish, shifting back to 13. Out.
	AA	Valdez Traffic. Valdez Traffic. ARCO ALASKA KSBK.
	VTC	ARCO ALASKA Traffic.

0102.03	AA	... personnel. We'll be departing the lanes in about half an hour. We'll give you a call when we do.
0102.27	VTC	ARCO ALASKA. Valdez traffic, roger. We also have the CHEVRON CALIFORNIA departing the lanes and heading to Knowles Head also. Traffic out.
	CC	CHEVRON CALIFORNIA to Valdez traffic. We'll be departing the lane here in 2 or 3 minutes. Over.
	VTC	Traffic, roger out.
	BE	Valdez Traffic. The BERING.
	VTC	BERING Traffic.
	BE	22.
	VTC	Two two.
	VTC	BERING traffic.
	BE	Traffic BERING.
	VTC	BERING Traffic. Go ahead.
	BE	Valdez Traffic. BERING.
	VTC	BERING Traffic. Go ahead.
0105.58	BE	Yeah, I understand you want to take some people out to--somewhere.
	VTC	Roger. We have the EXXON VALDEZ hard aground on Bligh Reef and presumably leaking oil. If you have enough people, we'd like you to go down there with the pilot boat to evaluate the situation, see what kind of damage they've sustained. And, if you have enough people, if you could send the SILVER BULLET into town to pick up some Coast Guard people.
0106.54	BE	Yeah, roger, okay. We'll do that and I guess you can figure that there'll be somebody in there within the hour. Okay?
	VTC	Roger that. Thank you very much, and we'll be standing by on 13. Traffic out.
	BE	Out BERING.

0107.29	COTP	EXXON VALDEZ. This is the Captain of the Port on channel 13. Over.
	EV	EXXON VALDEZ back. Over.
	COTP	EXXON VALDEZ. This is the Captain of the Port, Commander McCall. Good evening. Do you have anymore of an estimate as to your situation at this time? Over.
	EV	Ah, not at the present, ah, Steve. Ah, ...or ah, a little problem here with the third mate but, ah, we are working our way off the reef. We've, ah, the vessel's been holed and, ah, we're ascertaining--right now we're trying to just to get her off the reef and, ah, we'll get back to you as soon as we can. Over.
	COTP	Roger on that. Yeah, I've got--we've got all our plan mechanisms in way to give you what assistance we can. Ah, you know take it slow and easy, and you know I'm telling you the obvious, but take it slow and easy and we're getting help out as fast as we can. And I'd appreciate when you get around, if you can give me a fairly good--if you can give me an update whenever as to the general location where you suspect it might be and of the stability info. Over.
	EV	Okay. We're, ah, pretty good shape right now stability-wise. We're, ah, just trying to extract her off the, ah, shoal here, and, ah, you can probably see me on your radar and, ah, once we get underway, I'll let you know. Do another, ah, damage control assessment. Over.
	COTP	Roger. Yeah. And let me know--again, before you make any drastic attempt to get underway, you make sure you don't start doing any ripping. You got a rising tide. You got about another--about an hour and a half worth of tide in your favor. Once you hit that max, I wouldn't recommend doing much wiggling. Over.
	EV	Okay. Yeah, I think it's, ah, major damage is kinda been done. We kinda rock and rolled over it, and, ah, we're just kinda hung up in the stern here. We're just, ah, we'll drift over it. I'll get back to ya. We'll be standing by thirteen sixteen. EXXON VALDEZ clear.
	COTP	Captain of the Port. Out.

ST-11-ES
12-211 R.v. 5-1-93

STATEMENT OF CAPTAIN JOSEPH J. HAZELWOOD OF THE EXXON VALDEZ 89-20572

ADDRESS

I, CAPTAIN JOSEPH J. HAZELWOOD make the following voluntary signed statement

at Valdez time 13:05 apprx. date 3/24/89

I was born on at . I have completed years of school.

MD= Chief Mark Delozier, U.S.C.G.

MF= Trooper Mike Fox

JH= Joseph J. Hazelwood

UM= Unidentified Male

MD: Well, why don't you describe to me in your own words what, what took place from the time we, we untied the, the vessel at the pier and, if you can remember...

JH: Yeah.

MD: The times, to the best of your ability, that would be helpful?

JH: Well, I...at approximately 2100, we started to single up.

MD: Okay.

JH: INAUDIBLE pretty routine, let...let go.

MD: As...as...as you, as you're doing it, you've got to place me in a location where you are and try to designate which persons are also with you at that time. In other words, you're up in the wheel house getting ready to...

JH: Oh.

MD: Get under way, the Chief Mate is there, etc.

JH: Yeah.

MD: Okay.

JH: It was myself, the Pilot, the Helmsman, and the Chief Officer, Bridge

court exhibit #4

I have read the above and foregoing statement consisting of page(s). I have been given an opportunity to make any corrections or changes that I might want to make. The changes which I have made are initialed by me in my own handwriting.

I now sign this statement in the presence of and to certify that the same is true and voluntarily made.

Signed at Alaska, this day of 19

005229

Watch Team.

MD: Alright.
JH: We let go normally, let go Valdez, just let the ends go, work down to the spring lines and let them go. The tug was inside, pushed us off the dock, we proceeded towards the Narrows.

MD: Did you say the First Officer was there too?
JH: Yeah, he's...that's his station.

MD: That's his station?
JH: INAUDIBLE...dock.

MD: Chief Mate?
JH: Chief Mate, First Officer, are the same...

MD: First, Pilot, and the Pilot was Mr. MURRAY?
JH: MURPHY.

MD: MURPHY. Okay, okay, go ahead...INAUDIBLE...
JH: And we disembarked him at Rocky Point, approximately 2330, 2325 exact time. He got on the pilot boat, I assumed the con of the vessel at that time.

MD: At Rocky Point?
JH: At Rocky Point, the pilot station.

MD: Okay, now when you say you assumed the con...you're referring to, from the Pilot?
JH: Yeah, he got off and I...

MD: Okay.
JH: I piloted through the waters.

MD: Okay.
JH: And then we came down here, I had to alter course somewhat to port, some ice was here.

MD: Um, huh.
JH: And then I noticed on the radar, you could kind of see it in the darkness, you could see some big chunks, there was a big, almost a flight of ice bergie bits and brash ice hanging across the entire separation zone into the northbound lane.

MD: Um, huh.
JH: At that point, I altered course to 200, which is about 17° to the left of the track line, because 217 is the median of the traffic lane.

MD: Okay.
JH: And I saw that wasn't going to be enough to avoid all the ice on the radar, so I altered course to 180 and...

005230

WITNESS SIGNATURE

MD: At any point during this determination of the ice and altering the course, did you communicate with the, the traffic?
JH: Yes, I notified traffic on Channel 13 and let them know my intentions, what I was doing, and that I would probably cross the inbound lane and they said there was, I think, two Arco ships that were outside of Hinchenbrook, so there would be no conflicting traffic.

MD: Okay, inbound, we're talking...
JH: Northbound.

MD: This one here, right? So, you're...
JH: Coming out here.

MD: You're supposed to be on this one here...
JH: Yeah.

MD: Normally, right?
JH: Yeah.

MD: So, you took...
JH: Well, this dotted line is the median or the...the solid line is the middle.

MD: This, this one here?
JH: Yeah.

MD: This is the one that you're supposed to be on?
JH: Yeah.

MD: For prime lane, okay, so you altered and you're about 17 off of that?
JH: Yeah.

MD: Which would put you...?
JH: INAUDIBLE position.

MD: Okay, right here.
JH: INAUDIBLE...that's 15 minutes after the pilot's got off.

MD: Okay, and then...
JH: And the I had to haul some more just about to due south, which would be this...

MD: Okay.
JH: That's a longitude line.

MD: Um, huh.
JH: It's...and it was about here, I had some paperwork to attend to down here for a few minutes and I asked the Third Mate...he had, was comfortable with the situation...the course we were steering...we got down to Busby Island, we clear the ice on the radar, haul it back to the right, and rejoin the traffic system.

WITNESS SIGNATURE

005231

MD: Okay, so the intention was to come on down to this vicinity?
JH: Yeah, Busby Island, get a new fix, and the light was visible.

MD: And then swing her back up?
JH: And swing her to westward again.

MD: Okay, and that was about...that was 180?
JH: That's a 180. Well, this isn't a course line, it's the meridians.

MD: Yeah.
JH: Due north and south, so basically that's a...

MD: Alright. So, you asked the Third, if he felt comfortable?
JH: Yeah.

MD: And...
JH: And he was aware of, apprised of the situation, what...how I had conned the ship, that it was steering 180.

MD: Um, huh. Did you leave any explicit instructions as far as when you get through such and such a point, you will turn to...
JH: No, I didn't...

MD: Any particular course?
JH: Ah, say at Busby Island, turn back, but I showed him on the radar where the ice was...

MD: Um, huh.
JH: And we'd be abeam of it and we'd be approximately here.

MD: Okay.
JH: And once we're abeam of the, the apex of the ice...

MD: Um, huh.
JH: Come back to the right and rejoin the traffic lane.

MD: Alright.
JH: And I went down to here, I was at my desk, starting to do some papers and I felt a shudder. The vessel shuddered and I was just about to go up to the bridge when the phone rang and he said, "I believe we're aground."

MD: Okay. Ah...you, you felt a shudder?
JH: Yeah.

MD: And you were preparing to, to get up and go?
JH: Get up to the bridge and find out what was...

MD: And, at that time then, you received a phone call?
JH: Yeah, the phone rang.

MD: Okay. Alright, and...alright, then what? I mean, once you got there?

WITNESS SIGNATURE

005232

JH: Well, I...I went over to the side and the...you could tell she was aground. I looked at the...INAUDIBLE...the depth sounder.

MD: Were you, were you dead in the water then? I mean...
JH: Yeah, she stopped.

MD: You were stopped?
JH: The engines were still running, but the, there...was making no way.

MD: Okay.
JH: Put some deck lights on and we saw the oil around the vessel and we called traffic.

MD: Um, huh.
JH: Informed them.

MD: As far as, when you, when you actually hit aground, you say, it shuddered?
JH: Yeah.

MD: Was...was that, was there a jolt...?
JH: No, it was just a...

MD: Rocked the boat, I mean?
JH: Well, there's a normal vibration of the engines. It's...but this was a, you know, significant shudder that's not, you know, didn't feel right.

MD: Okay. Alright...alright, when you arrived on the bridge, did you, did you do anything at that time?
JH: Oh, I was...I tried the rudder and the engines for a few minutes, to see if we could extract it from the situation, but then, I got my faculties about me...I was a little upset, of course, but then I thought about it and driving her off might not be the best way to go, because it just... exacerbate the damage, so I just stopped the engines.

MD: Did...did the Third say anything to you then or...?
JH: No, he...he didn't communicate anything. He...the only mention he made, he said, "he started the turn too late." He said, "she was sitting down on this area," and then he said, "he put more wheel on it." That's when she shuddered and stopped. He was in the process of making the turn when she...

MD: Alright, did...did you have any conversation with him once you got up there, I mean, as far as...?
JH: No, I haven't really spoken to him concerning this situation...INAUDIBLE...

MD: Okay.
JH: He's probably as upset as I am, so...

MD: INAUDIBLE...okay.

WITNESS SIGNATURE

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JH: Constructive at this point.

MD: Alright, so there you sat, high...high aground and was there any other, any other attempts to, to do anything or...I mean, I...I assume at that time you're starting notification?
JH: The notification, I had the Mate to sound the tanks and the engineers sound the engine room...

MD: Um, huh.
JH: Void spaces, double bottoms, pump room, to ascertain any damage that we could ascertain.

MD: Okay. Alright, again on, on the...who was where, when. You departed with the Chief Mate, yourself, First, and the Pilot, and the Helmsman in the wheel house. Alright, the Helmsman at departure was RED...REDDICK? Is that his name?
JH: RADTKE.

MD: RADTKE?
JH: PAUL RADTKE.

MD: PAUL RADTKE?
JH: Yeah.

MD: Okay, and ah...do you know how far he took the vessel?
JH: He had the wheel, so he would have taken it through the Narrows, almost to....where the pilots disembarking and shortly thereafter, he was relieved by KAGAN.

MD: Do you remember that for a fact? I mean...
JH: Yeah....

MD: As far as the pilot...
JH: I remember the pilot...

MD: Departing and RADTKE's still at the helm?
JH: I couldn't say for sure if he was on the wheel.

MD: Alright, and ah, alright, how about the Chief Mate, how far did he take it?
JH: He took it until we were clear of the dock and the deck was reasonably secured, and the Third Mate came up from his docking station to relieve him on the bridge. The Third Mate INAUDIBLE...

MD: Do you know what your, what the ship's location was about that time? Just a...
JH: It's usually about halfway between the, the berths and Middle Rock by the time all the lines are stowed...kind of a rule of thumb, to have everything buttoned up pretty well on deck.

MD: Alright, then the Third took over, right?

JH: Yes, he, that's his regular watch.

MD: Okay, and how about the First, he was on, on the bridge when you departed. When did he...when you left the dock...
JH: Yeah.

MD: When did he leave or do whatever he did, did he stay there the whole time or...?
JH: No, he turned in as soon as he was relieved, went down below decks, well...

MD: In about what location did he INAUDIBLE...
JH: At about the halfway point...

MD: INAUDIBLE I believe.
JH: INAUDIBLE...Third Mate relieved him.

MD: Okay, so the Third relieved the First?
JH: Yeah.

MD: The Chief's position is to take the ship out?
JH: No, the Chief Mate is the same as the First Mate.

MD: Oh, I'm sorry.
JH: INAUDIBLE...

MD: Maybe I should just INAUDIBLE...gotcha...sorry about that...First, Chief-Mate...Okay, did you notice anything unusual about this, about any of the, the operators or the persons in the wheel house?
JH: No.

MD: During this...INAUDIBLE...did you observe them to be in a fairly routine manner or?
JH: Yeah, it was...pretty routine INAUDIBLE...

MD: How about the Helmsman or did you get an opportunity to take a look INAUDIBLE?
JH: Well, it was dark and he did fine coming out through the Narrows, you know. Tight spot, so he responded per the pilot's orders.

MD: Have you sailed with him before?
JH: No, I haven't.

MD: How about the, the Third, have you sailed with him before?
JH: Yeah, he's a regular on this vessel.

MD: And you feel pretty comfortable with him?
JH: Yeah, competent man.

MD: There have been some suggestions and statements concerning the fact that, ah, that you had some alcohol or an odor of alcohol on you, do you?

WITNESS SIGNATURE

JH: Well, I had one of these phony beers, "Moussy," and I'd been ashore, I had lunch with Captain MURPHY, drank iced tea.

MD: That's the pilot?
JH: Yeah, he's an old friend of mine. I went to see him, had lunch over in the town.

MD: Where was that at?
JH: Ah, the pizza joint there.

MD: Pizza Palace?
JH: Yeah.

MD: What time was that, do you remember?
JH: Right around noon time. I conducted some business in the agency office and he picked me up. We saw the Chief Engineer, Radio Operator...lunch.

MD: What time were you done there?
JH: Oh, I'd say, roughly 2:00. I did a little shopping, got some post cards, and sent some flowers to my wife for Easter and picked up some pizza to bring back to the ship with us. The Chief got a cab and we come back to the ship...

MD: Alright, what time did you grab the cab?
JH: Oh, I'd say about 7:00 o'clock. We were just walking around the town, hadn't been ashore in awhile, stretch my legs. We were diddling around for a while with the cab, because he had to pick up another fare that was coming back to the docks, Arco ship, crew member...he was trying to track him down in town.

MD: Alright, did you have anything to drink at the Pizza Palace?
JH: Ah, I had a beer with a piece of pizza, picked up before we came back.

MD: One beer?
JH: Yeah.

MD: A real beer?
JH: A real beer, nothing with lunch, just iced tea.

MD: Anything af...any other alcohol consumption after the pizza?
JH: Well, these "Moussy's," I had one of them prior to sailing. It's...I guess it's not alcohol and it's an alcohol free beer.

MD: It's...what's it called, a Moose?
JH: "Moussy."

MD: Non-alcoholic...and you had one of these when you came back?
JH: One or two. I was just sorting out some papers before we sailed.

MD: Prior to sailing?
JH: Yeah.

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MD: One or two "Moussy's,"...alright, any indication that anyone else on watch was, had been drinking or had been ashore or had the indication to you that maybe they had been drinking?
JH: No, nothing was evident.

MD: Okay.
JH: No erratic behavior INAUDIBLE...

MD: Do you know if any of those people were ashore?
JH: That I, I really couldn't tell you. I, I don't believe so anyway.

MD: Alright.
JH: The Mates didn't go ashore.

MD: Alright, let's start with the Chief Mate. Do you know if he was or wasn't ashore?
JH: No, he wasn't.

MD: That's a definite no?
JH: Yeah.

MD: Ah, how about the Third?
JH: I...couldn't swear to it, but I, I, I don't think he was ashore. I don't believe he went, the Second Mate as well...INAUDIBLE...

MD: Alright, and how about either of the helmsmen, either?
JH: That I...CLAAR or RADTKE.

MD: CLAAR or RADTKE? No, KAGAN?
JH: Oh, KAGAN relieved the wheel. I couldn't say.

MD: INAUDIBLE...
JH: INAUDIBLE...You'd have to ask him that...

MD: Okay, and, and RADTKE?
JH: No, I, I don't know.

MD: Yeah, okay.
JH: I didn't see him in town.

MD: Did you, did you stop at any other...establishments in town, liquor places or bars?
JH: Well, we went by the Pipeline to see if anybody off the ship was in there, if we knew anybody.

MD: Okay.
JH: That was...nobody there, so we left and picked up the pizza over at the, the Harbour Club.

MD: Um, huh. Did you go by cab to the Pipeline or were you just walking...
JH: Walking...

WITNESS SIGNATURE

STATEMENT OF CAPTAIN JOSEPH J. HAZELWOOD OF THE EXXON VALDEZ 89-20572

MD: Around?
JH: We were just walking around.

MD: Okay. Do you have any idea what time you stopped in at the Pipeline?
JH: Oh, I'd say 3:30 or so, it was after lunch, and I did some shopping.

MD: Okay. Alright...okay, well, do you have any suggestions or thoughts on the cause or reason why this, this happened? Why we are where we are?
JH: The only...I've, I've got to accept the responsibility for not, possibly overestimated the Third Mate's abilities as a ship handler, perfectly reliable before...that's a pretty simple maneuver...wasn't you know, I wouldn't have left the bridge if I didn't feel comfortable with his abilities to bring her back on course.

MD: Ah, when I talked to the Third, he said that...okay, between Busby, the fix at Busby...
JH: Um, huh.

MD: And the grounding, ah, he gave her ten degrees rudder at ten degrees right...
JH: Um, huh.

MD: About in this position...
JH: Yeah.

MD: And then he felt the ship sliding, in his words, and then he gave her twenty degrees right.
JH: Okay.

MD: And then, just prior to the grounding, it was hard right. Um, what does he mean by sliding down? Do you have any idea?
JH: The only thing I can think of is he must have felt some motion that would indicate she's sliding over the bottom, touched the bottom around, actually touched.

MD: With the bottom...okay, how about the...let's get back to the traffic service here. What's your thoughts on that? I mean, any, if any?
JH: No, I've done the same maneuver before with ice...

MD: Okay.
JH: In the lanes. Check with them and let them know what I was doing.

MD: Um, huh.
JH: I had to do the same thing inbound...avoid some ice...came over...

MD: Were you aware of this, this section here?
JH: Yeah, I, like I said, I felt comfortable leaving him there, because it...the way the ice was situated, the turn.

UM: INAUDIBLE...The fenders are on.

WITNESS SIGNATURE

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JH: Okay, 'cause BARRY's going to hang them on himself, I think.

UM: Yeah, they're sending one to us.
JH: One?

UM: Yeah, and they're rolling up another one.
JH: Oh, okay. Yeah, just ah...

MD: Okay, do you feel like, like the Third was aware of this, you know, the...?
JH: Yeah, he's competent and it's on...it's well charted and...

MD: Um, huh.
JH: You know, he's looking right at it.

MD: Alright, um, how about drugs? Do you use any drugs, any medication?
JH: No, uh, uh.

MD: Neither?
JH: Neither.

MD: How about your health?
JH: Ah, fine.

MD: I'm not talking about at the moment. I'm talking about yesterday.
JH: Well, yesterday morning, I worked out and I felt fine, so...

MD: Good health?
JH: Good health...INAUDIBLE.

MD: Okay, alright, how about...a home address?
JH: My home?

MD: Do you have a permanent home?
JH: Yeah, 48 Crescent Beach Drive, Huntington, New York, 11743.

MD: Four what?
JH: 11743.

MD: 11743, and an area code and phone number?
JH: 516 area code, 427-6486.

MD: Do you have family there?
JH: Yes, my wife.

MD: And...
JH: My daughter.

MD: Okay, let's see, how long have you been on board here?
JH: Six...five weeks.

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MD: And how much longer would you...?
JH: I was looking at approximately four to five more weeks INAUDIBLE.

MD: And then you're scheduled off after that four to five weeks?
JH: Yeah.

MD: Four to five more weeks and then you're off for?
JH: Well it's two month, two month. Approximately two months off, two months on.

MD: Okay, so, if you do go as scheduled, then you should be off for two months?
JH: Yes.

MD: And if you go on that two months off, you go to your home?
JH: Yes.

MD: Okay...got anything?
MF: I'm not quite clear on the sequence in town. I, I lost a...you were from town from what, noon till 9:00, is that?
JH: Oh, no, to about 7:00, 1900.

MF: Oh.
JH: When we came back. We were...had been conducting some business at the agency office, ship's business, we made some phone calls and then went to lunch. We just walked around...

MF: With, with Mr. MURPHY?
JH: With...no, had lunch with Captain MURPHY. Then he went back to take a nap. The pilot's have their own apartment. He was going to lay down before he...

MF: Right.
JH: Drove us out and ah...went and picked up a pizza, got a cab, did a little shopping.

MF: And you walked by the Pipeline at about 3:00, you said?
JH: Yeah, looked in there to see if anybody was off the ship INAUDIBLE...

MD: You didn't have anything in there?
JH: No.

MF: And then when did you have the beer, you said that was?
JH: About an hour later at the Harbour Club.

MF: When you picked the pizza up?
JH: Picked the pizza up, yeah, just waiting for the pizza, cab was coming.

MD: Sir, you did stop at the Harbour...
JH: Club or the...

MD: Or the Club?

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JH: Yeah, that's where I picked up the pizza.

MF: The Pizza Palace?
MD: Yeah, what's the one next door, Club Valdez?

MF: No, it's called the Harbour Club INAUDIBLE....
JH: Harbour Club, I believe.

MF: I think...INAUDIBLE...
MD: You stopped there? You went to the pizza...
JH: Had lunch and then we were going to pick up two pizzas...

MD: INAUDIBLE...
JH: To bring back to the ship.

MD: From the Pipeline, you went to get your pizza that you'd ordered?
JH: Yeah.

MD: While you were waiting for the pizza, you went in the club?
JH: Yeah, we were in there waiting. I'd called a cab and INAUDIBLE...

MD: And you got picked up...
JH: INAUDIBLE...

MD: By the cab at the Club?
JH: Yeah, and then we had to go find somebody else, I believe he was off an Arco ship.

MD: Okay, well...
JH: The cab had another fare.

MD: This, this time limit, this time frame right here, okay, you said that somewhere around 1900, is when you caught the cab to come back to the ship.
JH: Um, huh.

MD: Okay, was that pretty accurate?
JH: Pretty close to it.

MD: Pretty close?
JH: Yeah.

MD: Alright, so somewhere around 1500 to 1530, you were at the Pipeline?
JH: Yeah.

MD: Right, for a few minutes?
JH: Yeah.

MD: Alright, then to...
JH: INAUDIBLE...

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MD: Then to Pizza Palace to pick up a pizza?
JH: Yeah.

MD: Waiting for it to get ready?
JH: And the cab.

MD: Stopped in the Club?
JH: Yeah.

MD: Then the cab and then to go look for someone else?
JH: Yeah, that's...we got in the cab and then we went, he had another fare. I've forgotten where he picked him up, fellow off another ship.

MD: That wasn't your fare?
JH: No.

MD: That was another fare that was going to where?
JH: To the Terminal.

MD: Okay, so you weren't looking for someone else for you?
JH: No, no, it was...

MD: It was, the cabbie was looking for?
JH: Yeah, the cabbie was looking for him.

MD: Do you recall who the cabbie was?
JH: No.

MD: Do you recall what he looks like?
JH: Big fellow, black hair.

MD: Ugly?
JH: Well, I really didn't...it was dark.

MD: A beard?
JH: Yeah, I'm pretty sure he had a beard. I was in the back seat. The Chief was in the front seat.

MD: Alright. Okay, so from the club, you got the cab, the cabbie went and picked up another fare and then to...
JH: The Terminal.

MD: To the Terminal, okay, and to the best of your recollection, you arrived back at the ship at approximately what time?
JH: About 2000, eightish.

MD: Okay.
JH: And Captain MURPHY was already on board, ready to go.

WITNESS SIGNATURE

MD: Okay. Ah, not to complicate anything, but while you're at the Pizza Palace with Captain MURPHY having lunch with Captain MURPHY and the Chief Engineer and the Radio Officer...
JH: Um, huh.

MD: Ah, he...did Captain MURPHY have anything to drink?
JH: No, iced tea, same as me.

MD: Okay, okay, I think that about summed it up for me? Mike?
MF: I just made, for you, a list of the guys will be wanting to talk to you later INAUDIBLE...
JH: Sure.

MF: And I doubt if it will be me, but it will be somebody representing the State Troopers or the Attorney General's Office or whoever...
JH: Shows up.

MF: They decide to send to town, yeah.
JH: Would that be from local, or you don't know?

MF: No, it's not local.
JH: Oh, okay.

MF: I'm the only one, me and one other guy, who's on vacation.
JH: I see.

MF: So, they'd send somebody who would be...have a particular duty...
JH: Okay.

MF: Interest...
JH: INAUDIBLE...

MF: Do you have any idea, I don't suppose there's anyway you could even guess a time frame or anything though, I suppose, what's going to happen here?
JH: Well, I, I just spoke to our office down in California and they...this ship, there's another one coming in at midnight...the same, the Exxon San Francisco, same class as...let's see how this first lightering goes...

MF: Um, huh.
JH: She's available for another lightering, you know, if it comes to that.

MF: Okay, the two together can, can equal what you've...
JH: Well...

MF: Got on board?
JH: Pretty close to it, yeah, but we'll have to see how this goes once she...

MF: Uh, huh.
JH: Starts getting up out of the water...

MF: Yeah.

WITNESS SIGNATURE

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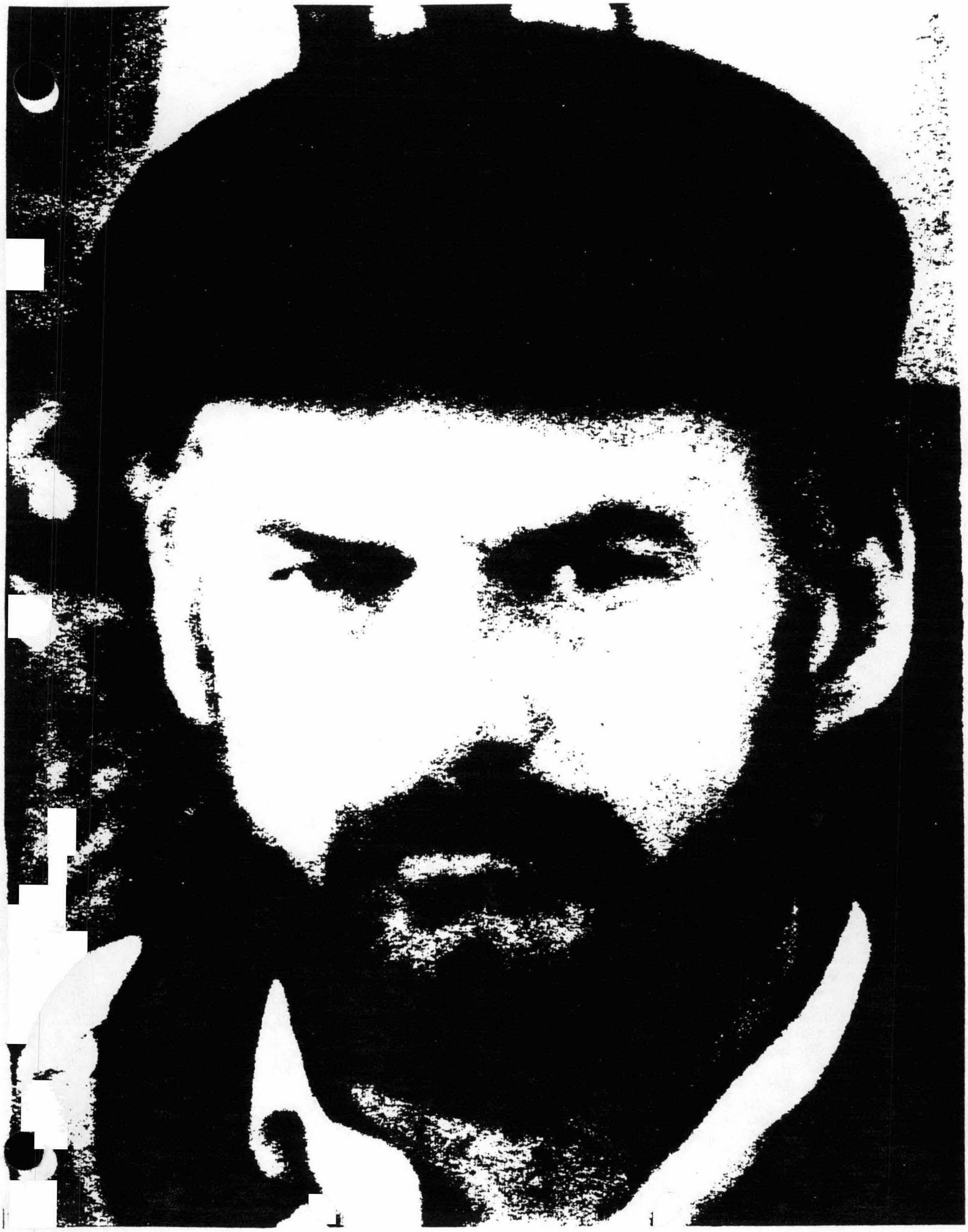
JH: And see which way she's going to flop, you know, stability-wise INAUDIBLE a few days.

MF: Um, huh, is there any speculation as, as of this point from your office as to, if we do get you afloat, which we will...which direction you'll want to be heading, ah...(SIDE 1 OF THE TAPE ENDS)...

END OF INTERVIEW

WITNESS SIGNATURE



George Papcun, Ph. D.
1081 Buckman Road
Santa Fe, NM 87501

Thomas Russo, Esq.
Room 1878
Captain Cook Hotel
Anchorage, Alaska

Dear Mr. Russo:

Pursuant to our telephone conversations of 20 and 21 February 1990, and specifically your request of 21 February 1990, I am hereby submitting a statement of my customary fees and charges. For telephone consultation, and library research and reporting, I charge One Hundred Dollars ($100.00) per hour. For acoustic analysis, including spectrographic analysis and related analyses, I charge One Hundred Dollars ($100.00) per hour plus any expenses I may incur for equipment rental or materials charges. For testimony, I charge One Thousand Dollars ($1000.00) per day or part thereof. Under the circumstances of this case as I understand them, there may be an issue of charges for time spent away from home. I suggest that we should discuss this issue, and negotiate a solution.

I will bill separately with supporting documentation for any expenses I may incur including transportation, hotel, meals, and necessary incidental expenses.

As I currently understand the situation, I foresee potential for the following phases of inquiry:

1. A literature survey including, but not limited to, references cited by Johnson, Pisoni and Bernacki

2. Possible acoustic analysis (including, but not limited to, spectrographic analysis) of pertinent tape recordings

3. Listening tests of pertinent recordings (possibly by listeners naive with respect to the issues at hand)

4. A survey of authorities and experts other than myself and Johnson, Pisoni and Bernacki with respect to the scientific acceptance of the method of spectrographic analysis to determine impairment due to alcohol or other drugs

Court's exhibit #5

5. Consultation and planning with you and/or other attorneys involved in this matter

6. Testimony

Please let me know whether these conditions are acceptable, and if I may be of any additional help in this matter.

Sincerely,

George Papcun

George Papcun, Ph. D.

Attached please find copies of selections from an article cited favorably as an authority by Johnson, Pisoni and Bernacki. Two points are worth noting:

1. In Section III, A, p. 933, Klingholz et al quote Pisoni et al (1986): "analysis of fricatives, stops, nasals and vowels did not reveal any consistent spectral differences which could be attributed to the effects of alcohol."

The significance of this remark in the current context is that "s" and "sh" on which Johnson, Pisoni and Bernacki's conclusions rest heavily, **are fricatives!**

2. In Section III, C (a) and (b) respectively, p. 934, Klingholz et al state their conclusions crucial to the current application: "...an intoxicated subject may be falsely classified as sober" and "On the other hand, sober subjects could also be falsely evaluated as intoxicated by acoustic analysis."

Moreover, their overall conclusion, stated in their abstract, p. 929, is "On the basis of the present results and various other factors (ambiguity of the sources of the acoustic effects, expense of the procedure), application of acoustic analysis in forensic medicine for the recognition of low-level alcohol intoxication is considered inexpedient."

Recognition of low-level alcohol intoxication from speech signal

F. Klingholz, R. Penning, and E. Liebhardt
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(Received 19 May 1987; accepted for publication 17 May 1988)

Eleven male subjects were required to read a text in both sober and alcohol intoxicated conditions. By means of statistical signal analysis, frequency distributions of fundamental frequency (F_0), signal-to-noise ratio (SNR), ratio of first- to second-formant frequencies (F_1/F_2), variation speed of the frequencies F_0, F_1, F_2, and the long-term average spectrum (LTAS) were determined. The distributions were examined for their suitability in discriminating between sober and intoxicated conditions. The SNR and F_0 distributions as well as the LTAS discriminated with an error rate less than 5%. Combination of SNR and F_0 profiles enabled correct discrimination in all cases. The parameter F_1/F_2 describing the articulation varied strongly among individuals. It was modified only with high levels of blood alcohol. Frequency variation speeds were not altered by intoxication. Speaker recognition by means of LTAS was more difficult in the intoxicated condition. The principal effect of intoxication on speech was interpreted as a perturbation of laryngeal movement control, where long-term voice effort was found to produce similar effects to alcohol intoxication. On the basis of the present results and various other factors (ambiguity of the sources of the acoustic effects, expense of the procedure), application of acoustic analysis in forensic medicine for recognition of low-level alcohol intoxication is considered inexpedient.

PACS numbers: 43.70.Gr, 43.70.Aj

INTRODUCTION

Although of physiological interest, investigation of the influence of alcohol intoxication on speech has been motivated primarily for forensic medical reasons. In connection with traffic offenses, and questions of guilt in criminal actions, alcohol intoxication plays an important role. Situations are conceivable in which estimation of the degree of intoxication may only be made from speech utterances. The purpose of the present work was to examine to what extent recognition of alcohol intoxication was possible by means of acoustic speech analysis.

Speech production can be divided into different, hierarchical levels: voice production, articulation, and performance of intelligible language. Although alcohol intoxication influences all of these components, they have rarely been investigated. Language function has been studied in intoxicated nonalcoholics by Andrews *et al.* (1977) and Natale *et al.* (1980). Speech and voice, however, have been analyzed in both sober and intoxicated alcoholics and nonalcoholics. Trojan and Kryspin-Exner (1968), Zalmov (1969), Sobell *et al.* (1972, 1982), Lester and Skousen (1974), and Pisoni *et al.* (1986) found that subjects were more likely to make sentence level, word level, and sound level errors when intoxicated. Furthermore, speech was found to be slower, and the production of stops, fricatives, affricates, and semivowels was found to be perturbated.

Sobell and Sobell (1972) found no significant influence of intoxication on pitch. Trojan and Kryspin-Exner (1968) reported that pitch effects varied from speaker to speaker. Beam *et al.* (1978) only described auditory perception of "pitch deviations" without detailed comment. Pisoni *et al.* (1986) measured a significant increase in pitch variability under the influence of alcohol.

The emergence of dysphonia due to intoxication was evaluated by auditory impressions by Beam *et al.* (1978). Pisoni *et al.* (1986) used the increased number of unvoiced signal frames to characterize growing hoarseness with intoxication.

The cited studies manifested one or more methodological deficiencies of possible importance as follows: (a) The blood alcohol level (BAL) was not measured objectively; (b) the BAL was so high that the intoxication effect was so apparent that acoustic verification was superfluous; (c) the number of intoxicated subjects examined was very low; (d) acoustic analysis was only performed qualitatively by auditory evaluation or by visual inspection of spectrograms, except for Pisoni *et al.* (1986) who used digital signal processing of utterances by four subjects.

In this article, an approach is presented for objective recognition of intoxication by automatic analysis, where the BALs range from a low to a medium level and may be regarded as a continuous, independent variable.

No adequate methods are available for computer recognition of intoxication based on semantic analysis or indication of language errors. Automatic measurement of effects at the phonemic level is also difficult. Pisoni *et al.* (1986), for example, required visual inspection of the signals and interactive digital processing to investigate effects on phonemes.

Recognition of "intoxicated speech" may be approached in a similar fashion to speaker recognition, whereby, rather than individual features as such, the modification by intoxication of these features is of interest. Speaker identification algorithms are usually based on the recognition of

TABLE II. Test distances DT_i (reference distance $DR_i = 1$) for F_0, SNR, and F_1/F_2 profiles for two intra-individual blood alcohol levels (BAL, %).

Subject	BAL	F_0	SNR	F_1/F_2	BAL	F_0	SNR	F_1/F_2
A	0.087	3.51	2.41	2.11	0.130	2.74	2.00	1.71
B	0.067	2.05	2.54	2.10	0.119	3.18	2.45	4.19
C	0.093	1.95	1.62	2.25	0.167	3.22	1.98	5.78

BALs greater than 0.1%; i.e., 0.1% is a critical threshold for forensic applications. When the test distances DT_i were determined for subjects with BAL less than and greater than 0.1% from the combined F_0 + SNR profile, the difference of means amounted to 2.2 ($p = 0.05$, Wilcoxon test).

C. Influence of voice effort

Five subjects who participated in the experiment without drinking but with the same long-term voice effort as the intoxicated subjects yielded test distances DT_i as listed in Table I. The distances were less than the distances determined for the intoxicated subjects. The distance differences between the conditions were significant (see Table I).

D. Error rates

In Table III, the error rates are shown for the SNR, F_0, F_1/F_2, and LTAS profiles. With SNR, F_0, and LTAS the error rate is less than 4%; in the case of F_1/F_2, it was 12.5%. The poor discrimination with F_1/F_2 could be caused by a dominating dependence of the profile on individual features. To clear this point, the error rate was computed using the F_1/F_2 profile for speaker recognition (sober condition). Table III demonstrates that the profile is more suitable for discriminating speakers than for the indication of an intoxicated condition. Speaker recognition was also attempted by means of the LTAS profile, and Table III lists the error rates for different conditions. The error rate increased with intoxication.

No vector alone was found that could yield absolute discrimination. However, the combination of two vectors improves discrimination performance. Table III, the error rate of the vector F_0 + SNR is zero; i.e., sober and intoxicated conditions are discriminated with zero error when this combination is employed.

TABLE III. Error rates for the recognition of intoxication and speaker.

Profile	Reference condition	Test condition	Error rates, % Intoxication recognition	Error rates, % Speaker recognition
F_0	sober	intoxicated	2.8	
SNR	sober	intoxicated	3.2	
F_0 + SNR	sober	intoxicated	0.0	
F_1/F_2	sober	sober		3.9
F_1/F_2	sober	intoxicated	12.5	
LTAS	sober	sober		0.7
LTAS	sober	intoxicated	3.1	1.0
LTAS	intoxicated	intoxicated		2.9

E. Listening tests

In the randomized listening tests, only 54.0% of the "intoxicated speech samples" were recognized as such; i.e., there was no significant perception of intoxication. When the listeners were presented with paired speech samples (the reference sample being randomly presented first or second), 61.1% of the "intoxicated speech samples" were recognized. The positive perception ratings also increased significantly ($p = 0.01$, Wilcoxon test) from 54.2% for BAL < 0.1% to 82.0% for BAL > 0.1%. The features, as employed in the listeners decision, were evaluated in the following order: speech errors, 19.8%; speech fluency, 21.4%; speech quality, 19.5%; voice quality, 14.0%; voice instability, 4.7%; and voice effort, 20.6%. In summary, the articulatory features were evaluated significantly more frequently than voice characteristics ($p = 0.01$, Wilcoxon test).

III. DISCUSSION

A. Articulation

Statistic examination of the first- and second-formant frequencies and the auditory test analysis (results for the whole BAL range) indicates that modification of articulation by intoxication is, if at all, very low for lower BALs. As Pisoni *et al.* (1986) commented: "...analysis of fricatives, stops, nasals, and vowels did not reveal any consistent spectral differences which could be attributed to the effects of alcohol."

The listening tests, in which articulation was evaluated more than voice, yielded error rates of 46% without reference sample and 39% with reference sample. Apart from the general conditions relating to perception tests as described by Doddington (1985), these high error rates could be explained by: (a) listeners' higher evaluation of features, which are not measured acoustically (see Andrews *et al.*, 1977); (b) the masking of intoxication features by individual features; and (c) the low BALs that did not create the usual intoxication features. Pisoni *et al.* (1986) measured a rate of about 80% for correct discrimination of intoxication. However, three of their four subjects showed BALs of at least 0.15%. According to the present results, the same success rate was reached when samples were used with BALs greater than 0.1%.

B. Voice

Our results indicate that with low BALs the intoxication mainly affects voice characteristics. There are some physiological arguments that would support the acoustic results. (a) Blood alcohol influences cerebellum function (Schenker, 1982) which is responsible for motor coordination. This has also been demonstrated by means of high-speed motion pictures of alcohol intoxicated vocal fold movement by Dunker and Schlosshauer (1964). These films demonstrated a countermotion of the mucous membrane in the glottal cycle which is only found in pathologic voices (Dejonckere and Lebacq, 1983). (b) Since blood alcohol causes a swelling of the mucous membrane, the mass of the vocal folds is increased and the proprioceptors are irritated and desensitized.

While the swelling is expected to lower F_0, the irritation of the proprioceptors should contribute to motor dysfunction. A lowering of F_0 was not measured. Since F_0 strongly depends on muscular tension and the swelling only modifies the mass of the mucous membrane, F_0 need not be affected. The contribution of the proprioceptor irritation to the perturbation of motor coordination by an intoxicated cerebellum cannot be evaluated.

After long-term voice effort, similar effects as with intoxication could be measured. In this case, the glottal sensors could also be affected due to swelling by mechanical strain. Moreover, as the high-speed motion pictures (Dunker and Schlosshauer, 1964) showed, the laryngeal muscular tension is reduced by long-term voice effort, and the motion of the mucous membrane shows higher variability. Therefore, the increase of F_0 variability and the decrease of SNR, which are manifestations of increasing hoarseness, occur both with alcohol intoxication and long-term voice effort.

In comparison to the results by Pisoni *et al.* (1986), the variation of F_0 and the increase of voice dysfunction due to intoxication were more prominent in the present study. Pisoni *et al.* (1986) measured a mean increase of pitch variability of 20% and a mean increase of devoiced signal segments of 10% at high BALs; however, in the present study, the variations amounted to 100% (see Table I; distances to the sober condition were doubled with intoxication) although only low and medium BALs were regarded.

C. Forensic aspects

In forensic medicine, the use of acoustic voice analysis for verifying alcohol intoxication remains questionable on the following grounds.

(a) There is a high interindividual sensitivity to alcohol intoxication and, hence, of the influence on related speech and voice features. Subjects may be stimulated by low alcohol levels and overcome reserve or improve their motor performance. Subjects can develop significant tolerance to many of the physiologic effects of alcohol or compensate alcohol intoxication to a certain degree. Therefore, although a statistically significant relationship between voice dysfunction and BALs was measured, this need not apply to every individual. Hence, an intoxicated subject may be falsely classified as sober.

(b) On the other hand, sober subjects could also be falsely evaluated as intoxicated by acoustic analysis, e.g., after long-term voice effort or in the case of laryngeal disorders. Articulatory dysfunction can be caused by neurological disease and also show effects like intoxication (e.g., slurred speech in the case of cerebellum disorders).

(c) Finally, realization of the test procedure is difficult. Signal recording and acoustic analysis is expensive (signals of reference and test states and long signal segments are indispensable), and the subjects to be tested are very often noncooperative.

The present study also raises an important problem related to acoustic recognition tasks used in forensic application and other areas. In the case of speaker recognition, not only speakers' extrinsic conditions like the quality of the information transfer determine the effectiveness of the recognition but also speakers' intrinsic conditions such as emotional state or intoxication.

IV. CONCLUSION

In summary, it has been shown that low-level alcohol intoxication can have definite consequences on the acoustic properties of speech. Both voice production and articulation were found to be influenced by alcohol consumption.

Modification of the distributions of fundamental frequency and signal-to-noise ratio in the speech signal significantly reflects the laryngeal dysfunction resulting from intoxication.

Measurement of the distribution of the ratio of first- to second-formant frequencies and the distribution of the time derivatives of fundamental and formant frequencies in the speech signal only showed intoxication influence at higher alcohol concentration. Other features, e.g., on the phonemic level, may yield better information on intoxication influence on articulation. However, such recognition requires deterministic signal analysis techniques.

As the study shows, recognition of alcohol intoxication from speech is possible although with some restrictions. The acoustic effects due to alcohol can be masked by other influences on speech, e.g., voice disorders or long-term voice effort.

On the other hand, alcohol intoxication can lower the effectiveness of other acoustic recognition tasks such as speaker recognition.

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