

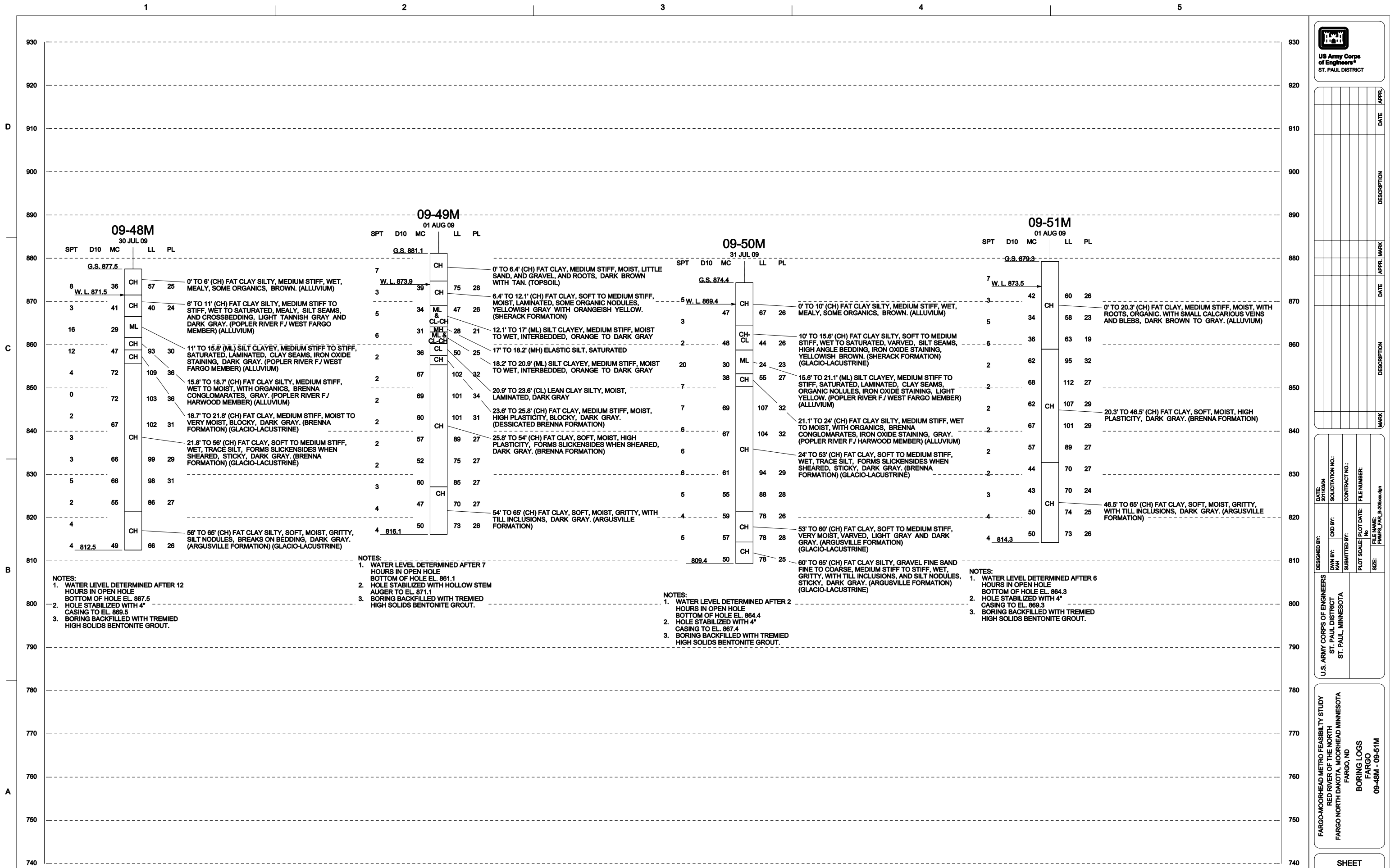
# Attachment I-3: Boring Log Plates and CPT Sounding Reports











NOTES:  
 1. WATER LEVEL DETERMINED AFTER 12 HOURS IN OPEN HOLE  
 BOTTOM OF HOLE EL. 867.5  
 2. HOLE STABILIZED WITH 4" CASING TO EL. 869.5  
 3. BORING BACKFILLED WITH TREMIED HIGH SOLIDS BENTONITE GROUT.

NOTES:  
 1. WATER LEVEL DETERMINED AFTER 7 HOURS IN OPEN HOLE  
 BOTTOM OF HOLE EL. 861.1  
 2. HOLE STABILIZED WITH HOLLOW STEM AUGER TO EL. 871.1  
 3. BORING BACKFILLED WITH TREMIED HIGH SOLIDS BENTONITE GROUT.

NOTES:  
 1. WATER LEVEL DETERMINED AFTER 2 HOURS IN OPEN HOLE  
 BOTTOM OF HOLE EL. 864.4  
 2. HOLE STABILIZED WITH 4" CASING TO EL. 867.4  
 3. BORING BACKFILLED WITH TREMIED HIGH SOLIDS BENTONITE GROUT.

NOTES:  
 1. WATER LEVEL DETERMINED AFTER 6 HOURS IN OPEN HOLE  
 BOTTOM OF HOLE EL. 864.3  
 2. HOLE STABILIZED WITH 4" CASING TO EL. 869.3  
 3. BORING BACKFILLED WITH TREMIED HIGH SOLIDS BENTONITE GROUT.

**US Army Corps of Engineers**  
 ST. PAUL DISTRICT

DATE	30 JUL 09	SOLICITATION NO.	
DESIGNED BY:	PKH	CONTRACT NO.:	
DRN BY:	PKH	FILE NUMBER:	
SUBMITTED BY:	PKH	FILE NAME:	PMHRS_FAL_09-2009c.dgn
DESIGNED BY:	PKH	FILE NAME:	PMHRS_FAL_09-2009c.dgn

U.S. ARMY CORPS OF ENGINEERS  
 ST. PAUL DISTRICT  
 ST. PAUL, MINNESOTA

FARGO-MOORHEAD METRO FEASIBILITY STUDY  
 RED RIVER OF THE NORTH  
 FARGO, ND

BORING LOGS  
 FARGO  
 09-48M - 09-51M

SHEET IDENTIFICATION  
**B-205**















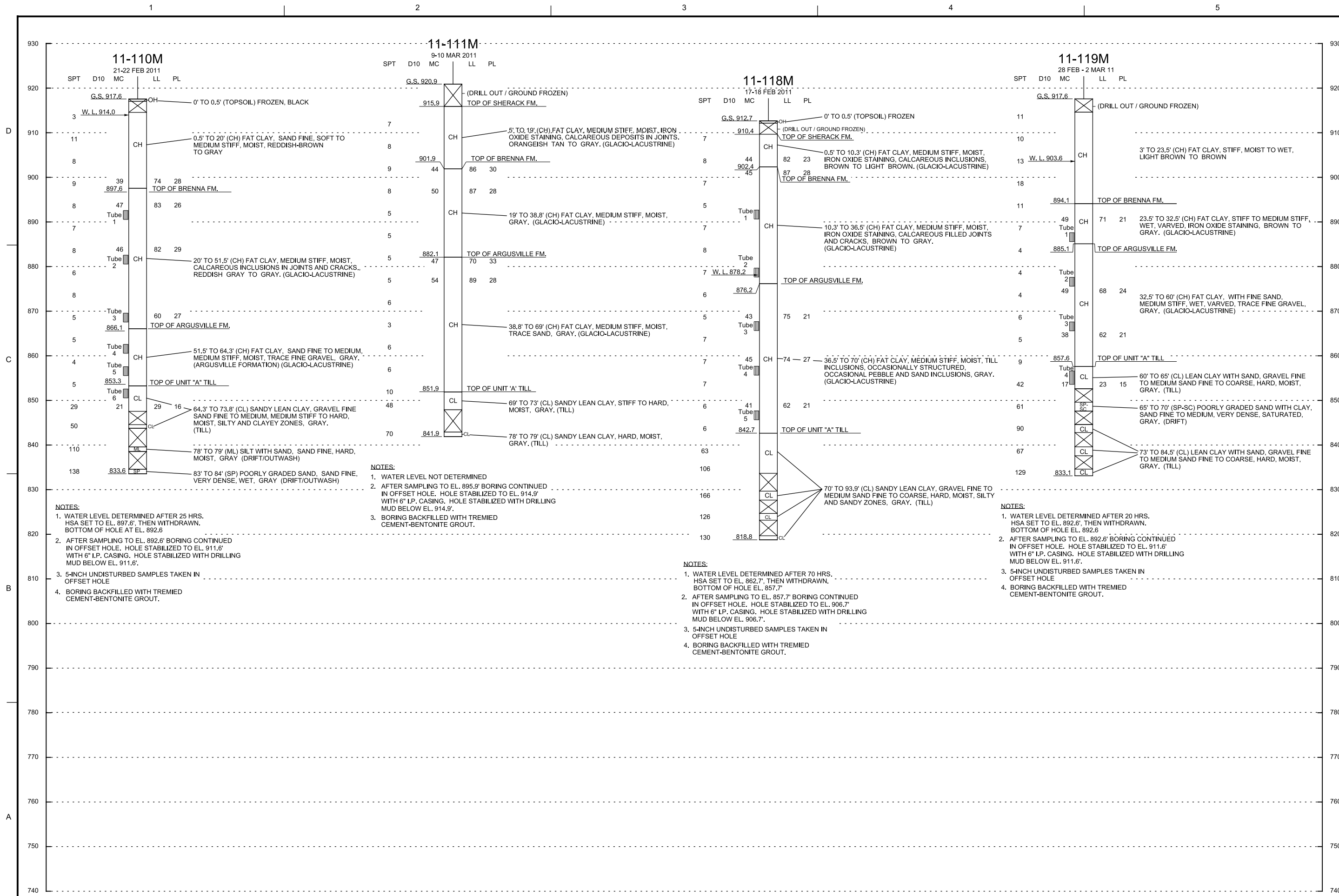












US Army Corps of Engineers  
ST. PAUL DISTRICT

DATE	APPR
DATE	DESCRIPTION
DATE	APPR
DATE	DESCRIPTION

DESIGNED BY: DATE: 02/17/13	CHKD BY: KMH	SUBMITTED BY: KMH	FILE NAME: F:\MMS_FAL_12-10xx.dgn
SOLICITATION NO.:	CONTRACT NO.:	FILE NUMBER:	

ST. PAUL DISTRICT  
ST. PAUL, MINNESOTA

FARGO-MOORHEAD METRO FEASIBILITY STUDY  
RED RIVER OF THE NORTH  
FARGO NORTH DAKOTA, MOORHEAD MINNESOTA

BORING LOGS  
FARGO  
11-110M, 11-111M, 11-118M & 11-119M

SHEET IDENTIFICATION  
**B-216**





Fargo Moorehead

# Cone Penetration Test

## 09-F-23C

Date: Jun. 24, 2009

Northing: 1995989.995

Elevation: 897.0

Operator: MARKOV

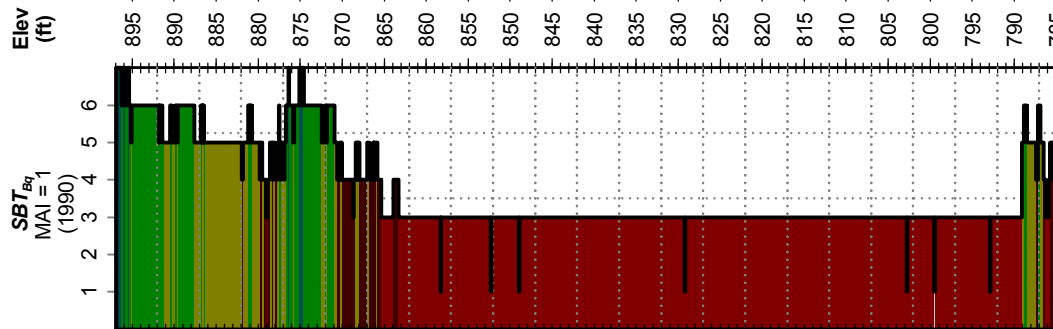
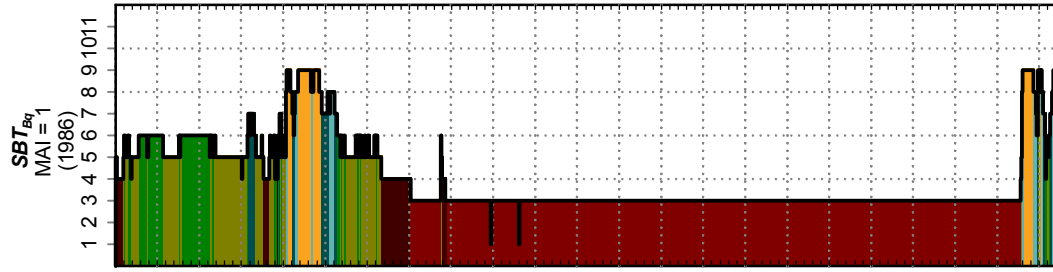
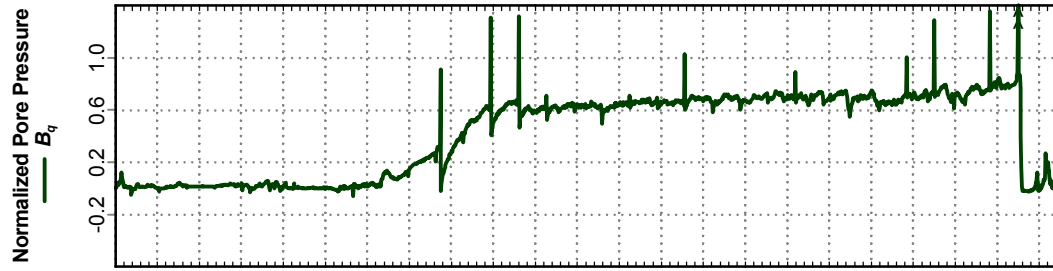
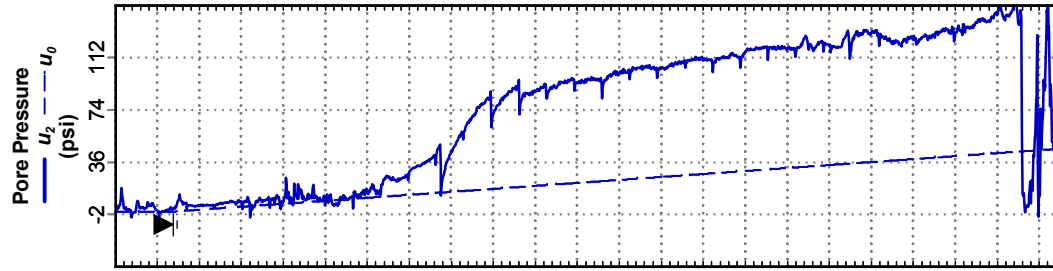
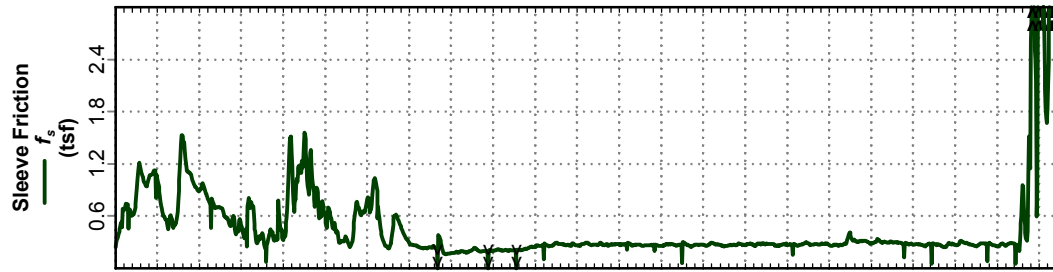
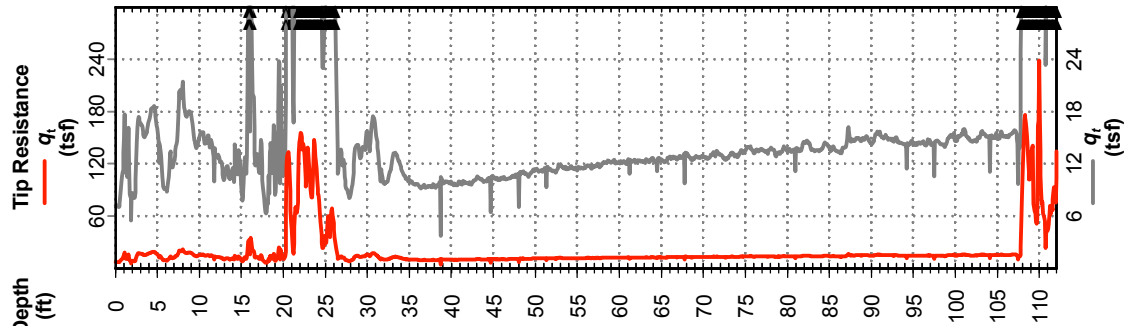
Eastings: 1040908.073

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 112.1 ft





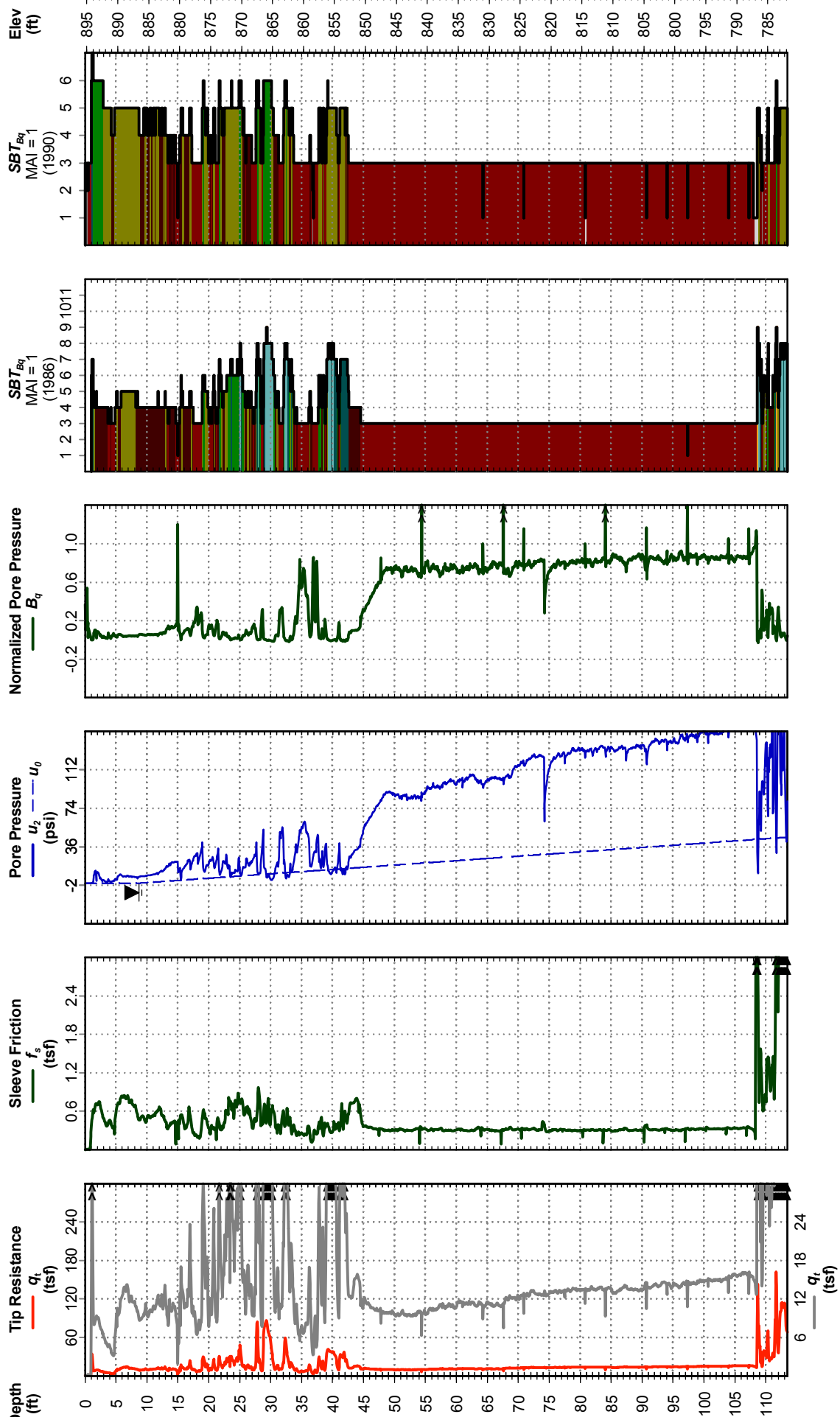
Fargo Moorehead

# Cone Penetration Test 09-F-24C

Date: Jun. 22, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 1989365.114  
Easting: 1045881.8  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 895.3  
Water Depth: 8.69  
Total Depth: 113.5 ft





Fargo Moorehead

# Cone Penetration Test 09-F13-25C

Date: Jul. 19, 2009

Northing: 1991535.54

Elevation: 893.4

Operator: MARKOV

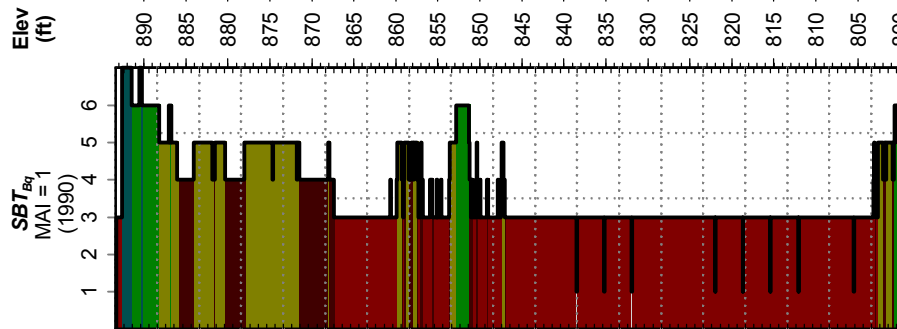
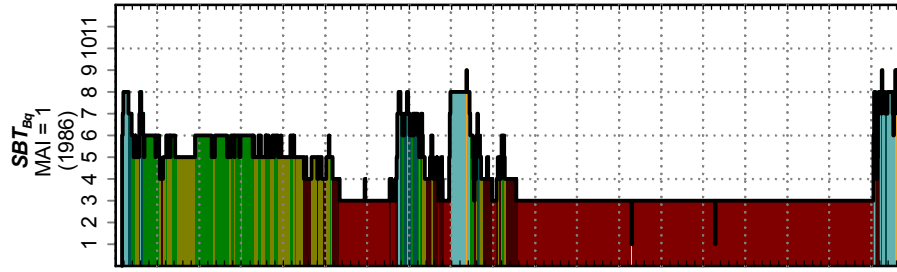
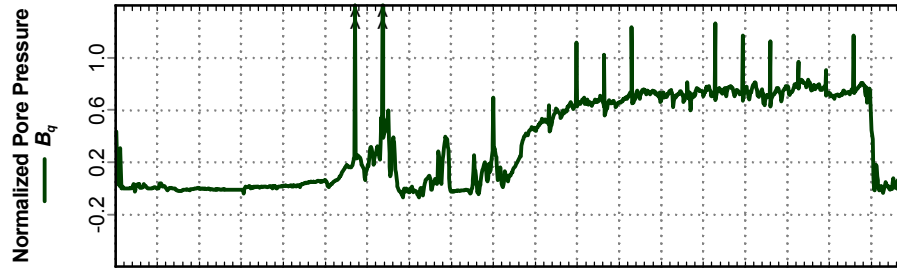
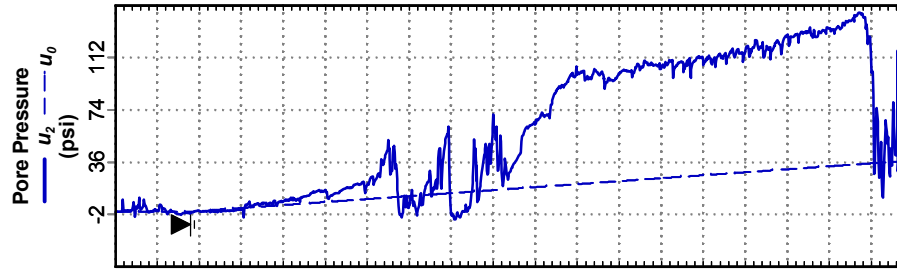
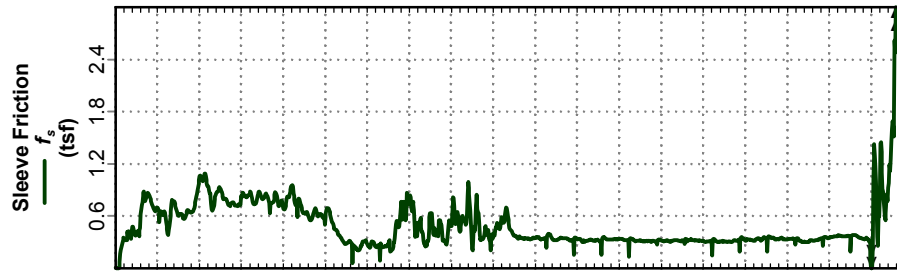
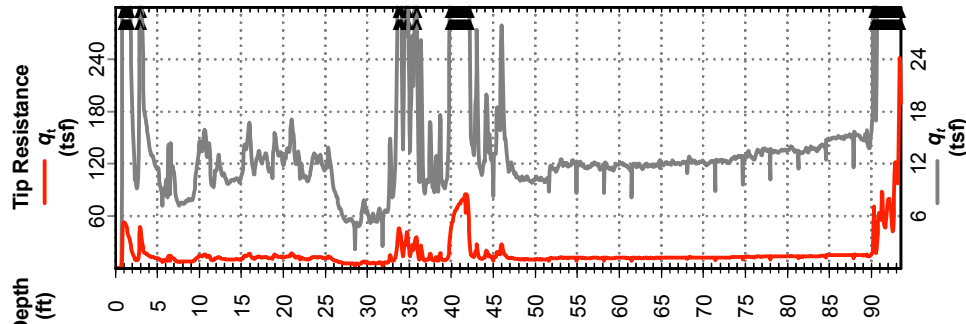
Eastng: 1023016.653

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 93.5 ft





Fargo Moorehead

# Cone Penetration Test 09-F15-26C

Date: Jul. 22, 2009

Northing: 1991012.693

Elevation: 903.5

Operator: MARKOV

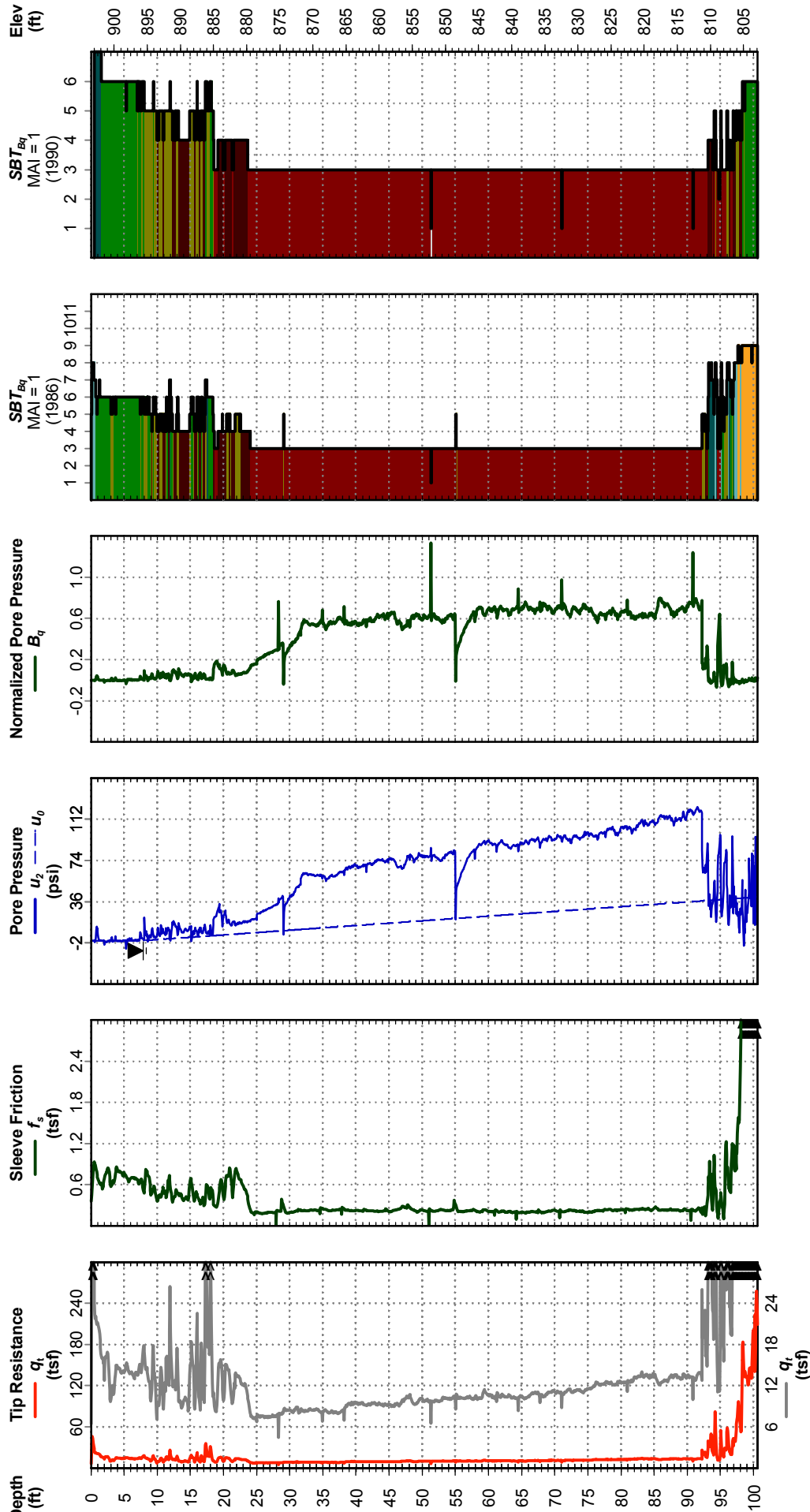
Eastng: 1015199.01

Water Depth: 7.87

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 100.6 ft





Fargo Moorehead

# Cone Penetration Test

## 09-F-27C

Date: Jul. 21, 2009

Northing: 1988783.267

Elevation: 903.0

Operator: MARKOV

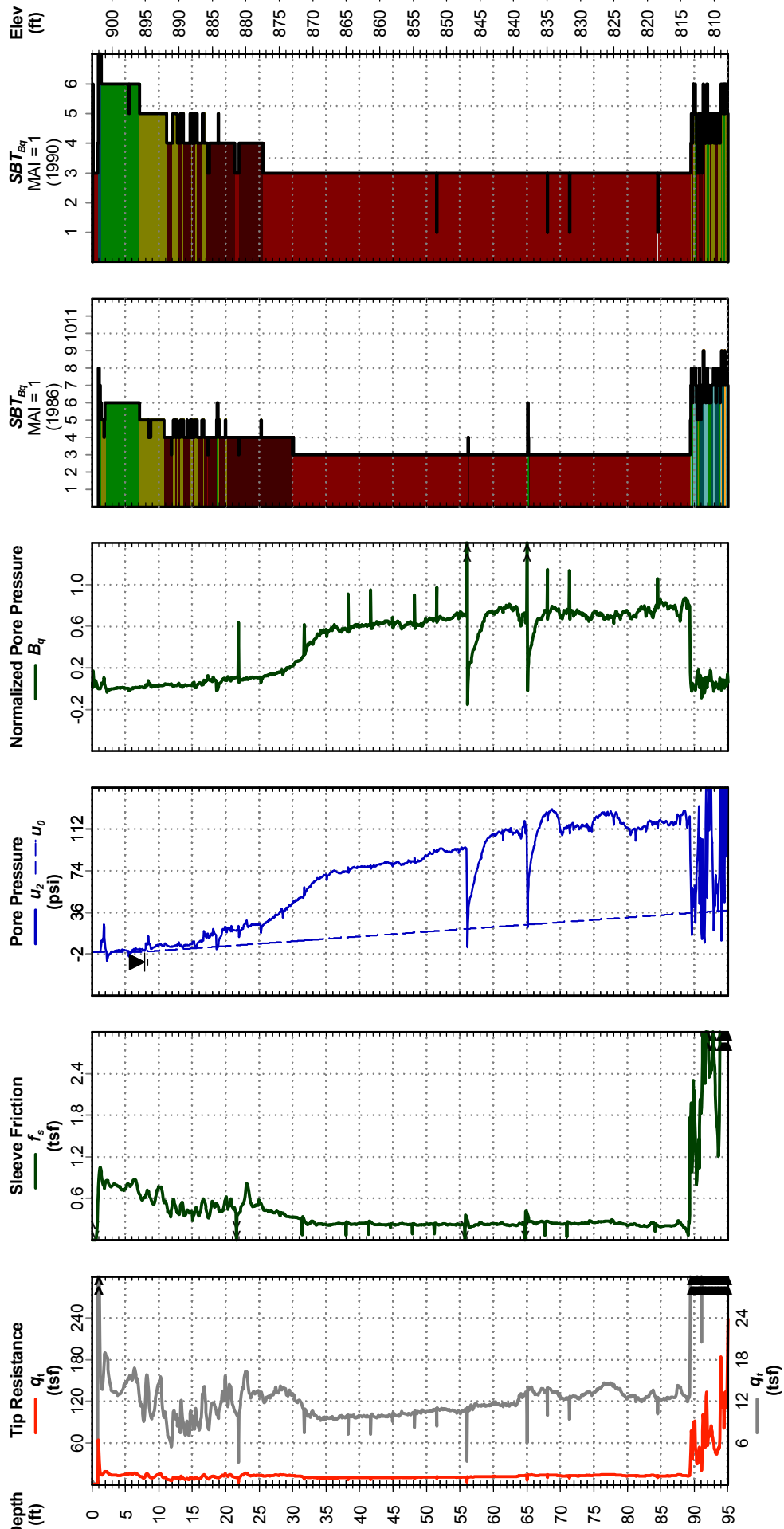
Eastings: 1005319.731

Water Depth: 7.87

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 95.0 ft





Fargo Moorehead

# Cone Penetration Test

## 09-F-28C

Date: Jul. 20, 2009

Northing: 1989113.168

Elevation: 906.4

Operator: MARKOV

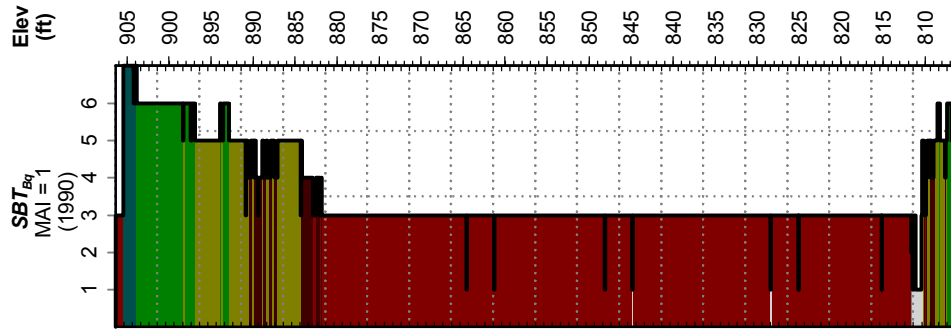
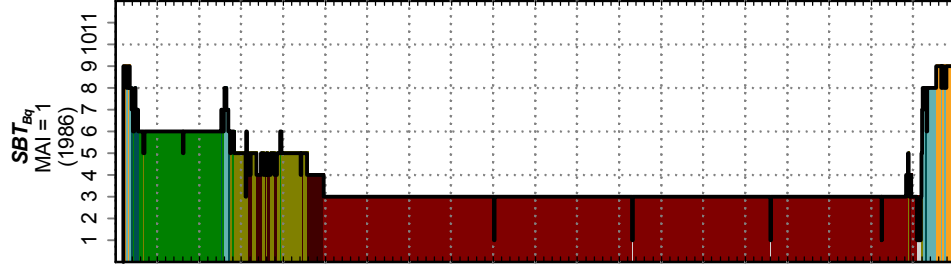
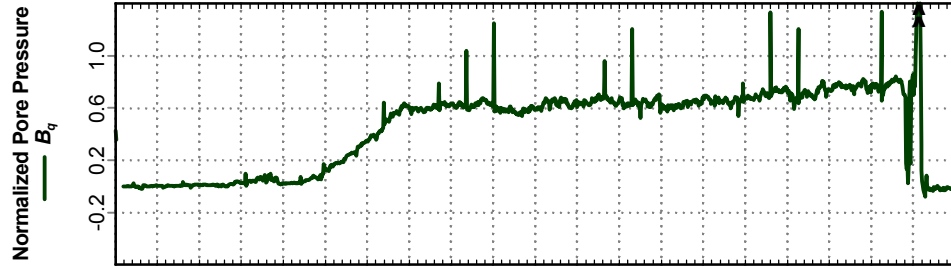
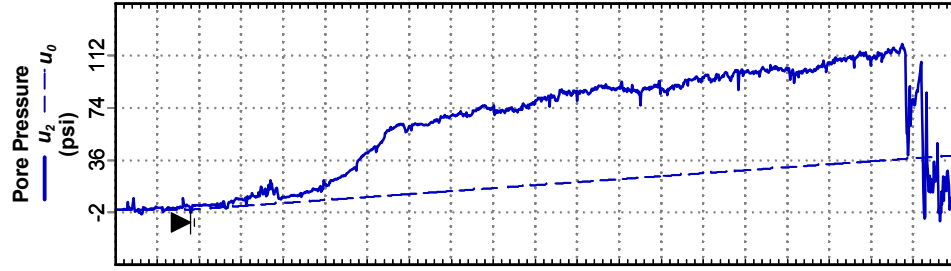
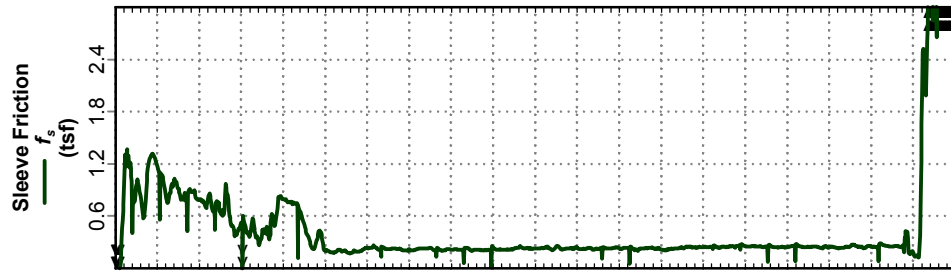
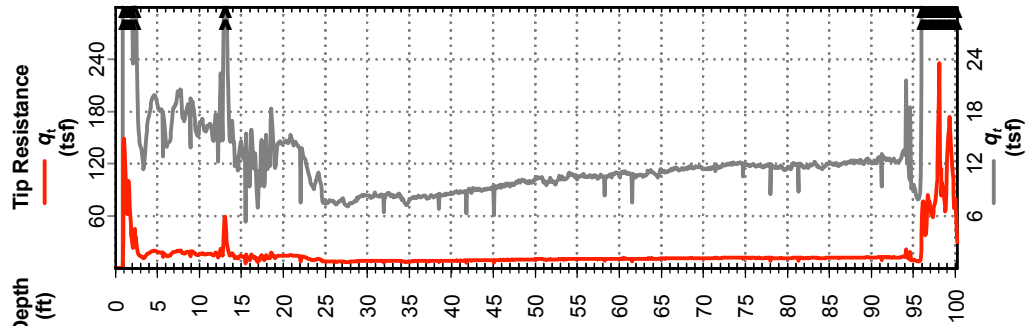
Eastng: 1009436.114

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 100.2 ft







Fargo Moorehead

# Cone Penetration Test

## 09-F-29C

Date: Jul. 20, 2009

Northing: 1987719.866

Elevation: 903.3

Operator: MARKOV

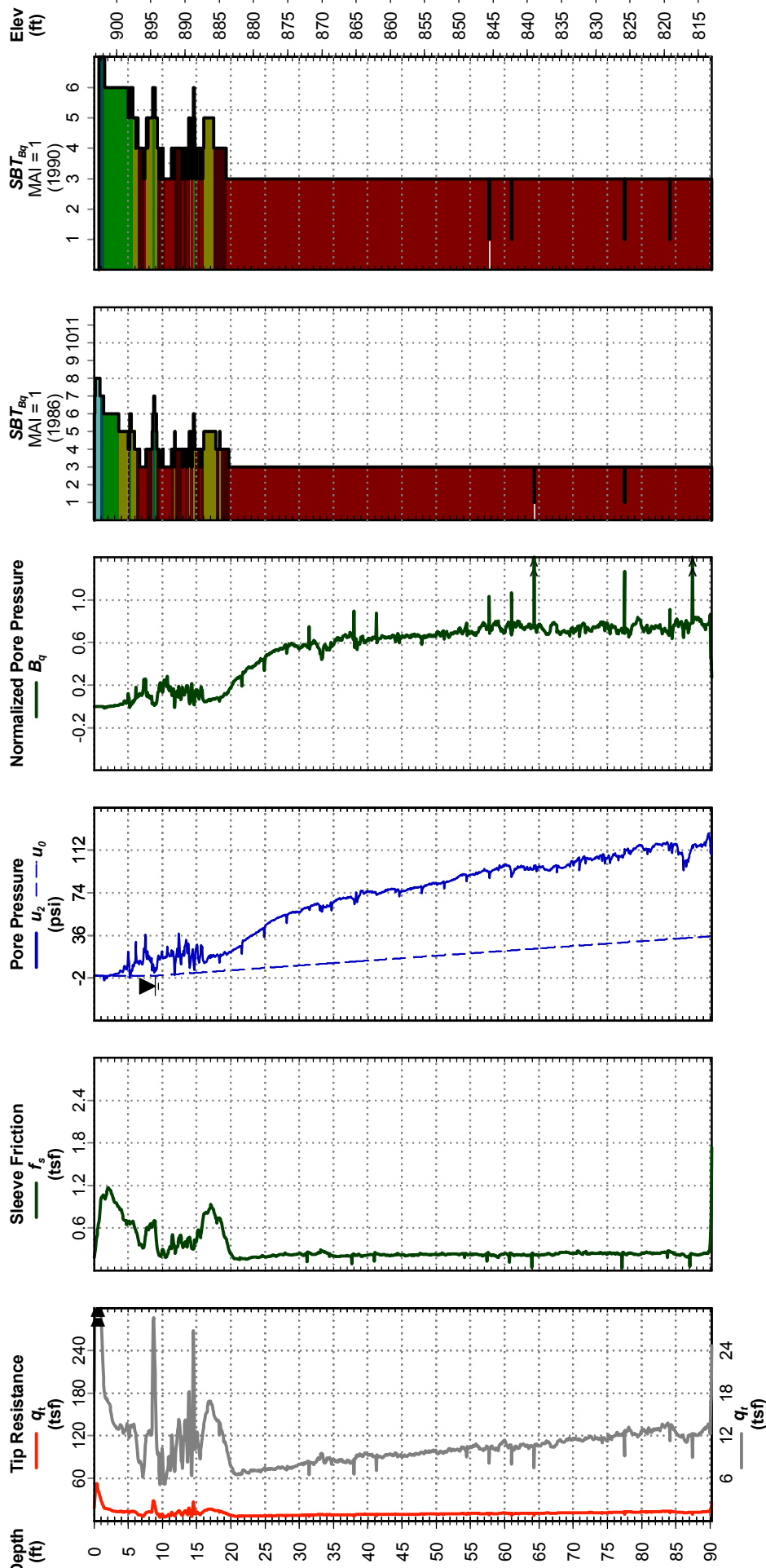
Eastings: 1007375.407

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 90.2 ft





Fargo Moorehead

# Cone Penetration Test

## 09-F-30C

Date: Jul. 21, 2009

Northing: 1990030.081

Elevation: 905.7

Operator: MARKOV

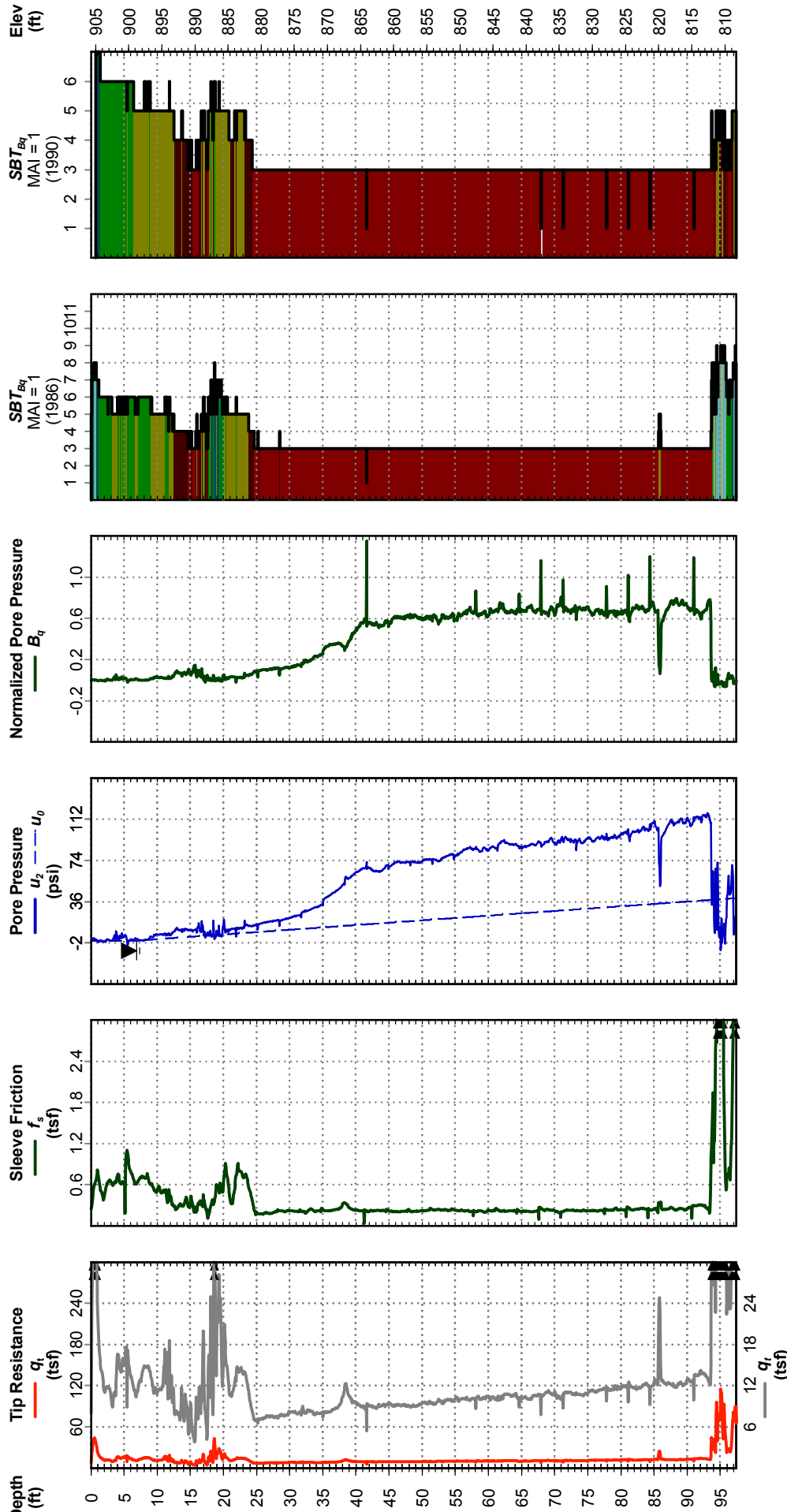
Eastng: 1013905.894

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 97.4 ft





Fargo Moorehead

# Cone Penetration Test 09-F-31C

Date: Jul. 22, 2009

Northing: 1986951.531

Elevation: 902.3

Operator: MARKOV

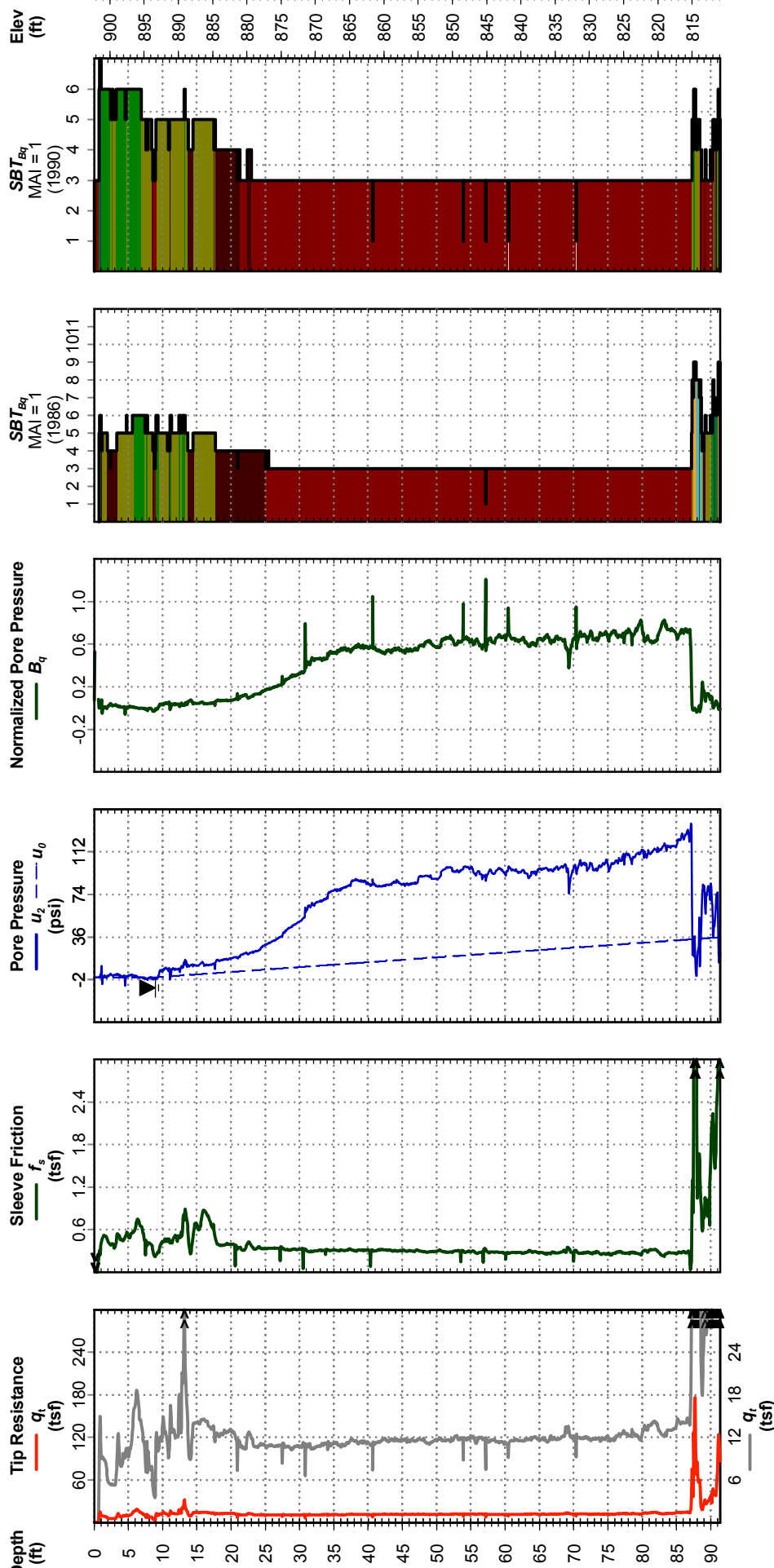
Eastings: 1003342.478

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 91.4 ft





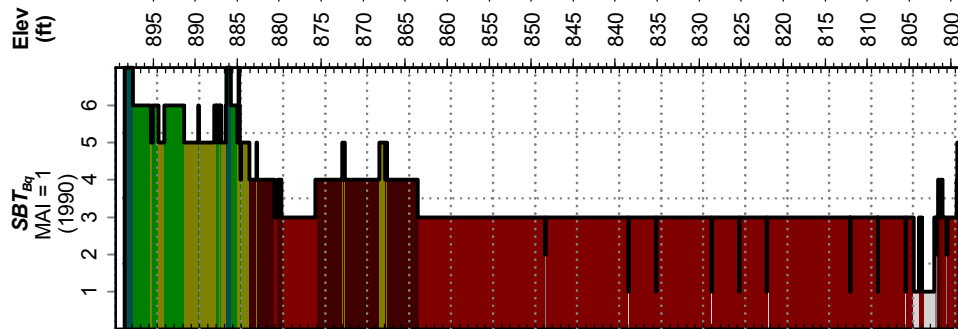
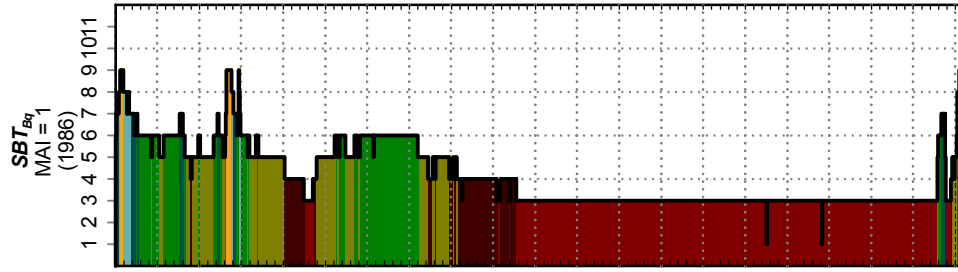
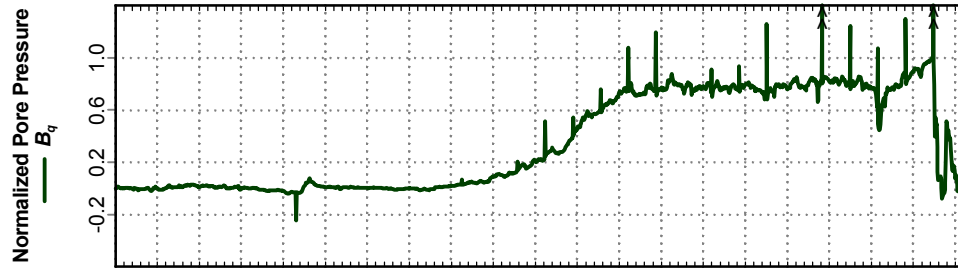
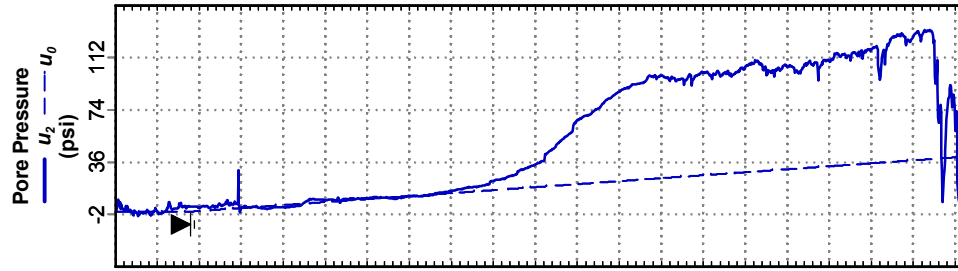
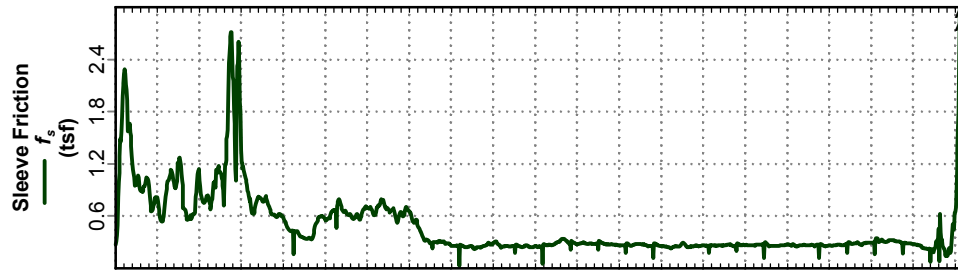
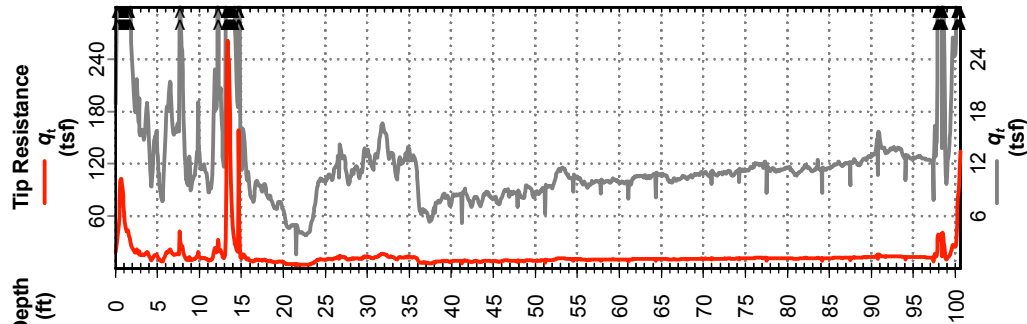
Fargo Moorehead

# Cone Penetration Test 09-F-32C

Date: Jul. 23, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 1991879.321  
Easting: 1021246.849  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 899.5  
Water Depth: 8.99  
Total Depth: 100.6 ft





Fargo Moorehead

# Cone Penetration Test

## 09-F-33C

Date: Jul. 23, 2009

Northing: 1992067.098

Elevation: 901.6

Operator: MARKOV

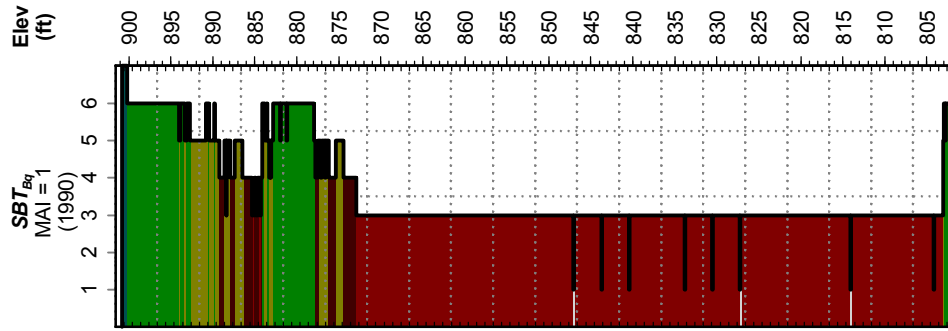
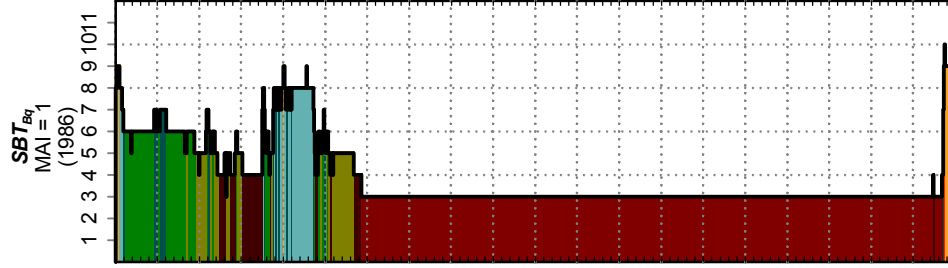
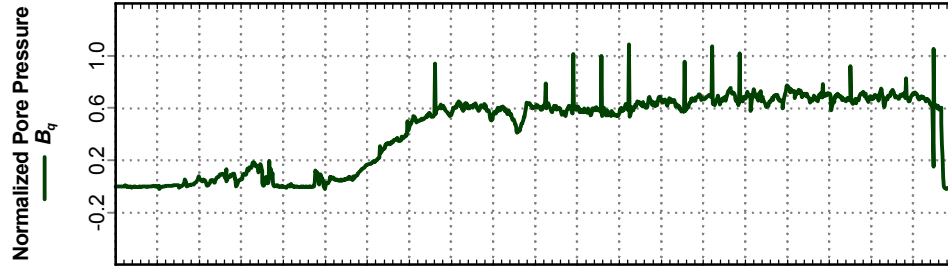
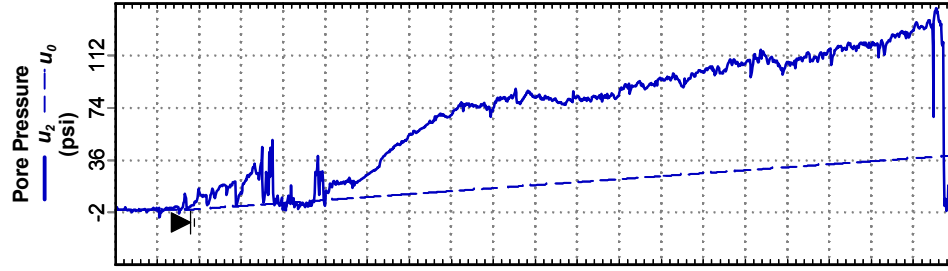
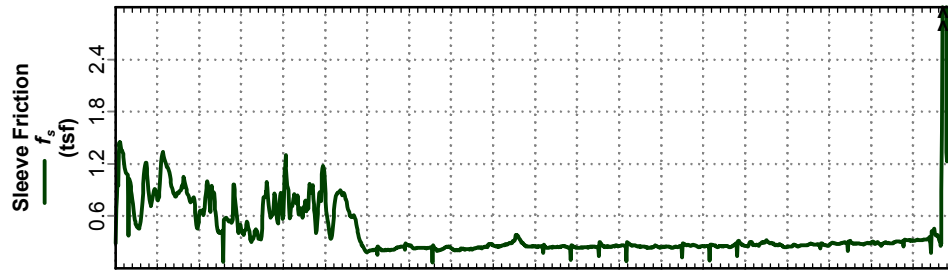
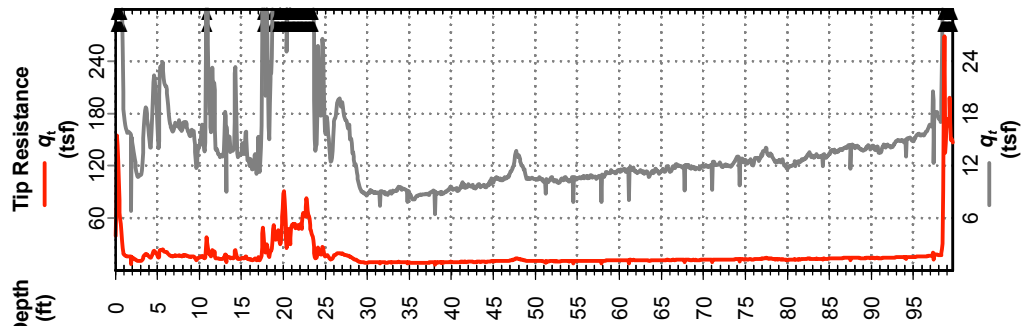
Eastng: 1024225.724

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 99.7 ft





Fargo Moorehead

# Cone Penetration Test 09-F-34C

Date: Jul. 23, 2009

Northing: 1994149.233

Elevation: 897.4

Operator: MARKOV

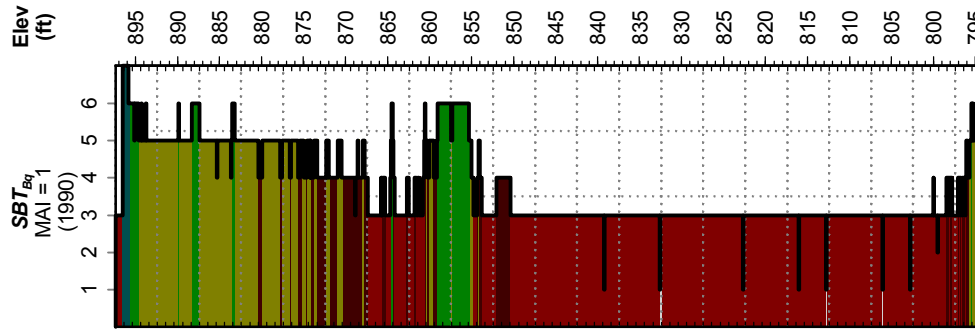
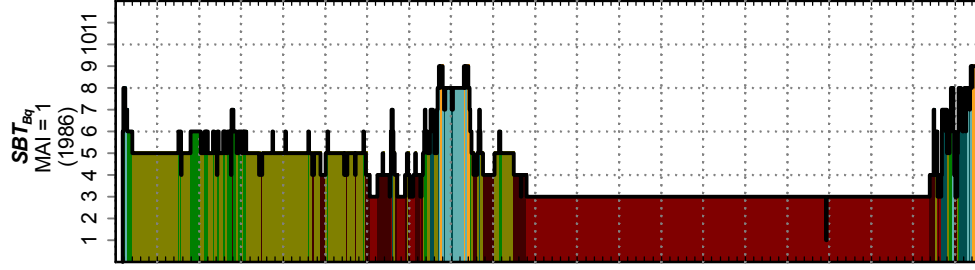
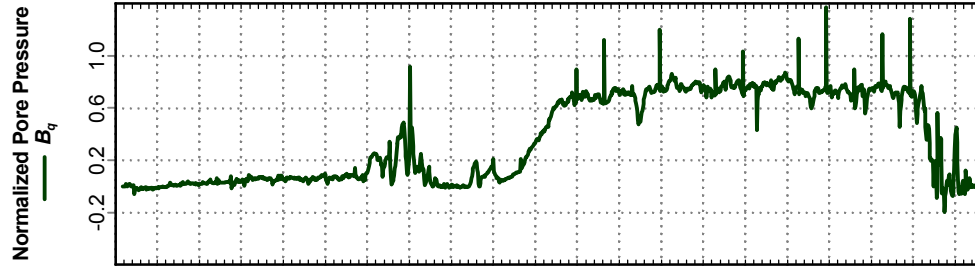
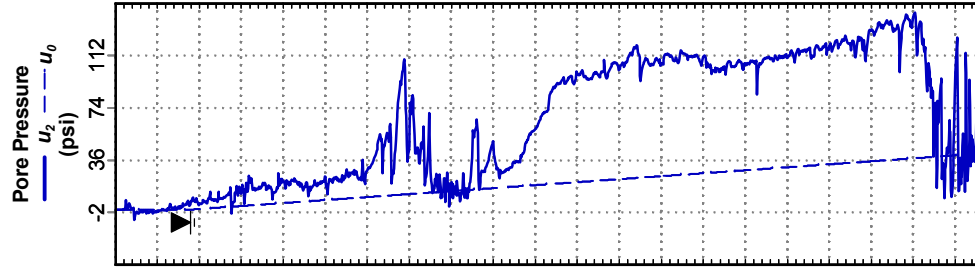
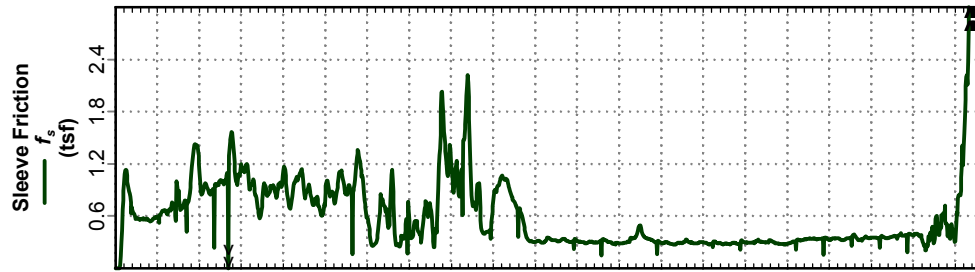
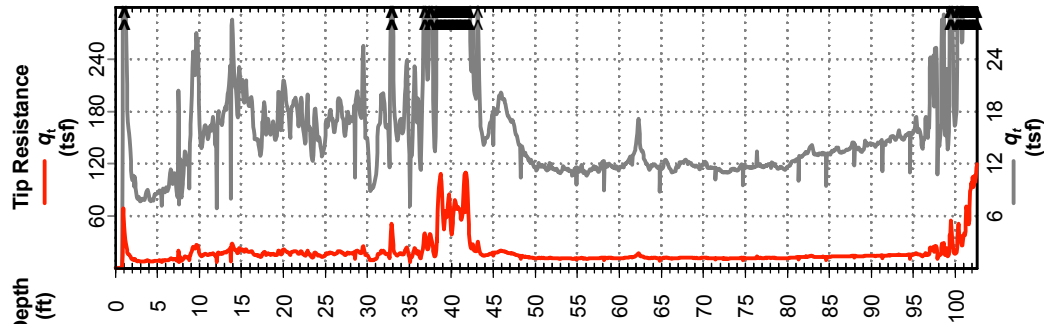
Eastings: 1024476.761

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 102.6 ft





Fargo Moorehead

# Cone Penetration Test

## 09-F-36C

Date: Jul. 24, 2009

Northing: 1992504.008

Elevation: 896.5

Operator: MARKOV

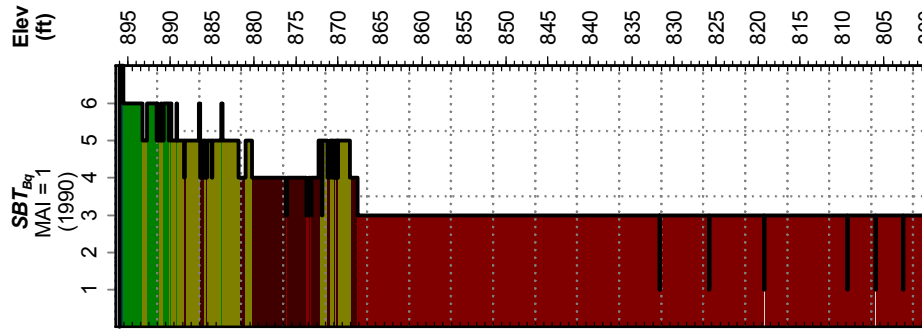
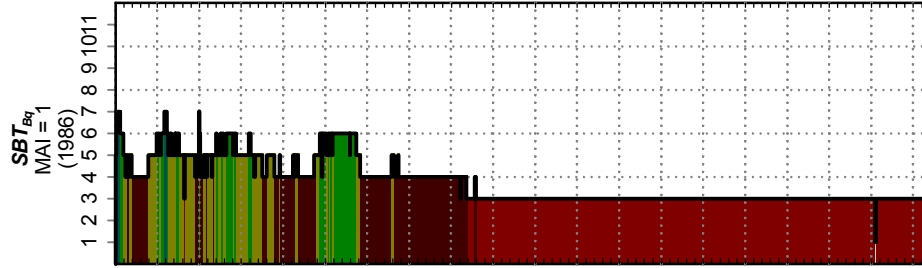
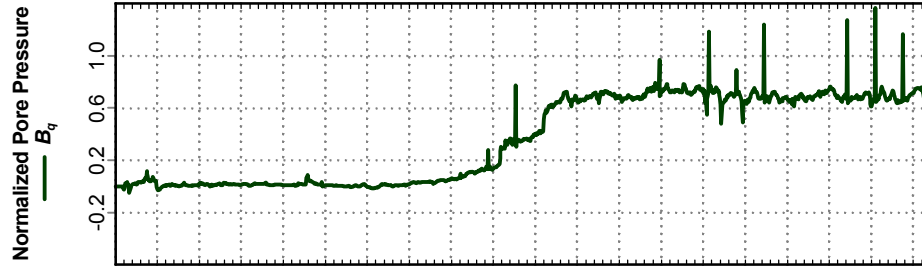
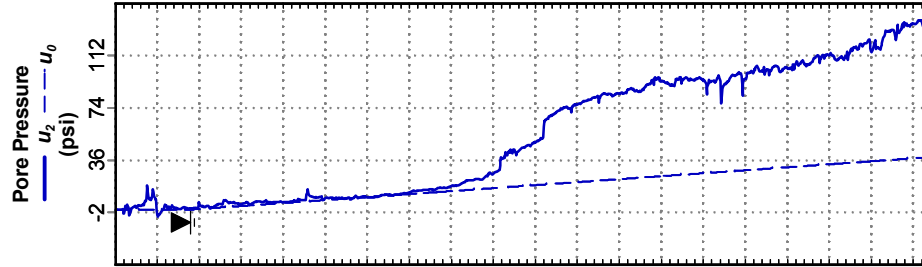
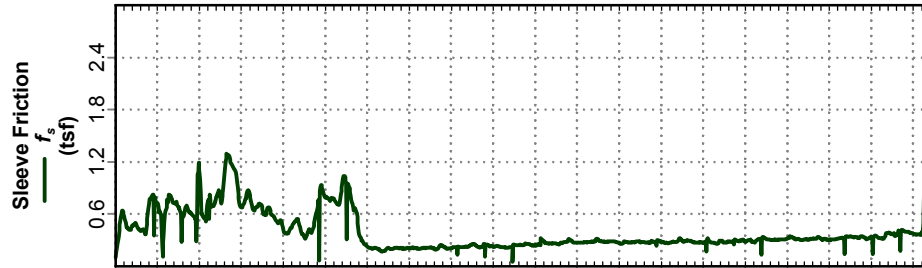
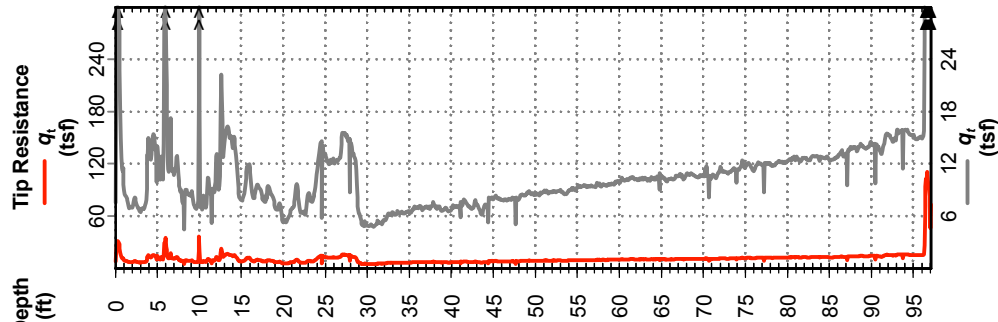
Eastings: 1026233.312

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 97.1 ft





Fargo Moorehead

# Cone Penetration Test 09-F-37C

Date: Jul. 24, 2009

Operator: MARKOV

Drilling Agency: USACE, Savannah District

Northing: 1993630.141

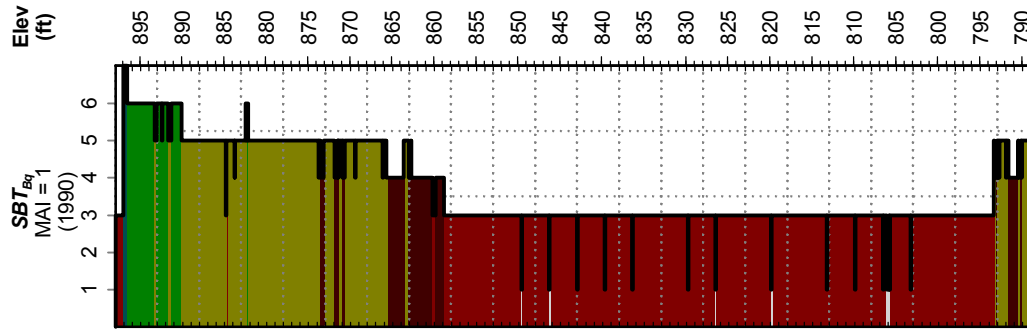
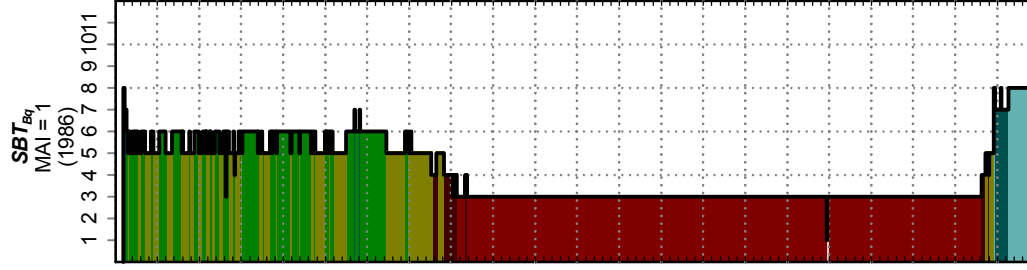
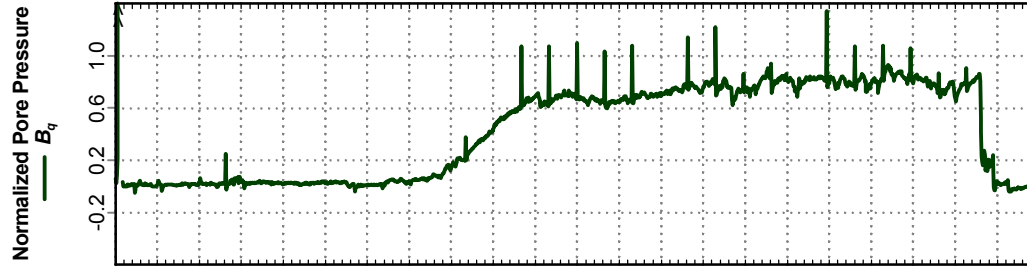
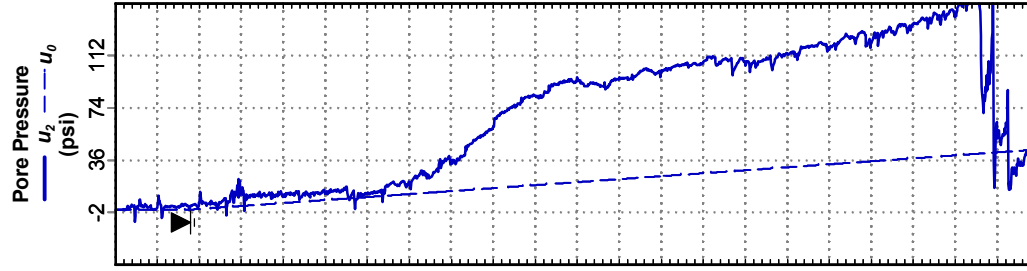
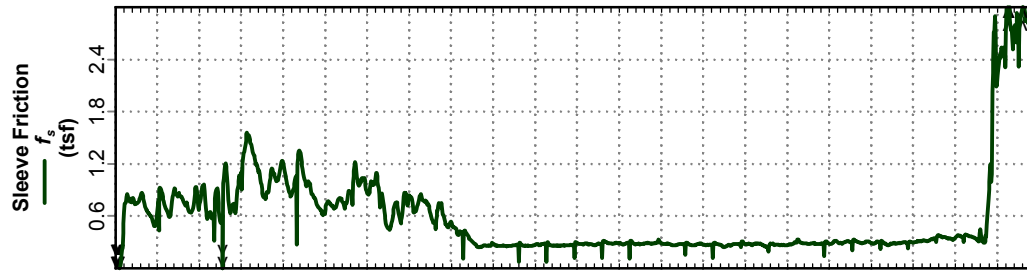
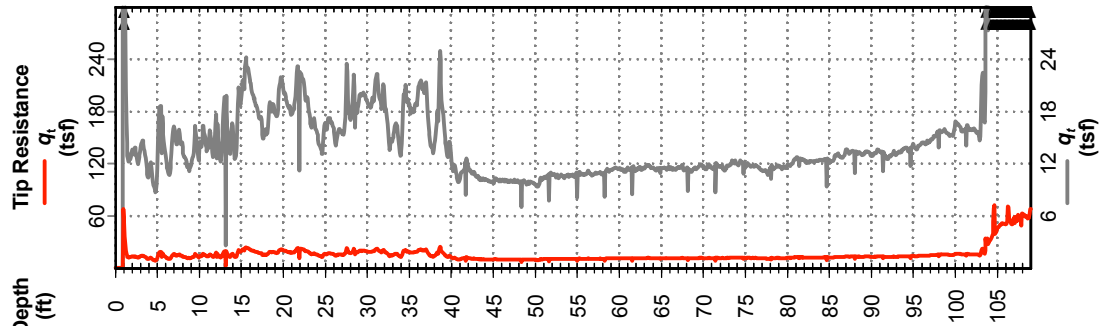
Easting: 1027970.793

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 897.9

Water Depth: 8.99

Total Depth: 109.0 ft







Fargo Moorehead

# Cone Penetration Test 09-F-38C

Date: Jul. 24, 2009

Northing: 1995881.285

Elevation: 895.3

Operator: MARKOV

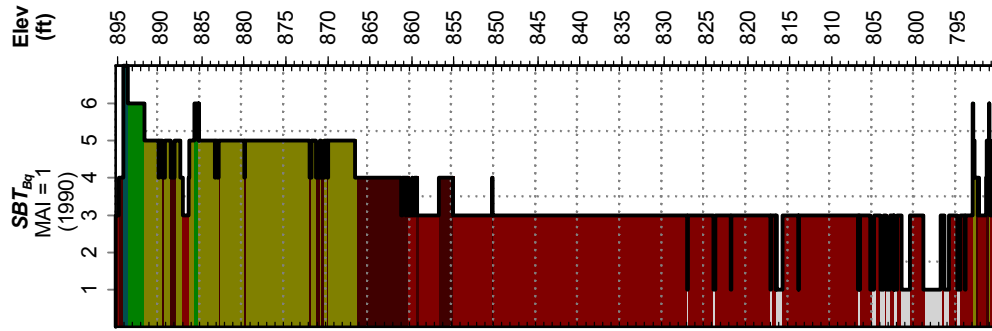
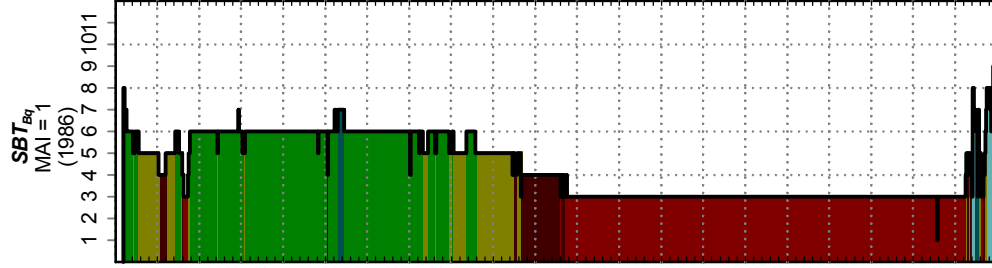
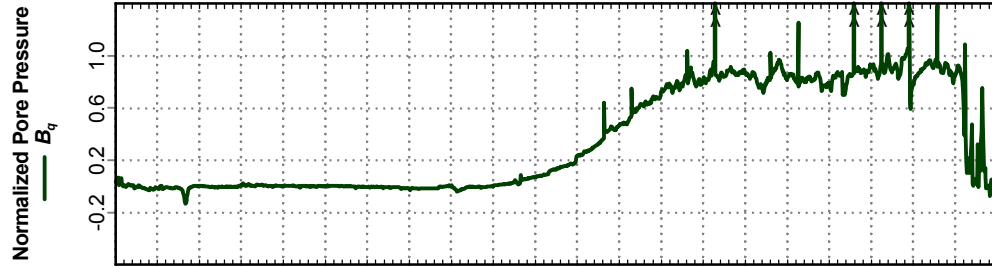
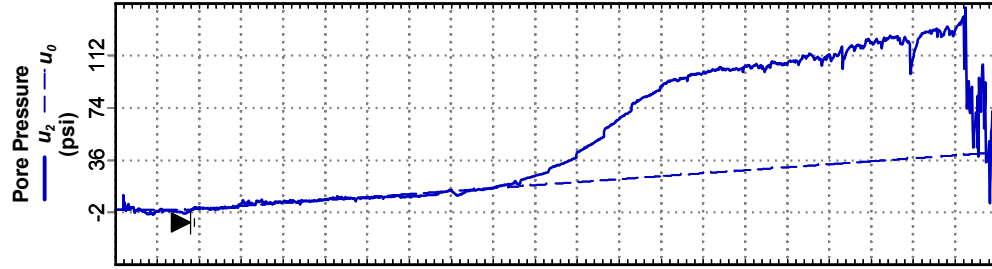
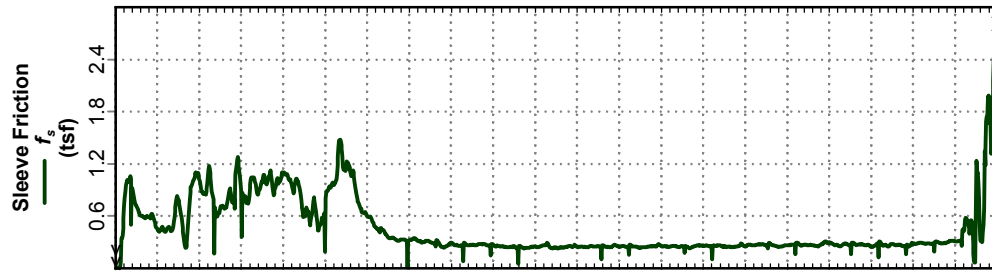
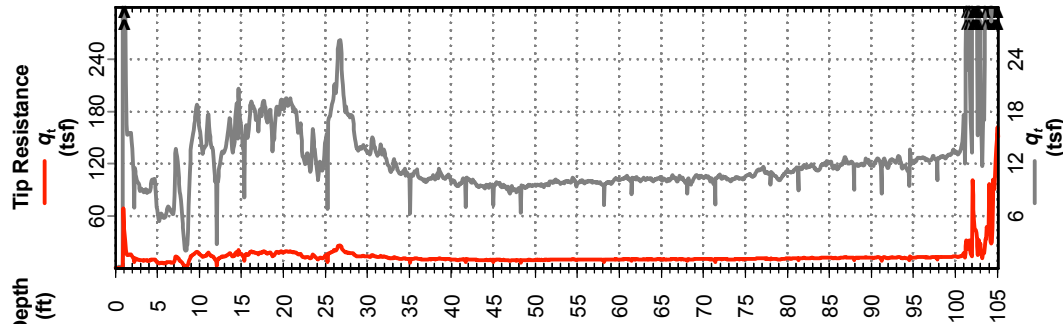
Eastings: 1034025.821

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 105.1 ft



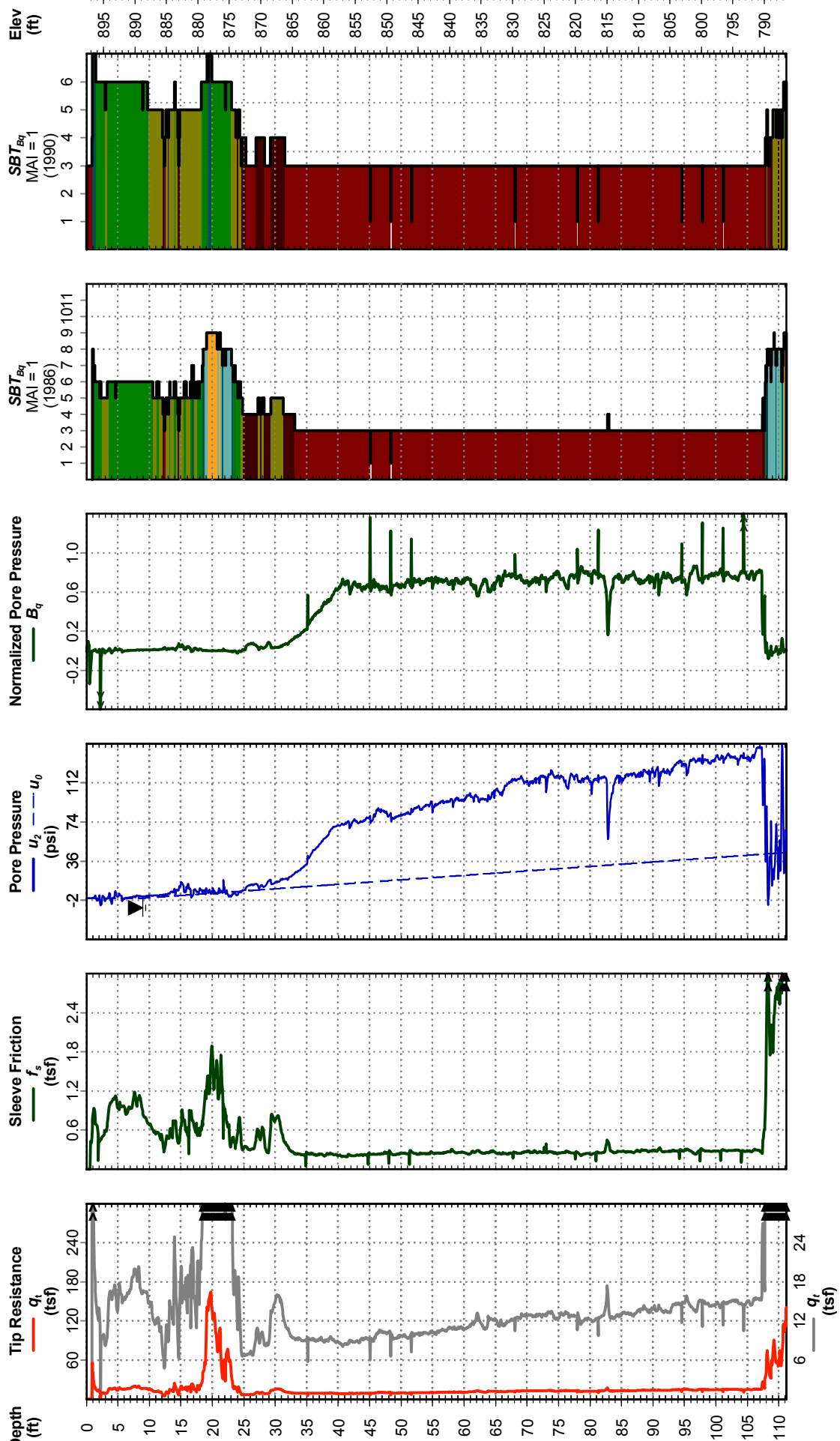
# Cone Penetration Test 09-F-39C

Fargo Moorehead

Date: Jul. 24, 2009  
 Operator: MARKOV  
 Drilling Agency: USACE, Savannah District

Northing: 1995628.878  
 Easting: 1035840.106  
 Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 897.7  
 Water Depth: 8.99  
 Total Depth: 111.2 ft





Fargo Moorehead

# Cone Penetration Test

## 09-F-40C

Date: Jul. 25, 2009

Northing: 1996365.961

Elevation: 896.9

Operator: MARKOV

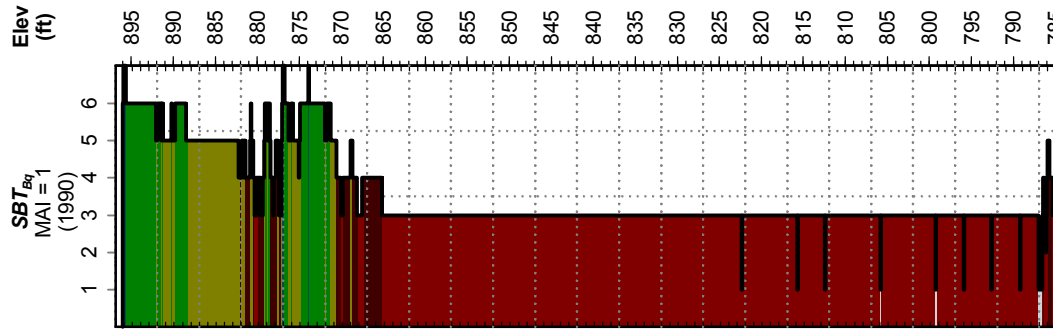
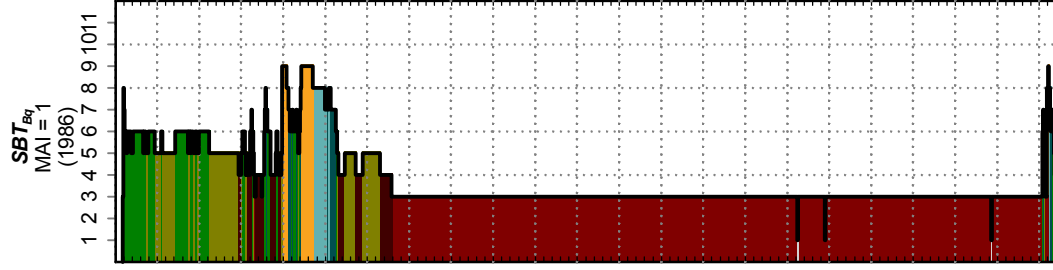
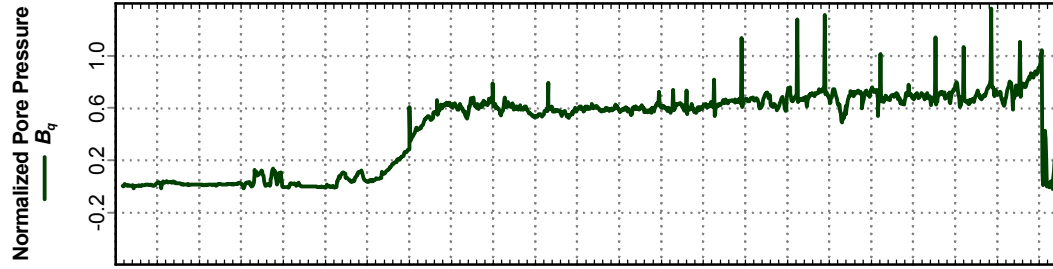
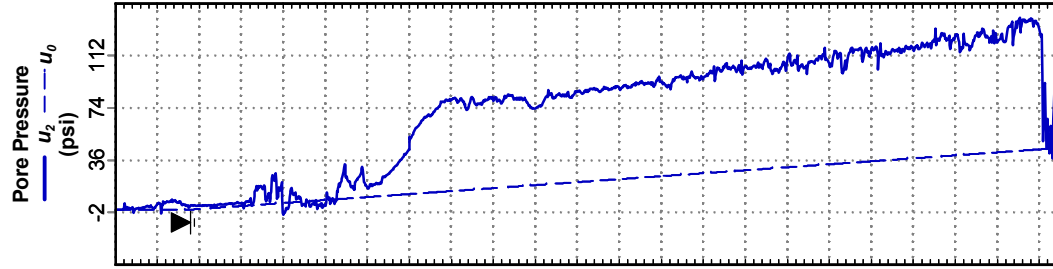
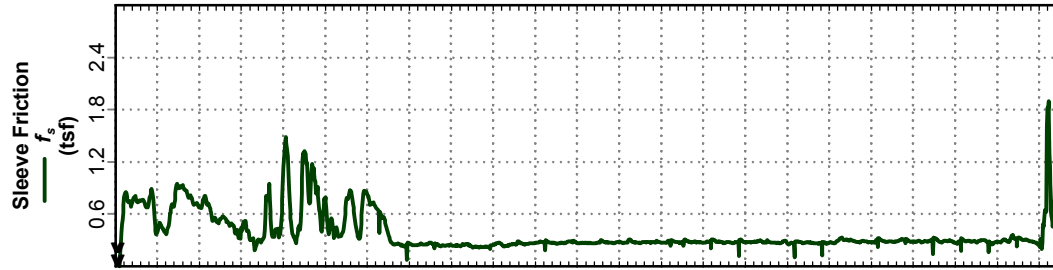
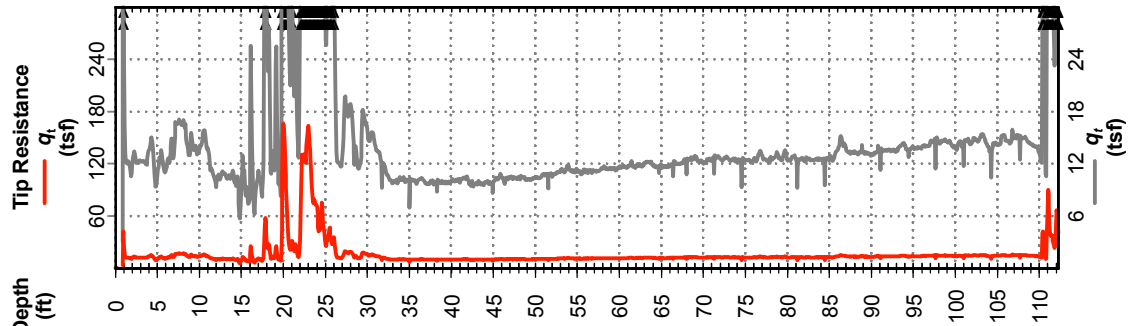
Eastng: 1038892.81

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 112.3 ft





Fargo Moorehead

# Cone Penetration Test 09-F-41C

Date: Jun. 23, 2009

Northing: 1989376.25

Elevation: 896.3

Operator: MARKOV

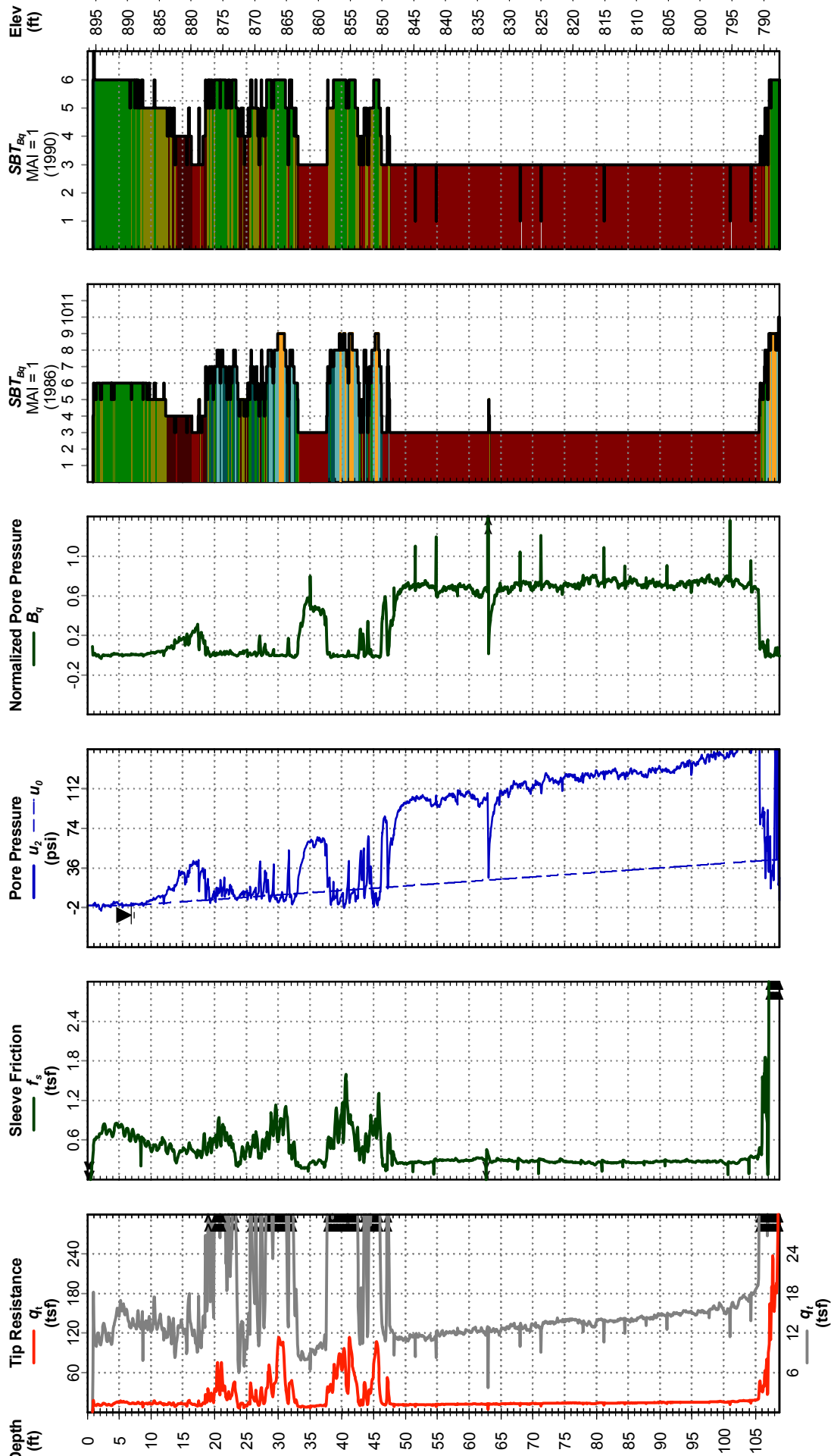
Eastings: 1041637.556

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 108.8 ft





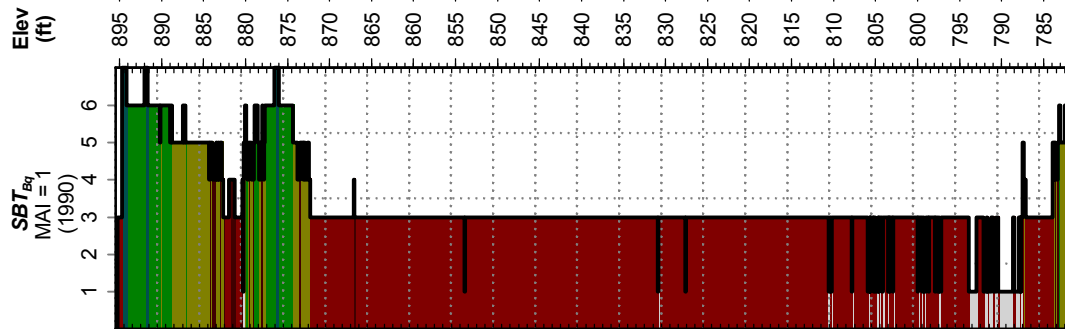
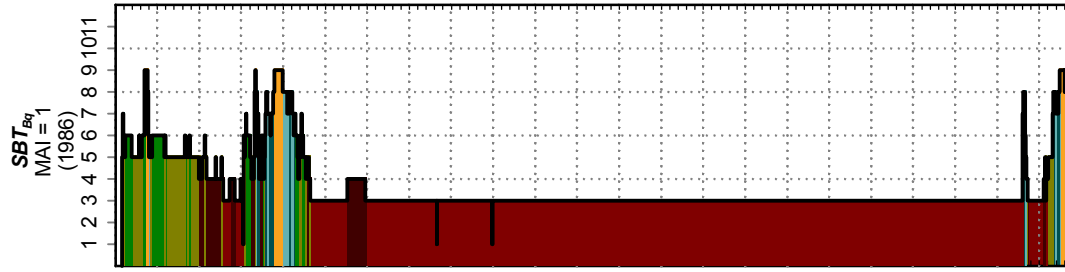
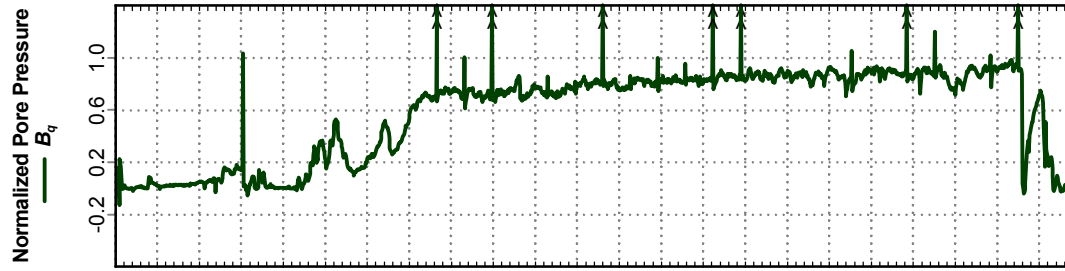
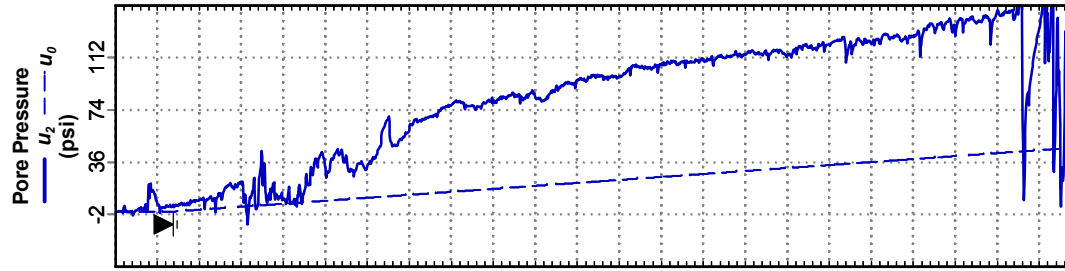
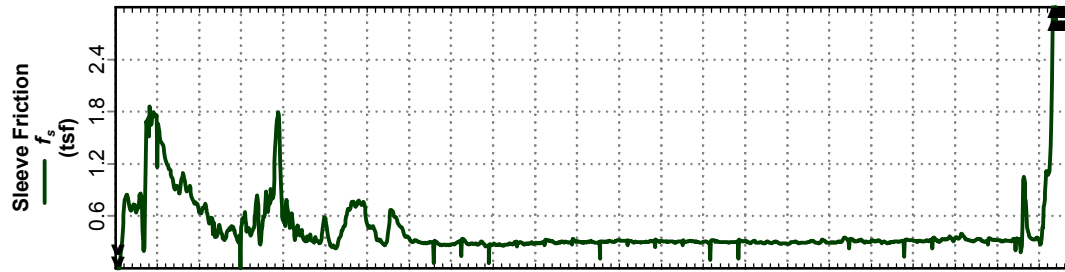
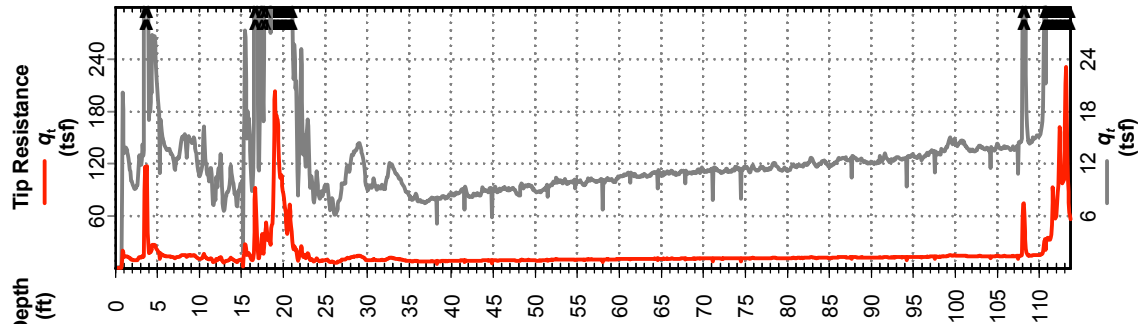
Fargo Moorehead

# Cone Penetration Test 09-F-56C

Date: Jun. 23, 2009  
 Operator: MARKOV  
 Drilling Agency: USACE, Savannah District

Northing: 1993023.229  
 Easting: 1040064.784  
 Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 895.5  
 Water Depth: 6.89  
 Total Depth: 113.7 ft





Fargo Red River Diversion

# Cone Penetration Test 10-81-Ca

Project No: FY 2011

Date: Nov. 20, 2010

Latitude: 47° 2' 12.588"

Elevation: 884.1

Operator: Johnston

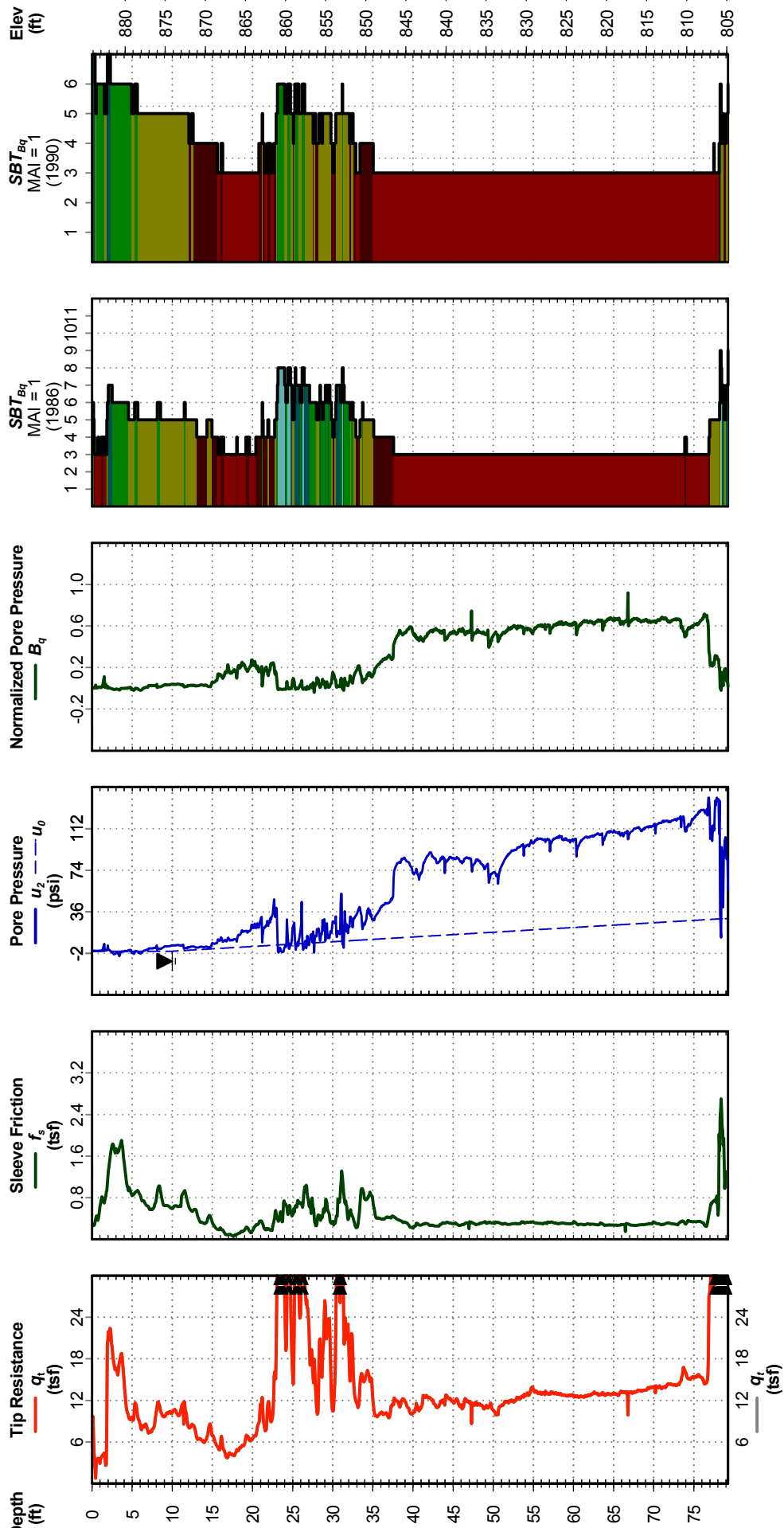
Longitude: -96° 52' 52.176"

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1069 / 0.8

Total Depth: 79.3 ft





# Fargo Red River Diversion

# Cone Penetration Test

# 10-85-C

Project No: FY 2011

Date: Nov. 18, 2010

Latitude: 47° 4' 14.448"

Elevation: 883.7

Operator: Johnston

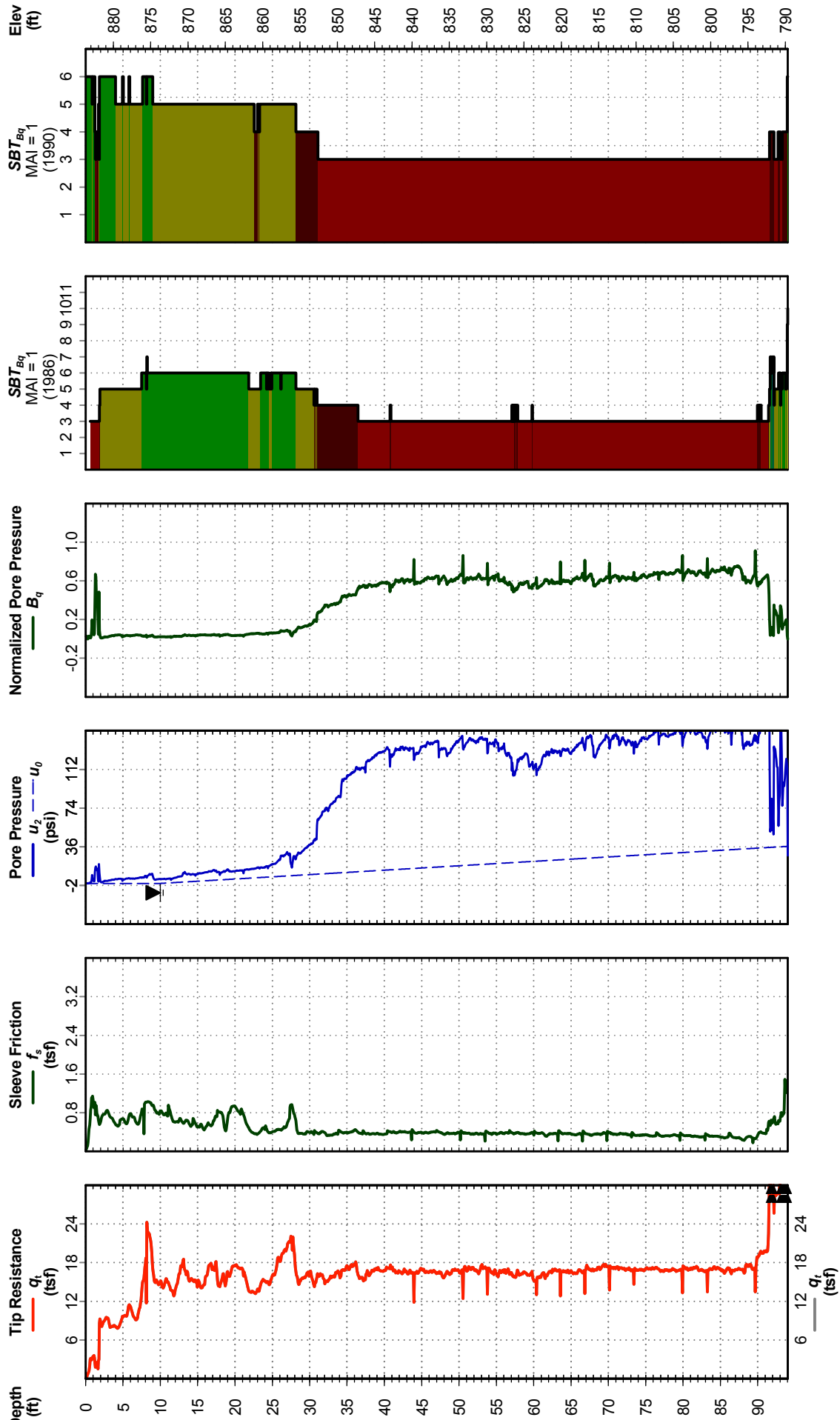
Longitude: -96° 50' 13.668"

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1069 / 0.8

Total Depth: 94.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-86-C

Project No: FY 2011

Date: Nov. 19, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 47° 3' 30.924"

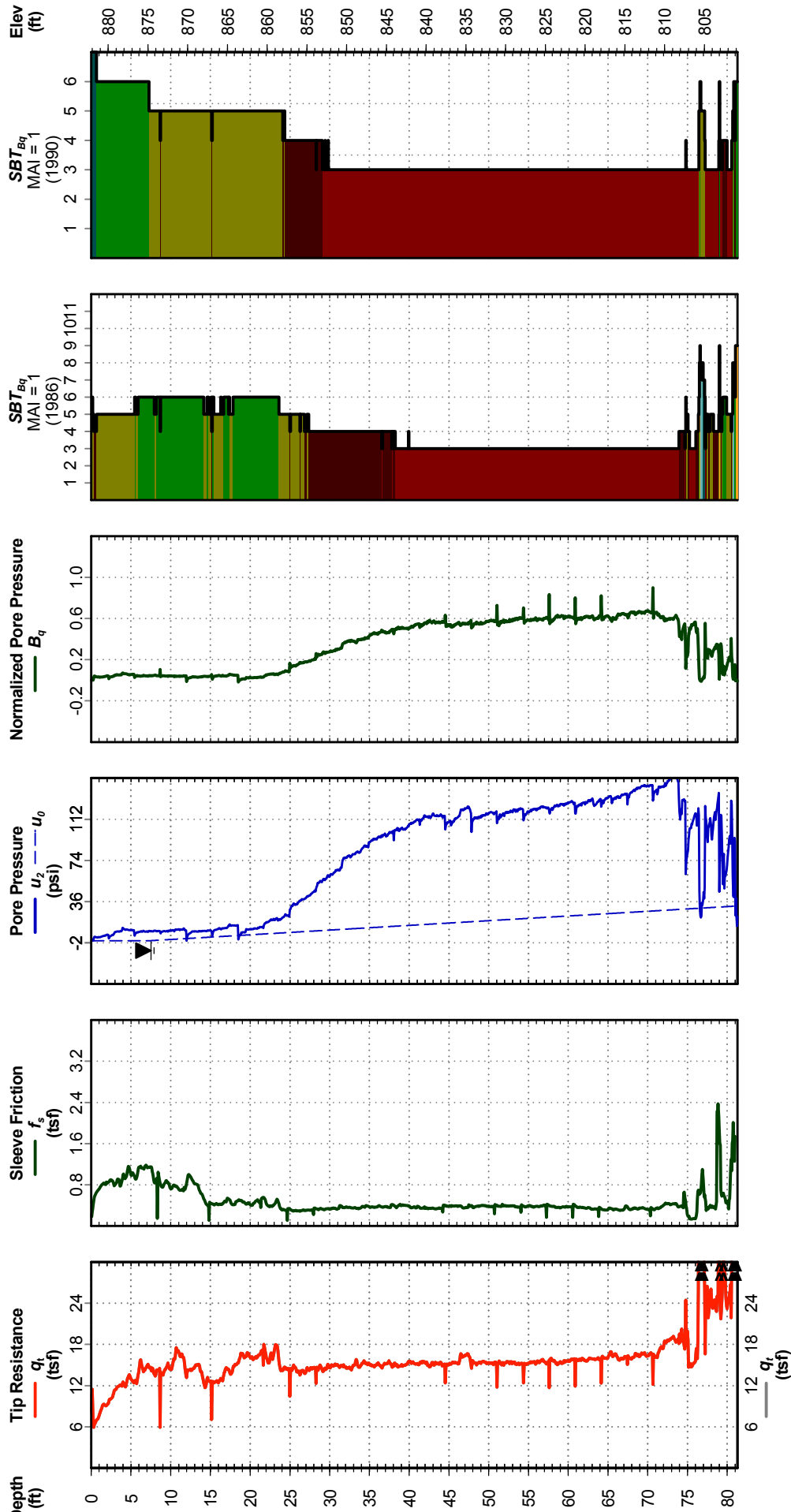
Longitude: -96° 52' 26.868"

Probe ID/Net Area Ratio: DDG1069 / 0.8

Elevation: 882.1

Water Depth: 7.51

Total Depth: 81.3 ft







# Fargo Red River Diversion

# Cone Penetration Test 10-87-Ca

Project No: FY 2011

Date: Nov. 19, 2010

Latitude: 47° 2' 36.168"

Elevation: 887.1

Operator: Johnston

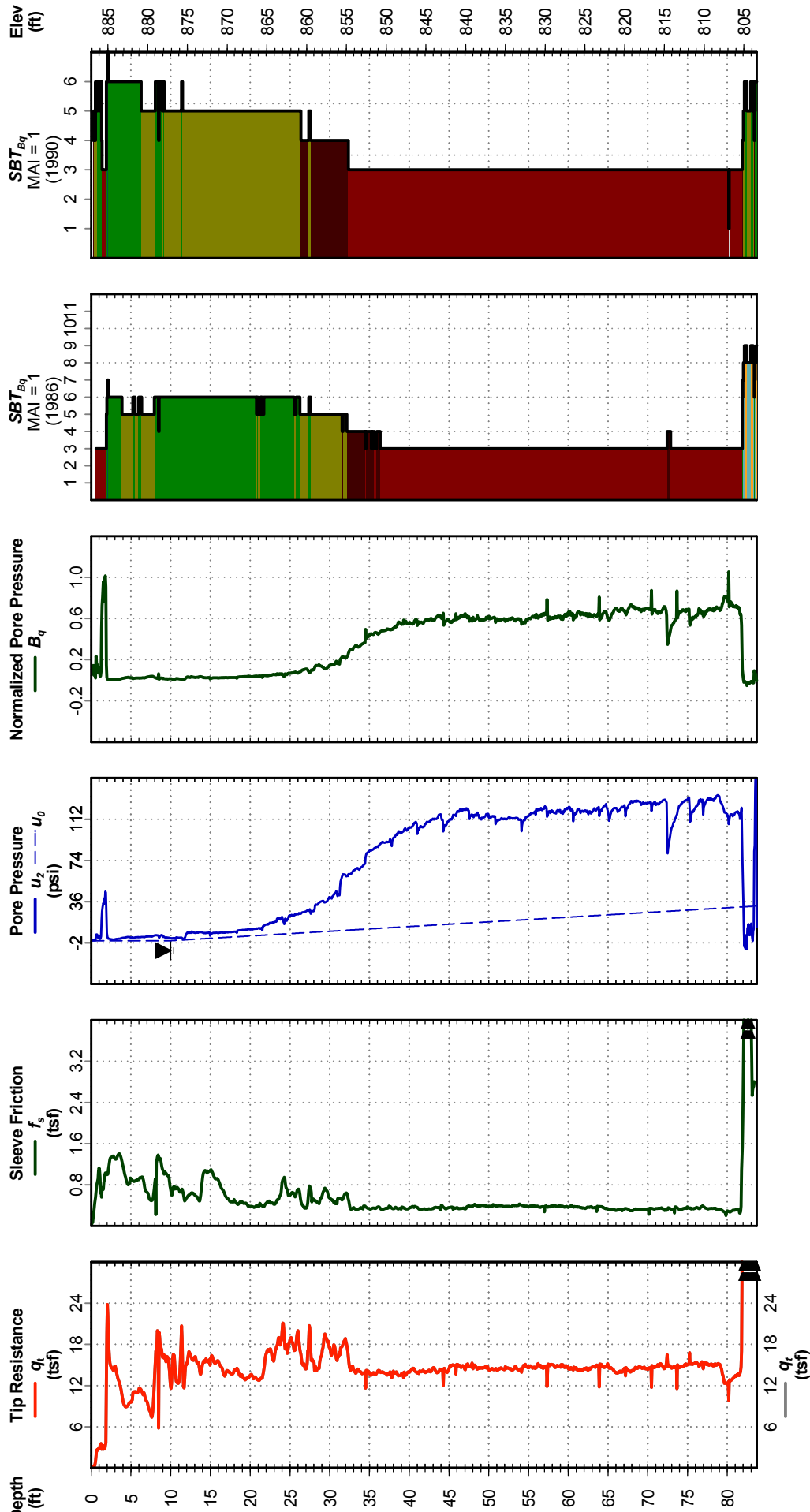
Longitude: -96° 52' 51.708"

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1069 / 0.8

Total Depth: 83.7 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-89-C

Project No: FY 2011

Date: Nov. 21, 2010

Latitude: 47° 1' 14.448"

Elevation: 889.5

Operator: Johnston

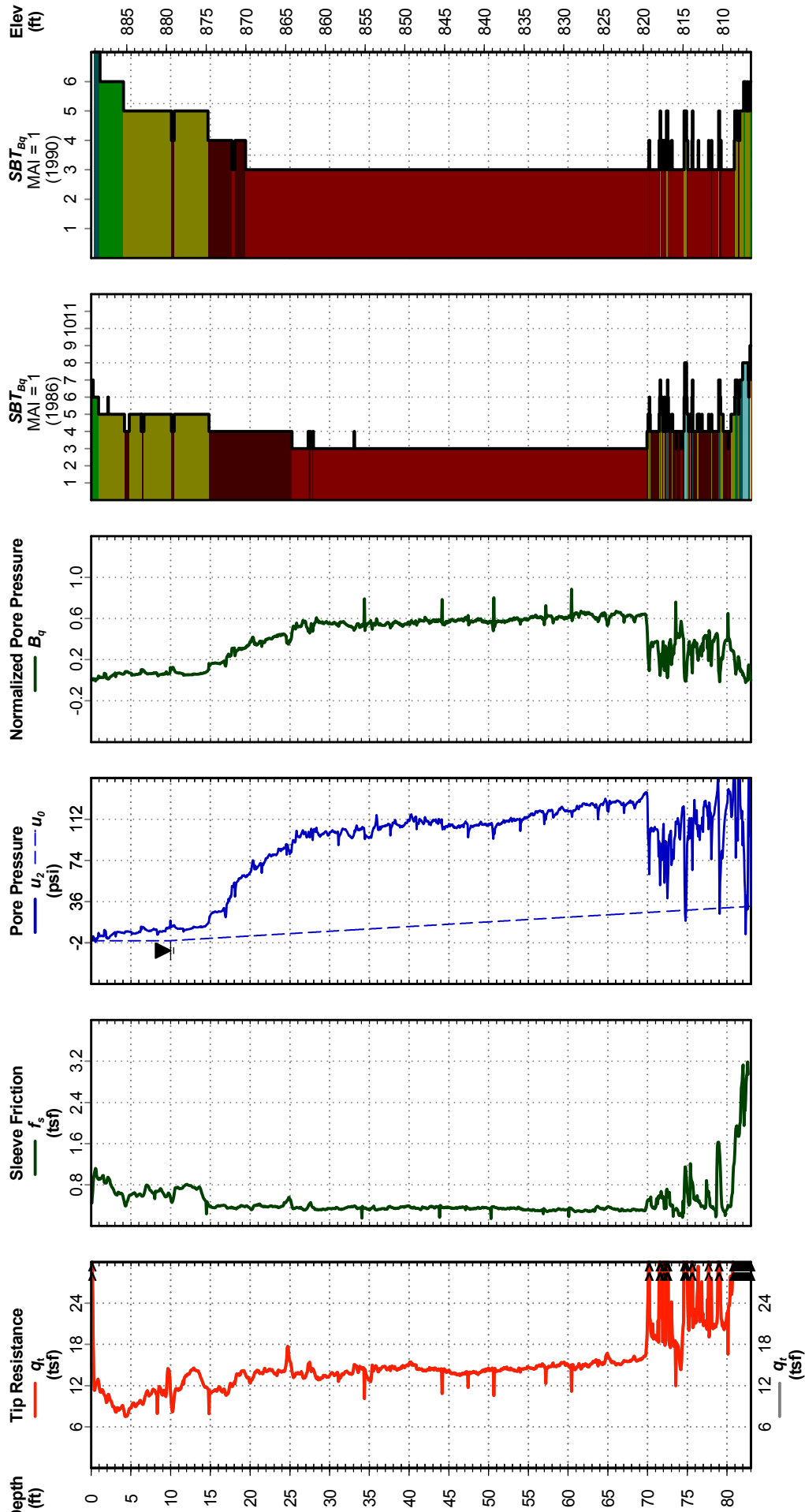
Longitude: -96° 55' 56.316"

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1069 / 0.8

Total Depth: 83.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-90-C

Project No: FY 2011

Date: Nov. 21, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 59' 30.3"

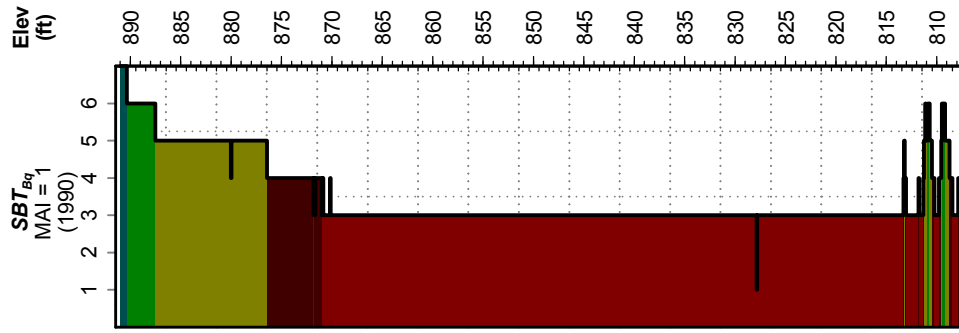
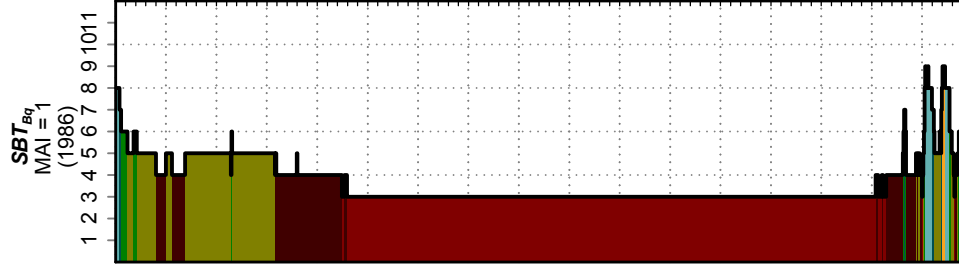
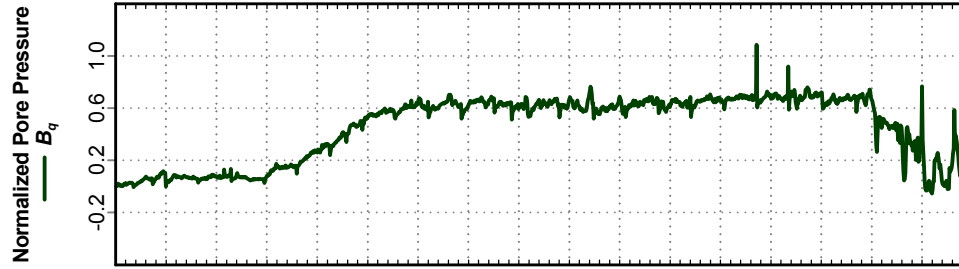
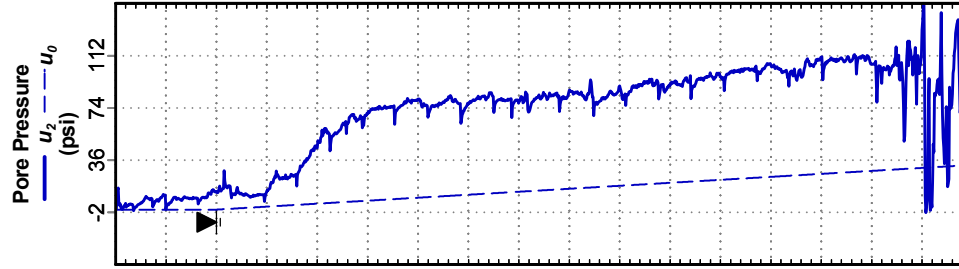
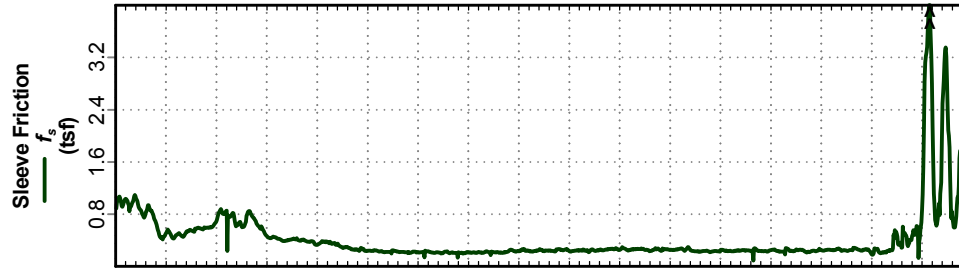
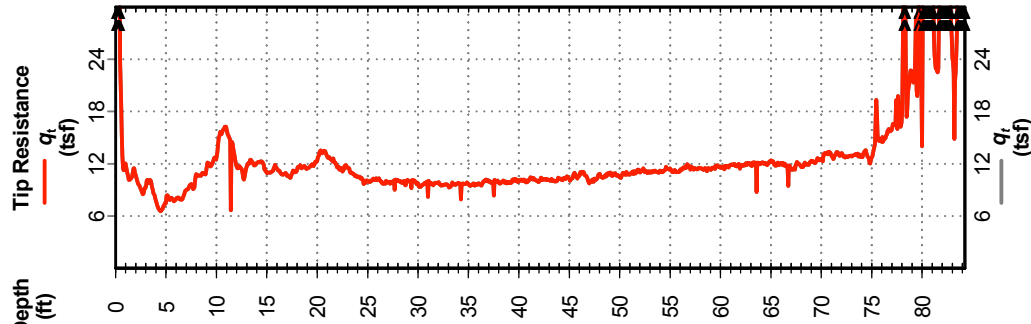
Longitude: -96° 55' 58.8"

Probe ID/Net Area Ratio: DDG1069 / 0.8

Elevation: 891.5

Water Depth: 10.01

Total Depth: 84.3 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-91-C

Project No: FY 2011

Date: Nov. 30, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 57' 43.272"

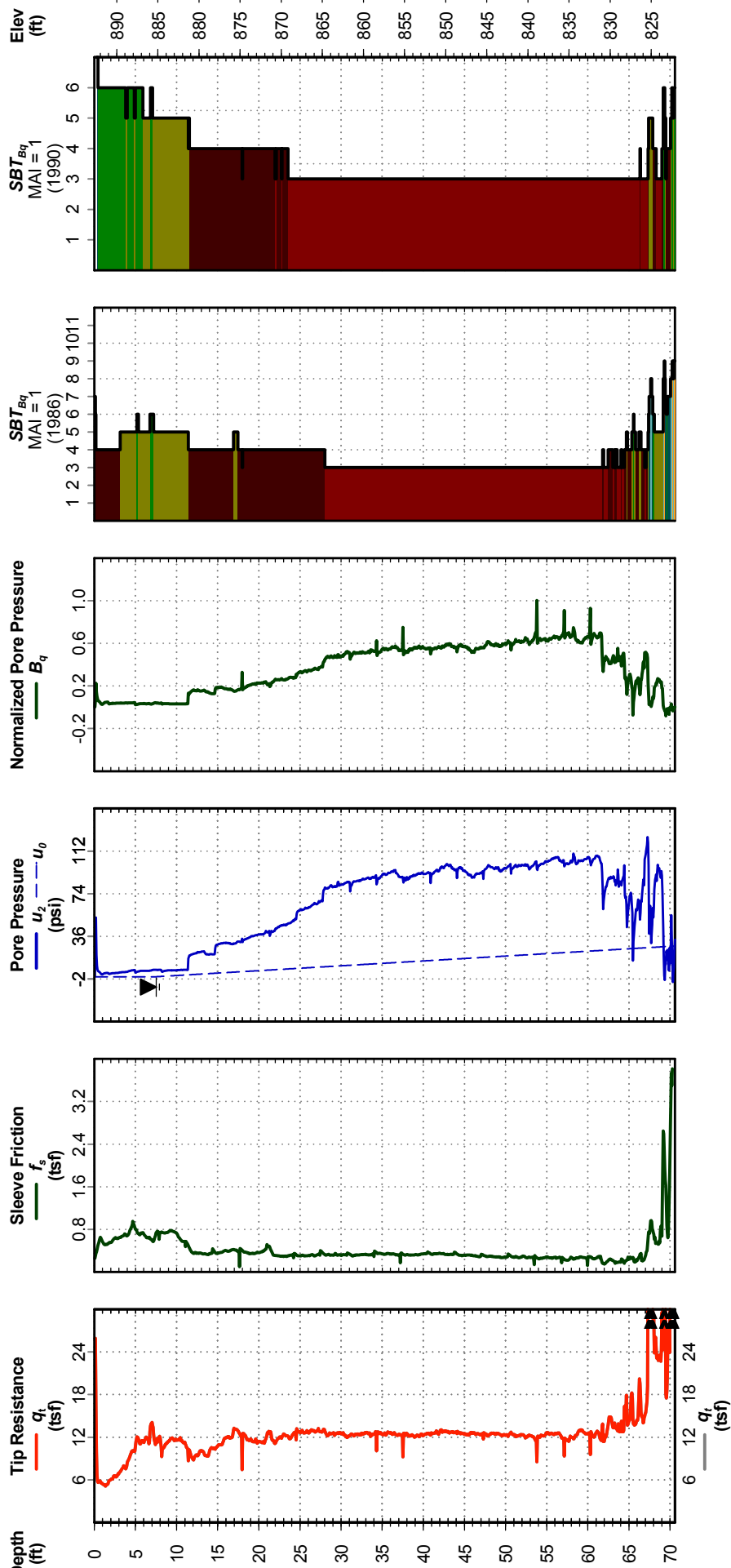
Longitude: -96° 57' 25.128"

Probe ID/Net Area Ratio: DDG1069 / 0.8

Elevation: 892.7

Water Depth: 7.51

Total Depth: 70.6 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-92-Ca

Project No: FY 2011

Date: Dec. 4, 2010

Latitude: 46° 58' 38.388"

Elevation: 890.9

Operator: Johnston

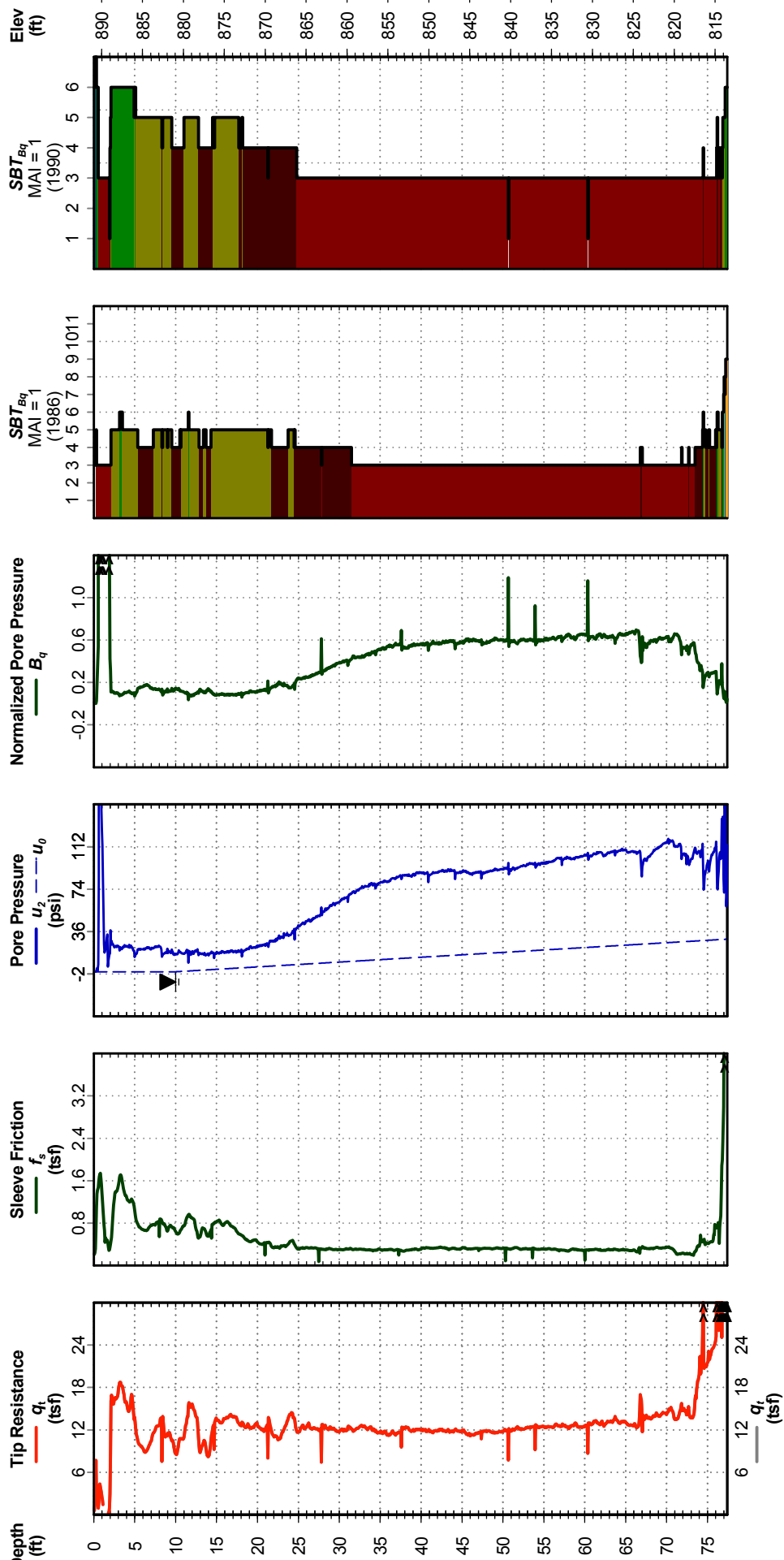
Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Longitude: -96° 56' 42.684"

Total Depth: 77.4 ft

Probe ID/Net Area Ratio: DDG1069 / 0.8





Fargo Red River Diversion

Cone Penetration Test 10-93-C

Project No: FY 2011

Date: Dec. 1, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 57' 25.56"

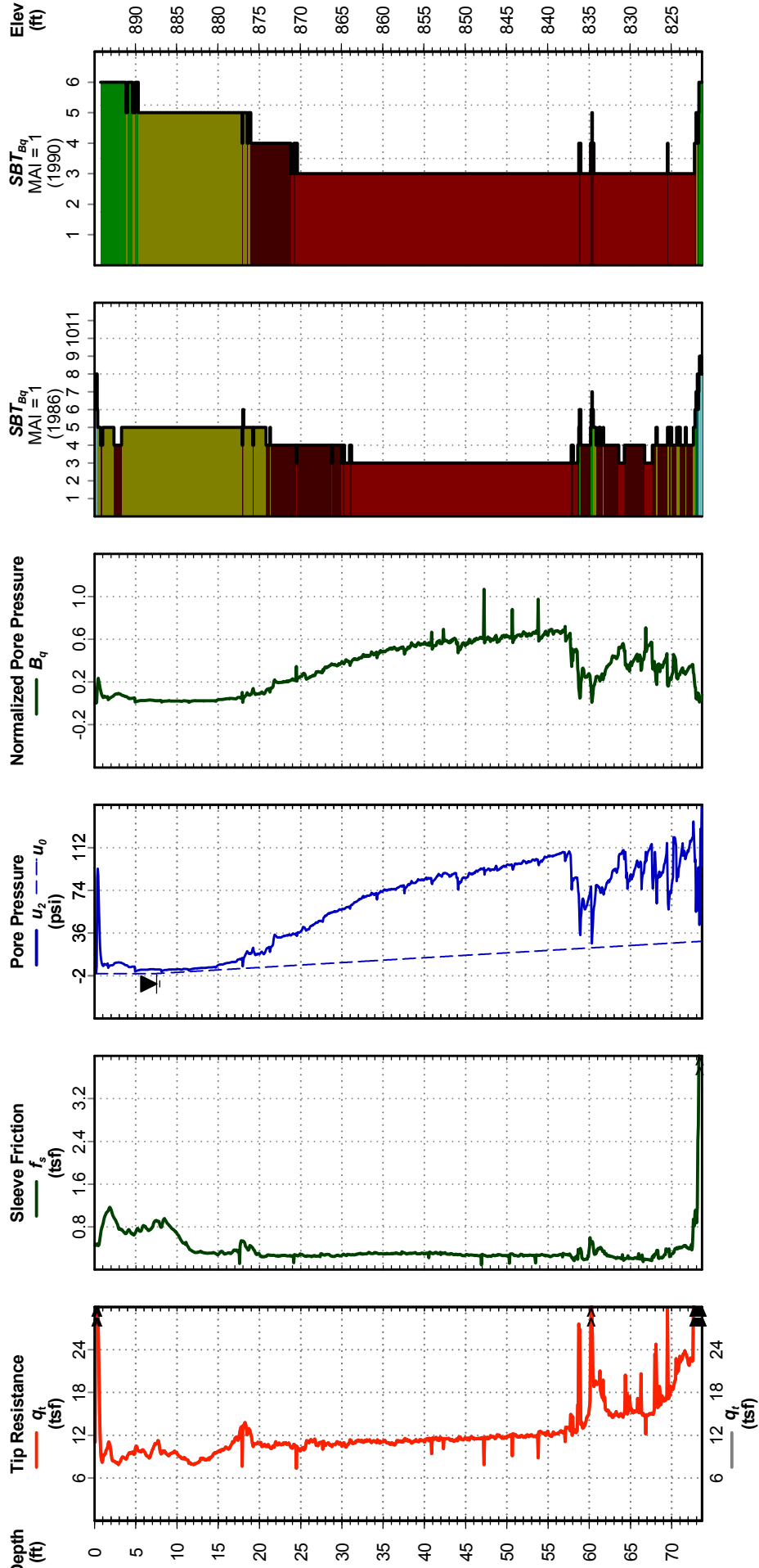
Longitude: -96° 57' 21.384"

Probe ID/Net Area Ratio: DDG1069 / 0.8

Elevation: 895.0

Water Depth: 7.51

Total Depth: 73.7 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-95-C

Project No: FY 2011

Date: Dec. 2, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 55' 51.168"

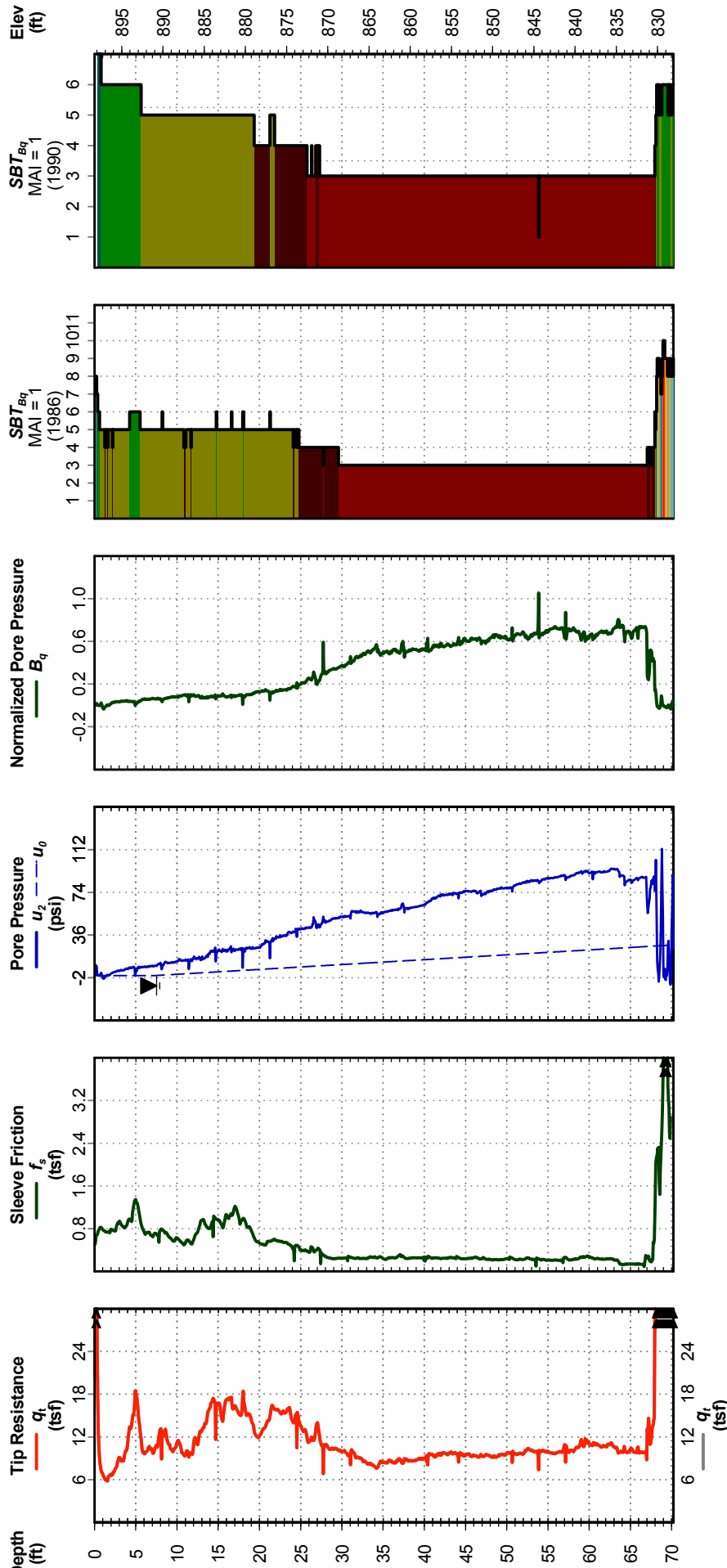
Longitude: -96° 57' 53.64"

Probe ID/Net Area Ratio: DDG1069 / 0.8

Elevation: 898.3

Water Depth: 7.51

Total Depth: 70.2 ft





# Fargo Red River Diversion

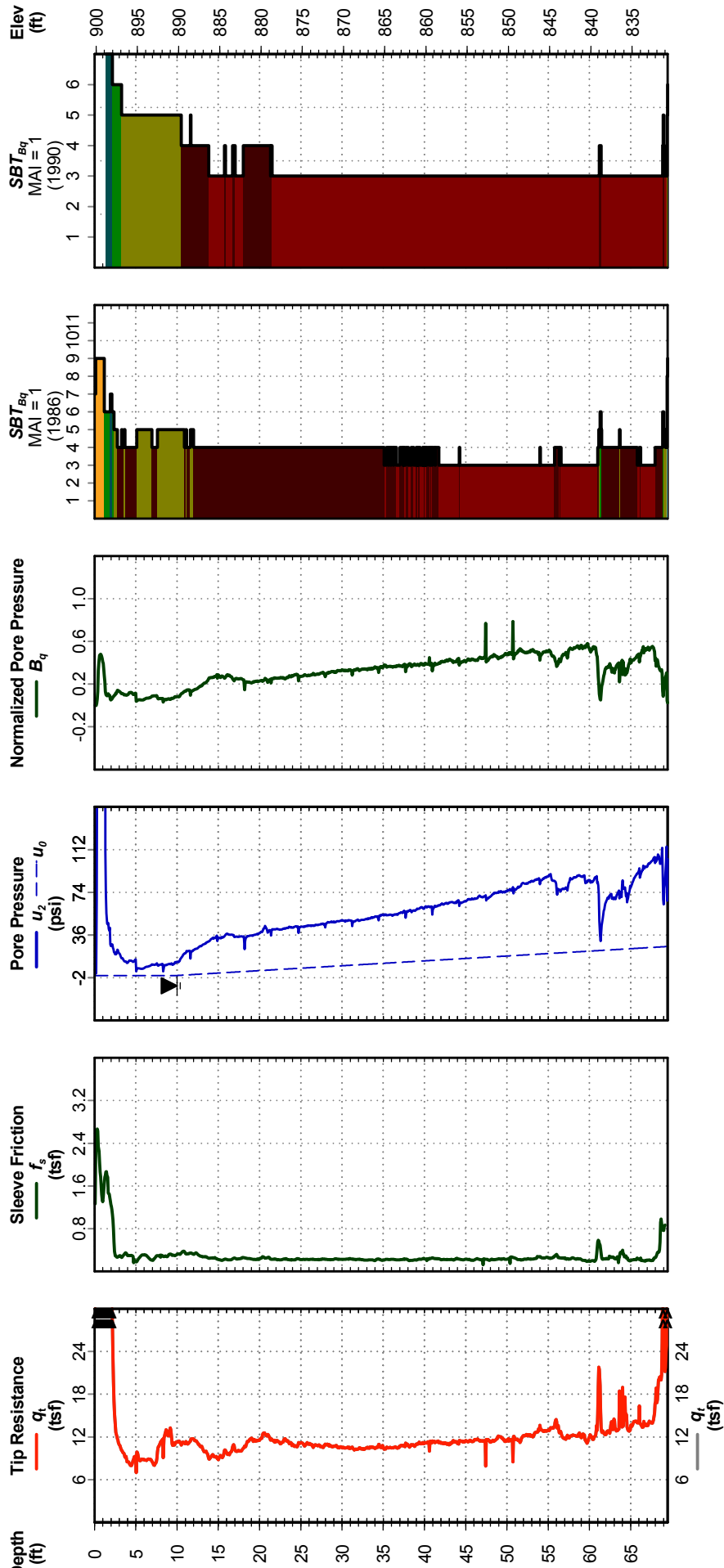
Project No: FY 2011

Date: Dec. 3, 2010  
Operator: Johnston  
Drilling Agency: USACE, Savannah District

Latitude: 46° 55' 14.376"  
Longitude: -96° 57' 38.196"  
Probe ID/Net Area Ratio: DDG1069 / 0.8

# Cone Penetration Test 10-96-C

Elevation: 900.2  
Water Depth: 10.01  
Total Depth: 69.5 ft







# Fargo Red River Diversion

# Cone Penetration Test 10-98-C

Project No: FY 2011

Date: Dec. 6, 2010

Latitude: 46° 52' 18.516"

Elevation: 901.2

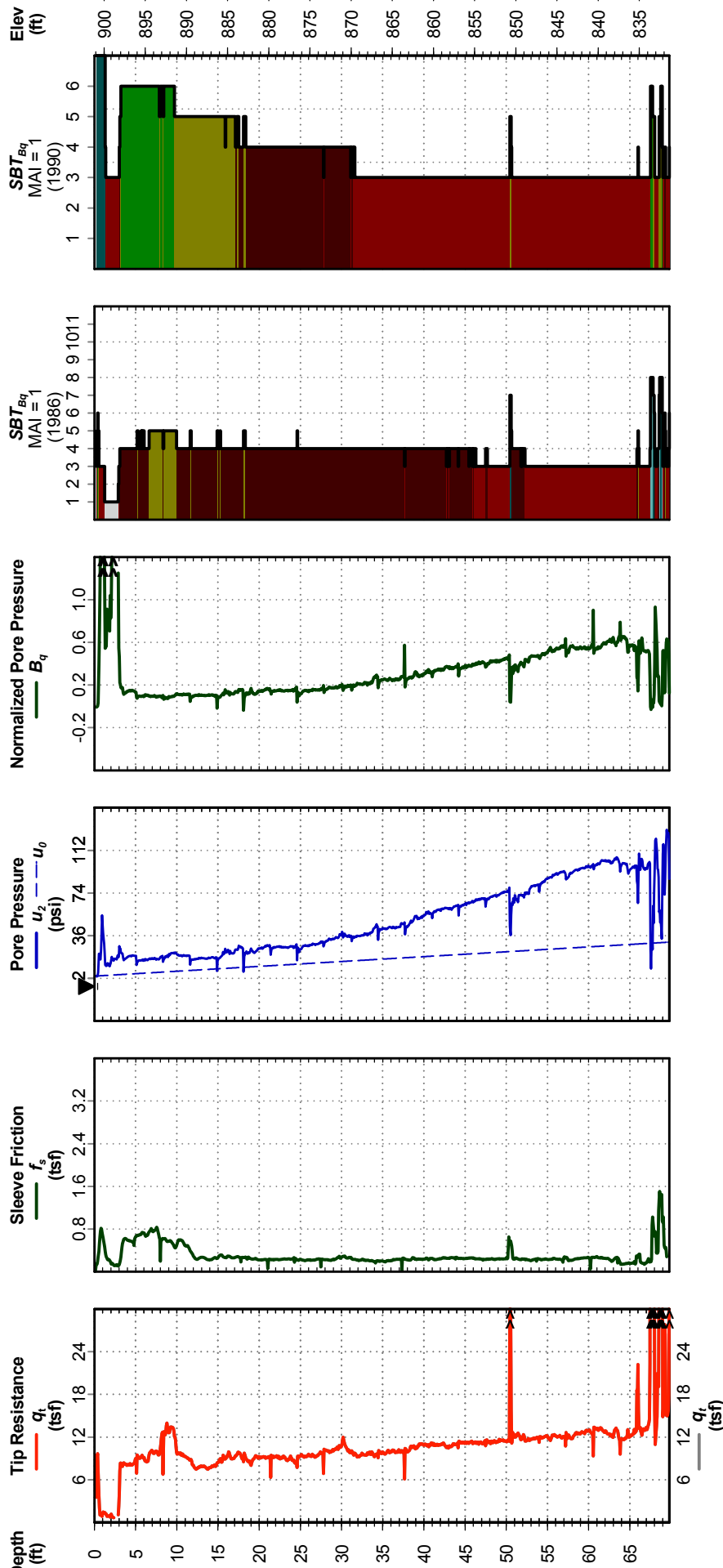
Operator: Johnston

Water Depth: 0

Total Depth: 69.8 ft

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1069 / 0.8





# Fargo Red River Diversion

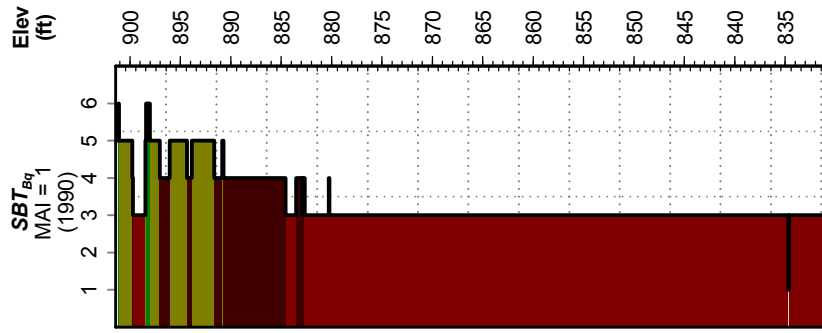
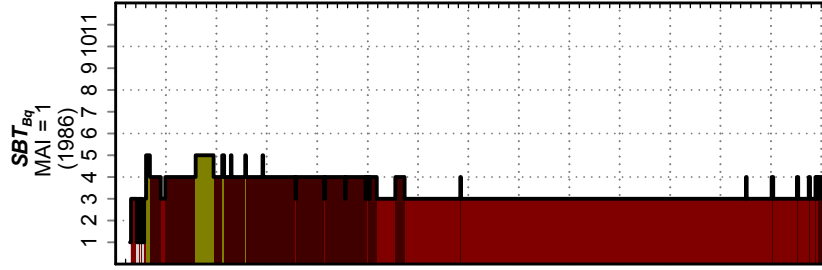
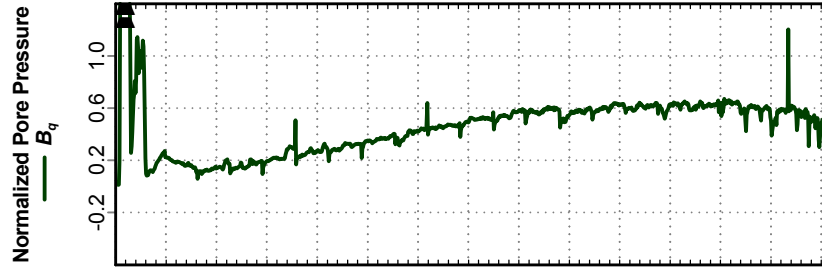
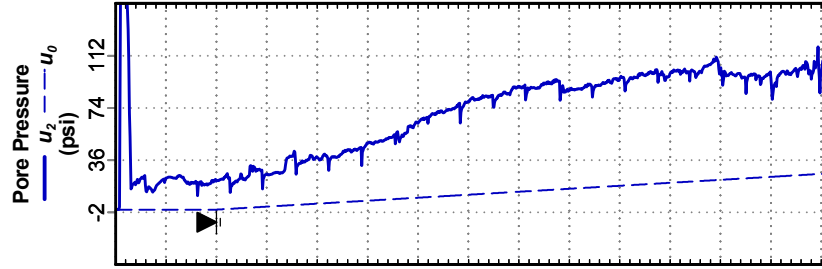
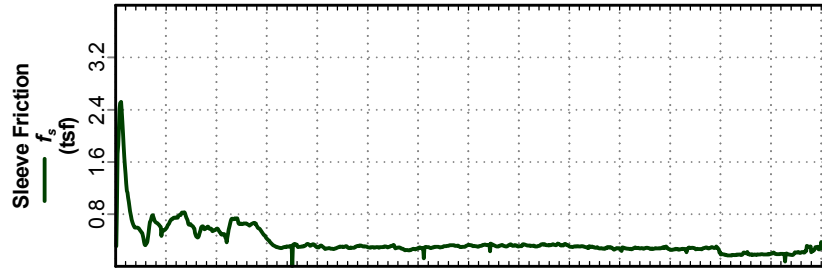
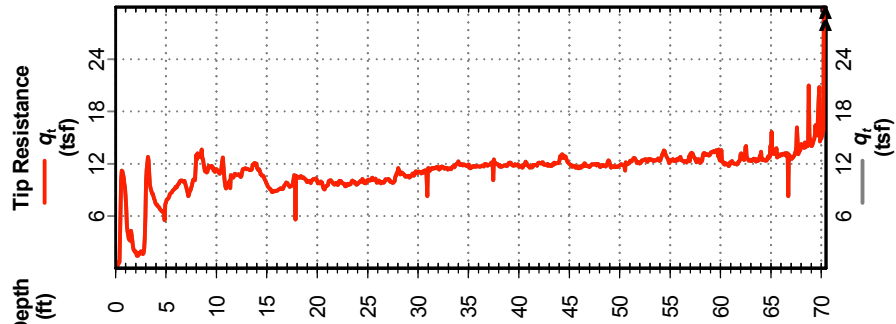
Project No: FY 2011

Date: Dec. 7, 2010  
Operator: Johnston  
Drilling Agency: USACE, Savannah District

Latitude: 46° 51' 45.36"  
Longitude: -96° 56' 0.6"  
Probe ID/Net Area Ratio: DDG1069 / 0.8

Elevation: 901.4  
Water Depth: 10.01  
Total Depth: 70.5 ft

# Cone Penetration Test 10-99-C





Fargo Red River Diversion

Cone Penetration Test 10-100-C

Project No: FY 2011

Date: Dec. 8, 2010

Latitude: 46° 51' 16.272"

Elevation: 899.4

Operator: Johnston

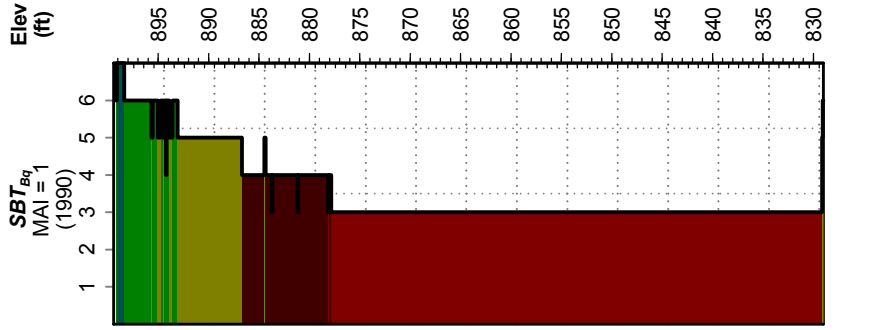
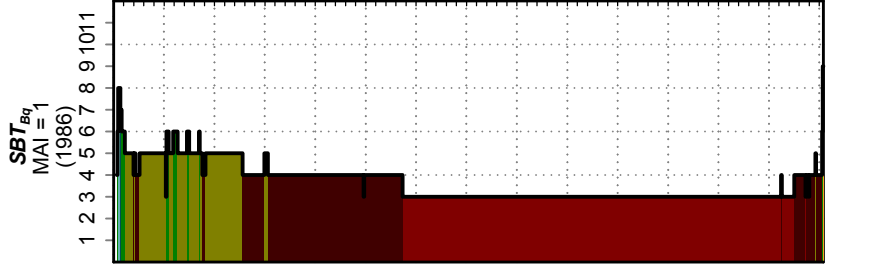
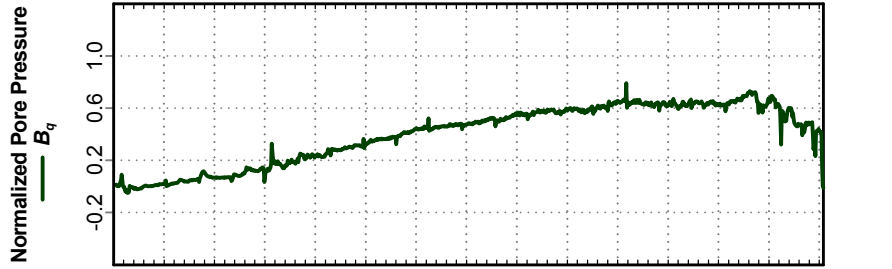
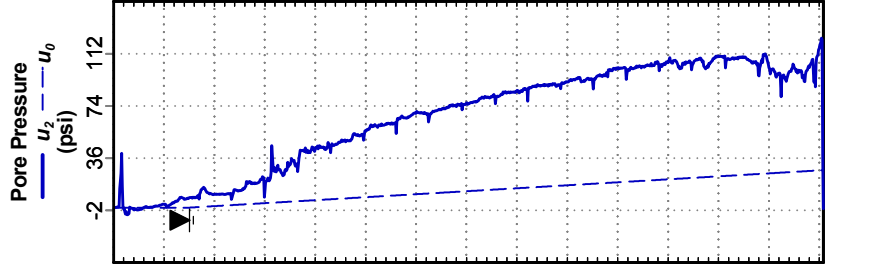
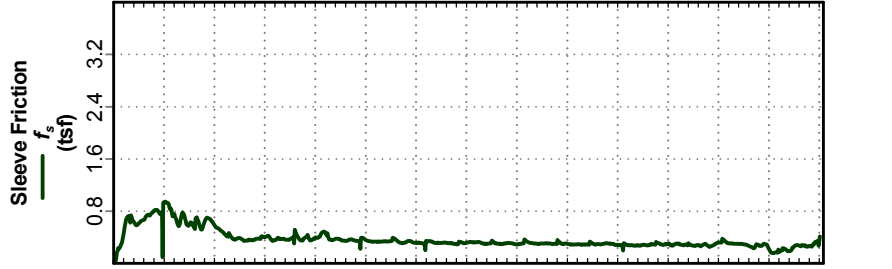
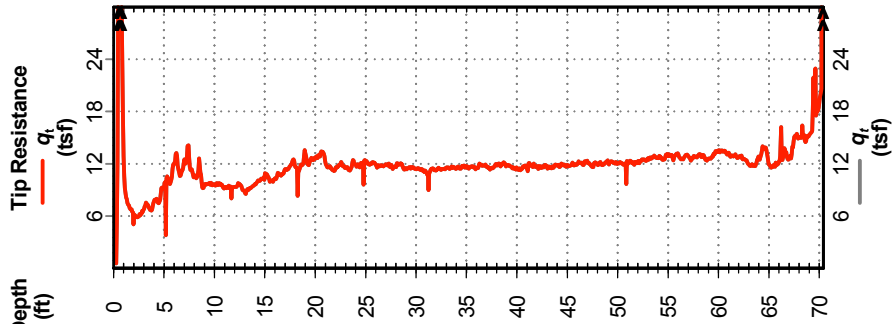
Longitude: -96° 55' 21.396"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 70.4 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-102-C

Project No: FY 2011

Date: Dec. 8, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 50' 26.952"

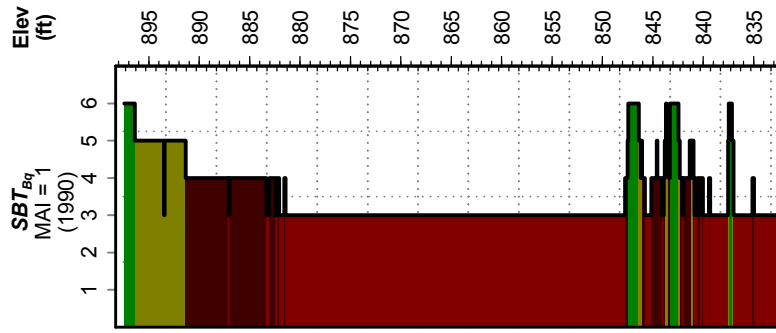
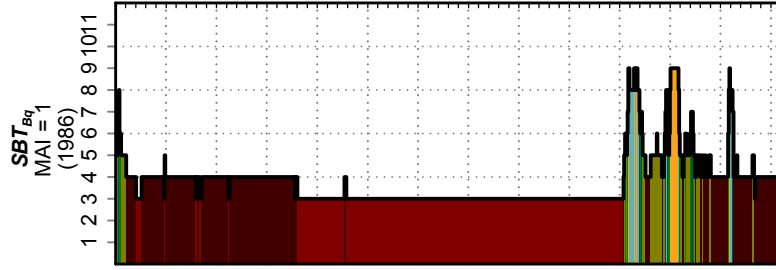
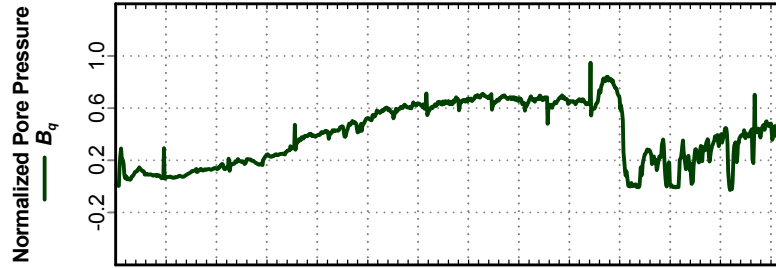
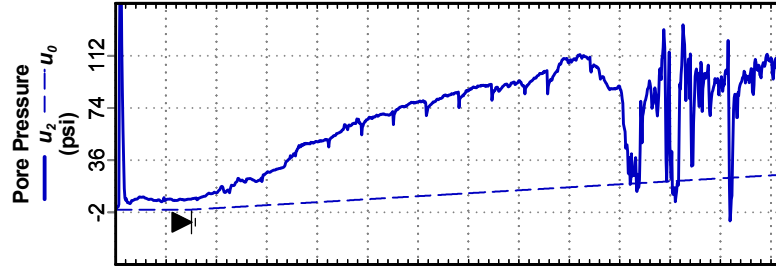
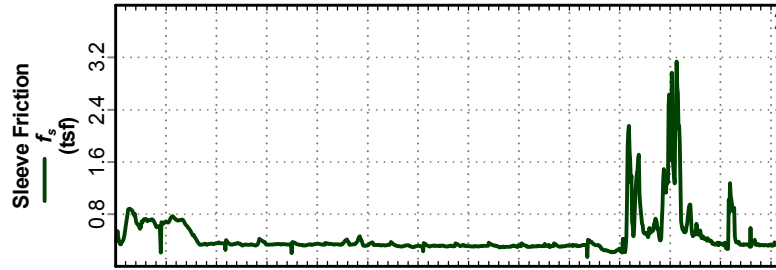
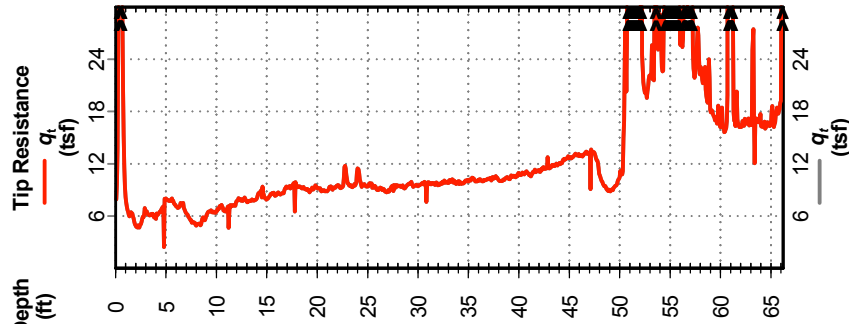
Longitude: -96° 55' 37.128"

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 898.3

Water Depth: 7.51

Total Depth: 66.2 ft





# Fargo Red River Diversion

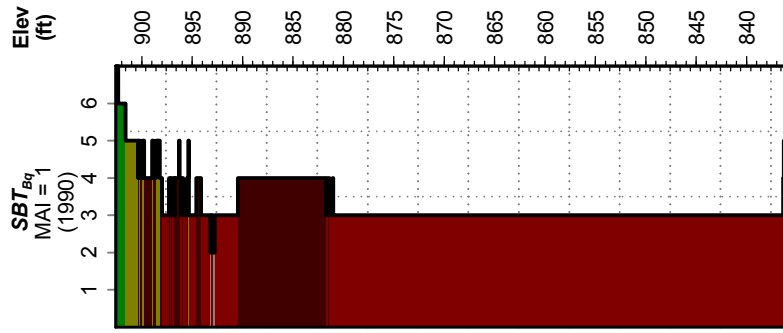
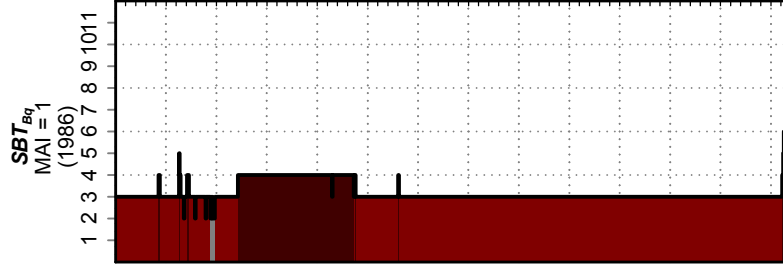
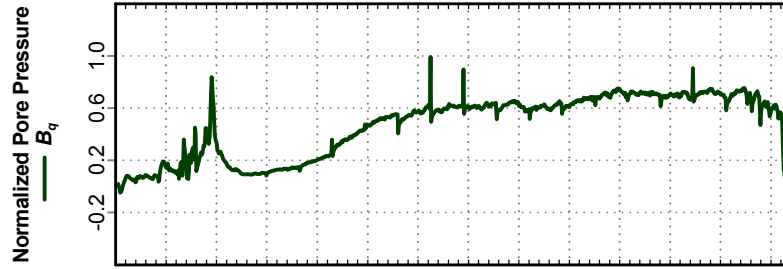
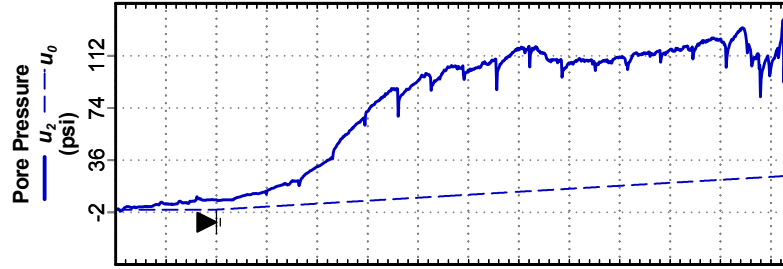
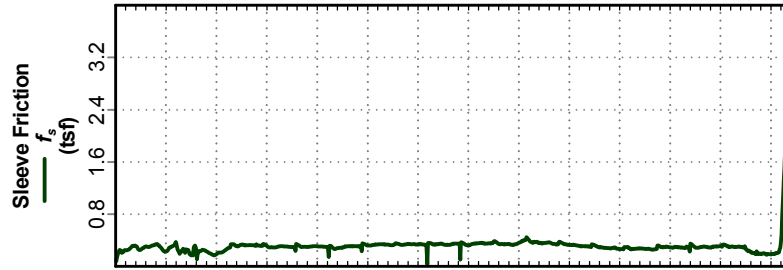
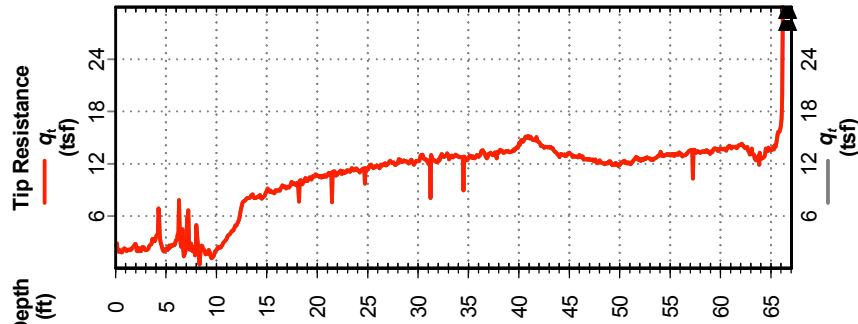
Project No: FY 2011

Date: Dec. 9, 2010  
Operator: Johnston  
Drilling Agency: USACE, Savannah District

Latitude: 46° 49' 34.14"  
Longitude: -96° 55' 30.396"  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 902.6  
Water Depth: 10.01  
Total Depth: 67.1 ft

# Cone Penetration Test 10-103-C





# Fargo Red River Diversion

# Cone Penetration Test 10-104-C

Project No: FY 2011

Date: Dec. 10, 2010

Latitude: 46° 47' 50.208"

Elevation: 905.6

Operator: Johnston

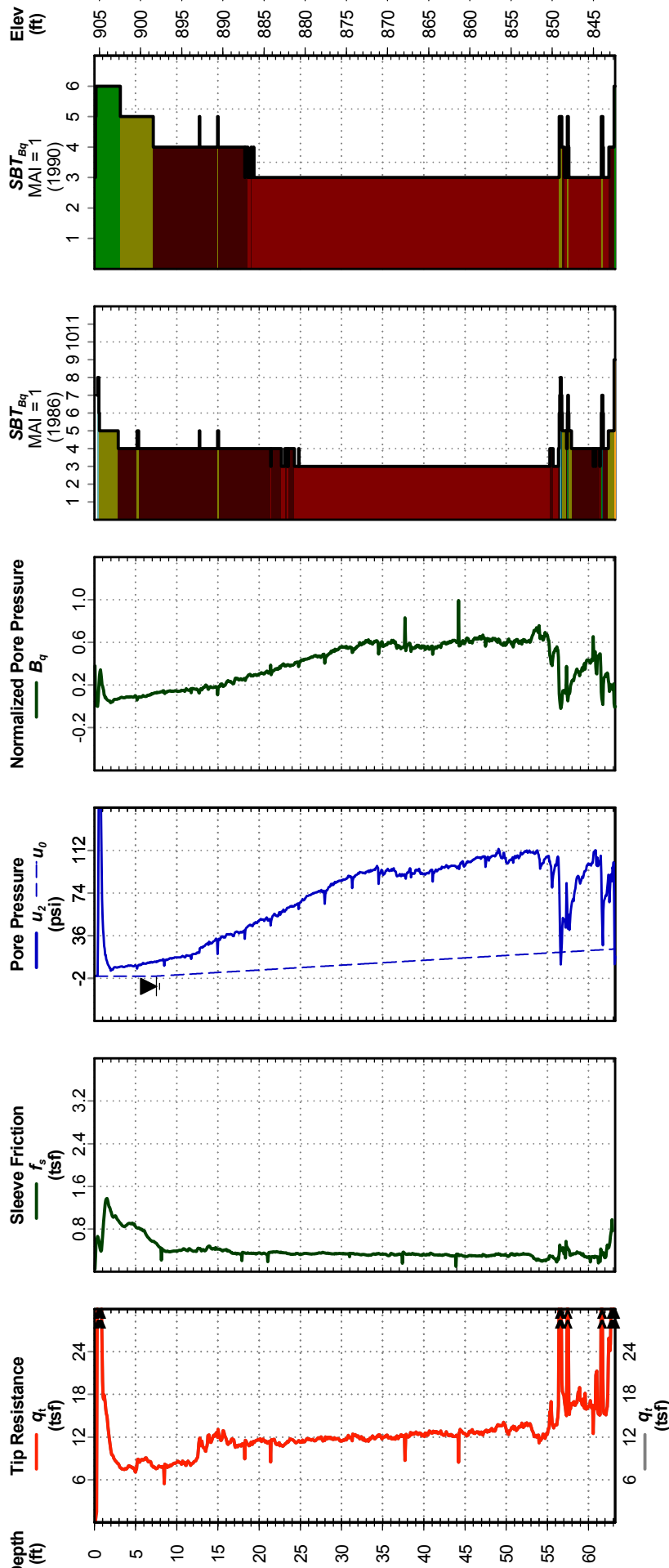
Longitude: -96° 55' 36.912"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 63.3 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-106-C

Project No: FY 2011

Date: Dec. 10, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 46' 58.26"

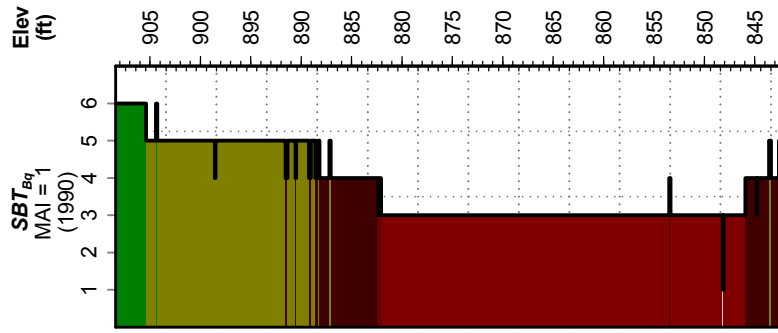
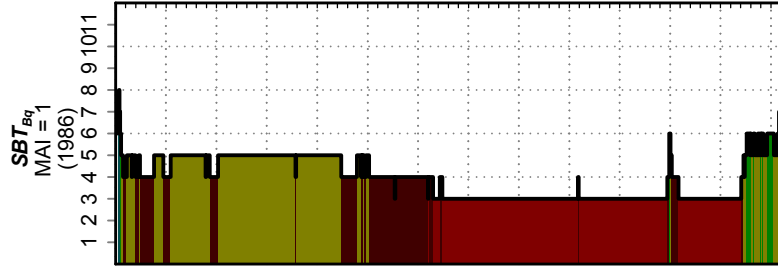
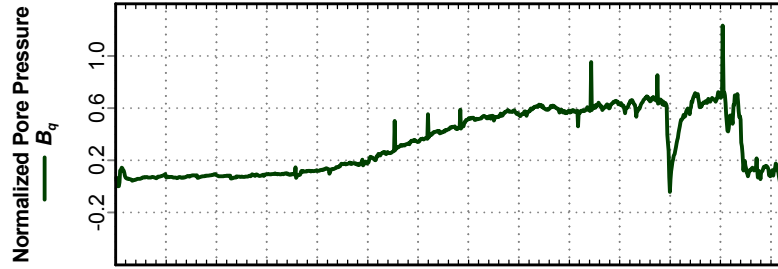
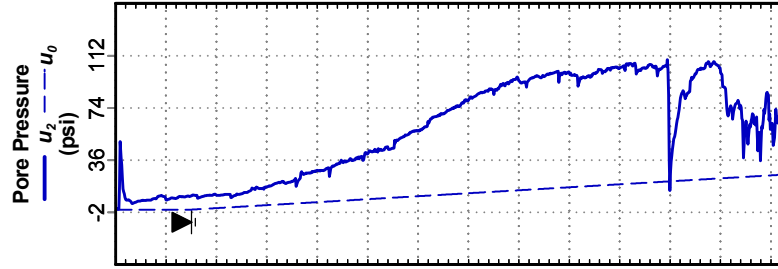
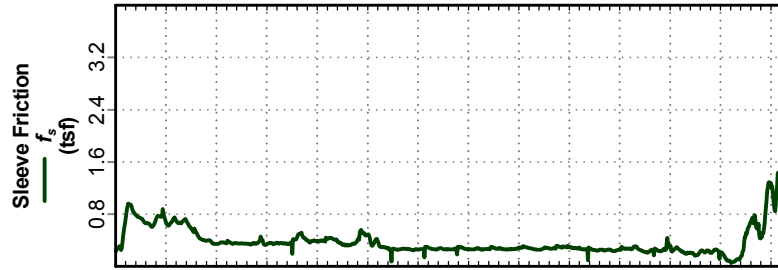
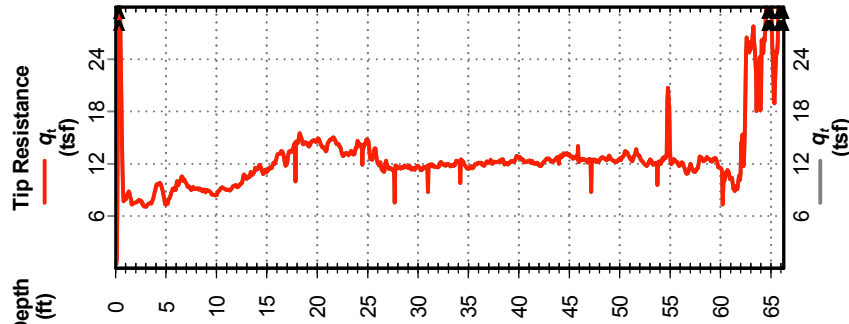
Longitude: -96° 55' 37.164"

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 908.4

Water Depth: 7.51

Total Depth: 66.3 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-107-C

Project No: FY 2011

Date: Dec. 11, 2010

Latitude: 46° 46' 5.124"

Elevation: 911.8

Operator: Johnston

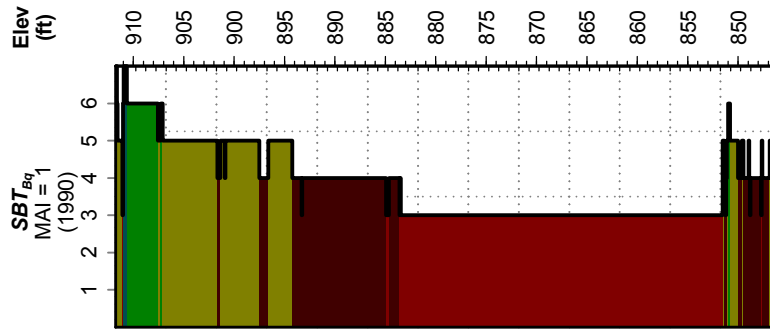
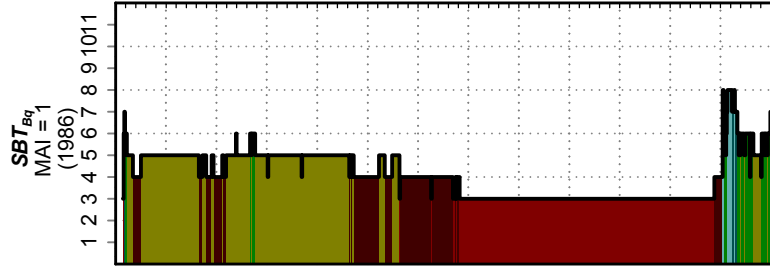
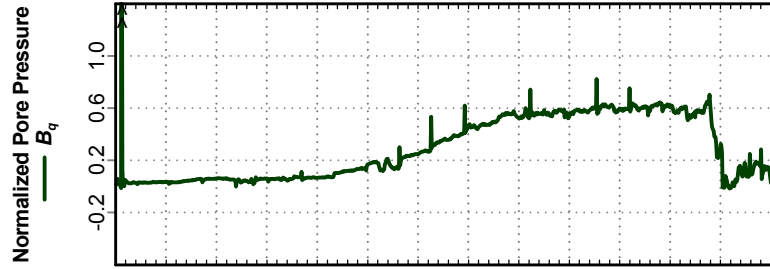
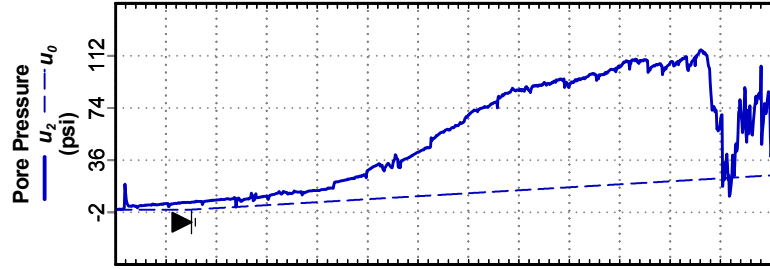
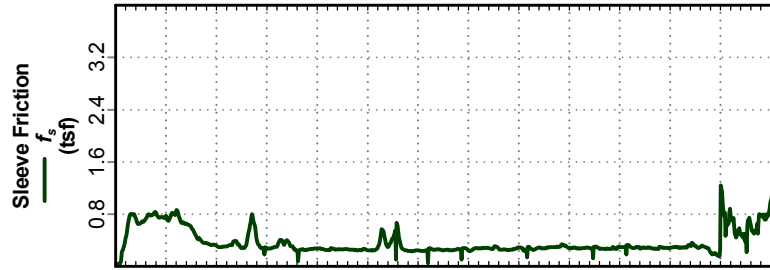
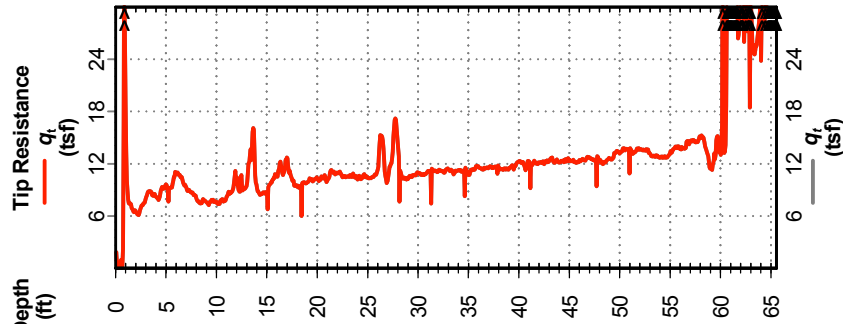
Longitude: -96° 55' 51.528"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 65.6 ft







# Fargo Red River Diversion

# Cone Penetration Test 10-108-C

Project No: FY 2011

Date: Dec. 11, 2010

Latitude: 46° 45' 11.448"

Elevation: 912.5

Operator: Johnston

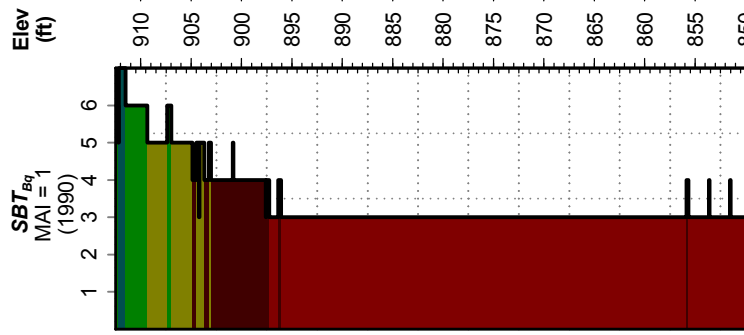
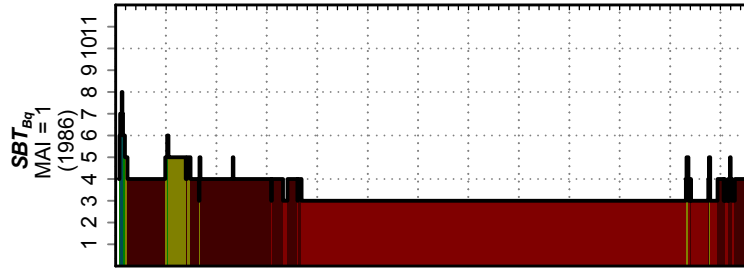
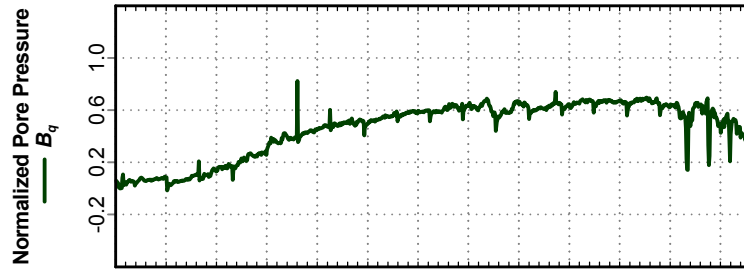
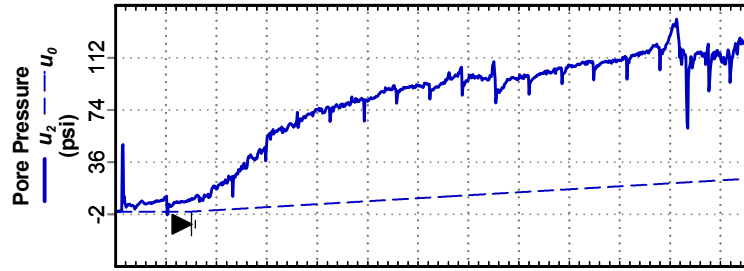
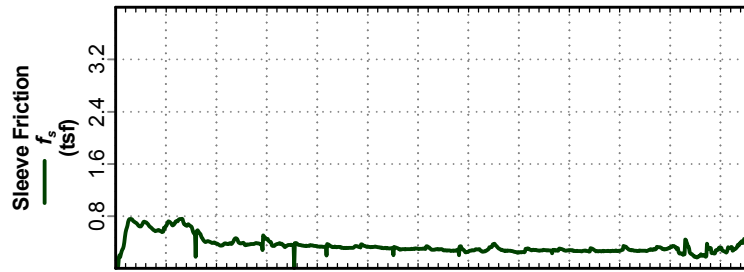
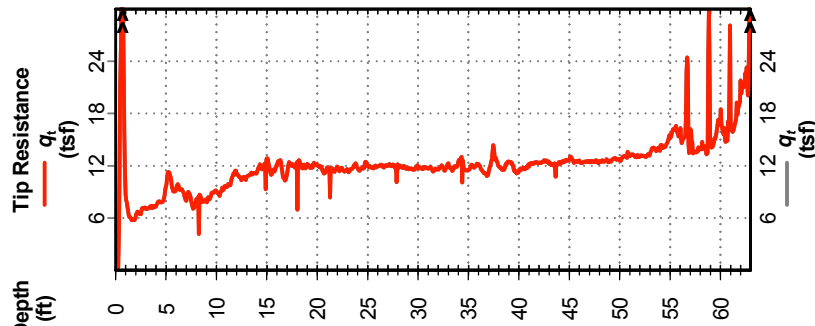
Longitude: -96° 56' 26.772"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 63.0 ft





# Fargo Red River Diversion

Project No: FY 2011

Date: Dec. 13, 2010

Operator: Johnston

Drilling Agency: USACE, Savannah District

# Cone Penetration Test

# 10-109-C

Latitude: 46° 44' 24.648"

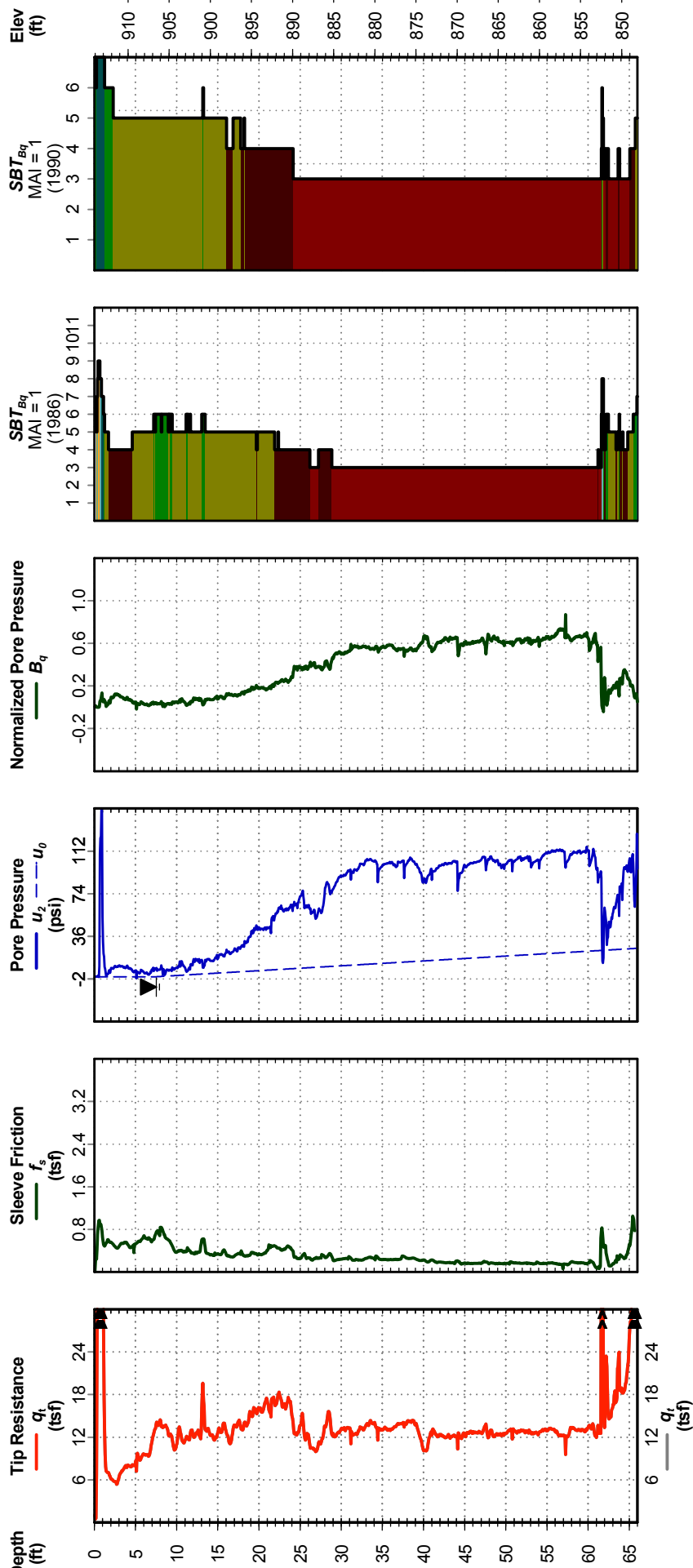
Longitude: -96° 56' 19.248"

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 914.1

Water Depth: 7.51

Total Depth: 66.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 10-110-Ca

Project No: FY 2011

Date: Dec. 14, 2010

Latitude: 46° 44' 18.6"

Elevation: 917.6

Operator: Johnston

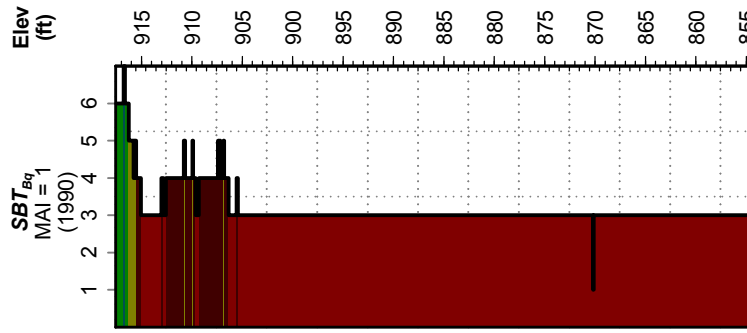
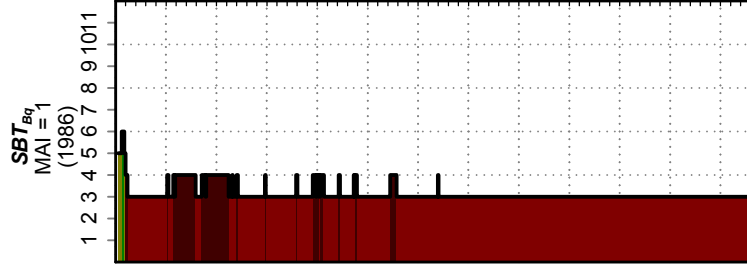
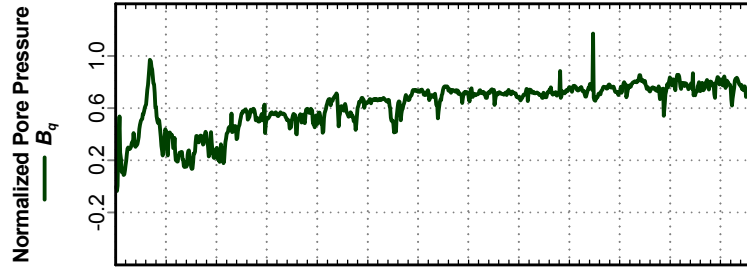
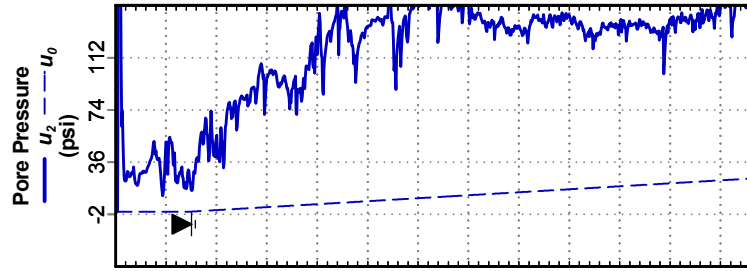
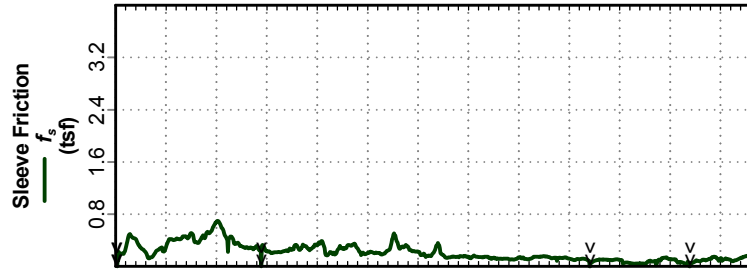
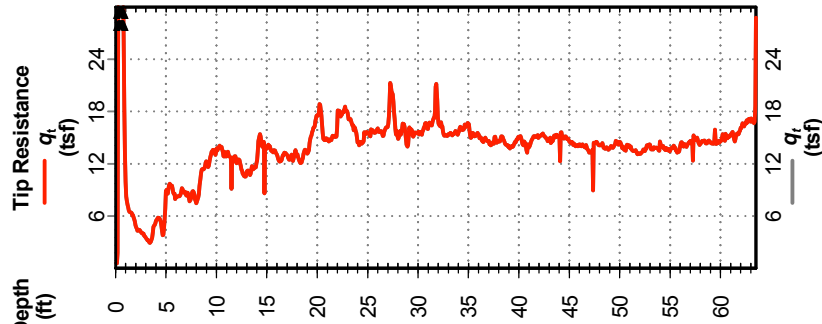
Longitude: -96° 55' 44.292"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 63.5 ft





### Fargo Red River Diversion

Project No: FY 2011

Date: Jan. 10, 2011

Operator: Johnston

Drilling Agency: USACE, Savannah District

# Cone Penetration Test

# 11-1111-C

Latitude: 46° 43' 54.48"

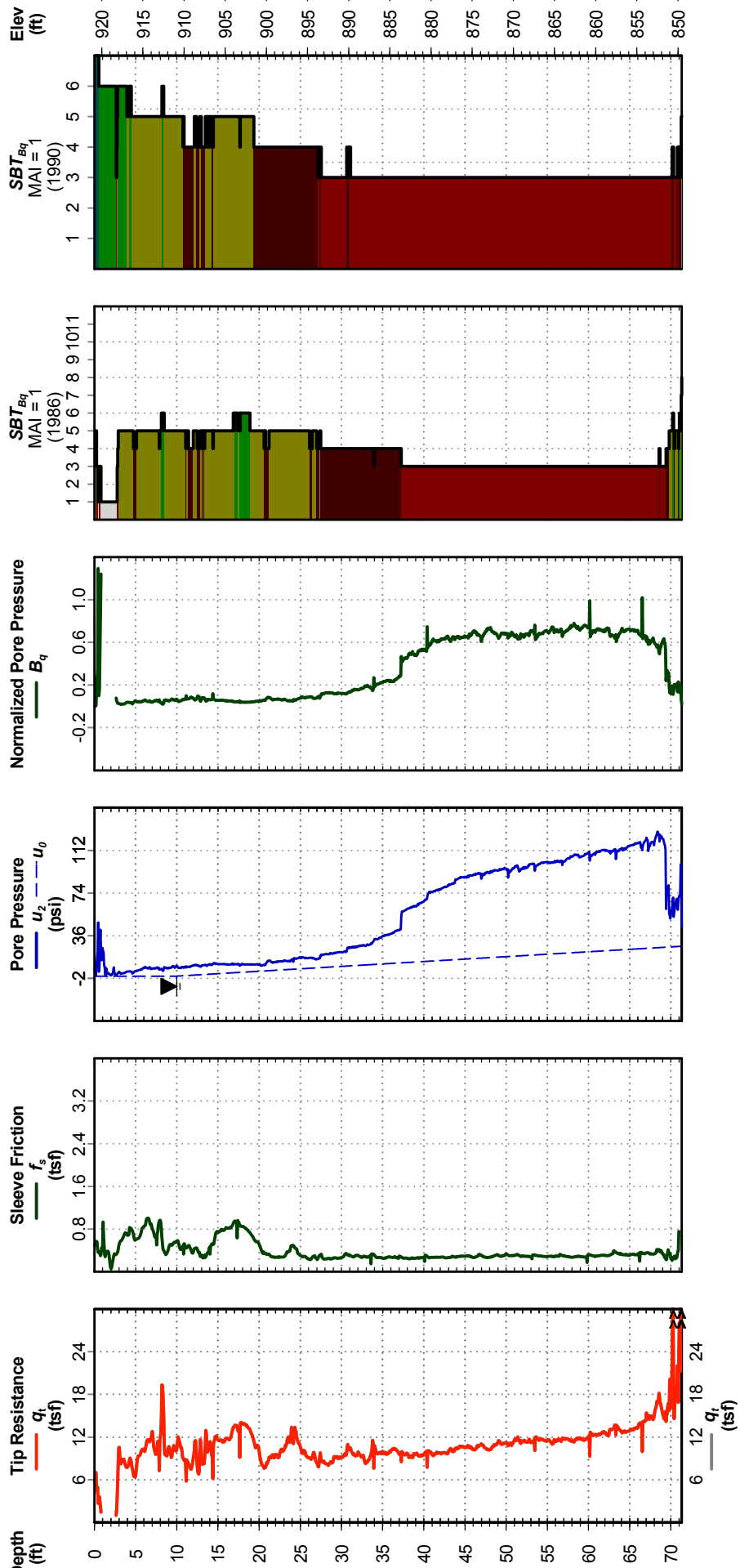
Longitude: -96° 55' 4.8"

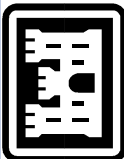
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 920.9

Water Depth: 10.01

Total Depth: 71.3 ft





Fargo Red River Diversion

Cone Penetration Test 11-112-C

Project No: FY 2011

Date: Jan. 11, 2011

Latitude: 46° 43' 40.512"

Elevation: 915.3

Operator: Johnston

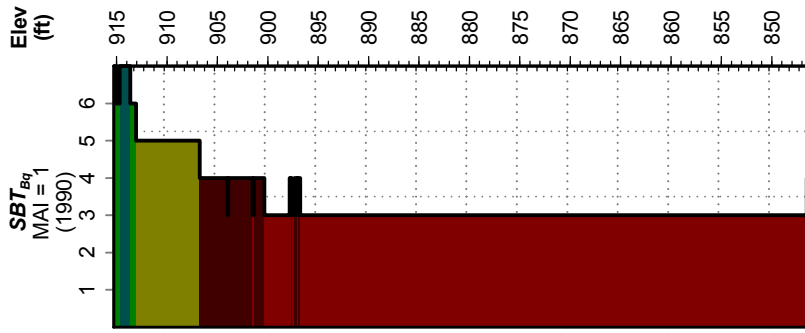
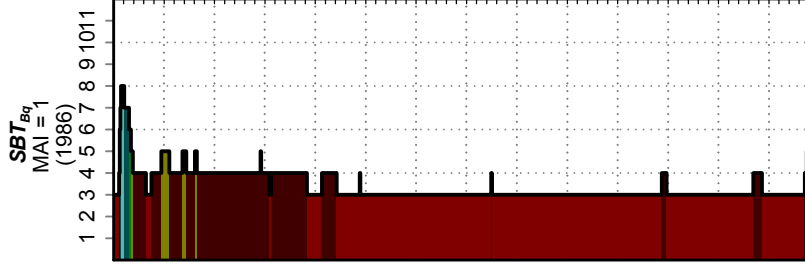
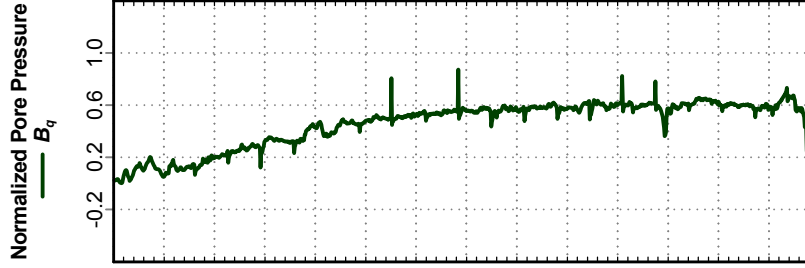
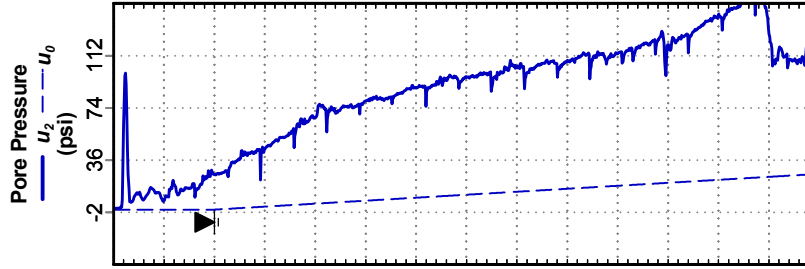
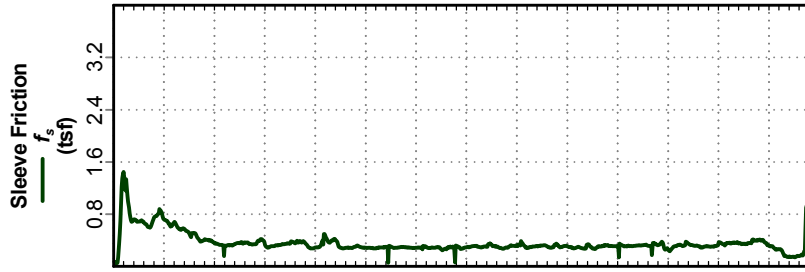
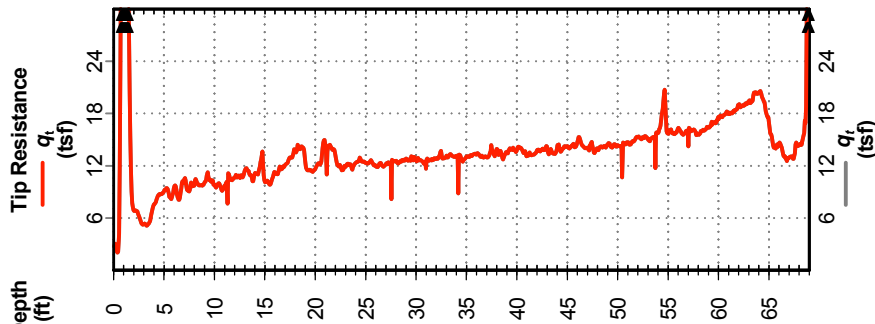
Longitude: -96° 54' 49.068"

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 69.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-113-C

Project No: FY 2011

Date: Jan. 12, 2011

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 43' 17.76"

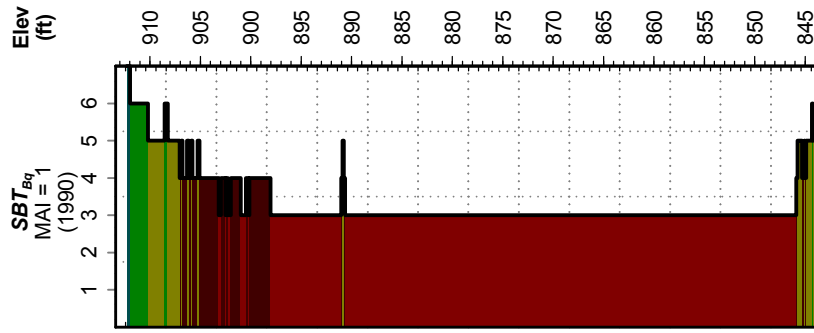
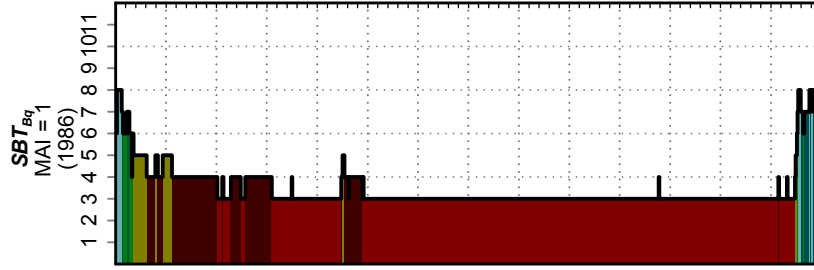
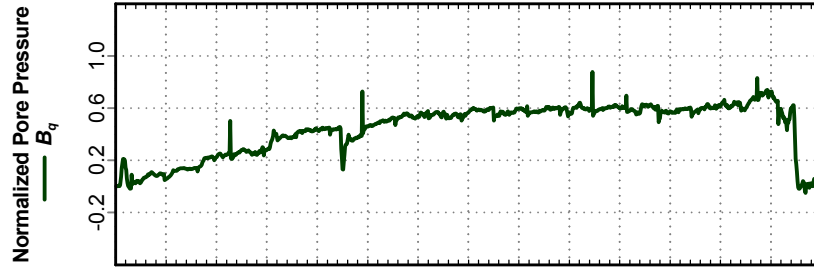
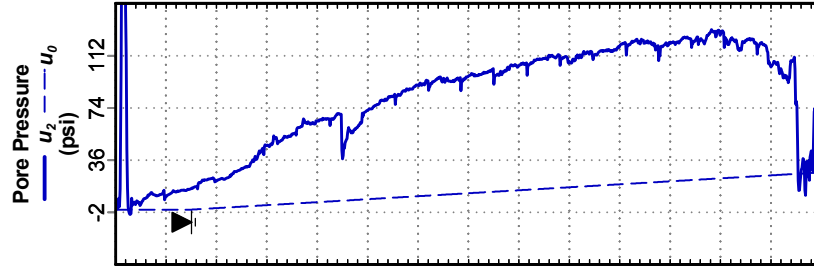
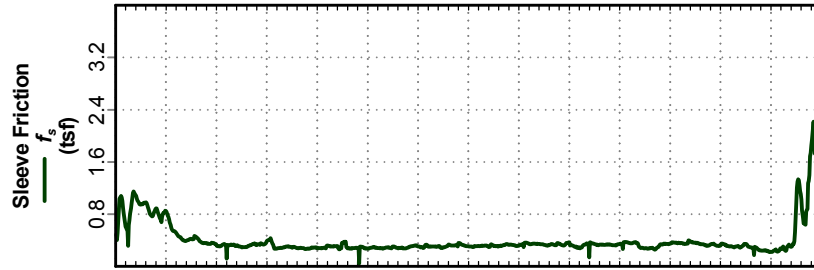
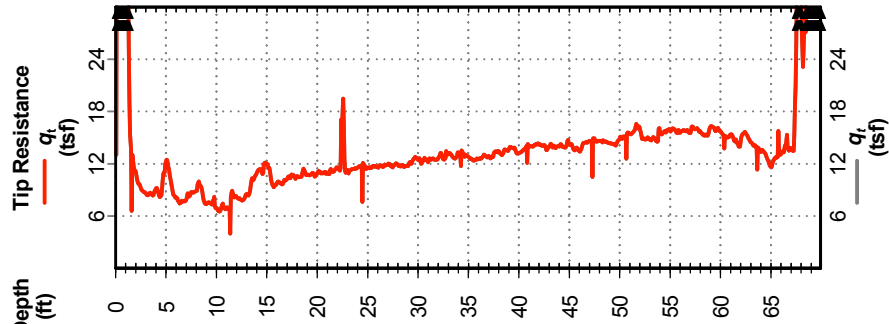
Longitude: -96° 53' 32.244"

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 913.4

Water Depth: 7.51

Total Depth: 70.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-114-C

Project No: FY 2011

Date: Jan. 12, 2011

Latitude: 46° 43' 1.416"

Elevation: 916.2

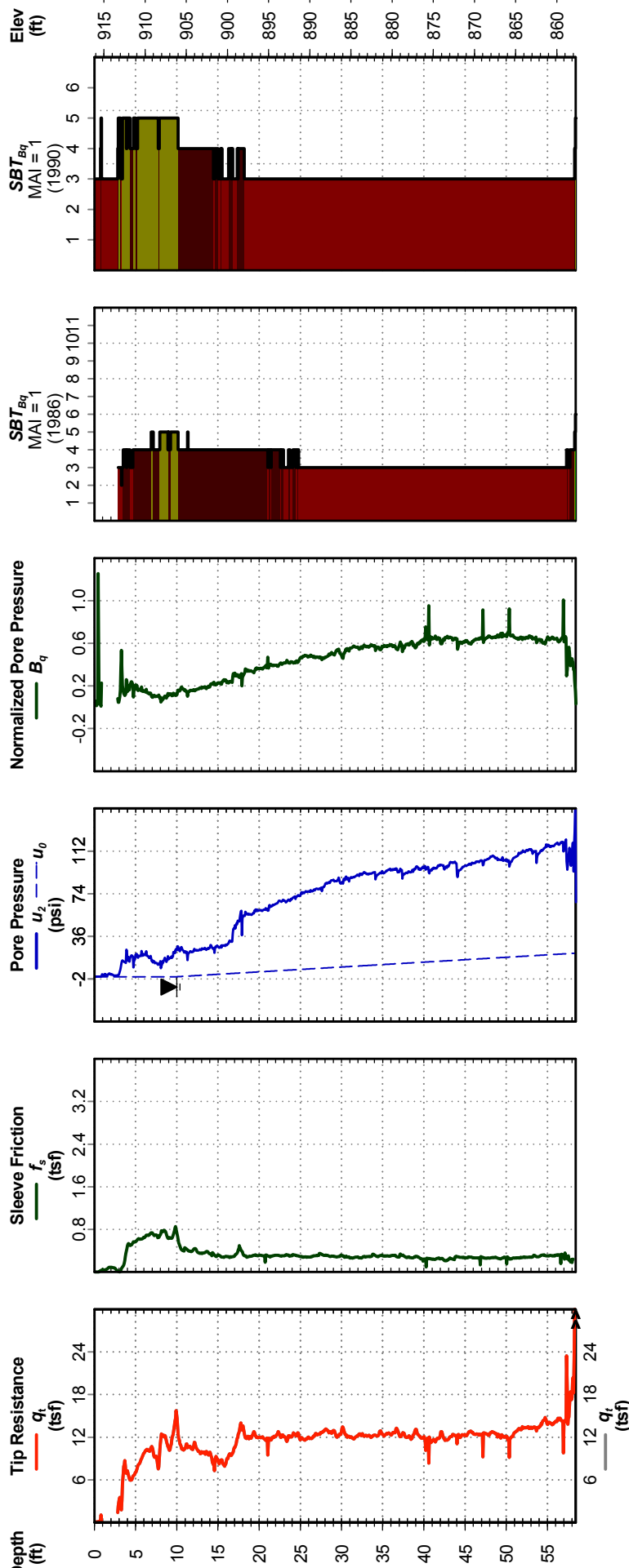
Operator: Johnston

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 58.5 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-115-C

Project No: FY 2011

Date: Jan. 13, 2011

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 42' 47.592"

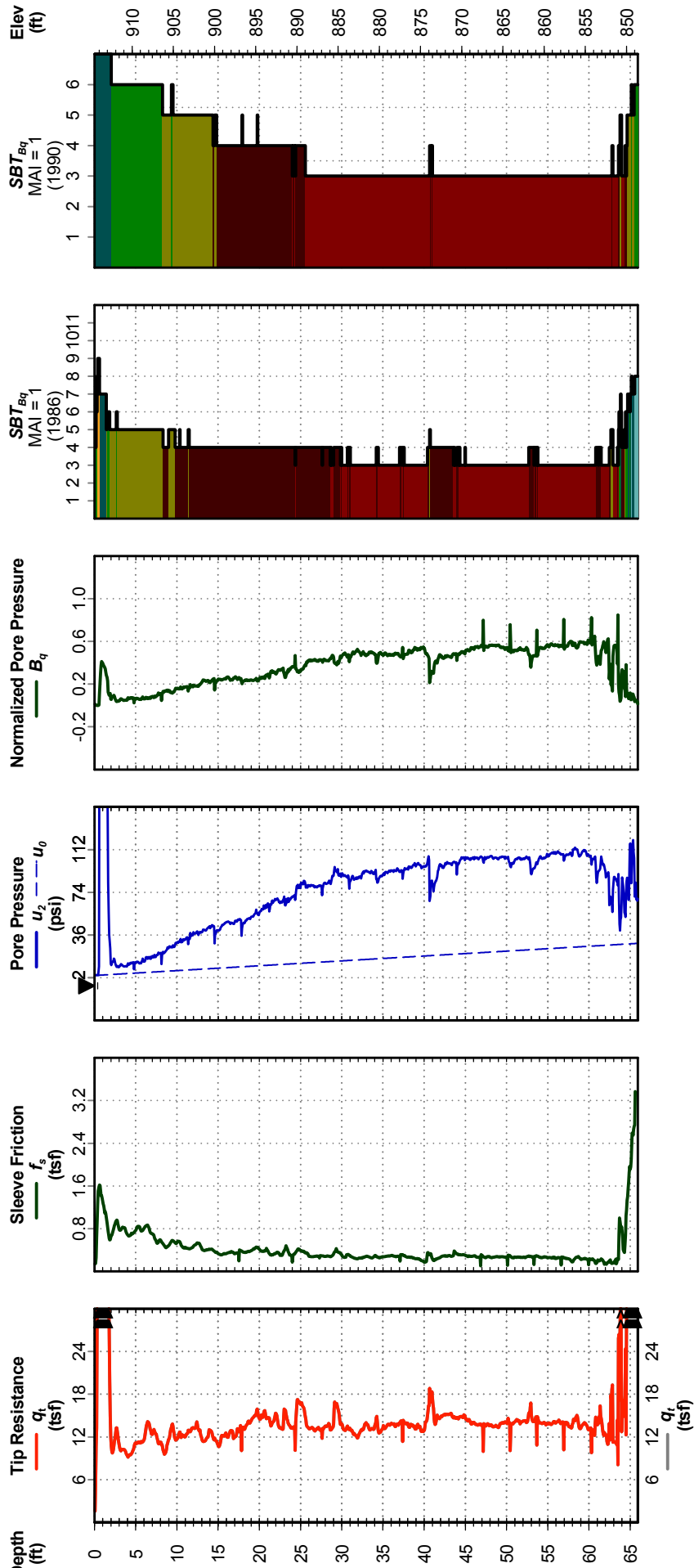
Longitude: -96° 53' 0.6"

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 914.6

Water Depth: 0

Total Depth: 65.9 ft







# Fargo Red River Diversion

# Cone Penetration Test 11-116-C

Project No: FY 2011

Date: Jan. 14, 2011

Latitude: 46° 41' 47.4"

Elevation: 913.5

Operator: Johnston

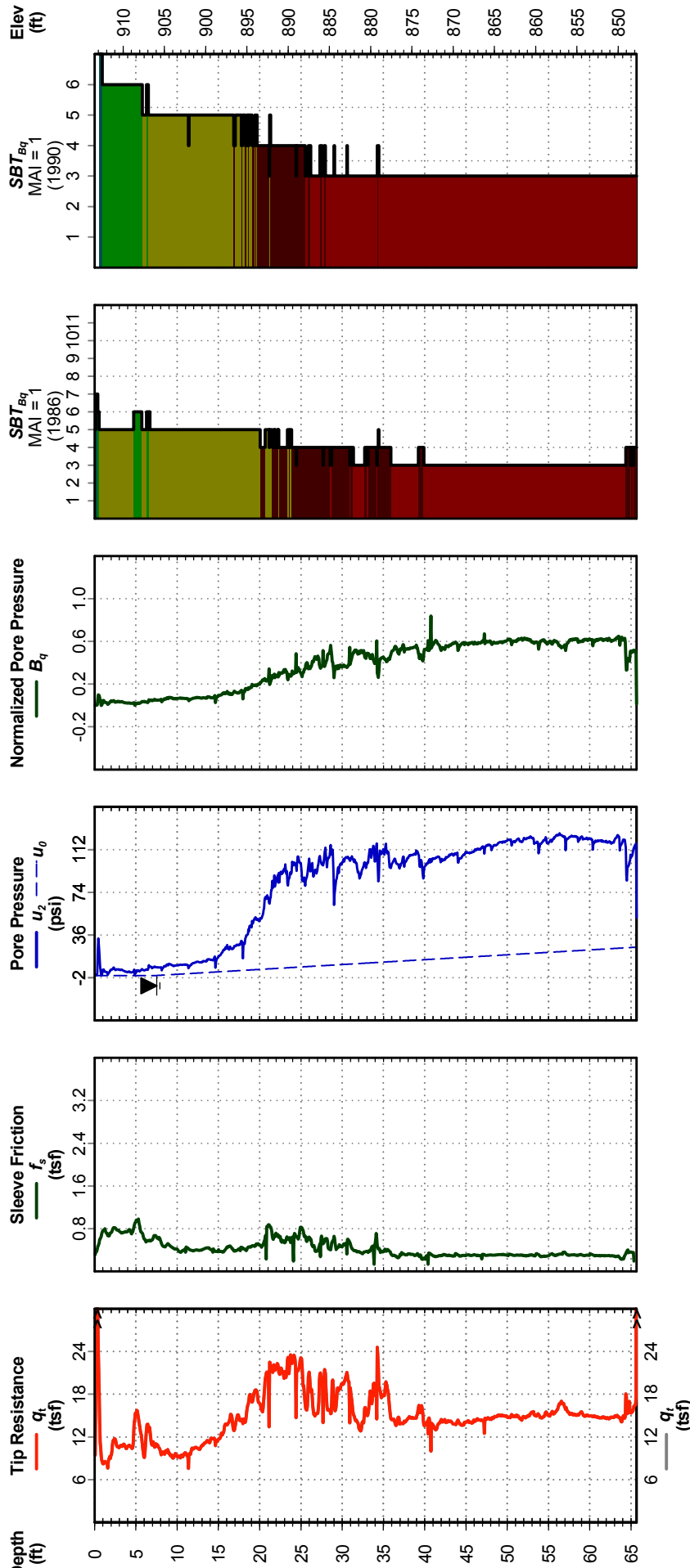
Longitude: -96° 50' 30.948"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 65.7 ft





# Fargo Red River Diversion

Project No: FY 2011

Date: Jan. 15, 2011

Operator: Johnston

Drilling Agency: USACE, Savannah District

# Cone Penetration Test 11-117-C

Latitude: 46° 42' 2.412"

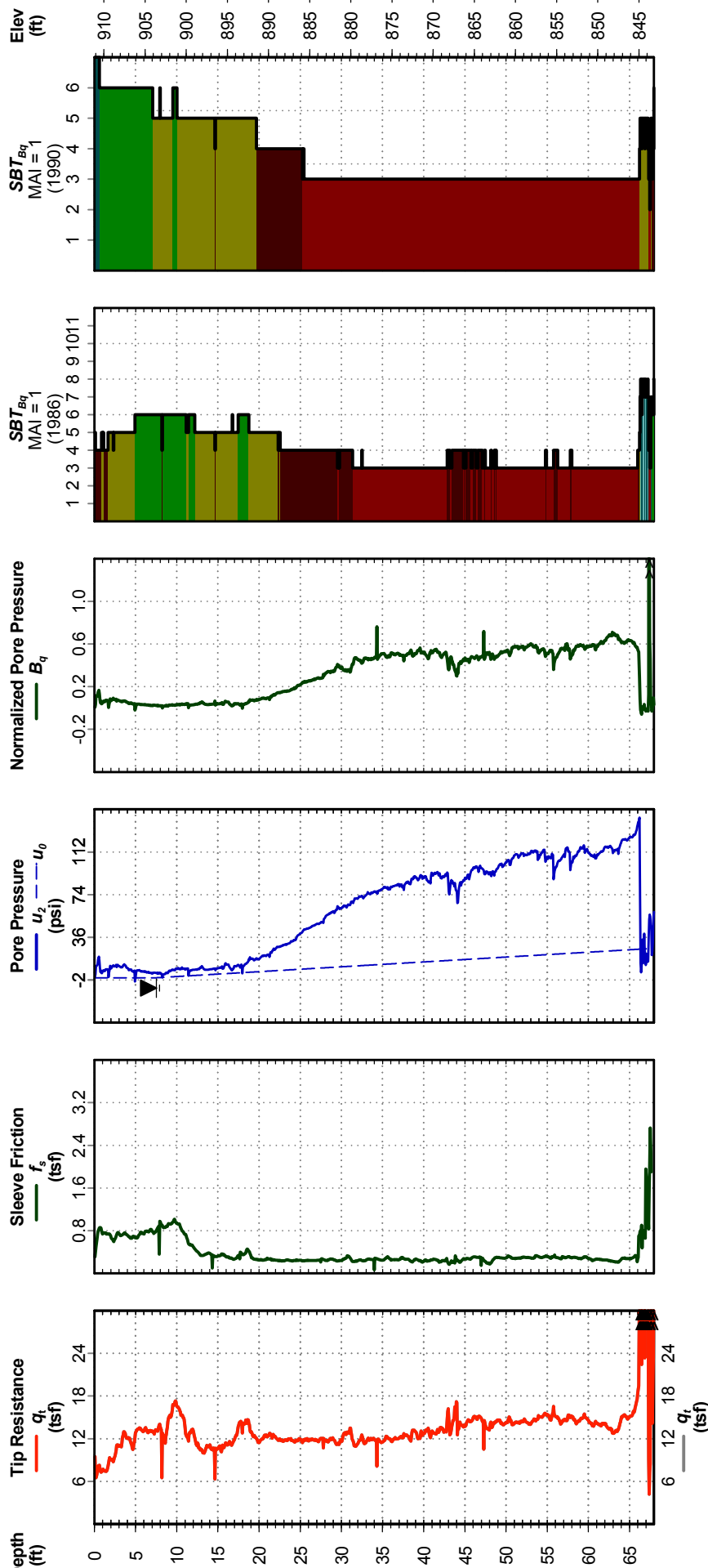
Longitude: -96° 50' 16.332"

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 911.2

Water Depth: 7.51

Total Depth: 68.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-118-Ca

Project No: FY 2011

Date: Jan. 15, 2011

Latitude: 46° 41' 58.56"

Elevation: 912.7

Operator: Johnston

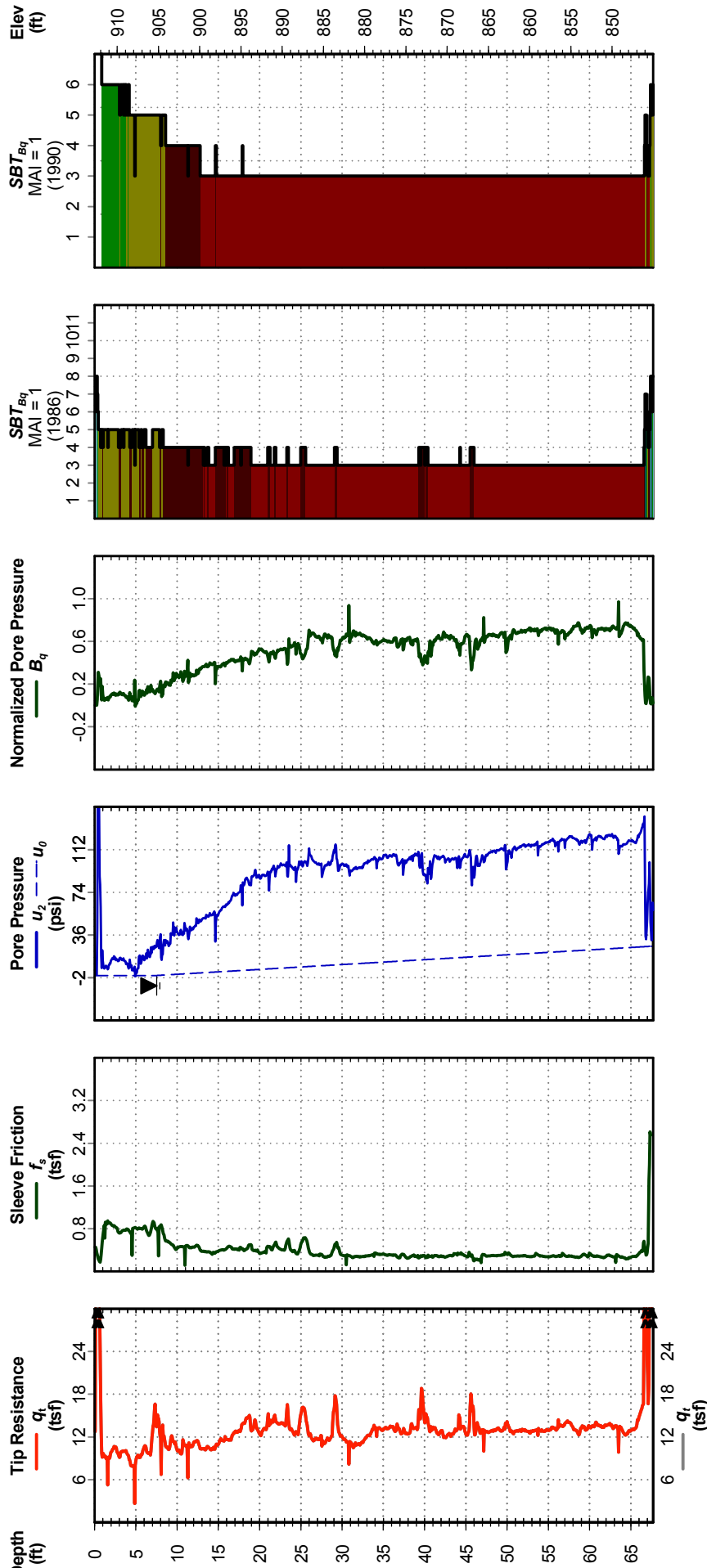
Longitude: -96° 50' 12.948"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 67.7 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-119-C

Project No: FY 2011

Date: Jan. 16, 2011

Latitude: 46° 42' 4.5"

Elevation: 917.6

Operator: Johnston

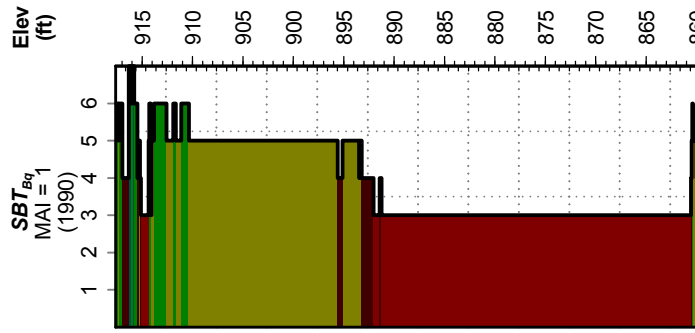
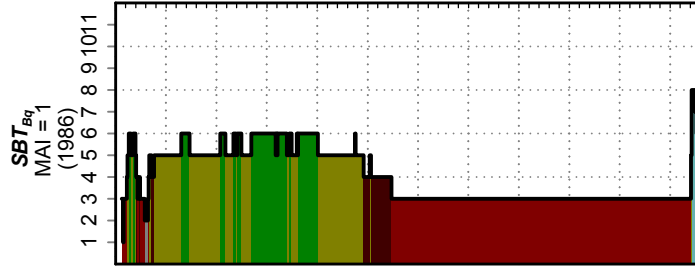
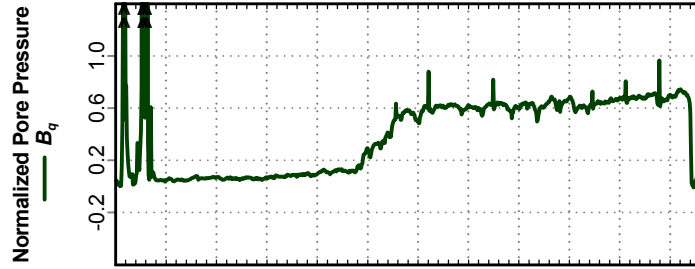
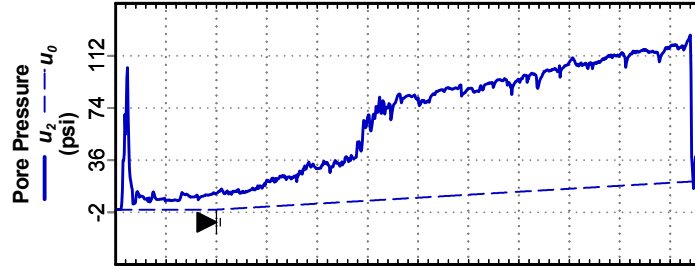
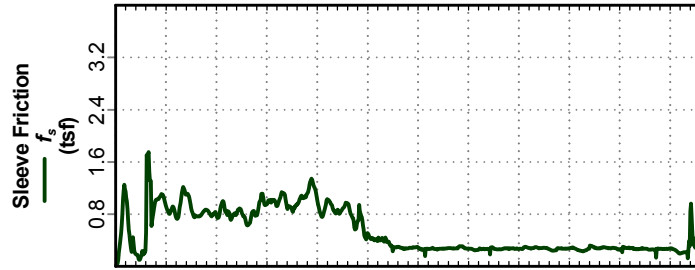
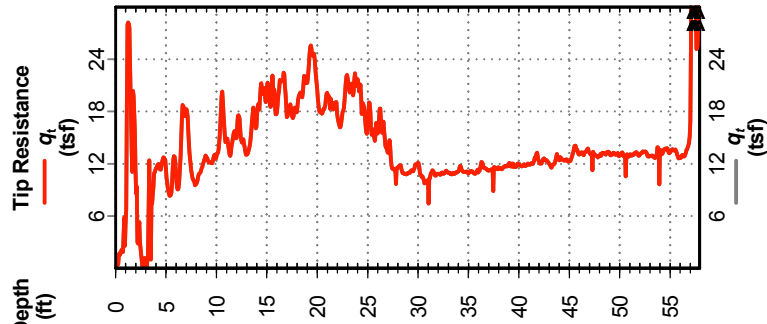
Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Longitude: -96° 47' 19.248"

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 57.9 ft







# Fargo Red River Diversion

# Cone Penetration Test 11-121-C

Project No: FY 2011

Date: Jan. 17, 2011

Latitude: 46° 41' 55.572"

Elevation: 911.1

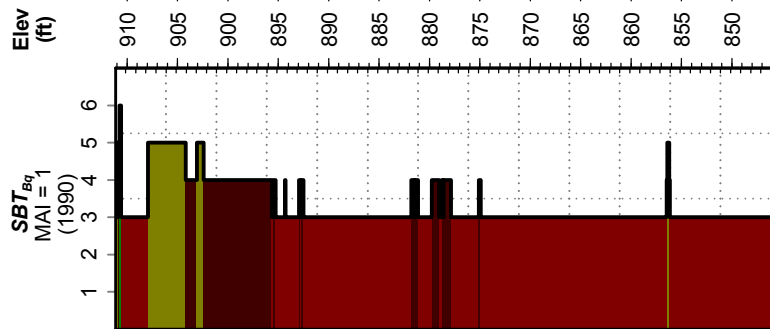
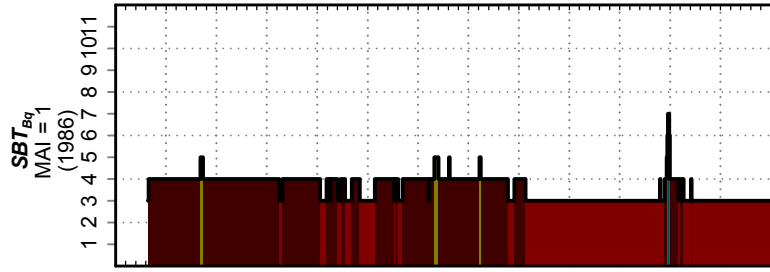
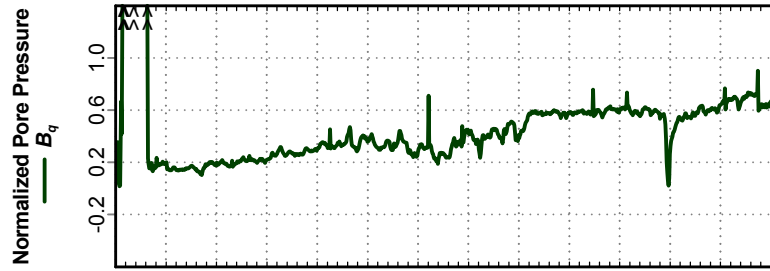
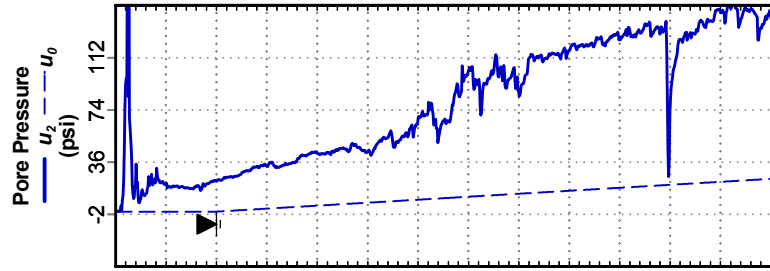
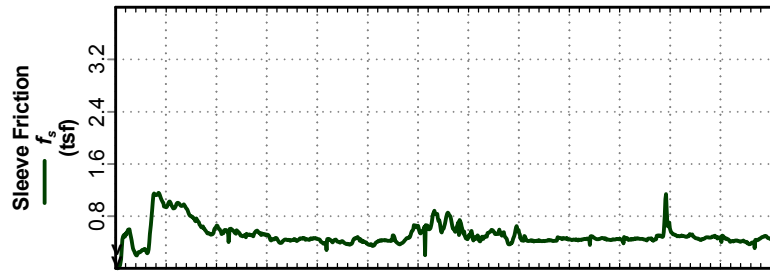
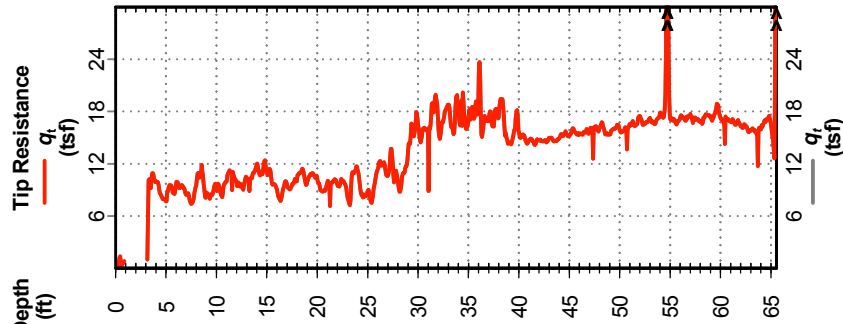
Operator: Johnston

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 65.6 ft











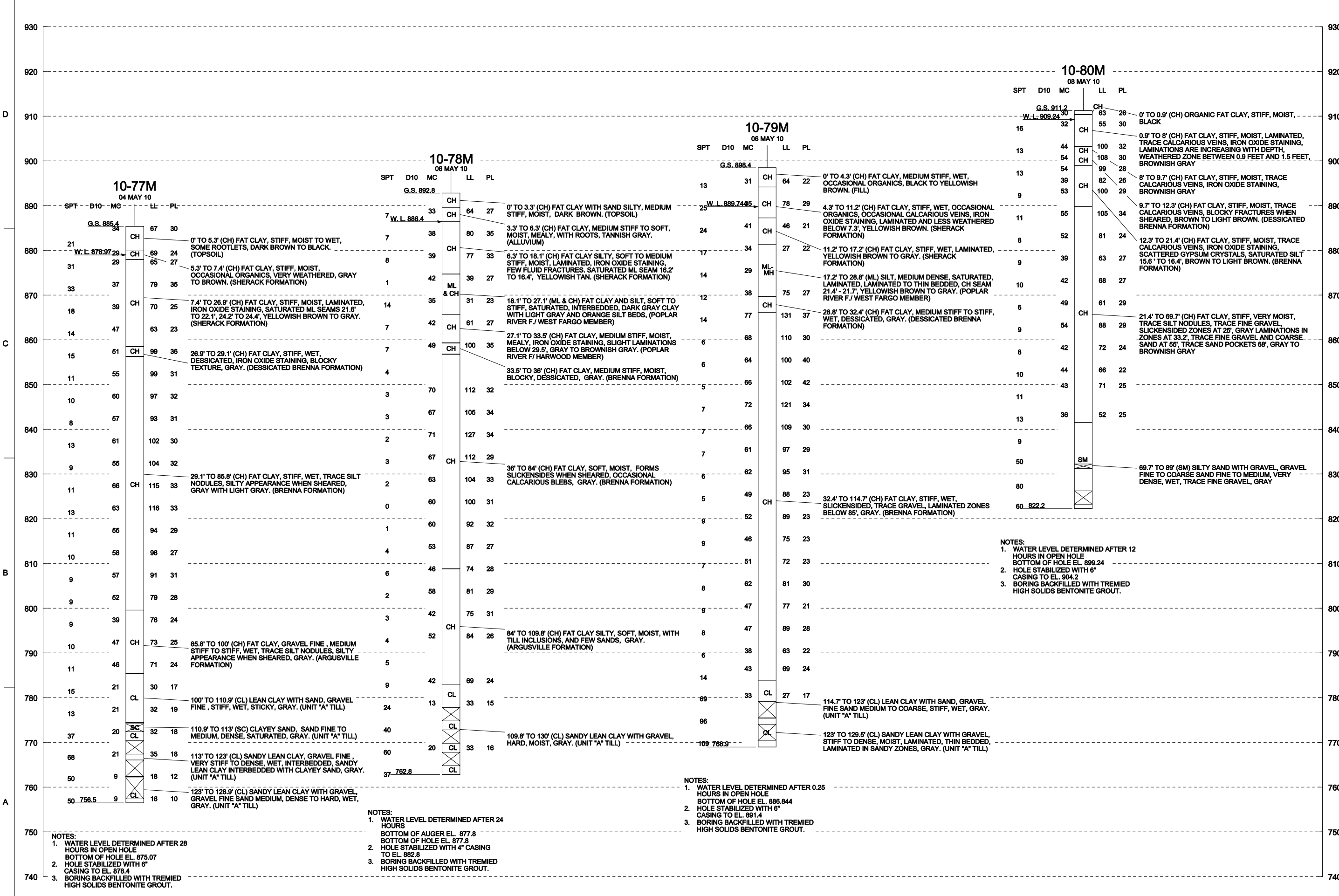












DATE	DESCRIPTION	MARK	DATE	DESCRIPTION	MARK

DESIGNED BY: DATE: 05/04/2010	CONTRACT NO.:
DRAWN BY: KAH	FILE NUMBER:
SUBMITTED BY:	FILE NAME: PMHFR_MCOR_B-224.mxd
PLOT SCALE: 1"=20'	SIZE: 11x17

U.S. ARMY CORPS OF ENGINEERS  
ST. PAUL DISTRICT  
ST. PAUL, MINNESOTA

FARGO-MOORHEAD METRO FEASIBILITY STUDY  
RED RIVER OF THE NORTH  
FARGO NORTH DAKOTA, MOORHEAD MINNESOTA  
MOORHEAD, MN  
BORING LOGS  
MOORHEAD  
10-77M - 10-80M

SHEET IDENTIFICATION  
**B-224**



















Fargo Moorehead

# Cone Penetration Test 09-ED-11C

Date: Jun. 19, 2009

Northing: 1985347.371

Elevation: 888.2

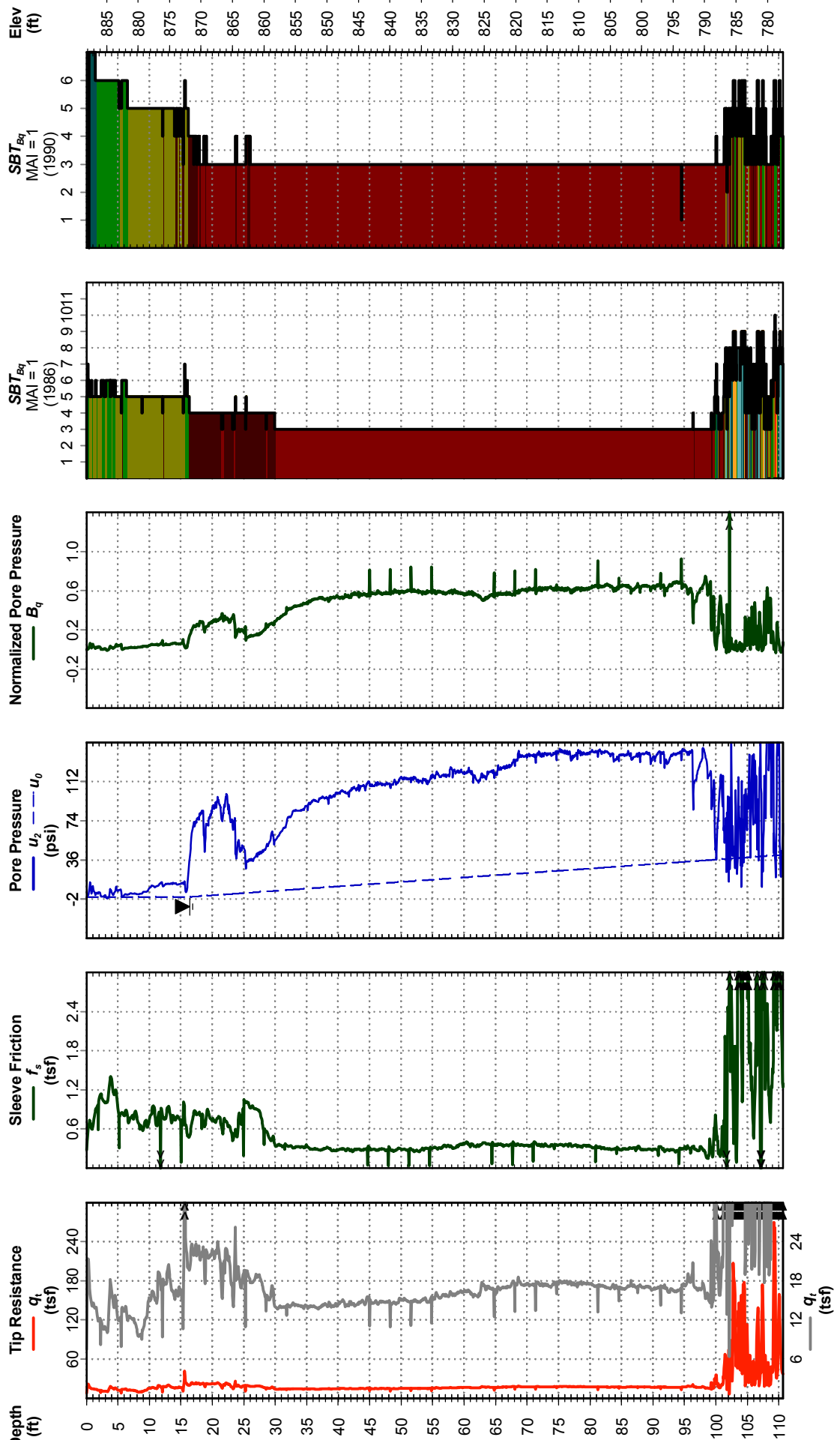
Operator: MARKOV

Water Depth: 16.4

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DSG1071 / 0.8

Total Depth: 110.7 ft





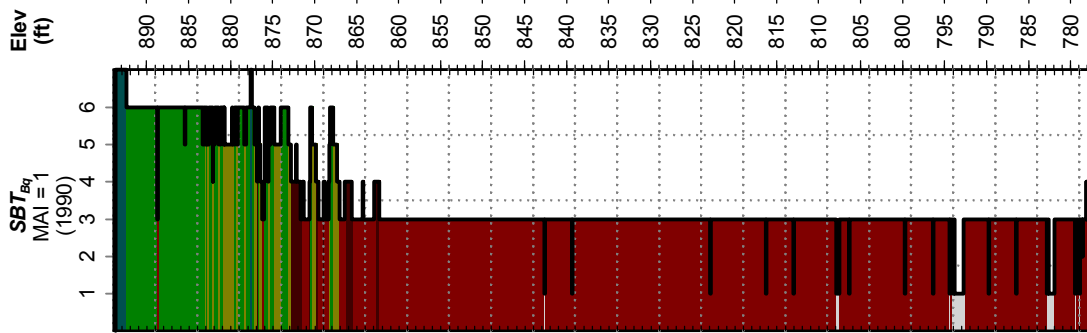
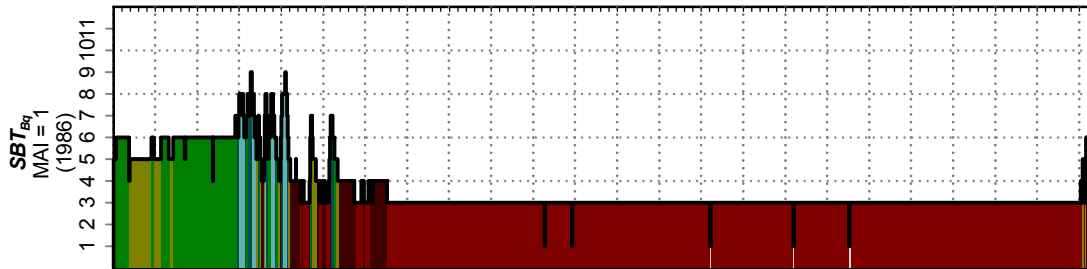
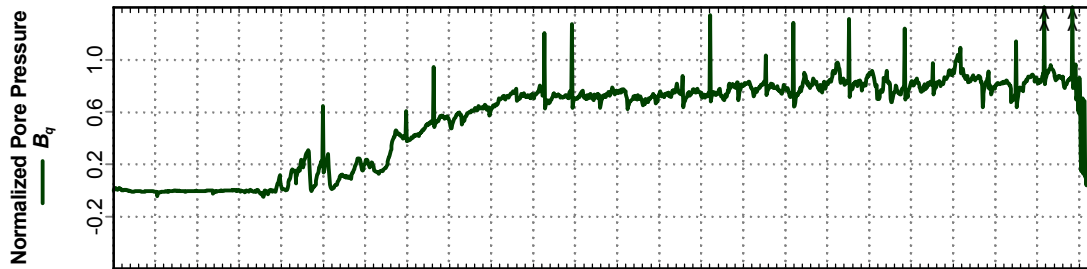
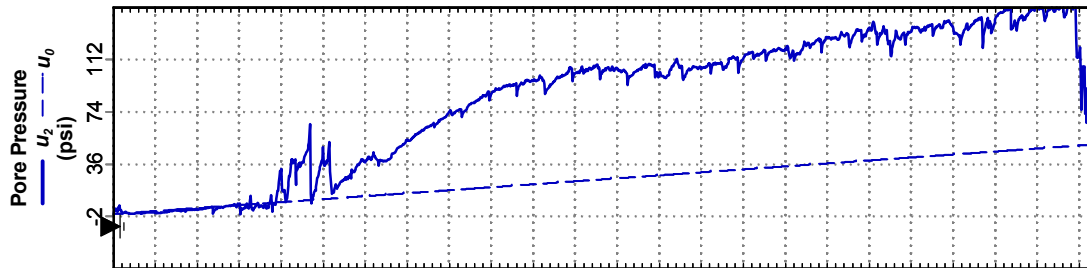
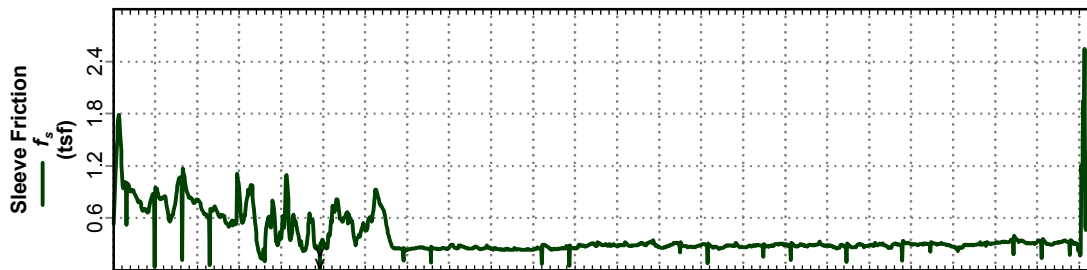
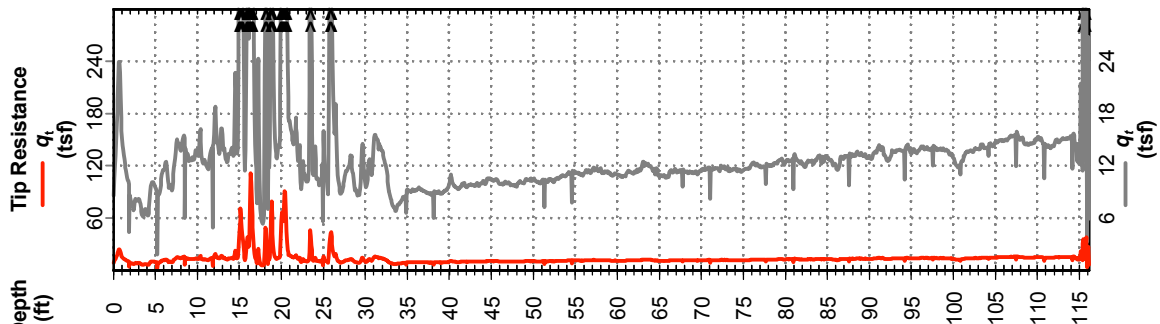
Fargo Moorehead

# Cone Penetration Test 09-ED-12C

Date: Jun. 20, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 2005250.814  
Easting: 1064018.93  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 894.0  
Water Depth: 0.82  
Total Depth: 116.1 ft









Fargo Moorehead

# Cone Penetration Test 09-ED-14C

Date: Jun. 21, 2009

Operator: MARKOV

Drilling Agency: USACE, Savannah District

Northing: 2019148.353

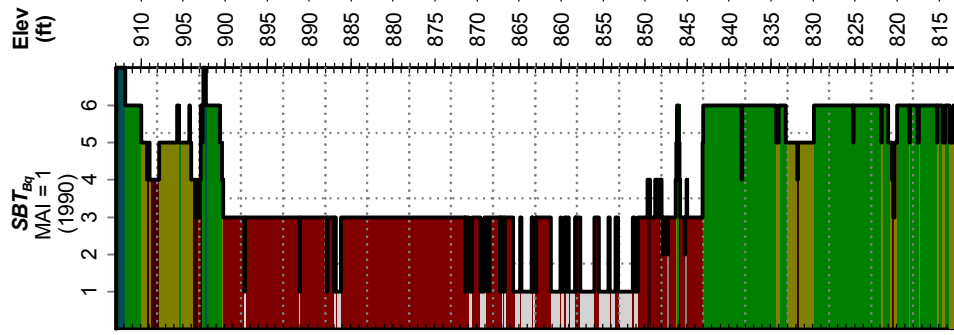
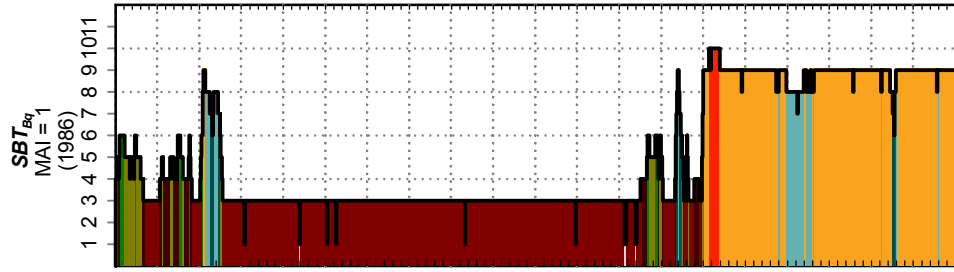
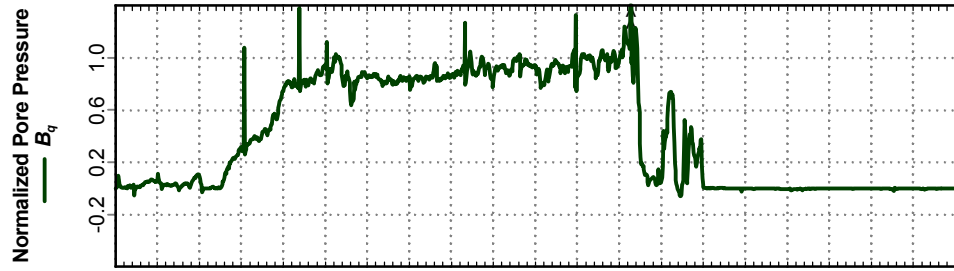
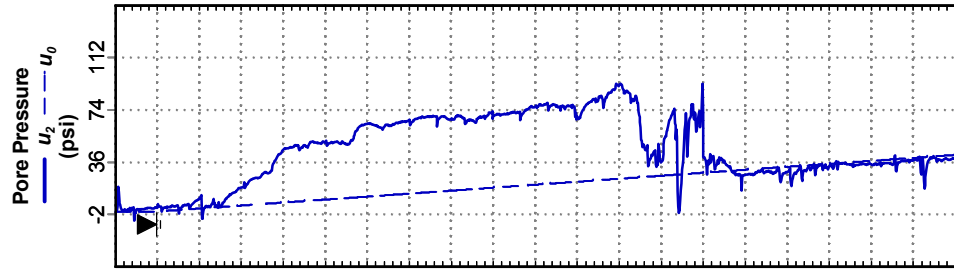
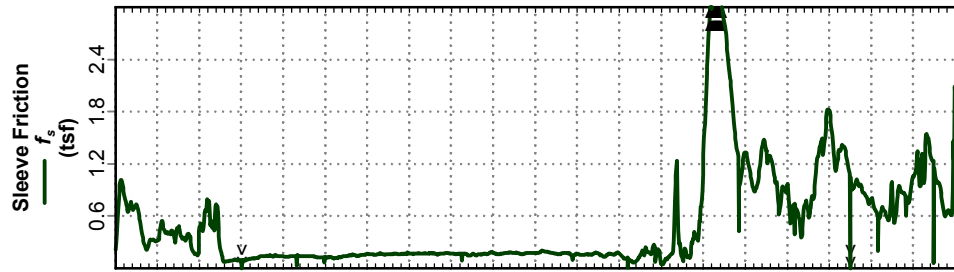
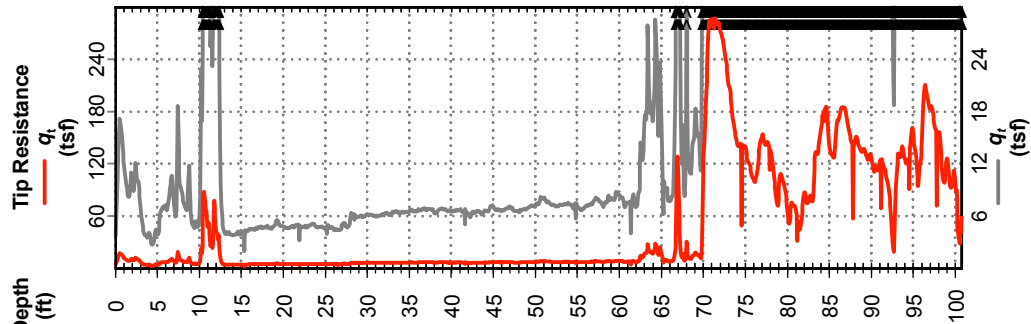
Eastings: 1032092.853

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 913.1

Water Depth: 4.89

Total Depth: 100.8 ft





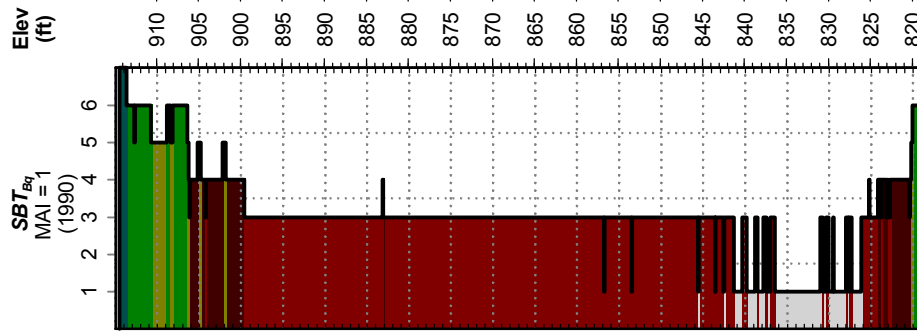
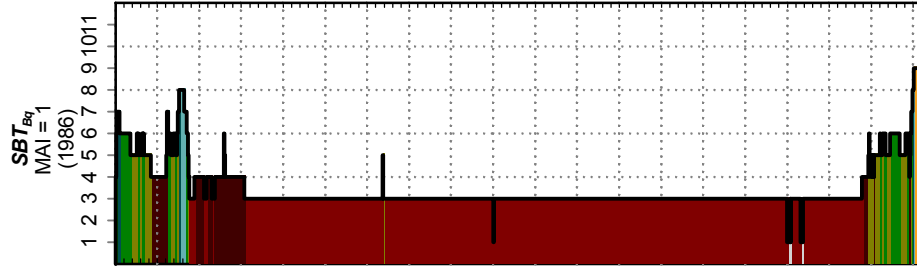
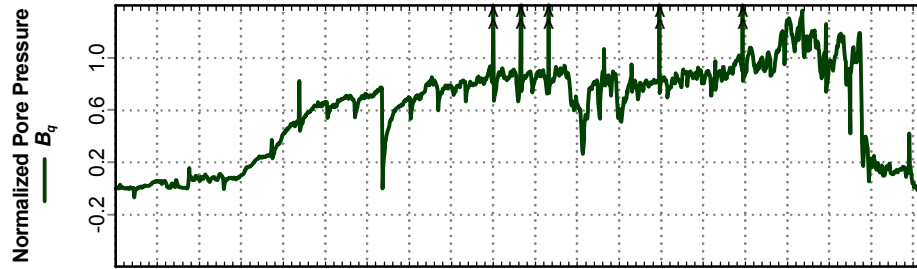
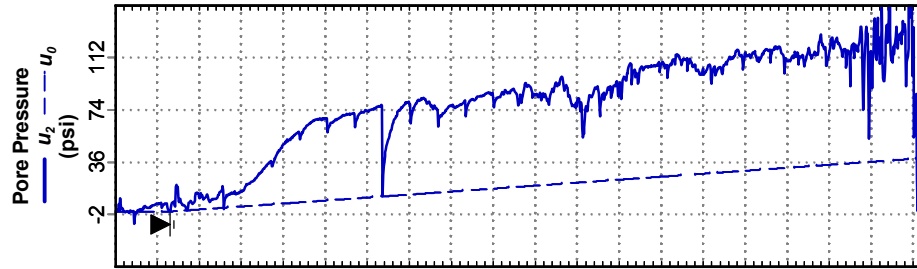
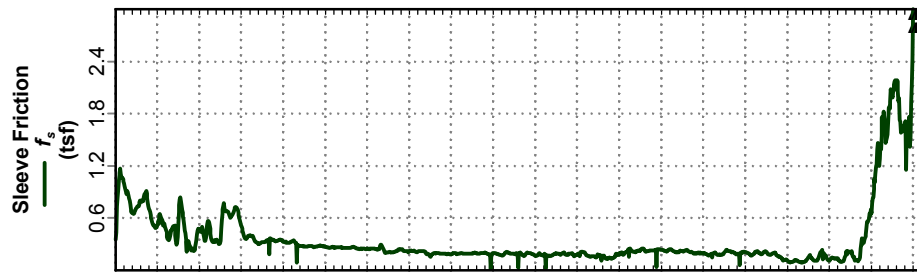
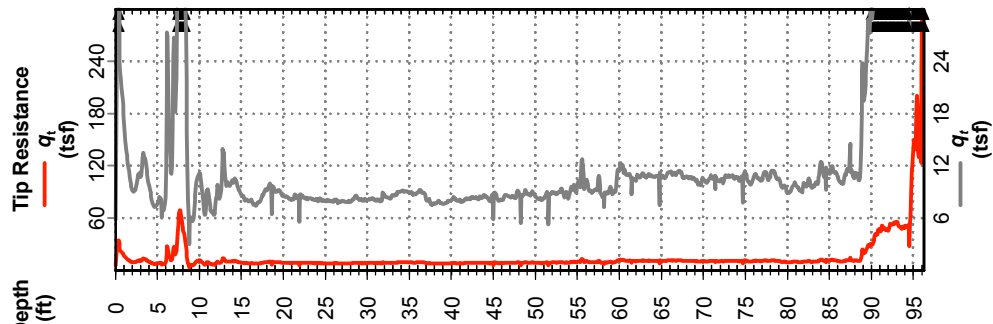
Fargo Moorehead

# Cone Penetration Test 09-ED-15C

Date: Jun. 21, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 2018445.437  
Easting: 1005853.612  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 914.9  
Water Depth: 6.5  
Total Depth: 96.3 ft











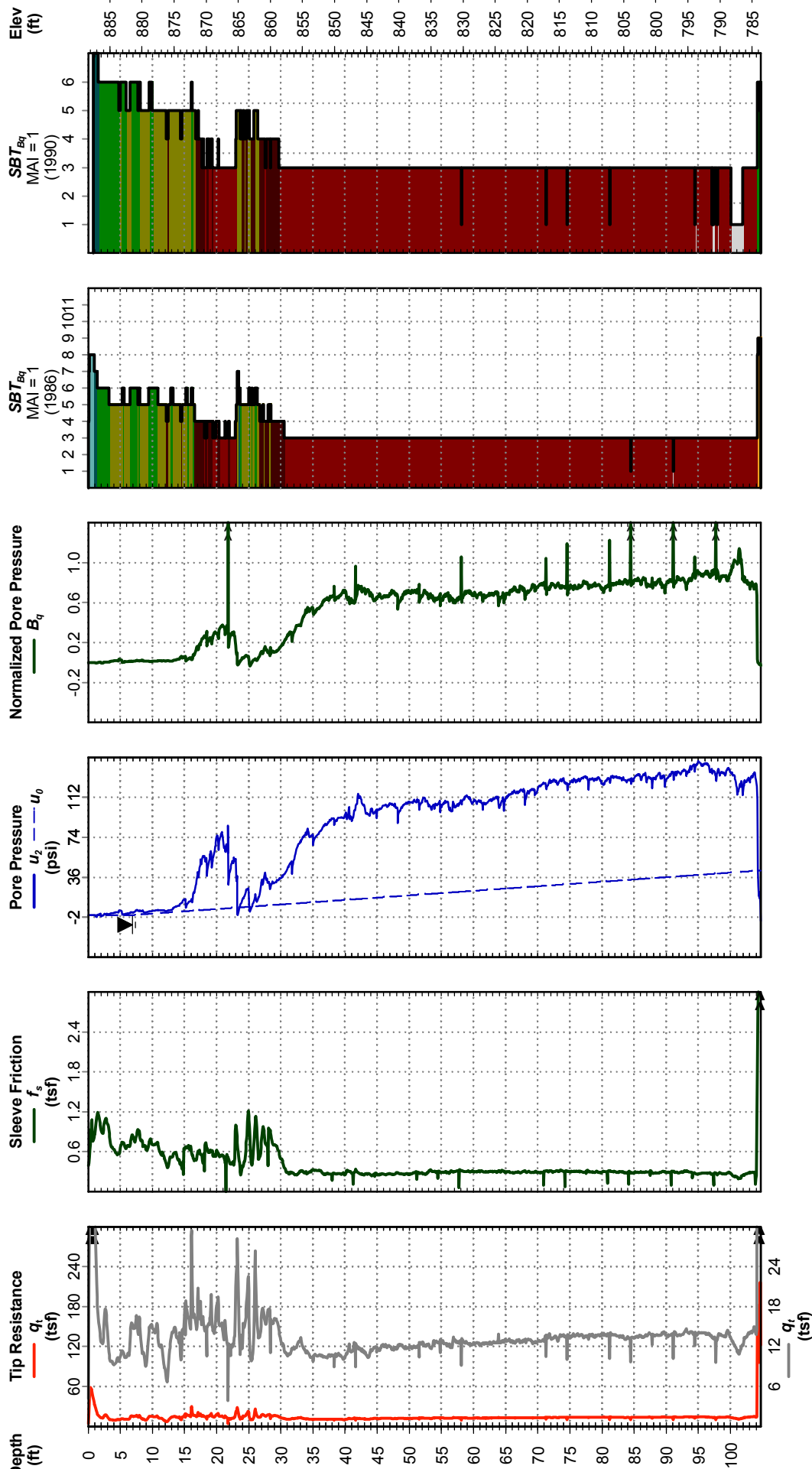
Fargo Moorehead

# Cone Penetration Test 09-ED-28C

Date: Jul. 7, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 1989657.367  
Easting: 1069764.57  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 888.4  
Water Depth: 6.89  
Total Depth: 104.7 ft









Fargo Moorehead

# Cone Penetration Test 09-ED-29C

Date: Jul. 7, 2009

Operator: MARKOV

Drilling Agency: USACE, Savannah District

Northing: 2000144.994

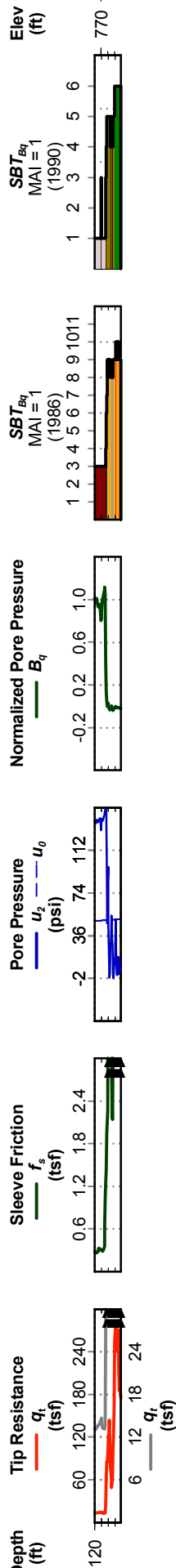
Easting: 1069476.461

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 891.0

Water Depth: 6.89

Total Depth: 123.8 ft







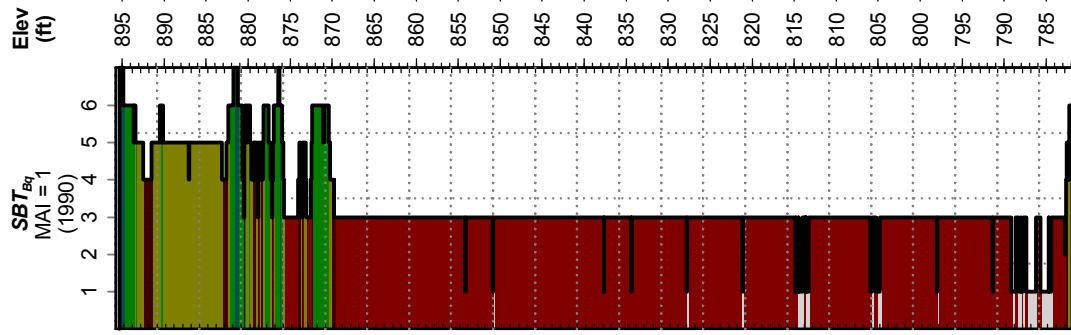
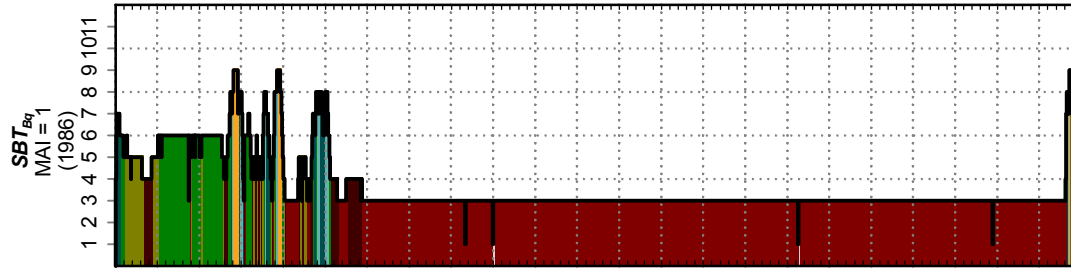
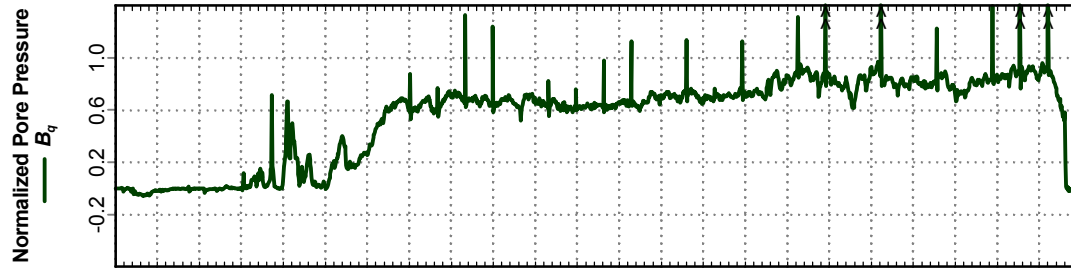
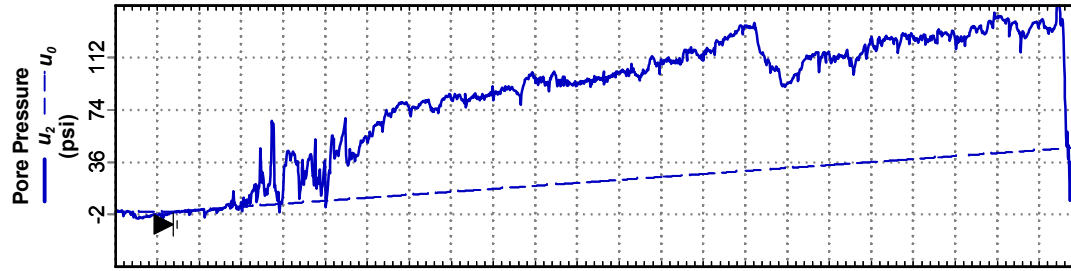
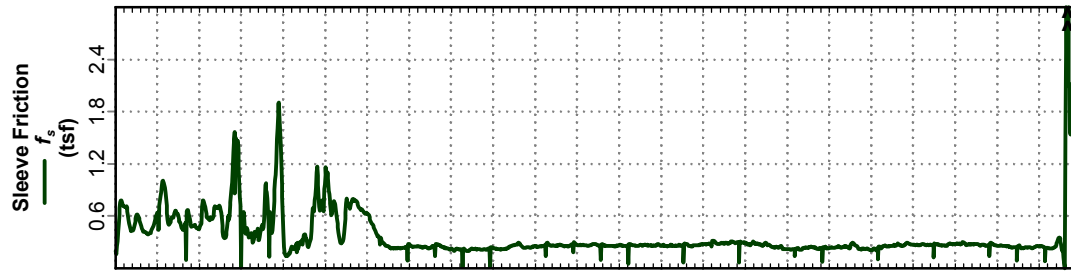
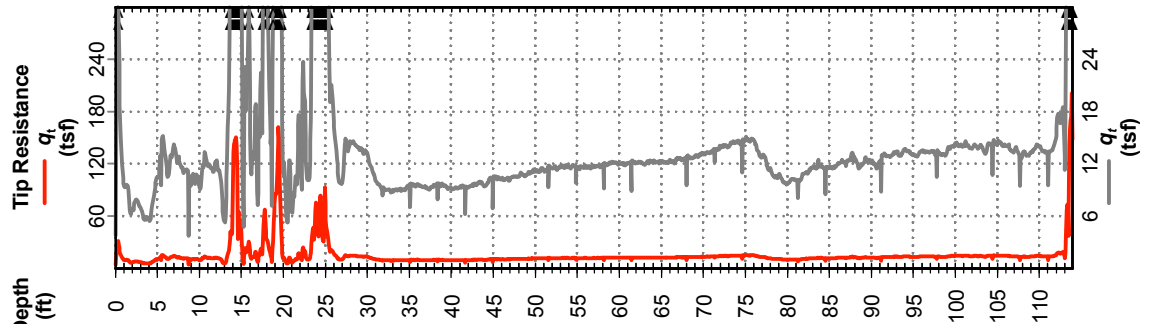
Fargo Moorehead

# Cone Penetration Test 09-ED-31C

Date: Jul. 8, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 2005180.111  
Easting: 1058817.526  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 895.8  
Water Depth: 6.89  
Total Depth: 113.9 ft





Fargo Moorehead

# Cone Penetration Test

## 09-ED-32C

Date: Jul. 8, 2009

Operator: MARKOV

Drilling Agency: USACE, Savannah District

Northing: 2012978.784

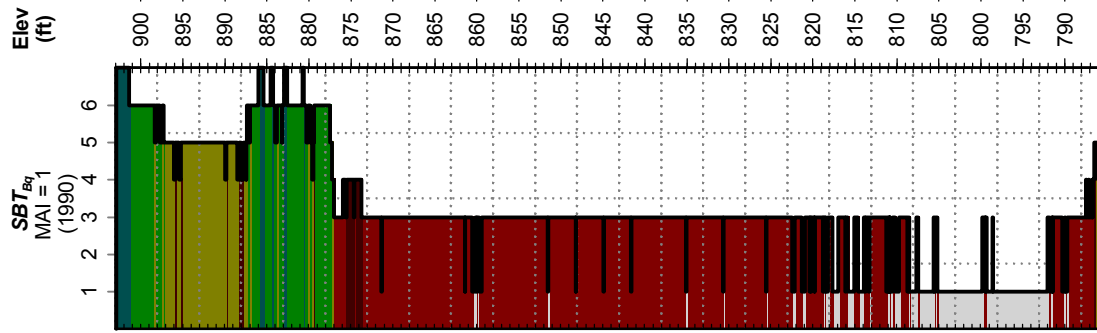
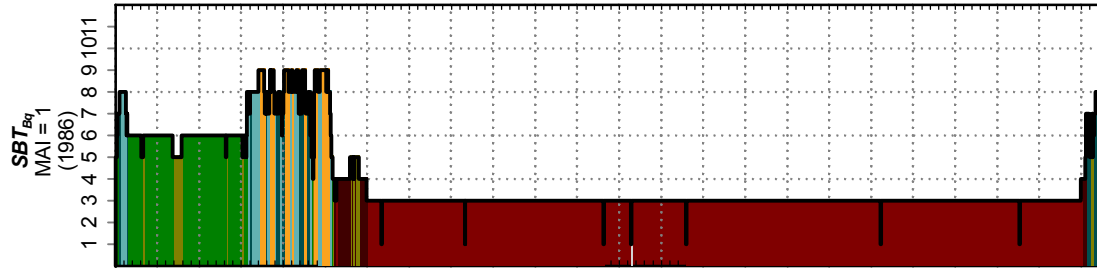
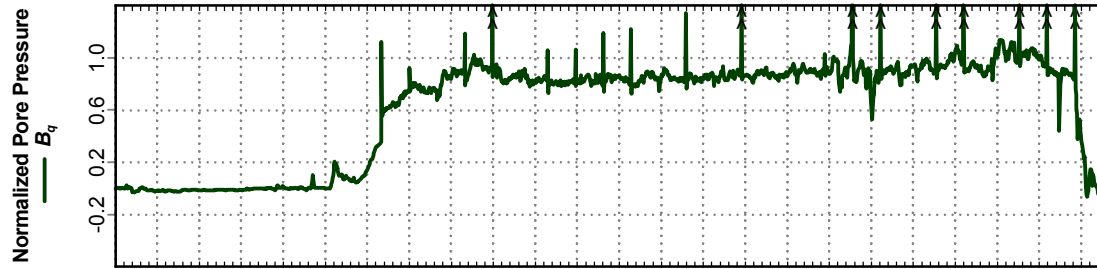
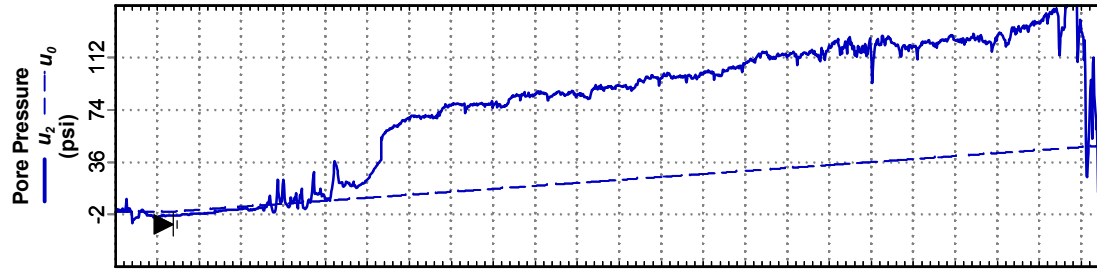
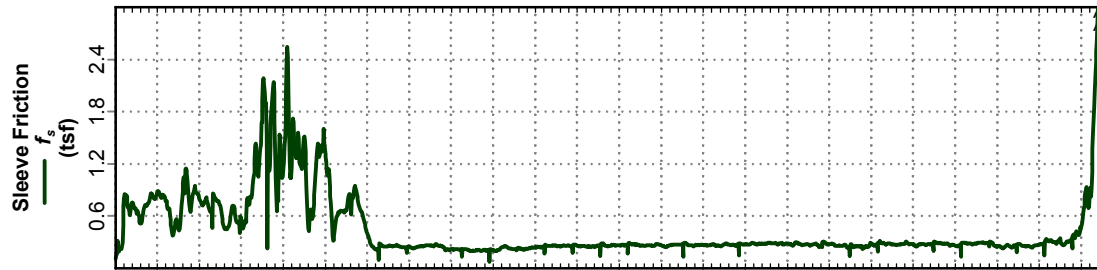
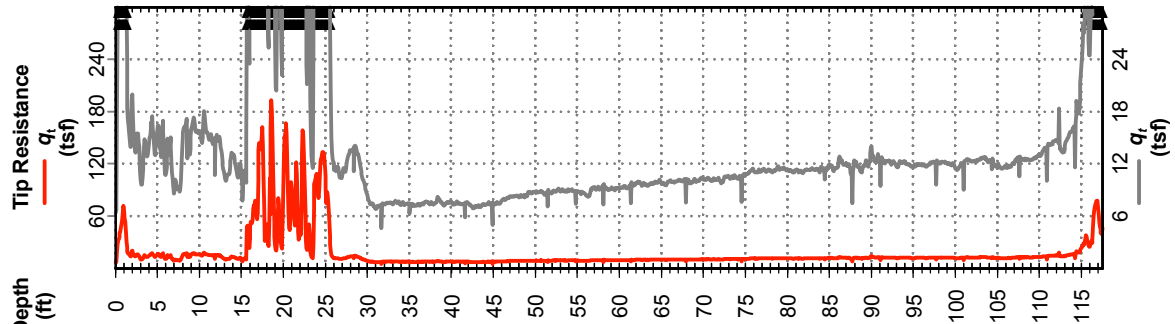
Eastings: 1058472.773

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 903.0

Water Depth: 6.89

Total Depth: 117.5 ft





Fargo Moorehead

# Cone Penetration Test 09-ED-33C

Date: Jul. 9, 2009

Operator: MARKOV

Drilling Agency: USACE, Savannah District

Northing: 2014279.359

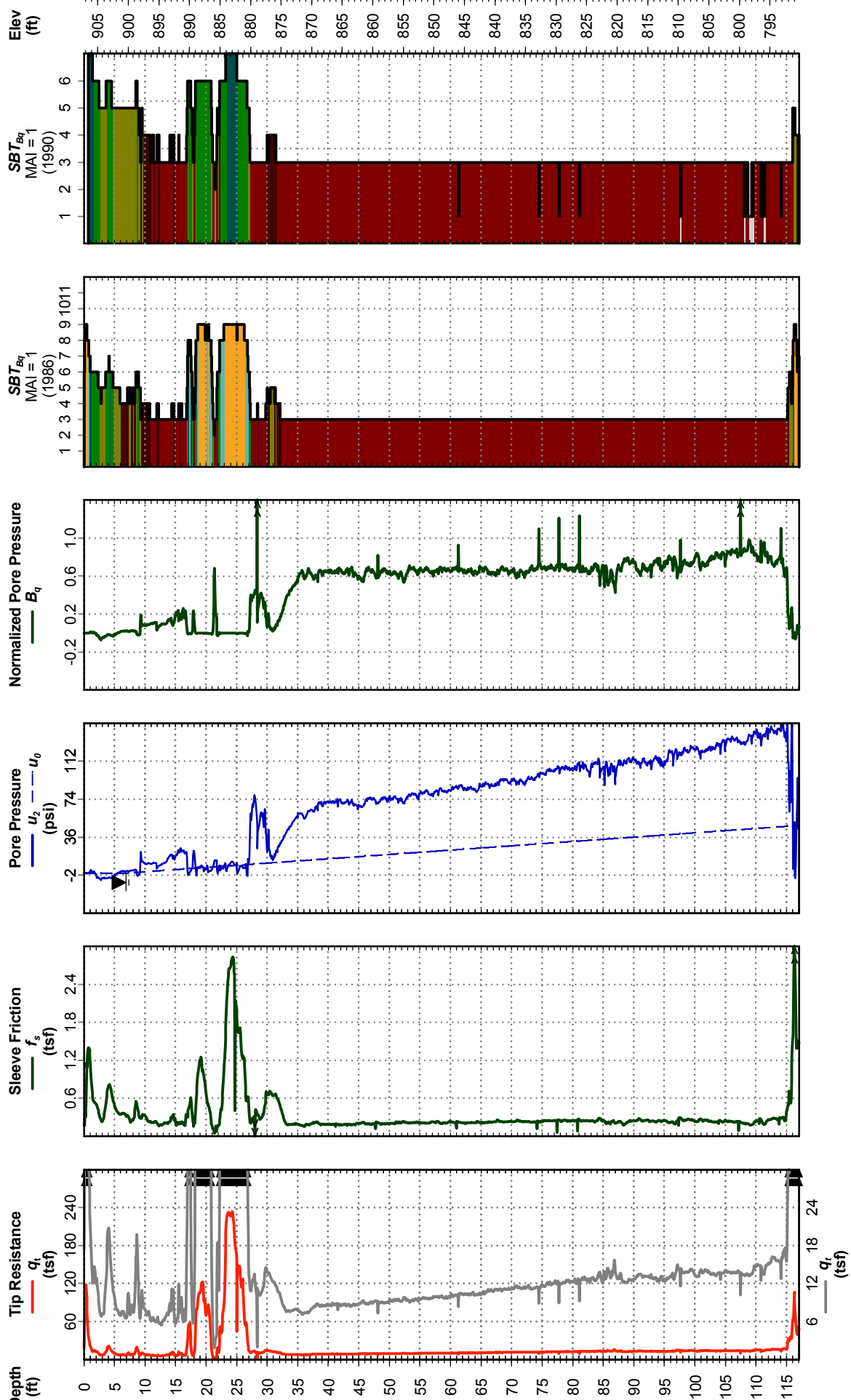
Easting: 1048182.44

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 907.3

Water Depth: 6.89

Total Depth: 117.1 ft





Fargo Moorehead

# Cone Penetration Test 09-M-34C

Date: Jul. 14, 2009

Northing: 1988877.165

Elevation: 908.2

Operator: MARKOV

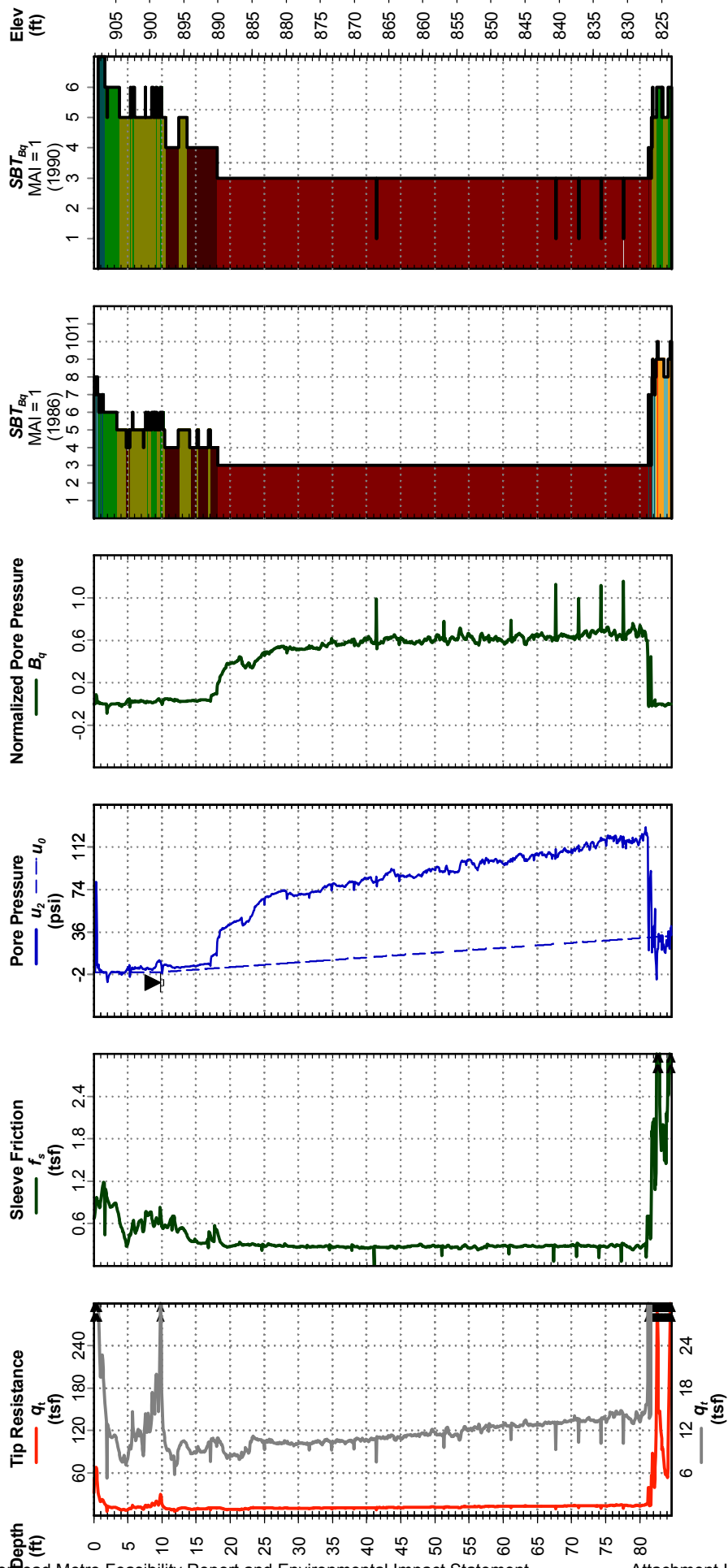
Eastings: 991064.019

Water Depth: 9.78

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 84.7 ft





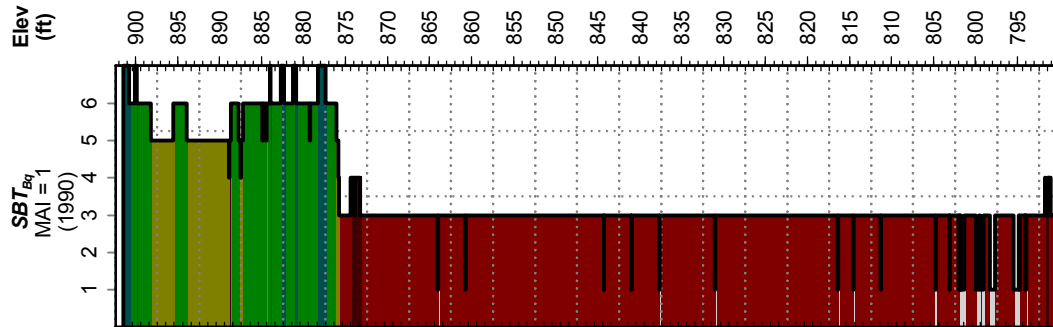
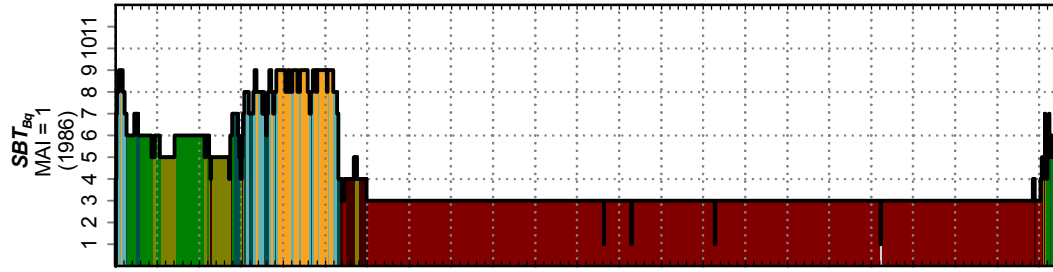
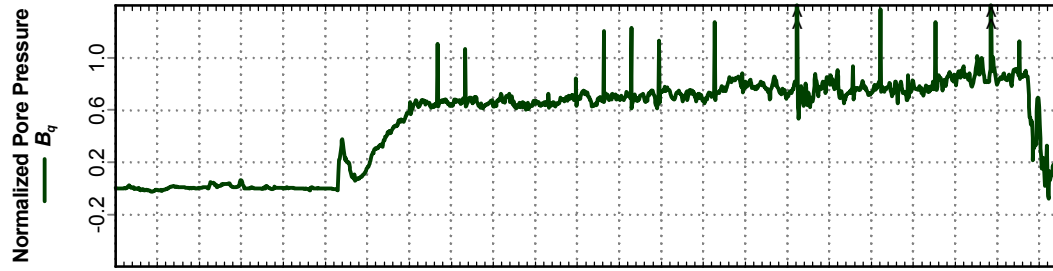
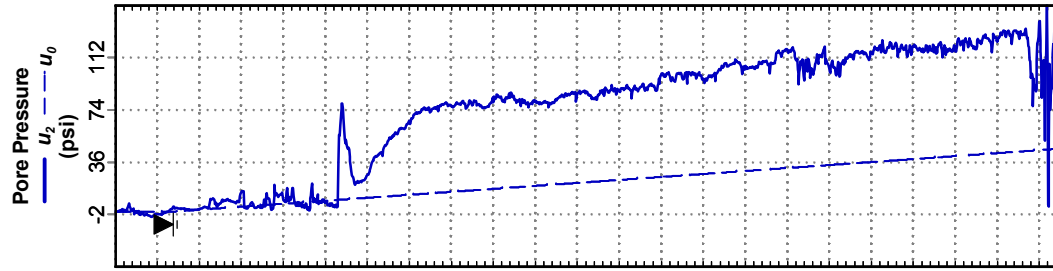
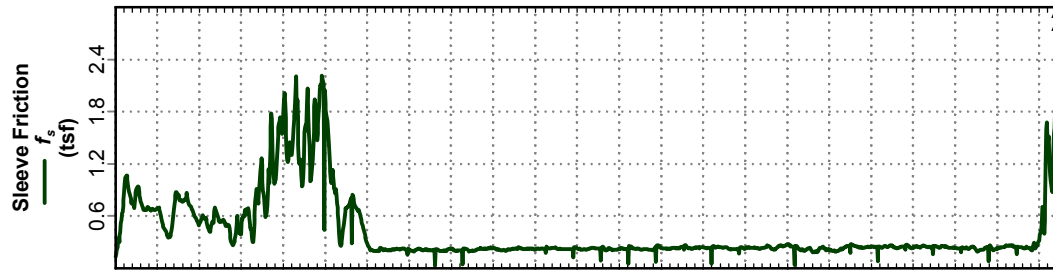
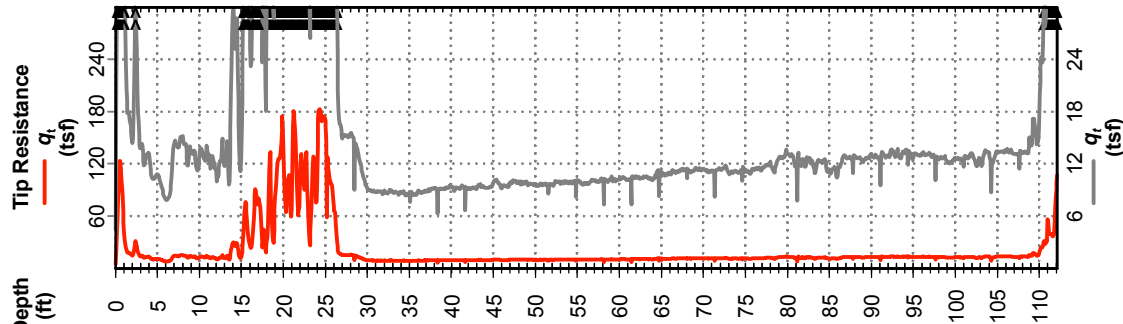
Fargo Moorehead

# Cone Penetration Test 09-ED-35C

Date: Jul. 9, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 2009195.271  
Easting: 1053533.505  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 902.4  
Water Depth: 6.89  
Total Depth: 112.1 ft





Fargo Moorehead

# Cone Penetration Test

## 09-ED-36C

Date: Jul. 9, 2009

Operator: MARKOV

Drilling Agency: USACE, Savannah District

Northing: 2009001.112

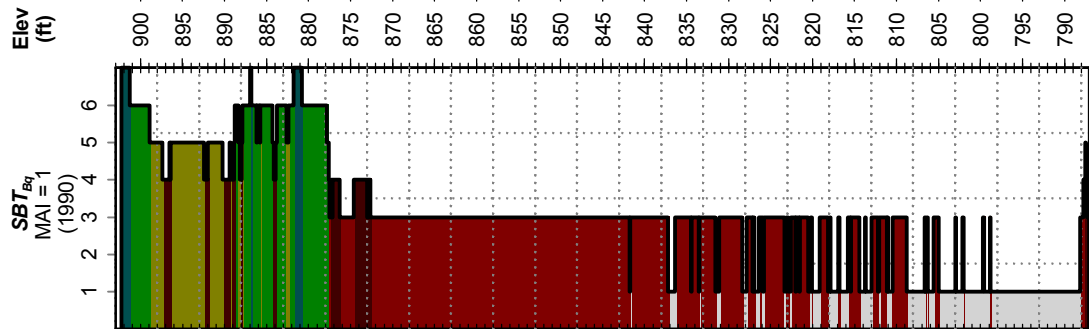
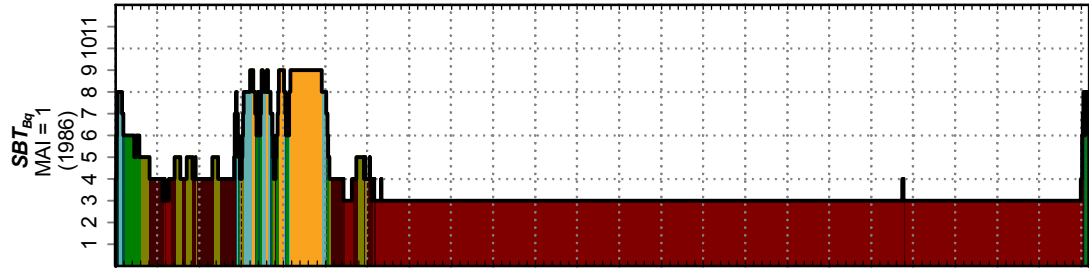
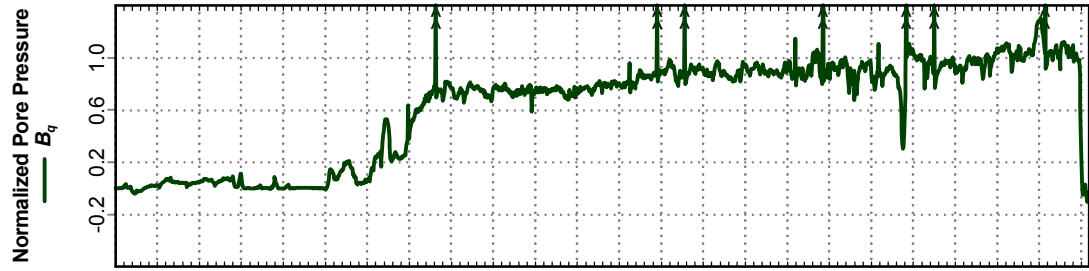
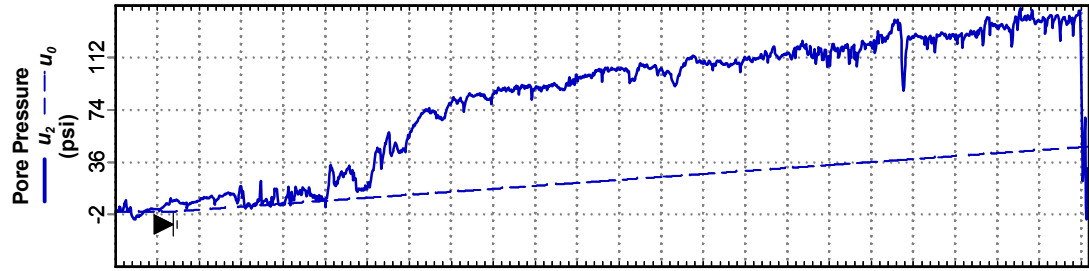
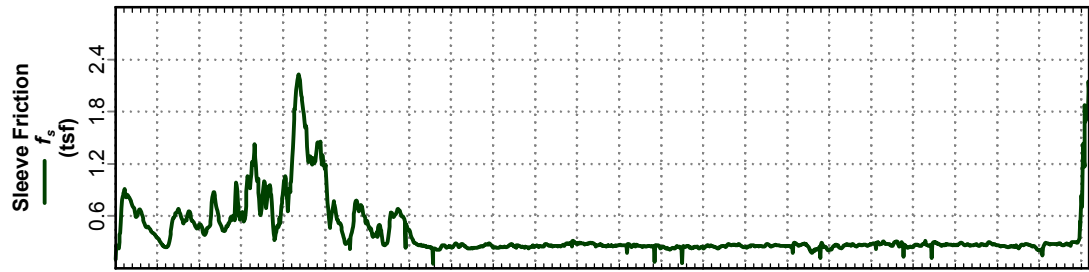
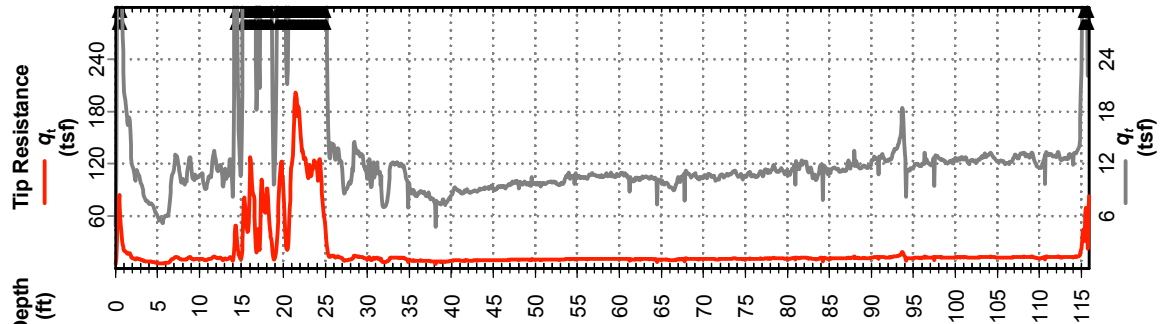
Easting: 1043053.704

Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 903.0

Water Depth: 6.89

Total Depth: 115.9 ft







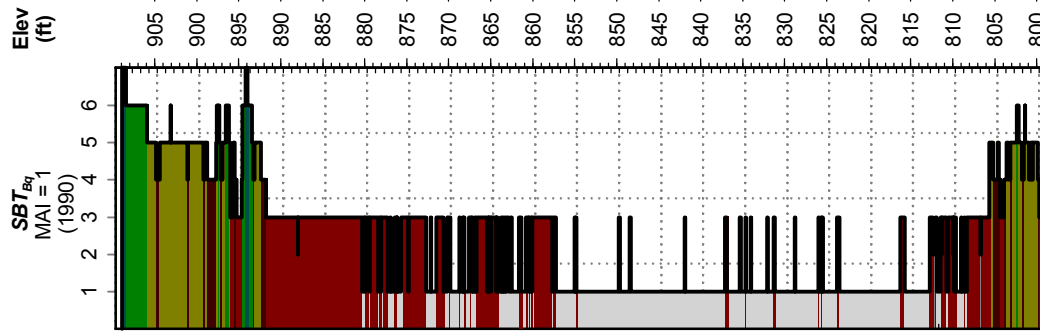
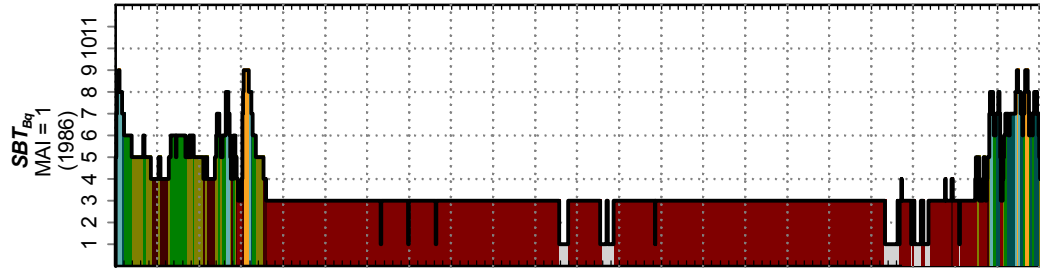
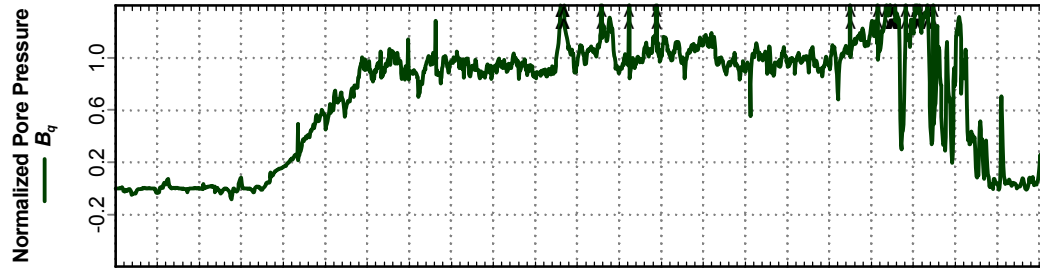
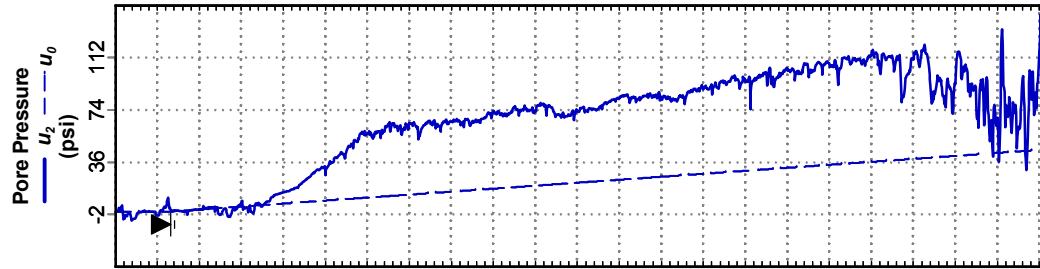
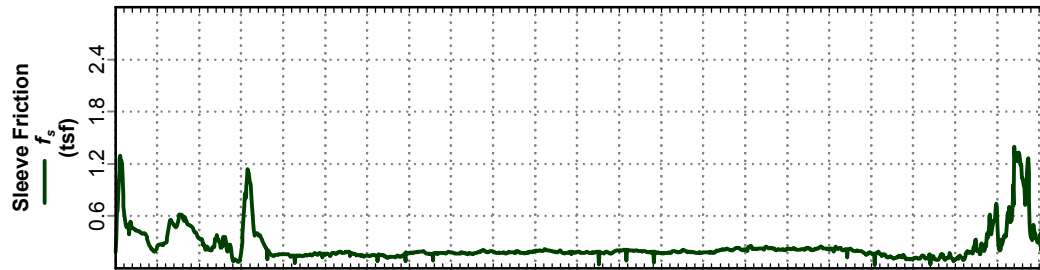
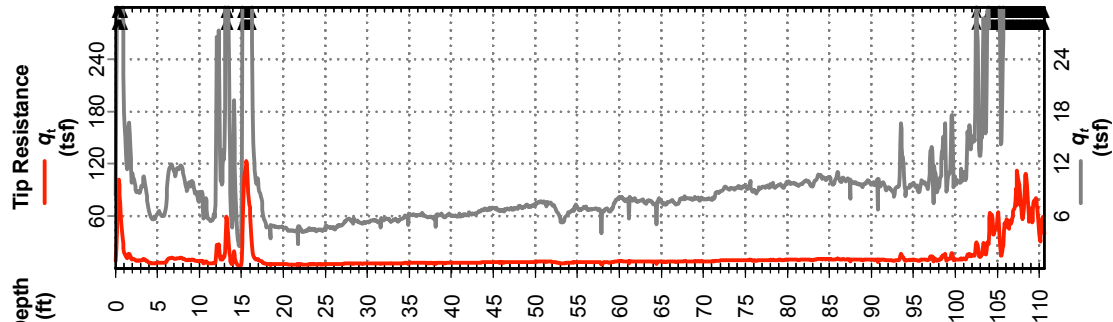
Fargo Moorehead

# Cone Penetration Test 09-ED-37C

Date: Jul. 9, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 2019462.535  
Easting: 1042722.879  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 909.7  
Water Depth: 6.56  
Total Depth: 110.6 ft





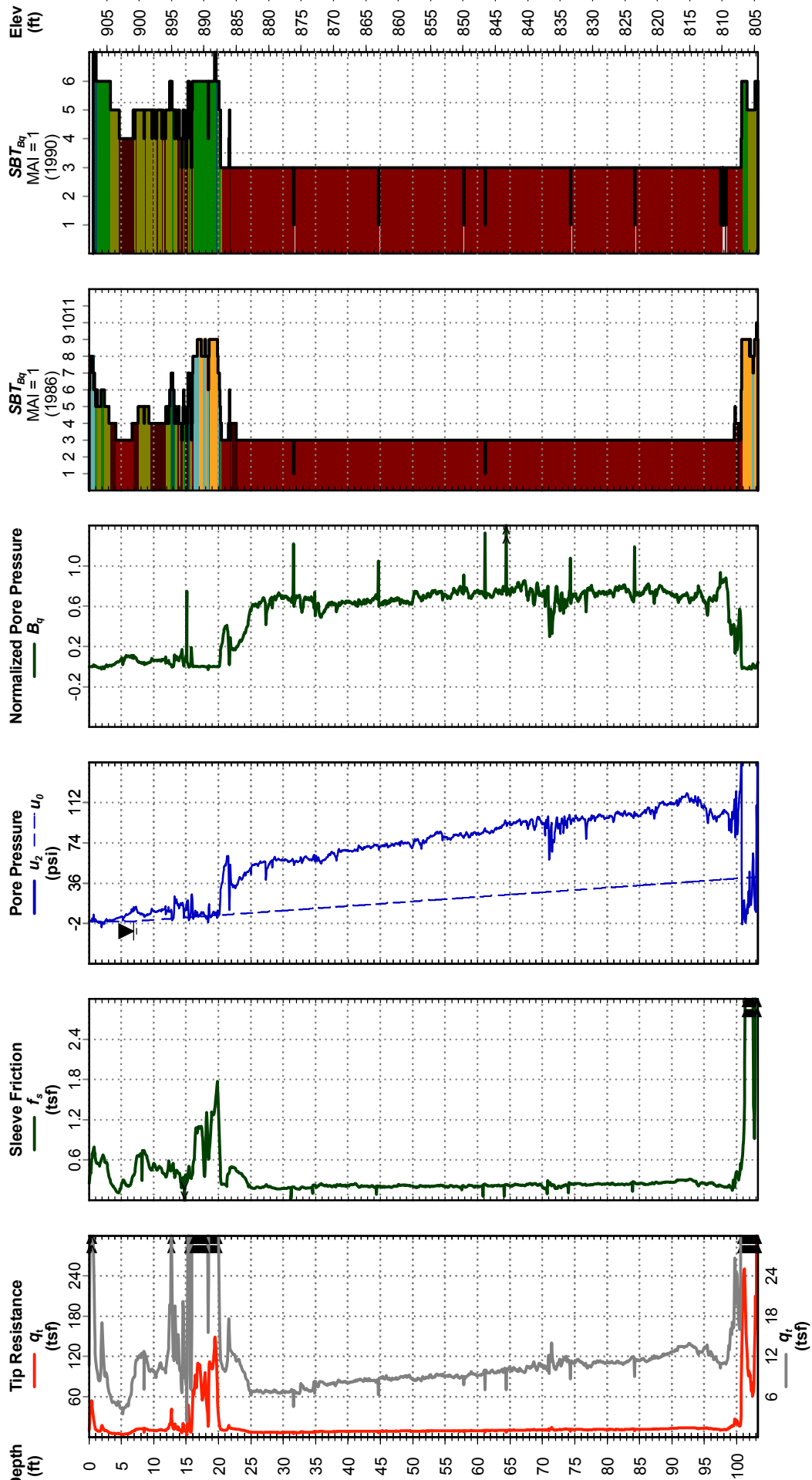
Fargo Moorehead

# Cone Penetration Test 09-ED-38C

Date: Jul. 10, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 2014018.872  
Easting: 1037544.621  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 907.8  
Water Depth: 6.89  
Total Depth: 103.3 ft















Fargo Moorehead

# Cone Penetration Test 09-ED-45C

Date: Jul. 11, 2009

Northing: 2015546.235

Elevation: 920.4

Operator: MARKOV

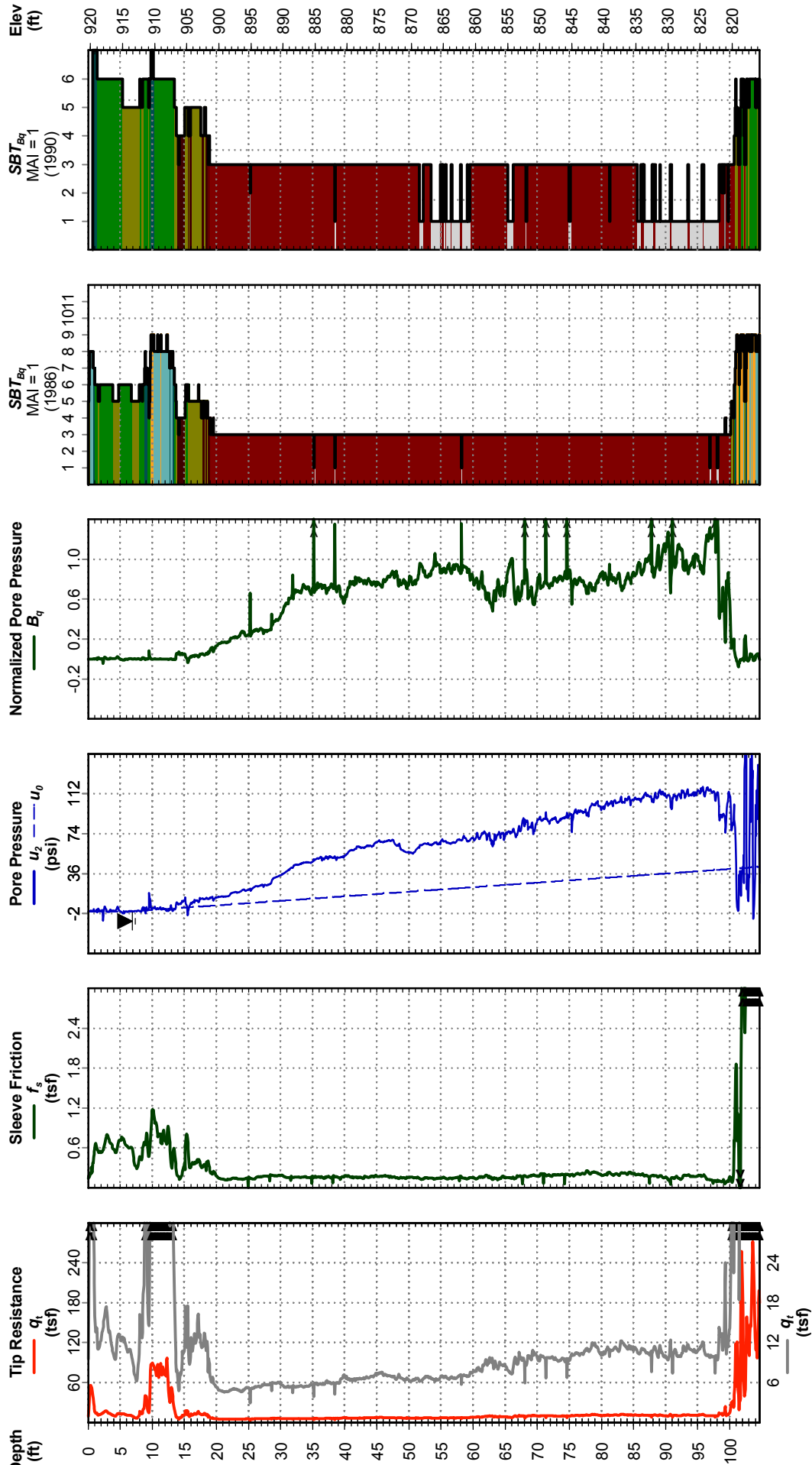
Eastng: 995390.533

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 104.7 ft















Fargo Moorehead

# Cone Penetration Test 09-ED-50C

Date: Jul. 13, 2009

Northing: 1996211.113

Elevation: 913.4

Operator: MARKOV

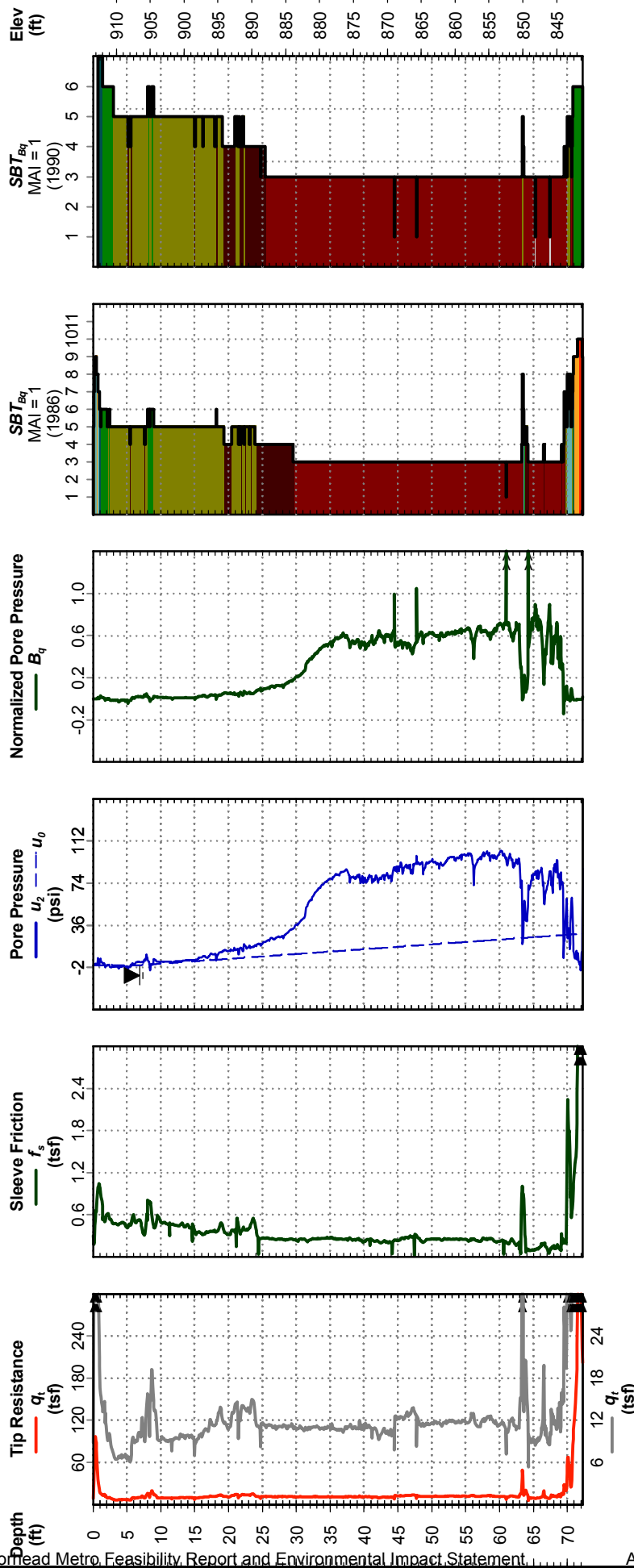
Eastng: 979899.051

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 72.2 ft





Fargo Moorehead

# Cone Penetration Test 09-ED-51C

Date: Jul. 13, 2009

Northing: 1993604.9

Elevation: 911.8

Operator: MARKOV

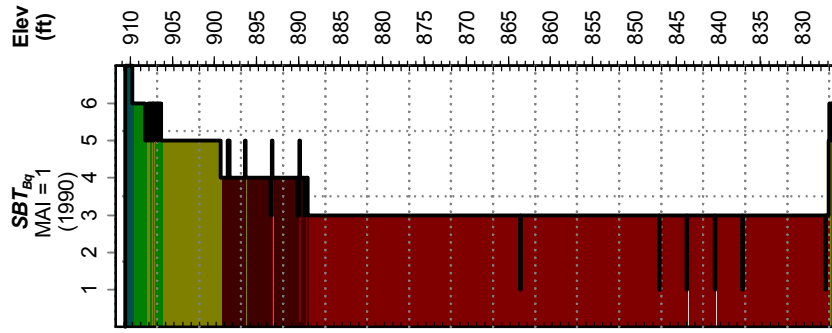
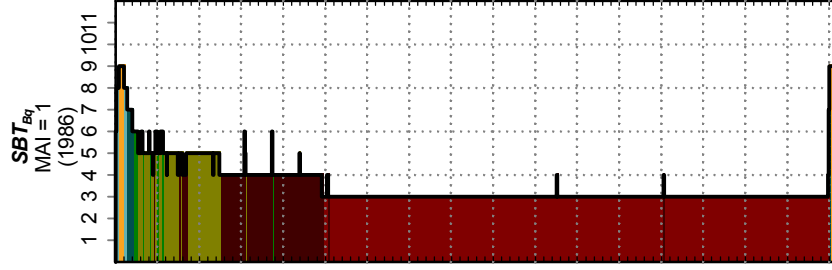
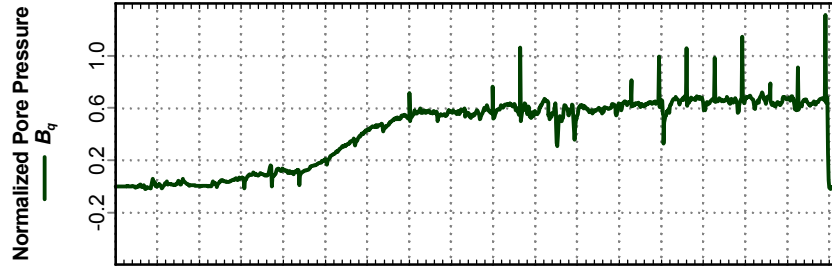
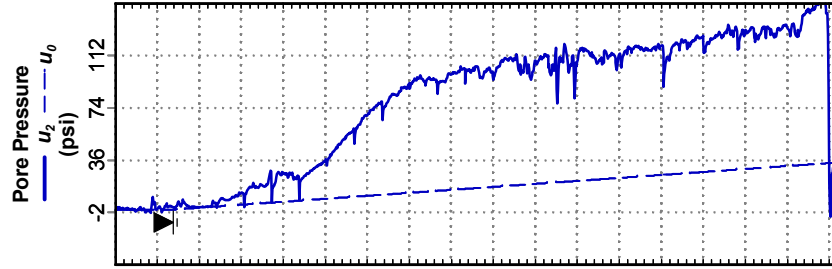
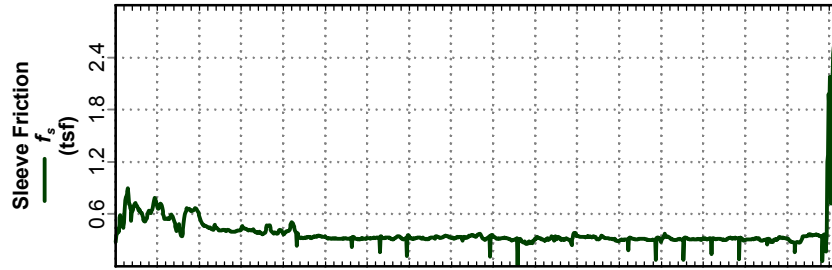
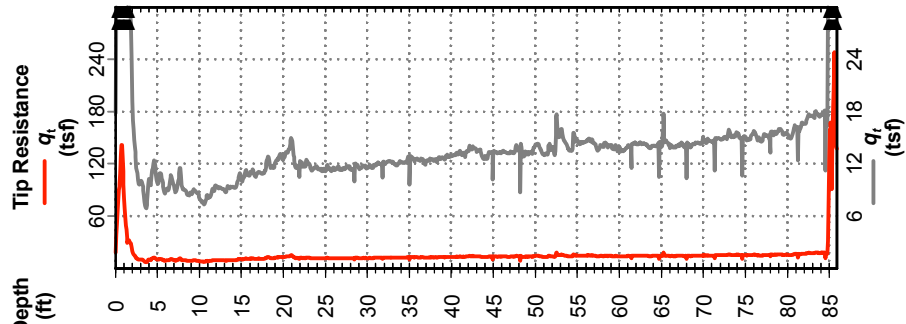
Eastng: 979953.4

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 85.9 ft







Fargo Moorehead

# Cone Penetration Test 09-M-53C

Date: Jul. 16, 2009

Northing: 1993033.858

Elevation: 898.4

Operator: MARKOV

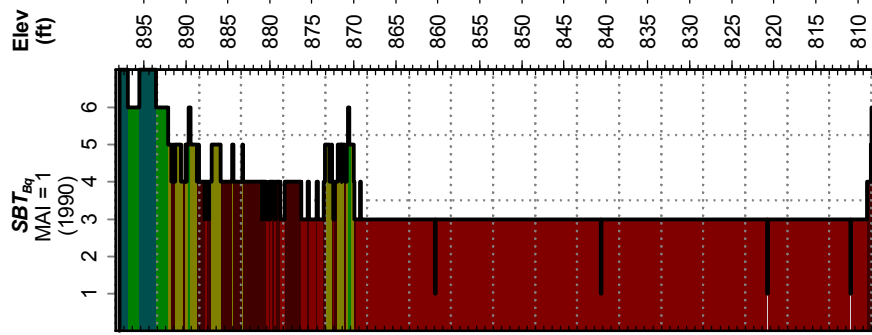
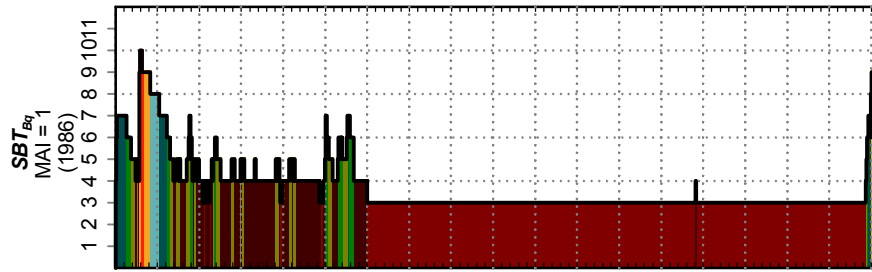
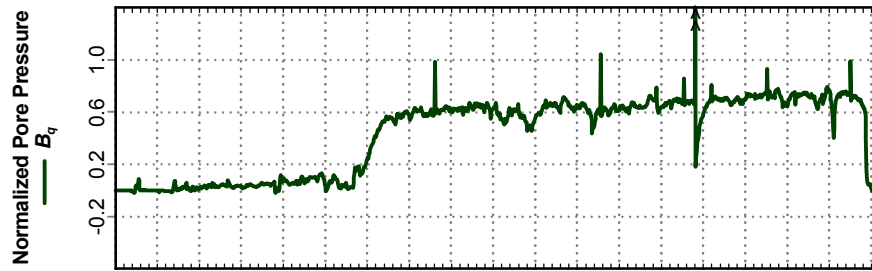
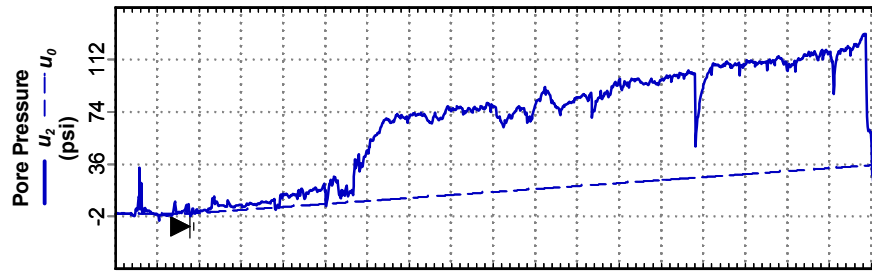
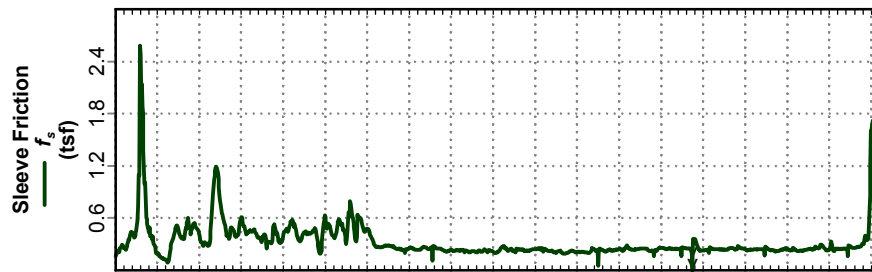
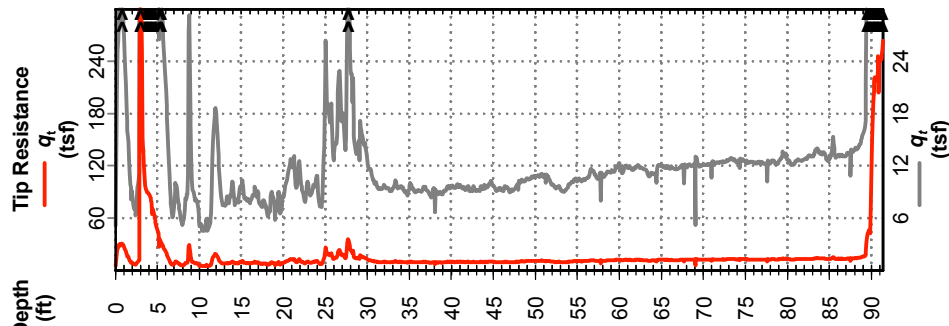
Eastings: 1014381.484

Water Depth: 8.86

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 91.4 ft











Fargo Moorehead

# Cone Penetration Test 09-M-56C

Date: Jul. 15, 2009

Northing: 1990641.26

Elevation: 904.5

Operator: MARKOV

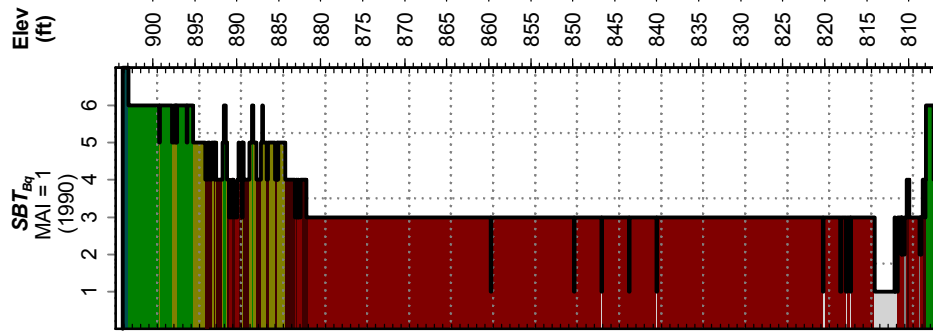
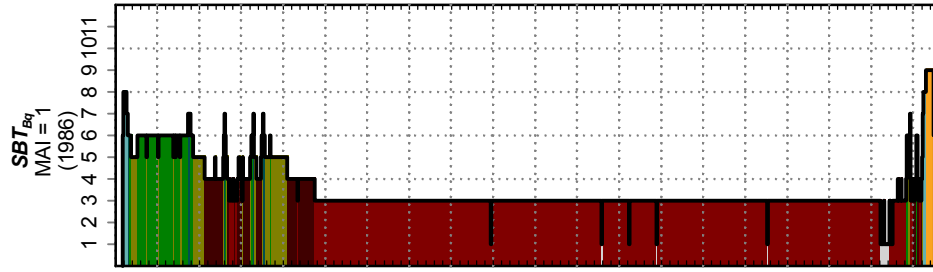
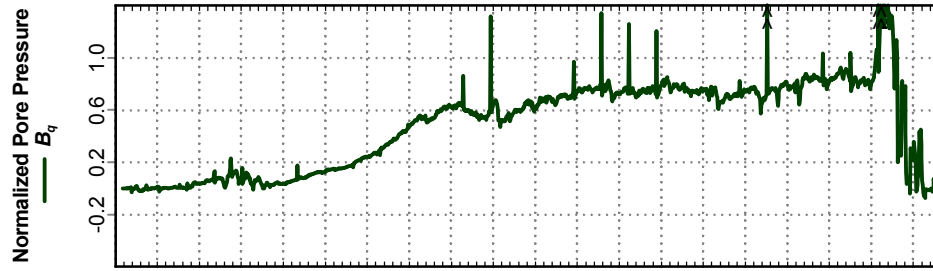
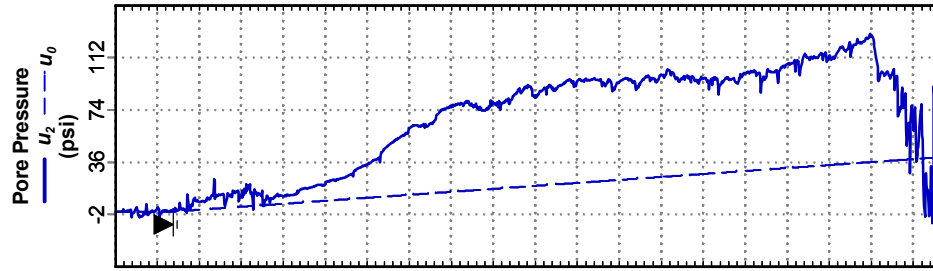
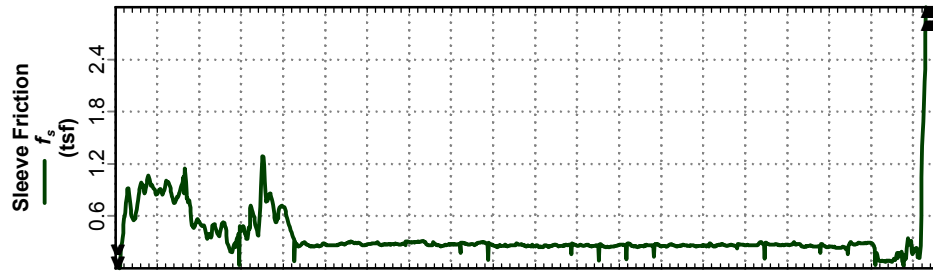
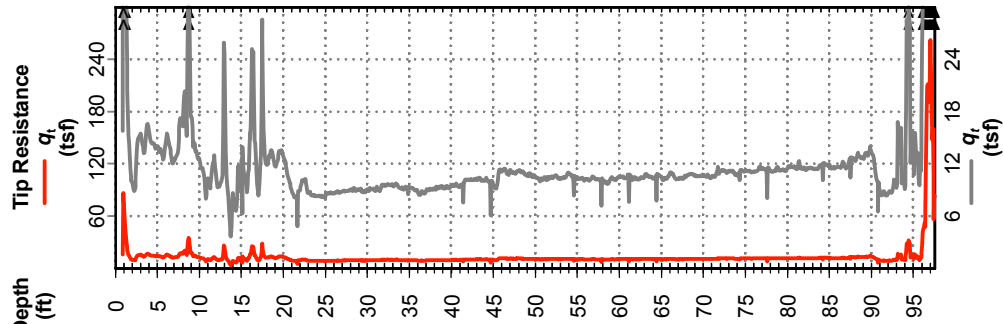
Eastng: 1006586.726

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 97.6 ft









Fargo Moorehead

# Cone Penetration Test 09-M-61C

Date: Jul. 17, 2009

Northing: 1994842.434

Elevation: 899.2

Operator: MARKOV

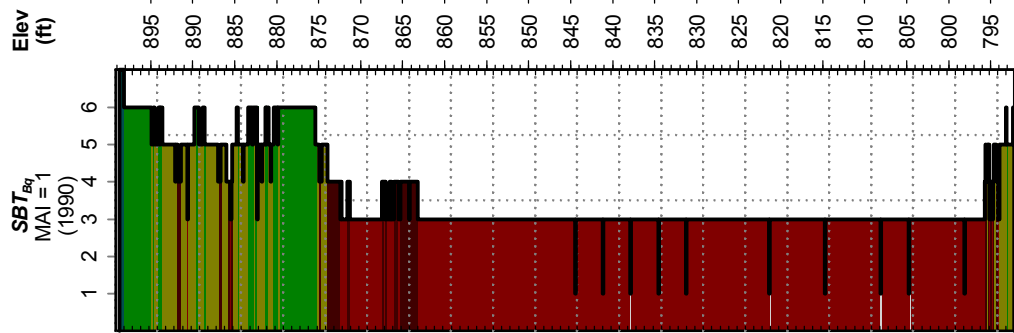
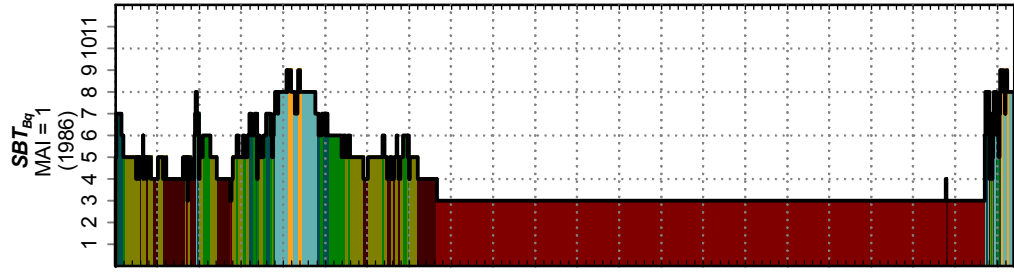
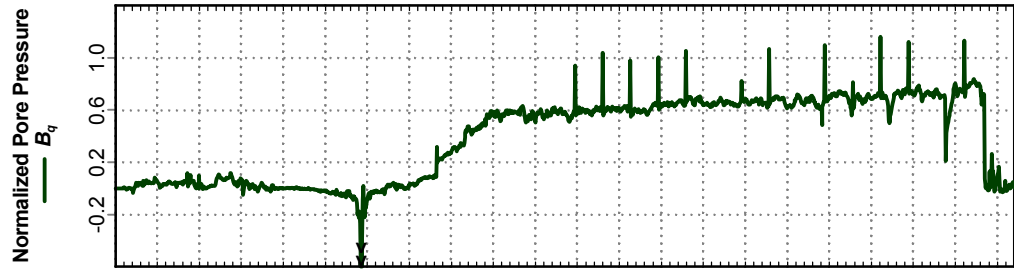
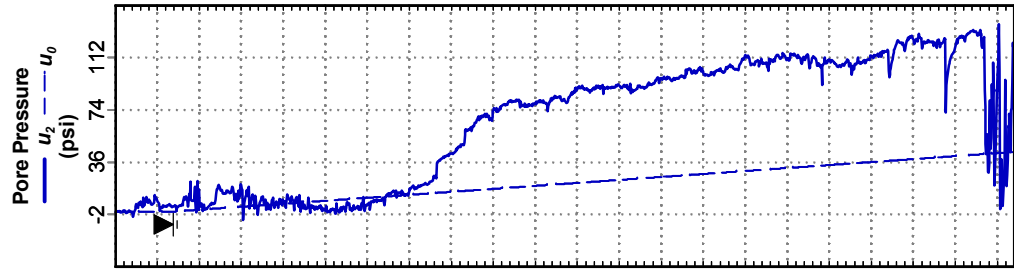
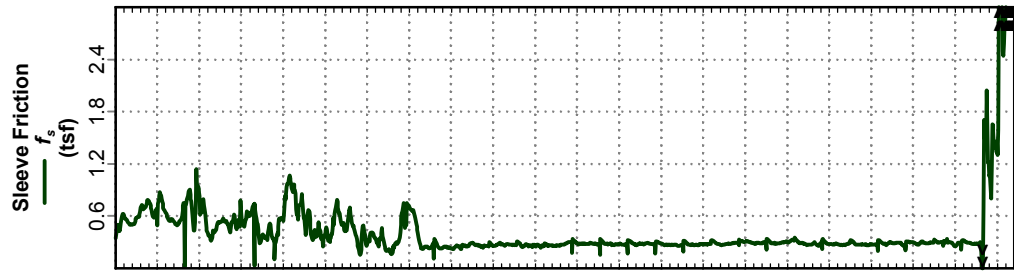
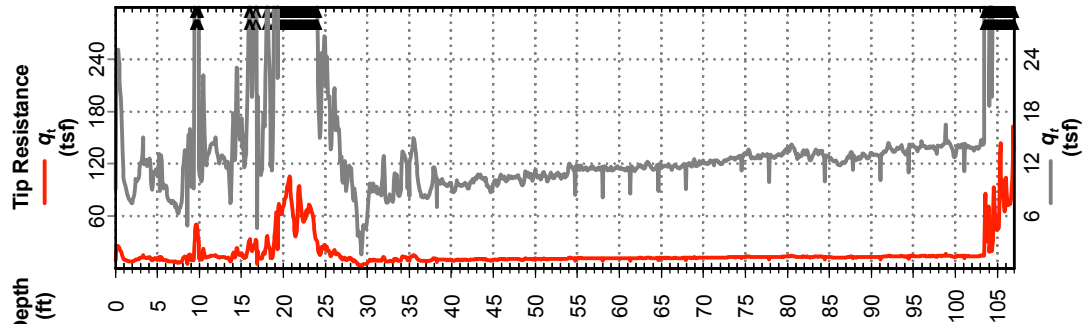
Eastings: 1028797.307

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 107.0 ft





Fargo Moorehead

# Cone Penetration Test

## 09-M-62C

Date: Jul. 18, 2009

Northing: 1994776.664

Elevation: 901.2

Operator: MARKOV

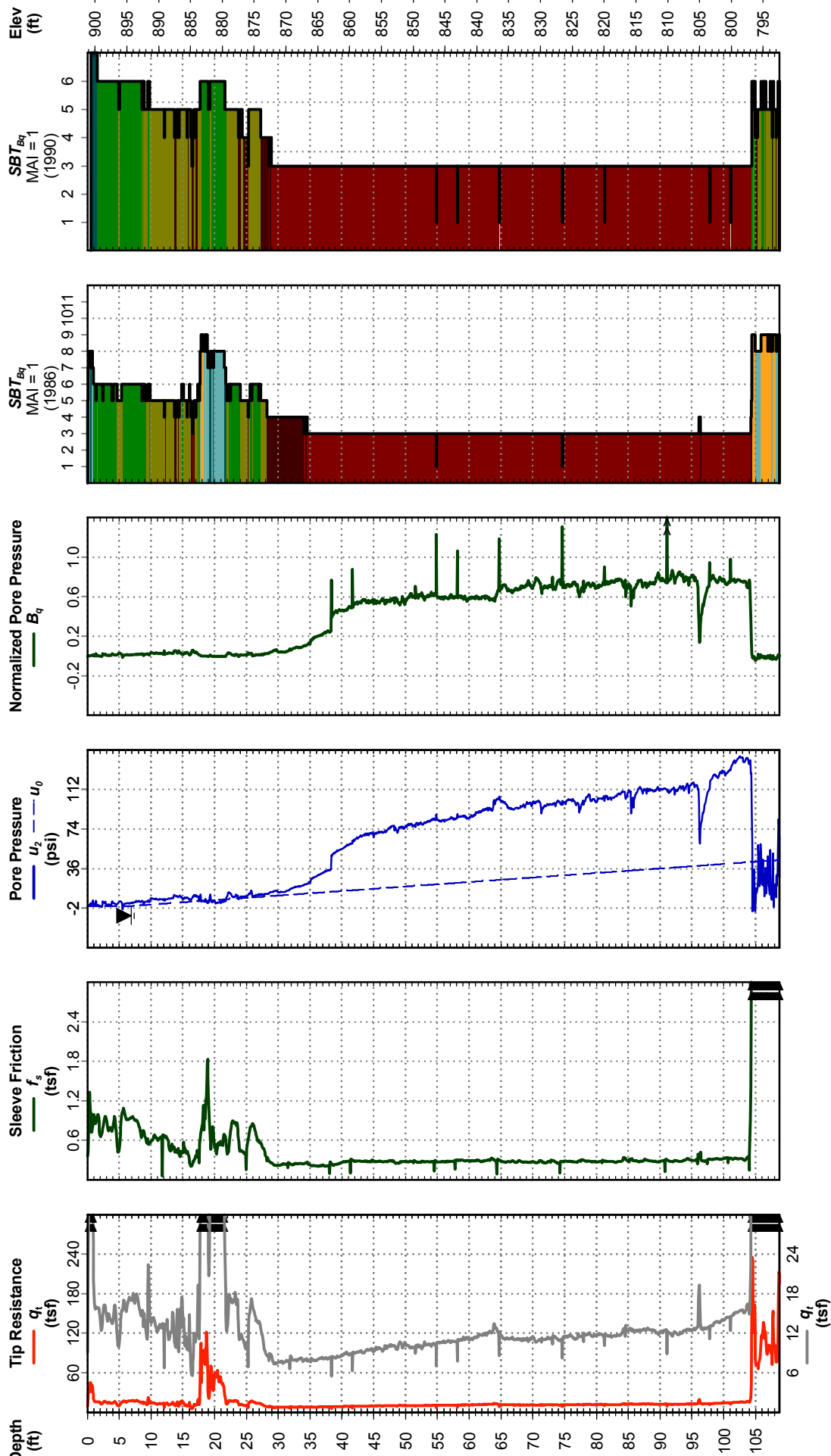
Eastng: 1025795.964

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 108.8 ft





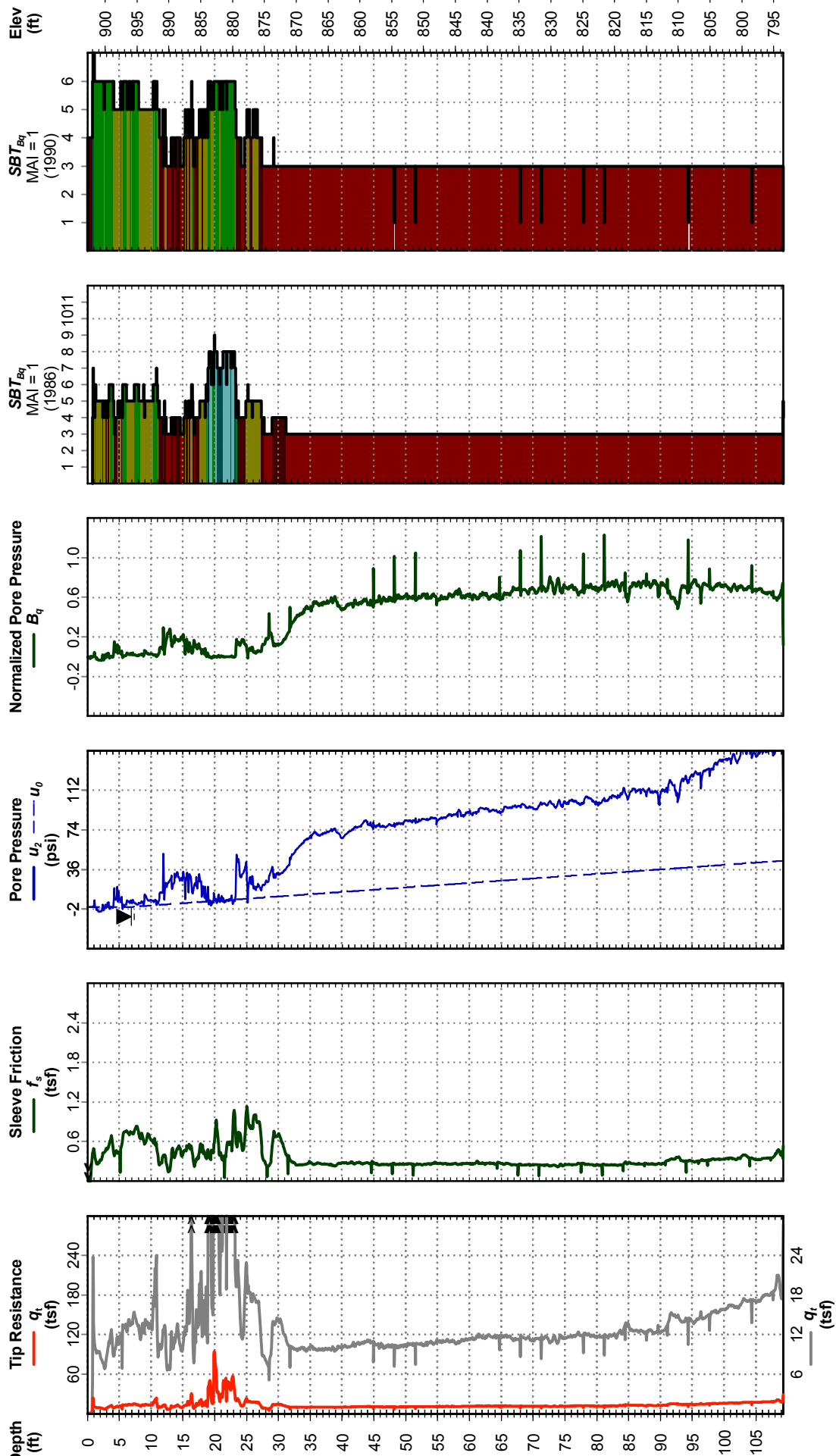
Fargo Moorehead

# Cone Penetration Test 09-M-64C

Date: Jul. 18, 2009  
Operator: MARKOV  
Drilling Agency: USACE, Savannah District

Northing: 1994850.143  
Easting: 1022600.768  
Probe ID/Net Area Ratio: DDG1117 / 0.8

Elevation: 902.8  
Water Depth: 6.89  
Total Depth: 109.3 ft







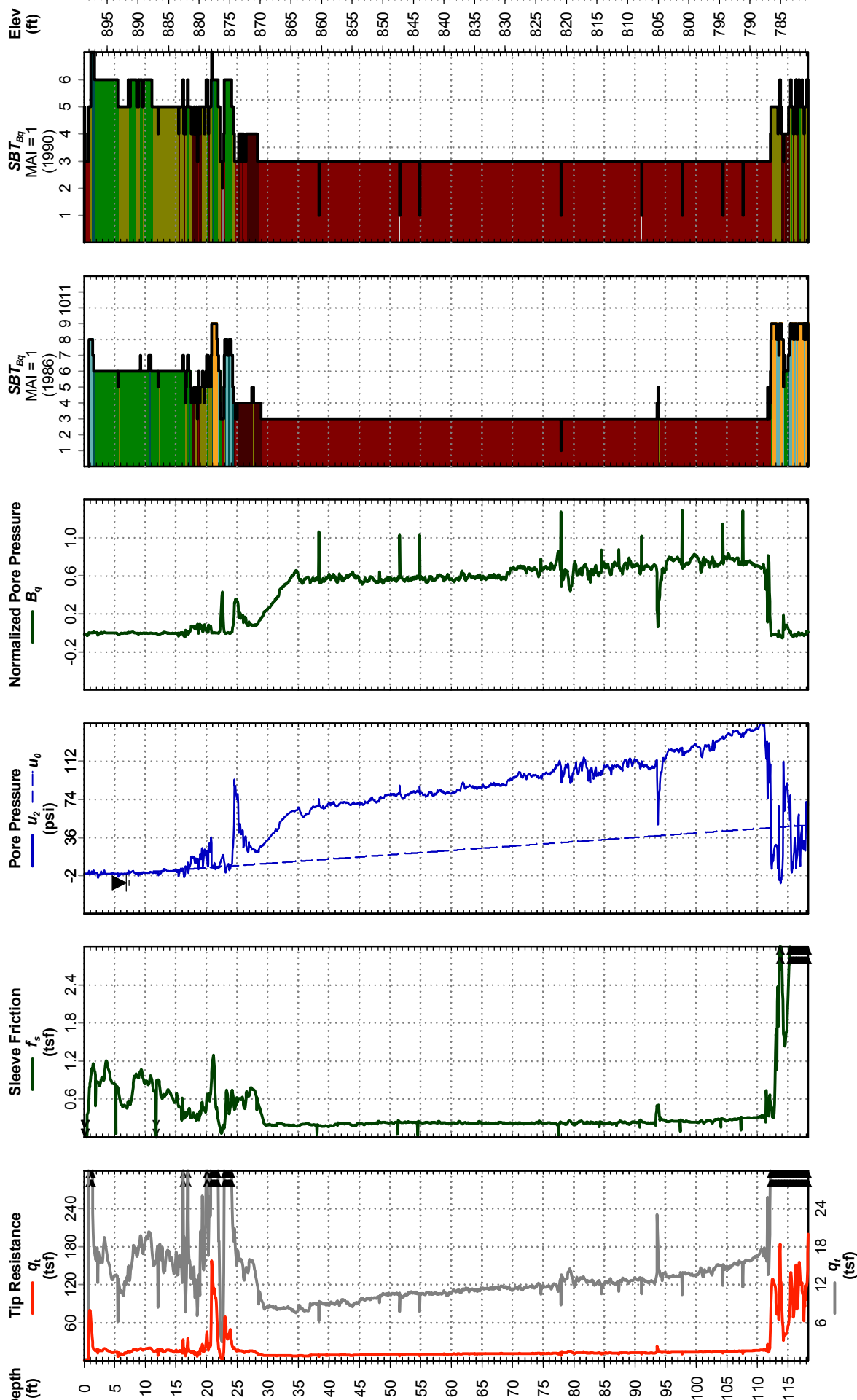
# Cone Penetration Test 09-M-66C

Fargo Moorehead

**Date:** Jul. 18, 2009  
**Operator:** MARKOV  
**Drilling Agency:** USACE, Savannah District

**Northing:** 1999566.278  
**Eastng:** 1036525.392  
**Probe ID/Net Area Ratio:** DDG1117 / 0.8

**Elevation:** 898.8  
**Water Depth:** 6.89  
**Total Depth:** 118.3 ft





Fargo Moorehead

# Cone Penetration Test

## 09-M-67C

Date: Jul. 19, 2009

Northing: 1999637.586

Elevation: 895.1

Operator: MARKOV

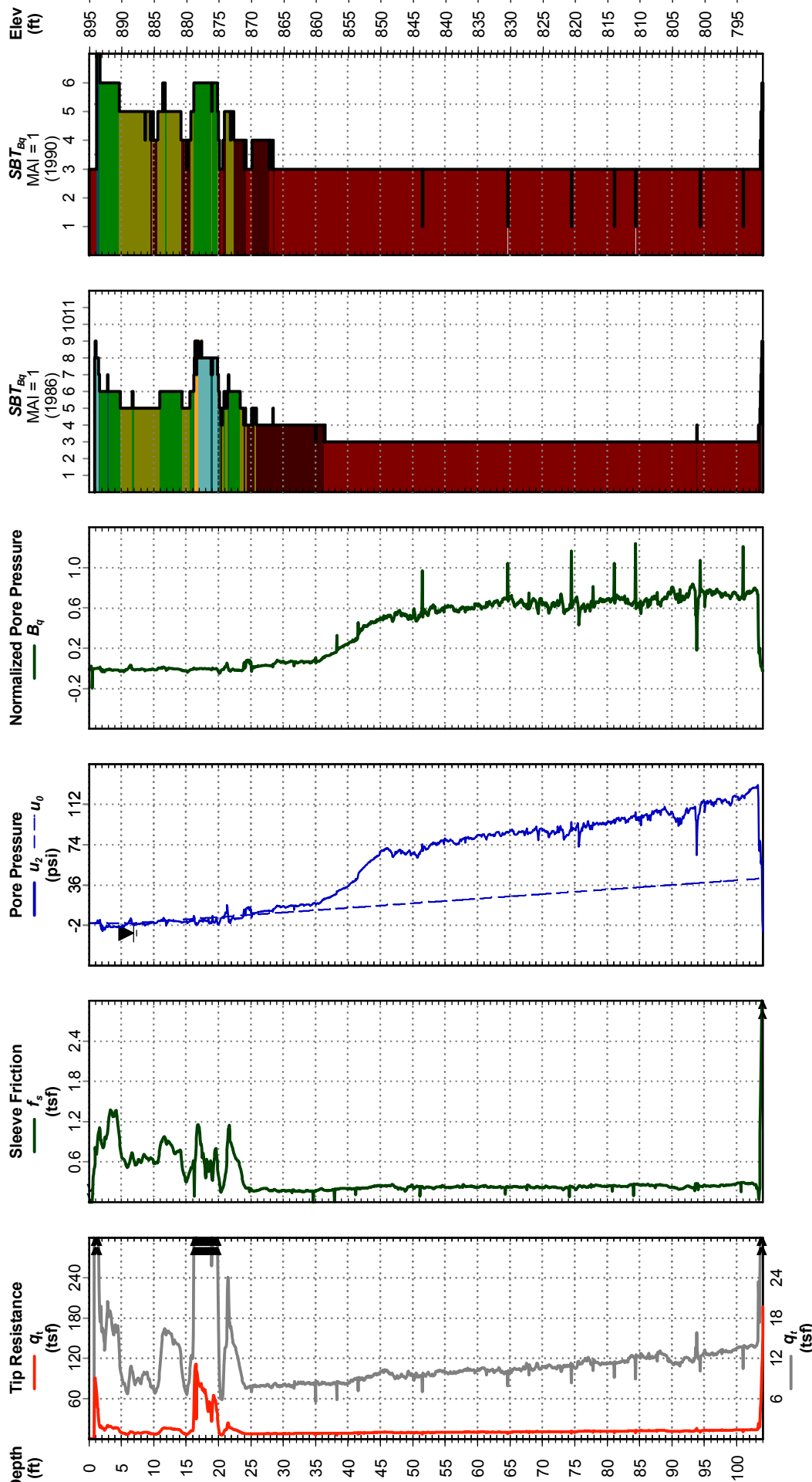
Eastings: 1039810.893

Water Depth: 6.89

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 104.1 ft





Fargo Moorehead

# Cone Penetration Test

## 09-M-71C

Date: Jul. 25, 2009

Northing: 1998637.438

Elevation: 896.1

Operator: MARKOV

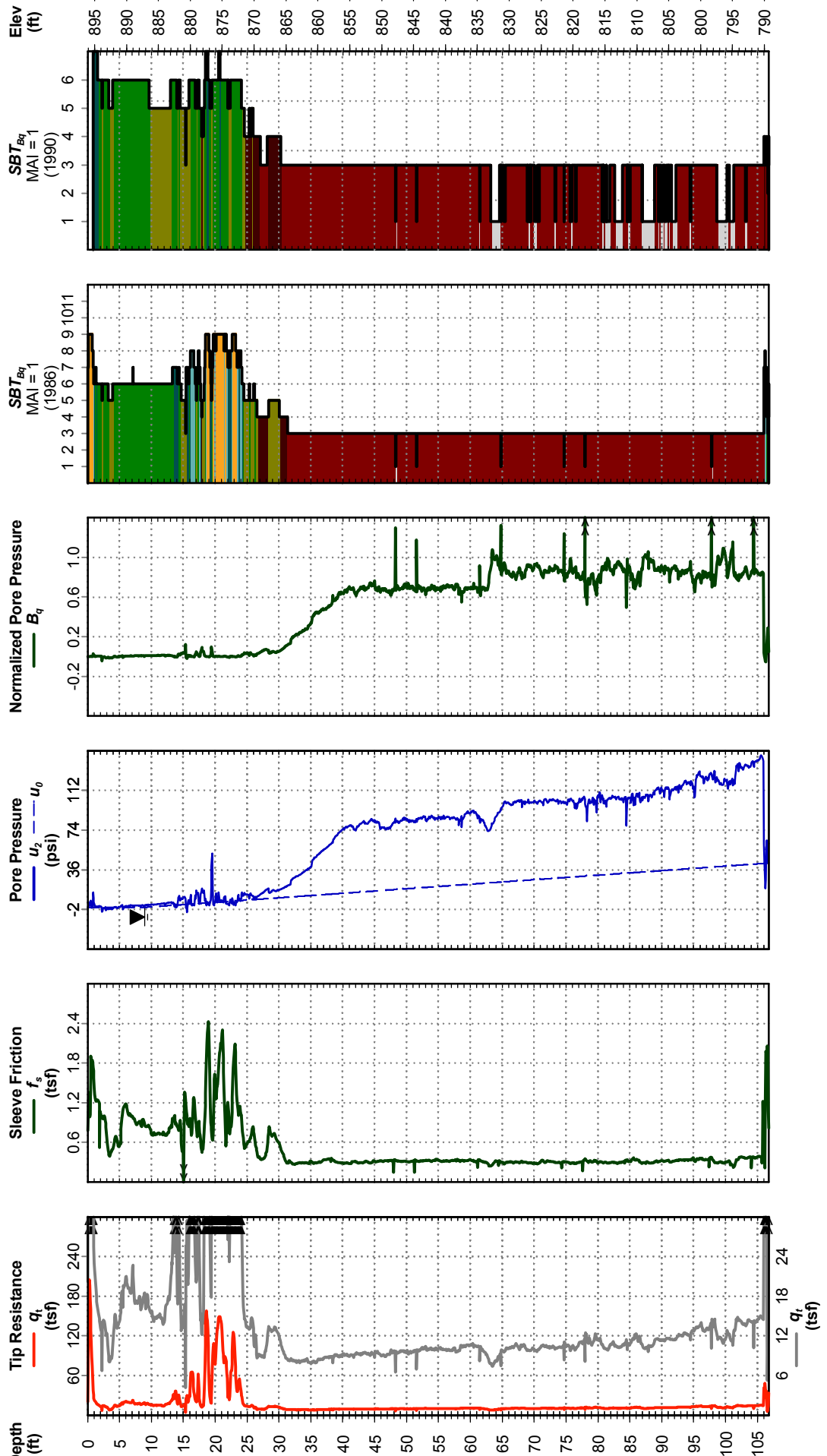
Eastng: 1042017.336

Water Depth: 8.99

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1117 / 0.8

Total Depth: 106.8 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-107-Ca

Project No: FY 2011

Date: Jan. 26, 2011

Latitude: 46° 45' 35.892"

Elevation: 909.6

Operator: Johnston

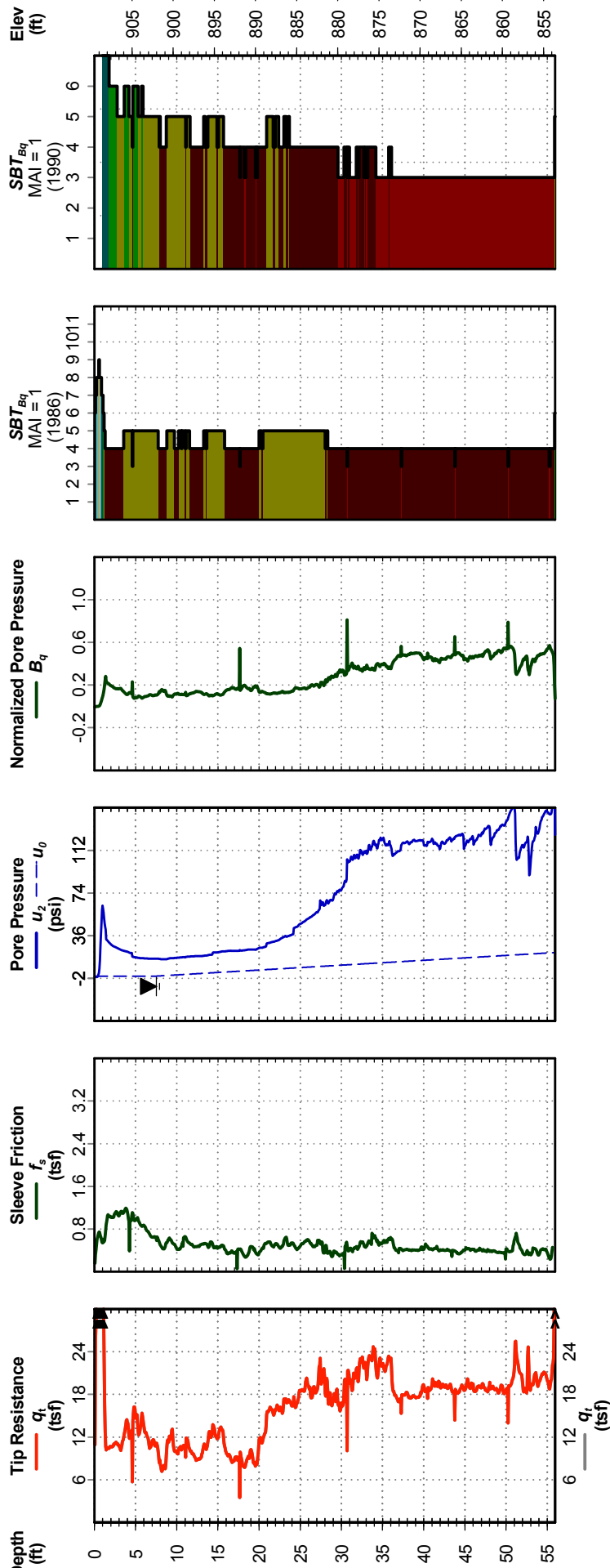
Longitude: -96° 49' 10.848"

Water Depth: 7.51

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1069 / 0.8

Total Depth: 56.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-108-C

Project No: FY 2011

Date: Jan. 26, 2011

Operator: Johnston

Drilling Agency: USACE, Savannah District

Latitude: 46° 45' 37.044"

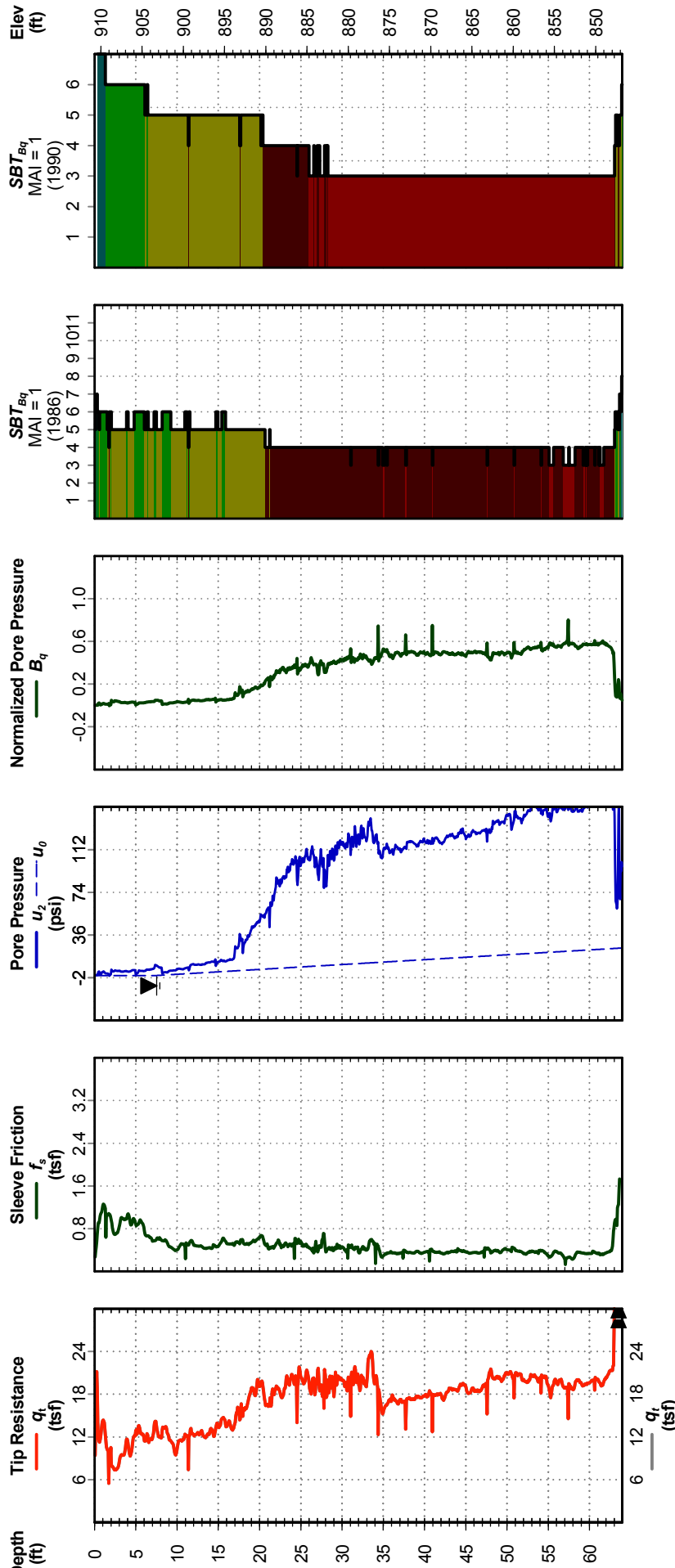
Longitude: -96° 52' 57"

Probe ID/Net Area Ratio: DDG1069 / 0.8

Elevation: 910.8

Water Depth: 7.51

Total Depth: 64.0 ft





# Fargo Red River Diversion

# Cone Penetration Test 11-109-C

Project No: FY 2011

Date: Jan. 27, 2011

Latitude: 46° 43' 52.608"

Elevation: 917.6

Operator: Johnston

Longitude: -96° 54' 15.3"

Water Depth: 10.01

Drilling Agency: USACE, Savannah District

Probe ID/Net Area Ratio: DDG1069 / 0.8

Total Depth: 59.7 ft

