

Datum: WGS84 Lat: 38.941117

Long: -94.7619885

NENE 8-13-24E

HNTB**LOG OF BORING**

BORING NO.

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PROJECT Gateway

STATION / NORTHING / 237823.737

LOCATION Johnson County, Kansas

OFFSET / EASTING / 2233137.833

DATE STARTED 04/05/2012

DATE COMPLETED 04/05/2012

SURFACE ELEVATION 990.7 ft

EXPLORATION CONTRACTOR Terracon

DATUM NAVD 88

DRILLER J. Johnson

DRILL RIG CME-75

GROUND WATER LEVELS:

HAMMER TYPE Auto

HAMMER EFFICIENCY

▽ AT TIME OF DRILLING NATD

LOGGED BY J. Martens

REVIEWED BY L. Wagner

▼ AFTER N/A

DRILLING METHOD	DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	CORE REC % (RQD %)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	GRAPHIC LOG	MATERIAL DESCRIPTION Unified (Visual) Classification System	GEOLOGIC NAME	ELEVATION (ft)
	0									990.7
SSA 4" OD								Orange Brown with Black Nodules, Firm, LEAN CLAY, Moist (CL), with Rootlets		990
									3.0	987.7
	5							LIMESTONE, Highly Weathered, Broken	Plattsburg LS	
									5.0	
								LIMESTONE, Brownish Gray, Moderately Hard		985
								1,100 psi downpressure		
	9	SPT S1	3		50/3"			3 - 4" SHALE Seam at 8.5'		
CORE BARREL NQ2	10	NQ C1		88% (75%)				LIMESTONE, Gray, Fine Grained, Medium Bedded, Fresh, Moderately Hard to Hard, Fossiliferous		980
	11							1" Gray SHALE Seam at 11.3'		
								With Wavy SHALE Laminae from 11.6 - 11.7'		
								40 degree Fracture at 12.4'		
		NQ C2		97% (65%)				Vertical Healed Fracture, Fossiliferous from 13.5 - 14.1'		976.6
	15							SHALE, Gray, Laminated, Fresh, Moderately Hard, with Calcareous Partings		
									16.0	
	16							SANDSTONE with Interbedded Shale Laminae, Gray, Medium Bedded, Fresh, Moderately Hard	Bonner Springs SH	975
									16.8	
		NQ C3		98% (63%)				SHALE, Gray, Laminated, Fresh, Moderately Hard to Hard		
								1" LIMESTONE Seam at 17.4'		
	20							Becoming Greenish Gray, Limey, with Limestone Nodules and Inclusions at 20'		
	21							Becoming Maroon and Greenish Gray, with Limestone Inclusions and Seams at 21'		970
		NQ C4		82% (8%)						
	25									

(Continued Next Page)

BORING LOG 2 W/O LAB DATA - GATEWAY_TEMPLATE.GDT - 4/6/12 11:58 - O:\55921\GEOTECH\GINT\GEOLOGY BORINGS.GPJ



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PROJECT Gateway

STATION / NORTHING / 237823.737

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DRILLING METHOD	DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	CORE REC % (RQD %)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	GRAPHIC LOG	MATERIAL DESCRIPTION Unified (Visual) Classification System	GEOLOGIC NAME	ELEVATION (ft)
	25									
	26	NQ								965
								SHALE, Gray to Bluish Gray, Blocky, Fresh, Moderately Hard to Hard With Interbedded Calcareous Sandstone Laminae from 27.3 - 28.1'		
		NQ C5		100% (80%)						
	30									
	31									960
								31.8		
		NQ C6		92% (52%)				SANDSTONE, Gray, Very Fine Grained, Thick Bedded, Fresh, Cemented/Moderately Hard		
	35							Becoming Laminated to Very Thin Bedded, Abundant Interbedded Shale Partings at 34.2'		
	36							34.1		
								SHALE, Gray, Laminated, Fresh, Moderately Hard		
								36.1		
								36.8		955
		NQ C7		87% (13%)				SANDSTONE, Gray, Very Fine Grained, Medium Bedded, Fresh, Cemented/Moderately Hard		
	40							SHALE, Gray, Laminated, Fresh, Soft to Moderately Hard, "Poker Chipped" Shale badly disturbed by coring process.		
	41									950
								1/4" Fossiliferous LIMESTONE Seam at 41.3'		
		NQ C8		100% (0%)						
	45									
	46							46.0		
								1" Fossiliferous LIMESTONE Seam at 45.7'		
								46.0	944.7	945
		NQ C9		100% (85%)				LIMESTONE, Gray, Very Fine Grained, Fresh, Medium to Thick Bedded, Hard	Farley LS	
	50							Wavy SHALE Partings from 48.0 - 48.4'		
								Becoming Fossiliferous at 49.7'		
								50.1		
	51							SHALE, Gray, Laminated, Fresh, Moderately Hard, Trace Calcareous Partings		940
								"Poker Chipped"		
		NQ		100%						

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BORING LOG 2 W/O LAB DATA - GATEWAY_TEMPLATE.GDT - 4/6/12 11:58 - 0:155921\GEOTECH\GINT\GEOLOGY BORINGS.GPJ



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DRILLING METHOD	DEPTH (ft)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY (in)	CORE REC % (RQD %)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	GRAPHIC LOG	MATERIAL DESCRIPTION Unified (Visual) Classification System	GEOLOGIC NAME	ELEVATION (ft)
	55	C10		(7%)				SHALE, Gray, Laminated, Fresh, Moderately Hard, Trace Calcareous Partings (<i>continued</i>)		56.0
										935

Boring backfilled with Enviropug upon completion.
Auger Refusal at 9.0 feet.
Bottom of borehole at 56.0 feet.