



MACTEC, Inc.
 MACTEC Engineering and Consulting
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Urgent, please hand deliver

For Review / Comment

Please Reply

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FIRM:	TVA	SUBJECT: Drilling Progress at Kingston Gypsum site.	
FAX:	423-751-7094		
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# PAGES:	7 + this cover sheet		
COPY TO:			
FROM:	MACTEC	COMMENTS: Field Boring Logs for NB-63A, NB-73, NB-74.	
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MACTEC SOIL TEST BORING FIELD REPORT

BORING NO. NB-63A PG. 2 OF 2

RIG TYPE CME 75 HAMMER TYPE _____

JOB NO. 303051021 DRILLER J. WARREN HOURS DRILLING _____ GROUND SURFACE ELEV _____

JOB NAME TYH KINGSTON LOGGED BY T. JUSTIN HOURS MOVING _____ DATE: 5/6/05 WEATHER 7 Sunny

LOYSUM

MA. DOPY

DRAWING

SCALE

IN

FEET

SOIL DESCRIPTION

FLOW

RAN HQ CASING TO A DEPTH OF 52.3 FT AND BEGAN HQ ROCK CORING.

OFFSET 6.5 FT S 00° W TO NB-63A FROM NB-63

Run #1; 52.3 FT TO 59.3 FT

RAN = 7.0 FT

REC = 6.9 FT (~~99%~~) (96%)

RQD = 4.3/7.0 = (61%)

Very slightly weathered, closely jointed, Bedding appears to be fine to 50° light gray, fine grained, very strong dolomitic. Several joint sets observed. Most notable oriented @ 60° to 80° and 45° (orthogonal to bedding)

Run #2; 59.3 FT TO 64.3 FT

RAN = 5.0 FT

REC = 4.8 FT (96%)

RQD = 1.5/5.0 = (30%)

Run #3; 64.3 FT TO 69.3 FT

RAN = 5.0 FT

REC = 5.0 FT (100%)

RQD = 2.5/5.0 = (50%)

Run #4; 69.3 FT TO 78.6 FT

RAN = 9.3 FT

REC = 9.3 FT (100%)

RQD = 5.5/9.3 = (59%)

Run #5; 78.6 FT TO 82.3 FT

RAN = 3.7 FT

REC = 3.6 FT (97%)

RQD = 3.1/3.7 = (84%)

CORING TERMINATED @ 82.3 FT

BORING TERMINATED: 82.3 FT
 BORING REFUSAL: HQ casing refusal 52.3 FT
 WATER TOB DEPTH: Not observed
 WATER 24 HR. DEPTH: _____
 WATER LOSSES: _____
 CAVE-IN DEPTHS: _____
 CASING: SIZE _____ LENGTH _____
 STANDBY TIME _____ BORING LAYOUT _____

METHOD OF ADVANCING BORING
 POWER AUGER HQ casing
 HAND SHOP: W/MUD: W/WATER
 ROTARY DRILL: W/MUD: W/WATER
 DIAMOND CORE
 CORE SIZE HQ
 UNDISTURBED SAMPLES NO _____ SIZE _____
 BAG SAMPLES NO _____

DEPTH
 TO 52.3
 TO _____
 TO _____
 TO _____
 TO 82.3

MACTEC SOIL TEST BORING FIELD REPORT

BORING NO. NB-73 PG. 1 OF 2

RIG TYPE NB-73(A) HAMMER TYPE _____

JOB NO. 3043051021 DRILLER M. Burnett HOURS DRILLING _____ GROUND SURFACE ELEV. _____

JOB NAME TVA KINGSTON LOGGED BY J. Mason HOURS MOVING _____ DATE: 5/10/05 WEATHER: 65° CLR

No. Depth	SAMPLES				UC	PRC	SOIL CLASSIFICATION	REMARKS
	1	2	3	5				
1 15:05	2	3	5		1.5	0.0 to 0.6 ft: Firm, 10YR 2/14 dark yellowish brown, slightly clayey silt, slightly moist 10YR 5/14 yellowish brown, slightly sandy, very silty CLAY, slightly moist.		
2 15:12	5	6	8		1.5	Still mottled (10YR 5/18 yellowish brown, 10YR 2/1 black spots, manganese staining), very silty CLAY, slightly moist.		
3 15:17	3	5	7		1.5	Same as above. Occasional 1 cm buff colored, weathered chert.		
4 15:24	4	4	6		1.5	Still, mottled (10YR 6/6 brownish yellow & 10YR 5/6 yellowish brown) very silty CLAY, slightly moist.		
5 15:40	3	4	4		1.0	Firm, mottled (10YR 6/6 brownish yellow, 10YR 5/6 yellowish brown, and 10YR 2/1 black manganese staining), very silty CLAY, Moist	19' during drilling	
6 15:48	3	2	3		1.5	24.0 to 24.4 ft: Same as above. 24.4 to 25.5 ft: Firm, 7.5YR 5/18 strong brown, sandy (very fine sand) clayey silt Moist.		
7 16:01	3	4	5		1.5	Same as above except stiff, with occasional 5 mm buff- to light gray-colored, angular, weathered chert, slightly moist.		

STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES.

BORING TERMINATED: NB-73 (40.0 FT) : NB-73A (50.5 SPT)
 BORING REFUSAL: NB-73 (40.0 FT) : NB-73A (NOT RECORDED)
 WATER TOB DEPTH: 9.8 FT (0 AUGER REFUSAL)
 WATER 24 HR.: DEPTH 7.5 FT (24-hr)
 WATER LOSSES _____
 CAVE-IN DEPTHS _____
 CASING: SIZE _____ LENGTH _____
 STANDBY TIME _____ BORING LAYOUT _____

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 3 1/4" (NB-73)	0 TO 90'
HAND SHAPED WOOD WRESTER (NB-73A)	0 TO 79'
ROTARY DRILL: W/MUD: W/WATER	TO _____
DIAMOND CORE	TO _____
CORE SIZE	TO _____
UNDISTURBED SAMPLES NO <u>1</u> SIZE <u>3</u> "	
BAG SAMPLES NO <u>1</u> , 2'-10'	

MACTEC SOIL TEST BORING FIELD REPORT

BORING NO. NB-73 PG. 2 OF 2
RIG TYPE (NB-73A) HAMMER TYPE _____

JOB NO. 3043051021 DRILLER M. Burnett HOURS DRILLING _____ GROUND SURFACE ELEV. _____
NAME TVA KINGSTON LOGGED BY J. Mason HOURS MOVING _____ DATE: 5/4/05 WEATHER: 65° CLR

No. Depth	SAMPLING			SCALE	SOIL CLASSIFICATION	REMARKS
	1	2	3			
9 ³⁴ / _{35.5} 16:13	3	5	6	1.5	Same as from 29.0 to 30.5 ft. with occasional 3.5 cm ball of white weathered chert. Slightly moist.	- suspect ALLUVIAL origin to Auger refusal depth (34.0 ft)
9 ³⁹ / _{39.8} 16:27	38	50/0.3'			No recovery; threaded upper section of split spoon broken off into split spoon head Auger. Refusal @ 40.0 FT. OFFSET 5 FT. N 110° E, to NB-73A AND DRILLED TO 44 FT AND BEGAN split spoon sampling.	
10 ⁴⁴ / _{45.5} 17:30	2	3	3	1.5	Same as from 24.4 to 25.5 ft. except moist.	
11 ⁴⁹ / _{50.5} 17:40	3	1	2	1.5	Soft, 10YR 5/8 yellowish brown, slightly clayey, very sandy (fine sand) SILT. Moist.	
12 ⁵⁴ / _{55.5} 17:48	Weight of hammer			0	No recovery.	
13 ⁵⁸ / _{60.5} 18:00	Weight of hammer			0	No recovery.	
14 ⁶⁴ / _{65.5} 18:07	3	4	1	0.3 0.4	Firm, N3/ very dark gray to gray greenish gray, sandy SILT. Slightly moist.	
15 ⁶⁹ / _{70.5} 18:18	12	20	11	0.6	Hard, 2-5Y 8/3 pale yellow, sandy (very fine sand) SILT, with occasional sh. fragments of weathered chert. Very moist to wet.	
16 ⁷⁴ / _{75.5} 19:00	4	7	5	0.6	Firm, 10YR 6/4 light yellowish brown, very silty SAND (fine to medium) with occasional chert fragments. Very moist to wet.	
17 ⁷⁹ / _{80.5} 19:18	2	2	2	0.2	Very loose, 10YR 6/8 brownish yellow, fine to medium, silty SAND. Very moist to wet.	

ANGERS APPEAR TO BE "LEAVING OFF" (OFFSET FROM VERTICAL) DUE TO SUSPECTED SOLUTIONED SCOT WITHIN WEATHERED BEDROCK INTERFAC. BOTTOM 10 FT OF ANGERS LOST IN BUREAU. BORING NB-73A TERMINATED AT 80.5 FT.

*STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" ID, 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES.

BORING TERMINATED: NB-73 (40 FT); NB-73A (80.5 FT)
 BORING REFUSAL: NB-73 (40 FT); NB-73A (NOT ENGULFED)
 WATER TOB DEPTH 9.0 FT @ AUGER REFUSAL
 WATER 24 HR.: DEPTH 7.5 FT (24-HR)
 WATER LOSSES _____
 CAVE-IN DEPTHS _____
 CASING: SIZE _____ LENGTH _____
 STANDBY TIME _____ BORING LAYOUT _____

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER 3 1/4" (NB-73)	0 TO 40'
HAND SPILL SAMPLER - WATER (NB-73A)	0 TO 79'
ROTARY DRILL: W/MUD: W/WATER	TO _____
DIAMOND CORE	TO _____
CORE SIZE	TO _____
UNDISTURBED SAMPLES NO <u>1</u> SIZE <u>3"</u>	
BAG SAMPLES NO <u>1</u> , 2'-10'	

MACTEC SOIL TEST BORING FIELD REPORT

BORING NO. NB-74 PG. 1 OF 3
RIG TYPE CME 550 HAMMER TYPE AUTO

JOB NO. 3043051021 DRILLER M. Burnett HOURS DRILLING _____ GROUND SURFACE ELEV. _____
JOB NAME TVA KINGSTON LOGGED BY J. Mason HOURS MOVING _____ DATE 5/5/05 WEATHER: _____

NO. FEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1.0/1.5 13:58	2	3	3										1.3	0.0 to 0.6 ft. Firm, SYR 4/4 brown, silty CLAY. Slightly moist. 0.6 to 1.3 ft. Firm, SYR 4/6 yellowish red, very silty, CLAY. Slightly moist																	
2.0/2.5 14:05	5	7	7										1.3	Stiff, SYR 5/6 yellowish red (with occasional 10% 6/6 brownish yellow, med. spotty, 10% 2/1 manganese mottling), silty CLAY. Slightly moist																	
3.0/3.5 14:15	4	5	6											0.9	Firm, 7.5 SYR 6/9 reddish yellow clayey to very clayey SAND (fine to medium). Slightly moist.																
4.0/4.5 14:29	1	2	2											1.2	Very loose, 7.5 SYR 6/8 reddish yellow silty to very silty, fine to medium SAND. Slightly moist to moist.																
5.0/5.5 14:41	7	6	5											1.2	19.0 to 19.7 ft. Firm, 10YR 5/6 yellowish brown (with some 10YR 2/1 black mottling), silty, fine to medium SAND. Very moist. 19.7 to 20.2 ft. Firm, 10YR 5/6 yellowish brown to 10YR 3/2 very dark grayish brown, sandy, fine to coarse, sub rounded to rounded, quartz GRAVEL. Moist.																

From 0.6 to about
24.0 FT SOILS
APPEAR ALLUVIAL

STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 130" I.D. 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES.

BORING TERMINATED: 75.79 ft.
 BORING REFUSAL: 44.0 ft (AUGER)
 WATER TOB DEPTH: ≈ 19 ft.
 WATER 24 HR.: DEPTH 11.5 ft. (prior to curing 5-6-05)
 WATER LOSSES: 70%
 CAVE-IN DEPTHS: _____
 CASING: SIZE NW LENGTH 44.0 ft.
 STANDBY TIME _____ BORING LAYOUT _____

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER <u>3 1/4"</u>	0 TO <u>44.0 FT</u>
HAND SHOP: WMUD: WWATER	TO _____
ROTARY DRILL: WMUD: WWATER	TO _____
DIAMOND CORE <u>NB</u>	TO _____
CORE SIZE <u>1/2</u>	<u>44.0</u> TO <u>75.0</u>
UNDISTURBED SAMPLES NO <u>6</u> SIZE <u>3"</u>	
BAG SAMPLES NO _____	

MACTEC SOIL TEST BORING FIELD REPORT

RIG TYPE CME 550 HAMMER TYPE AUTO

JOB NO. 3043051021
JOB NAME TVA KINGSTON

DRILLER M. Burnett
LOGGED BY J. Nelson

HOURS DRILLING _____

GROUND SURFACE ELEV. _____

HOURS MOVING _____

DATE: 5/5 WEATHER: _____

6:24/35.5 4 4 6 1.5 Still mottled (7.5YR 5/8 strong brown to 10YR 7/8 yellow) silty CLAY with 5mm to 2cm angular silt to light gray chert fragments from 24.3 to 24.7 ft. Slightly moist.

Note: At 24.0' FT. 5 point samples appear RESIDUAL.

~~1.4'~~

7:29/30.5 4 5 10 1.1 Still, 7.5YR 5/6 strong brown (with spotty 10YR 2/1 black mottling) very silty CLAY with 2 to 6mm, dark gray to buff-colored angular chert fragments throughout. Slightly moist.

~~0.5'~~

8:34/35.5 2 3 5 1.5 Firm, mottled (7.5YR 5/8 strong brown, 10YR 5/6 yellowish brown, 10YR 2/1 black, and 2.5Y 8/3 pale yellow) silty CLAY with occasional concentrations of under 3mm buff to chert gray angular chert fragments. Slightly moist.

9:39/40.5 2 3 4 1.5 Same as above.

10:44/44 50ft
Auger split spear, solidly retrieved @ 44.0 ft. Set NW casing to 44.0 ft., begin casing.

44.0 to 75.79 ft.: Dolomite, 5YR 6/1 light brownish gray to 5YR 4/1 brownish gray. Fine grained; upper two feet has a crystalline appearance, and may be slightly siliceous. Other portions may be slightly calcareous with a very weak reaction occasionally to dilute HCl. Residual core is indicated. Distinct identifiable bedding features are not readily noticeable. Weathering ranges from slight to complete, resulting in multiple cavities (described).

BORING TERMINATED: 75.8 FT
 BORING REFUSAL: 44.0 FT (AUGER)
 WATER TOB DEPTH: 72.19 FT
 WATER 24 HR.: DEPTH 11.5 FT
 WATER LOSSES: -70%
 CAVE-IN DEPTHS _____
 CASING: SIZE NW LENGTH 94.0 FT
 STANDBY TIME _____ BORING LAYOUT _____

METHOD OF ADVANCING BORING	DEPTH
POWERAUGER <u>3 1/4"</u>	<u>0' TO 44.0 FT</u>
HAND SHOPL: W/MUD: W/WATER	TO _____
ROTARY DRILL: W/MUD: W/WATER	TO _____
DIAMOND CORE	TO _____
CORE SIZE <u>NO</u>	<u>44.0 TO 75.8</u>
UNDISTURBED SAMPLES <u>NO</u> SIZE <u>3 1/2"</u>	
BAG SAMPLES <u>NO</u>	

STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES.

MACTEC SOIL TEST BORING FIELD REPORT

BORING NO. NB-74 PG. 3 OF 3

RIG TYPE CME 550 HAMMER TYPE AUTO

JOB NO. 3043051021 DRILLER M. Burnett HOURS DRILLING _____ GROUND SURFACE ELEV. _____

JOB NAME TVA Kingston LOGGED BY J. Meson HOURS MOVING _____ DATE: 5/6/05 WEATHER: _____

No	Depth	Soil Classification	Remarks

below. Recovered pieces of dolomite are hard. The dolomite is considerably fractured; intact core pieces exhibit a joint set at an average apparent dip of 60° with a spacing of about 1/4 inch. Many of these fractures are healed with white dolomite and are occasionally intersected by an orthogonal set of joints with an apparent dip of 50°.

45.4 to 46 ft.: Cherty.

47.3 to 51.1 ft.: Clay-filled cavity. Clay washed out during drilling.

51.3 to 54.2 ft.: Cavity; very soft filling.

54.4 to 54.9 ft.: Cavity

61.4 to 65.7 ft.: Cavity

66.0 to 68.0 ft.: Cavity

68.4 to 68.75 ft.: Chert layer, 5YR 8/1, pinkish gray matrix, with abundant 1- to 7 mm, subrounded quartz clasts.

68.75 to 72.5 ft.: The advance of the core barrel indicates repeated intervals of alternately hard/soft material in increments too small to measure. Only a few fragments of dolomite were recovered from this interval; the largest intact section was from about 71.9 to 72.5 ft.

72.5 to 75.3 ft.: Cavity.

Overall drilling water return was at approximately 30%, which may indicate clay fill in most of the cavities.

- Run 1 from 44.0 to 53.5 ft.; run 9.5 ft., recovered 7.2 ft. (73%), $RQD = 1.93/9.5 = 20\%$. Run time: 0945 - 0957

- Run 2 from 53.5 to 63.5 ft.; run 10.0 ft., recovered 4.03 ft. (40%), $RQD = 2.04/10.0 = 20\%$. Run time: 1030 - 1040, 1050 - 1055, 1124 - 1127.

- Run 3 from 63.5 to 75.79 ft.; run 12.29 ft. (with repeated stops/starts to pull block core, hence > 10.0 ft.), recovered 1.92 ft. (15%), $RQD = 0.41/12.29 = 3\%$. Run time: 1145 - 1152, 1200 - 1213.

STANDARD PENETRATION RESISTANCE IS SUM OF BLOWS FOR 2ND 6" AND 3RD 6" TO DRIVE 1-3/8" I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES.

BORING TERMINATED: 75.8 FT
 BORING REFUSAL: 44.0 FT (AUGER)
 WATER TOB DEPTH: ± 19.0 FT
 WATER 24 HR.: DEPTH: 11.5 FT
 WATER LOSSES: 70%
 CAVE-IN DEPTHS: _____
 CASING: SIZE NW LENGTH 44.0 FT
 STANDBY TIME: _____ BORING LAYOUT: _____

METHOD OF ADVANCING BORING	DEPTH
POWER AUGER <u>3 1/4"</u>	<u>0</u> TO <u>44.0 FT</u>
HAND SHOP: W/MUD: W/WATER	_____ TO _____
ROTARY DRILL: W/MUD: W/WATER	_____ TO _____
DIAMOND CORE	_____ TO _____
CORE SIZE <u>NQ</u>	<u>44.0</u> TO <u>75.8</u>
UNDISTURBED SAMPLES NO <u>6</u> SIZE <u>3</u>	
BAG SAMPLES NO _____	