

<i>JD</i>	<i>Time UTC</i>	<i>Knudsen 1600 (*.keb/kea)</i>	<i>Resistivity</i>	<i>Hypack</i>	<i>Comments</i>
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SURVEY PARAMETERS:

All Survey Times are in UTC (ZD= +5 hrs), All positions are in UTM Zone 18 WGS84***note by vac5/21/09 the UTC times are local +4, not +5

GPS Equipment: Ashtech DGPS2 Crew: Worley, Foster, Bratton, Erban, Crusius, Cross

Knudsen: 1600 USB, 1.2 kW, 2 Massa transducers for 3.5 kHz

Resistivity: AGI Supersting R8 Marine Resistivity Meter

JD 249

<i>JD</i>	<i>Time UTC</i>	<i>Knudsen 1600 (*.keb/kea)</i>	<i>Resistivity</i>	<i>Hypack</i>	<i>Comments</i>
249	1210				Depart dock, Solomons, MD, Calvert Marina
249	1240				Deploying Knudsen sidemount, 100 meter resistivity cable
249	1340	0001_2006_249_1340_001	l1f1	001_1341.249	SOL 1, Knudsen power 2, gain 38, 0.25 ms chirp pulse
249	1445				increase Knudsen power from 2 to 3
249	1450				Knudsen back to power 2
249	1447	0001_2006_249_1447_002			automatic Knudsen keb file change at ~ 65 MB, kea files change automatic at a different interval
249	1553				EOL 1
249	1553	0002_2006_249_1553_001	l2f1	000_1553.249	SOL 2
249	1700	0002_2006_249_1700_002			
249					EOL 2
249	1706	0003_2006_249_1706_001	l3f1	000_1705.249	SOL 3
249	1722				increase Knudsen power from 2 to 3
249	1805				decrease Knudsen power to 2
249	1813	0003_2006_249_1813_002			automatic Knudsen keb file change
249	1815				EOL 3

JD 249

JD	Time UTC	Knudsen 1600 (*.keb/kea)	Resistivity	Hypack	Comments
249	1846	0004_2006_249_1847_001	I4f1	000_1846.249	SOL 4
249	1954	0004_2006_249_1954_002			automatic Knudsen keb file change
249	2013				EOL 4
249	2014	0005_2006_249_2014_003	I5f1	000_2014.249	SOL 5
249	2043				increased Knudsen power to 3
249	2100				turned depth off on resitivity, trying to clear noise on Knudsen
249	2109				turned depth back on resistivity, does not seem to be the reason for noise on Knudsen, depth not working on resistivity, may need to use ship nav and depth to process
249	2121	0005_2006_249_2121_004			automatic Knudsen keb file change
249	2122				EOL 5
249	2125				stopping to pull sidemount, no apparent reason for noise, lowered and tested, noise from sidemount starts at about 2 kts, will continue line with noise on Knudsen
249	2144	0006_2006_249_2144_001	I6f1	000_2144.249	SOL 6
249	2228				EOL 6
249					EOD at Dennis Point Marina

JD 250

JD	Time UTC	Knudsen 1600 (*.keb/kea)	Resistivity	Hypack	Comments
250	1220				Depart Dennis Point Marina
250	1324	0007_2006_250_1324_001	l7f1	000_1323.250	SOL 7, Knudsen looks great - the noise (from resist. Xducer) is gone!
250	1431	0007_2006_250_1431_002			automatic Knudsen keb file change, 20,000 pings
250	1514				EOL 7
250	1514	0008_2006_250_1514_001	l8f1	000_1514.250	SOL 8
250	1550				EOL 8
250	1550	0009_2006_250_1550_001	l9f1	000_1550.250	SOL 9
250	1618				EOL 9
250	1618	0010_2006_250_1618_001	l10f1	000_1618.250	SOL 10
250	1704 ??				EOF 1 for AGI Resistivity,
250	1711		l10f2		SOF 2 for AGI Resistivity.
250					
250	1725	0010_2006_250_1725_002			
250	1727				EOL 10
250	1728	0011_2006_250_1728_001	l11f1	000_1727.250	SOL 11
250	1746				EOL 11
250	1747	0012_2006_250_1747_001	l12f1	000_1728.250	SOL 12
250	1829				EOL 12
250	1830	0013_2006_250_1830_001	l13f1	000_1829.250	SOL 13
250	1847				EOL 13
250	1847	0014_2006_250_1847_001	l14f1	000_1847.250	SOL 14
250	1920				EOL 14
250	1921	0015_2006_250_1921_001	l15f1	000_1921.250	SOL 15
250	1949				EOL 15
250	1949	0016_2006_250_1949_001	l16f1	000_1949.250	SOL 16
250					EOL 16
250	2024	0017_2006_250_2024_001	l17f1	000_2024.250	SOL 17
250	2057				EOL 17
250	2057	0018_2006_250_2057_001	l18f1	000_2057.250	SOL 18

JD 250

JD	Time UTC	Knudsen 1600 (*.keb/kea)	Resistivity	Hypack	Comments
250	2140	0019_2006_250_2140_001	l19f1	000_2141.250	SOL 19
250	2217				EOL 19
250					EOD, Dennis Point Marina

JD 251					
JD	Time UTC	Knudsen 1600 (*.keb/kea)	Resistivity	Hypack	Comments
251	1247	0020_2006_251_1247_001	I20f1	000_1251.251	SOL 20
251	1337				EOL 20
251	1338	0021_2006_251_1338_001	I21f1	000_1338.251	SOL 21
251	1421				EOL 21
251	1421	0022_2006_251_1421_001	I22f1	000_1421.251	SOL 22
251	1525				EOL 22
251	1526	0023_2006_251_1525_001	I23f1	000_1525.251	SOL23
251	1622				EOL 23
251	1626	0024_2006_251_1626_001	I24f1	000_1626.251	SOL 24
251	1733	0024_2006_251_1733_002			automatic Knudsen keb file change, 20,000 pings
251	1819				EOL 24
251	1819	0025_2006_251_1819_001	I25f1	000_1819.251	SOL 25
251	1845				stopping to take water samples
251	1851	0025_2006_251_1851_002	125f2	000_1851.251	continue Line 25
251	1912				EOL 25
251	1912	0026_2006_251_1912_001	I26f1	000_1912.251	SOL 26
251	1934				stopping, something caught on resistivity streamer, removed crab pot from end of streamer
251	1937				EOL 26
					water sampling
	1946				EOD/EOS

#06018

Potomac SGD Surveying

Radon/Radium, Seismics, Electrical Resistivity

Notes: tropical storm Ernesto produced heavy rain over 1 weekend

Monday, 4 Sept 2006 (JC flew down scouted)

16:15 - Labor Day: JB to USGS-MOF, to get pickup + trailer, to office for more supplies

17:00 - Leave Woods Hole

23:00 - Stop for night, Ramada near Trenton, NJ

Tuesday 5 Sept 2006 Day 1

6:30 - Leave hotel

12:30 - arrive Solomons, meet JC, DF CW, LE @ Comfort Inn, lunch

14:00 - to boat, R/V Kerhin, MD-DNR loading gear, troubleshoot YSI Seismic software

20:00 - shuttle cars to Dennis Pt. Marina

22:00 - JB/JC/LE back @ hotel

Weds. 6 Sept 2006 - partly cldy, lt. N breeze 65° F

Day 2

0700 - Leave hotel, to Food Lion for lunch supplies.

0730 - at boat, setting up gear

0805 - cast off, idling out of Solomons Harbor (Calvert Marina), setting up equipment for surveying, will start outside Patuxent along western shore of bay to south

John Bratton - USGS Woods Hole

John Crusius - "

Dave Foster - "

Chuck Worley - "

Laura Erlan - USGS-Eco

(27)

Vessel = R/V Kerhin
Captain = Rick Younger
Mate = Joyce Blix

0830 - deploying seismic source (Knudsen 3.5 kHz sidemount - port)

0850 - all gear out, checking systems

Radon mapping - G-Rad7 array, 5 min. count pumping water from deck pump @ ~ 0.5 m below surface, YSI in bucket, logging position w/ software, depth will come from ship nav. log. (draft corrected), flow = 7.8 L/min, depth sidemount w/ transducer

Seismics - Knudsen 1600 USB

1.2 kw 2 Massa transducers

@ 3.5 kHz, GPS AshTech

DGPS 2, software not logging nav. due to problem, time server used to sync. w/ resistivity

Resistivity - AGI super sting TB, ~2 amps w/ 30m extension w/ 100-m streamer, graphite source electrodes, stainless receivers, 15m between anchor pt. + electrode #1, used depression weight on front shackle to hold @ water surface

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Potomac SGD
(Continued) Day 2JB, JC, LE
DF, CW
RY, J.Blix(28)
6. Sept 2006

Survey mainstem shore + mouth Potomac

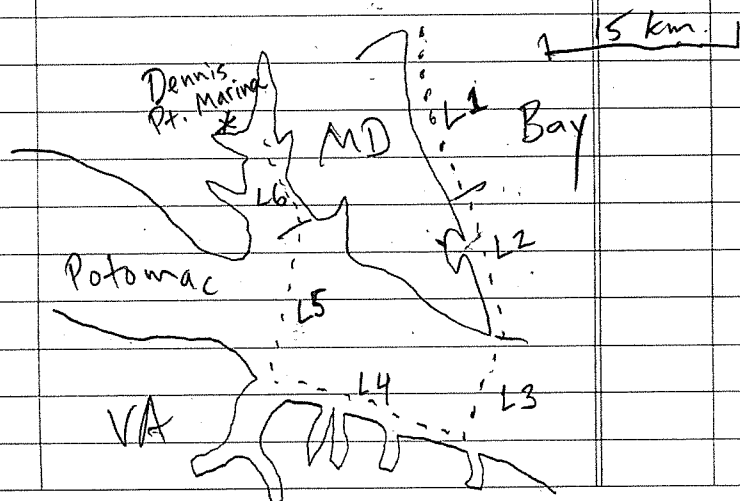
- | | | | |
|-------|--|----------------|--|
| 09:10 | - CW troubleshooting resistivity problem before start of first line off Cedar Pt. | 12:45 | - T = 24.98, S = 15.19 |
| 09:40 | - Start line southbound along Patuxent NAS, water temp and salinity from YSI =
T = 24.2°C, S = 13.64 psu | 12:52 | - channel complexes in seismics off Tanner Creek/Lake Conoy |
| 10:30 | - running in about 5-6 m of water to avoid pound nets running perpendicular to shore
T = 24.18°C, S = 13.58 | 13:10 | - Radon spray chamber foamed up to air intake, possible mucilage from Potomac diatoms?
T = 25.38, S = 15.29 |
| | - speed = 9.4 kilometers per hr (kph) | 13:32 | - T = 25.78, S = 14.98, middle of Potomac mouth, some structure in seismics, alternating with gas |
| 11:45 | - Approaching Point No Point, rebooted Rad. laptop because system stopped logging navigation and GPS - OK after reboot | 13:56 | - approaching Virginia shore, end of line, T = 25.83, S = 14.54, no gas in seismics, some deep (10-15 m sub-bottom) reflectors |
| 11:52 | - T = 23.96, S = 14.85 turning @ Pt. No Pt., start 2nd line of Seis/ER data | ~14:05 = 14:40 | - troubleshooting seismic transducer after turn |
| 12:10 | - slow turn to port, same line, off St. Jerome Creek | 14:45 | - straightened out around fish pen, starting 4th line upstream along VA shore |
| 12:30 | - crossing paleochannel just north of Deep Creek/Long Neck Creek confluence, some gas in channel | 14:52 | - crossing 3rd line |
| | | 14:56 | - passing mouth of Cubitt Creek |
| | | 15:08 | - T = 24.95, S = 13.57 |
| | | 15:16 | - passing Hull Creek |
| | | 15:30 | - passing Corbin Pond |

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Potomac SGD (Cont.) Day 2

- 15:36 - passing Presley Creek
will continue line until
turn just NW of large
tributary mouth of Cod River/Glebe
and head north across
main channel again to
St. Mary's River/Dennis Pt. Marina
- 15:42 - $T = 25.16$, $S = 13.85$
- 15:52 - passing Cod Creek
- 16:13 - end of 4th line, start 5th
 $T = 24.37$, $S = 13.41$
- 16:50 - in deep channel (12.5 m),
 $T = 25.19$, $S = 13.52$

Sketch Map



JB, etc.

(29)

6 Sept. 2006

70s, 14 E breeze,
hazy sun

- 17:22 - end of line 5, troubleshoot
vibration on Knudsen
 $T = 25.59$, $S = 14.85$
- ~17:45 - start line 6, up E shore
of St. Mary's River from
Sage Pt. to Priests Point
- 18:01 - Passing Sage Pond
 $T = 25.71$, $S = 14.93$
- ~18:15 - snagged two streamer floats
on crab pot and ripped
them off
- 18:20 - $T = 25.33$, $S = 14.77$
- 18:30 - gear up, still collecting
radon data into
Carthage Creek/Dennis
Pt. Marina
- 18:50 - At pier, radon not much higher
 $S = 13.15$, $T = 25.91$
- 19:25 - pulled air lines from
equilibrator, put T probe into
bucket w/ YSI, pump still running
- chamber probe reading
 25.00°C , YSI reading 25.77°C
- JC + LE setting up Rad7 for time series
- 20:00 - JB, CW, DF, RY, JBI leave in minivan
- ~20:15 - JC + LE leave in pickup.
- ~22:00 - VeeAnn Cross arrives @ hotel.

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Potomac SGD (cont.) Day 3

Survey MD shore, Zigzag back

- 7:05 Leave hotel
- 7:40 Arrive marina, JC+LE
check on stationary Rad7,
fix streamer floats, set up
depth transducer off sidemount,
set up Rad. mapping
- 8:15 - cast off, transit out
of St. Mary's River around
St. George's Island and
Piney Pt.
- 9:05 - On station just downstream
of Herring Crk., deployed
Knudsen, moved depth
transducer to starboard
mount on 2x4, deployed
streamer
- 9:24 - Start line 7, lots of
pound nets and crab pots
to avoid, $T=24.17$, $S=12.59$
- 9:46 - off Blake Creek, channels in
Seismics
- 10:20 - passing Flood Creek
- 10:32 - $T=24.84$, $S=12.13$
- 10:56 - crossing channel into
Breton Bay, $T=24.67$, $S=11.73$

JB, etc. +
VeeAnn Cross
today

7 Sept 2006 (30)

70s, sunny,
light N breeze

- 11:14 - end line 7 @ Heron Island
Bar, turn south for crossing
(line 8) at St. Clement's Island
- 11:20 - $T=24.69$, $S=11.47$
- 11:35 - middle of channel in main
estuary, collected sample for
Julian Sachs^(uw) $T=24.97$, $S=11.53$,
sampled out of Rad. Mapping overflow
- 11:50 - End line 8, start short
line 9 into Nomini Bay,
 $S=10.39$, $T=24.98$
Resistivity line started late (11:57),
running along Holts Marsh/Island
- 12:16 - $T=25.11$, $S=10.70$
- 12:19 - End line 9 in Nomini Bay,
turn N along E shore of bay
for shore-parallel line and
crossing (all one line, #10)
- 12:40 - Rounding Kingcopsis Pt.,
beginning crossing
 $T=25.33$, $S=11.05$
- 13:27 - $T=25.18$, $S=11.78$
End line 10, start line 11 ^{@ sandy beach}
along MD shore to E. (short line)
- 13:41 - $T=25.52$, $S=12.56$
- 13:47 - End line 11, start line 12
back across main channel (S)

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Potomac SGD
(Cont.) Day 3

Zig-zagging downstream

- 14:03 - Mid-channel, $T = 25.26$,
 $S = 11.86$, nice dipping
reflector on N channel edge
- 14:29 - End of line 12, start
line 13 E. along VA shore
(short line), $T = 24.98$, $S = 12.06$
off Coles Pt.
- 14:41 - snagged two floats on (#7 pair)
streamer and ripped them
off, electrodes OK but blinked out
- 14:46 - turn @ Ragged Pt. to N
end line 13, start line 14
 $T = 25.81$, $S = 12.87$
- 15:20 - End of line 14, good
seismics showing
Herring Creek paleovalley
fill structures before end
- Running line 15 along MD
shore E. across Herring Ek.
Inlet w/ slight overlap
of line 7
- 15:44 - off Piney Pt. Creek, $T = 25.88$,
 $S = 12.60$
- 15:48 - End line 15 @ Piney Pt.
oil terminal pier

VB, etc.

(31)

800, med. W. wind
hazy sun

- 15:49 - Start line 16 crossing to
VA shore
- 15:59 - near miss on streamer by
powerboat crossing
behind, warned off w/ horn
- 16:22 - $T = 26.56$, $S = 12.61$
- 16:24 - End of line 16, start line 17
along MD shore
- 16:41 - $T = 26.91$, $S = 12.59$
- 16:47 - navigating around pound nets
- 16:58 - End line 17 @ Sandy Pt.,
start line 18 across main
channel (N) to St. Georges bar
+ St. Mary's River/Marina
 $T = 26.66$, $S = 12.77$
- 17:19 - Mid-channel $T = 26.91$, $S = 12.95$,
good detail on seismics,
N edge of Cape Charles - aged
paleochannel
- 17:40 - End of line 18 on St. George Bar,
start line 19 up St. Mary's R.
 $T = 25.75$, $S = 14.83$
- 18:01 - $T = 26.30$, $S = 14.35$
- 18:20 - End line 19, pull streamer +
sidemount
- 18:30 - At pier, checked Rad 7 on dock
- ~19:00 - leave marina for Solomons

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Potomac SGD

(cont.)

Day 4

St Mary's/MD shore to start, then VA upstream

JB, etc.

(32)

8 Sept 2006

hazy sun, 65°

calm/light breeze later

AM incoming tide

- 07:00 - Meet @ Calvert Marina in Solomons, drop cars, drive to Dennis Pt. marina
- ~07:40 - arrive Dennis Pt., swap batteries on dock Rad 7, fuel up vessel
- ~08:10 - cast off, transit to mouth of St. Mary's River
- 8:20 - deploying gear
- ~8:50 - begin surveying, off St Mary's River, - line 20, ~12 kph (faster)
- 9:07 - T = 24.54, S = 14.77, weaving through pound nets and crab pot floats
- 9:27 - off Potter Creek, T = 24.92, S = 14.78
- 9:37 - end line 20, begin 21 off Cornfield Pt., T = 24.72, S = 14.81
- collecting radium sample
- 9:48 - T = 24.39, S = 13.89
- 9:58 - YSI salinity out, logged off and back on, Rick starting to log QTC for sediment type, collected water sample mid-channel for J. Sachs, flat calm
- ~10:00 - slowed down a bit to get AGI transducer to pick up bottom again
- 10:20 - end line 21, start 22 T = 24.43 S = 13.31, off Travis Pt., turn upstream along VA shore for ~20 km
- 11:02 - T = 24.96, S = 13.20 off Lynch Pt., Yeocomico River
- 11:17 - T = 24.82, S = 13.08 (from YSI) VC + LE working on 4th radium sample
- 11:23 - Off Sandy Pt., running along outside edge of pound nets, end line 22, start 23
- 11:44 - Passing Bonum Creek, T = 24.88, S = 12.40
- 11:55 - radium sample off Gardner Crk.
- 12:20 - evasive maneuvers for crab pots, end line 23, 12:27 re-align for start of line 24 at Ragged Pt., strong current, T = 25.21, S = 13.00, visible front
- 12:34 - T = 25.06, S = 11.84
- 12:52 - T = 25.03, S = 10.76, off Cabin Point, w. side of Lower Machodoc Creek

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Potomac SGD (Cont.) Day 4

End of VA shore, crossing, W MD shore

JB, JC, LE
VC, DF, CW
RY, JBlix

(33)

8 Sept 2006
hazy sun, 80°

med 'E' wind,

tidal range \approx 2.3 ft.

high at about

15:30

13:30 - $T = 24.79$, $S = 9.70$,
electrodes #7 + #8 acting
up, possibly due to lower
salinity, radium sample

13:40 - Approaching Nomini Cliffs
 $T = 24.74$, $S = 9.39$,
electrodes behaving again
(off Mt. Airy), cliffs
are about 20-30 m high

14:18 - End of line 24 at
Horsehead Cliffs, start
line 25 crossing to MD
 $T = 24.78$, $S = 8.86$, getting
choppy but resistivity
data are OK

crossing
Dahlgren
Firing
Range
area

14:40 - Stopped mid-channel for
radium sample + VSI
profile, resumed line as
L25.F2 after ~ 0.5 km offset
 $T = 24.99$, $S = 9.59$ to W

15:00 - crossing kettle bottom
sheals area, buried and
proud oyster bioherms, round
- Approaching St. Catherine Isl.
- for turn downstream
radium sample

15:11 - end of L25.F2,
start line 26
E along MD shore
(last line)

15:20 - $T = 24.96$, $S = 11.69$

$\sim 15:35$ - end line and survey,
streamer snagged crab pot,
pulled all survey gear,
steamed to original
end of line (stopped about
halfway down line) and
took radium sample,
four more mid-channel
samples scheduled
en route to Chesapeake
main stem and Solomons

16:47 - transit to 2nd to last
sample point off Ragged Pt.,
still running radon mapper

16:54 - sampling + profile,
 $T = 24.83$, $S = 12.23$

17:50 - last data, profile and sample
St. Mary's River, $T = 25.47$,
 $S = 13.47$

18:10 - Begin final transit.

19:45 - Back @ Solomons, Calvert Marina

20:30 - Finish demobe, leave for hotel

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Potomac SGD
(Cont.) Days 5

JB+JC - working
VC, LE, DF, CW driving
to BWI airport

(34)

9 Sept 2006

0600 ~ Leave hotel for

Dennis Pt. Marina

0645 - Arr Dennis Pt. after
stop for bkfst., sun
coming up

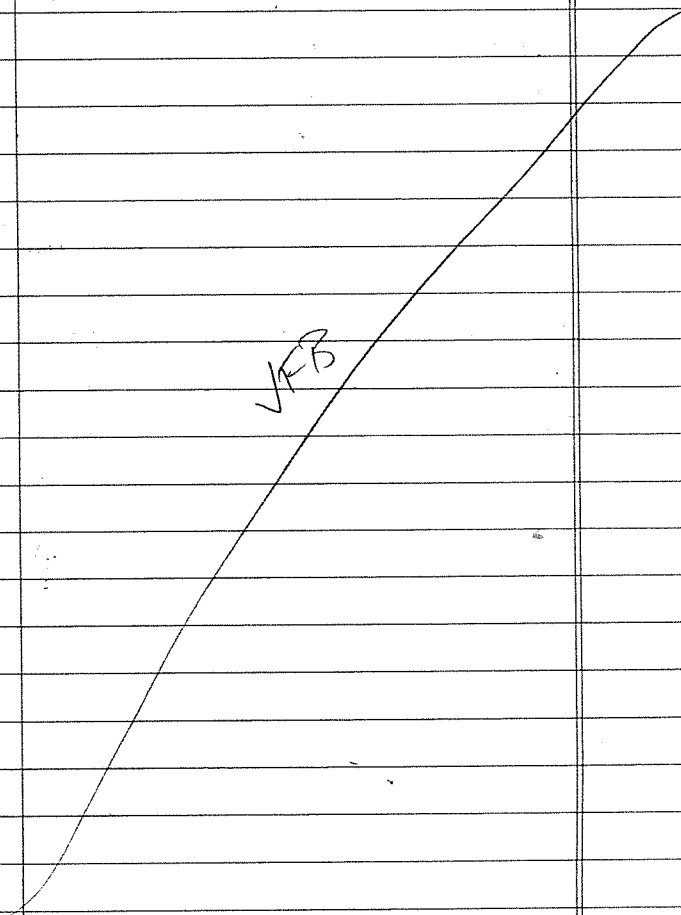
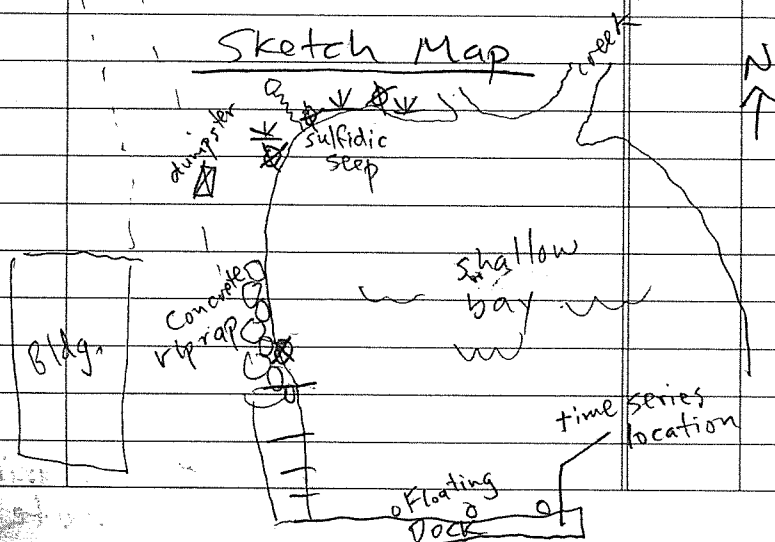
- collect groundwater
samples for radon (3)
and radium (1)

along shore of marina
in bay where Rad 7
time series was set
up (see map), and
break down time
series eqpt.

930 - JB leave marina, JC to airport

1030 - stop for gas \$2.49/gall → \$75

~2100 - arrive home in Edmonoth



JD249 9/6/06 wed

@ Dock 0745

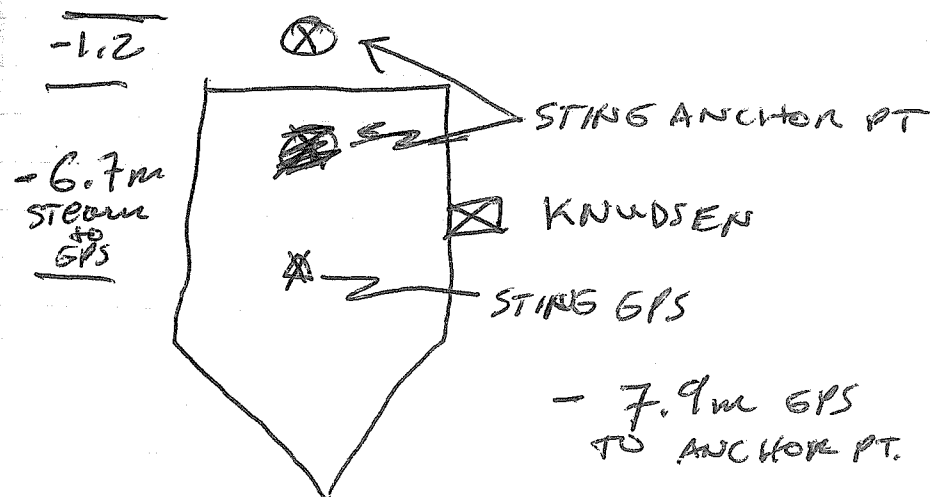
LJ Dock @ 0800

Still NO GPS ON KNUDSEN

Scaling factor = 2.0

Distance from anchor pt to
1st electrode = -15.0m

Using 'AmceyDDSm'
command file.



$x = -7621.6 \text{ m}$
 $y = 3817.1 \text{ m}$

- Batteries
- TRX mount
- Rx string cable

Rest

	<u>SOL</u>	<u>EOL</u>	(Out of Bay)
L1F1	1341	1552	N → S
L2F1	1554	1705	STB TURN + head N → S
L3F1	1707	1815	TURN INTO PR
L4F1	1847	2013	* **

* Files L1, L2 + L3 Depth was
 intermittent / not working correctly
 + $x = -7621.6 \text{ m}$ $y = 3817.0 \text{ m}$

** Files L4 and Beyond repositioned
 depth trans now recording correctly.
 Did $x=0$ + $y=0$.

L5F1 2015 2125 $x+y$ values Δ 's
 Depth intermittent, due to Knudsen
 Stopped Sounder, - turned ON again.

L6F1 2144 2228

AC/charge - ON Batt = OFF
AC - ON
VOLT = 9.2 ON GPS
8.7 ON Batt out box

Jumped from 10.6 \rightarrow 8.0V's
when charge light is not
blinking. When light ~~blinks~~
~~it goes solid & drops~~
blinks V is @ 10.6V.

When charge light goes OFF
then V = 11.5

Cycles power when light goes
OFF

AC/charge = OFF Batt = ON
AC = ON
V = 10.2 \rightarrow drops to 9.6
Both lights ON
Plugs = 10.5V

JD 250 9/7/06 THURSDAY

@ DOCK 0730

LV DOCK 0845

L 7F1 $\frac{50L}{1324}$

$\frac{EOC}{1514}$ $\frac{I^0}{24.5}$

Δ 'd AGI TRNK TO STBD SIDE
MIDSHIPS. - KNUDSEN CLEANER.
set X=0 + Y=0. d'offsets = ϕ

Temp working

INOVL error?

#8 - neg + INOVL occasionally.

@ 1412 GPS cycled ON/OFF
due to power battery.

@ 1418 GPS cycled power

@ 1426 GPS cycled power.

@ 1512 GPS cycled power

	<u>SSL</u>	<u>ECL</u>	<u>T^o</u>
L8F1	1515	1550	24.5

cycled GPS power @ 1520
 " " " 1531

L9F1	1556	1618	24.6
------	------	------	------

cycled GPS pwr @ 1558

L10F1	1619	
cycled pwr @	1529	
" "	1631	
	1648	

Power off @ 1701
 ON @ 1703

DATA GAP
 Fixed GPS
 L10F2 @ 1711 1728 ↓

L11F1 @ 1729 1748 24.6

L12F1 1747 1829

	<u>SOL</u>	<u>EOL</u>	<u>\bar{x}</u>
L13F1	1830	1842	25.3
L13F1	1844	1847	25.5
L14F1	1848	1820	25.5
L15F1	1921	1949	25.4
L16F1	1950	2024	25.8
L17F1	2025	2057	25.5
L18F1	2058	2140	26.2
L19F1	2041	2216	25.4

L.

SD 251 9/8/06 FRIDAY

@ DOCK 0800 Fueled

25 DOCK 0815

~~200F1~~

	SOL	EOL	T° Speed @ 6.7K
L20F1	1247	1337	25.1
L21F1	1339	1421	slowed 1/2 KN.
L22F1	1422	1525	6.2 KN 24.6
L23F1	1526	1621	25.4
L24F1	1626	1820	25.4
L25F1	1822	1846	24.8
L25F2	1853	1912	25.4
L26F1	1913		25.3