

EXELON COL VICTORIA - Boring B3131 (338.4'-339.9' sample)

Hammer ID: 100; Driller: J.COOK CME 75 (Miller)

OP: JNH

Test date: 25-Jan-2009

AR: 1.43 in²

SP: 0.492 k/ft³

LE: 344.00 ft

EM: 30,000 ksi

WS: 16,807.9 t/s

JC: 0.70

CSX: Max Measured Compr. Stress

BPM: Blows per Minute

TSX: Tension Stress Maximum

EF2: Energy of F²

VMX: Maximum Velocity

ETR: Energy Transfer Ratio

FMX: Maximum Force

EMX: Max Transferred Energy

FVP: Force/Velocity proportionality

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	28.3	8.5	14.3	40	0.9	1.9	0.355	82.8	0.290
3	27.8	8.6	14.2	40	0.8	58.0	0.358	84.8	0.297
4	28.1	8.7	14.4	40	0.8	58.8	0.363	85.5	0.299
5	28.2	8.8	14.3	40	1.1	57.7	0.358	84.2	0.295
6	29.1	8.8	15.6	42	0.9	57.9	0.346	82.8	0.290
7	27.8	8.7	14.0	40	0.8	58.3	0.354	82.9	0.290
8	27.6	8.4	14.7	40	1.0	57.7	0.348	79.7	0.279
9	27.2	7.8	13.3	39	0.8	57.3	0.350	82.0	0.287
10	27.3	7.6	13.9	39	0.8	57.6	0.350	80.3	0.281
11	28.2	7.7	14.8	40	1.0	56.7	0.351	81.7	0.286
12	28.3	7.4	14.2	40	1.0	57.2	0.357	81.2	0.284
13	27.5	7.0	14.3	39	1.0	57.1	0.348	79.1	0.277
14	27.5	6.5	14.1	39	0.8	55.8	0.329	75.9	0.266
15	26.2	5.9	13.4	38	0.9	28.7	0.293	66.8	0.234
16	27.7	6.5	14.3	40	0.8	29.8	0.352	81.7	0.286
17	28.1	6.3	14.6	40	0.8	55.2	0.335	76.5	0.268
18	27.8	5.9	13.9	40	1.0	53.1	0.343	77.6	0.272
20	28.7	5.4	15.2	41	0.9	3.8	0.333	80.5	0.282
21	28.7	5.5	14.8	41	0.9	57.8	0.354	82.2	0.288
22	28.2	5.1	15.7	40	0.8	57.6	0.345	80.1	0.280
23	28.5	5.3	15.3	41	0.8	58.3	0.359	81.7	0.286
24	28.9	5.2	15.1	41	0.8	58.0	0.355	82.3	0.288
25	28.7	4.9	15.7	41	0.9	57.5	0.347	79.8	0.279
26	27.7	4.9	14.4	40	0.8	57.6	0.350	81.2	0.284
27	28.5	4.7	14.4	41	1.0	58.2	0.334	82.0	0.287
28	27.9	4.8	14.4	40	0.8	57.6	0.356	82.7	0.290
29	28.6	4.6	15.0	41	0.8	57.7	0.335	81.2	0.284
30	28.7	4.7	15.0	41	0.9	58.4	0.336	81.6	0.286
31	29.0	4.5	15.6	41	0.9	58.0	0.341	82.5	0.289
32	28.7	4.5	15.0	41	0.9	57.5	0.335	80.6	0.282
33	28.4	4.4	14.5	41	1.0	57.9	0.356	82.7	0.289
34	28.5	4.4	14.7	41	1.0	58.1	0.353	83.9	0.294
35	27.2	4.5	13.4	39	0.8	57.6	0.350	80.7	0.283
36	27.3	4.2	13.7	39	0.8	57.9	0.346	81.1	0.284
37	27.7	4.2	14.6	40	0.8	57.1	0.345	78.8	0.276
38	28.5	4.0	15.2	41	0.9	58.2	0.342	77.1	0.270
39	28.4	3.9	14.5	41	0.9	58.2	0.350	80.8	0.283
40	28.3	4.0	14.8	40	0.8	57.1	0.352	81.5	0.285
41	27.9	3.9	14.7	40	0.8	57.7	0.347	78.9	0.276
42	28.2	3.9	15.2	40	0.8	57.8	0.356	81.0	0.283
43	27.1	3.9	14.0	39	0.8	57.9	0.344	80.3	0.281
44	27.9	3.8	14.5	40	0.9	57.8	0.339	77.2	0.270
45	29.0	4.0	15.5	41	0.8	57.4	0.339	81.8	0.286
46	28.3	4.2	15.4	40	0.9	57.4	0.357	79.6	0.279
47	28.3	3.9	15.0	41	0.9	57.3	0.356	80.6	0.282
48	28.3	3.9	14.6	40	0.9	58.3	0.359	80.2	0.281
49	28.5	3.7	14.7	41	1.0	57.1	0.358	80.2	0.281
50	28.0	3.7	15.4	40	0.8	58.1	0.347	80.3	0.281
Average	28.1	5.5	14.6	40	0.9	54.1	0.347	80.6	0.282

Total number of blows analyzed: 48

Time Summary

Drive 7 minutes 56 seconds

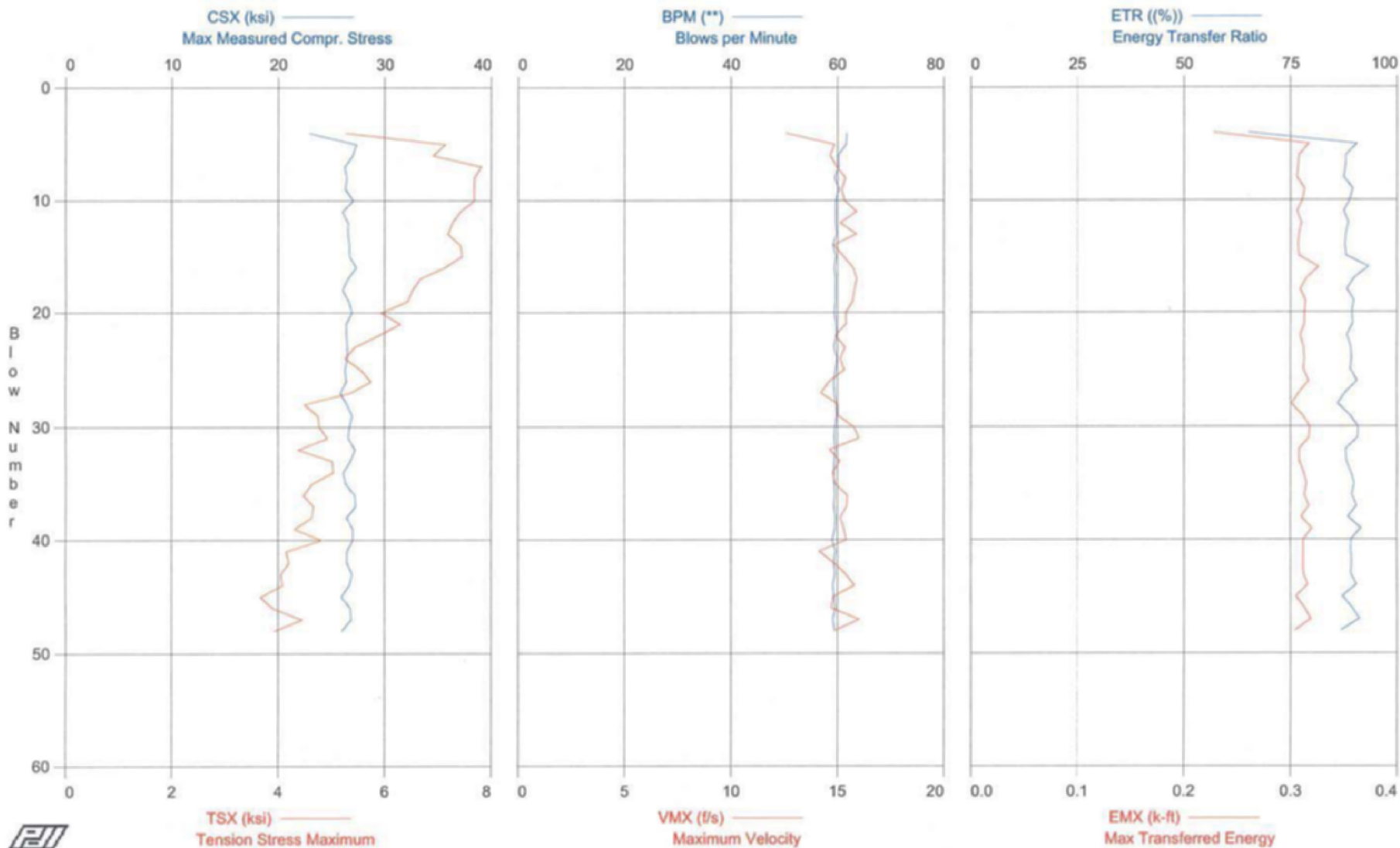
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PDIPLOT Ver. 2008.1 - Printed: 23-Feb-2009

MACTEC Engineering and Consulting, Inc. - Case Method Results

Test date: 26-Jan-2009

EXELON COL VICTORIA - Boring B3131 (400.6'-402.1' sample)



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SP: 0.492 k/ft³

LE: 406.00 ft

EM: 30,000 ksi

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TSX: Tension Stress Maximum

EF2: Energy of F²

VMX: Maximum Velocity

ETR: Energy Transfer Ratio

FMX: Maximum Force

EMX: Max Transferred Energy

FVP: Force/Velocity proportionality

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
4	22.9	5.3	12.6	33	1.0	61.7	0.241	65.2	0.228
5	27.3	7.1	14.8	39	0.8	61.6	0.360	90.5	0.317
6	27.0	6.9	14.7	39	0.9	60.1	0.349	88.0	0.308
7	26.2	7.8	14.9	38	1.0	60.2	0.348	87.8	0.307
8	26.4	7.7	15.4	38	0.9	59.4	0.351	87.4	0.306
9	26.3	7.7	15.2	38	1.0	60.3	0.356	89.6	0.313
10	27.0	7.7	15.3	39	0.9	59.6	0.360	88.8	0.311
11	26.0	7.4	15.9	37	0.9	59.6	0.344	87.4	0.306
12	26.5	7.3	15.1	38	1.0	59.6	0.358	88.5	0.310
13	26.5	7.2	15.9	38	0.9	59.8	0.355	87.9	0.308
14	26.7	7.4	14.8	38	0.8	59.1	0.352	87.7	0.307
15	26.7	7.5	15.3	38	0.8	59.7	0.352	88.0	0.308
16	27.3	7.1	15.7	39	1.0	59.4	0.361	93.3	0.326
17	26.5	6.7	15.9	38	0.9	59.6	0.356	89.9	0.315
18	26.0	6.5	15.8	37	0.9	59.6	0.346	88.2	0.309
19	26.6	6.4	15.7	38	0.9	59.6	0.355	89.8	0.314
20	26.9	5.9	15.4	39	0.9	59.4	0.362	89.3	0.313
21	26.4	6.3	15.4	38	0.9	59.7	0.351	89.6	0.313
22	26.4	5.9	14.9	38	1.0	59.8	0.353	88.2	0.309
23	26.5	5.4	15.4	38	0.8	59.3	0.355	89.1	0.312
24	26.5	5.3	15.1	38	1.0	59.9	0.353	89.3	0.313
25	26.3	5.6	15.3	38	1.0	59.6	0.356	89.0	0.312
26	26.4	5.7	14.6	38	0.8	59.3	0.353	90.7	0.317
27	25.8	5.4	14.2	37	1.0	59.4	0.347	87.9	0.308
28	26.4	4.5	15.0	38	0.9	59.7	0.344	86.0	0.301
29	26.9	4.8	15.0	39	0.9	59.8	0.352	88.9	0.311
30	26.7	4.8	15.8	38	0.9	59.5	0.356	90.8	0.318
31	26.6	4.9	16.0	38	0.9	59.4	0.355	90.7	0.317
32	27.2	4.4	14.6	39	0.9	59.6	0.353	87.9	0.308
33	26.8	5.0	15.1	38	0.9	59.4	0.350	88.0	0.308
34	26.1	5.0	14.8	37	1.0	59.3	0.350	89.1	0.312
35	26.3	4.6	14.9	38	1.0	59.4	0.355	89.9	0.315
36	27.2	4.5	15.5	39	0.9	59.5	0.356	89.4	0.313
37	27.3	4.7	15.4	39	0.9	59.3	0.360	90.5	0.317
38	26.4	4.6	15.1	38	0.9	59.6	0.353	88.5	0.310
39	27.0	4.3	15.3	39	1.0	59.5	0.358	91.5	0.320
40	27.0	4.8	15.4	39	0.9	59.0	0.358	89.2	0.312
41	26.4	4.1	14.1	38	1.0	59.6	0.355	89.2	0.312
42	26.4	4.2	14.8	38	1.0	59.3	0.357	89.3	0.312
43	26.9	4.1	15.4	39	0.9	59.5	0.356	89.1	0.312
44	26.6	4.1	15.8	38	0.9	59.1	0.356	90.4	0.316
45	25.9	3.7	14.8	37	1.0	59.3	0.343	87.1	0.305
46	26.8	3.9	14.7	38	1.0	59.6	0.353	89.3	0.313
47	26.8	4.4	16.0	38	0.8	59.1	0.358	91.1	0.319
48	26.0	3.9	14.9	37	1.0	59.4	0.346	86.9	0.304
Average	26.5	5.6	15.2	38	0.9	59.6	0.351	88.5	0.310

Total number of blows analyzed: 45

Time Summary

Drive 7 minutes

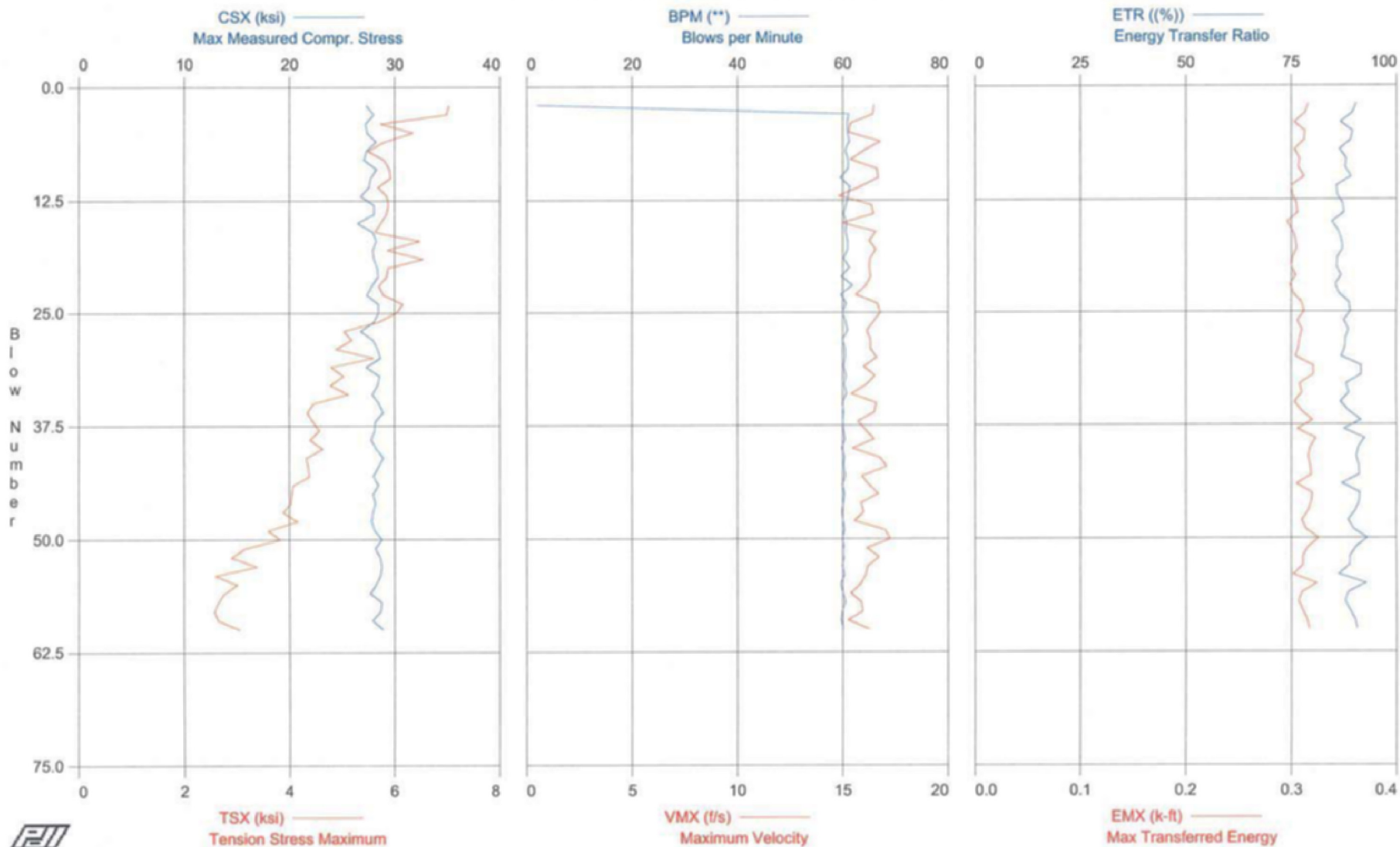
5:49:47 PM - 5:56:47 PM (1/26/2009) BN 1 - 48

PDIPLOT Ver. 2008.1 - Printed: 23-Feb-2009

MACTEC Engineering and Consulting, Inc. - Case Method Results

Test date: 27-Jan-2009

EXELON COL VICTORIA - Boring B3131 (405.3'-406.8' sample)



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Test date: 27-Jan-2009

AR: 1.43 in² SP: 0.492 k/ft³
LE: 411.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.70

CSX: Max Measured Compr. Stress BPM: Blows per Minute
TSX: Tension Stress Maximum EF2: Energy of F²
VMX: Maximum Velocity ETR: Energy Transfer Ratio
FMX: Maximum Force EMX: Max Transferred Energy
FVP: Force/Velocity proportionality

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	27.3	7.0	16.5	39	0.9	1.9	0.354	90.3	0.316
3	28.0	7.0	16.4	40	0.9	61.1	0.361	89.5	0.313
4	27.2	5.7	15.4	39	1.0	60.8	0.350	86.7	0.303
5	27.3	6.3	15.3	39	1.0	60.9	0.357	89.5	0.313
6	28.2	5.8	16.8	40	0.8	61.2	0.354	89.0	0.312
7	27.3	5.5	16.0	39	0.9	60.4	0.348	86.5	0.303
8	27.1	5.8	15.4	39	1.0	61.0	0.350	88.0	0.308
9	28.3	5.9	16.6	40	0.8	61.0	0.350	87.8	0.307
10	27.7	5.9	16.7	40	0.9	59.5	0.343	89.2	0.312
11	27.5	5.7	15.8	39	0.9	61.3	0.344	85.7	0.300
12	26.8	5.8	14.8	38	0.8	61.0	0.331	85.9	0.301
13	28.0	5.9	16.3	40	0.8	60.6	0.348	87.2	0.305
14	28.0	5.8	16.5	40	0.8	60.1	0.351	87.5	0.306
15	26.5	5.7	15.0	38	0.8	60.7	0.339	84.6	0.296
16	27.9	5.6	16.6	40	0.8	60.5	0.346	86.1	0.301
17	28.2	6.5	16.2	40	0.8	60.9	0.356	86.9	0.304
18	27.9	5.9	16.6	40	0.8	60.9	0.350	87.2	0.305
19	28.0	6.5	16.3	40	0.9	60.1	0.353	85.9	0.301
20	28.4	5.9	16.3	41	0.8	61.2	0.352	85.8	0.300
21	28.4	5.8	16.3	41	0.8	59.7	0.357	86.8	0.304
22	27.8	5.7	16.1	40	0.8	61.8	0.349	85.4	0.299
23	27.4	5.8	15.6	39	0.8	59.6	0.351	86.3	0.302
24	28.4	6.1	16.6	41	0.8	60.6	0.358	88.7	0.310
25	28.4	6.0	16.8	41	0.8	59.9	0.360	89.0	0.312
26	28.0	5.7	16.5	40	0.8	60.5	0.357	87.5	0.306
27	26.8	5.0	16.1	38	0.9	60.9	0.354	88.6	0.310
28	27.9	5.2	16.3	40	0.8	59.9	0.353	87.9	0.308
29	28.4	4.9	16.3	41	0.8	60.4	0.359	87.7	0.307
30	28.6	5.6	16.6	41	0.8	60.4	0.361	86.9	0.304
31	27.3	4.8	16.0	39	1.0	60.1	0.363	91.6	0.321
32	28.6	5.0	16.5	41	0.9	60.6	0.371	91.6	0.321
33	28.4	4.8	16.1	41	0.8	60.2	0.352	88.0	0.308
34	27.9	5.1	15.4	40	1.0	60.7	0.359	88.7	0.310
35	28.5	4.5	16.6	41	0.8	59.9	0.356	86.7	0.303
36	28.9	4.3	16.5	41	0.9	60.1	0.367	88.6	0.310
37	28.1	4.5	15.7	40	0.8	60.0	0.371	91.5	0.320
38	28.1	4.6	16.1	40	0.9	60.1	0.358	87.5	0.306
39	27.8	4.4	16.5	40	0.9	60.4	0.362	92.3	0.323
40	28.2	4.6	15.5	40	0.8	59.8	0.365	90.9	0.318
41	28.9	4.3	16.8	41	0.8	60.3	0.365	90.4	0.316
42	28.4	4.4	17.1	41	0.9	60.1	0.365	91.0	0.318
43	28.0	4.4	15.9	40	1.0	60.5	0.362	91.1	0.319
44	28.4	4.1	16.3	41	0.8	59.9	0.356	87.0	0.305
45	27.9	4.0	16.7	40	0.9	60.3	0.364	91.3	0.320
46	28.1	4.0	15.9	40	0.8	60.1	0.359	91.1	0.319
47	27.9	3.9	16.0	40	0.8	59.8	0.359	90.2	0.316
48	27.8	4.2	15.6	40	0.8	60.0	0.354	88.5	0.310
49	28.1	3.6	17.0	40	0.9	60.3	0.358	89.8	0.314
50	28.8	3.8	17.3	41	0.8	59.9	0.367	93.0	0.326
51	28.1	3.2	16.1	40	0.8	60.2	0.359	90.4	0.316
52	28.6	2.9	16.7	41	0.8	60.2	0.359	88.9	0.311
53	28.8	3.4	16.2	41	0.8	59.9	0.359	88.9	0.311
54	28.6	2.6	16.1	41	0.8	60.3	0.354	86.3	0.302
55	28.2	3.0	15.8	40	0.8	59.6	0.360	92.7	0.324
56	27.7	2.8	15.4	40	1.0	60.0	0.360	88.5	0.310
57	28.7	2.7	15.9	41	0.8	60.5	0.358	87.8	0.307
58	28.7	2.6	16.0	41	0.8	59.9	0.359	88.9	0.311
59	27.9	2.7	15.3	40	1.0	59.7	0.361	90.1	0.315
60	28.9	3.1	16.3	41	0.8	60.1	0.365	90.7	0.317
Average	28.0	4.9	16.2	40	0.9	59.4	0.356	88.6	0.310

Total number of blows analyzed: 59

Time Summary

Drive
Stop 22 minutes 30 seconds

9:54:04 AM - 9:54:04 AM (1/27/2009) BN 1 - 1
9:54:04 AM - 10:16:34 AM

EXELON COL VICTORIA - Boring B3131 (405.3'-406.8' sample)
OP: JNH

Hammer ID: 100; Driller: J.COOK CME 75 (Miller)
Test date: 27-Jan-2009

Drive 58 seconds 10:16:34 AM - 10:17:32 AM BN 2 - 60
Total time [0:23:28] = (Driving [0:00:58] + Stop [0:22:30])



Engineering and constructing a better tomorrow

October 20, 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 550 ATV, Rev.1**
Hammer Serial No. 353 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 24 and 25, 2009, during drilling of Boring B3132 at the referenced site. The testing was performed by Jonathan Honeycutt from approximately 9:12 AM to 3:42 PM (ET) on January 24 under cloudy skies with a temperature of about 60 degrees Fahrenheit and from approximately 9:39 AM to 9:41 AM (ET) on January 25 under cloudy skies with a temperature of about 65 degrees Fahrenheit. The boring was drilled with personnel and equipment from Miller Drilling. The drilling equipment consisted of a CME 550 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 Rick White. 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,

19 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 PDILOT tables and are also shown graphically in the PDILOT 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 280 foot-pounds to 296 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 80% to 85% 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 292.0 foot-pounds, with an average ETR of 83.4%.

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 – 19 PDILOT Output – 12 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

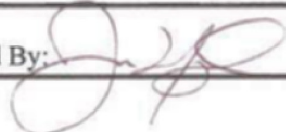
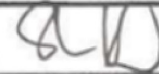
Automatic Hammer Serial Number and Rig Model	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Drill Rod Size	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) ^a	Energy Transfer Ratio (%) ^b (Average ETR)
353 (CME 550)	Miller Drilling	Rick White	B3132	1/24/2009	NW-J	330.4 - 331.9	9 - 13 - 17	39	292	83.4%
						340.9 - 342.4	11 - 18 - 20	50	291	83.1%
						350.9 - 352	39 - 115 - 50/0.1'	207	296	84.6%
						360.8 - 362.3	6 - 13 - 14	33	280	80.0%
				1/25/2009		370.9 - 372.4	12 - 14 - 21	48	284	81.1%
										Average for Rig:

^aMeasured 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).

^bEnergy 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 PDILOT tables due to roundoff.

Prepared By: 	Date: 5/4/09	Checked By: 	Date: 5-4-09
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Work Instruction No. 311
Exelon COL Victoria Site
MACTEC Engineering and Consulting, Inc.
MACTEC Project 6468-07-1777

DCN 11/2/09

Issued To: Steve Kiser and Jonathan Honeycutt
Issued By: Daniel E. Atkinson
Valid From: 11/12/09
Rev. No. 0
Date: 11/12/09
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: [Signature] Date: 11/12/09
Pages: 1 plus attachment
Attachments: ASTM D 4633-05
DCN: EXE917

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:	550
PROJECT NO.:	6468-07-1777	SERIAL NO.:	353
DATE:	1/24/2009	HAMMER TYPE:	Auto
WEATHER:	60°F Cloudy Sk:Es	ROPE CONDITION:	N/A
INSPECTOR:	JxH	ROD SIZE:	NW J
DRILLING COMPANY:	Miller	NO. OF SHEAVES:	N/A

BORING DATA	
BORING NUMBER:	B 3132
DEPTH DRILLED:	Various
TIME DRIVEN:	7:30 AM - 4:00 PM
RIG OPERATOR:	B. WHITE
HAMMER OPERATOR:	N/A
PDA PAK SERIAL NO.:	3622L
INSTR. ROD AREA:	1.43 in ² / K1050 SWH 4/21/09
ACCEL. SERIAL NOS.:	193-4998 144-4990
STRAIN SERIAL NOS.:	146 NW 1/2

[illegible]

REMARKS:



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

RECORD OF SPT ENERGY MEASUREMENT

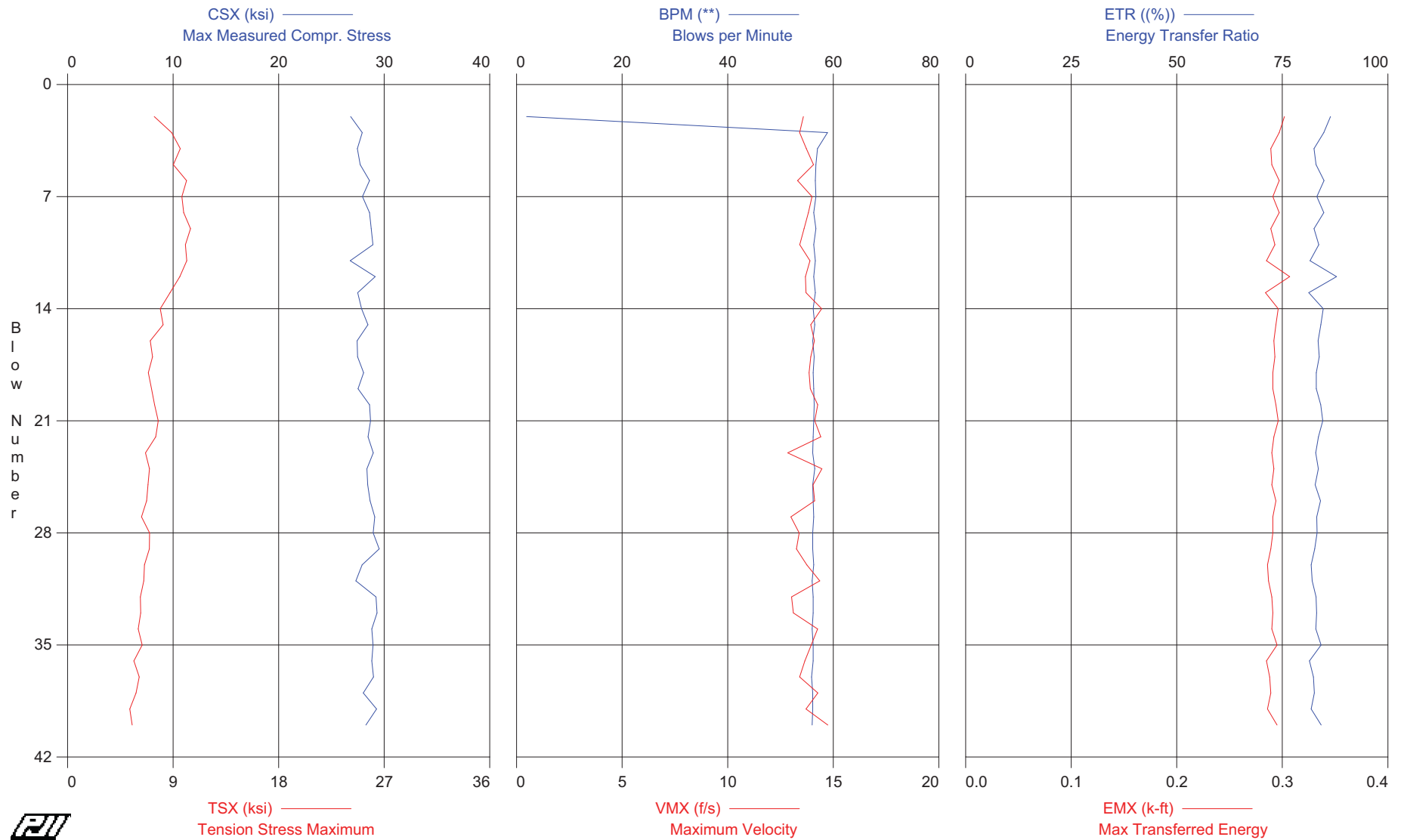
GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	Exelon	MAKE:	CNF
LOCATION:	Victoria, Texas	MODEL:	550
PROJECT NO.:	6468-07-1777	SERIAL NO.:	353
DATE:	1/25/2009	HAMMER TYPE:	Auto
WEATHER:	65°F Cloudy	ROPE CONDITION:	N/A
INSPECTOR:	JNH	ROD SIZE:	NW 15
DRILLING COMPANY:	M. H. Co.	NO. OF SHEAVES:	N/A

		BORING DATA	
BORING NUMBER:	B5132		
DEPTH DRILLED:	VARIOUS		
TIME DRIVEN:	8:00 am - 8:45 am		
RIG OPERATOR:	R. WHITE.		
HAMMER OPERATOR:	N/A		
PDA PAK SERIAL NO.:	3622L		
INSTR. ROD AREA:	14.5 in 2		
ACCEL. SERIAL NOS.:	43 - 4990 44 - 41050		
STRAIN SERIAL NOS.:	146 NW 1/2		

[illegible]

REMARKS:

EXELON VICTORIA - B3132 (330.4-331.9 sample)



EXELON VICTORIA - B3132 (330.4-331.9 sample)
OP: JNH

Hammer ID: 353; Driller: R.WHITE CME 550 (Miller)
Test date: 24-Jan-2009

AR: 1.43 in² SP: 0.492 k/ft³
LE: 336.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.70

CSX: Max Measured Compr. Stress BPM: Blows per Minute
TSX: Tension Stress Maximum EF2: Energy of F²
VMX: Maximum Velocity ETR: Energy Transfer Ratio
FMX: Maximum Force EMX: Max Transferred Energy
FVP: Force/Velocity proportionality

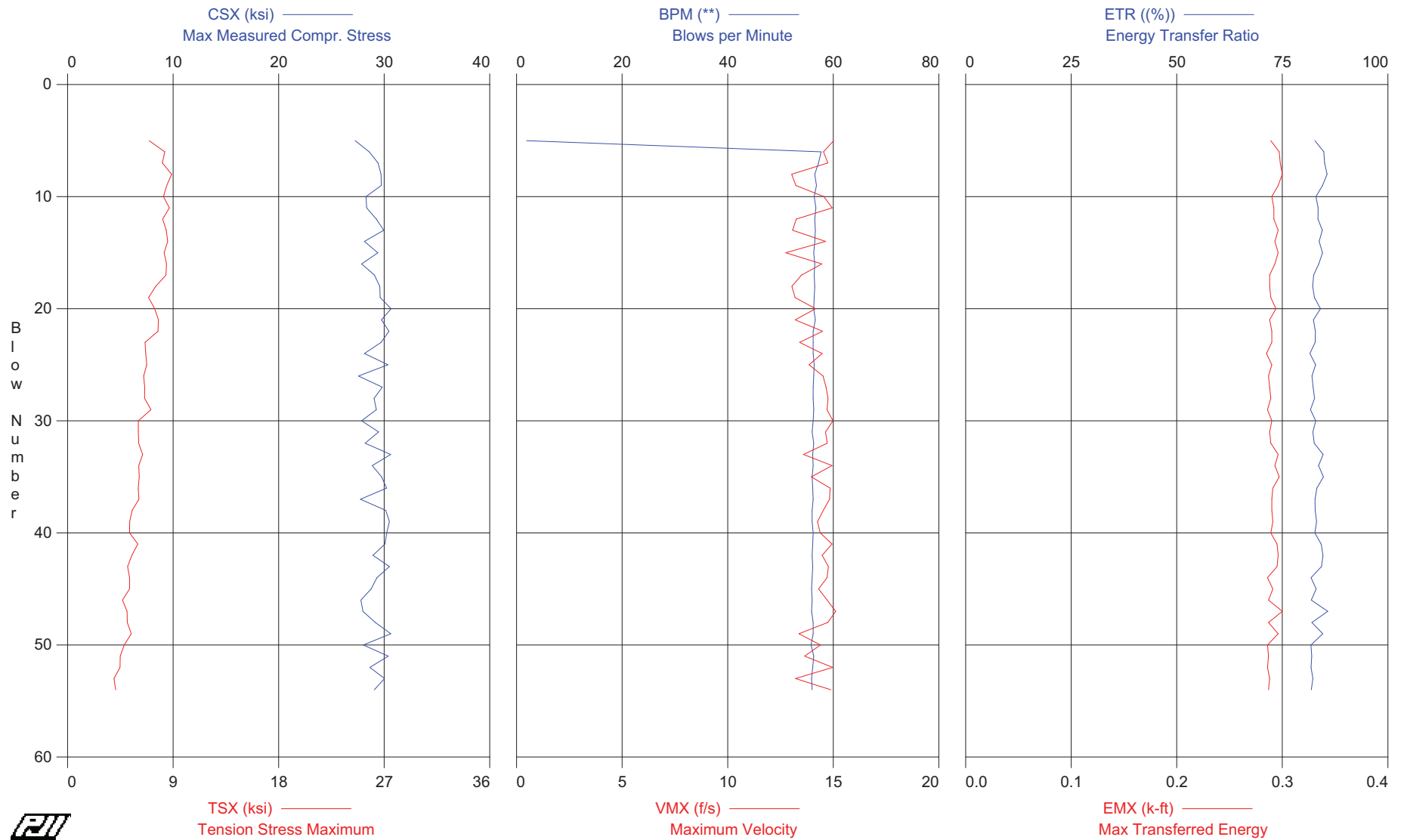
BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	26.8	7.4	13.6	38	0.9	1.9	0.332	86.4	0.302
3	27.9	8.9	13.4	40	0.9	58.9	0.343	84.8	0.297
4	27.5	9.6	13.7	39	1.1	57.0	0.338	82.5	0.289
5	27.7	9.0	14.1	40	1.0	56.7	0.340	83.0	0.290
6	28.6	10.1	13.3	41	1.2	56.6	0.340	84.9	0.297
7	27.9	9.7	14.0	40	1.0	56.7	0.344	83.2	0.291
8	28.6	9.9	13.8	41	0.9	56.3	0.342	84.8	0.297
9	28.8	10.5	13.6	41	1.2	56.7	0.341	82.5	0.289
10	28.9	10.1	13.4	41	0.9	56.3	0.345	83.6	0.293
11	26.8	10.2	13.9	38	1.1	56.6	0.340	81.5	0.285
12	29.1	9.6	13.7	42	0.9	56.3	0.343	87.8	0.307
13	27.5	8.7	13.7	39	1.0	56.6	0.335	81.3	0.284
14	27.9	7.9	14.5	40	1.0	56.2	0.344	84.7	0.296
15	28.5	8.1	13.9	41	1.0	56.5	0.339	84.1	0.294
16	27.4	7.1	14.1	39	1.0	56.1	0.342	83.5	0.292
17	27.5	7.3	13.9	39	1.1	56.4	0.342	83.8	0.293
18	28.0	6.9	13.9	40	1.1	56.2	0.342	83.0	0.291
19	27.5	7.2	13.9	39	1.1	56.3	0.342	83.0	0.291
20	28.6	7.4	14.3	41	0.9	56.4	0.342	84.1	0.294
21	28.7	7.7	14.1	41	1.0	56.3	0.343	84.6	0.296
22	28.5	7.5	14.4	41	1.0	56.2	0.342	83.6	0.292
23	29.0	6.7	12.8	41	0.9	56.1	0.344	82.9	0.290
24	28.4	7.0	14.5	41	1.0	56.5	0.344	83.5	0.292
25	28.4	6.9	14.0	41	1.0	56.1	0.344	82.8	0.290
26	28.7	6.7	14.1	41	0.9	56.2	0.344	84.0	0.294
27	29.1	6.3	13.0	42	0.9	56.3	0.343	83.1	0.291
28	29.0	7.0	13.4	41	1.2	56.1	0.340	83.2	0.291
29	29.5	7.0	13.3	42	1.2	56.1	0.338	82.7	0.289
30	27.9	6.6	13.7	40	1.1	56.3	0.338	81.8	0.286
31	27.3	6.5	14.4	39	1.0	56.0	0.338	82.1	0.287
32	29.2	6.2	13.0	42	0.9	56.2	0.342	83.0	0.290
33	29.3	6.2	13.1	42	0.9	56.2	0.341	83.1	0.291
34	28.8	6.0	14.3	41	0.9	56.0	0.338	82.9	0.290
35	28.9	6.4	14.0	41	0.9	56.2	0.339	84.2	0.295
36	28.8	5.7	13.7	41	1.2	56.2	0.339	81.4	0.285
37	29.0	6.1	13.4	41	1.2	55.9	0.335	82.4	0.288
38	28.0	5.8	14.3	40	1.0	56.1	0.338	82.6	0.289
39	29.3	5.3	13.7	42	0.9	56.1	0.340	81.8	0.286
40	28.3	5.5	14.7	40	1.0	56.0	0.336	84.2	0.295
Average	28.4	7.6	13.8	41	1.0	55.0	0.341	83.4	0.292

Total number of blows analyzed: 39

Time Summary

Drive 9:12:00 AM - 9:12:00 AM (1/24/2009) BN 1 - 1
 Stop 15 minutes 17 seconds 9:12:00 AM - 9:27:17 AM
 Drive 40 seconds 9:27:17 AM - 9:27:57 AM BN 2 - 40
 Total time [0:15:57] = (Driving [0:00:40] + Stop [0:15:17])

EXELON VICTORIA - B3132 (340.9'-342.4' sample)



EXELON VICTORIA - B3132 (340.9'-342.4' sample)
OP: JNH

Hammer ID: 353; Driller: R.WHITE CME 550 (Miller)
Test date: 24-Jan-2009

AR: 1.43 in² SP: 0.492 k/ft³
LE: 346.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.70

CSX: Max Measured Compr. Stress BPM: Blows per Minute
TSX: Tension Stress Maximum EF2: Energy of F²
VMX: Maximum Velocity ETR: Energy Transfer Ratio
FMX: Maximum Force EMX: Max Transferred Energy
FVP: Force/Velocity proportionality

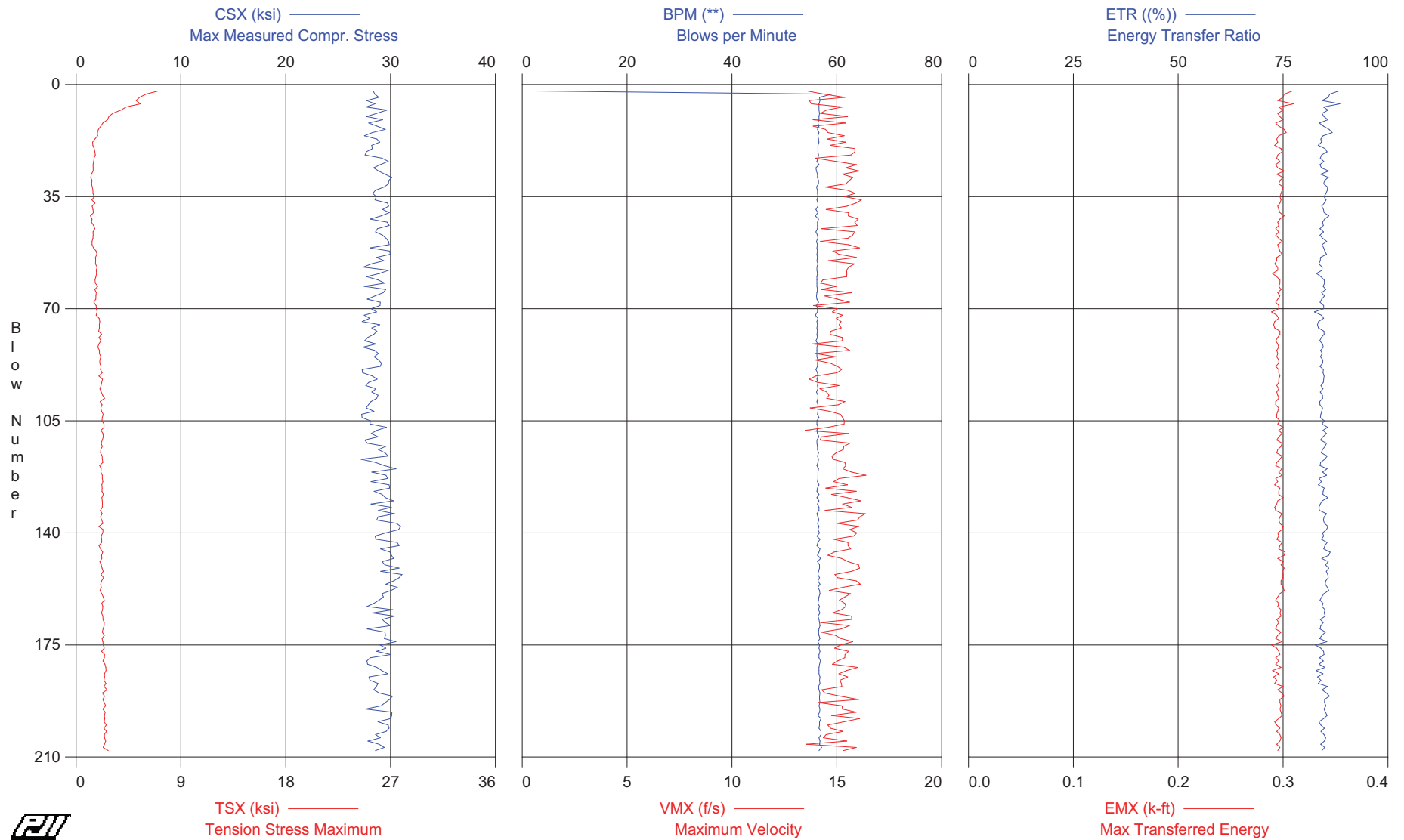
BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
5	27.2	7.0	15.0	39	1.0	1.9	0.339	82.7	0.289
6	28.6	8.3	14.5	41	1.1	57.7	0.356	84.8	0.297
7	29.4	8.1	14.7	42	0.9	57.2	0.354	85.0	0.298
8	29.7	8.9	13.0	42	0.9	56.5	0.355	85.6	0.300
9	29.7	8.5	13.2	43	0.9	56.8	0.353	84.5	0.296
10	28.3	8.2	14.6	40	1.0	56.4	0.354	83.0	0.290
11	28.3	8.7	14.9	41	1.0	56.7	0.356	83.5	0.292
12	29.3	8.1	13.2	42	1.2	56.5	0.354	83.4	0.292
13	30.0	8.4	13.1	43	1.3	56.6	0.354	84.5	0.296
14	28.1	8.5	14.6	40	1.1	56.5	0.357	83.7	0.293
15	29.4	8.2	12.8	42	1.3	56.3	0.354	84.5	0.296
16	27.9	8.4	14.5	40	1.1	56.5	0.355	83.6	0.293
17	29.1	8.4	13.5	42	1.2	56.4	0.356	82.4	0.288
18	29.6	7.5	13.0	42	1.3	56.5	0.354	82.2	0.288
19	29.6	6.9	13.2	42	1.3	56.4	0.353	82.6	0.289
20	30.7	7.4	14.2	44	0.9	56.3	0.357	84.1	0.294
21	29.7	7.8	13.2	43	1.3	56.6	0.356	82.4	0.288
22	30.5	7.7	14.5	44	0.9	56.2	0.353	82.8	0.290
23	29.7	6.6	13.4	42	1.2	56.2	0.355	82.8	0.290
24	28.1	6.7	14.5	40	1.0	56.2	0.351	81.5	0.285
25	30.4	6.8	13.9	43	0.9	56.4	0.353	82.9	0.290
26	27.6	6.5	14.5	39	1.1	56.3	0.353	82.0	0.287
27	29.8	6.6	14.7	43	0.9	56.2	0.353	82.3	0.288
28	29.0	6.6	14.8	42	1.0	56.2	0.357	82.6	0.289
29	29.3	7.1	14.7	42	0.9	56.3	0.353	81.7	0.286
30	27.9	6.0	15.0	40	1.0	56.2	0.357	82.9	0.290
31	29.5	6.0	14.6	42	0.9	56.0	0.353	82.2	0.288
32	28.2	6.1	14.7	40	1.0	56.3	0.354	82.6	0.289
33	30.6	6.4	13.6	44	1.3	56.1	0.358	84.6	0.296
34	28.9	6.1	14.9	41	1.0	56.2	0.355	83.6	0.293
35	29.7	6.1	14.0	43	1.2	56.0	0.358	84.7	0.297
36	30.2	6.0	14.8	43	0.9	56.1	0.357	83.2	0.291
37	27.7	6.1	14.8	40	1.0	56.2	0.356	82.7	0.290
38	30.1	5.5	14.5	43	0.9	56.0	0.356	82.8	0.290
39	30.5	5.3	14.3	44	0.9	56.0	0.355	83.1	0.291
40	30.2	5.3	14.4	43	0.9	56.2	0.356	82.7	0.289
41	30.1	6.0	14.9	43	0.9	56.1	0.357	84.2	0.295
42	28.9	5.5	14.5	41	1.1	56.0	0.358	84.6	0.296
43	30.5	5.1	14.8	44	0.9	56.1	0.355	84.3	0.295
44	29.3	5.3	14.7	42	1.0	56.0	0.355	81.8	0.286
45	28.8	5.3	14.3	41	1.1	55.9	0.357	83.0	0.291
46	27.8	4.7	14.7	40	1.1	56.0	0.354	81.9	0.287
47	28.0	5.1	15.1	40	1.0	55.9	0.360	85.8	0.300
48	29.2	5.1	14.7	42	1.0	56.2	0.355	82.0	0.287
49	30.6	5.4	13.4	44	1.3	56.2	0.358	84.6	0.296
50	28.0	4.8	14.4	40	1.1	55.8	0.355	81.8	0.286
51	30.4	4.5	13.6	43	0.8	56.3	0.356	82.0	0.287
52	28.6	4.5	15.0	41	1.0	56.1	0.354	81.8	0.286
53	30.0	4.0	13.2	43	1.3	55.9	0.355	82.2	0.288
54	29.1	4.1	14.9	42	1.0	56.0	0.354	81.9	0.287
Average	29.2	6.5	14.2	42	1.0	55.2	0.355	83.2	0.291

Total number of blows analyzed: 50

Time Summary

Drive 10:55:02 AM - 10:55:02 AM (1/24/2009) BN 1 - 1
 Stop 14 minutes 24 seconds 10:55:02 AM - 11:09:26 AM
 Drive 4 minutes 22 seconds 11:09:26 AM - 11:13:48 AM BN 2 - 54
 Total time [0:18:46] = (Driving [0:04:22] + Stop [0:14:24])

EXELON VICTORIA - B3132 (350.9-352' sample)



EXELON VICTORIA - B3132 (350.9-352' sample)
OP: JNH

Hammer ID: 353; Driller: R.WHITE CME 550 (Miller)
Test date: 24-Jan-2009

AR: 1.43 in^2
LE: 356.00 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	28.3	7.1	13.6	41	0.8	1.9	0.349	88.3	0.309
3	28.5	6.0	14.4	41	0.8	59.0	0.345	86.1	0.301
4	28.9	5.4	15.4	41	0.9	56.7	0.331	85.8	0.300
5	27.7	5.2	13.7	40	1.1	56.8	0.348	84.3	0.295
6	28.5	5.5	13.8	41	1.2	56.6	0.352	88.5	0.310
7	27.6	4.3	15.3	40	1.0	56.6	0.344	84.6	0.296
8	29.7	3.8	14.5	42	0.8	56.6	0.349	85.7	0.300
9	28.7	3.1	14.2	41	0.8	56.7	0.343	84.3	0.295
10	27.7	2.8	15.5	40	1.0	56.6	0.345	84.7	0.297
11	29.2	2.7	13.9	42	0.8	56.6	0.345	85.7	0.300
12	27.9	2.3	15.4	40	1.0	56.4	0.344	83.7	0.293
13	28.7	2.1	13.9	41	0.8	56.6	0.343	84.6	0.296
14	29.5	1.9	14.5	42	0.8	56.3	0.345	86.0	0.301
15	28.3	1.8	14.6	40	1.1	56.6	0.342	86.7	0.303
16	27.5	1.8	15.4	39	1.0	56.4	0.341	84.6	0.296
17	28.7	1.6	14.5	41	0.8	56.5	0.339	84.0	0.294
18	29.0	1.4	15.4	41	0.8	56.6	0.341	84.2	0.295
19	28.2	1.4	14.7	40	1.1	56.4	0.341	83.4	0.292
20	28.3	1.6	15.9	40	0.9	56.4	0.343	85.0	0.298
21	27.7	1.6	15.9	40	1.0	56.4	0.344	85.5	0.299
22	27.6	1.7	15.7	39	1.0	56.5	0.344	84.2	0.295
23	29.2	1.5	14.0	42	1.2	56.4	0.343	83.9	0.294
24	29.8	1.5	14.9	43	0.8	56.2	0.344	84.7	0.297
25	29.0	1.5	15.9	41	0.9	56.6	0.341	83.8	0.293
26	28.4	1.5	15.4	41	1.0	56.0	0.345	84.2	0.295
27	28.9	1.5	16.1	41	0.9	56.1	0.348	85.9	0.301
28	29.5	1.3	15.3	42	0.8	56.3	0.344	83.9	0.294
29	30.1	1.3	15.8	43	0.8	56.3	0.348	85.8	0.300
30	29.8	1.4	15.6	43	0.8	56.5	0.348	84.9	0.297
31	29.8	1.3	15.4	43	0.8	56.5	0.345	84.7	0.296
32	29.4	1.4	14.5	42	1.1	56.1	0.348	85.6	0.300
33	28.6	1.4	15.5	41	1.0	56.3	0.349	85.6	0.299
34	28.3	1.4	15.9	40	1.0	56.3	0.349	85.2	0.298
35	28.6	1.6	15.4	41	1.0	56.4	0.346	84.8	0.297
36	28.5	1.4	16.2	41	0.9	56.2	0.335	85.3	0.298
37	29.7	1.6	15.9	42	0.9	56.4	0.346	84.8	0.297
38	29.8	1.4	15.5	43	0.8	56.4	0.344	84.2	0.295
39	29.2	1.4	14.5	42	0.8	56.0	0.342	84.6	0.296
40	29.9	1.5	15.6	43	0.8	56.4	0.346	84.8	0.297
41	29.1	1.2	15.5	42	1.1	55.9	0.347	86.0	0.301
42	28.1	1.4	16.0	40	1.0	56.5	0.346	84.9	0.297
43	29.7	1.3	15.9	42	0.9	56.3	0.334	84.4	0.295
44	29.9	1.5	16.0	43	0.9	56.3	0.347	84.6	0.296
45	28.8	1.6	14.3	41	1.1	56.3	0.341	83.8	0.293
46	28.6	1.5	15.9	41	0.9	56.0	0.348	84.6	0.296
47	29.2	1.5	15.8	42	0.9	56.3	0.331	83.8	0.293
48	29.6	1.4	15.5	42	0.8	56.4	0.345	84.4	0.296
49	29.8	1.4	14.2	43	0.8	56.1	0.347	85.4	0.299
50	29.9	1.4	15.6	43	0.8	56.3	0.346	84.3	0.295
51	28.0	1.5	16.1	40	1.0	56.2	0.346	84.7	0.296
52	29.9	1.7	14.8	43	0.8	56.3	0.346	84.9	0.297
53	30.0	1.8	15.1	43	0.8	56.2	0.347	85.4	0.299
54	28.7	1.7	15.9	41	0.9	56.3	0.332	83.9	0.294
55	29.4	1.7	14.6	42	0.8	56.2	0.343	83.9	0.294
56	28.2	1.7	15.8	40	0.9	56.4	0.344	83.5	0.292
57	27.4	1.8	15.6	39	1.0	56.2	0.343	84.3	0.295
58	29.8	1.7	15.5	43	0.8	56.2	0.332	84.3	0.295
59	28.9	1.8	15.5	41	0.9	56.3	0.342	83.0	0.290
60	27.7	1.7	15.5	40	1.0	56.2	0.343	84.0	0.294
61	28.8	1.6	14.3	41	1.1	56.2	0.343	84.8	0.297
62	29.4	1.7	14.2	42	1.2	56.2	0.347	84.9	0.297
63	27.5	1.9	15.0	39	1.0	56.2	0.342	84.6	0.296
64	29.5	1.6	14.3	42	0.8	56.3	0.347	85.2	0.298
65	29.3	1.7	15.7	42	0.9	56.2	0.345	84.2	0.295
66	28.5	1.7	14.4	41	1.1	56.1	0.344	84.9	0.297

EXELON VICTORIA - B3132 (350.9-352' sample)
OP: JNH

Hammer ID: 353; Driller: R.WHITE CME 550 (Miller)
Test date: 24-Jan-2009

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
67	27.8	1.7	15.0	40	1.0	56.2	0.344	84.2	0.295
68	29.0	1.5	15.6	41	0.9	56.5	0.344	83.8	0.293
69	29.0	1.7	13.9	41	1.2	56.1	0.342	84.7	0.296
70	28.2	1.7	15.0	40	1.0	56.3	0.344	84.7	0.296
71	28.7	1.8	14.8	41	0.9	56.3	0.339	82.5	0.289
72	27.5	1.7	15.3	39	1.0	55.9	0.342	84.1	0.294
73	28.0	2.0	15.0	40	1.0	56.4	0.343	84.7	0.296
74	27.3	2.0	15.2	39	1.0	56.2	0.340	83.5	0.292
75	29.0	2.0	15.1	41	0.9	56.3	0.342	83.2	0.291
76	28.2	2.0	15.2	40	0.9	56.2	0.341	83.4	0.292
77	28.7	1.9	14.7	41	1.1	56.3	0.344	84.8	0.297
78	28.4	2.2	14.7	41	1.1	56.2	0.342	84.8	0.297
79	27.8	2.0	15.3	40	1.0	56.3	0.342	84.2	0.295
80	27.5	2.1	15.3	39	1.0	56.0	0.341	83.7	0.293
81	28.6	2.0	13.8	41	1.2	56.4	0.341	84.4	0.295
82	27.4	1.9	15.3	39	1.0	56.2	0.346	84.6	0.296
83	28.5	2.0	15.6	41	0.9	56.2	0.345	84.0	0.294
84	28.8	2.0	14.0	41	0.8	56.2	0.343	84.3	0.295
85	28.4	2.1	15.0	41	0.9	56.2	0.342	83.9	0.294
86	28.9	2.0	14.0	41	0.8	56.4	0.342	84.5	0.296
87	29.1	2.0	14.7	42	0.8	56.3	0.344	84.4	0.296
88	29.0	2.1	15.0	42	0.9	56.3	0.344	83.8	0.293
89	27.3	2.1	15.2	39	1.0	56.0	0.343	84.6	0.296
90	27.3	2.2	15.0	39	1.0	56.3	0.345	84.5	0.296
91	28.3	2.0	14.0	40	1.1	56.4	0.345	84.8	0.297
92	28.7	2.3	13.7	41	0.8	56.2	0.346	84.7	0.296
93	27.9	2.2	14.1	40	1.1	56.4	0.343	84.6	0.296
94	27.6	2.1	15.1	40	0.9	56.3	0.343	84.0	0.294
95	28.6	2.0	14.2	41	0.8	56.4	0.345	84.5	0.296
96	28.2	2.2	14.5	40	0.8	56.1	0.343	83.9	0.294
97	28.8	2.3	14.6	41	0.8	56.4	0.347	84.4	0.295
98	28.7	2.4	14.5	41	0.8	56.4	0.345	84.5	0.296
99	28.1	2.1	15.4	40	0.9	56.2	0.347	83.7	0.293
100	27.9	2.2	15.1	40	0.9	56.4	0.343	83.8	0.293
101	27.7	2.1	13.7	40	1.1	56.4	0.341	84.4	0.296
102	28.4	2.2	14.6	41	0.8	56.4	0.345	84.2	0.295
103	27.2	2.3	15.2	39	1.0	56.3	0.343	84.0	0.294
104	27.3	2.3	15.3	39	1.0	56.6	0.344	83.9	0.294
105	28.1	2.2	15.4	40	1.0	56.2	0.347	84.8	0.297
106	28.0	2.4	15.3	40	1.0	56.2	0.347	84.3	0.295
107	29.6	2.4	14.6	42	0.8	56.4	0.347	85.6	0.300
108	28.7	2.1	13.5	41	1.2	56.2	0.344	84.5	0.296
109	28.2	2.3	15.6	40	1.0	56.3	0.349	85.4	0.299
110	28.8	2.3	14.3	41	1.1	56.6	0.346	84.5	0.296
111	27.5	2.3	14.2	39	1.1	56.2	0.349	83.9	0.294
112	27.8	2.1	15.6	40	1.0	56.2	0.350	85.4	0.299
113	29.5	2.3	15.3	42	0.9	56.3	0.336	85.0	0.298
114	28.8	2.1	15.3	41	0.9	56.3	0.349	84.4	0.295
115	29.5	2.1	15.0	42	0.8	56.5	0.337	84.1	0.294
116	29.8	2.2	14.8	43	0.8	56.3	0.338	85.5	0.299
117	27.2	2.2	14.8	39	1.0	56.5	0.336	85.0	0.297
118	28.6	2.3	15.4	41	0.9	56.4	0.336	84.0	0.294
119	29.4	2.0	15.4	42	0.9	56.2	0.340	83.8	0.293
120	30.5	2.1	15.3	44	0.8	56.5	0.352	85.5	0.299
121	28.2	2.1	15.7	40	1.0	56.4	0.339	84.5	0.296
122	29.6	2.2	16.4	42	0.9	56.4	0.340	85.4	0.299
123	29.7	2.3	15.1	42	0.8	56.4	0.337	83.6	0.293
124	28.1	2.3	14.8	40	1.1	56.3	0.336	84.2	0.295
125	29.9	2.2	15.5	43	0.9	56.6	0.335	83.4	0.292
126	29.9	2.2	14.5	43	0.8	56.3	0.336	84.8	0.297
127	28.4	2.2	15.9	41	1.0	56.2	0.348	84.5	0.296
128	29.2	2.4	14.7	42	1.1	56.6	0.347	84.5	0.296
129	29.5	2.2	15.5	42	1.1	56.2	0.354	85.7	0.300
130	30.3	2.2	16.2	43	0.9	56.6	0.338	84.3	0.295
131	28.1	2.3	15.3	40	1.0	56.3	0.334	83.9	0.294
132	30.1	2.2	15.7	43	0.9	56.6	0.338	83.5	0.292
133	28.8	2.1	14.4	41	1.1	56.6	0.344	83.7	0.293
134	30.4	2.2	16.4	43	0.9	56.2	0.349	85.4	0.299
135	28.8	2.1	16.1	41	1.0	56.4	0.350	84.8	0.297
136	28.7	2.2	16.0	41	1.0	56.6	0.350	84.6	0.296
137	30.6	2.3	15.0	44	0.8	56.3	0.349	84.9	0.297
138	30.9	2.0	16.0	44	0.8	56.6	0.349	85.7	0.300
139	30.8	2.3	15.6	44	0.8	56.4	0.348	85.4	0.299
140	29.5	2.3	16.0	42	0.9	56.7	0.344	84.4	0.295

EXELON VICTORIA - B3132 (350.9-352' sample)
OP: JNH

Hammer ID: 353; Driller: R.WHITE CME 550 (Miller)
Test date: 24-Jan-2009

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
141	28.5	2.2	15.8	41	1.0	56.2	0.349	84.7	0.296
142	28.6	2.2	14.9	41	1.1	56.8	0.344	84.1	0.294
143	30.6	2.2	15.5	44	0.8	56.4	0.345	85.5	0.299
144	30.8	2.0	15.5	44	0.9	56.2	0.350	85.0	0.297
145	29.0	2.1	15.7	42	1.0	56.8	0.351	84.7	0.296
146	30.0	2.3	14.9	43	1.1	56.6	0.347	86.2	0.302
147	30.1	2.2	14.6	43	1.2	56.3	0.348	85.9	0.301
148	30.3	2.2	15.2	43	0.9	56.9	0.343	84.2	0.295
149	29.2	2.0	15.5	42	1.1	56.3	0.353	85.8	0.300
150	29.5	2.2	16.0	42	1.0	56.7	0.351	85.1	0.298
151	30.8	2.2	16.1	44	0.9	56.7	0.351	85.9	0.301
152	29.1	2.3	15.7	42	1.0	56.5	0.347	85.3	0.299
153	31.1	2.1	14.9	44	0.8	56.4	0.349	85.7	0.300
154	30.8	2.4	15.0	44	0.8	56.7	0.345	85.8	0.300
155	30.3	2.2	15.9	43	0.9	56.4	0.348	85.2	0.298
156	29.5	2.1	16.1	42	0.9	56.8	0.347	85.0	0.298
157	30.6	2.2	15.3	44	0.9	56.4	0.346	85.6	0.300
158	30.1	2.0	14.6	43	1.2	56.7	0.346	85.9	0.301
159	29.2	2.2	15.7	42	0.9	56.8	0.342	84.7	0.297
160	29.3	2.3	15.4	42	0.9	56.6	0.343	84.2	0.295
161	28.9	2.4	15.1	41	0.9	56.5	0.340	83.8	0.293
162	28.4	2.2	15.4	41	1.0	56.4	0.345	84.5	0.296
163	27.7	2.3	15.4	40	1.0	56.7	0.350	84.3	0.295
164	30.2	2.3	15.2	43	0.8	56.5	0.347	85.0	0.298
165	28.2	2.2	14.8	40	1.1	56.8	0.344	84.8	0.297
166	30.4	2.3	15.7	43	0.8	56.4	0.345	85.1	0.298
167	29.2	2.3	15.7	42	0.9	56.6	0.343	83.9	0.294
168	29.5	2.4	14.2	42	1.2	56.7	0.350	84.6	0.296
169	30.0	2.4	15.6	43	0.8	56.8	0.341	84.0	0.294
170	27.8	2.3	15.2	40	1.0	56.6	0.340	83.8	0.293
171	29.5	2.3	14.3	42	1.2	56.5	0.342	85.1	0.298
172	29.5	2.4	14.9	42	0.8	56.6	0.341	84.3	0.295
173	29.4	2.2	15.2	42	0.9	56.8	0.340	83.7	0.293
174	30.5	2.3	15.8	44	0.8	56.4	0.345	85.5	0.299
175	29.0	2.3	15.2	41	0.9	56.7	0.341	82.7	0.289
176	29.5	2.4	14.9	42	0.8	56.6	0.342	84.0	0.294
177	28.7	2.2	15.6	41	1.0	56.8	0.345	84.7	0.296
178	30.0	2.4	15.4	43	0.8	56.6	0.344	84.8	0.297
179	28.1	2.4	15.4	40	1.0	56.6	0.343	83.7	0.293
180	27.7	2.3	15.0	40	1.0	56.9	0.341	84.6	0.296
181	27.8	2.5	14.8	40	1.1	56.7	0.339	83.6	0.293
182	28.7	2.6	16.0	41	0.9	56.6	0.343	85.0	0.298
183	29.2	2.6	15.5	42	0.9	56.6	0.340	82.8	0.290
184	29.7	2.4	15.1	43	0.8	56.6	0.343	84.5	0.296
185	27.9	2.4	15.5	40	1.0	56.8	0.346	83.2	0.291
186	28.0	2.4	15.1	40	1.0	56.7	0.339	84.0	0.294
187	28.8	2.6	15.2	41	0.9	56.8	0.341	83.4	0.292
188	28.6	2.4	15.2	41	1.1	56.5	0.345	85.6	0.300
189	28.4	2.7	14.3	41	1.1	56.6	0.347	84.3	0.295
190	28.9	2.3	14.4	41	1.1	56.8	0.342	85.4	0.299
191	30.2	2.4	15.2	43	0.8	56.7	0.344	86.1	0.301
192	29.9	2.3	16.0	43	0.9	56.7	0.345	84.9	0.297
193	29.5	2.4	14.1	42	0.8	56.8	0.342	84.9	0.297
194	29.1	2.5	15.2	42	1.1	56.6	0.344	85.2	0.298
195	27.6	2.3	15.3	39	1.0	56.8	0.349	84.7	0.297
196	30.1	2.5	15.9	43	0.9	56.7	0.344	85.1	0.298
197	30.1	2.4	14.7	43	0.8	56.4	0.347	85.5	0.299
198	30.0	2.5	16.1	43	0.9	57.0	0.345	84.7	0.296
199	28.8	2.4	15.4	41	0.9	56.7	0.342	83.5	0.292
200	29.8	2.6	14.6	43	0.8	56.7	0.341	84.0	0.294
201	29.9	2.4	14.7	43	0.8	56.6	0.341	84.9	0.297
202	29.6	2.6	15.3	42	0.9	57.0	0.343	84.0	0.294
203	28.6	2.4	14.5	41	1.1	57.0	0.341	84.8	0.297
204	29.0	2.4	14.4	42	1.1	56.6	0.344	85.2	0.298
205	27.8	2.6	15.5	40	1.0	56.8	0.343	84.9	0.297
206	28.9	2.4	13.5	41	1.2	56.7	0.342	84.0	0.294
207	29.4	2.3	15.9	42	0.9	57.1	0.344	84.9	0.297
208	28.5	2.8	15.3	41	1.0	56.6	0.342	84.3	0.295
Average	28.9	2.2	15.1	41	0.9	56.2	0.344	84.6	0.296

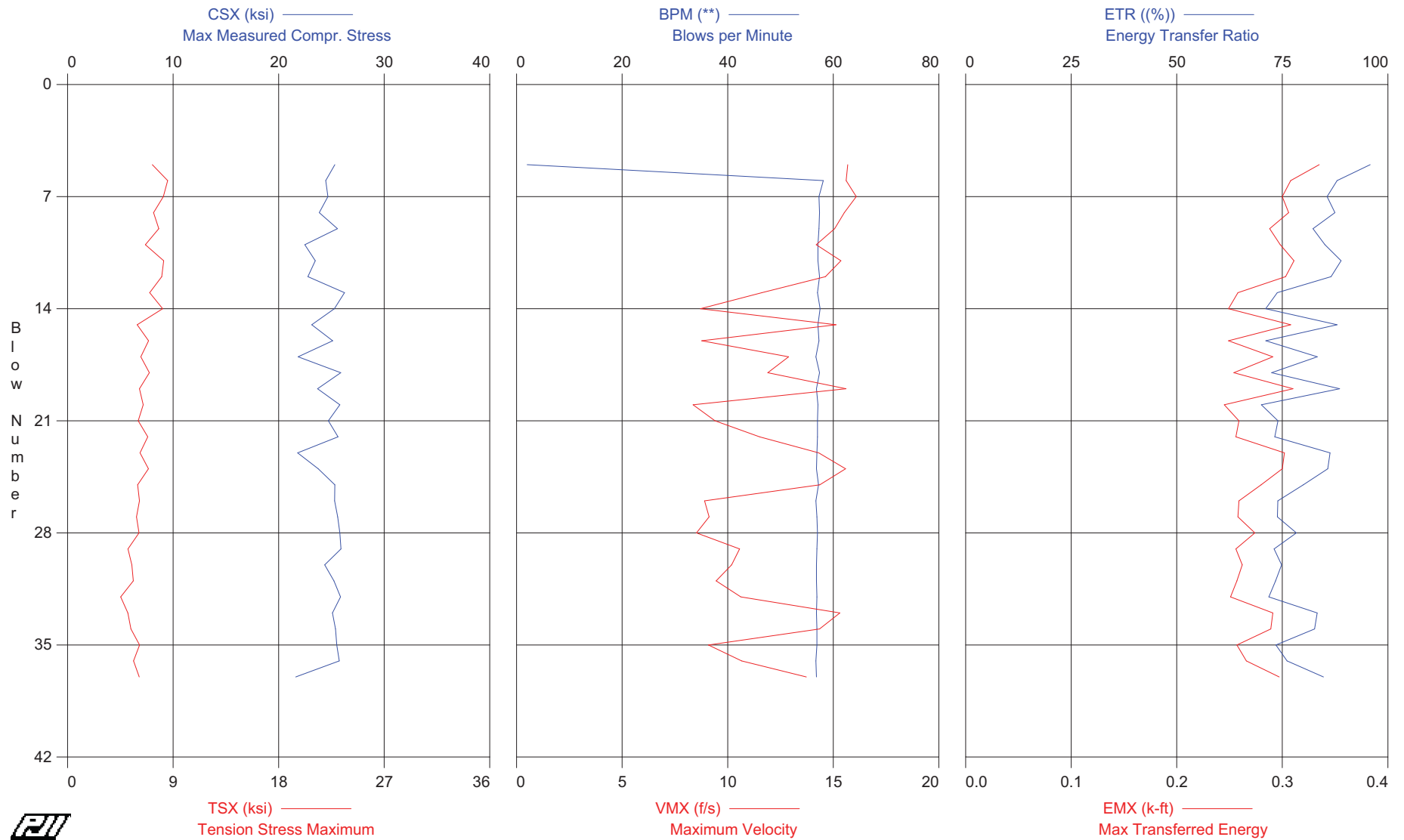
Total number of blows analyzed: 207

Time Summary

Drive 13 minutes 19 seconds

12:58:17 PM - 1:11:36 PM (1/24/2009) BN 1 - 208

EXELON VICTORIA - B3132 (360.8'-362.3' sample)



EXELON VICTORIA - B3132 (360.8'-362.3' sample)
OP: JNH

Hammer ID: 353; Driller: R.WHITE CME 550 (Miller)
Test date: 24-Jan-2009

AR: 1.43 in² SP: 0.492 k/ft³
LE: 366.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.70

CSX: Max Measured Compr. Stress BPM: Blows per Minute
TSX: Tension Stress Maximum EF2: Energy of F²
VMX: Maximum Velocity ETR: Energy Transfer Ratio
FMX: Maximum Force EMX: Max Transferred Energy
FVP: Force/Velocity proportionality

BL#	CSX ksi	TSX ksi	VMX f/s	FMX kips	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
5	25.3	7.2	15.7	36	0.5	2.0	0.330	95.8	0.335
6	24.5	8.5	15.6	35	0.6	58.1	0.328	88.0	0.308
7	24.7	8.2	16.1	35	0.5	57.3	0.329	85.6	0.300
8	23.8	7.3	15.5	34	0.6	57.4	0.333	87.5	0.306
9	25.6	7.8	15.1	37	0.5	57.3	0.330	82.3	0.288
10	22.5	6.6	14.2	32	0.8	57.1	0.337	85.1	0.298
11	23.5	8.2	15.4	34	0.7	57.1	0.335	88.9	0.311
12	22.8	8.0	14.6	33	0.8	57.4	0.333	86.5	0.303
13	26.2	7.0	11.6	38	0.4	57.0	0.335	73.8	0.258
14	25.3	8.1	8.7	36	1.6	57.5	0.335	71.1	0.249
15	23.1	5.9	15.1	33	0.7	57.1	0.330	88.0	0.308
16	25.1	6.9	8.8	36	1.6	57.3	0.333	71.1	0.249
17	21.8	6.2	12.9	31	0.9	56.7	0.333	83.3	0.291
18	25.9	7.0	11.9	37	0.4	57.4	0.329	72.5	0.254
19	23.7	6.1	15.6	34	0.6	56.8	0.328	88.6	0.310
20	25.8	6.5	8.4	37	0.4	57.1	0.331	70.0	0.245
21	24.7	6.0	9.4	35	1.5	57.0	0.333	74.0	0.259
22	25.6	6.8	11.5	37	0.4	57.0	0.326	73.2	0.256
23	21.8	6.2	14.3	31	0.8	56.9	0.329	86.3	0.302
24	23.7	6.9	15.6	34	0.6	56.8	0.322	85.8	0.300
25	25.3	6.0	14.4	36	0.4	57.2	0.321	80.0	0.280
26	25.3	6.1	8.9	36	1.6	56.7	0.331	73.9	0.259
27	25.6	5.9	9.1	37	1.6	56.9	0.335	73.8	0.258
28	25.8	6.1	8.5	37	1.7	57.0	0.330	78.3	0.274
29	25.9	5.2	10.6	37	0.4	56.9	0.332	73.0	0.256
30	24.4	5.5	10.2	35	1.3	56.8	0.333	74.8	0.262
31	25.2	5.6	9.5	36	1.5	56.8	0.335	73.4	0.257
32	25.9	4.5	10.6	37	0.4	56.9	0.326	71.8	0.251
33	25.1	5.1	15.3	36	0.5	56.8	0.327	83.2	0.291
34	25.4	5.4	14.4	36	0.4	56.9	0.323	82.7	0.289
35	25.5	6.1	9.1	36	1.6	56.9	0.329	73.5	0.257
36	25.7	5.6	10.7	37	0.4	56.7	0.330	76.1	0.266
37	21.6	6.1	13.7	31	0.9	56.8	0.331	84.7	0.297
Average	24.6	6.5	12.4	35	0.8	55.4	0.330	79.9	0.280

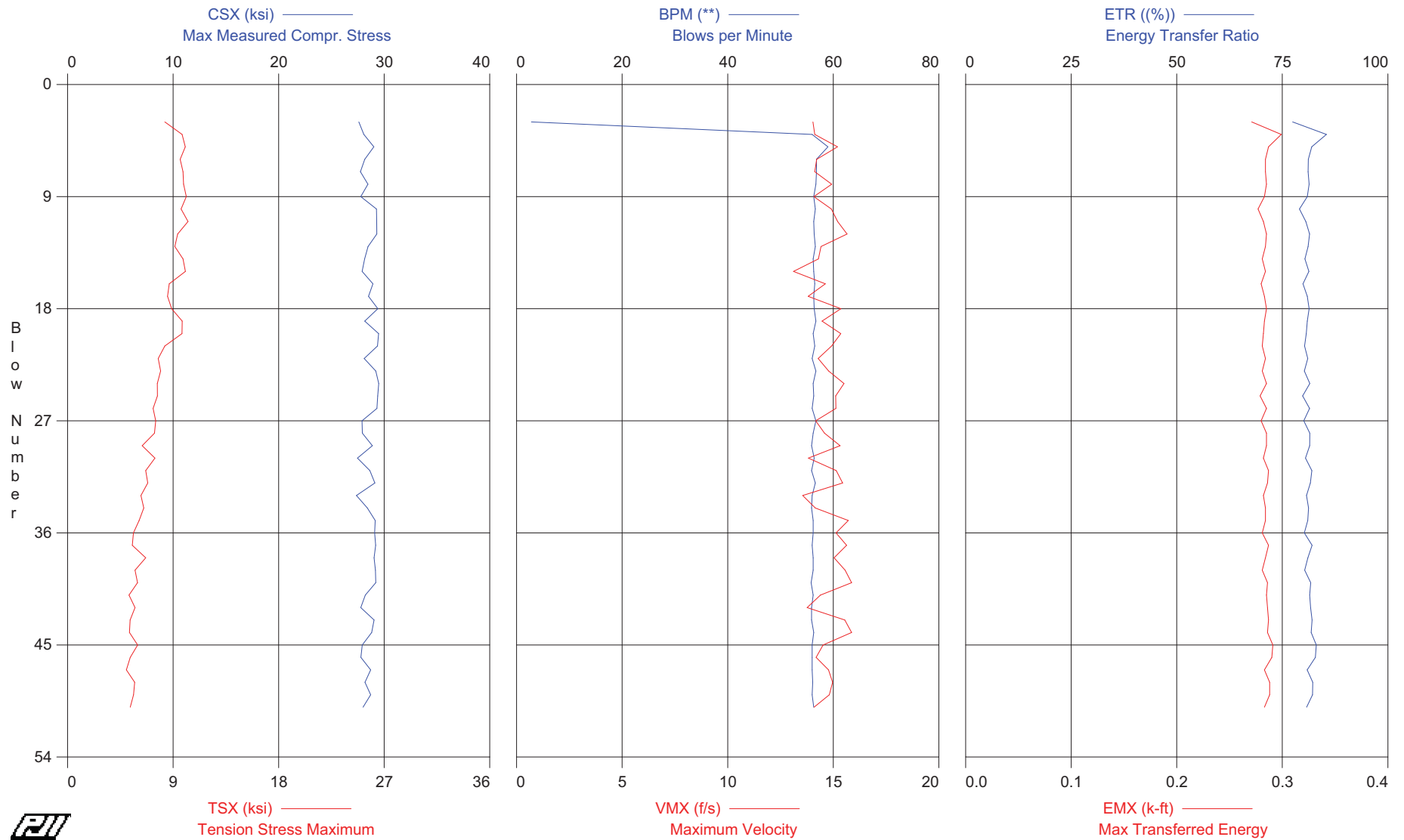
Total number of blows analyzed: 33

Time Summary

Drive 3:29:35 PM - 3:29:35 PM (1/24/2009) BN 1 - 1
Stop 12 minutes 12 seconds 3:29:35 PM - 3:41:47 PM
Drive 1 minute 5 seconds 3:41:47 PM - 3:42:52 PM BN 2 - 37

Total time [0:13:17] = (Driving [0:01:05] + Stop [0:12:12])

EXELON VICTORIA - B3132 (370.9'-372.4' sample)



EXELON VICTORIA - B3132 (370.9'-372.4' sample)
OP: JNH

Hammer ID: 353; Driller: R.WHITE CME 550 (Miller)
Test date: 25-Jan-2009

AR: 1.43 in²
LE: 376.00 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 F²
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
3	27.6	8.3	14.0	39	0.8	2.8	0.334	77.5	0.271
4	28.1	9.8	14.1	40	0.8	56.0	0.362	85.4	0.299
5	29.0	10.0	15.2	41	0.9	59.0	0.357	81.9	0.287
6	28.2	9.6	14.2	40	1.1	56.8	0.357	81.2	0.284
7	27.7	9.9	14.1	40	0.8	56.8	0.356	81.1	0.284
8	28.5	9.9	14.9	41	0.8	56.7	0.353	81.4	0.285
9	27.8	10.1	14.1	40	0.8	56.3	0.351	80.9	0.283
10	29.3	9.7	14.9	42	0.9	56.6	0.353	79.1	0.277
11	29.3	10.3	15.2	42	0.9	56.3	0.355	80.6	0.282
12	29.3	9.4	15.7	42	0.8	56.4	0.354	81.5	0.285
13	28.5	9.1	14.4	41	0.8	56.6	0.355	81.1	0.284
14	28.1	9.8	14.3	40	0.8	56.2	0.353	80.4	0.281
15	27.9	10.1	13.1	40	1.2	56.3	0.355	81.3	0.284
16	28.9	8.7	14.6	41	1.0	56.5	0.354	79.9	0.280
17	28.5	8.5	13.8	41	1.1	56.3	0.352	80.9	0.283
18	29.4	8.9	15.4	42	0.8	56.4	0.354	81.4	0.285
19	28.2	9.8	14.5	40	0.8	56.7	0.350	80.9	0.283
20	29.5	9.8	15.4	42	0.9	56.2	0.354	80.7	0.282
21	29.4	8.3	14.9	42	0.9	56.5	0.351	80.3	0.281
22	28.1	7.7	14.3	40	0.8	56.0	0.358	81.0	0.284
23	29.2	7.9	14.8	42	0.9	56.7	0.354	80.2	0.281
24	29.5	7.7	15.5	42	0.9	56.2	0.355	81.5	0.285
25	29.4	7.7	15.1	42	0.9	56.3	0.353	79.8	0.279
26	29.3	7.3	15.1	42	0.9	56.0	0.355	81.5	0.285
27	27.9	7.5	14.2	40	0.8	56.7	0.352	80.1	0.280
28	27.9	7.4	14.6	40	0.8	56.2	0.349	81.5	0.285
29	28.9	6.4	15.3	41	0.9	55.9	0.355	81.5	0.285
30	27.5	7.4	13.8	39	0.8	56.4	0.348	80.5	0.282
31	28.6	6.7	15.1	41	0.8	55.9	0.353	82.0	0.287
32	29.1	6.8	15.4	42	0.9	56.6	0.351	81.6	0.286
33	27.4	6.3	13.6	39	0.8	56.0	0.349	80.7	0.282
34	28.4	6.5	14.2	41	1.0	55.9	0.353	81.2	0.284
35	29.1	6.1	15.7	42	0.8	56.2	0.353	81.0	0.284
36	29.1	5.6	15.1	42	0.9	56.2	0.348	80.2	0.281
37	29.2	5.5	15.6	42	0.9	56.0	0.354	82.0	0.287
38	29.0	6.7	15.0	42	0.8	56.2	0.349	81.1	0.284
39	29.2	5.8	15.6	42	0.8	56.2	0.350	80.3	0.281
40	29.2	6.0	15.9	42	0.9	55.8	0.352	81.7	0.286
41	28.2	5.2	14.4	40	1.0	56.2	0.352	81.5	0.285
42	27.8	5.8	13.8	40	1.1	55.9	0.351	81.7	0.286
43	29.0	5.3	15.5	42	0.8	55.9	0.355	82.1	0.287
44	28.8	5.3	15.9	41	0.8	56.3	0.352	81.9	0.286
45	27.9	6.0	14.5	40	0.8	56.0	0.352	83.0	0.291
46	27.8	5.3	14.2	40	0.8	56.0	0.355	82.8	0.290
47	28.7	5.0	14.8	41	0.9	56.0	0.351	80.9	0.283
48	28.2	5.7	15.0	40	0.8	56.1	0.351	82.2	0.288
49	28.7	5.6	14.8	41	1.0	56.0	0.356	82.2	0.288
50	28.0	5.4	14.1	40	1.0	56.3	0.353	80.7	0.283
Average	28.6	7.6	14.7	41	0.9	55.2	0.353	81.2	0.284

Total number of blows analyzed: 48

Time Summary

Drive 1 minute 50 seconds

9:39:49 AM - 9:41:39 AM (1/25/2009) BN 1 - 51