#105302 NPTN 89-1

NEPTUNE #89011

S. Lake Michigan

May 21-Jun 3, 1989

J.Risch

Cruise Log (Nav,Seismic,Sample)

U.S.G.S.
INTEGRATED NAVIGATION SYSTEM
AND
NORTHSTAR LORAN-C NAVIGATION LOG

SHIP R/V NEPTUNE

CRUISE NO. NPTN 89-1

DATE 5/21/89 - 6/03/89

CHIEF SCIENTIST JOHN RISCH

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE _____
			NOTE: ALL TIMES GIVEN IN THIS LOG ARE LOCAL (CST)	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES	NAVIGATION LATITUDE ± MINUTES	NAVIGATION LONGITUDE ± DEGREES	NAVIGATION LONGITUDE ± MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	05	21	0630										
			0907	001	090	4.5		42	29.6	-87	47.7		
			1145	001	090	5.0		42	29.6	-87	34.3		
			1210										
			1307	002	270	5.0		42	27.0	-87	38.7		
			1434	002	270	5.0		42	27.0	-87	47.7		
			1500					42	27.0	-87	46.9		
			1545					42	27.0	-87	46.0		
			1555										
			1620										
			1700					42	27.0	-87	45.1		
			1745					42	27.0	-87	39.7		
			1930										
89	05	22	0615										
			0630		034	9.8							
			0835					42	29.5	-87	35.5		
			0933					42	29.5	-87	44.1		
			0952					42	29.6	-87	45.6		
			1005					42	29.6	-87	46.9		
			1015					42	29.6	-87	47.7		

DISK ~~TAPE~~ #	START	END	COMMENTS AND OBSERVATIONS	PAGE 1
1			TD's AT DOCK: 33269.22 49761.74 ODOM CAL: 25'	
			SOL 1	
			EOL 1	
			ODOM PROBLEMS; NEPTUNE FATHOMETER ON, CAUSING INTERFERENCE	
2			SOL 2	
			EOL 2	
3			SAMPLE NE88-8	
			SAMPLE NE88-7	
			PROBLEMS W/ CLUTCH ON WINCH; DRIFTING	
			WINCH REPAIRED	
			SAMPLE NE88-6	
			SAMPLE NE88-5	
			BACK AT GLNTC DOCK	
			TD's AT DOCK: 33269.20 49761.74 ODOM CAL: 15'	
			UNDER WAY	
			SAMPLE NE88-4	
			SAMPLE NE88-3	
			SAMPLE NE88-2	
			SAMPLE NE88-1	
			SAMPLE NE88-9	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES	NAVIGATION LATITUDE MINUTES	NAVIGATION LONGITUDE ± DEGREES	NAVIGATION LONGITUDE MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	05	22	1030										
			1043		180	4.0		42	29.6	-87	47.9		
			1100										
			1115		185	5.5		42	27.4	-87	47.4		
			1154	003	90	4.0		42	23.5	-87	48.0		
			1345					42	23.4	-87	39.9		
			1444					42	23.4	-87	36.8		
			1515	003				42	23.4	-87	34.8		
			1542					42	23.5	-87	34.6		
			1550					42	23.4	-87	34.0		
			1622					42	23.4	-87	37.8		
			1706					42	23.4	-87	44.7		
			1718					42	23.4	-87	45.5		
			1726					42	23.4	-87	45.9		
			1735					42	23.5	-87	46.1		
			1748					42	23.4	-87	47.3		
			1756					42	23.4	-87	47.6		
			1758		192	9.6							
			1840										

DISK ~~TAPE~~ #	START	END	COMMENTS AND OBSERVATIONS	PAGE 2
			SAMPLER STOWED; DROPPING FISH & SLED	
			CALIBRATING SIDESCAN W/ PASS BY NORTHPOINT MARINA (WINTHROP HARBOR)	
			NAV PROGRAM CRASH - REBOOTING	
4			PROGRAM REBOOTED; PROCEEDING TO SOL 3	
			SOL 3	
			LORAN BECOMING ERRATIL (END TAPE 3; START TAPE 4 @ 13:55)	
			PAPER CHANGE ON SIDESCAN RECORDER	
			EOL 3	
			RETRIEVED FISH & SLED. UNDERWAY TO SAMPLE SITE ~~#~~ 17	
			SAMPLE NE 88-17	
			SAMPLE NE 88-16	
			SAMPLE NE 88-15	
			SAMPLE NE 88-14	
			SAMPLE NE 88-13	
			SAMPLE NE 88-12	
			SAMPLE NE 88-11	
			SAMPLE NE 88-10	
			INBOUND	
			DOCKED	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES ± MINUTES	NAVIGATION LONGITUDE ± DEGREES ± MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	05	23	0646								
			0650								
			0700								
			0713	04	90	40		42 18.3	-87 49.5		
			0800								
			0945	04				42 18.3	-87 36.0		
			0950								
			1006					42 18.3	-87 36.6		
			1030					42 18.3	-87 39.6		
			1040					42 18.3	-87 40.7		
			1047								
			1052		262	9.0					
			1103					42 18.3	-87 43.1		
			1115					42 18.3	-87 43.9		
			1132					42 18.3	-87 44.4		
			1157					42 18.3	-87 46.0		
			1202					42 18.3	-87 47.1		
			1220								
			1300								

DISK ~~TAPE~~ #	START	END	COMMENTS AND OBSERVATIONS
5			TD's AT DOCK 33269.22 49761.72 ODOM: 151
			UNDER WAY
			FLATTER THAN PISS ON A PLATE
			SOL 4
			END TAPE 4; START TAPE 5
			EOL 4; END TAPE 5
			RETRIEVING FISH & SLED
			SAMPLE NE 88-25
			SAMPLE NE 88-24
			SAMPLE NE 88-23
			NAV PROG CRASH - OUT OF STACK SPACE LINE 1710 MODULE T1
6			NEW NAV DISK; UNDER WAY TO SAMPLE SITE 22
			SAMPLE NE 88-22
			SAMPLE NE 88-21
			SAMPLE NE 88-20 GLACIAL TILL (?) RETRIEVED AFTER 4TH TRY
			SAMPLE NE 88-19 7' PINACLE
			SAMPLE NE 88-~~18~~ 18 (18B TILL LAYER APPROX 6" FROM SURFACE)
			DISK 6 OFF; ENABLING MINI-RANGER, UNDERWAY TO FT. SHERIDAN
			MINI-RANGER UP, EN ROUTE TO WP1

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES ± MINUTES	NAVIGATION LONGITUDE ± DEGREES ± MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	05	23	1350	01	251	4.1		6597703	20822588		
			1403	01							
			1440	01				6422301	20261536		
			1444	02	072	4.3		6429466	20259499		
			1527	02	072	4.3		6694906	20317647		
			1532	03	251			6594091	20309485		
			1535								
			1554								
									2		
			1616					6425988	20253361		
									2		
			1619					6434722	25068		
									31149		
			1701					6609394	↓↓↓↓↓		
			1707					6611888	20307046		
			1732		251	3.3		6524744	20276666		
			1756					6432522	20245444		
			1945								

FILE TAPE #	START	END	COMMENTS AND OBSERVATIONS — PAGE 4
1			SOL FS1 (DATE ON NAV FILES MAY BE WRONG - READS 093) START TAPE 6
			UPDATE RATE CHANGED FROM 5 TO 10 SEC
			EOL FS1
2 (?)			SOL FS2
3			EOL FS2
4			SOL FS3 (NAV WEIRD)
			SCREEN INDICATES LINE 4, M-R LINE DOING #3, HOWEVER.
			TAPE CHANGE; 4 min. data gap END TAPE 6 - START TAPE 7
			EOL FS3
5			SOL FS4
			EOL FS4
6			SOL FS5
			PASSED OVER WRECK
			EOL FS5
			DOCKED
			X= 6348700 ± 40 Y= 2056260 ± 60
			M-RANGER CALS: (3) - SS=28, 44580 (2) - SS=18, 39565

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	NAVIGATION LATITUDE ± DEGREES	LATITUDE ± MINUTES	LONGITUDE ± DEGREES	LONGITUDE ± MINUTES	TYPE	QUAL.
89	05	24	0656						.		.		
			0720						.		.		
			↓↓↓↓		174	10.0			.		.		
			0746					42	15.0	-87	48.7		
									.		.		
			0830					42	11.8	-87	46.4		
			0900		156	6.0			.		.		
									.		.		
			0904		090	40		42	9.9	-87	45.7		
									.		.		
			1005					42	9.9	-87	39.9		
			1035						.		.		
									.		.		
			1112						.		.		
									.		32.8		
			1130					42	9.9	-87	↓↓.↓		
									.		.		
		~	1150						.		.		
		~	1200						.		.		
		~	1210						.		.		
			1220					42	9.9	-87	35.5		
			1236					42	9.9	-87	32.6		
			1245					42	9.9	-87	38.1		
			1314					42	9.9	-87	40.2		
			1322					42	9.9	-87	42.1		
			1350					42	9.9	-87	44.9		
			1356						.		.		
									.		.		
			1400						.		.		

DISK ~~TAPE~~ #	START	END	COMMENTS AND OBSERVATIONS	PAGE 5
			TD's AT DOCK: 33269.33 49761.78 ODOM: 15'	
			UNDER WAY	
7			DISK ON	
			SIDESCAN CALIBRATION (PRINDLE INTAKE CAIB)	
			LORAN WEAK; RESTARTING (REBOOTING PROGRAM)	
			SOL 5; START OF TAPE ~~8~~ 8	
			PASSED ABREAST OF PLASTIC PIPE (NOT ON SIDESCAN)	
			LORAN ERRATIC	
			CHANGING PAPER ON SS	
			EOL 5	
			SAMPLE NE88-35	
			SAMPLE NE88-34	
			SAMPLE NE88-33	
			SAMPLE NE88-32	
			SAMPLE NE88-31	
			SAMPLE NE88-30	
			SAMPLE NE88-29 WIND PICKING UP	
			SAMPLE NE88-28 QUESTIONABLE LOCATION - LORAN GLITCH	
			SAMPLE NE88-27	
			SAMPLE NE88-26 WIND 25 kts. SSE, DRIFTING	
			LORAN CHAIN BANDETTE DOWN AS SCHEDULED	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	X NAVIGATION LATITUDE ± DEGREES ± MINUTES	Y NAVIGATION LONGITUDE ± DEGREES ± MINUTES	TYPE	QUAL.
89	05	24	1552								
			1530					653042.	2028053.		
		~	1555					658675.	2030128.		
		~	1616					660653.	2030466.		
		~	1630					648527.	2026871.		
			1647					648866.	2027636.		
			1654								
			1700								
			1705		338	5.0					
			1739								
89	05	25	0647								
			0749					649702.	2027130.		
			↓↓↓↓					↓↓↓↓↓↓.	↓↓↓↓↓↓↓.		
			0801					650570.	2028205.		
			0814					651633.	2028478.		
			0822					652533.	2028609.		
			0839					652949.	2028989.		
			0848					654097.	2029331.		
			0908					659673.	2031571.		
			0931					648774.	2026098.		
			0939					647708.	2027647.		
			0951					642315.	2026297.		
			1002					644366.	2026963.		
			1016					647323.	2028110.		
			1030					650593.	2029329.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 6
			MINI-RANGED NAV PROBLEMS; ON STATION AT FT. SHERIDAN	
			SAMPLE FS-20 ; SEAS 3-4'	
			SAMPLE FS-19	
			SAMPLE FS-18	
			SAMPLE FS-17	
			SAMPLE FS-16	
			SAMPLE FS-15 NO SAMPLE	
			CALLING IT QUITS. SEAS 4-5'.	
			INBOUND	
			DOCKED	
			UNDER WAY - CALM, LIGHT FOG	
			SAMPLE FS-15	
			SAMPLE FS-14	
			SAMPLE FS-13	
			SAMPLE FS-12	
			SAMPLE FS-11	
			SAMPLE FS-10	
			SAMPLE FS-9 NOTE; 09:20 - COMPUTER WENT DEMOCRATIC	
			SAMPLE FS-8	
			SAMPLE FS-7	
			SAMPLE FS-6	
			SAMPLE FS-5	
			SAMPLE FS-4	
			SAMPLE FS-3	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	NAVIGATION X LATITUDE ± DEGREES	NAVIGATION X LATITUDE MINUTES	NAVIGATION Y LONGITUDE ± DEGREES	NAVIGATION Y LONGITUDE MINUTES	TYPE	QUAL.
89	05	25	1045					65	31.61	203	00.17		
			1056					65	55.12	203	04.73		
			1110					65	24.07	202	76.74		
			1115		325	5.0							
			1200										
89	05	25	1330										
			1700										
			1700										
89	05	26	0725										
			0730										
			0913					42	4.8	-87	40.3		
			0926		090	40		42	4.6	-87	40.1		
			0938										
			1100										
			1125										
			1134					42	4.6	-87	28.0		

DISC TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 7
			SAMPLE FS-2	
			SAMPLE FS-1	
			SAMPLE FS-21	
			INBOUND	
			NOTE: 3 NAV DISKS FOR FORT SHERIDAN TRANSECT:	
			I - SS & 3.5 LINES II SAMPLES 9-20 III SAMPLES 1-8 & 21	
			DOCKED	
			OUTBOUND FROM GREAT LAKES NTC MARINA; TRANSIT TO CHICAGO POLICE DOCK-	
			ARRIVE CHICAGO	
			TD's AT POLICE DOCK: 33390.93 50086.11	
			UNDER WAY	
			DEPLOYING FISH & 3.5 SLED	
			SOL 6	
			LORAN ERRATIC	
			LORAN STILL ERRATIC	
			END OF TAPE 9; START OF TAPE 10	
			EOL 6	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	LATITUDE ± DEGREES	LATITUDE MINUTES	LONGITUDE ± DEGREES	LONGITUDE MINUTES	TYPE	QUAL.
89	05	26	1156					42	4.6	-87	28.5		
			1218					42	4.6	-87	30.5		
			1242					42	4.6	-87	32.9		
									.		.		
			1253						.		.		
									.		.		
			1301					42	4.6	-87	34.0		
			1341					42	4.6	-87	34.6		
									.		.		
			1345						.		.		
			1351						.		.		
									.		.		
			1356					42	4.6	-87	35.6		
			1407					42	4.6	-87	36.0		
			1417					42	4.6	-87	36.9		
			1443					42	4.6	-87	38.2		
			1457					42	4.6	-87	39.1		
			1509					42	4.6	-87	39.8		
			1530					42	4.6	-87	40.0		
									.		.		
			1550		130	85		42	4.6	-87	40.0		
									.		.		
			1710						.		.		
									.		.		
89	05	27	0645						.		.		
									.		.		
			0830						.		.		
			0915						.		.		
									.		.		
			0924						.		.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			SAMPLE NE88-46
			SAMPLE NE88-45
			SAMPLE NE88-44
			0000M PAPER CHANGE (NEW ROLL # 5)
			SAMPLE NE88-43 ; SEAS 2-4'
			SAMPLE NE88-42
			NAV SYSTEM CRASH - RENAMED DATA1, DATA0
			NAV SYSTEM REBOOT
			SAMPLE NE88-41
			SAMPLE NE88-40
			SAMPLE NE88-39
			SAMPLE NE88-38 TEMPORARILY
			SAMPLE NE88-37 ; LORAN ^ HAYWIRE
			SAMPLE NE88-36
			SAMPLE NE88-47
			UNDER WAY TO EAST END LINE 7 ; DISK OFF
			LINE 7 ABORTED DUE TO TIME CONSTRAINT.
			UNDER WAY TO WILMETTE HARBOR
			TIED UP AT BARGE, WILMETTE HARBOR ; MINI-RANGER CAL
			X,Y AT BARGE : 676 893 1971277
			UNDER WAY TO SOL 1

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	X NAVIGATION ~~LATITUDE~~ ± DEGREES ± MINUTES	Y NAVIGATION ~~LONGITUDE~~ ± DEGREES ± MINUTES	TYPE	QUAL.
89	05	27	0945								
			1025								
			1040								
			1050		200	4.0		6810720	19877500		
			1109								
			1120								
			1131					6760680	19737420		
			1134		020	4.0		6768300	19746030		
			1137								
			1213					6815400	19876190		
			1216		200	4.0		6818990	19873410		
			1251					6768080	19729610		
			1254		20	4.0		6773330	19728290		
			1333					6824610	19872890		
			1337		200	4.0		6828220	19871060		
			1413					6775680	19722330		

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 7
			PROTRACTED MINI-RANGER PROBLEMS - DISPLAY REVERSED	
			PROBLEM SOLVED; INITIAL POSITION ESTIMATE MUST BE VERY EXACT.	
			GEAR IN WATER.	
11			SOL WH1	
			FISH CABLE JAMMED IN BLOCK; CIRCLING	
			RESUMING LINE WH1	
			EOL WH1	
			SOL WH2	
			VEERING SLIGHTLY TO MISS BUOY	
			EOL WH2	
			SOL WH3	
			EOL WH3	
12			SOL WH4	
			EOL WH4	
			SOL WH5	
			EOL WH5	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	X NAVIGATION Y ~~LATITUDE~~ ±DEGREES ± MINUTES	~~LONGITUDE~~ ± DEGREES ± MINUTES	TYPE	QUAL.
89	05	27	1456					6791889.	1976907.		
			1515					6818788.	1984377.		
			1529					6825233.	1986702.		
			1546					6811196.	1984629.		
			1613					6786777.	1977244.		
			1625					6775166.	1973563.		
			1632					6779133.	1976175.		
			1644					6791688.	1980181.		
			1653					6798388.	1981999.		
			1705					6817208.	1986608.		
			1710								
			1915								
89	05	28	0740								
			0945					6812888.	1987004.		
			0950					6812888.	1987004.		
			0958					6808023.	1985745.		
			1013					6793566.	1981731.		
			1024					6778277.	1977240.		
			1033					6759447.	1973704.		
			1044					6776008.	1977992.		
			1102					6790418.	1982117.		
			1112					6811248.	1987603.		
			1138					6779958.	1974065.		
			1154					6774958.	1972070.		
			1210								

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			SAMPLE WH-17 2 TRIES
			SAMPLE WH-16 NAV. PROG. KEEPS CRASHING 3TRIES
			SAMPLE WH-15 1 TRY
			SAMPLE WH-14 3 TRIES
			SAMPLE WH-13 3 TRIES
			SAMPLE WH-12 2 TRIES
			SAMPLE WH-11 1 TRY
			SAMPLE WH-10 3 TRIES
			SAMPLE WH-9 3 TRIES
			SAMPLE WH-8 1 TRY
			HOMEWARD BOUND
			DOCKED
			OUTBOUND - CALM, WAVES 0-2'
			ON STATION/ OFF WILMETTE; UNDER WAY TO SAMPLE SITE WH-7
			SAMPLE WH-7 1 TRY
			SAMPLE WH-7B 1 TRY
			SAMPLE WH-6 2 TRIES
			SAMPLE WH-5 1 TRY
			SAMPLE WH-4 1 TRY
			SAMPLE WH-3 1 TRY
			SAMPLE WH-2 3 TRIES
			SAMPLE WH-1 2 TRIES
			SAMPLE WH-18 2 TRIES
			SAMPLE WH-19 1 TRY
			FINISHED WILMETTE HARBOR TRANSECT

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	X NAVIGATION Y ~~LATITUDE~~ ± DEGREES ± MINUTES	~~LONGITUDE~~ ± DEGREES ± MINUTES	TYPE	QUAL.
89	05	28	1215								
			1218		130	7.5					
				001	246	40		694603.	1975152.		
			1309								
			1316					684979.	1970968.		
			1333								
			1338					677860.	1967158.		
			1344	002	066	40		678143.	1967428.		
			1352								
			1354								
			1404								
			1411								
			1425					695034.	1974818.		
			1434								
			1450								
			1500								
			1502		246	40		693437.	1973721.		
			1503								
			1521					686200.	1970717.		
			1544					678304.	1966957.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			PREPARING TO BEGIN GROSSEPOINT LIGHTHOUSE TRANSECT
			UNDERWAY TO SOL GPL1
			SOL GPL1
			HEAVY SAILBOAT TRAFFIC; VEERED ~80m OFF COURSE; CIRCLING
			BACK ON COURSE
			MINI-RANGER ERRATIC
			EOL GPL1
			SOL GPL2; HEAVY BOAT TRAFFIC
			MINI-RANGER SCREWUP - 40m JUMP LEFT - ALTERING CSE TO CORRECT
			" " - 30m JUMP RIGHT " "
			" " - 60m " " " "
			IN MIDST OF REGATTA
			EOL GPL2
			MINI-RANGER SHOWS SOL GPL3 1500m AWAY!
			CIRCLING, TRYING TO FIX NAV.
			NAV STILL SCREWED UP; GOING TO TRUST IT; MOVING TO INTERSECT SOL 3
			CUT OUT STATION 3 - BREAKWATER - ASSUMING IT BLOCKED BY SAILBOATS
			SOL GPL3
			GYROCOMPASS 3° OFF; CORRECTING
			100 m JUMP TO RIGHT; CORRECTING COURSE
			EOL GPL3; CIRCLING WHILE DICK MOVES AT STATION

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	NAVIGATION ~~LATITUDE~~ ± DEGREES ± MINUTES	NAVIGATION ~~LONGITUDE~~ ± DEGREES ± MINUTES	TYPE	QUAL.
89	05	24	~~1025~~	004	045	4.0		~~679596.~~	~~1967249.~~		
			1715					679655.	1967063.		
			1745					.	.		
								.	.		
			1752					.	.		
								.	.		
			1754					.	.		
								.	.		
89	05	29	0650					.	.		
								.	.		
			0755					.	.		
								.	.		
								.	.		
			0834					.	.		
								.	.		
			0840	~~246~~ 1	246	4.0		694339.	1975135.		
								.	.		
			0918					680403.	1968653.		
								.	.		
			0921					678782.	1968207.		
								.	.		
			0923		2066	4.0		.	.		
								.	.		
			0925					679763.	1968165.		
								.	.		
			1001					694991.	1974798.		
								.	.		
			1003		3246	4.0		695106.	1974407.		
			1011					692211.	1973079.		
			1041					.	.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 12
			SOL GPL 4	
			↓ ↓	
			LINE ABORTED; TAPE PLAYER WASN'T SET TO RECORD	
			GEAR RETRIEVED	
			INBOUND	
			UNDER WAY TO WILMETTE	
			STOPPED TO RECOVER 10' BOSTON WHALER ADRIFT OFF NORTH	
			CHICAGO - MARKED "CHICAGO PARK DISTRICT"	
			ON STATION, DEPLOYING GEAR; NAV LOOKS EXCELLENT	
14			SOL GPL1	
			NAV LOST; REGAINE ~ 45 SECS LATER	
			EOL GPL1	
			SOL GPL2; NO NAV, DEAD RECKONING UNTIL NAV REGAINED	
			NAV REGAINED	
			EOL GPL2	
			SOL GPL3	
			LARGE MAN-MADE TARGET ON SIDESCAN	
15			END TAPE 14; START TAPE 15	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES ± MINUTES	NAVIGATION LONGITUDE ± DEGREES ± MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	05	29	1043	3							
			1048					6792560	1967309		
			1052								
			1108		664,0			6794070	1967309.7		
			1110					6811270	1967712		
			1112								
			1118								
			1143					6928120	1972808		
			1153					6958990	1974120		
			1155		246,0			6957470	1973593		
			1218					6885120	1970361		
			1222								
			1242					6811570	1967203		
			1247								
			1305								
			1307								

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 13
			LOST TAIL FIN ON FISH	
			EOL 3	
			REPLACING TAILFIN; CHANGING SIDESCAN PAPER	
			SOL 4; NO NAV	
			NAV REGAINED	
			REPLACING SS PAPER	
			WIND FRESHENING; 20 kts	
			MANMADE TARGET RE ACQUIRED	
			EOL 4	
			SOL 5; WAVES 2-3'	
			TURNING OFF 3.5; SEAS TOO ROUGH	
			WIND 25 kts SSW; BOAT HEADING 220; BOAT TRACK 246	
			LOST NAV	
			EOL GPL5	
			FATHOMETER USELESS; SWITCHED OFF	
			UNDER WAY TO SAMPLE SITE GL-16	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	X NAVIGATION ~~LATITUDE~~ ± DEGREES ± MINUTES	Y NAVIGATION ~~LONGITUDE~~ ± DEGREES ± MINUTES	TYPE	QUAL.
89	05	29	1326								
			1335								
			1340								
			1600								
89	05	30	0645								
			0830								
			0914		095	10.0					
			0930					69 26 98.	19 72 20 4.		
			0941					69 52 82.	19 73 32 6.		
			0951					69 56 40.	19 73 96 3.		
			1009					68 83 16.	19 70 76 7.		
			1021					68 91 91.	19 71 74 4.		
			1031					69 16 22.	19 72 42 7.		
			1047								
			1135								
			(1047)					68 27 22.	19 69 37 0.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			NAV VERY ERRATIC
			SAMPLE GL-10 NO SAMPLE; SEAS 3-5'
			NAV UNUSABLE; RETURNING TO DOCK
			DOCKED
			UNDER WAY
			ON STATION - WILMETTE LIGHTHOUSE TRANSECT
			MINI-RANGER RANGING ON ONLY 1 STATION; DICK CHECKING BATTERIES
			NAV FIXED; UNDERWAY TO SAMPLE SITE GL-10
			SAMPLE GL-10; WINDS 25 kts. SW
			SAMPLE GL-9
			SAMPLE GL-8
			SAMPLE GL-7
			SAMPLE GL-6
			SAMPLE GL-5
			SAMPLER LINE WRAPPED AROUND STARBOARD WHEEL; BRAD GOING IN TO UNTANGLE. SAMPLER STILL ATTACHED
			SAMPLER RETRIEVED, LINE UNDAMAGED. BOTTOM IS A COARSE COBBLE/BOULDER PAVEMENT. SAMPLE INTACT → END MORAINE?
			SAMPLE GL-4

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	X NAVIGATION Y ~~LATITUDE~~ ± DEGREES ± MINUTES	~~LONGITUDE~~ ± DEGREES ± MINUTES	TYPE	QUAL.
89	05	30	1204					68 1596.	196 9412.		
			1210					68 4263.	197 0627.		
			1239					69 3533.	197 4692.		
			1316					68 2098.	196 7507.		
			1330					.	.		
			1332					.	.		
								.	.		
			1340					.	.		
								.	.		
			1545					.	.		
								.	.		
			1558	07	270	4.0		41 52.2	-87 22.9		
								.	.		
			1625					.	.		
								.	.		
			1715					.	.		
								.	.		
			1720					.	.		
			????					52.2666	29.1953		
			1726					41 52.3	-87 30.6		
								.	.		
			1738		270	4.0		41 52.3	-87 30.0		
								.	.		
			1744					52.2220	30.5174		
								.	.		
			1756					.	.		
								.	.		
			1803					.	.		
			1805					.	.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			SAMPLE GL-3
			SAMPLE GL-2
			~~SAMPLE GL-1~~ - NO SAMPLE AFTER 5 TRIES -
			SAMPLE GL-11 - NO SAMPLE AFTER 4 TRIES -
			SAMPLE GL-12 - NO NAV; ~ 130 M. OFFSHORE, LINE 5
			SAMPLE GL-12B - " 100 M. " "
			UNDERWAY TO SOL 7
			ON STATION AT SOL 7
16			SOL 7; DEAD CALM, LIGHT FOG
			LORAN ERRATIC; BOAT HOLDING STEADY COURSE
			LORAN REALLY BAD; WIND 10-15 kts.
			NAV PROGRAM ERROR; REBOOTING W/ NEW DATA DISK → "DISK FULL", BUT ONLY ~ 600 records
			MANMADE OBJECT, STARBOARD
			BAD HELIX; CIRCLING WHILE TUG REPLACES IT.
			RECOMMENCE LINE 7
			MANMADE OBJECT, PORT SIDE
17			CHANGE TAPE
			HUGE, DISTINT TARGET ON SIDESCAN @ 3.5; SCHOOL OF FISH
			MORE FISH

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES	NAVIGATION LATITUDE MINUTES	NAVIGATION LONGITUDE ± DEGREES	NAVIGATION LONGITUDE MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	05	30	1811	07				41	52.3	-87	34.8		
			1819					52	27.7	33	46.1		
			1829					52	31.6	34	29.7		
			1832					52	33.3	34	60.2		
			1834					52	31.1	34	58.2		
			1839					52	33.4	35	10.7		
			1839					52	33.2	35	17.5		
								52	29.5	35	39.8		
			1856					41	52.3	-87	36.5		
			1900										
			1905										
			1930										
			2000										
89	05	31	0700										
			0800										
			0838					41	52.3	-87	35.5		
			0848					41	52.3	-87	34.8		
			"										

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			PASSING TO PORT OF 4-MILE CRIB
			MANMADE TARGET PASSED 30 secs. BACK
			MANMADE TARGET (BIG 'UN)
			" " 30 m. STARBOARD
			" " 50 m. PORT
			" " 30 m. STARBOARD
			MULTIPLE MANMADE TARGETS STARBOARD
			LARGE MANMADE TARGET
			EOL 7
			RETRIEVING GEAR
			INBOUND
			TAKING ON WATER
			DOCKED
			PHONE CALLS
			UNDERWAY
			SAMPLE NE88-57
			SAMPLE NE 88-56 SAND ← THIN ORGANIC LAYER
			SAMPLE NE 88-56B CLAY

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES	NAVIGATION LATITUDE MINUTES	NAVIGATION LONGITUDE ± DEGREES	NAVIGATION LONGITUDE MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
69	05	31	0854					41	52.3	-87	33.4		
									.		.		
			0915					41	52.3	-87	32.1		
			0921					41	52.3	-87	31.6		
			0944					41	52.3	-87	28.7		
			0954					41	52.2	-87	28.0		
			1014					41	52.3	-87	25.7		
			1028					41	52.2	-87	24.9		
			1049					41	52.3	-87	23.0		
									.		.		
									.		.		
									.		.		
									.		.		
			1055						.		.		
									.		.		
			1127		220	40			50.2		19.6		
									.		.		
			1137						49.7		20.2		
			1226						47.3		22.9		
			1300						.		.		
			1400						.		.		
			1420						.		.		
									.		.		
			1422					41	41.5	-87	29.6		
									.		.		
			1425						.		.		
									.		.		
			1430						.		.		
									.		.		
			1532						.		.		
			1625						.		.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 17
			SAMPLE NE88-55	1½" GRAVELLY SAND
			SAMPLE NE88-55B	SILTY TILL
			SAMPLE NE88-54	MED-COARSE SAND, PEBBLES
			SAMPLE NE88-53	WELL SORTED FWS GRAVEL
			SAMPLE NE88-52	FINE SILTY SAND
			SAMPLE NE88-51	PEBBLY MED. SAND
			SAMPLE NE88-50	SILTY CLAY
			SAMPLE NE88-49	SILTY CLAY w/ .5 cm VENEER OF SAND
			SAMPLE NE88-48	WELL SORTED, MED SAND
			NOTE: NAV DISK OFF DURING ABOVE SAMPLING	
			UNDERWAY TO SOL 8	
			SOL 8; LORAN ERRATIC - TRACKLINE SHOWS 60m AMPLITUDE PERIODIC WAVERING	
			MANMADE TARGET	
			CURIOUS BOTTOM FEATURE	
			FLYS EVERYWHERE	
			LORAN VERY ERRATIC	
			LORAN COMPLETLY FREAKED OUT	
			EOL 8	
			RETRIEVING GEAR	
			RETURNING TO DOCK; FUEL LOW	
			WIND 40 kts. NW	
			DOCKED	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	LATITUDE ± DEGREES	LATITUDE MINUTES	LONGITUDE ± DEGREES	LONGITUDE MINUTES	TYPE	QUAL.
89	06	01	0630										
			0905										
			1029										
			1045										
			1103					41	42.0	-87	29.1		
			1121					41	43.2	-87	27.7		
			1137					41	45.2	-87	25.4		
			1144					41	45.3	-87	25.3		
		~	1148										
			1202					41	46.5	-87	23.8		
			1204					41	46.7	-87	23.6		
			1216					41	46.8	-87	23.4		
			1221					41	46.9	-87	23.4		
			1235					41	47.5	-87	22.7		
			1246					41	47.9	-87	22.3		
			1312					41	50.1	-87	19.8		
			1315										
			1355										
			1437										
			1443		044	4.0		41	41.0	-87	27.7		

DISK ~~TAPE~~ #	START	END	COMMENTS AND OBSERVATIONS
			TRANSIT TO INDIANA HARBOR TO REFUEL
			ARRIVE INDIANA HARBOR; COMMENCE REFUELING
			REFUELING COMPLETE, UNDERWAY TO SAMPLE SITE # 67
12			LORAN EXCELLENT
			SAMPLE NE88-67 FINE SAND
			SAMPLE NE88-66A&B 2" SILTY FINE SAND OVER GRAVELLY SAND
			SHARPENED PENCIL
			SAMPLE NE88-65A&B 6" MED-COARSE SAND & FINE GRAVEL OVER SILTY CLAY
13			NAV PROGRAM CRASH; REBOOTING
			SAMPLE NE88-64 V. COARSE SAND & GRAVEL
			SAMPLE NE88-63 WELL SORTED FINE SAND
			SAMPLE NE88-62 V. COARSE SAND W/ PEABLES
			SAMPLE NE88-61 WELL SORTED FINE GRAVEL
			SAMPLE NE88-60 V. FINE SAND
			SAMPLE NE88-59A&B 1cm FINE SAND OVER SILTY CLAY
			SAMPLE NE88-58 WELL SORTED V. COARSE SAND
			UNDERWAY TO INDIANA SHOALS AREA
			HEAVY RAIN, LIGHT WINDS
			ON STATION, DEPLOYING GEAR
			SOL IS-1; LORAN FUNKY

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SPD	NAVIGATION FIX TIME	LATITUDE ± DEGREES	MINUTES	LONGITUDE ± DEGREES	MINUTES	TYPE	QUAL.
89	06	01	1524	1	044			41	44.0	-87	23.8		
			1530	2222				41	43.6	-87	23.7		
			1543										
			1604					41	41.1	-87	26.8		
			1609	3044				41	41.0	-87	26.4		
			1618										
			1622										
			1653										
			1657	4222				41	42.9	-87	22.6		
			1723					41	41.2	-87	24.7		
			1800										
89	06	02	0745										
			0810										
			0819	5045	40				40.8	-87	24.0		
			0840										
			0847						42.5	-87	21.9		

DISK ~~TAPE~~ #	START	END	COMMENTS AND OBSERVATIONS
			EOL IS-1
			SOL IS-2
			SOUNDER DATA INTERRUPTED FOR ~ 20 MIN
			EOL IS-2
			SOL IS-3; LORAN VERY ERRATIC
			JOG IN LINE 3
			OVERSHOT END OF JOG 150 M.
			EOL IS-3; NAV SYSTEM CRASH
14			NAV SYSTEM BACK UP
			SOL IS-4; HEAVY FOG
			EOL IS-4
			DOCKED AT INLAND STEEL TUGBOAT DOCK (INDIANA HARBOR)
			UNDERWAY
			SLED IN WATER
			SOL IS-5; LORAN LOOKS PASSABLE
			LORAN ERRATIC
			EOL IS-5

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES ± MINUTES	NAVIGATION LONGITUDE ± DEGREES ± MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	06	02	0855	6	222	4.0		41 42.0	-87 21.6		
			0931					41 40.1	-87 24.1		
			0935								
			1210								
			1235								
			1247	1	335	4.0		53 71 60	153 37 21		
			1304					53 40 81	154 01 34		
			1325								
			1340								
			1344								
			1352								
			1356								
			1359					52 31 06	156 38 79		
			1404	2	155	5.0		52 24 28	156 40 17		
			1406			4.0					

TAPE #	START / END	COMMENTS AND OBSERVATIONS	PAGE 20
		SOL IS-6	
		EOL IS-6 ; RETRIEVING SLED	
		HEADED FOR MICHIGAN CITY HARBOR TO PICK UP MIKE -	
		PICKED UP MIKE & STEVE DAVIS, MICHIGAN DNR	
		DEPLOYING SS & 3.5	
		SOL MC-1 ; DEAD CALM, BRIGHT SUNNY DAY	
		VEERING AROUND BOUY MARKING END OF FISHNET. - FISHNET STRETCHES RIGHT ACROSS SURVEY AREA -	
		CONTACTED MICH. DNR ; NETS ONLY 5' OFF BOTTOM	
		VERED 30 M. OFF COURSE	
		MINI-RANGER BECOMING ERRATIC	
		LARGE MINI-RANGER DEVIATIONS -	
		PLANNED EOL 1 ; CONTINUING DUE TO INTERESTING BOTTOM FEATURE	
		EOL MC-1 ; 500 M. OVERSHOOT	
		SOL MC-2	
		SPEED DROPPED TO 4.0	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SPD	FIX TIME	NAVIGATION LATITUDE ± DEGREES ± MINUTES	LONGITUDE ± DEGREES ± MINUTES	TYPE	QUAL.
89	06	02	1413	2	155	4.0					
			1425								
			1459					53203 8	154332 8		
			1507					53347 4	154020 1		
			1527					53702 7	153259 9		
			1530	3	345	4.0		53649 4	153252 7		
			1545								
			1601	3	335	4.0		53654 7	153235 8		
			1618					53345 3	153898 3		
			1630								
			1643								
			1656								
			1705								
			1714					52 20 7 3	156380 1		
			1733	4	155	4.5		52083	156312 7		

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			MINI-RANGER WACKED OUT
			NAV LOOKS OK AGAIN
			PASSING OVER FISHNET
			PASSING OVER 2ND SET OF NETS
			EOL ML-2
			SOL ML-3
			ABORTING LINE; VEERED 300 m. STARBOARD DUE TO M-R ERRORS
			SOL ML-3B
			TARGET
			FISHNET
			STRANGE LINEAR FEATURE ON SS.
			SOUNDER WENT DEMOCRATIC
			BOAT WENT BY ON STARBOARD; PRODUCED ARTIFACT ON SS.
			EOL ML-3B; DATA TAPE MAY HAVE BEEN OFF ~ 5 min.
			SOL ML-4

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	NAVIGATION FIX TIME	NAVIGATION LATITUDE ± DEGREES ± MINUTES	NAVIGATION LONGITUDE ± DEGREES ± MINUTES	NAVIGATION TYPE	NAVIGATION QUAL.
89	06	02	1822	4	155	4.5		.	.		
								.	.		
			1824					.	.		
								.	.		
			1829					.	.		
								.	.		
			1832					.	.		
			1833					.	.		
								.	.		
			1841					.	.		
								.	.		
			1852					535975	1532169		
								.	.		
			1853		533	4.0		535553	1532022		
								.	.		
			1908					.	.		
								.	.		
			2007					521770	1563344		
								.	.		
			2010					.	.		
								.	.		
			2105					.	.		
								.	.		
89	06	03	1000		317	9.5		.	.		
								.	.		
			1039					526383	1556737		
								.	.		
			1044					.	.		
								.	.		
			1052					524775	1560351		

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 22
			FISHNET BOUYS ABEAM PORT	
			" " " STARBOARD	
			NAV PROGRAM ERROR; QUIT, THEN RERAN	
			FISHNET BOUYS ABEAM PORT	
			" " " PORT & STARBOARD	
			NAV PROGRAM ERROR, ETC.	
			EOL MC-4	
			SOL MC-5	
			ABEAM FISHNET BOUYS STBD & PT; NET SHOWS ON SIDESCAN	
			EOL MC-5	
			RETRIEVING GEAR	
			DOCKED MICHIGAN CITY	
			OUTBOUND; CALM, THREATENING RAIN	
			SAMPLE MC-2 MED SAND	
			NAV CRASH	
			SAMPLE MC-3 1" MED SAND OVER SILTY CLAY	

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	NAVIGATION X LATITUDE ± DEGREES ± MINUTES	NAVIGATION Y LONGITUDE ± DEGREES ± MINUTES	TYPE	QUAL.
89	06	03	1059					523036.	1563029.		
			1110					524627.	1559161.		
			1123					527507.	1553451.		
			1134					529564.	1546319.		
			1157					536222.	1534048.		
			1202					536636.	1533291.		
			1207					536424.	1532450.		
			1226					534655.	1536274.		
								..	..		
			1240					..	..		
								..	..		
								..	..		
			1247					532740.	1540714.		
			1307					527629.	1551071.		
			1317					525636.	1555433.		
			1333					522791.	1561896.		
								..	..		
			1336					..	..		
								..	..		
			1339					522602.	1561600.		
			1354					523865.	1558373.		
			1406					525565.	1554979.		
			1418					526253.	1553916.		
			1427					527109.	1551292.		
								..	..		
			1445					..	..		
								..	..		
			1453					529755.	1545743.		
			1511					534266.	1535970.		
			1524					531261.	1541311.		

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			SAMPLE MC-4 MED. SAND
			SAMPLE MC-5 MED. SAND W/ SHRIMP
			SAMPLE MC-6 .5" MED. SAND OVER SILTY CLAY
			SAMPLE MC-7 SILTY SAND W/ GRAVEL
			SAMPLE MC-8 PEBBLY CLAY
			SAMPLE MC-9 PEBBLY CLAY
			SAMPLE MC-10 MED-COARSE PEBBLY SAND
			SAMPLE MC-11 .5" SAND OVER TILL
			COORDINATES FOR SAMPLE MC-12 APPEAR TO BE ERRONEOUS -
			- SAMPLE MC-12 ABORTED -
			SAMPLE MC-13 .25" SILTY SAND OVER COARSE SAND W/ GRAVEL
			SAMPLE MC-14 COARSE SAND W/ GRAVEL
			SAMPLE MC-15 1" FINE BROWN SILTY SAND OVER GREY SILTY SAND
			SAMPLE MC-16 .5" MED-COARSE SAND OVER SILTY CLAY
			PROGRAM CRASH
			SAMPLE MC-17 MED-COARSE SAND W/ PEBBLES STARTING ~ 6" DOWN
			SAMPLE MC-18 3" MED-COARSE BROWN SAND OVER M-C SILTY GREY SAND
			SAMPLE MC-19 1" FINE BROWN SAND OVER SILTY GREY SAND
			SAMPLE MC-20 V. COARSE PEBBLY SAND OVER SILTY CLAY
			SAMPLE MC-21 5" COARSE PEBBLY SAND OVER TILL (?)
			WINDS UP TO 20 kts.; SEAS PICKING UP
			SAMPLE MC-22 1" MED. GRAVEL OVER CLAY
			SAMPLE MC-23 PEBBLY MED. GRAVEL
			SAMPLE MC-24 6" COARSE-V COARSE SAND/GRAVEL OVER CLAY

YR	MO	DAY	TIME	LINE #	SHIPS COURSE	SHIPS SPD	FIX TIME	NAVIGATION X (~~LATITUDE~~) ± DEGREES ± MINUTES	NAVIGATION Y (~~LONGITUDE~~) ± DEGREES ± MINUTES	TYPE	QUAL.
89	06	03	1543					528444	1547789		
			1557					525905	1552808		
			1603					525802	1553469		
			1614					524100	1556876		
			1622					523339	1554751		
			1631					521933	1561337		
			1713					536603	1534352		
			1715								
			1716		246	WARP 8					
			1740								

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 24
			SAMPLE MC-25 3" PEBBLY FINE SAND OVER CLAY/TILL	
			SAMPLE MC-26 CLAY	
			SAMPLE MC-27 MED. SAND	
			SAMPLE MC-28 .5" SILT OVER GRAVEL W/ MED. PEBBLES	
			SAMPLE MC-29 MED GRAVEL W/ SMALL PEBBLES	
			SAMPLE MC-30 SILTY SAND (UPPER PART SILTIER)	
			SAMPLE MC-1 TILL	
			THAT'S A WRAP	
			INBOUND	
			DOCKED	