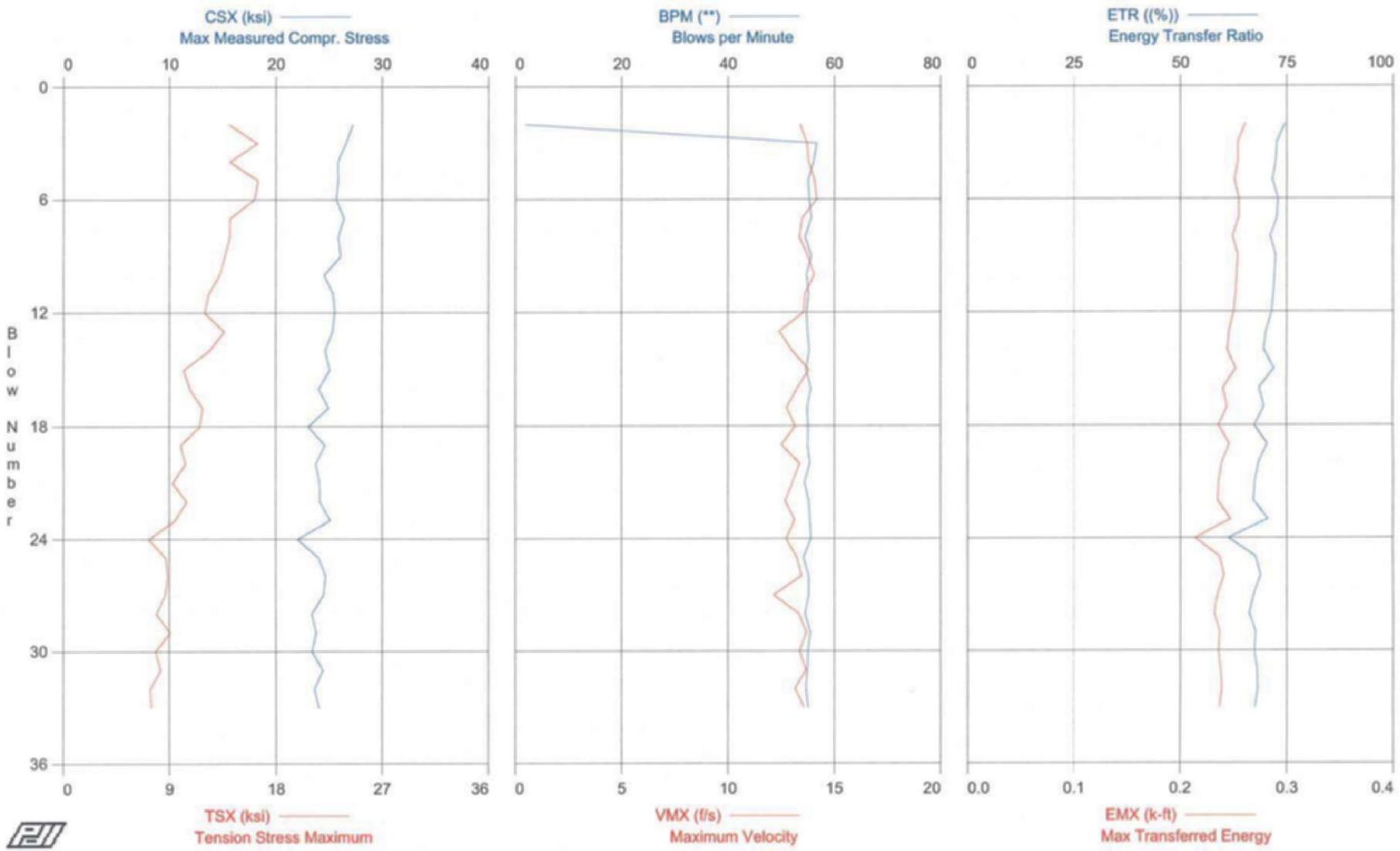
MACTEC Engineering and Consulting, Inc. - Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 10-Mar-2009

Test date: 24-Jan-2009

EXELON VICTORIA - Boring B3104 (73.6-75.1' sample)



EXELON VICTORIA - Boring B3104 (73.6-75.1' sample)
OP: JNH

Hammer ID: ME05; Driller: M.CASTEEL CME 550 (MACTEC)
Test date: 24-Jan-2009

AR: 1.43 in^2
LE: 79.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
VMX: Maximum Velocity
FMX: Maximum Force
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	27.2	14.0	13.4	39	0.9	1.9	0.299	74.6	0.261
3	26.6	16.4	13.7	38	1.1	56.7	0.296	72.7	0.254
4	25.8	14.1	13.8	37	1.1	56.1	0.291	72.4	0.254
5	25.9	16.5	14.1	37	0.9	55.1	0.289	71.6	0.251
6	25.7	16.2	14.2	37	1.0	55.3	0.290	73.0	0.255
7	26.4	14.1	13.5	38	0.9	55.7	0.287	72.7	0.255
8	25.9	14.1	13.4	37	1.1	54.5	0.282	71.1	0.249
9	26.1	13.7	13.8	37	1.1	55.7	0.286	72.4	0.254
10	24.5	13.3	14.1	35	1.0	54.8	0.285	72.2	0.253
11	25.4	12.3	13.6	36	1.0	55.2	0.280	71.9	0.252
12	25.6	12.0	13.6	37	0.9	54.8	0.280	71.5	0.250
13	25.3	13.6	12.4	36	0.8	55.0	0.274	70.1	0.246
14	24.7	12.4	13.0	35	0.9	55.3	0.276	69.6	0.244
15	25.1	10.2	13.8	36	1.0	54.7	0.282	72.0	0.252
16	24.0	10.7	13.2	34	0.9	55.6	0.272	68.5	0.240
17	25.0	11.8	12.8	36	1.1	54.9	0.276	69.7	0.244
18	23.1	11.6	13.2	33	0.9	55.1	0.269	67.4	0.236
19	24.6	9.9	12.5	35	1.1	55.0	0.276	70.4	0.246
20	23.8	10.4	13.4	34	1.0	55.4	0.271	68.4	0.239
21	24.1	9.3	13.0	34	0.9	54.4	0.269	67.5	0.236
22	24.1	10.5	12.7	35	0.9	55.2	0.269	67.1	0.235
23	25.1	9.5	13.1	36	1.1	55.4	0.279	70.6	0.247
24	22.0	7.2	12.7	32	1.0	55.6	0.240	61.3	0.214
25	24.0	8.7	13.2	34	0.9	54.2	0.267	67.7	0.237
26	24.7	8.9	13.5	35	1.0	55.2	0.275	68.9	0.241
27	24.4	8.6	12.1	35	1.1	55.2	0.267	67.3	0.235
28	23.4	7.9	13.3	33	1.0	54.5	0.261	66.2	0.232
29	23.8	9.1	13.7	34	0.9	55.5	0.272	67.7	0.237
30	23.4	7.8	13.4	33	1.0	55.1	0.263	67.5	0.236
31	24.4	8.3	13.7	35	0.9	54.9	0.276	68.0	0.238
32	23.6	7.4	13.2	34	0.9	54.7	0.267	68.1	0.239
33	24.0	7.5	13.6	34	0.9	55.1	0.271	67.6	0.237
Average	24.7	11.2	13.3	35	1.0	53.5	0.276	69.6	0.244

Total number of blows analyzed: 32

Time Summary

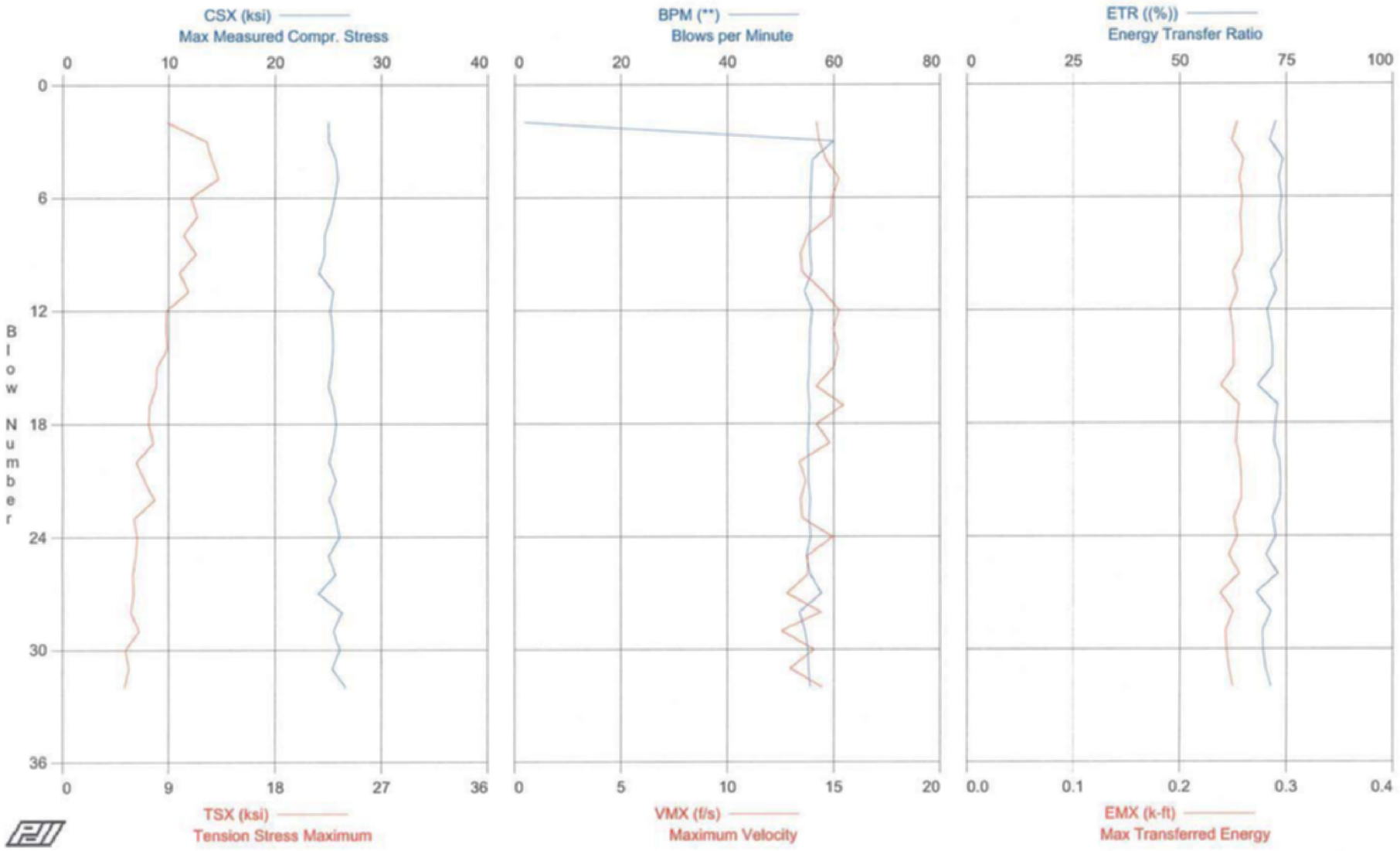
Drive 4 minutes 39 seconds 11:56:52 AM - 12:01:31 PM (1/24/2009) BN 1 - 33

MACTEC Engineering and Consulting, Inc. - Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 10-Mar-2009

Test date: 25-Jan-2009

EXELON VICTORIA - Boring B3104 (108.6'-110.1' sample)



MACTEC Engineering and Consulting, Inc.
Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 10-Mar-2009

EXELON VICTORIA - Boring B3104 (108.6'-110.1' sample)
OP: JNH

Hammer ID: ME05; Driller: M.CASTEEL CME 550 (MACTEC)
Test date: 25-Jan-2009

AR: 1.43 in^2
LE: 114.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
VMX: Maximum Velocity
FMX: Maximum Force
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	25.0	8.9	14.2	36	0.9	1.9	0.293	72.6	0.254
3	25.0	12.2	14.3	36	0.9	60.0	0.286	71.1	0.249
4	25.7	12.6	14.6	37	0.9	56.0	0.294	74.2	0.260
5	25.9	13.2	15.2	37	0.8	55.8	0.291	73.2	0.256
6	25.6	10.9	14.9	37	0.9	55.6	0.293	74.0	0.259
7	25.2	11.4	14.9	36	0.9	55.7	0.290	73.4	0.257
8	24.7	10.2	13.8	35	1.0	55.5	0.292	73.6	0.258
9	24.7	11.3	13.4	35	1.0	55.6	0.290	74.0	0.259
10	24.1	9.9	13.5	34	1.0	55.9	0.285	71.4	0.250
11	25.5	10.7	14.5	36	0.7	54.5	0.288	72.7	0.254
12	25.2	8.8	15.3	36	0.8	56.0	0.281	70.5	0.247
13	25.4	8.7	15.0	36	0.8	55.6	0.285	71.3	0.250
14	25.5	8.9	15.2	36	0.8	55.5	0.286	71.9	0.251
15	25.3	8.0	15.0	36	0.7	55.5	0.287	71.9	0.251
16	25.1	7.9	14.2	36	0.8	55.2	0.282	68.4	0.239
17	25.6	7.4	15.5	37	0.8	55.5	0.294	73.1	0.256
18	25.8	7.3	14.2	37	0.9	55.4	0.295	72.5	0.254
19	25.5	7.7	14.8	36	0.8	55.2	0.289	72.2	0.253
20	25.1	6.2	13.4	36	0.7	55.3	0.294	73.5	0.257
21	25.8	7.0	13.7	37	0.7	55.3	0.295	73.7	0.258
22	25.1	7.8	13.4	36	0.7	55.6	0.292	73.6	0.258
23	25.7	6.0	13.5	37	0.7	55.4	0.291	71.8	0.251
24	26.1	6.3	15.0	37	0.8	55.7	0.293	72.6	0.254
25	25.0	6.2	13.8	36	0.9	54.9	0.281	70.2	0.246
26	25.7	6.0	13.8	37	0.7	55.6	0.294	73.0	0.256
27	24.1	6.0	12.8	34	1.0	57.7	0.272	68.0	0.238
28	26.3	5.8	14.4	38	0.8	53.6	0.293	71.4	0.250
29	25.5	6.5	12.5	36	1.1	54.6	0.285	69.5	0.243
30	26.1	5.3	14.1	37	0.9	55.2	0.284	69.6	0.244
31	25.4	5.6	13.0	36	1.0	55.3	0.284	70.1	0.246
32	26.6	5.2	14.4	38	0.9	55.6	0.293	71.4	0.250
Average	25.4	8.3	14.2	36	0.9	53.9	0.289	71.9	0.252

Total number of blows analyzed: 31

Time Summary

Drive 5 minutes 7 seconds 9:50:19 AM - 9:55:26 AM (1/25/2009) BN 1 - 32

MACTEC

Engineering and constructing a better tomorrow

May 4, 2009

Memorandum to File

From: Jon Honeycutt, Staff Professional JNH

Reviewed By: Steve Kiser, Principal Professional SK

Subject: **Report of SPT Energy – Miller Drilling CME 750 ATV**
Hammer Serial No. 07 Automatic Hammer
WORK INSTRUCTION No. 311 (DCN: EXE-917)
Exelon Texas COL Project – Supplemental Investigation, Including UHS
Victoria, Texas
MACTEC Project No. 6468-07-1777

Jonathan Honeycutt, of MACTEC Engineering and Consulting, Inc. (MACTEC), performed energy measurements on the above referenced drill rig at the subject site per the referenced Work Instructions. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

SPT Energy Field Measurements

SPT energy measurements were made on January 25 and 26, 2009, during drilling of Boring B3234 at the referenced site. The testing was performed by Jonathan Honeycutt from approximately 10:11 AM to 3:57 PM (ET) on January 25 under cloudy skies with a temperature of about 65 degrees Fahrenheit and from approximately 9:40 AM to 4:07 PM (ET) on January 26 under cloudy skies with a temperature of about 60 degrees Fahrenheit. The boring was drilled with personnel and equipment from Miller Drilling. The drilling equipment consisted of a CME 750 model ATV-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of NW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring. The drill rig operator during sampling was Glen Bilbrey. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAX (Serial No. 3622L), and calibrated accelerometers (Serial Nos. K990 and K1050) and strain gages (Serial Nos. NW#146/1 and NW#146/2). A steel drill rod, 2-feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.43 square inches and an outside diameter of approximately 2.625 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10 foot long sections, with an outside and inside diameter of approximately 2.625 and 2.25 inches,

23 Pages Total

MACTEC Engineering and Consulting, Inc.
2801 Yorkmont Road, Suite 100 ● Charlotte, NC 28208 ● Phone: 704.357.8600

respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

Calibration Records

The calibration records for all the above are filed in DCN EXE-918.

Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV
F(t) = Calculated force at time t
V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDIPLOT tables and are also shown graphically in the PDIPLOT charts.

Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30 inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper; however, maximum and minimum ETR values of up to 98% and 56%, respectively, were reported in the literature. The ETR values shown in Table 1 are generally within the range of typical values for automatic hammers as reported in the literature.

Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality data (which is relatively common) and, as such, the record(s) was(were) not used in the data reduction. This may result in more or less blows evaluated for ETR than what is shown on the boring logs.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 281 foot-pounds to 315 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 80% to 90% of the theoretical energy (350 foot-pounds) of the SPT hammer.

- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 294.9 foot-pounds, with an average ETR of 84.3%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page
Page 5 Work Instruction – DCN EXE-917 – 1 Page
Page 6 - 7 Record of SPT Energy Measurement – 2 Pages
Pages 8 – 23 PDIPLOT Output – 16 Pages

TABLE 1

SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)

Exelon Texas COL Project - Supplemental Investigation, Including UHS

Victoria, Texas

MACTEC Project No. 6468-07-1777

Automatic Hammer Serial Number and Rig Model	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Drill Rod Size	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs)[a]	Energy Transfer Ratio (%)[b] (Average ETR)
07 (CME 750)	Miller Drilling	Glen Bilbrey	B3234	1/25/2009	NW-J	332.5 - 334	13 - 27 - 55	95	281	80.3%
						342.5 - 344	9 - 11 - 16	37	295	84.3%
						352.5 - 354	29 - 42 - 46	118	294	84.0%
						362.5 - 363.9	49 - 33 - 50/0.4'	135	296	84.6%
				1/26/2009		372.5 - 374	9 - 14 - 21	44	307	87.7%
						402.5 - 404	7 - 12 - 19	38	315	90.0%
							Average for Rig:		**294.9**	**84.3%**

[a]Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy. This may result in more or less blows evaluated for ETR than what is shown on the boring logs.

EFV = EMX * 1000 lbs/kip, where EMX equals the maximum transferred energy measured by the PDA (see attached PDA data).

[b]Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet).

The average EFV and ETR values may differ slightly and insignificantly from those in the PDIPLOT tables due to roundoff.

Prepared By:	Date: 5/4/09		Checked By:	Date: 5-4-09

Work Instruction No. 311
Exelon COL Victoria Site
MACTEC Engineering and Consulting, Inc.
MACTEC Project 6468-07-1777

DCH 1/2/09

Issued To: ~~Steve Kiser and~~ Jonathan Honeycutt

Issued By: Daniel E Atkinson **Rev. No.** 0

Valid From: 1/12/09 **Date:** 1/12/09

To: 12/31/09

Task Description: Perform SPT Energy Measurements

Applicable Technical Procedures or Plans, or other reference:

1. Geotechnical Work Plan (current revision; available at Site Office), and
2. ASTM D 4633-05 (copy attached.).

Specific Instructions (note attachments where necessary): Perform energy measurements for each drill rig on site in accordance with ASTM D-4633-05. Consult with Site Manager as to schedule for performing the measurements. Hammer weights have been checked by site personnel, and records will be available on site. All rigs are using automatic hammer systems. Confirm that automatic hammer system is being operated within manufacturer's recommendations or in a typical operating fashion as observed from watching one or two SPT measurements prior to measuring energy. Check each drill rig using all hammer/rod combinations that it will be using. Depths for measurements should be coordinated with the Site Manager. See Site Manager for current boring logs of holes drilled and use these to plan most effective field measurement program. Submit copies of calibration records for equipment to Project Principal for review prior to beginning work on site.

Special Instructions (note attachments where necessary): Confirm with Site Manager that approval of equipment calibration records have been received prior to beginning field testing. If unexpected conditions are encountered that affect measurements, contact Site Manager or Project Principal immediately.

Report Format: Prepare standard report in accordance with ASTM D 4633 requirements.

Specific Quality Assurance Procedures Applicable: QAP 20-1; QAP 25-1; QAP for Reporting Nuclear-Related Defects, or Noncompliances, per Federal Regulation 10CFR21 and Section 306 of the Energy Reorganization Act of 1974. Current revisions apply.

Hold Points or Witness Points: None

Records: All records generated shall be considered QA Records.

Reviewed and Approved by: (Note: Only one signature is required for issuance)

Project Manager: _____ Date: _____

Project Principal Engineer: _____ Date: _____

Site Manager/Coordinator: _____ Date: 1/12/09

Pages: 1 plus attachment

Attachments: ASTM D 4633-05

DCN: EXE917

MACTEC
2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208
Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	Exelon	MAKE:	CME
LOCATION:	Victoria, Texas	MODEL:	750
PROJECT NO.:	6468-07-1777	SERIAL NO.:	07
DATE:	1/25/2009	HAMMER TYPE:	Auto
WEATHER:	65° F Cloudy Skies	ROPE CONDITION:	N/A
INSPECTOR:	JNH JNH 1/25/2009	ROD SIZE:	NW J
DRILLING COMPANY:	MACTEC Miller	NO. OF SHEAVES:	N/A

BORING DATA										
BORING NUMBER:	B3234									
DEPTH DRILLED:	Various									
TIME DRIVEN:	7:30 am - 3:30 pm									
RIG OPERATOR:	G. Bibrey									
HAMMER OPERATOR:	N/A									
PDA PAK SERIAL NO.:	3622L									
INSTR. ROD AREA:	1.43 in²									
ACCEL. SERIAL NOS.:	143-K990 144-K1050									
STRAIN SERIAL NOS.:	146 NW 1/2									

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)
332.5 - 334	13-27-55
342.5 - 344	9-11-16
352.5 - 354	29-42-46
~~362.5 - 364~~	
JNH 1/25/09 362.5 - 363.9	49-33-50/0.4'

REMARKS:

MACTEC

2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208
Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	Exelon	MAKE:	CME
LOCATION:	Victoria, Texas	MODEL:	750
PROJECT NO.:	6468-07-1777	SERIAL NO.:	07
DATE:	1/26/2009	HAMMER TYPE:	Auto
WEATHER:	60°F Cloudy	ROPE CONDITION:	N/A
INSPECTOR:	JNH	ROD SIZE:	NW I
DRILLING COMPANY:	Miller	NO. OF SHEAVES:	N/A

BORING DATA										
BORING NUMBER:	B3234									
DEPTH DRILLED:	VARIOUS JNH 1/26/09									
TIME DRIVEN:	8:00 am - 9:00 am 4:50 pm									
RIG OPERATOR:	G. Bibbey									
HAMMER OPERATOR:	N/A									
PDA PAK SERIAL NO.:	3622L									
INSTR. ROD AREA:	1.43 in^2									
ACCEL. SERIAL NOS.:	43 - K990 49 - K1050									
STRAIN SERIAL NOS.:	146 NW 1/2									

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)
372.5-374	9-14-21
4025-404	7-12-19

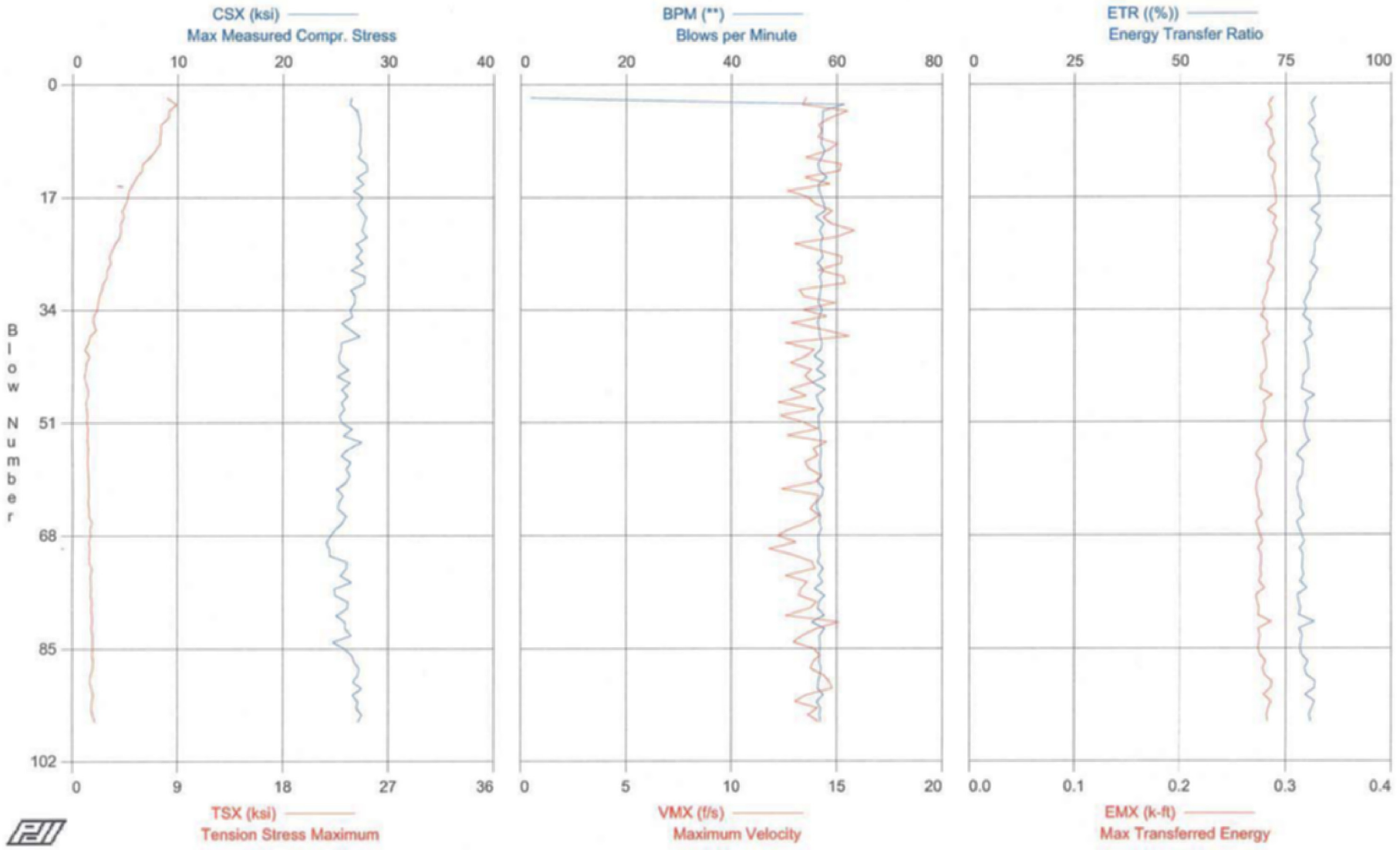
REMARKS:

MACTEC Engineering and Consulting, Inc. - Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 9-Mar-2009

Test date: 25-Jan-2009

EXELON VICTORIA - Boring B3234 (332.5'-334' sample)



EXELON VICTORIA - Boring B3234 (332.5'-334' sample)
OP: JNH

Hammer ID: 07; Driller: G.BILBREY CME 750 (Miller)
Test date: 25-Jan-2009

AR: 1.43 in^2
LE: 338.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

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TSX: Tension Stress Maximum
VMX: Maximum Velocity
FMX: Maximum Force
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	CSX	TSX	VMX	FMX	FVP	BPM	EF2	ETR	EMX
	ksi	ksi	f/s	kips	[]	**	k-ft	(%)	k-ft
2	26.5	8.1	13.6	38	0.8	1.9	0.334	82.2	0.288
3	26.4	8.9	13.3	38	0.8	61.4	0.334	81.0	0.284
4	27.0	8.2	15.5	39	0.9	57.3	0.344	81.6	0.286
5	27.2	8.2	14.7	39	0.9	57.3	0.343	82.1	0.287
6	27.3	7.6	14.1	39	0.8	57.2	0.345	80.4	0.281
7	27.3	7.6	14.3	39	0.8	57.2	0.345	81.7	0.286
8	27.3	7.5	14.1	39	0.8	57.1	0.343	82.1	0.287
9	27.2	7.5	15.0	39	0.9	57.0	0.343	82.6	0.289
10	27.4	7.1	14.5	39	0.9	57.7	0.342	81.3	0.284
11	27.1	6.6	13.5	39	0.8	57.1	0.342	81.1	0.284
12	27.9	6.0	15.2	40	0.9	56.4	0.348	83.0	0.290
13	28.0	5.9	15.1	40	0.9	56.7	0.353	82.9	0.290
14	27.0	5.5	13.5	39	0.8	58.1	0.343	82.1	0.287
15	27.7	5.2	14.7	40	0.9	56.6	0.348	82.5	0.289
16	26.7	4.8	12.7	38	0.8	56.6	0.347	82.8	0.290
17	27.5	4.7	13.6	39	0.8	57.1	0.350	83.1	0.291
18	27.1	4.5	14.0	39	1.1	57.5	0.344	83.0	0.291
19	27.4	4.2	14.8	39	0.8	57.8	0.335	81.0	0.283
20	27.9	4.4	14.3	40	0.8	56.0	0.349	83.1	0.291
21	27.7	4.1	14.7	40	0.8	57.5	0.341	82.1	0.288
22	27.5	4.1	15.8	39	0.9	56.7	0.343	83.5	0.292
23	28.0	4.0	15.0	40	0.8	57.3	0.340	82.8	0.290
24	27.0	3.7	13.0	39	0.8	56.9	0.345	81.9	0.287
25	27.5	3.4	14.2	39	0.8	57.0	0.344	81.9	0.287
26	27.0	3.2	15.2	39	0.9	57.3	0.338	81.7	0.286
27	27.6	3.3	15.2	39	0.9	56.3	0.344	80.9	0.283
28	26.5	3.0	14.1	38	1.0	57.4	0.341	82.6	0.289
29	27.8	3.0	15.3	40	0.9	56.7	0.345	81.8	0.286
30	27.7	2.6	15.4	40	0.8	57.1	0.337	80.8	0.283
31	26.4	2.5	13.2	38	1.1	56.9	0.345	80.9	0.283
32	26.9	2.3	13.4	38	0.8	56.7	0.340	80.2	0.281
33	26.8	2.2	14.9	38	0.9	56.5	0.339	79.4	0.278
34	26.4	2.1	13.4	38	0.8	57.2	0.335	80.0	0.280
35	26.6	1.8	14.5	38	0.8	56.7	0.332	79.1	0.277
36	25.6	1.8	12.8	37	1.1	56.4	0.337	81.0	0.283
37	26.4	2.0	14.4	38	0.9	56.7	0.339	80.6	0.282
38	27.3	1.5	15.6	39	0.8	56.8	0.342	81.4	0.285
39	25.5	1.4	12.6	37	0.8	57.2	0.333	79.4	0.278
40	25.5	1.0	13.9	37	1.0	57.0	0.332	80.1	0.280
41	25.3	1.5	13.6	36	1.0	55.8	0.340	80.3	0.281
42	25.4	1.2	12.8	36	1.1	57.5	0.337	80.5	0.282
43	26.2	1.1	13.8	38	0.9	56.2	0.344	80.5	0.282
44	25.2	1.0	13.5	36	1.0	57.9	0.330	79.2	0.277
45	26.4	1.1	13.8	38	0.9	55.4	0.337	79.3	0.278
46	25.6	1.3	12.8	37	0.8	57.8	0.341	78.8	0.276
47	26.1	1.3	13.5	37	1.1	56.2	0.347	81.9	0.287
48	25.6	1.2	12.2	37	0.8	56.6	0.340	79.7	0.279
49	25.9	1.2	14.0	37	1.0	57.4	0.340	80.4	0.281
50	25.4	1.3	12.3	36	1.2	56.6	0.337	80.0	0.280
51	25.6	1.3	13.4	37	1.1	56.6	0.339	79.5	0.278
52	26.6	1.4	14.1	38	0.8	56.7	0.336	79.5	0.278
53	25.8	1.3	12.7	37	1.1	57.0	0.338	79.9	0.280
54	27.5	1.3	14.5	39	0.8	56.9	0.342	80.6	0.282
55	26.2	1.4	13.9	38	1.0	57.0	0.334	78.9	0.276
56	25.6	1.3	14.1	37	0.9	57.0	0.333	77.7	0.272
57	26.4	1.3	13.5	38	0.8	56.8	0.332	79.2	0.277
58	26.0	1.3	13.7	37	0.8	56.8	0.335	79.1	0.277
59	26.4	1.4	14.3	38	0.8	57.1	0.331	79.0	0.276
60	26.0	1.4	14.0	37	0.9	56.4	0.335	78.0	0.273
61	25.1	1.4	12.4	36	1.1	57.5	0.326	77.8	0.272
62	25.7	1.4	14.1	37	0.9	57.2	0.324	78.0	0.273
63	25.3	1.3	14.0	36	0.9	56.3	0.323	78.7	0.275
64	25.3	1.4	13.7	36	1.0	56.3	0.327	78.6	0.275
65	26.0	1.4	14.2	37	0.8	56.9	0.326	79.3	0.278
66	25.7	1.7	13.7	37	0.9	56.7	0.328	77.7	0.272

EXELON VICTORIA - Boring B3234 (332.5'-334' sample)
OP: JNH
Hammer ID: 07; Driller: G.BILBREY CME 750 (Miller)
Test date: 25-Jan-2009

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
67	25.1	1.5	12.8	36	0.8	57.1	0.323	78.3	0.274
68	24.5	1.6	12.2	35	1.1	56.5	0.325	78.9	0.276
69	24.2	1.4	13.1	35	1.0	56.6	0.322	79.5	0.278
70	24.4	1.5	11.8	35	1.2	56.6	0.322	78.4	0.274
71	24.4	1.5	13.0	35	1.1	56.8	0.326	79.1	0.277
72	26.1	1.5	13.8	37	0.9	56.4	0.333	79.0	0.277
73	26.0	1.7	14.0	37	0.9	57.4	0.329	78.9	0.276
74	25.5	1.6	12.6	36	0.8	56.5	0.328	79.2	0.277
75	26.5	1.6	13.6	38	0.9	57.3	0.330	78.5	0.275
76	24.9	1.6	13.3	36	1.0	55.8	0.329	80.0	0.280
77	25.0	1.6	13.2	36	1.0	57.7	0.324	77.8	0.272
78	26.2	1.7	14.0	37	0.9	56.6	0.328	78.1	0.273
79	26.1	1.6	13.7	37	0.9	56.4	0.330	78.6	0.275
80	25.1	1.7	12.6	36	1.1	57.6	0.324	78.1	0.274
81	25.9	1.7	15.1	37	0.9	55.3	0.334	81.8	0.286
82	25.9	1.6	14.0	37	0.9	57.7	0.327	78.2	0.274
83	26.5	1.7	13.4	38	0.8	56.7	0.330	78.9	0.276
84	24.8	1.7	13.0	35	1.1	56.8	0.325	78.6	0.275
85	25.9	1.7	13.9	37	0.9	56.8	0.327	78.4	0.274
86	26.6	1.7	14.2	38	0.9	56.7	0.335	78.9	0.276
87	26.8	1.8	13.9	38	1.0	56.7	0.334	80.4	0.281
88	27.2	1.7	13.7	39	0.9	57.0	0.335	79.5	0.278
89	27.1	1.6	14.4	39	0.9	56.8	0.335	80.0	0.280
90	26.7	1.5	14.6	38	1.0	56.5	0.336	82.0	0.287
91	27.4	1.7	14.8	39	0.9	56.4	0.335	81.8	0.286
92	26.6	1.8	13.6	38	1.0	57.4	0.331	79.6	0.279
93	27.1	1.7	13.0	39	0.8	56.2	0.337	81.8	0.286
94	27.0	1.6	14.1	39	1.0	56.9	0.335	81.2	0.284
95	27.5	1.7	13.6	39	0.8	56.7	0.335	80.5	0.282
96	27.1	1.9	14.1	39	1.0	56.9	0.331	81.0	0.283
Average	26.4	2.7	13.9	38	0.9	56.3	0.336	80.3	0.281

Total number of blows analyzed: 95

Time Summary

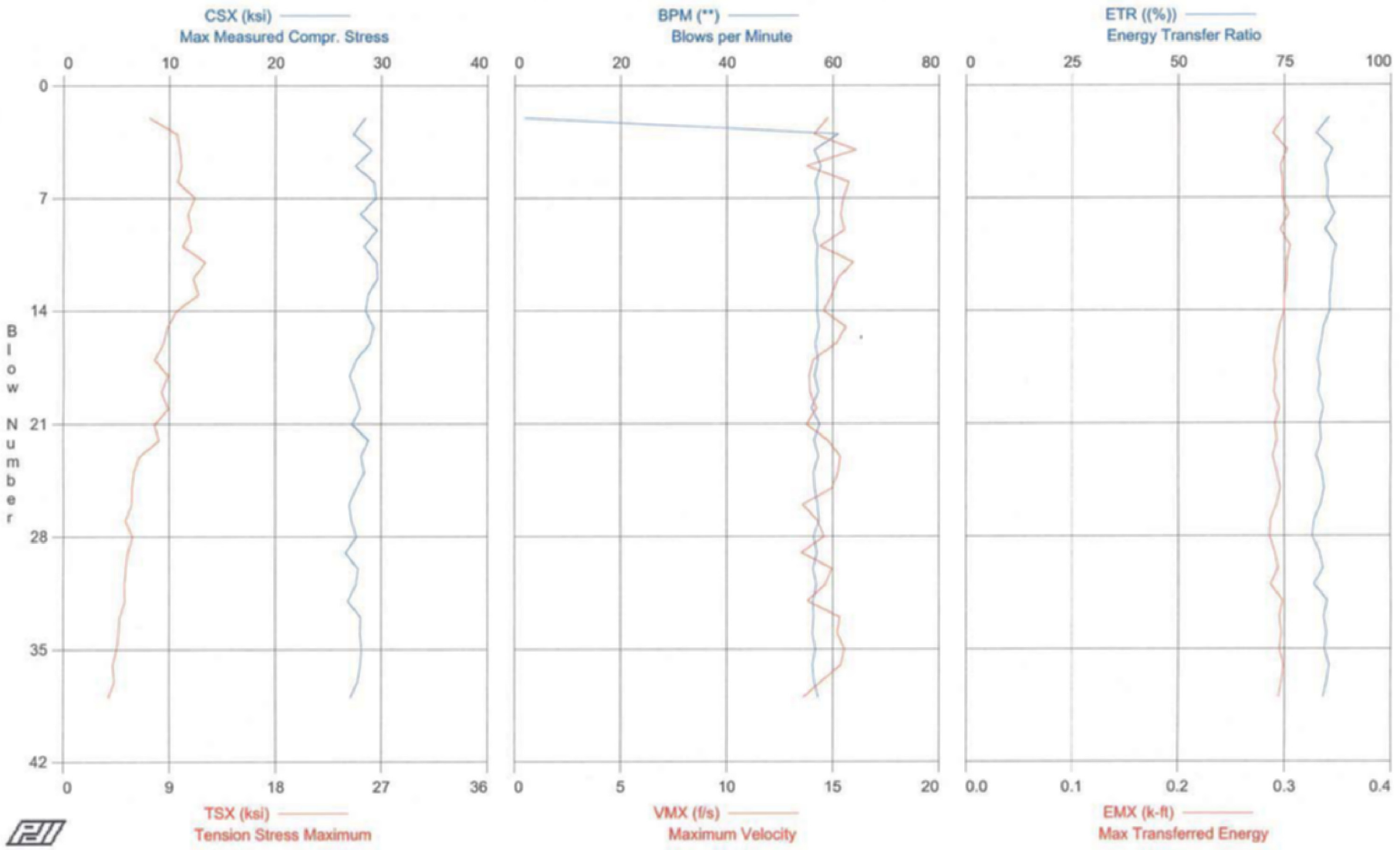
Drive 4 minutes 54 seconds 10:11:19 AM - 10:16:13 AM (1/25/2009) BN 1 - 96

MACTEC Engineering and Consulting, Inc. - Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 9-Mar-2009

Test date: 25-Jan-2009

EXELON VICTORIA - Boring B3234 (342.5'-344' sample)



EXELON VICTORIA - Boring B3234 (342.5'-344' sample)
OP: JNH

Hammer ID: 07; Driller: G.BILBREY CME 750 (Miller)
Test date: 25-Jan-2009

AR: 1.43 in^2
LE: 348.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
VMX: Maximum Velocity
FMX: Maximum Force
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	28.5	7.3	14.8	41	1.0	1.9	0.355	85.5	0.299
3	27.3	9.6	14.1	39	0.8	61.0	0.355	82.5	0.289
4	29.1	9.9	16.1	42	0.9	56.5	0.355	86.2	0.302
5	27.5	10.0	13.8	39	0.8	57.7	0.364	84.5	0.296
6	29.3	9.7	15.7	42	0.8	56.7	0.359	85.2	0.298
7	29.5	11.2	15.5	42	0.8	57.2	0.366	85.0	0.298
8	28.0	10.6	15.4	40	1.0	57.3	0.354	86.9	0.304
9	29.6	10.8	15.5	42	0.9	56.4	0.369	84.6	0.296
10	28.4	10.1	14.4	41	1.1	57.1	0.364	87.2	0.305
11	29.5	12.1	16.0	42	0.8	56.9	0.369	86.3	0.302
12	29.6	11.0	15.2	42	0.9	57.0	0.371	86.2	0.302
13	28.8	11.5	15.0	41	0.8	57.1	0.360	85.6	0.300
14	28.5	9.6	14.6	41	1.0	57.0	0.363	85.7	0.300
15	29.3	8.9	15.6	42	0.9	57.4	0.363	84.3	0.295
16	28.9	8.5	15.2	41	0.9	56.7	0.363	83.7	0.293
17	27.7	7.8	14.1	40	0.8	57.2	0.359	82.9	0.290
18	27.0	8.9	13.9	39	0.8	56.6	0.357	83.5	0.292
19	27.6	8.4	13.9	39	1.0	57.3	0.355	82.9	0.290
20	28.0	8.9	14.2	40	1.0	56.0	0.364	84.2	0.295
21	27.2	7.8	13.8	39	1.1	57.5	0.356	83.3	0.291
22	28.8	8.1	14.8	41	0.9	56.5	0.362	83.6	0.293
23	28.1	6.5	15.4	40	0.9	57.3	0.350	82.5	0.289
24	28.4	6.0	15.2	41	0.9	56.4	0.359	83.8	0.293
25	27.6	5.8	15.0	39	1.0	56.6	0.353	84.4	0.296
26	27.0	5.8	13.6	39	1.1	57.1	0.355	83.6	0.293
27	27.2	5.3	14.3	39	1.0	57.4	0.352	82.1	0.287
28	27.7	5.9	14.6	40	0.9	56.4	0.355	81.6	0.286
29	26.6	5.5	13.5	38	0.8	57.0	0.349	83.3	0.291
30	27.8	5.3	15.0	40	1.0	56.3	0.352	84.1	0.294
31	27.6	5.2	14.6	39	0.9	56.9	0.354	82.0	0.287
32	26.8	5.3	13.8	38	1.1	56.3	0.354	85.0	0.298
33	28.0	4.8	15.3	40	0.8	56.4	0.351	84.3	0.295
34	28.0	4.7	15.2	40	0.9	56.2	0.352	84.9	0.297
35	28.1	4.6	15.6	40	0.9	56.7	0.349	84.4	0.295
36	28.0	4.2	15.4	40	0.9	56.2	0.351	85.5	0.299
37	27.7	4.3	14.5	40	0.9	56.5	0.360	84.9	0.297
38	27.1	3.8	13.6	39	0.8	57.2	0.355	84.0	0.294
Average	28.1	7.7	14.8	40	0.9	55.5	0.358	84.3	0.295

Total number of blows analyzed: 37

Time Summary

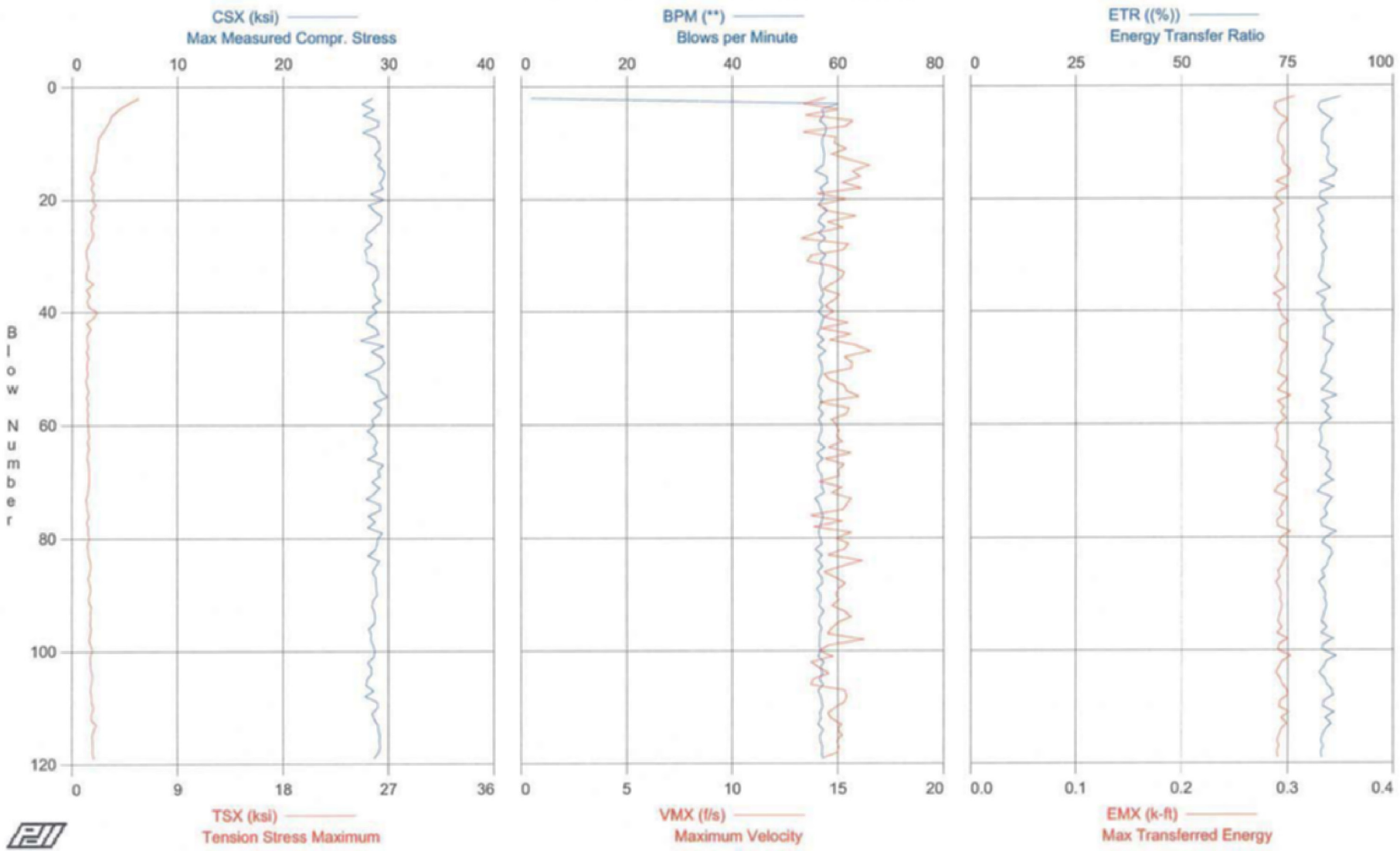
Drive 2 minutes 50 seconds 12:15:56 PM - 12:18:46 PM (1/25/2009) BN 1 - 38

MACTEC Engineering and Consulting, Inc. - Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 23-Apr-2009

Test date: 25-Jan-2009

EXELON VICTORIA - Boring B3234 (352.5'-354' sample)



EXELON VICTORIA - Boring B3234 (352.5'-354' sample)
OP: JNH

Hammer ID: 07; Driller: G.BILBREY CME750 (Miller)
Test date: 25-Jan-2009

AR: 1.43 in^2
LE: 358.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
VMX: Maximum Velocity
FMX: Maximum Force
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	28.5	5.7	14.4	41	1.0	1.9	0.365	87.5	0.306
3	27.4	4.7	13.4	39	0.8	60.1	0.354	82.6	0.289
4	28.6	3.9	15.0	41	0.8	57.0	0.356	82.3	0.288
5	27.6	3.4	13.5	39	0.8	57.3	0.357	83.5	0.292
6	29.0	3.2	15.7	42	0.9	56.6	0.361	85.6	0.300
7	29.0	2.9	15.4	41	0.9	57.7	0.358	84.4	0.295
8	27.5	2.6	13.3	39	1.1	57.7	0.353	83.3	0.292
9	28.8	2.3	14.9	41	0.9	57.1	0.355	83.2	0.291
10	29.1	2.2	14.8	42	0.9	57.0	0.360	83.2	0.291
11	29.2	2.2	15.4	42	0.8	57.2	0.357	84.6	0.296
12	28.7	2.1	14.7	41	0.8	57.4	0.358	84.8	0.297
13	29.3	2.1	15.6	42	0.8	57.3	0.360	84.3	0.295
14	29.0	1.9	16.5	41	0.9	57.2	0.360	84.8	0.297
15	29.6	1.9	15.7	42	0.8	55.7	0.370	86.7	0.303
16	29.5	1.6	16.1	42	0.9	57.9	0.367	86.0	0.301
17	29.2	1.8	15.2	42	0.9	58.1	0.357	82.6	0.289
18	29.5	1.6	16.1	42	0.8	56.7	0.362	86.1	0.301
19	28.3	1.9	14.0	40	1.1	57.3	0.358	82.8	0.290
20	29.5	1.7	15.4	42	0.9	57.2	0.362	82.7	0.289
21	28.1	2.0	14.1	40	0.8	56.3	0.361	84.5	0.296
22	28.6	1.6	14.4	41	0.8	58.0	0.360	82.0	0.287
23	29.4	1.8	15.8	42	0.8	56.8	0.360	82.9	0.290
24	29.2	1.6	14.5	42	1.0	56.3	0.367	83.6	0.292
25	28.6	1.6	15.2	41	0.8	57.5	0.360	82.5	0.289
26	28.0	1.8	14.0	40	0.8	56.4	0.361	83.5	0.292
27	27.8	1.7	13.3	40	1.2	57.6	0.358	83.0	0.290
28	28.4	1.4	15.5	41	0.8	56.4	0.357	83.6	0.293
29	27.8	1.2	15.2	40	1.0	56.5	0.359	84.3	0.295
30	27.9	1.2	13.8	40	0.8	57.7	0.361	83.2	0.291
31	27.9	1.3	13.5	40	1.1	56.7	0.362	83.5	0.292
32	28.8	1.4	14.8	41	1.0	57.1	0.362	83.3	0.292
33	29.0	1.2	15.3	42	0.9	57.2	0.361	83.1	0.291
34	29.0	1.2	15.2	41	0.9	56.7	0.359	82.4	0.288
35	28.5	1.8	14.8	41	0.8	56.6	0.364	83.3	0.292
36	28.7	1.2	14.3	41	0.8	56.9	0.367	85.2	0.298
37	28.7	1.5	15.1	41	0.9	57.3	0.340	81.9	0.287
38	29.2	1.3	14.8	42	0.8	56.6	0.366	84.0	0.294
39	28.5	1.4	14.4	41	1.0	57.2	0.340	83.2	0.291
40	28.9	2.1	14.8	41	0.8	56.4	0.345	83.8	0.293
41	28.1	1.8	14.3	40	1.1	57.3	0.363	84.3	0.295
42	27.9	1.2	15.5	40	1.0	57.0	0.360	86.0	0.301
43	28.9	1.6	14.2	41	0.8	56.7	0.361	83.7	0.293
44	29.1	1.3	15.6	42	0.8	56.2	0.358	83.9	0.293
45	27.3	1.3	14.6	39	1.0	57.3	0.355	83.6	0.293
46	29.5	1.4	15.9	42	0.9	56.2	0.346	85.8	0.300
47	28.4	1.2	16.5	41	0.9	57.7	0.360	85.2	0.298
48	29.3	1.4	15.3	42	0.8	56.4	0.337	84.1	0.294
49	29.6	1.3	15.7	42	0.9	56.8	0.364	84.2	0.295
50	29.1	1.3	15.6	42	0.9	57.1	0.361	83.6	0.293
51	27.8	1.4	14.3	40	1.1	57.0	0.355	83.0	0.291
52	29.0	1.2	14.6	41	1.1	56.5	0.363	85.7	0.300
53	29.2	1.3	15.3	42	1.0	56.3	0.363	84.6	0.296
54	29.3	1.4	15.4	42	0.9	57.1	0.361	83.1	0.291
55	30.0	1.2	16.0	43	0.8	56.6	0.363	86.7	0.303
56	28.6	1.4	14.1	41	0.8	57.0	0.359	83.2	0.291
57	29.3	1.3	15.5	42	0.9	56.4	0.363	84.8	0.297
58	29.1	1.4	15.4	42	0.9	57.2	0.361	83.9	0.294
59	28.4	1.3	14.7	41	0.8	56.4	0.360	85.5	0.299
60	28.7	1.4	14.9	41	1.0	56.9	0.361	83.4	0.292
61	28.0	1.4	15.1	40	1.0	57.0	0.357	82.7	0.289
62	28.7	1.5	14.9	41	1.0	56.6	0.356	83.0	0.291
63	28.9	1.3	15.2	41	0.9	56.3	0.361	83.2	0.291
64	28.6	1.5	14.6	41	0.8	57.5	0.357	82.5	0.289
65	28.9	1.3	15.6	41	0.9	56.1	0.359	84.7	0.296
66	28.0	1.3	14.4	40	1.1	57.2	0.357	84.2	0.295

EXELON VICTORIA - Boring B3234 (352.5'-354' sample)
OP: JNH
Hammer ID: 07; Driller: G.BILBREY CME750 (Miller)
Test date: 25-Jan-2009

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
67	29.5	1.4	15.3	42	0.9	56.1	0.364	85.3	0.299
68	29.0	1.5	15.0	42	0.8	56.3	0.363	85.3	0.298
69	29.2	1.5	15.1	42	0.9	57.0	0.363	84.0	0.294
70	28.4	1.5	14.1	41	1.1	57.0	0.362	85.9	0.301
71	29.2	1.4	15.2	42	0.9	57.0	0.360	83.3	0.291
72	28.7	1.4	14.7	41	0.8	57.4	0.354	82.2	0.288
73	27.9	1.2	15.6	40	1.0	55.7	0.358	85.7	0.300
74	29.2	1.3	15.4	42	0.9	56.5	0.360	84.7	0.296
75	29.2	1.3	15.2	42	0.9	56.8	0.362	83.8	0.293
76	28.1	1.5	13.7	40	1.1	57.2	0.357	84.5	0.296
77	28.7	1.3	15.2	41	0.8	57.0	0.356	82.9	0.290
78	28.0	1.4	13.9	40	1.1	56.6	0.357	83.3	0.291
79	29.4	1.4	15.6	42	0.8	56.4	0.362	86.6	0.303
80	29.0	1.5	14.9	41	0.8	56.7	0.361	84.0	0.294
81	28.9	1.3	15.5	41	0.9	57.0	0.357	83.3	0.292
82	28.8	1.4	15.3	41	1.0	55.7	0.364	85.3	0.299
83	28.1	1.4	14.5	40	1.1	57.0	0.361	85.6	0.300
84	29.1	1.6	16.1	42	0.9	56.3	0.362	84.8	0.297
85	28.8	1.6	15.2	41	0.8	57.1	0.359	84.4	0.295
86	28.5	1.5	14.3	41	0.8	56.2	0.358	83.1	0.291
87	28.8	1.4	14.9	41	1.0	56.9	0.361	83.8	0.293
88	28.8	1.5	15.3	41	0.9	57.1	0.355	82.4	0.289
89	28.9	1.6	15.0	41	0.9	56.0	0.360	83.4	0.292
90	28.9	1.5	14.9	41	0.9	56.7	0.363	84.0	0.294
91	28.5	1.4	15.0	41	0.8	56.7	0.362	83.8	0.293
92	28.4	1.7	14.7	41	1.0	56.5	0.360	84.3	0.295
93	28.7	1.6	15.3	41	0.9	57.3	0.359	83.9	0.294
94	28.7	1.6	15.6	41	0.8	56.6	0.355	83.5	0.292
95	28.7	1.6	15.0	41	0.9	56.4	0.356	83.1	0.291
96	28.1	1.7	14.7	40	1.0	56.9	0.360	84.4	0.295
97	28.3	1.6	14.5	41	1.0	56.6	0.357	82.9	0.290
98	28.3	1.5	16.2	40	0.9	56.6	0.358	85.8	0.300
99	28.6	1.7	14.6	41	0.9	56.5	0.359	83.4	0.292
100	28.7	1.7	14.1	41	1.0	56.7	0.362	83.3	0.291
101	28.6	1.6	14.7	41	0.8	56.3	0.362	86.5	0.303
102	28.0	1.6	13.7	40	1.1	57.3	0.358	84.2	0.295
103	28.4	1.6	14.1	41	1.1	56.7	0.358	83.6	0.292
104	28.4	1.8	14.6	41	0.8	57.1	0.355	82.5	0.289
105	28.0	1.8	13.8	40	0.8	56.5	0.355	83.8	0.293
106	27.9	1.6	13.7	40	1.1	57.2	0.352	84.3	0.295
107	28.6	1.6	15.3	41	0.8	56.3	0.358	85.5	0.299
108	27.8	1.7	15.4	40	1.0	56.7	0.356	85.8	0.300
109	29.0	1.7	15.3	41	0.9	57.0	0.357	83.6	0.293
110	29.0	1.8	14.9	41	0.9	57.1	0.358	83.4	0.292
111	28.4	1.7	14.5	41	1.1	56.6	0.356	85.9	0.301
112	28.6	1.6	14.7	41	0.8	56.8	0.355	83.9	0.294
113	29.0	2.0	15.2	41	0.8	56.3	0.363	85.3	0.299
114	29.0	1.8	15.0	42	0.8	57.2	0.360	84.0	0.294
115	29.2	1.7	15.2	42	0.9	56.6	0.358	83.3	0.292
116	29.1	1.8	15.0	42	1.0	56.7	0.359	82.9	0.290
117	29.2	1.8	15.1	42	0.9	57.1	0.358	83.5	0.292
118	29.0	1.8	15.0	41	0.8	57.0	0.358	82.9	0.290
119	28.6	1.9	14.3	41	0.8	57.1	0.355	83.1	0.291
Average	28.7	1.7	14.9	41	0.9	56.4	0.359	84.0	0.294

Total number of blows analyzed: 118

Time Summary

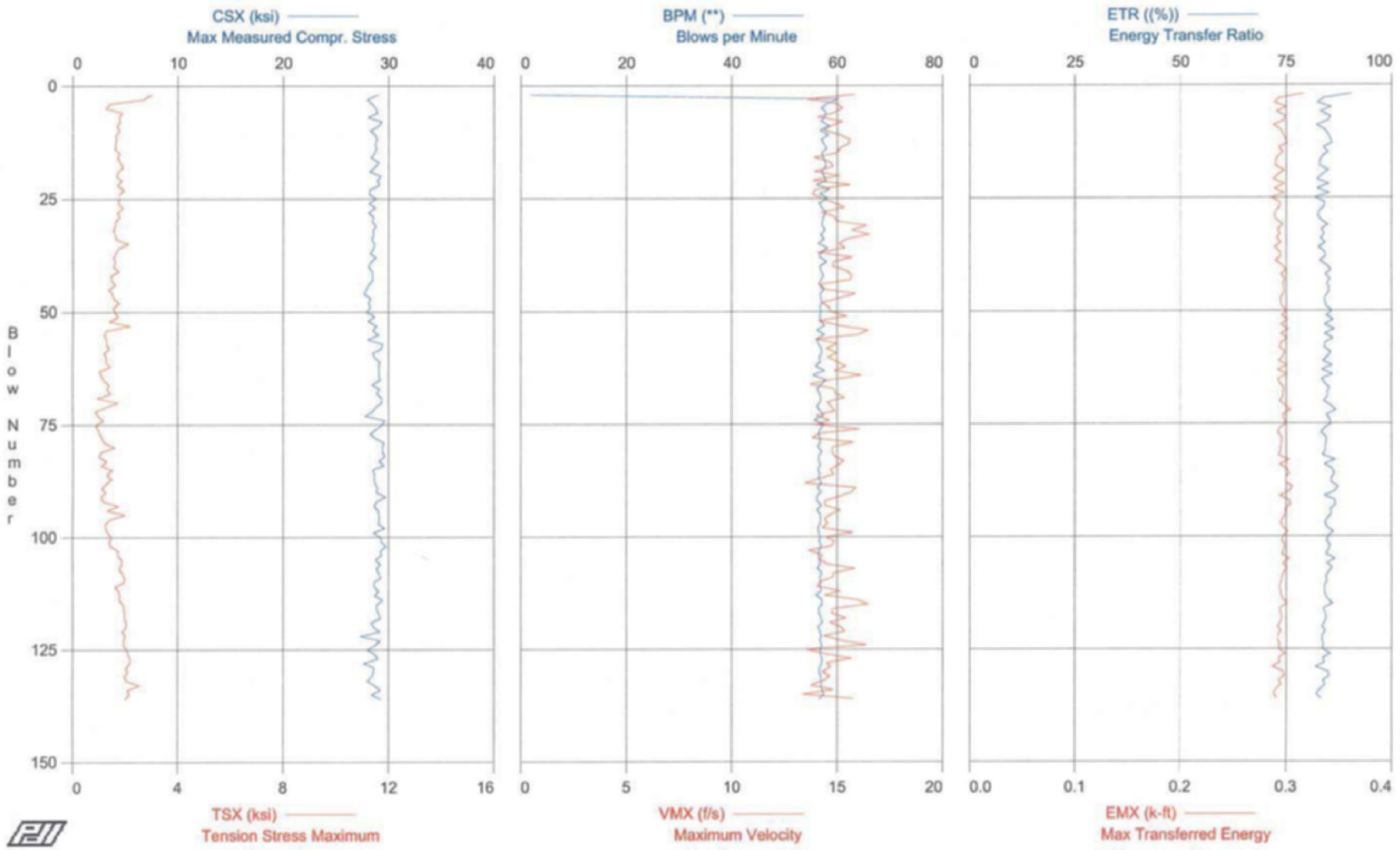
Drive 10 minutes 40 seconds 2:01:51 PM - 2:12:31 PM (1/25/2009) BN 1 - 119

MACTEC Engineering and Consulting, Inc. - Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 23-Apr-2009

Test date: 25-Jan-2009

EXELON VICTORIA - Boring B3234 (362.5'-363.9' sample)



EXELON VICTORIA - Boring B3234 (362.5'-363.9' sample)
OP: JNH

Hammer ID: 07; Driller: G.BILBREY CME 750 (Miller)
Test date: 25-Jan-2009

AR: 1.43 in^2
LE: 368.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
VMX: Maximum Velocity
FMX: Maximum Force
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	28.9	3.0	15.8	41	0.8	1.9	0.365	90.4	0.316
3	28.0	2.7	13.6	40	0.8	60.2	0.361	83.8	0.293
4	28.4	1.4	14.9	41	0.8	58.1	0.353	82.5	0.289
5	28.8	1.3	15.2	41	1.0	57.0	0.362	85.6	0.300
6	28.9	1.9	14.9	41	1.0	57.9	0.359	83.1	0.291
7	28.1	1.8	14.1	40	0.8	57.6	0.361	85.5	0.299
8	29.3	1.8	15.2	42	0.9	57.0	0.367	85.0	0.298
9	29.0	1.7	14.7	42	0.9	58.5	0.362	82.3	0.288
10	28.3	1.8	14.4	40	0.8	56.8	0.363	84.2	0.295
11	28.8	1.6	15.1	41	1.0	58.3	0.357	84.9	0.297
12	28.9	1.6	15.6	41	0.9	57.0	0.357	85.5	0.299
13	28.7	1.6	15.5	41	1.0	57.4	0.359	85.9	0.301
14	28.9	1.6	15.1	41	0.9	58.0	0.354	83.9	0.293
15	28.7	1.8	15.0	41	1.0	57.1	0.355	85.0	0.297
16	28.3	1.7	13.9	41	0.8	57.3	0.361	83.5	0.292
17	29.1	1.8	14.6	42	0.9	57.8	0.360	83.0	0.290
18	28.7	1.9	14.8	41	1.0	57.8	0.355	83.0	0.290
19	28.2	1.7	13.9	40	0.8	57.0	0.356	85.0	0.298
20	29.2	1.7	15.1	42	0.9	57.4	0.358	83.5	0.292
21	29.0	1.9	13.9	41	1.0	57.9	0.352	82.4	0.288
22	29.1	1.7	15.6	42	0.8	56.1	0.360	85.1	0.298
23	28.2	2.0	14.0	40	0.8	58.5	0.351	82.4	0.289
24	28.2	1.8	13.8	40	0.8	56.7	0.358	85.2	0.298
25	28.8	1.8	14.3	41	0.9	58.2	0.348	81.8	0.286
26	28.2	1.7	14.9	40	0.8	56.6	0.351	84.1	0.294
27	28.8	1.9	15.3	41	0.8	57.0	0.354	84.0	0.294
28	28.1	1.7	14.2	40	0.8	57.9	0.352	82.8	0.290
29	28.6	1.8	14.9	41	0.9	57.4	0.348	82.6	0.289
30	28.5	1.6	15.0	41	0.9	57.2	0.346	83.3	0.291
31	28.8	1.6	16.4	41	0.8	57.1	0.345	84.9	0.297
32	28.5	1.6	15.7	41	0.9	57.7	0.345	83.4	0.292
33	28.6	1.6	16.5	41	0.8	56.9	0.343	84.0	0.294
34	28.4	1.7	15.4	41	0.9	57.5	0.345	83.2	0.291
35	28.7	2.1	15.1	41	0.8	56.4	0.352	84.3	0.295
36	28.6	1.7	15.4	41	0.9	58.2	0.343	82.7	0.289
37	28.2	1.6	14.1	40	1.1	56.7	0.351	84.1	0.294
38	28.8	1.5	15.7	41	0.8	56.7	0.350	84.3	0.295
39	28.3	1.6	14.9	40	1.0	58.0	0.345	83.0	0.290
40	28.1	1.5	14.8	40	1.0	56.7	0.344	84.7	0.296
41	28.5	1.7	15.5	41	0.8	56.9	0.342	85.6	0.300
42	28.5	1.4	15.7	41	0.8	57.4	0.344	84.3	0.295
43	28.5	1.5	15.6	41	0.8	56.9	0.344	85.4	0.299
44	28.1	1.6	14.2	40	0.8	56.6	0.352	84.7	0.297
45	27.9	1.4	14.3	40	1.1	57.6	0.342	85.2	0.298
46	27.7	1.5	15.9	40	1.0	56.8	0.341	85.1	0.298
47	28.3	1.6	15.1	40	1.0	56.9	0.348	84.2	0.295
48	28.1	1.8	14.3	40	0.8	57.1	0.351	84.2	0.295
49	28.2	1.5	14.6	40	0.8	56.7	0.350	84.5	0.296
50	27.9	1.6	14.7	40	1.1	56.9	0.350	85.8	0.300
51	28.7	1.7	15.4	41	0.8	56.7	0.349	84.6	0.296
52	28.0	1.4	14.1	40	1.1	56.8	0.352	86.1	0.301
53	28.9	2.2	15.1	41	0.8	57.6	0.348	84.1	0.295
54	28.5	1.3	16.5	41	0.9	56.2	0.350	86.4	0.302
55	29.0	1.2	16.0	42	0.8	57.5	0.344	84.2	0.295
56	28.0	1.3	14.0	40	0.8	56.1	0.350	86.1	0.301
57	29.5	1.3	15.0	42	0.9	56.4	0.355	84.2	0.295
58	29.3	1.4	14.5	42	0.9	57.0	0.357	84.1	0.294
59	28.5	1.2	15.0	41	1.0	57.1	0.350	85.5	0.299
60	28.7	1.3	14.6	41	0.8	56.6	0.354	85.0	0.297
61	29.2	1.3	15.0	42	1.0	56.8	0.350	83.7	0.293
62	29.1	1.4	15.4	42	1.0	55.9	0.356	85.9	0.301
63	29.1	1.0	14.9	42	0.9	57.6	0.352	83.5	0.292
64	29.1	1.1	16.1	42	0.8	55.4	0.353	86.0	0.301
65	29.2	1.2	14.7	42	0.9	57.8	0.351	83.5	0.292
66	28.4	1.4	13.7	41	0.8	57.1	0.347	84.1	0.294

EXELON VICTORIA - Boring B3234 (362.5'-363.9' sample)
OP: JNH
Hammer ID: 07; Driller: G.BILBREY CME 750 (Miller)
Test date: 25-Jan-2009

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
67	29.1	1.3	14.8	42	1.0	56.2	0.355	85.3	0.298
68	28.9	1.4	14.9	41	0.8	56.6	0.350	84.8	0.297
69	29.4	0.9	15.3	42	0.9	56.9	0.352	84.8	0.297
70	29.4	1.7	14.5	42	0.8	56.8	0.354	84.0	0.294
71	28.8	1.3	14.7	41	1.0	56.2	0.354	85.7	0.300
72	28.5	0.9	14.9	41	1.1	56.8	0.351	86.9	0.304
73	27.8	1.0	14.0	40	1.1	57.4	0.353	84.7	0.297
74	29.6	1.2	14.6	42	1.0	55.7	0.360	85.3	0.298
75	29.4	0.9	14.0	42	0.8	57.4	0.353	85.7	0.300
76	28.8	1.0	16.0	41	0.9	56.8	0.344	84.1	0.294
77	28.3	1.0	14.2	40	0.8	56.5	0.346	83.3	0.292
78	28.8	1.1	13.8	41	0.8	56.7	0.353	84.5	0.296
79	29.5	1.2	15.8	42	0.8	56.8	0.344	84.5	0.296
80	29.4	1.6	14.8	42	1.0	56.3	0.352	84.3	0.295
81	29.4	1.1	14.8	42	1.0	57.1	0.354	84.3	0.295
82	29.7	1.0	14.9	42	0.9	56.5	0.353	83.7	0.293
83	29.1	1.3	15.3	42	1.0	56.5	0.353	86.6	0.303
84	29.6	1.1	15.0	42	0.9	56.8	0.354	84.1	0.294
85	28.5	1.5	14.7	41	1.1	56.4	0.351	85.9	0.301
86	28.7	1.3	14.8	41	1.1	56.7	0.352	86.5	0.303
87	28.6	1.5	14.1	41	1.1	56.5	0.355	85.8	0.300
88	28.7	1.3	13.5	41	1.2	57.0	0.356	85.7	0.300
89	29.0	1.1	15.9	41	1.0	56.3	0.350	87.4	0.306
90	28.9	1.3	15.7	41	1.0	56.9	0.348	86.5	0.303
91	29.7	1.1	15.1	42	0.9	56.2	0.352	84.1	0.294
92	28.9	1.1	14.4	41	1.1	56.2	0.359	86.7	0.303
93	28.6	1.7	14.4	41	1.1	57.0	0.354	86.7	0.304
94	29.0	1.3	15.1	41	1.0	56.2	0.355	85.6	0.299
95	29.1	2.0	14.7	42	1.0	56.8	0.355	85.8	0.300
96	29.1	1.4	14.4	42	0.9	56.8	0.358	84.9	0.297
97	29.0	1.2	14.5	41	1.0	56.8	0.356	84.3	0.295
98	29.6	1.3	14.3	42	0.9	56.4	0.356	84.7	0.297
99	28.6	1.3	15.7	41	1.0	56.5	0.347	86.3	0.302
100	29.3	1.5	14.5	42	0.8	56.8	0.347	85.0	0.297
101	29.3	1.4	14.9	42	0.9	56.6	0.351	84.7	0.296
102	29.8	1.5	14.7	43	0.9	57.0	0.350	85.4	0.299
103	29.2	1.7	13.6	42	0.8	56.6	0.354	85.1	0.298
104	29.3	1.7	14.3	42	0.8	56.6	0.351	84.5	0.296
105	28.7	1.9	14.2	41	1.1	56.6	0.352	86.6	0.303
106	29.2	1.9	14.5	42	0.8	56.8	0.353	84.8	0.297
107	28.9	1.8	15.8	41	1.0	56.3	0.350	85.9	0.301
108	29.1	1.9	14.8	42	1.0	57.1	0.352	85.1	0.298
109	29.3	2.0	14.8	42	1.0	56.7	0.354	84.5	0.296
110	28.6	2.0	14.2	41	0.8	56.9	0.346	84.7	0.296
111	28.7	1.6	14.1	41	1.0	56.8	0.351	84.1	0.294
112	29.1	1.8	15.1	42	0.8	57.0	0.344	84.2	0.295
113	28.7	1.8	14.4	41	0.8	56.0	0.350	84.3	0.295
114	29.4	1.8	15.9	42	0.9	57.1	0.341	84.9	0.297
115	28.9	1.9	16.4	41	0.9	57.1	0.346	86.0	0.301
116	28.9	2.0	14.8	41	0.8	56.5	0.345	83.9	0.294
117	29.1	2.0	14.8	42	0.9	56.6	0.349	84.3	0.295
118	29.2	2.0	15.4	42	0.9	56.9	0.353	84.5	0.296
119	28.4	2.0	14.7	41	1.0	57.2	0.346	84.2	0.295
120	28.6	2.0	15.2	41	0.9	56.4	0.344	83.6	0.292
121	29.1	1.9	15.4	42	0.8	56.7	0.345	84.3	0.295
122	27.3	2.0	14.4	39	1.1	57.0	0.344	83.6	0.292
123	29.2	1.9	15.1	42	0.8	56.7	0.345	83.5	0.292
124	28.7	1.9	16.4	41	0.9	57.1	0.342	83.9	0.294
125	28.0	2.1	13.6	40	0.8	56.8	0.345	83.6	0.293
126	28.7	2.1	14.4	41	0.8	56.8	0.350	85.5	0.299
127	29.0	2.2	15.7	41	0.8	57.1	0.340	83.8	0.293
128	27.7	2.2	14.5	40	1.1	57.1	0.342	84.0	0.294
129	28.6	2.0	14.7	41	0.8	56.7	0.341	82.0	0.287
130	28.6	2.1	14.3	41	0.8	56.6	0.343	84.9	0.297
131	28.4	2.0	14.6	41	1.1	56.9	0.341	85.2	0.298
132	28.0	2.1	14.4	40	1.1	56.9	0.345	83.8	0.293
133	28.7	2.5	13.7	41	0.8	57.0	0.350	84.2	0.295
134	29.2	2.1	14.8	42	0.9	57.1	0.347	83.0	0.290
135	28.4	2.2	13.4	41	0.8	57.5	0.342	82.2	0.288
136	29.2	2.0	15.7	42	0.9	56.6	0.342	83.1	0.291
Average	28.8	1.6	14.9	41	0.9	56.6	0.351	84.6	0.296

Total number of blows analyzed: 135

EXELON VICTORIA - Boring B3234 (362.5'-363.9' sample)
OP: JNH
Hammer ID: 07; Driller: G.BILBREY CME 750 (Miller)
Test date: 25-Jan-2009

Time Summary

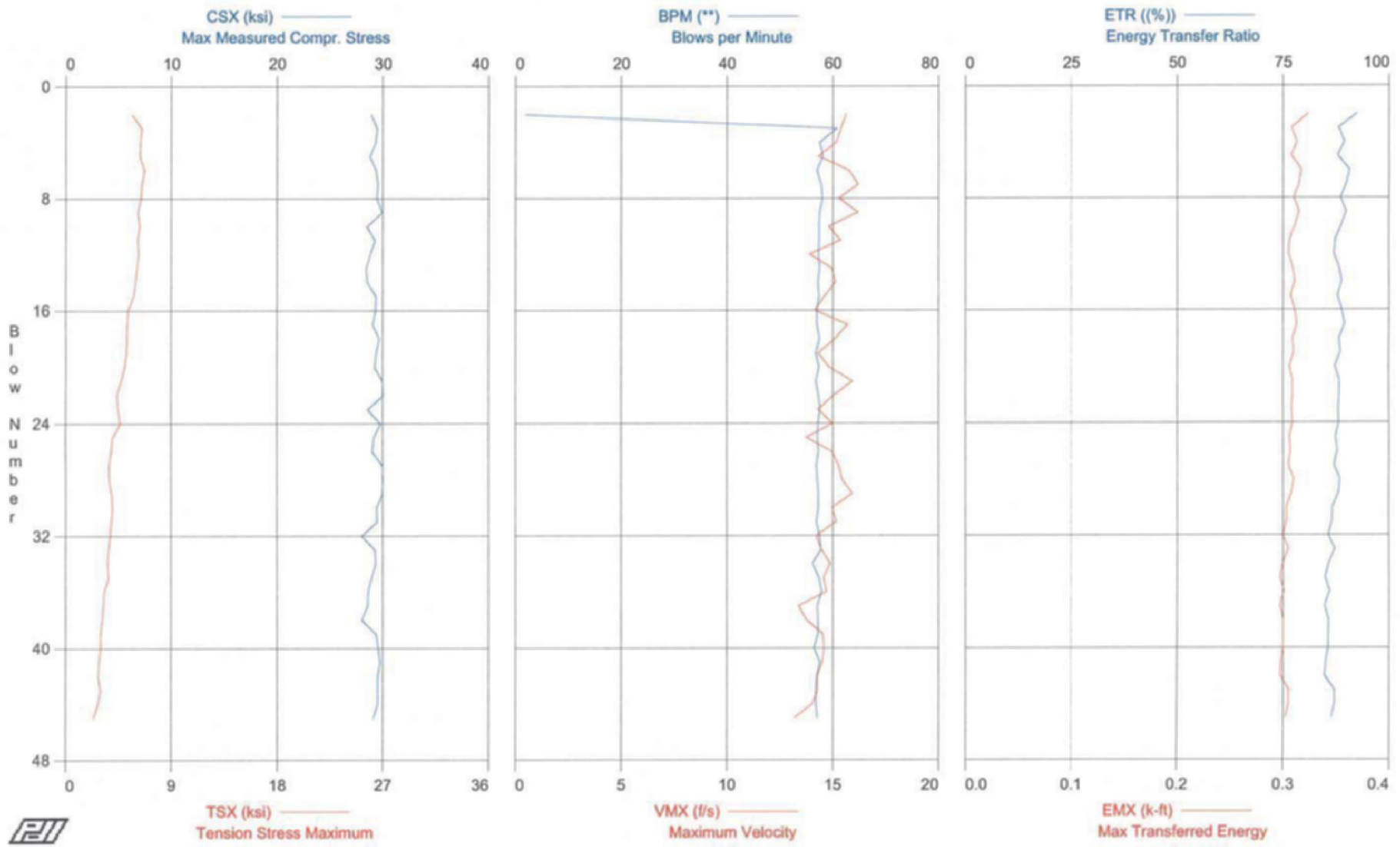
Drive	9 minutes 8 seconds	3:48:13 PM - 3:57:21 PM (1/25/2009) BN 1 - 136

MACTEC Engineering and Consulting, Inc. - Case Method Results

PDIPLOT Ver. 2008.2 - Printed: 10-Mar-2009

Test date: 26-Jan-2009

EXELON VICTORIA - Boring B3234 (372.5'-374' sample)



EXELON VICTORIA - Boring B3234 (372.5'-374' sample)
Hammer ID: 07; Driller: G.BILBREY CME750 (Miller)
OP: JNH
Test date: 26-Jan-2009

AR: 1.43 in^2
LE: 378.00 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
VMX: Maximum Velocity
FMX: Maximum Force
FVP: Force/Velocity proportionality
BPM: Blows per Minute
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	28.9	5.6	15.6	41	0.9	1.9	0.376	92.5	0.324
3	29.5	6.5	15.4	42	0.9	60.8	0.376	88.1	0.308
4	29.3	6.3	15.2	42	1.0	57.5	0.382	89.5	0.313
5	28.8	6.3	14.3	41	1.1	58.1	0.377	87.9	0.308
6	29.4	6.7	15.8	42	1.0	57.0	0.381	90.7	0.317
7	29.6	6.5	16.2	42	0.9	57.8	0.381	90.0	0.315
8	29.4	6.4	15.3	42	0.8	58.0	0.380	88.6	0.310
9	29.9	6.1	16.2	43	0.8	57.5	0.381	89.9	0.315
10	28.5	6.3	14.8	41	1.1	57.4	0.380	88.7	0.311
11	29.3	6.1	15.4	42	0.9	57.4	0.380	87.3	0.306
12	28.8	6.2	13.9	41	0.8	57.3	0.381	87.0	0.305
13	28.4	6.1	14.9	41	1.1	57.5	0.377	88.2	0.309
14	28.5	5.9	15.1	41	1.1	57.2	0.382	88.8	0.311
15	29.4	5.8	14.6	42	0.8	57.4	0.383	87.8	0.307
16	29.3	5.3	14.2	42	0.8	57.0	0.384	88.9	0.311
17	29.1	5.2	15.7	42	1.0	57.0	0.384	89.6	0.313
18	29.7	5.2	15.1	42	0.9	57.5	0.379	88.2	0.309
19	29.4	5.2	14.3	42	0.8	56.8	0.384	88.5	0.310
20	29.2	5.0	14.8	42	1.0	57.4	0.381	87.3	0.306
21	30.0	4.7	15.9	43	0.9	56.8	0.380	88.4	0.309
22	30.0	4.4	15.0	43	0.8	57.3	0.381	88.2	0.309
23	28.5	4.5	14.3	41	1.1	57.6	0.377	88.0	0.308
24	29.8	4.7	15.0	43	0.9	57.2	0.381	88.2	0.309
25	29.1	4.0	13.7	42	0.8	57.1	0.378	87.4	0.306
26	29.0	3.9	15.0	41	1.0	57.3	0.380	87.8	0.307
27	30.0	3.7	15.3	43	0.9	56.9	0.381	87.0	0.305
28	30.0	3.7	15.5	43	0.8	57.1	0.383	88.4	0.310
29	30.0	3.9	15.9	43	0.9	57.3	0.375	88.1	0.308
30	29.4	4.0	15.0	42	0.9	57.3	0.376	86.7	0.303
31	29.5	3.9	15.2	42	0.9	56.9	0.358	86.5	0.303
32	28.0	3.8	14.2	40	1.1	57.5	0.375	85.7	0.300
33	29.3	3.7	14.5	42	0.8	57.8	0.374	87.2	0.305
34	29.3	3.6	14.9	42	0.9	56.2	0.357	85.8	0.300
35	28.9	3.7	14.6	41	1.0	57.4	0.380	84.9	0.297
36	28.6	3.3	14.7	41	1.0	57.9	0.353	86.0	0.301
37	28.6	3.2	13.4	41	0.8	57.1	0.378	84.8	0.297
38	28.0	3.1	13.8	40	1.1	57.2	0.377	85.7	0.300
39	29.4	3.0	14.5	42	0.9	57.2	0.353	85.7	0.300
40	29.6	3.0	14.6	42	0.9	56.5	0.352	85.6	0.300
41	29.7	2.9	14.5	43	0.9	57.6	0.354	85.0	0.298
42	29.5	2.8	14.3	42	0.9	57.0	0.355	84.8	0.297
43	29.5	3.0	14.3	42	0.9	56.8	0.356	87.1	0.305
44	29.5	2.8	14.0	42	0.9	56.8	0.380	87.1	0.305
45	29.1	2.4	13.2	42	0.9	57.1	0.356	86.4	0.302
Average	29.2	4.6	14.8	42	0.9	56.1	0.375	87.6	0.307

Total number of blows analyzed: 44

Time Summary
Drive 9 minutes 16 seconds 9:40:34 AM - 9:49:50 AM (1/26/2009) BN 1 - 45