LOG OF BORING NO. MC-21

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 737+00, 120 Feet left of centerline

Approx. Surface Elev.: 1052.5 ft

DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
SILTY GRAVEL light grayish brown, dry (2 – 1050.5)		GM	1	AS						
GRAVEL, with sand, with clay seams light reddish brown and light gray, dry (5 – 1047.5)		GP GC	2	AS						
GRAVEL, with sand, with clay seams reddish brown and light gray, dry to moist (21.5 – ▽ 1031.0)	5	GP GC	3	AS						
	10	GP GC	4	AS						
	15	GP GC	5	AS						
	20									
CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid			RUN 1	DB	100%	RQD 64%				
	25									
	30		RUN	DB	100%	RQD				

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 21.5	WD	▼ DRY AB
WL	▼		▼
WL			

Terracon

BORING STARTED	10-16-02		
BORING COMPLETED	10-17-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	CSK	JOB #	J7P0601

LOG OF BORING NO. MC-21

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
	CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid			2			46%				
		35									
		40									
				RUN 3	DB	100%	RQD 95%				
		45									
		50									
				RUN 4	DB	100%	RQD 92%				
	55.5 997.0	55									
	BOTTOM OF BORING AT 55.5 FEET BACKFILLED WITH CUTTINGS 10/17/02										
	++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 21.5	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-16-02		
BORING COMPLETED	10-17-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	CSK	JOB #	J7P0601

LOG OF BORING NO. MC-21

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	OVERBURDEN										
	21.5 ▽ 1031.0										
	CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid			RUN 1	DB	100%	RQD 64%				
	CT, TR LS										
	LS REED SPRINGS FORMATION										
	CT, TR LS	25									
		30									

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 21.5	WD	▼ DRY AB
WL	▼		▼
WL			

Terracon

BORING STARTED	10-16-02		
BORING COMPLETED	10-17-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	CSK	JOB #	J7P0601

1.59

LOG OF BORING NO. MC-21

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid (CT, TR LS)									
	31.5 — 1021.0									
	CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid (CT, TR LS)			RUN 2	DB	100%	RQD 46%			
		35								
	(CT, TR LS) LS	40								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 21.5	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-16-02		
BORING COMPLETED	10-17-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	CSK	JOB #	J7P0601

LOG OF BORING NO. MC-21

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf	
CT LS	**CHERT++** stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid										
	41.5 1011.0										
CT, TR LS	**CHERT++** stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid			RUN 3	DB	100%	RQD 95%				
CT, TR LS		45									
CT, TR LS		50									

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 21.5	WD ▼ DRY	AB
WL	▽	▼	
WL			

Terracon

BORING STARTED	10-16-02		
BORING COMPLETED	10-17-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	CSK	JOB #	J7P0601

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LOG OF BORING NO. MC-21

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

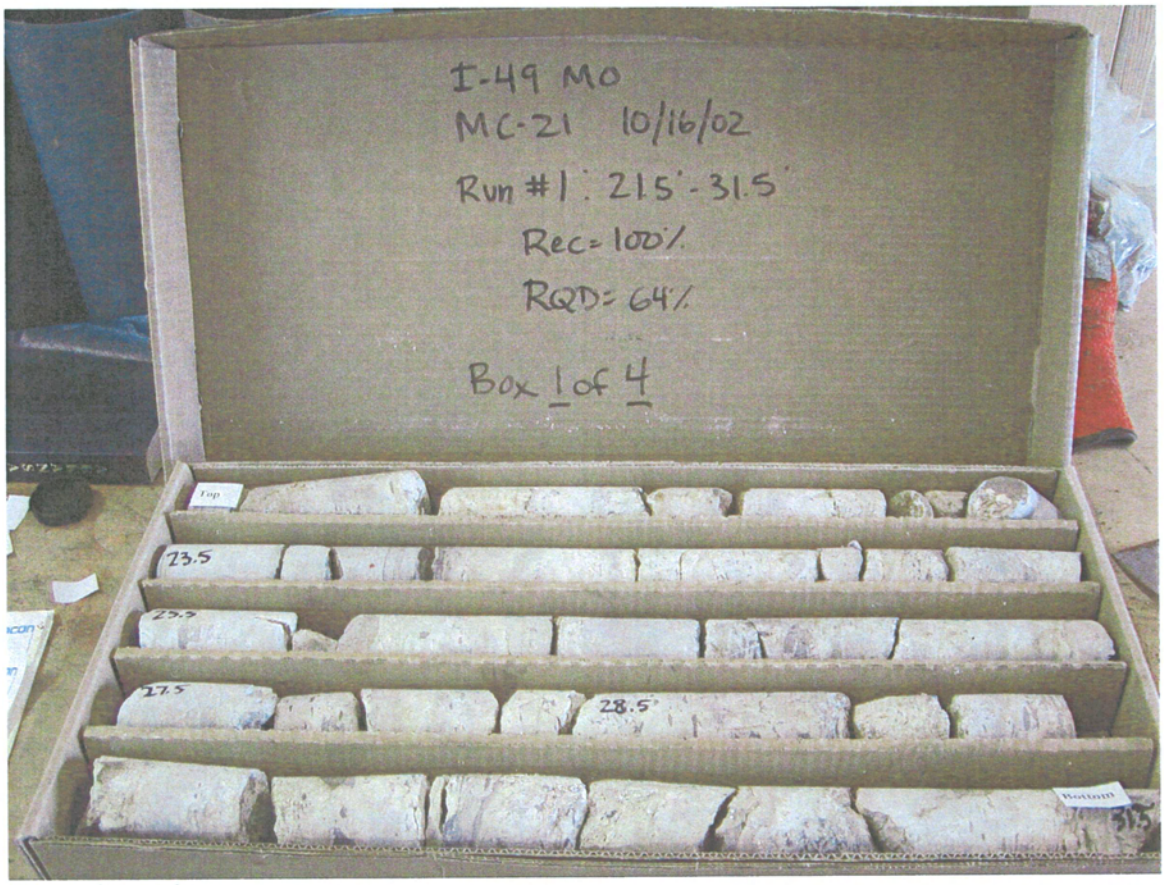
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid (CT, TRLS) 51.5 — 1001.0									
	CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid (CT, TRLS) 55.5 — 997.0	55		RUN 4	DB	100%	RQD 92%			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

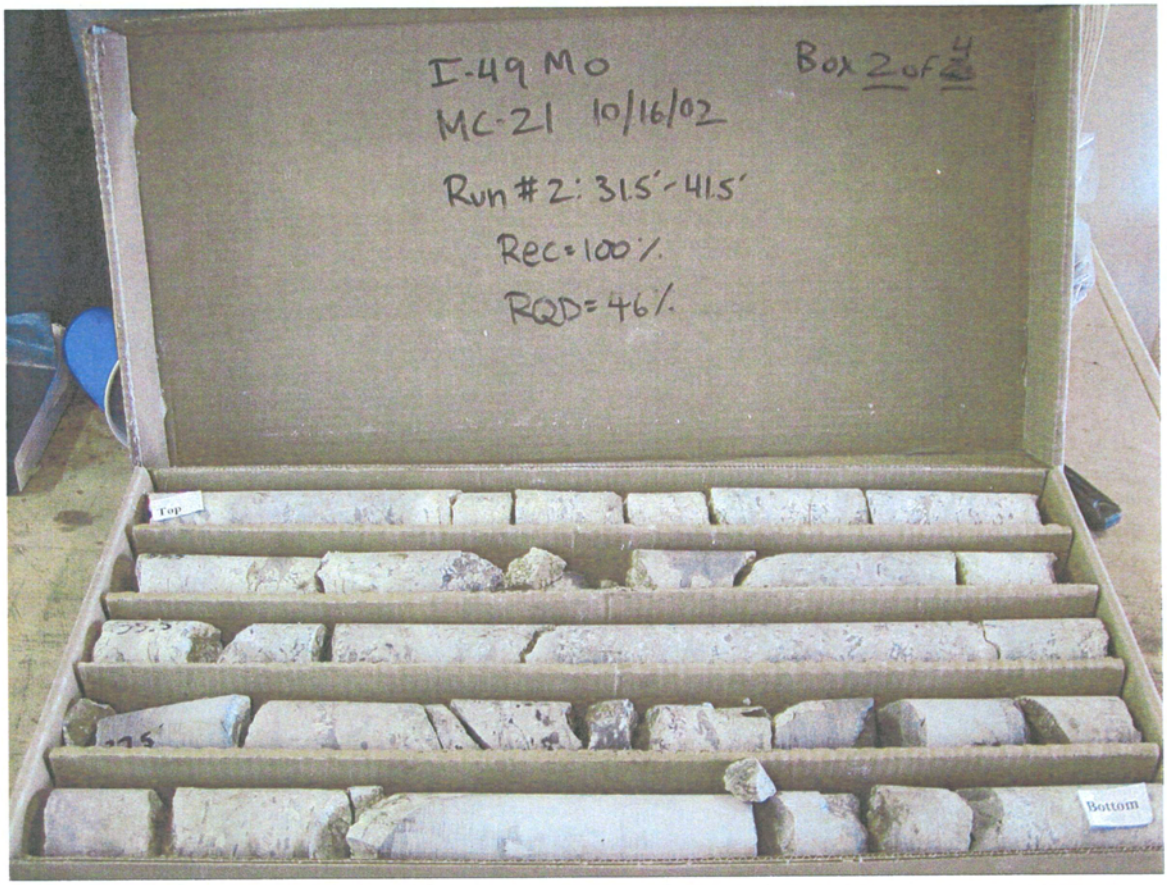
WATER LEVEL OBSERVATIONS, ft			
WL	▽ 21.5	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

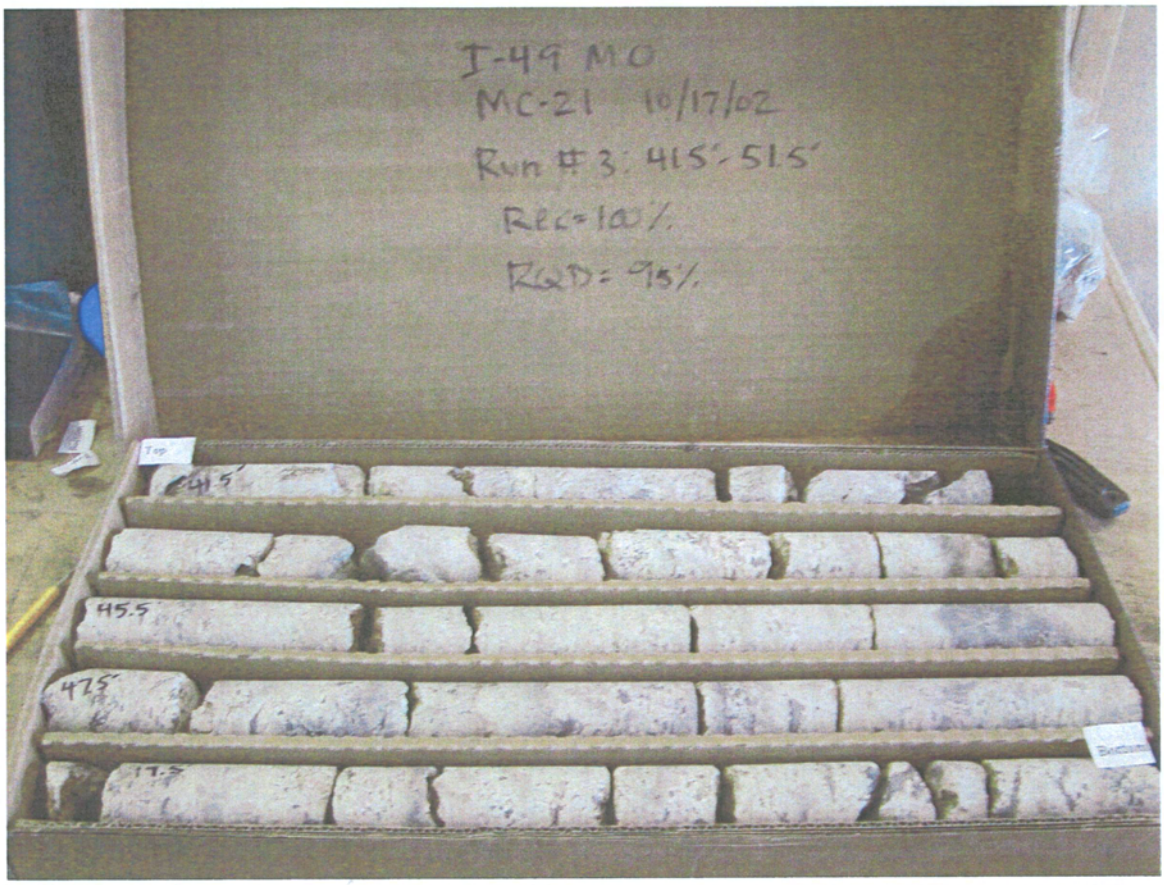
BORING STARTED	10-16-02		
BORING COMPLETED	10-17-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	CSK	JOB #	J7P0601



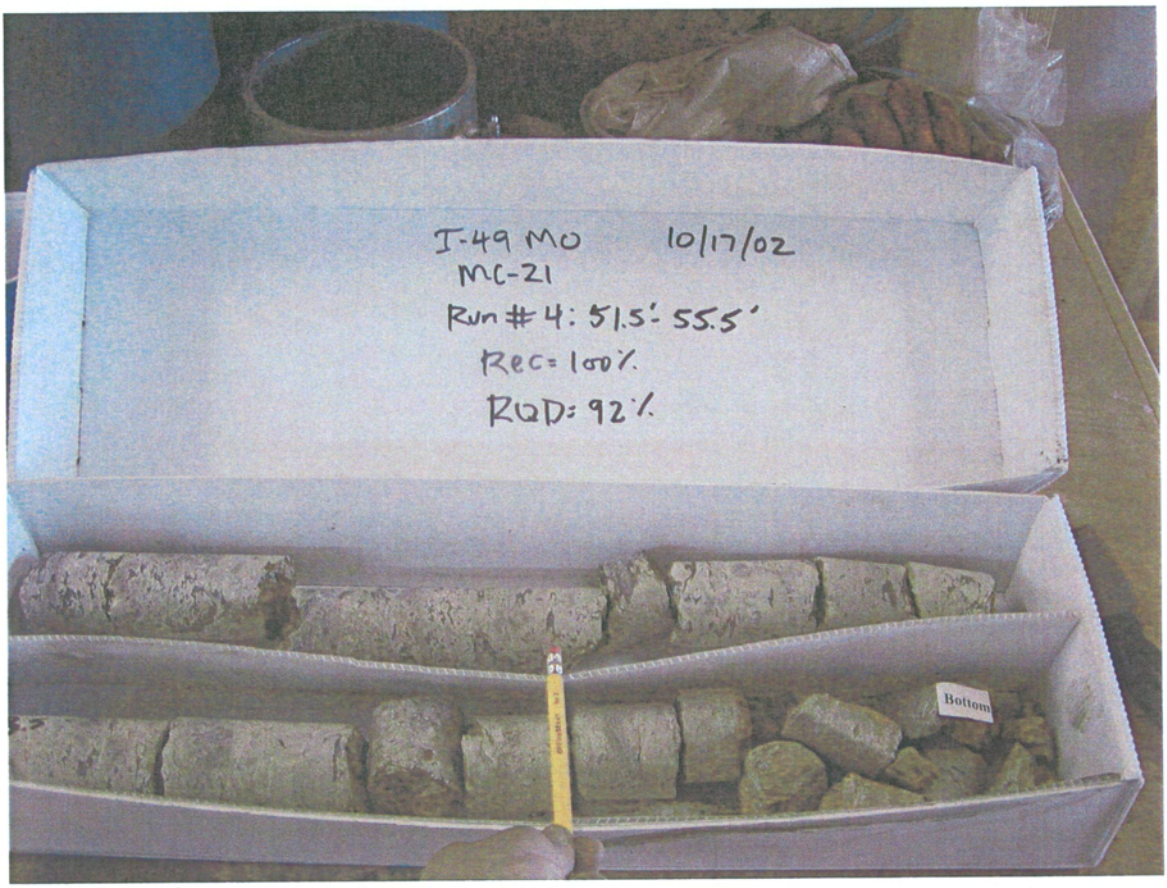
I 49 Missouri
Missouri J7P0601
Boring MC-21
Run No. 1
21.5 Feet to 31.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-21
Run No. 2
31.5 Feet to 41.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-21
Run No. 3
41.5 Feet to 51.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-21
Run No. 4
51.5 Feet to 55.5 Feet

LOG OF BORING NO. MC-28

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 747+00, 100 Feet right of centerline

Approx. Surface Elev.: 1080.5 ft

DESCRIPTION	Elev.	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
GRAVEL AND COBBLES, with sand and clay, dark brown and white, dry	1078.5 (2)		GP	1	AS						
GRAVEL, with clay, with chert seams, white and light reddish brown, dry	1075.5 (5)	5	GP	2	AS						
CLAYEY GRAVEL, scattered chert seams, white and reddish brown, moist	1067.5 (13)	10	GC	3	AS						
			GC	4	AS						
SANDY GRAVEL, with clay, with chert seams, light brown, moist to wet	1060.5 (20)	15	GP	5	AS						
BROKEN CHERT, with clay seams, abundant chert seams and beds, light brown and white, moist	1052.5 (28) ▽	20	GP	6	AS						
		25	GP	7	AS						
CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid				RUN 1	DB	77%	RQD 58%				
		30		RUN 2	DB	100%	RQD 59%				

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 27.5	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	11-13-02		
BORING COMPLETED	11-13-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

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LOG OF BORING NO. MC-28

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	Blow Counts for 18"
	34.5 - weathered and vuggy below 33.5 feet 1046.0			RUN 3	DB	97%	RQD 39%				

BOTTOM OF BORING AT 34.5 FEET
BACKFILLED WITH CUTTINGS 11/13/02

++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 27.5	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	11-13-02		
BORING COMPLETED	11-13-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-28

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	OVERBURDEN									
	LS GRAVEL									
	27.5 ▽ 1053.0									
	CHERT++ stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid			RUN 1	DB	77%	RQD 58%			
	CT + LS – INTERBEDDED									
	REED SPRINGS FORMATION									
	LS									
	CT									
	30 1050.5	25								
	Continued Next Page	30								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 27.5	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	11-13-02		
BORING COMPLETED	11-13-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-28

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
CT, LS	**CHERT++** stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid			RUN 2	DB	100%	RQD 59%			
	32 — 1048.5									
CT	**CHERT++** stratified, trace limestone seams, light gray and gray, thin bedded, very fine grained, slightly weathered to fresh, hard, solid - weathered and vuggy below 33.5 feet dissolution - smooth, rounded			RUN 3	DB	97%	RQD 39%			
LS, CT	34.5 — 1046.0									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 27.5	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	11-13-02		
BORING COMPLETED	11-13-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

I 49 Missouri
Missouri J7P0601
Boring MC-28
Run No. 1
27.5 Feet to 30.0 Feet
Run No. 2
30.0 Feet to 32.0 Feet
Run No. 3
32.0 Feet to 34.5 Feet

LOG OF BORING NO. MC-64

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 788+00, 120 Feet left of centerline

Approx. Surface Elev.: 1117.4 ft

DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
SILT, trace gravel and sand, with clay seams light reddish brown, dry		ML	1	AS						
5 — 1112.4	5									
SANDY LEAN CLAY, with gravel reddish brown, moist		CL	2	AS						
10 — 1107.4	10									
SILTY GRAVEL AND SAND light reddish brown, dry		GP GM	3	AS						
	15	GP GM	4	AS						
	20	GP GM	5	AS						
25 — 1092.4	25									
CLAYEY GRAVEL, with chert seams and beds white and reddish brown, moist		GC	6	AS						
	30	GC	7	AS						

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽ Dry 24 hr	AB	▽
WL			

Terracon

BORING STARTED	10-23-02		
BORING COMPLETED	10-25-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-64

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
	CLAYEY GRAVEL, with chert seams and beds white and reddish brown, moist	35	GC	8	AS						
		40	GC	9	AS						
	43 — 1074.4										
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid	45		RUN 1	DB	100%	RQD 43%				
		50		RUN 2	DB	85%	RQD 21%				
		55		RUN 3	DB	100%	RQD 25%				
		60									
		65		RUN 4	DB	99%	RQD 15%				

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽ Dry 24 hr	AB	▽
WL			

Terracon

BORING STARTED	10-23-02		
BORING COMPLETED	10-25-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-64

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf	Blow Counts for 18"
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid										
		70		RUN 5	DB	100%	RQD 22%				
	75 1042.4	75									
	BOTTOM OF BORING AT 75 FEET BACKFILLED WITH CUTTINGS ON 10/25/02										

++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽ Dry 24 hr	AB	▼
WL			

Terracon

BORING STARTED	10-23-02		
BORING COMPLETED	10-25-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-64

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	OVERBURDEN									
	43 — 1074.4									
CT, LS, CT, CT, CT, CT, LS, CT, CT, LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid — REED SPRINGS FORMATION	45		RUN 1	DB	100%	RQD 43%			
	48 — 1069.4									
CT, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid	50		RUN 2	DB	85%	RQD 21%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY WD	▽ DRY AB	
WL	▽ Dry 24 hr AB	▽	
WL			

Terracon

BORING STARTED	10-23-02		
BORING COMPLETED	10-25-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-64

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
LS, CT, CT, LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid									
Damaged 53.5	1063.9									
CT, LS, CT, LS, CT, CT, CT, LS, CT, LS, LS, LS, CT, CT, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid	55, 60		RUN 3	DB	100%	RQD 25%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▼ Dry 24 hr	AB	▼
WL			

Terracon

BORING STARTED	10-23-02		
BORING COMPLETED	10-25-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-64

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
LS, CHERT LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid									
CT w/LS - broken and recemented w/calcite, some crystals	62.5 / 1054.9									
CT, CT, LS, CT, CT, LS, CT, LS, CT - highly fractured, CT, LS, CT, CT - highly fractured, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid	65		RUN 4	DB	99%	RQD 15%			
	68.5 / 1048.9									
LS, CT, CT, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid → highly fractured	70		RUN 5	DB	100%	RQD 22%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽ Dry 24 hr	AB	▽
WL			

Terracon

BORING STARTED	10-23-02		
BORING COMPLETED	10-25-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

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LOG OF BORING NO. MC-64

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

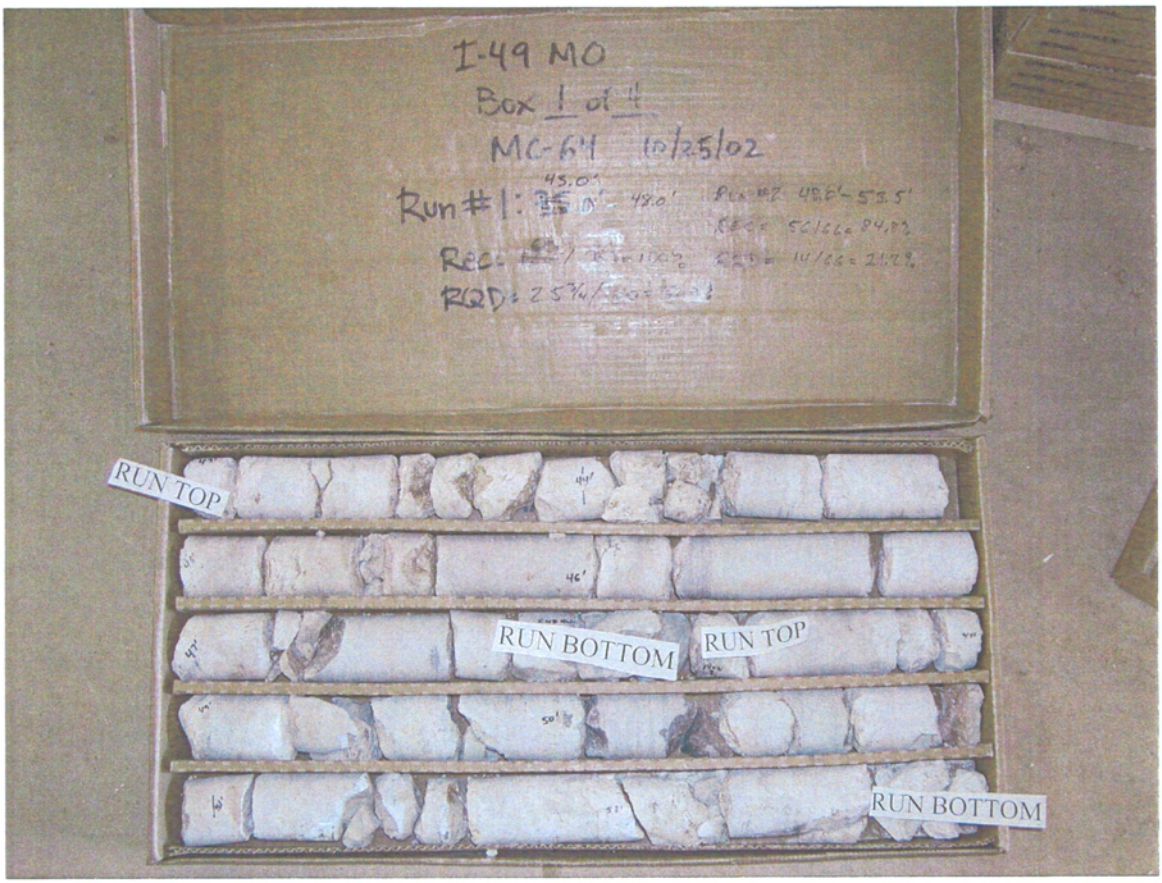
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
LS, CT, LS, LS, LS, LS, LS, CT, CT, LS, LS, CT, CT, LS, CT, CT, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid; CT - Lightly fractured	75								
75	1042.4	75								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽ Dry 24 hr AB		▼
WL			

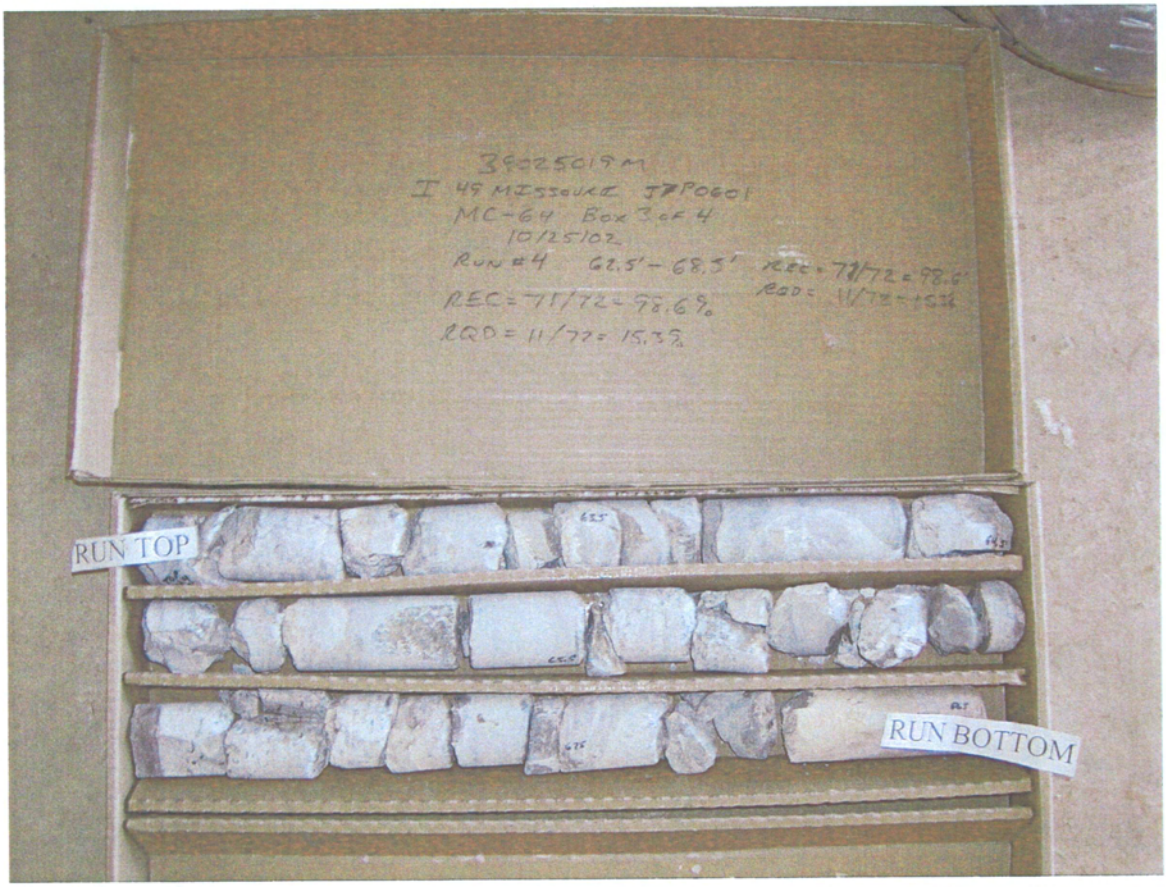
Terracon

BORING STARTED	10-23-02		
BORING COMPLETED	10-25-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

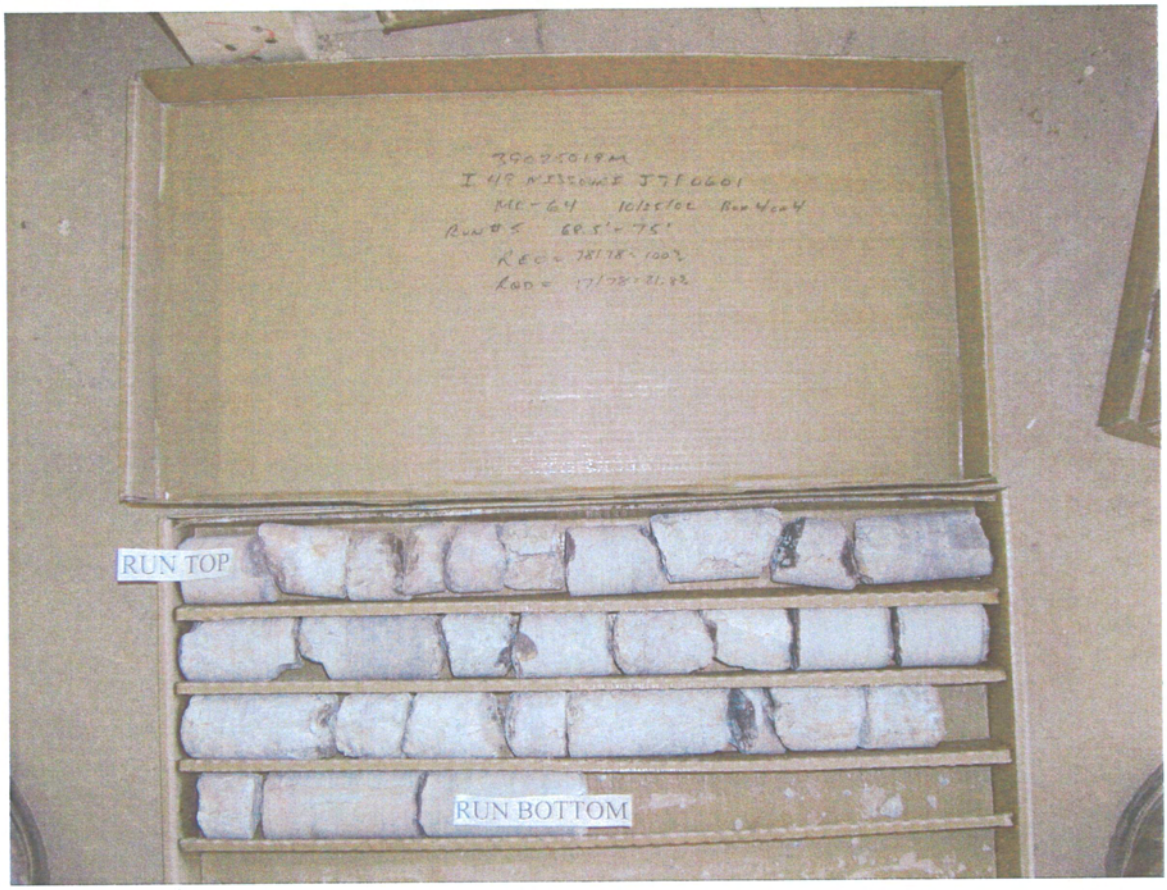


I 49 Missouri
Missouri J7P0601
Boring MC-64
Run No. 1
43.0 Feet to 48.0 Feet
Run No. 2
48.0 Feet to 53.5 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-64
Run No. 3
53.5 Feet to 62.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-64
Run No. 4
62.5 Feet to 68.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-64
Run No. 5
68.5 Feet to 75.0 Feet

LOG OF BORING NO. MC-82

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 804+00, Centerline

Approx. Surface Elev.: 1107.6 ft

DESCRIPTION	Elev.	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
SANDY GRAVEL, trace clay light brown to reddish brown, dry	1104.6	3	GP	1	AS						
GRAVELLY FAT CLAY, with sand light brown to reddish brown, moist	1100.6	7	CH								
FAT CLAY, with gravel, trace sand reddish brown, moist			CH	2	AS						
		10	CH	3	AS						
		15	CH	4	AS						
		20	CH	5	AS						
		25	CH	6	AS						
		30	CH	7	AS						

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-17-02		
BORING COMPLETED	10-17-02		
RIG CME-75, #219		FOREMAN	DB
APPROVED	DP	JOB #	J7P0601

180

LOG OF BORING NO. MC-82

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
	33 — 1074.6 **GRAVELLY FAT CLAY**, with sand light brown, moist										
	37.4 — 1070.2 **LIMESTONE++** stratified, with chert seams and inclusions, gray, thin to medium bedded, fine grained, slightly weathered, hard, solid	35	CH	8	AS						
				RUN 1	DB	95%	RQD 13%				
		40		RUN 2	DB	97%	RQD 80%				
		45		RUN 3	DB	100%	RQD 77%				
		50		RUN 4	DB	92%	RQD 63%				
		55		RUN 5	DB	100%	RQD 82%				
		60		RUN 6	DB	100%	RQD 75%				
	62 — 1045.6	65									

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	10-17-02		
BORING COMPLETED	10-17-02		
RIG CME-75, #219	FOREMAN	DB	
APPROVED	DP	JOB #	J7P0601

LOG OF BORING NO. MC-82

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
	LIMESTONE++ stratified, abundant chert seams and inclusions, gray and dark gray, medium bedded, fine grained, slightly weathered, hard to very hard, solid			RUN 7	DB	100%	RQD 87%				
		70		RUN 8	DB	95%	RQD 73%				
		75		RUN 9	DB	100%	RQD 81%				
	78.6 1029.0										
	BOTTOM OF BORING AT 78.6 FEET BACKFILLED WITH CUTTINGS 10/17/02										
	++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-17-02		
BORING COMPLETED	10-17-02		
RIG CME-75, #219	FOREMAN	DB	
APPROVED DP	JOB #	J7P0601	

LOG OF BORING NO. MC-82

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	NO LOG No original sketch	35								
	37.4 1070.2									
	LIMESTONE++ stratified, with chert seams and inclusions, gray, thin to medium bedded, fine grained, slightly weathered, hard, solid			RUN 1	DB	95%	RQD 13%			
	40 1067.6	40								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-17-02		
BORING COMPLETED	10-17-02		
RIG CME-75, #219		FOREMAN	DB
APPROVED	DP	JOB #	J7P0601

I 49 Missouri
Missouri J7P0601
Boring MC-82
Run No. 1
37.4 Feet to 40.0 Feet
Run No. 2
40.0 Feet to 45.0 Feet
Run No. 3 (partial)
45.0 Feet to 50.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-82
Run No. 3(partial)
45.0 Feet to 50.0 Feet
Run No. 4
50.0 Feet to 55.0 Feet
Run No. 5 (partial)
55.0 Feet to 60.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-82
Run No. 5 (partial)
55.0 Feet to 60.0 Feet
Run No. 6
60.0 Feet to 65.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-82
Run No. 7
65.0 Feet to 70.0 Feet
Run No. 8 (partial)
70.0 Feet to 75.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-82
Run No. 8 (partial)
70.0 Feet to 75.0 Feet
Run No. 9
75.0 Feet to 78.6 Feet

LOG OF BORING NO. MC-110

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 824+88, 115 Feet left of centerline

Approx. Surface Elev.: 1163.7 ft

DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
1 **LEAN CLAY** light brown and brown, dry — 1162.7		CL	1	AS						
LEAN CLAY, trace gravel reddish brown, dry		CL	2	AS						
4 — 1159.7										
LEAN CLAY, scattered to with gravel light reddish brown, dry	5	CL	3	AS						
	10									
	15									
19 — 1144.7										
CHERT++ stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid	20			HS						
			RUN 1	DB	100%	RQD 92%				
	25		RUN 2	DB	97%	RQD 88%				
			RUN 3	DB	100%	RQD 85%				

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▼ DRY 24 hr	AB	▼
WL			

Terracon

BORING STARTED	5-5-03		
BORING COMPLETED	5-6-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

189

LOG OF BORING NO. MC-110

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	Blow Counts for 18"
	CHERT++ stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid										
				RUN 4	DB	100%	RQD 56%				
				RUN 5	DB	100%	RQD 88%				
				RUN 6	DB	100%	RQD 86%				
				RUN 7	DB	100%	RQD 95%				
				RUN 8	DB	100%	RQD 85%				
	BOTTOM OF BORING AT 64.3 FEET BACKFILLED WITH CUTTINGS 05/06/03			RUN 9	DB	100%	RQD 100%				
	++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.										
	64.3	1099.4									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▼ DRY 24 hr	AB	▼
WL			

Terracon

BORING STARTED	5-5-03
BORING COMPLETED	5-6-03
RIG ATV, #103E	FOREMAN JW
APPROVED BKM	JOB # J7P0601

LOG OF BORING NO. MC-110

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	OVERBURDEN									
	22.3 — 1141.4									
CT CT CT LS	**CHERT++** stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid — REED SPRINGS FORMATION			RUN 1	DB	100%	RQD 92%			
CT	24.3 — 1139.4									
CT LS CT LS CT	**CHERT++** stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid	25		RUN 2	DB	97%	RQD 88%			
	LS Inclusions; LS; CT; LS; — minor dissolution; LS + CT - Interbedded									
	29.3 — 1134.4									
CT	CT; LS Inclusions	30		RUN 3	DB	100%	RQD 85%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL	DRY 24 hr AB		
WL			

Terracon

BORING STARTED	5-5-03		
BORING COMPLETED	5-6-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

191

LOG OF BORING NO. MC-110

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	↑ CT ↓ **CHERT++** stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid									
	LS									
	CT									
	LS - highly fractured									
	CT									
	LS - highly fractured									
	34.3 1129.4									
	CT **CHERT++** stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid			RUN 4	DB	100%	RQD 56%			
	LS	35								
	CT									
	39.3 1124.4									
	LS			RUN 5	DB	100%	RQD 88%			
	CT									
	CT	40								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▼ DRY 24 hr	AB	▼
WL			

Terracon

BORING STARTED	5-5-03
BORING COMPLETED	5-6-03
RIG ATV, #103E	FOREMAN JW
APPROVED BKM	JOB # J7P0601

LOG OF BORING NO. MC-110

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CT, LS, CT, LS, CT	**CHERT++** stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid									
	44.3 — 1119.4									
CT, LS - Inclusions, CT, LS - Inclusions, CT, CT	**CHERT++** stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid	45		RUN 6	DB	100%	RQD 86%			
	49.3 — 1114.4									
		50		RUN 7	DB	100%	RQD 95%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽ DRY 24 hr	AB	▽
WL			

Terracon

BORING STARTED	5-5-03		
BORING COMPLETED	5-6-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

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LOG OF BORING NO. MC-110

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	CHERT++ stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid CT LS CT 54.3 1109.4									
	CHERT++ stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid LS - Inclusions CT - highly fractured CT LS CT LS 59.3 1104.4	55		RUN 8	DB	100%	RQD 85%			
	CT LS **Continued Next Page**	60		RUN 9	DB	100%	RQD 100%			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽ DRY 24 hr	AB	▼
WL			

Terracon

BORING STARTED	5-5-03		
BORING COMPLETED	5-6-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

LOG OF BORING NO. MC-110

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
LS	**CHERT++** stratified, with limestone seams, light gray and gray, medium bedded, very fine grained, slightly weathered to fresh, hard, solid									
CT										
LS										
CT										
LS - Inclusions										
	64.3 1099.4									

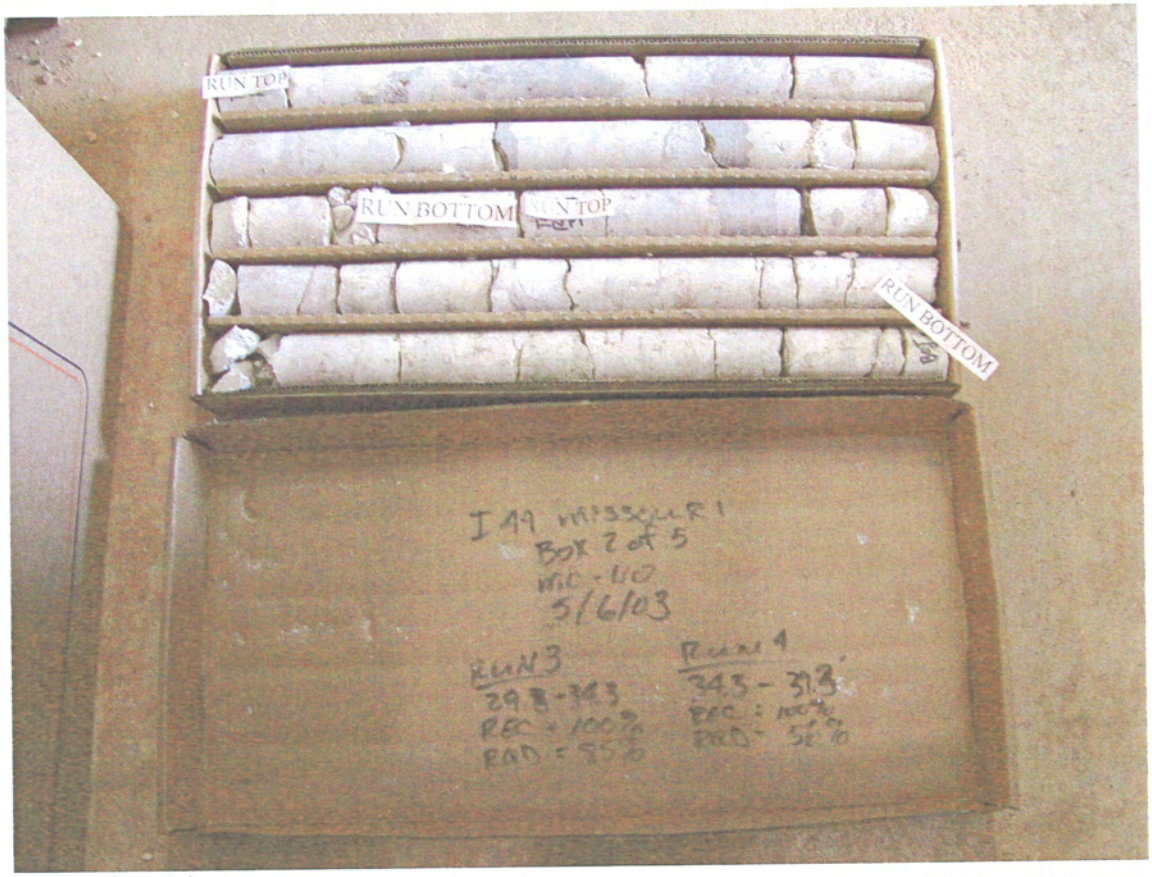
The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽ DRY 24 hr	AB	▼
WL			

Terracon

BORING STARTED	5-5-03		
BORING COMPLETED	5-6-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

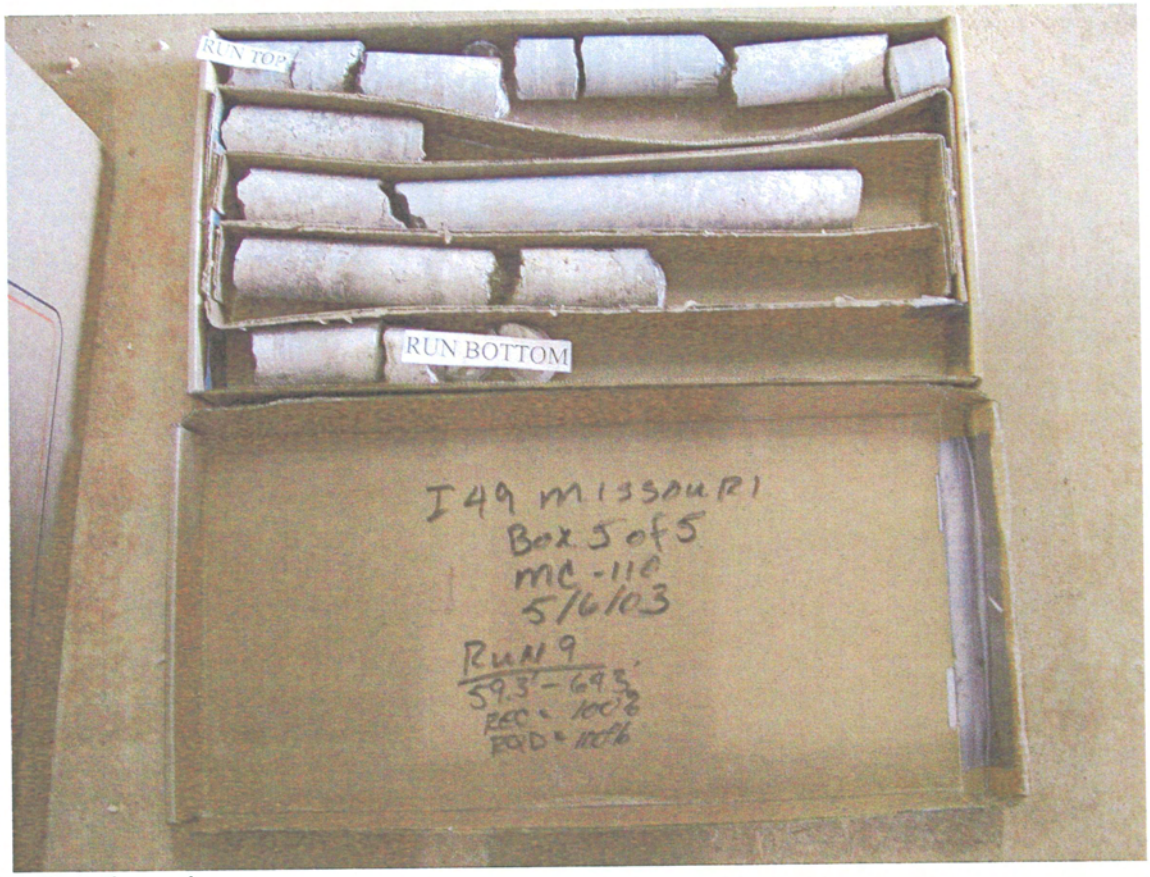
I 49 Missouri
Missouri J7P0601
Boring MC-110
Run No. 1
22.3 Feet to 24.3 Feet
Run No. 2
24.3 Feet to 29.3 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-110
Run No. 3
29.3 Feet to 34.3 Feet
Run No. 4
34.3 Feet to 39.3 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-110
Run No. 5
39.5 Feet to 44.5 Feet
Run No. 6
44.5 Feet to 49.5 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-110
Run No. 7
49.3 Feet to 54.3 Feet
Run No. 8
54.3 Feet to 59.3 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-110
Run No. 9
59.3 Feet to 64.3 Feet

LOG OF BORING NO. MC-124

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 837+00, 120 Feet left of centerline

Approx. Surface Elev.: 1169.5 ft

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	GRAVEL, abundant clay brown and reddish brown, dense			1	AS					
	5 — 1164.5	5								
	FAT CLAY, abundant gravel, trace chert seams reddish brown, very stiff, moist			2	AS					
		10		3	AS					
	15 — 1154.5	15								
	FAT CLAY, with gravel reddish brown, stiff, moist			4	AS					
	18.5 — 1151.0									
	LIMESTONE++ stratified, scattered chert seams and inclusions, light gray and white, medium bedded, very fine grained, fresh, hard, solid	20		RUN 1	DB	99%	RQD 88%			
		25								
		30		RUN 2	DB	98%	RQD 71%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-24-02		
BORING COMPLETED	10-24-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

201

LOG OF BORING NO. MC-124

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	LIMESTONE++ stratified, scattered chert seams and inclusions, light gray and white, medium bedded, very fine grained, fresh, hard, solid	35								
				RUN 3	DB	100%	RQD 80%			
	40.5 1129.0	40								

BOTTOM OF BORING AT 40.5 FEET
BACKFILLED WITH CUTTINGS 10/24/02

++ Classification estimated from core samples. Petrographic analsysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-24-02		
BORING COMPLETED	10-24-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-124

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	OVERBURDEN	15									
	18.5 1151.0										
CT LS LS LS	**LIMESTONE++** stratified, scattered chert seams and inclusions, light gray and white, medium bedded, very fine grained, fresh, hard, solid REED SPRINGS FORMATION **Continued Next Page**	20		RUN 1	DB	99%	RQD 88%				

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	10-24-02		
BORING COMPLETED	10-24-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-124

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
LS, LS, CT, LS, LS, LS, CT, LS, CT, CT, CT, LS, LS, LS, LS	**LIMESTONE++** stratified, scattered chert seams and inclusions, light gray and white, medium bedded, very fine grained, fresh, hard, solid	25								
LS, CT, CT, CT, LS, CT, CT, LS	**LIMESTONE++** stratified, scattered chert seams and inclusions, light gray and white, medium bedded, very fine grained, fresh, hard, solid	30		RUN 2	DB	98%	RQD 71%			

28.2 — 1141.3

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	10-24-02		
BORING COMPLETED	10-24-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-124

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
LS, LS, CT, LS, LS, LS, LS, CT, LS, LS, CT	**LIMESTONE++** stratified, scattered chert seams and inclusions, light gray and white, medium bedded, very fine grained, fresh, hard, solid	35								
38.2	1131.3									
LS, CT, CT+LS, CT, LS	**LIMESTONE++** stratified, scattered chert seams and inclusions, light gray and white, medium bedded, very fine grained, fresh, hard, solid	40		RUN 3	DB	100%	RQD 80%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-24-02		
BORING COMPLETED	10-24-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-124

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	LS 40.5 1129.0									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

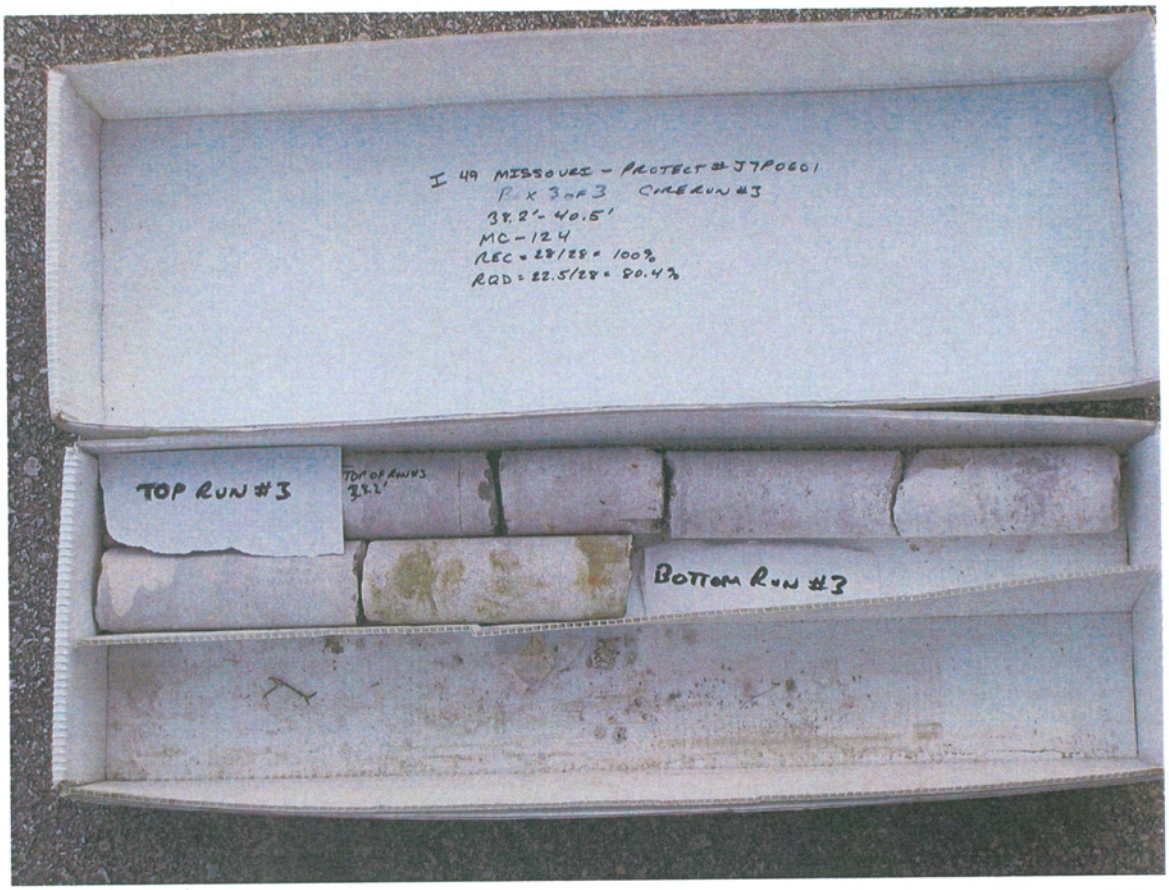
WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	10-24-02		
BORING COMPLETED	10-24-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

I 49 Missouri
Missouri J7P0601
Boring MC-124
Run No. 1
18.5 Feet to 28.2 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-124
Run No. 2
28.2 Feet to 38.2 Feet



I 49 Missouri
Missouri J7P0601
Boring No. MC 124
Run No. 3
38.2 Feet to 40.5 Feet

LOG OF BORING NO. MC-179

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 905+67, 114 Feet right of centerline

Approx. Surface Elev.: 1163.7 ft

DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
1 **CLAYEY GRAVEL** light brown, dry — 1162.7		GC	1	AS					
SANDY FAT CLAY, scattered gravel light brown to light reddish brown, dry		CH	2	AS					
9.5 — 1154.2	5								
SANDY FAT CLAY, with chert seams light brown to light reddish brown, moist	10	CH	3	AS					
	15								
	20								
23.5 — 1140.2									
CHERT++ stratified, abundant limestone seams, light gray and gray, thin bedded, very fine grained, fresh, hard, solid	25		RUN 1	DB	90%	RQD 37%			
	30		RUN 2	DB	100%	RQD 45%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	12-20-02		
BORING COMPLETED	12-20-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

210

LOG OF BORING NO. MC-179

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin bedded, very fine grained, fresh, hard, solid	35								
	40.2 1123.5	40								
	BOTTOM OF BORING AT 40.2 FEET BACKFILLED WITH CUTTINGS 12/20/02									

++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	12-20-02		
BORING COMPLETED	12-20-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

LOG OF BORING NO. MC-179

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
	OVERBURDEN										
	24.5 1139.2										
CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin bedded, very fine grained, fresh, hard, solid	25		RUN 1	DB	90%	RQD 37%				
	REED SPRINGS FORMATION										
LS											
CT+LS - Interbedded											
LS											
CT											
LS											
CT											
LS		30									

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	12-20-02		
BORING COMPLETED	12-20-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601

212

LOG OF BORING NO. MC-179

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

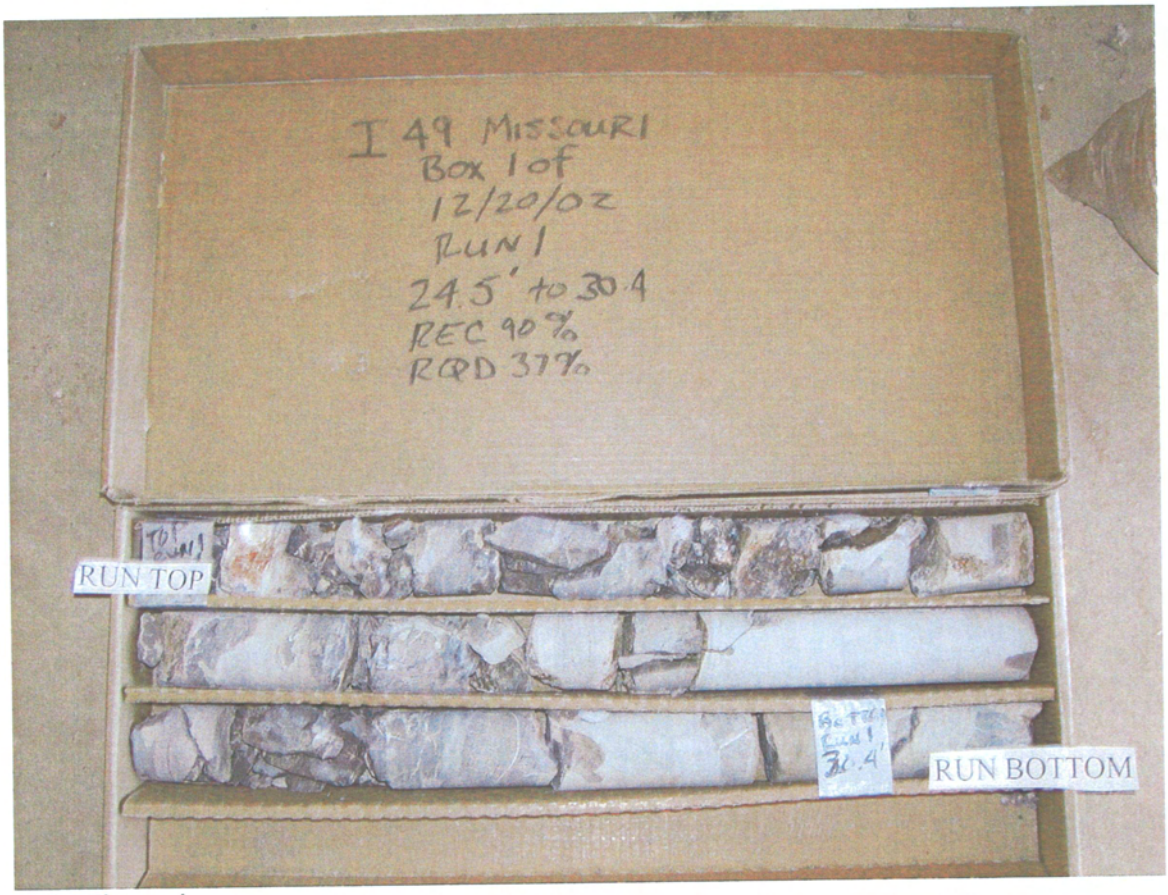
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
	LS 30.4 — 1133.3									
CT	**CHERT++** LS stratified, abundant limestone seams, light gray and gray, thin bedded, very fine grained, fresh, hard, solid			RUN 2	DB	100%	RQD 45%			
	LS									
	CT									
	LS									
	CT									
	LS									
	CT									
	LS,	35								
	LS w/ CT Inclusions									
	LS - healed vertical joint									
	CT									
	LS									
	CLAY SEAM / JOINT									
	LS									
	CT									
	LS w/ CT INCLUSIONS									
	40.2 — 1123.5	40								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	12-20-02		
BORING COMPLETED	12-20-02		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	BKM	JOB #	J7P0601



I 49 Missouri
Missouri J7P0601
Boring MC-179
Run No. 1
24.5 Feet to 30.4 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-179
Run No. 2
30.4 Feet to 40.2 Feet

LOG OF BORING NO. MC-191

CLIENT: HNTB

Automatic Hammer Efficiency = 80.7%

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

Boring Location: 917+30, 94 Feet right of centerline

Approx. Surface Elev.: 1168.7 ft

DESCRIPTION	Elev.	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CHERT GRAVEL AND COBBLES light brown and white, dry - trace clay below 3 feet	5 / 1163.7		GP	1	AS					
CHERT GRAVEL, with clay and chert seams reddish brown and white, dense, dry to moist	10 / 1158.7	5	GP GC	2	AS					
CLAYEY CHERT GRAVEL, abundant chert seams reddish brown and white, dense, moist	15 / 1153.7	10	GC	3	AS					
CLAYEY CHERT GRAVEL, with chert seams reddish brown, white and gray, dense, moist - very soft clay seam at about 19 feet	22.8 / 1145.9	15	GC	4	AS					
		20	GC	5	AS					
CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid		25		RUN 1	DB	100%	RQD 56%			
				RUN 2	DB	97%	RQD 53%			
				RUN 3	DB	100%	RQD 75%			
		30		RUN 4	DB	100%	RQD 76%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft				
WL	▽ DRY	WD	▼ DRY	AB
WL	▼ DRY	24 hr	▼	
WL				

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-191

CLIENT: HNTB

Automatic Hammer Efficiency = 80.7%

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid									
		35		RUN 5	DB	94%	RQD 59%			
				RUN 6	DB	100%	RQD 53%			
		40		RUN 7	DB	100%	RQD 75%			
				RUN 8	DB	98%	RQD 81%			
		45		RUN 9	DB	100%	RQD 65%			
	- trace shale seams below 49.5 feet	50		RUN 10	DB	100%	RQD 29%			
		55		RUN 11	DB	100%	RQD 98%			
		60		RUN 12	DB	100%	RQD 84%			
		65								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft				
WL	▽ DRY	WD	▼ DRY	AB
WL	▽ DRY	24 hr	▼	
WL				

Terracon

BORING STARTED			1-31-03
BORING COMPLETED			2-8-03
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-191

CLIENT: HNTB

Automatic Hammer Efficiency = 80.7%

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid			RUN 13	DB	100%	RQD 90%			
		70		RUN 14	DB	100%	RQD 74%			
73	1095.7									
	LIMESTONE++ stratified, trace shale seams, light gray, medium bedded, fine grained, fresh, hard, solid	75		RUN 15	DB	100%	RQD 100%			
	BOTTOM OF BORING AT 84.5 FEET BACKFILLED WITH CUTTINGS 02/08/03	80		RUN 16	DB	100%	RQD 96%			
	++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.									
84.5	1084.2									

NOTE:
Information from two borings was combined to produce this log.
Boring MC-191 was drilled to 21.9 feet and cored to 37.1 feet, where the boring caved in and was abandoned.

Boring MC-191A was moved 2 feet east of MC-191 and drilled to a depth of 22.8 feet and cored to 84.5 feet.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft				
WL	▽ DRY	WD	▼ DRY	AB
WL	▽ DRY	24 hr	▼	
WL				

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-191

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	OVERBURDEN 22.8 1145.9									
	CT LS CT LS CT CT CT LS LS **CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid REED SPRINGS FORMATION 25.3 1143.4	25		RUN 1	DB	100%	RQD 56%			
	CT LS CT LS CT LS CT LS 26.5 CT **CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid 1142.2			RUN 2	DB	97%	RQD 53%			
	CT CT **CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid LS W/ CT SEAMS CT LS CT 29.5 LS 1139.2			RUN 3	DB	100%	RQD 75%			
	CT CT **Continued Next Page**	30		RUN 4	DB	100%	RQD 76%			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽ DRY	24 hr	▽
WL			

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

219

LOG OF BORING NO. MC-191

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CT, CT, CT, LS, LS, CT, CT, LS, CT, CT, LS, CT, LS, CT, LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid; Quartz filled vug; open fracture									
34.5 / 1134.2										
CT, CT, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid	35		RUN 5	DB	94%	RQD 59%			
36.2 / 1132.5										
CT, CT, LS, CT, CT, CT, CT, CT, CT, CT, CT, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid			RUN 6	DB	100%	RQD 53%			
39.5 / 1129.2										
CT, CT, LS, CT		40		RUN 7	DB	100%	RQD 75%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft				
WL	▽ DRY	WD	▼ DRY	AB
WL	▽ DRY	24 hr	▼	
WL				

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-191

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
CT, LS, LS, 41	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid — 1127.7									
LS, CT, CT, CT, LS, CT, LS, CT, 44.5 LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid — 1124.2			RUN 8	DB	98%	RQD 81%			
LS, LS, CT, CT, CT, LS, CT, LS, CT, LS, CT, LS, 49.5	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid — 1119.2	45		RUN 9	DB	100%	RQD 65%			
CT, LS, CT	**Continued Next Page**	50		RUN 10	DB	100%	RQD 29%			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽ DRY	24 hr	▽
WL			

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-191

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CT, CT, CT, LS, CT, LS, CT, LS, CT, CT, CT, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid									
54.5	1114.2									
LS, CT, CT, CT, SH, CT, SH, LS, CT, SH, LS, CT, SH, LS, CT, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid	55		RUN 11	DB	100%	RQD 98%			
59.5	1109.2									
CT, LS	**Continued Next Page**	60		RUN 12	DB	100%	RQD 84%			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft				
WL	▽ DRY	WD	▽ DRY	AB
WL	▽ DRY	24 hr	▽	
WL				

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-191

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid									
	64.5 1104.2									
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid	65		RUN 13	DB	100%	RQD 90%			
	69.5 1099.2									
		70		RUN 14	DB	100%	RQD 74%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL	DRY	24 hr	
WL			

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

223

LOG OF BORING NO. MC-191

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
CT, CT, LS, CT, LS, LS, CT, CT, LS Inclusion, LS, CT, LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard to very hard, solid — REED SPRINGS FORMATION									
73	1095.7									
SH, LS, SH	**LIMESTONE++** stratified, trace shale seams, light gray, medium bedded, fine grained, fresh, hard, solid — ST. JOE LIMESTONE MEMBER									
74.5	1094.2									
LS, SH, SH, SH, SH, SH, SH, SH, SH, SH, SH, SH, SH, SH, SH, LS	**LIMESTONE++** stratified, trace shale seams, light gray, medium bedded, fine grained, fresh, hard, solid	75		RUN 15	DB	100%	RQD 100%			
79.5	1089.2									
SH, SH, LS		80		RUN 16	DB	100%	RQD 96%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽ DRY	24 hr	▼
WL			

Terracon

BORING STARTED	1-31-03		
BORING COMPLETED	2-8-03		
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-191

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf	
LS, SH, SH, SH, SH, SH, LS, SH, SH	**LIMESTONE++** stratified, trace shale seams, light gray, medium bedded, fine grained, fresh, hard, solid										
	84.5 1084.2										

NOTE:
Information from two borings was combined to produce this log.
Boring MC-191 was drilled to 21.9 feet and cored to 37.1 feet, where the boring caved in and was abandoned.

Boring MC-191A was moved 2 feet east of MC-191 and drilled to a depth of 22.8 feet and cored to 84.5 feet.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft				
WL	▽ DRY	WD	▼ DRY	AB
WL	▽ DRY	24 hr	▼	
WL				

Terracon

BORING STARTED			1-31-03
BORING COMPLETED			2-8-03
RIG	ATV, #103E	FOREMAN	JW
APPROVED	SPB	JOB #	J7P0601

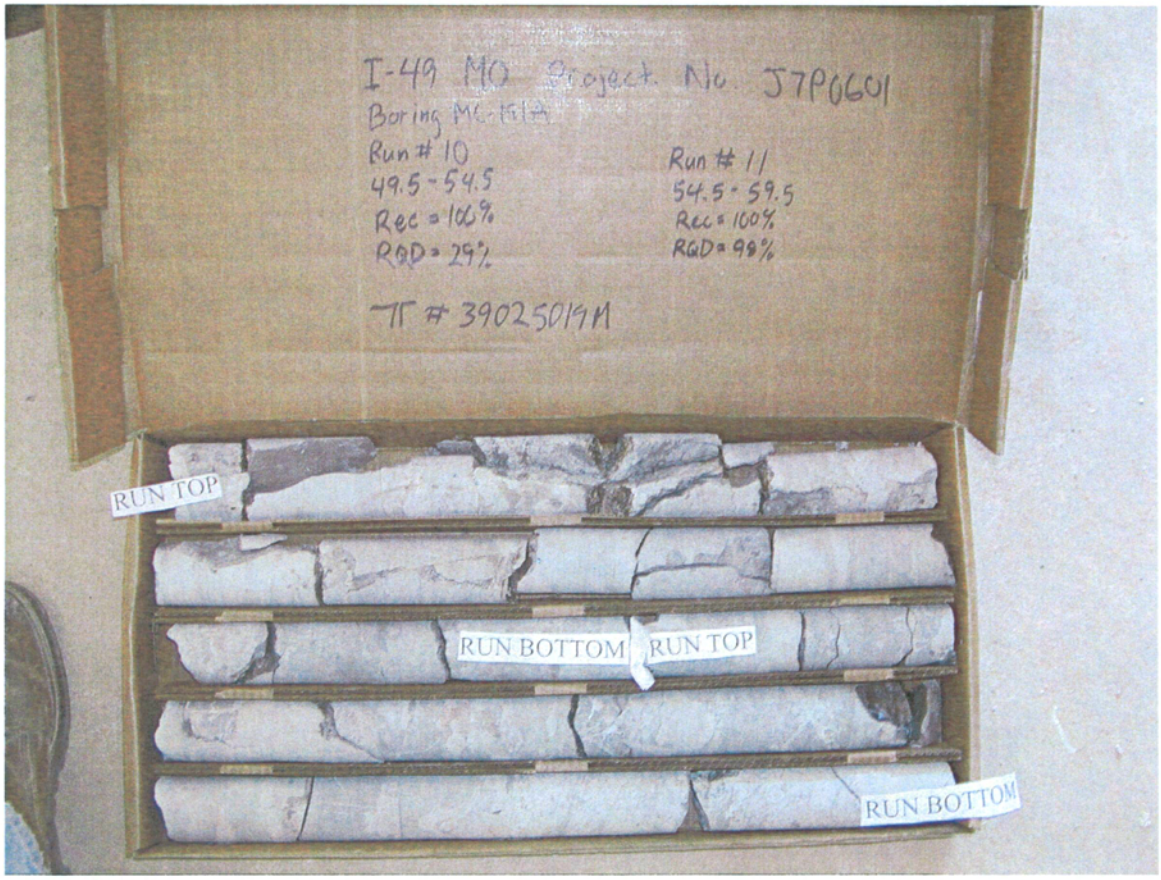
I 49 Missouri
Missouri J7P0601
Boring MC-191
Run No. 1
21.9 Feet to 25.2 Feet
Run No. 2
25.2 Feet to 30.2 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-191
Run No. 3
30.2 Feet to 35.2 Feet
Run No. 4
35.2 Feet to 37.1 Feet

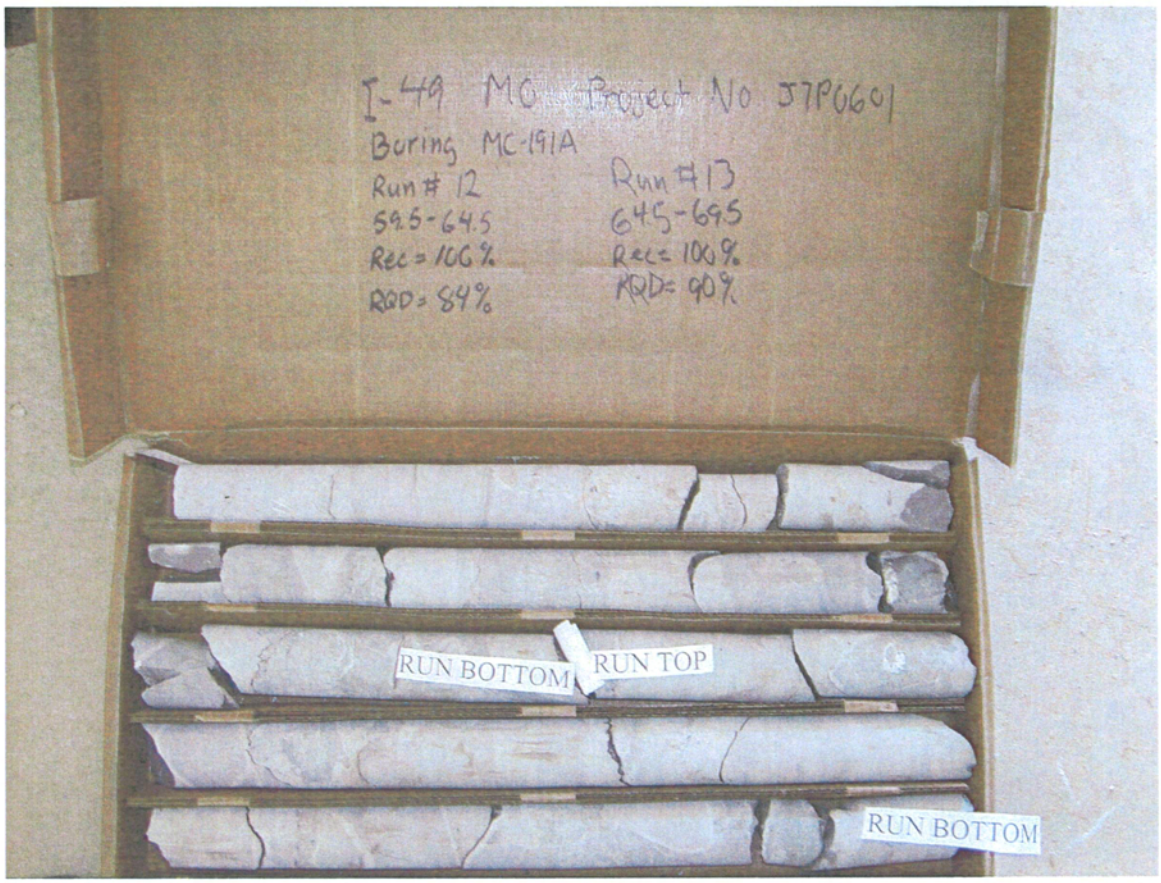
I 49 Missouri
Missouri J7P0601
Boring MC-191A
Run No. 1
22.8 Feet to 25.3 Feet
Run No. 2
25.3 Feet to 26.5 Feet
Run No. 3
26.5 Feet to 29.5 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-191A
Run No. 4
29.5 Feet to 34.5 Feet
Run No. 5
34.5 Feet to 36.2 Feet
Run No. 6
36.2 Feet to 39.5 Feet

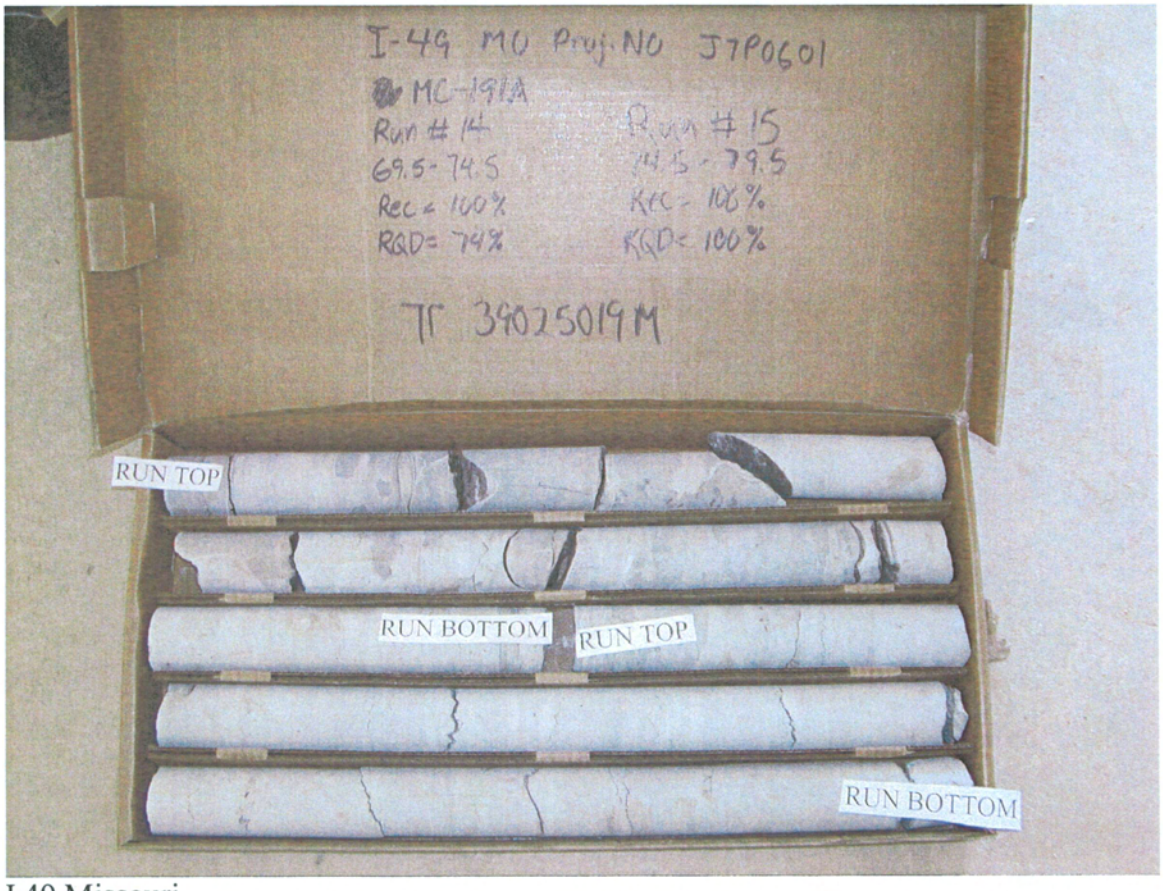
I 49 Missouri
Missouri J7P0601
Boring MC-191A
Run No. 7
39.5 Feet to 41.0 Feet
Run No. 8
41.0 Feet to 44.5 Feet
Run No. 9
44.5 Feet to 49.5 Feet



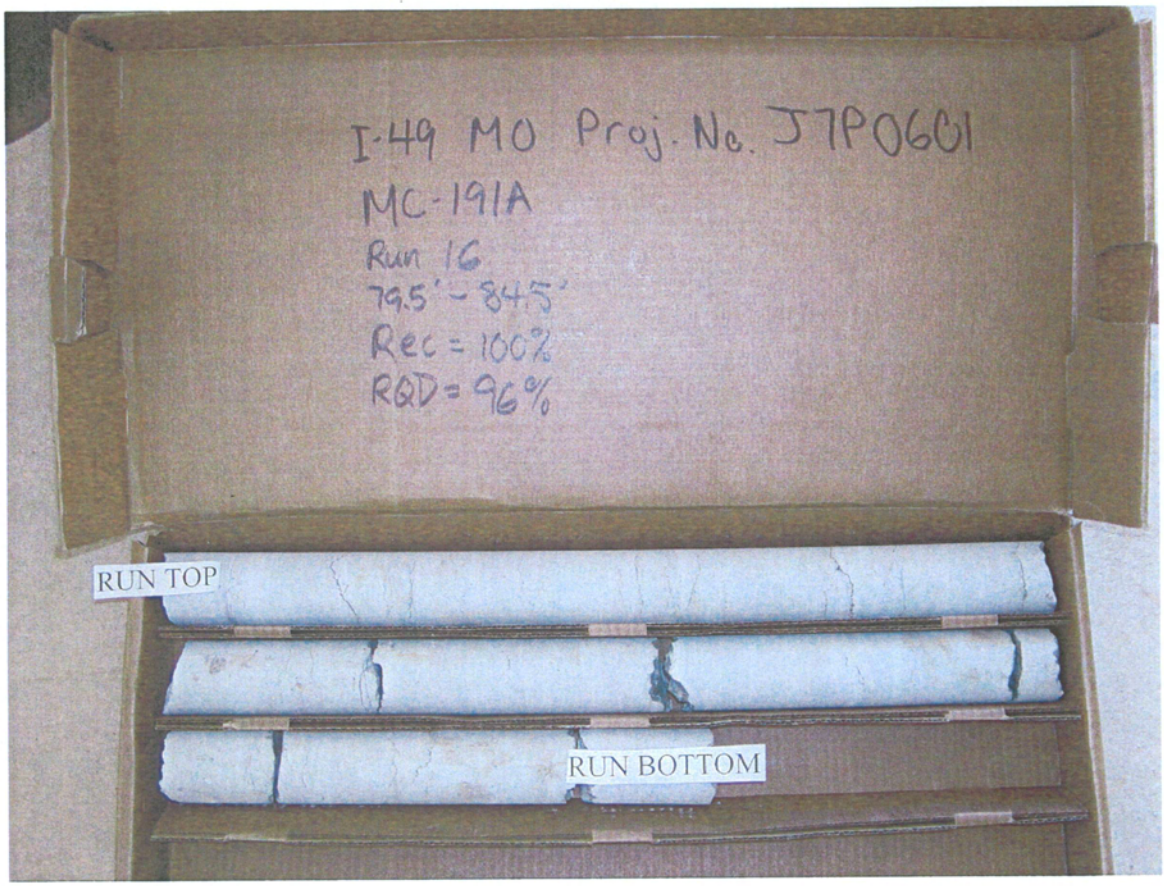
I 49 Missouri
Missouri J7P0601
Boring MC-191A
Run No. 10
49.5 Feet to 54.5 Feet
Run No. 11
54.5 Feet to 59.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-191A
Run No. 12
59.5 Feet to 64.5 Feet
Run No. 13
64.5 Feet to 69.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-191A
Run No. 14
69.5 Feet to 74.5 Feet
Run No. 15
74.5 Feet to 79.5 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-191A
Run No. 16
79.5 Feet to 84.5 Feet

LOG OF BORING NO. MC-212

CLIENT
HNTB

SITE
McDONALD COUNTY, MISSOURI

PROJECT
I-49, MISSOURI

Boring Location: 931+00, 65 Feet left of centerline

Approx. Surface Elev.: 1151.7 ft

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	LEAN CLAY, with gravel brown, stiff to very stiff, moist 5 1146.7		CL	1	AS					
	SANDY LEAN CLAY, with gravel, scattered chert seams brown to light reddish brown, very stiff, moist 10 1141.7	5	CL	2	AS					
	SANDY LEAN CLAY, with gravel, with chert seams light brown to brown, very stiff, moist 17 - soft clay layer from 16 to 17 feet 1134.7	10	CL	3	AS					
	LIMESTONE++ stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid	15	CL	4	AS					
				RUN 1	DB	100%	RQD 93%			
		20		RUN 2	DB	100%	RQD 93%			
		25		RUN 3	DB	100%	RQD 98%			
		30		RUN 4	DB	100%	RQD 79%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	LIMESTONE++ stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid									
		35		RUN 5	DB	100%	RQD 83%			
		40		RUN 6	DB	100%	RQD 63%			
		45		RUN 7	DB	100%	RQD 72%			
		50		RUN 8	DB	100%	RQD 61%			
		55		RUN 9	DB	100%	RQD 84%			
		60		RUN 10	DB	100%	RQD 94%			
		65		RUN	DB	100%	RQD			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	LIMESTONE++ stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			11			88%			
		70		RUN 12	DB	100%	RQD 95%			
		75		RUN 13	DB	100%	RQD 98%			
		80		RUN 14	DB	100%	RQD 100%			
	81 / 1070.7									
	LIMESTONE++ stratified, trace shale laminations, gray, medium to thick bedded, medium to coarse grained, fresh, hard, solid	85		RUN 15	DB	100%	RQD 93%			
		90		RUN 16	DB	100%	RQD 100%			
	91 / 1060.7									
	BOTTOM OF BORING AT 91 FEET BACKFILLED WITH CUTTINGS 02/20/03									
	++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	OVERBURDEN	15									
	18 1133.7										
	CT **LIMESTONE++** stratified, abundant chert seams and CT inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, CT very fine to fine grained, fresh, hard, solid			RUN 1	DB	100%	RQD 93%				
	LS REED SPRINGS FORMATION										
	20 LS 1131.7	20									
	LS **Continued Next Page**										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	LIMESTONE++ stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 2	DB	100%	RQD 93%			
	25	1126.7								
	LIMESTONE++ stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid	25		RUN 3	DB	100%	RQD 98%			
	30	1121.7								
	Continued Next Page	30								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	LS CT CT+LS **LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid; CT LS CT+LS SH CT LS CT LS CT CT CT LS CT			RUN 4	DB	100%	RQD 79%			
	34 CT 1117.7									
	LS LS CT CT+LS **LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid; CT LS CT+LS CT CT SH CT SH LS CT LS, CT Inclusion; LS + CT w/ SH Laminations	35		RUN 5	DB	100%	RQD 83%			
	39 1112.7									
	LS	40		RUN 6	DB	100%	RQD 63%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CT CT CT LS CT CT CT LS	**LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid									
44	1107.7									
CT LS CT CT CT LS CT CT LS LS CT LS SH LS + CT CT LS LS 49 SH	**LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid	45		RUN 7	DB	100%	RQD 72%			
	1102.7									
CT LS + CT LS - healed joint CT		50		RUN 8	DB	100%	RQD 61%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CT, LS, CT, LS, CT, LS, CT, CT+LS, LS, CT, LS, CT	**LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid									
54	1097.7									
LS, CT, LS, SH, CT, LS, CT, CT+LS, SH, LS, LS+CT, LS, SH, LS, SH, LS	**LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid	55		RUN 9	DB	100%	RQD 84%			
59	1092.7									
LS, CT, CT, LS	healed vertical joint	60		RUN 10	DB	100%	RQD 94%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽		▽
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

292

LOG OF BORING NO. MC-212

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
LS+ CT SH LS+ CT SH LS LS+CT LS+CT	**LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid									
64	1087.7									
CT+ LS LS LS LS LS LS+CT SH CT+LS LS LS LS LS+CT	**LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid healed joints	65		RUN 11	DB	100%	RQD 88%			
69	1082.7									
CT LS CT LS		70		RUN 12	DB	100%	RQD 95%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	CT, LS, CT, CT, CT, LS, LS+CT, SH, CT, SH, LS, LS, CT **LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid 74 1077.7									
	CT+LS, SH, CT, CT, LS, CT, CT, CT, SH, LS+CT, LS, LS **LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid healed vertical joint healed vertical joint healed vertical joint 79 1072.7	75		RUN 13	DB	100%	RQD 98%			
	LS **Continued Next Page**	80		RUN 14	DB	100%	RQD 100%			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽		▽
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

2 99

LOG OF BORING NO. MC-212

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	REED SPRINGS FORMATION									
LS	**LIMESTONE++** stratified, abundant chert seams and inclusions, trace shale laminations, white, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid									
81 LS	1070.7									
	LIMESTONE++ stratified, trace shale laminations, gray, medium to thick bedded, medium to coarse grained, fresh, hard, solid									
LS	ST. JOE LIMESTONE MEMBER									
LS										
84	1067.7									
	LIMESTONE++ stratified, trace shale laminations, gray, medium to thick bedded, medium to coarse grained, fresh, hard, solid			RUN 15	DB	100%	RQD 93%			
		85								
LS										
SH										
SH										
SH										
89	1062.7									
	LIMESTONE++ stratified, trace shale laminations, gray, medium to thick bedded, medium to coarse grained, fresh, hard, solid			RUN 16	DB	100%	RQD 100%			
LS		90								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601

LOG OF BORING NO. MC-212

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

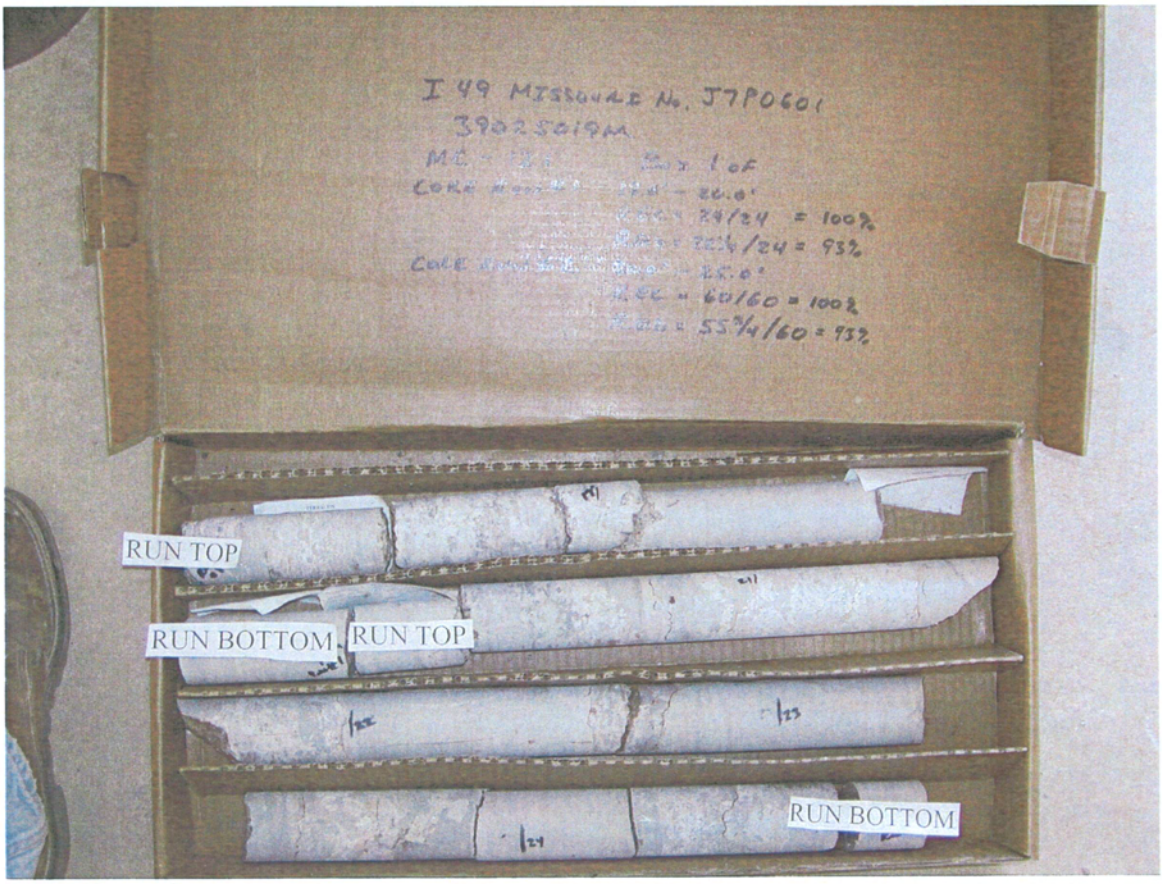
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf	
LS SH 91 LS	**LIMESTONE++** stratified, trace shale laminations, gray, medium to thick bedded, medium to coarse grained, fresh, hard, solid 1060.7										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

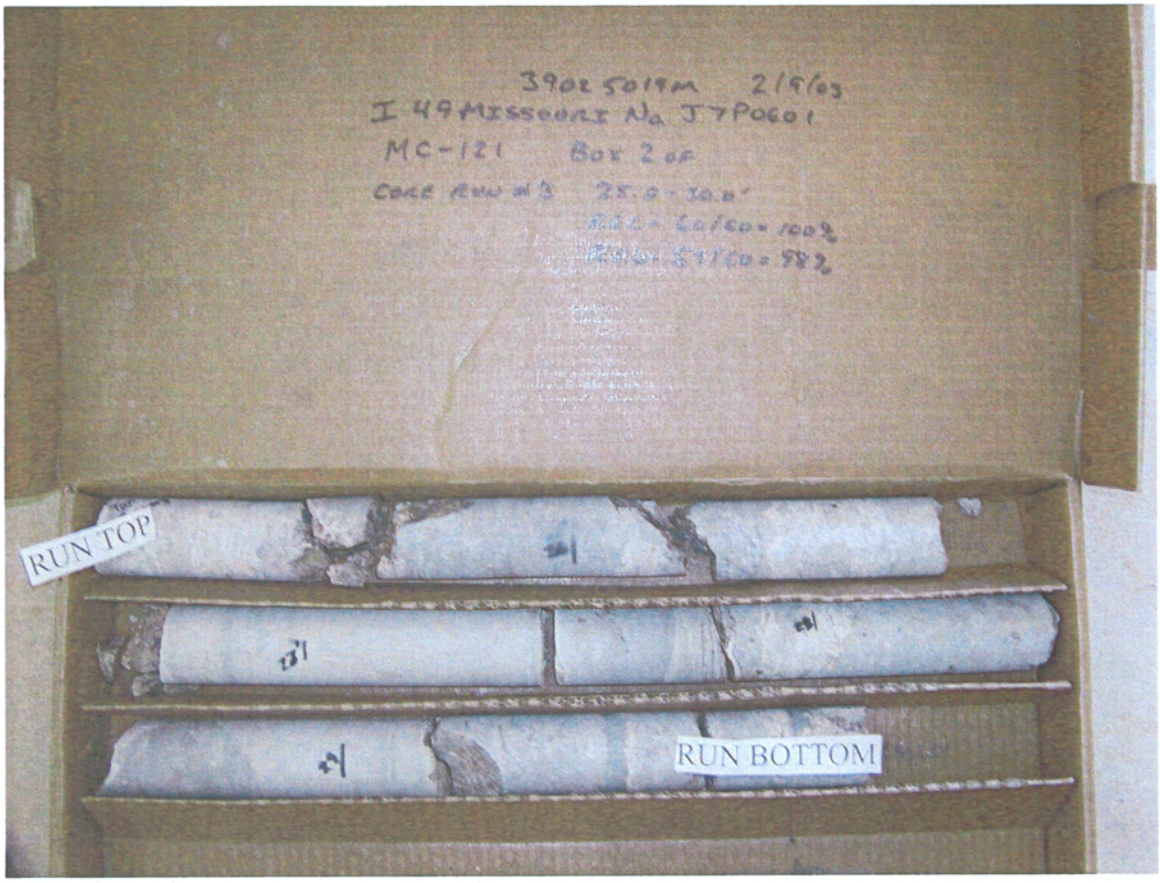
WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-9-03		
BORING COMPLETED	2-20-03		
RIG	ATV, #103E	FOREMAN	KS
APPROVED	SPB	JOB #	J7P0601



I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 1
18.0 Feet to 20.0 Feet
Run No. 2
20.0 Feet to 25.0 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 3
25.0 Feet to 30.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 4
30.0 Feet to 34.0 Feet
Run No. 5
34.0 Feet to 39.0 Feet

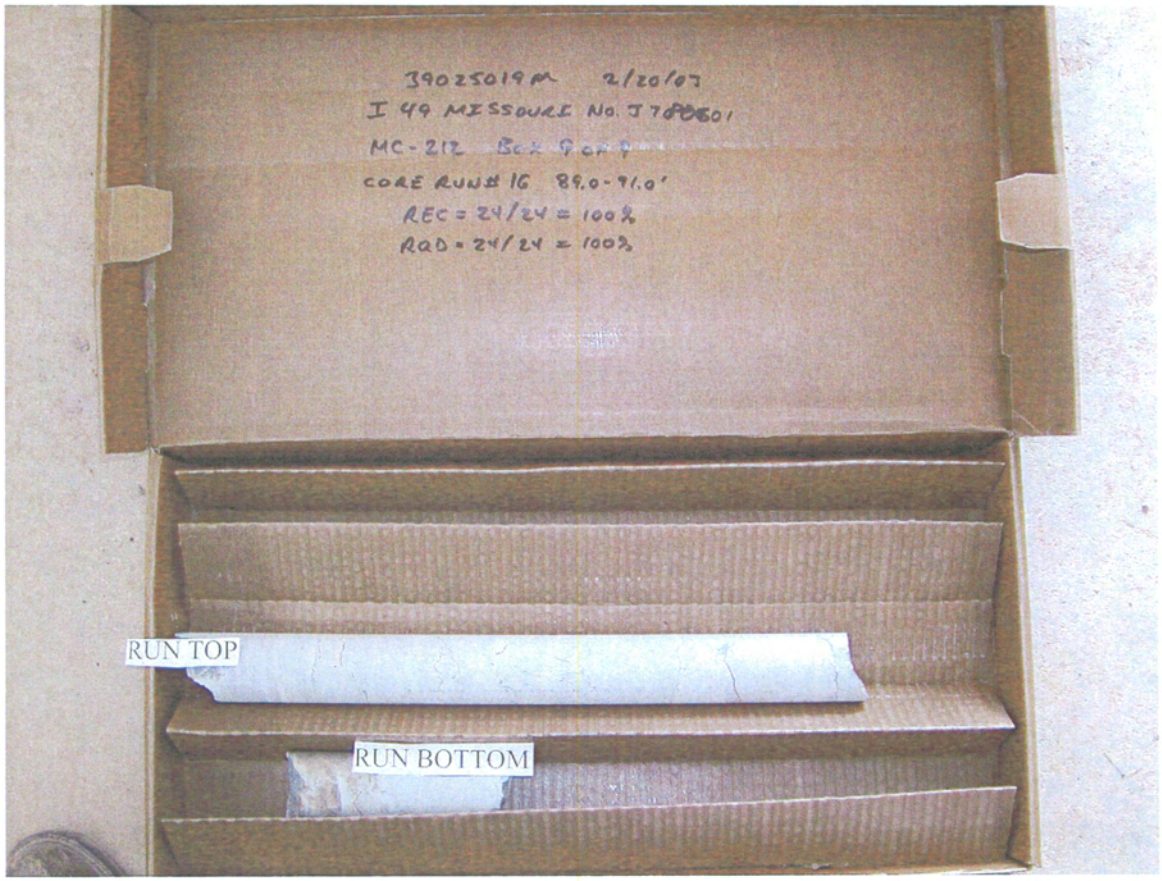
I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 6
39.0 Feet to 44.0 Feet
Run No. 7
44.0 Feet to 49.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 8
49.0 Feet to 54.0 Feet
Run No. 9
54.0 Feet to 59.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 10
59.0 Feet to 64.0 Feet
Run No. 11
64.0 Feet to 69.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 12
69.0 Feet to 74.0 Feet
Run No. 13
74.0 Feet to 79.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 14
79.0 Feet to 84.0 Feet
Run No. 15
84.0 Feet to 89.0 Feet



I 49 Missouri
Missouri J7P0601
Boring MC-212
Run No. 16
89.0 Feet to 91.0 Feet

LOG OF BORING NO. MC-229

CLIENT
HNTB

SITE
McDONALD COUNTY, MISSOUR

PROJECT
I-49, MISSOURI

Boring Location: 945+08, 120 feet left of centerline

Approx. Surface Elev.: 1169.5 ft

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	LEAN CLAY, with gravel brown, stiff, moist		CL	1	AS					
	5 — 1164.5	5								
	LEAN CLAY, scattered gravel reddish brown, stiff to very stiff, moist		CL	2	AS					
		10								
		15								
	20 — 1149.5	20								
	LEAN CLAY, with gravel brown, stiff, moist		CL	3	AS					
		25								
		30								
	- abundant chert seams below 31 feet									

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

2 56

LOG OF BORING NO. MC-229

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	LEAN CLAY, with gravel brown, stiff, moist									
	36 — 1133.5	35								
	LIMESTONE++ stratified, abundant chert seams and inclusions, with clay seams, light gray and gray, thin bedded, fine grained, weathered, hard, possible cavities			RUN 1	DB	73%	RQD 59%			
	39.5 — 1130.0									
	CHERT++ stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace vugs	40		RUN 2	DB	100%	RQD 95%			
		45		RUN 3	DB	100%	RQD 81%			
	49 — 1120.5			RUN 4	DB	100%	RQD 100%			
	CHERT++ stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs	50		RUN 5	DB	98%	RQD 88%			
		55		RUN 6	DB	97%	RQD 79%			
					RB					
				RUN 7	DB	98%	RQD 83%			
		60		RUN 8	DB	100%	RQD 55%			
		65		RUN	DB	100%	RQD			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

LOG OF BORING NO. MC-229

CLIENT
HNTB

SITE
McDONALD COUNTY, MISSOURI

PROJECT
I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs			9			60%			
		70		RUN 10	DB	95%	RQD 75%			
		75		RUN 11	DB	95%	RQD 94%			
		80		RUN 12	DB	97%	RQD 97%			
				RUN 13	DB	100%	RQD 98%			
	BOTTOM OF BORING AT 88.5 FEET BACKFILLED WITH CUTTINGS ON 05/20/03	85		RUN 14	DB	100%	RQD 80%			
	++ Classification estimated from core samples. Petrographic analysis may reveal other rock types. 88.5 1081.0									

NOTE:
Boring MC-229 was drilled to 36 feet and cored to 49 feet. At this depth, the core bit would not cut the chert. The boring was abandoned until a different bit could be used.

Boring MC-229B was cored in the same boring as MC-229. The hole was cased to 42 feet and cored to 88.5 feet.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

LOG OF BORING NO. MC-229

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	36 — 1133.5	35								
CT, CLAY, LS, CT, LS, CT	**LIMESTONE++** stratified, abundant chert seams and inclusions, with clay seams, light gray and gray, thin bedded, fine grained, weathered, hard, possible cavities REED SPRINGS FORMATION 39.5 — 1130.0			RUN 1	DB	73%	RQD 59%			
LS, CT	**Continued Next Page**	40		RUN 2	DB	100%	RQD 95%			

The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

LOG OF BORING NO. MC-229

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
CT, fractures, CT, LS, CT, CT, LS, CT, LS, CT, LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace vugs									
44.5	1125.0									
LS, CT, CT, LS, CT, LS, CT, 47.5 LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace vugs	45		RUN 3	DB	100%	RQD 81%			
49	1122.0									
CT, LS, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, thin to medium bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace vugs			RUN 4	DB	100%	RQD 100%			
	1120.5									
LS, CT, CT		50		RUN 5	DB	98%	RQD 88%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

LOG OF BORING NO. MC-229

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
CT LS CT LS CT LS CT LS 54 CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs 1115.5										
LS CT 56 LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs 1113.5	55		RUN 6	DB	97%	RQD 79%				
NO CORE 57	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs 1112.5				RB						
LS CT CT 59	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs 1110.5			RUN 7	DB	98%	RQD 83%				
LS CT CT	**Continued Next Page**	60		RUN 8	DB	100%	RQD 55%				

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽		▽
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

261

LOG OF BORING NO. MC-229

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
CT, LS, LS, CT, LS, CT, LS, CT, LS, CT, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs									
	64 — 1105.5									
CT, LS, CT, LS, CT, LS, CT, LS, CT, LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs	65		RUN 9	DB	100%	RQD 60%			
	69 — 1100.5									
LS, CT, LS, LS		70		RUN 10	DB	95%	RQD 75%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

LOG OF BORING NO. MC-229

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs									
	74 1095.5									
	CHERT++ stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs	75		RUN 11	DB	95%	RQD 94%			
	79 1090.5									
		80		RUN 12	DB	97%	RQD 97%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽		▽
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

263

LOG OF BORING NO. MC-229

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CT, LS, CT, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs									
81.5	1088.0									
CT, CT, LS, CT, CT, LS, CT	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs			RUN 13	DB	100%	RQD 98%			
84	1085.5									
LS, CT, LS, LS, LS, CT, LS, LS	**CHERT++** stratified, abundant limestone seams, light gray and gray, medium to thick bedded, very fine to fine grained, slightly weathered to fresh, hard, solid, trace pits and vugs	85		RUN 14	DB	100%	RQD 80%			
88.5	1081.0									

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

LOG OF BORING NO. MC-229

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf	
	NOTE: Boring MC-229 was drilled to 36 feet and cored to 49 feet. At this depth, the core bit would not cut the chert. The boring was abandoned until a different bit could be used. Boring MC-229B was cored in the same boring as MC-229. The hole was cased to 42 feet and cored to 88.5 feet.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▼		▼
WL			

Terracon

BORING STARTED	5-8-03		
BORING COMPLETED	5-20-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7PO601

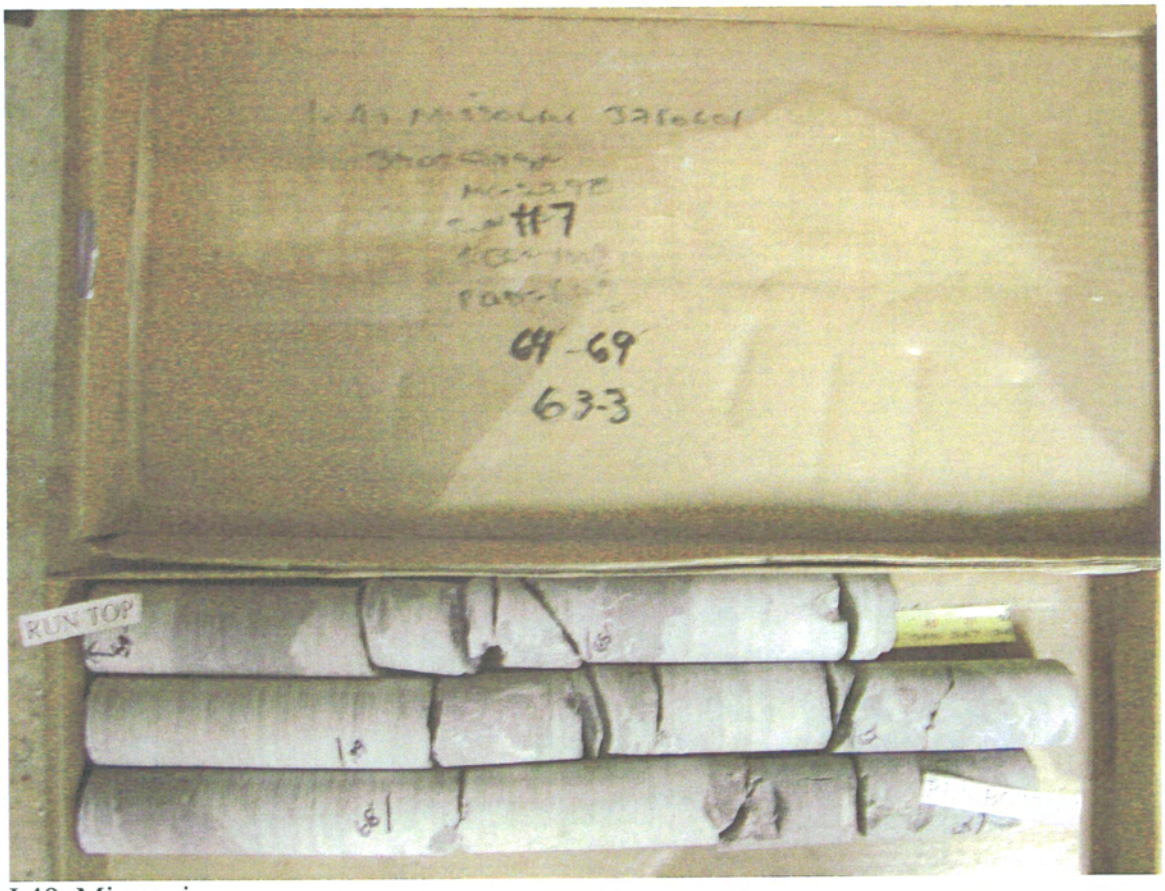
I 49 Missouri
Missouri J7P0601
Boring MC-229
Run No. 1
36.0 Feet to 39.5 Feet
Run No. 2
39.5 Feet to 44.5 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-229
Run No. 3
44.5 Feet to 49.0 Feet
Run No. 4
49.0 Feet to 51.5 Feet

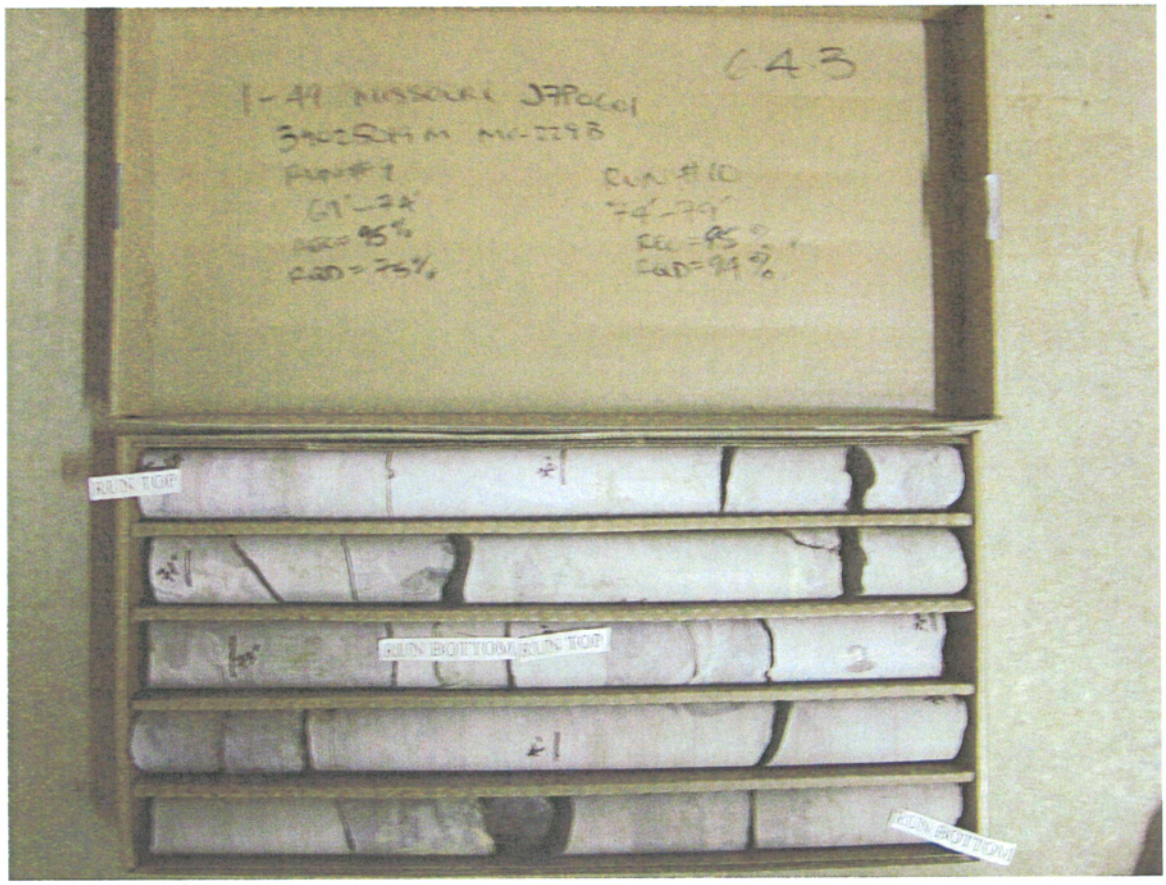
I 49 Missouri
Missouri J7P0601
Boring No. MC 229B
Run No. 1
42.0 Feet to 44.0 Feet
Run No. 2
44.0 Feet to 47.5 Feet

I 49 Missouri
Missouri J7P0601
Boring No. MC 229B
Run No. 3
47.5 Feet to 49.0 Feet
Run No. 4
49.0 Feet to 54.0 Feet
Run No. 5
54.0 Feet to 56.0 Feet

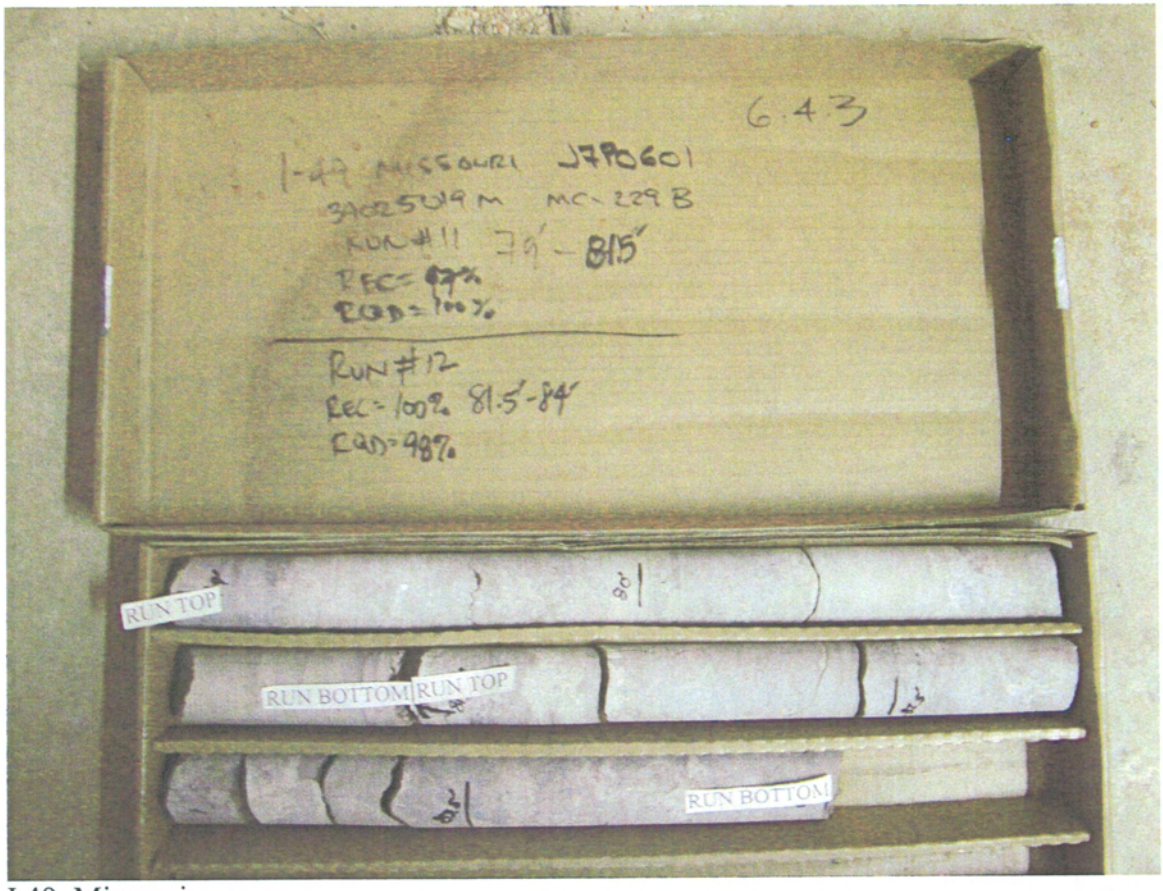
I 49 Missouri
Missouri J7P0601
Boring No. MC 229B
Run No. 6
57.0 Feet to 59.0 Feet
Run No. 7
59.0 Feet to 64.0 Feet



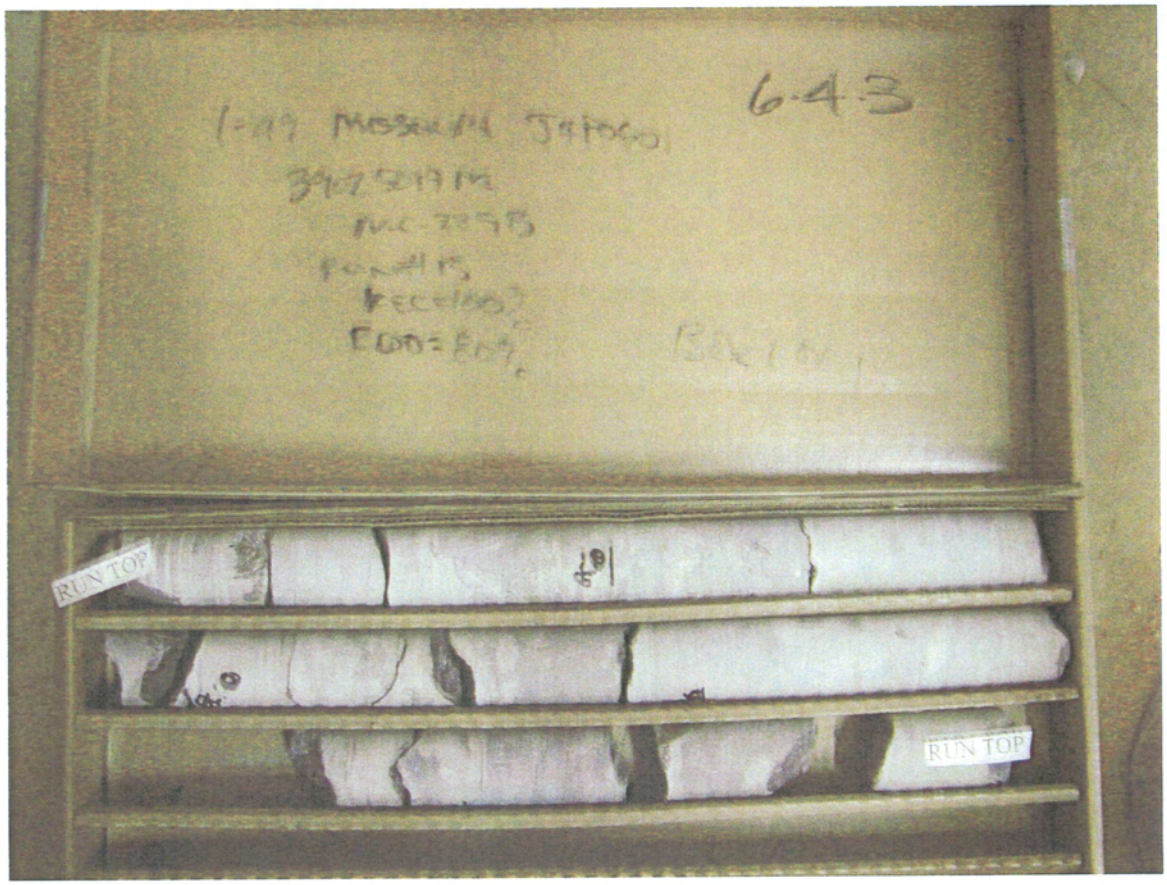
I 49 Missouri
Missouri J7P0601
Boring No. MC 229B
Run No. 8
64.0 Feet to 69.0 Feet



I 49 Missouri
Missouri J7P0601
Boring No. MC 229B
Run No. 9
69.0 Feet to 74.0 Feet
Run No. 10
74.0 Feet to 79.0 Feet



I 49 Missouri
Missouri J7P0601
Boring No. MC 229B
Run No. 11
79.0 Feet to 81.5 Feet
Run No. 12
81.5 Feet to 84.0 Feet



I 49 Missouri
Missouri J7P0601
Boring No. MC 229B
Run No. 13
84.0 Feet to 88.5 Feet

LOG OF BORING NO. MC-253

CLIENT
HNTB

SITE
McDONALD COUNTY, MISSOURI

PROJECT
I-49, MISSOURI

Boring Location: 961+08, 120 feet left of centerline

Approx. Surface Elev.: 1183.4 ft

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	CLAYEY GRAVEL, with chert seams light brown and brown, dense, moist		GC		HS					
	17 — 1166.4	5, 10, 15								
	CLAYEY GRAVEL / HIGHLY WEATHERED CHERT, abundant chert seams light brown, very dense, moist		GC		RB					
	30 — 1153.4	20, 25, 30								
				RUN 1	DB	100%	RQD 32%			

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

275

LOG OF BORING NO. MC-253

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams and beds, light gray and gray, thin bedded, very fine grained, weathered, hard, abundant fractures, with vugs									
		35		RUN 2	DB	100%	RQD 42%			
		40		RUN 3	DB	100%	RQD 57%			
		45		RUN 4	DB	100%	RQD 82%			
				RUN 5	DB	100%	RQD 46%			
	50 1133.4	50		RUN 6	DB	100%	RQD 85%			
	CHERT++ stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			~~RUN 7~~	~~DB~~	~~100%~~	~~RQD~~			
				RUN 7	DB	100%	100% RQD			
		55		RUN 8	DB	100%	85% RQD			
				RUN 9			60%			
		60		RUN 10	DB	100%	RQD 75%			
		65								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

LOG OF BORING NO. MC-253

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	CHERT++ stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 11	DB	100%	RQD 74%			
		70		RUN 12	DB	100%	RQD 74%			
	BOTTOM OF BORING AT 80 FEET BACKFILLED WITH CUTTINGS 05/31/03	75		RUN 13	DB	100%	RQD 78%			
	++ Classification estimated from core samples. Petrographic analysis may reveal other rock types.									
	80 1103.4	80								

NOTE:
Information from three borings was combined to produce this log.
Boring MC-253 was drilled to 7 feet and cored to 45 feet. At this depth, the boring caved in and was abandoned.

Boring MC-253A was moved 9 feet northwest of boring MC-253. MC-253A was drilled to 28 feet and cored to 49.5 feet, where the core barrel became stuck in the rock. The boring was abandoned.

Boring MC-253B was moved 9 feet northeast of boring MC-253. MC-253B was drilled to 30 feet and cored to 80 feet.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

277

LOG OF BORING NO. MC-253

CLIENT: HNTB

GEOLOGIC LOG

SITE: McDONALD COUNTY, MISSOURI

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
LS CT LS CT LS CT LS CT CT CT LS CT	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin bedded, very fine grained, weathered, hard, abundant fractures, with vugs REED SPRINGS FORMATION			RUN 1	DB	100%	RQD 32%			
35	1148.4	35								
LS CT LS CT LS LS CT CT LS LS CT	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin bedded, very fine grained, weathered, hard, abundant fractures, with vugs			RUN 2	DB	100%	RQD 42%			
40	1143.4	40								
LS	**Continued Next Page**									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▼ DRY AB
WL	▽		▼
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

BORE MC-253.GPJ TERRACON.GDT 12/5/03

278

LOG OF BORING NO. MC-253

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
LS, CT, CT, LS, CT, CT, LS, CT, LS, CT	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin bedded, very fine grained, weathered, hard, abundant fractures, with vugs			RUN 3	DB	100%	RQD 57%			
45	1138.4	45								
CT, CT, LS	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin bedded, very fine grained, weathered, hard, abundant fractures, with vugs			RUN 4	DB	100%	RQD 82%			
47.3	1136.1									
CT, LS, CT, LS	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin bedded, very fine grained, weathered, hard, abundant fractures, with vugs			RUN 5	DB	100%	RQD 46%			
50	1133.4	50								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

LOG OF BORING NO. MC-253

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
LS, CT, LS, CT	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 6	DB	100%	RQD 85%			
53	1130.4			RUN 7	DB	100%	RQD 100%			
CT, LS, CT	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 8	DB	100%	RQD 85%			
55	1128.4	55								
LS, CT, CT, CT, CT, LS, LS, CT, CT, LS, LS	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 9	DB	100%	RQD 60%			
60	1123.4	60								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	2-20-03
BORING COMPLETED	5-31-03
RIG ATV, #98	FOREMAN SS
APPROVED BRO	JOB # J7P0601

BOREHOLE 39 MC-253.GPJ TERRACON.GDT 12/5/03

280

LOG OF BORING NO. MC-253

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
CT, LS, LS, CT, LS, CT, LS, CT, LS, CT, LS, CT, LS, CT, LS, CT, LS, LS, LS, LS, LS, 65 LS	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 10	DB	100%	RQD 75%			
	1118.4	65								
LS, CT, CT, LS, CT, LS, LS, CT, CT, LS, 70 LS	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 11	DB	100%	RQD 74%			
	1113.4	70								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY	WD	▽ DRY AB
WL	▽		▽
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

28/5

LOG OF BORING NO. MC-253

CLIENT: HNTB

SITE: McDONALD COUNTY, MISSOURI

GEOLOGIC LOG

PROJECT: I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf
LS, CT, CT, LS, CT, CT, CT, LS, LS, CT Inclusions, CT, LS, LS	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 12	DB	100%	RQD 74%			
75	1108.4	75								
LS, CT, CT, LS, LS, CT	**CHERT++** stratified, abundant limestone seams and beds, light gray and gray, thin to medium bedded, very fine to fine grained, fresh, hard, solid			RUN 13	DB	100%	RQD 78%			
80	1103.4	80								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	DRY	WD	DRY AB
WL			
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

282

LOG OF BORING NO. MC-253

CLIENT	GEOLOGIC LOG
HNTB	
SITE	PROJECT
McDONALD COUNTY, MISSOURI	I-49, MISSOURI

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, in.	SAMPLES: SPT - N BLOWS / ft.	TESTS: WATER CONTENT, %	TESTS: DRY UNIT WT pcf	TESTS: UNCONFINED STRENGTH, psf	
	NOTE: Information from three borings was combined to produce this log. Boring MC-253 was drilled to 7 feet and cored to 45 feet. At this depth, the boring caved in and was abandoned. Boring MC-253A was moved 9 feet northwest of boring MC-253. MC-253A was drilled to 28 feet and cored to 49.5 feet, where the core barrel became stuck in the rock. The boring was abandoned. Boring MC-253B was moved 9 feet northeast of boring MC-253. MC-253B was drilled to 30 feet and cored to 80 feet.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

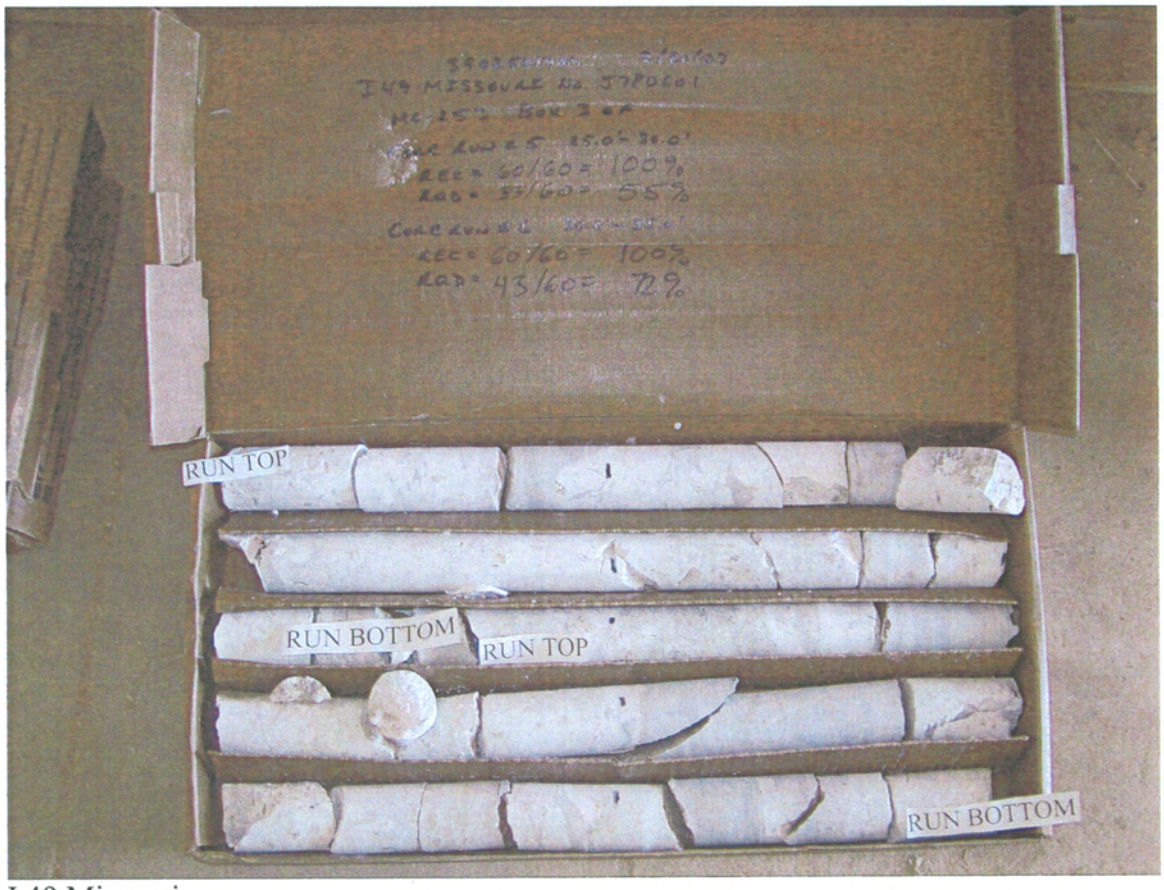
WATER LEVEL OBSERVATIONS, ft			
WL	▽ DRY WD	▼ DRY AB	
WL	▽	▼	
WL			

Terracon

BORING STARTED	2-20-03		
BORING COMPLETED	5-31-03		
RIG	ATV, #98	FOREMAN	SS
APPROVED	BRO	JOB #	J7P0601

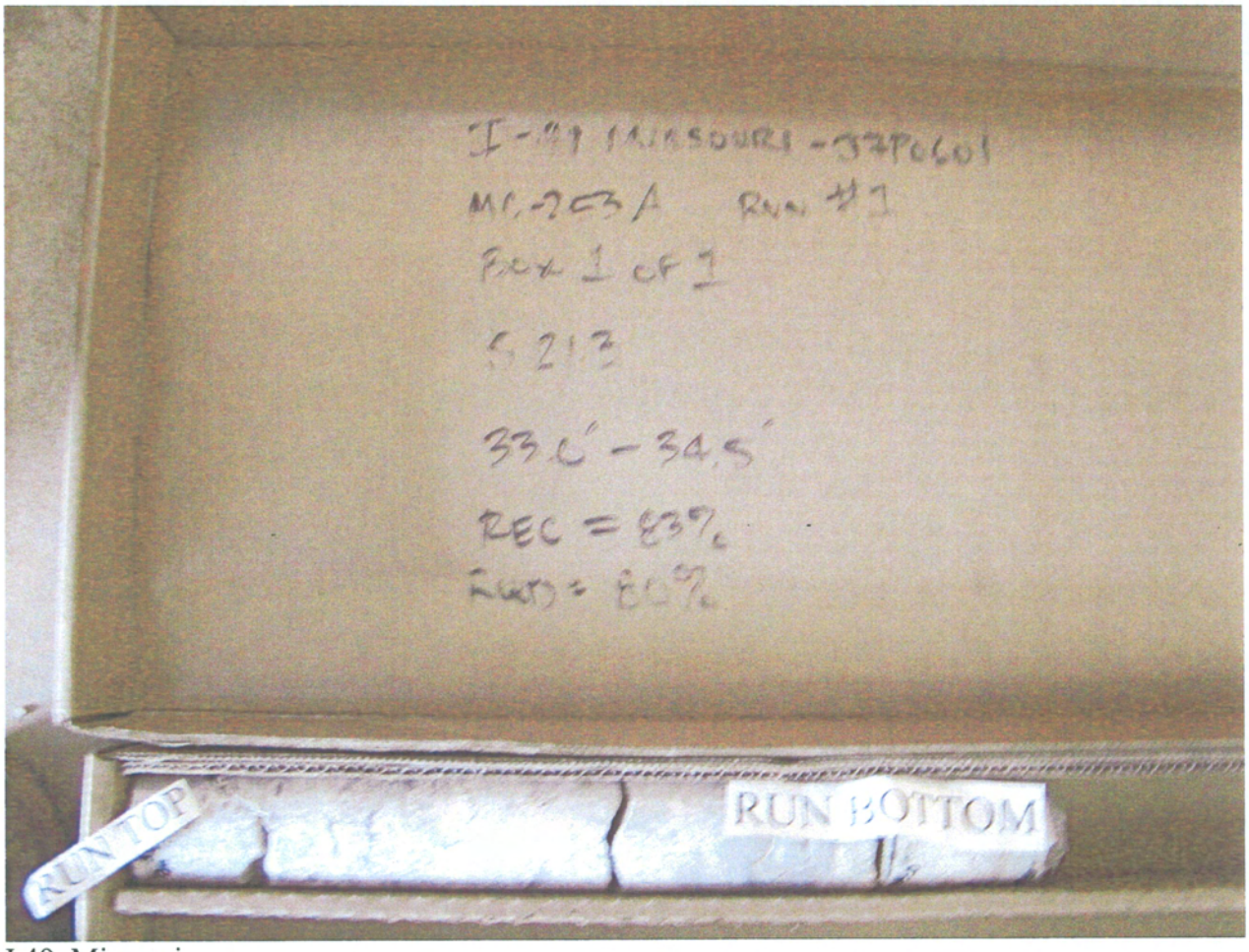
I 49 Missouri
Missouri J7P0601
Boring MC-253
Run No. 1
7.0 Feet to 10.0 Feet
Run No. 2
10.0 Feet to 15.0 Feet

I 49 Missouri
Missouri J7P0601
Boring MC-253
Run No. 3
15.0 Feet to 20.0 Feet (no recovery)
Run No. 4
20.0 Feet to 25.0 Feet

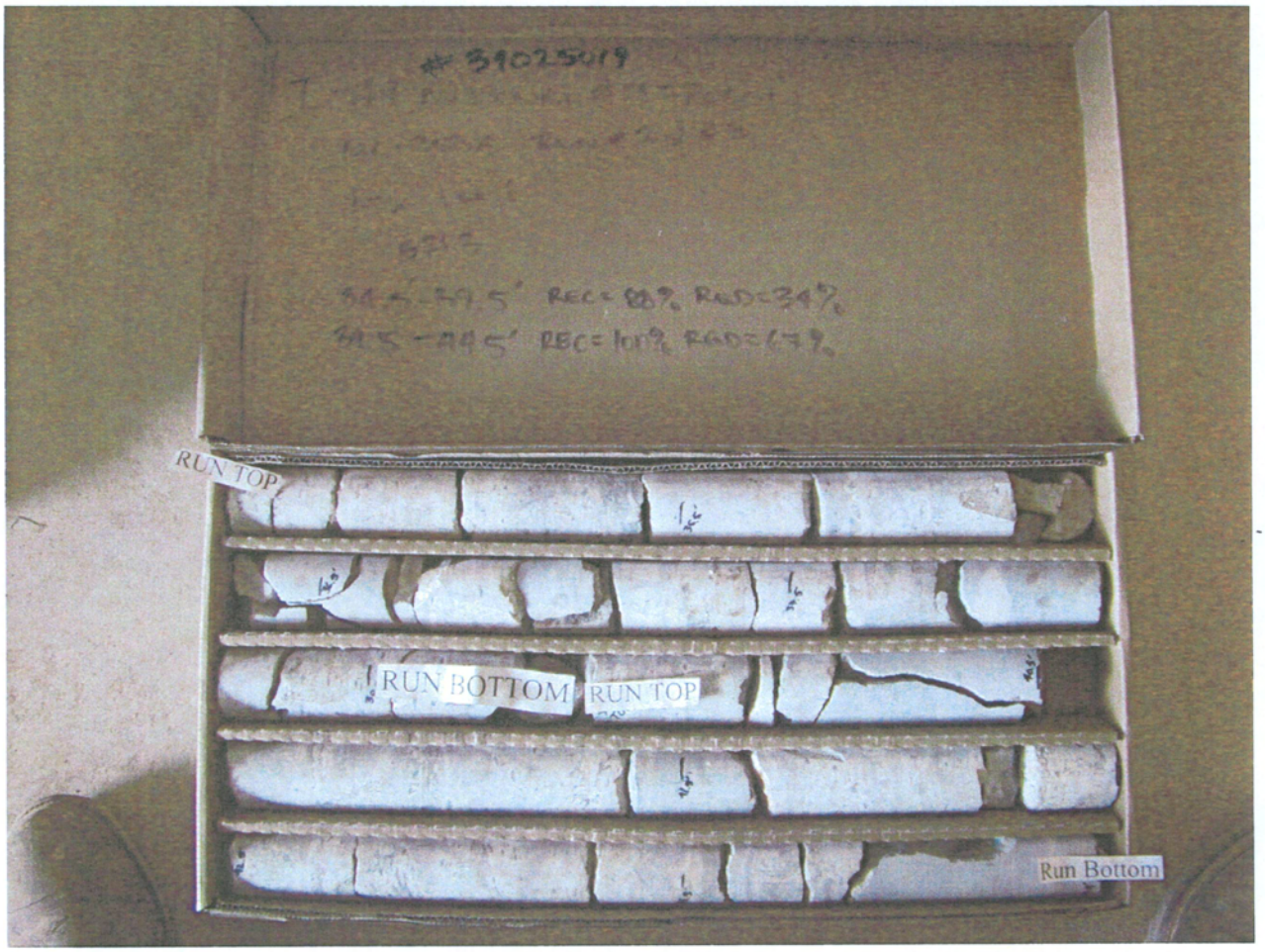


I 49 Missouri
Missouri J7P0601
Boring MC-253
Run No. 5
25.0 Feet to 30.0 Feet
Run No. 6
30.0 Feet to 35.0 Feet

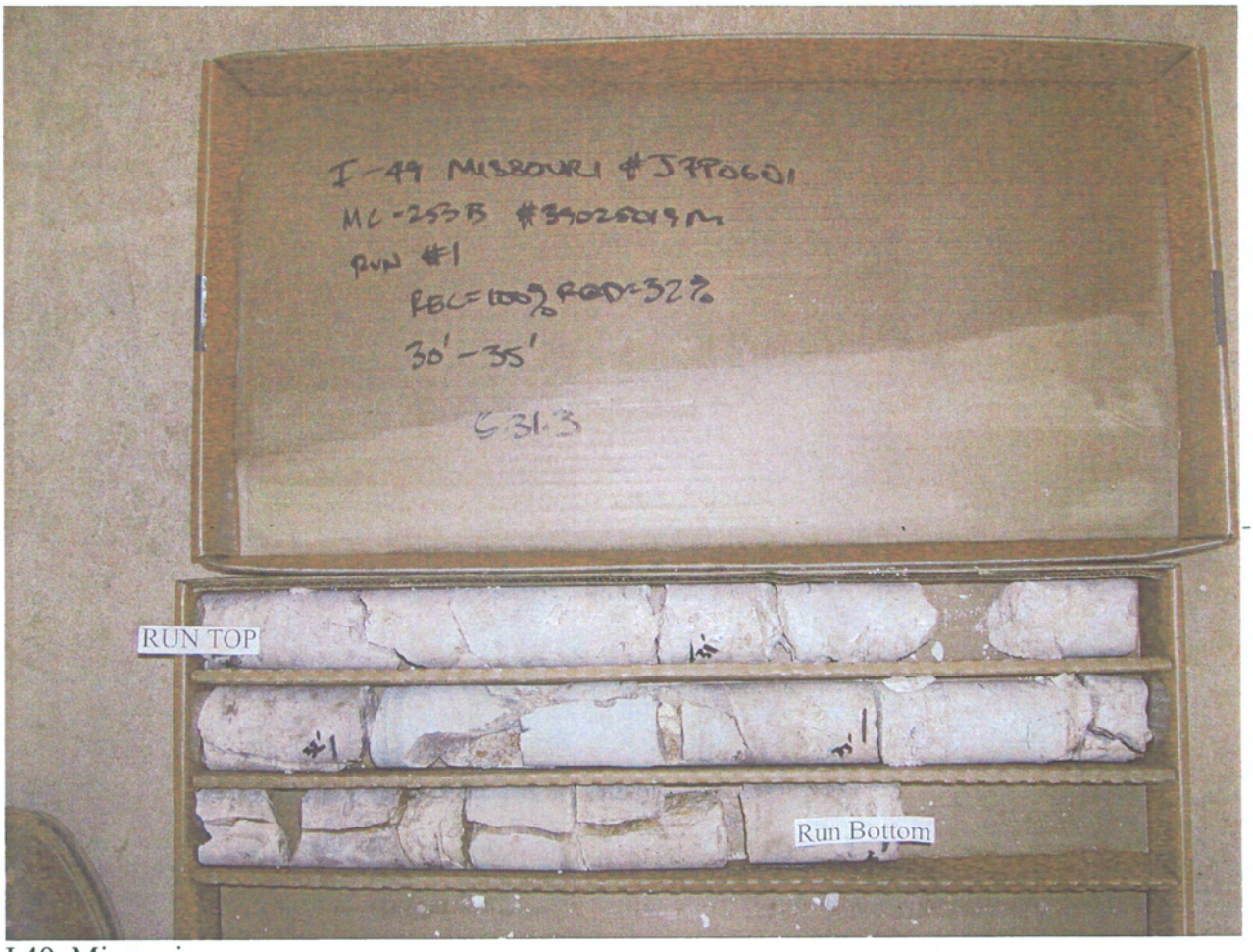
I 49 Missouri
Missouri J7P0601
Boring MC-253
Run No. 7
35.0 Feet to 40.0 Feet
Run No. 8
40.0 Feet to 45.0 Feet



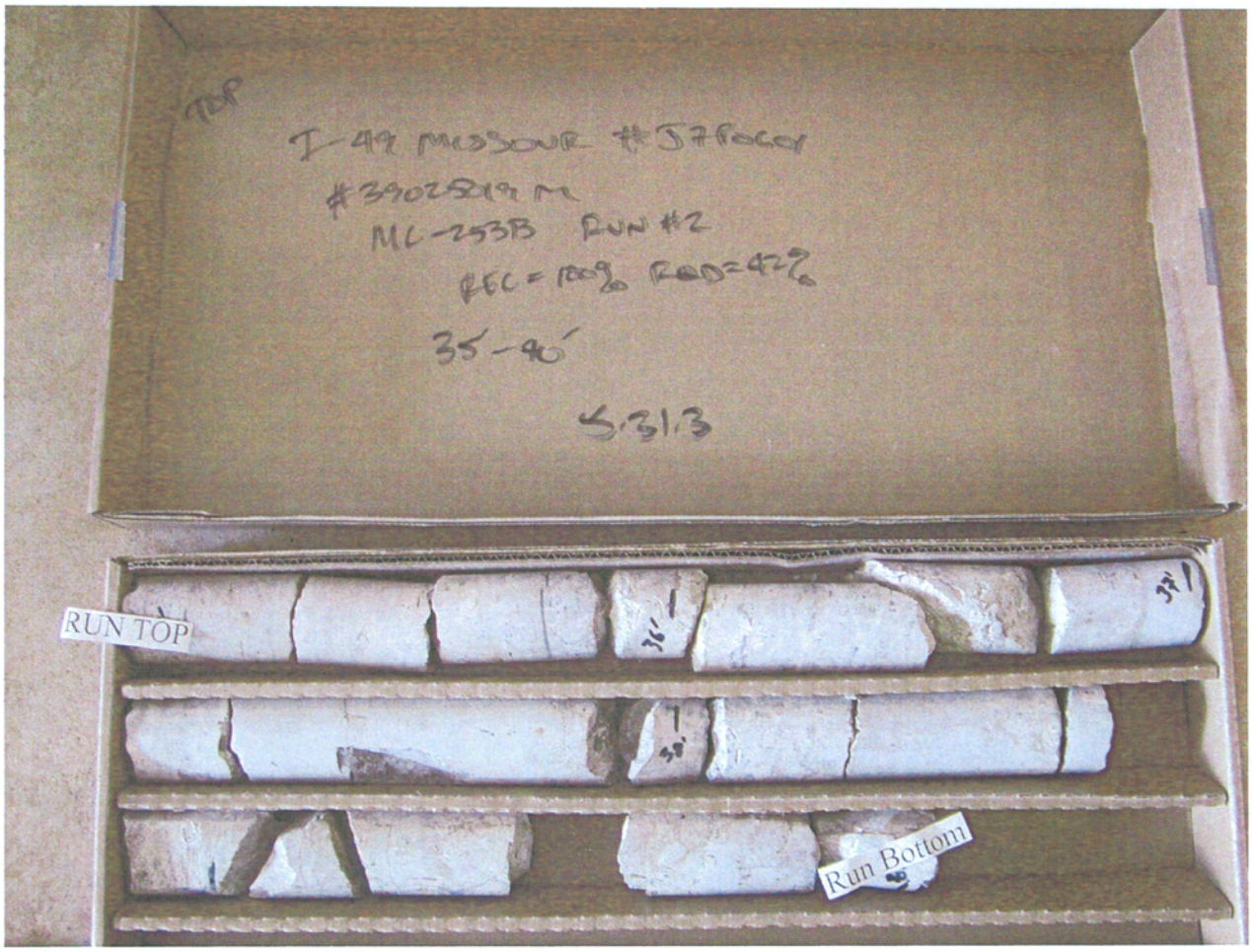
I 49 Missouri
Missouri J7P0601
Boring No. MC 253A
Run No. 1
33.0 Feet to 34.5 Feet



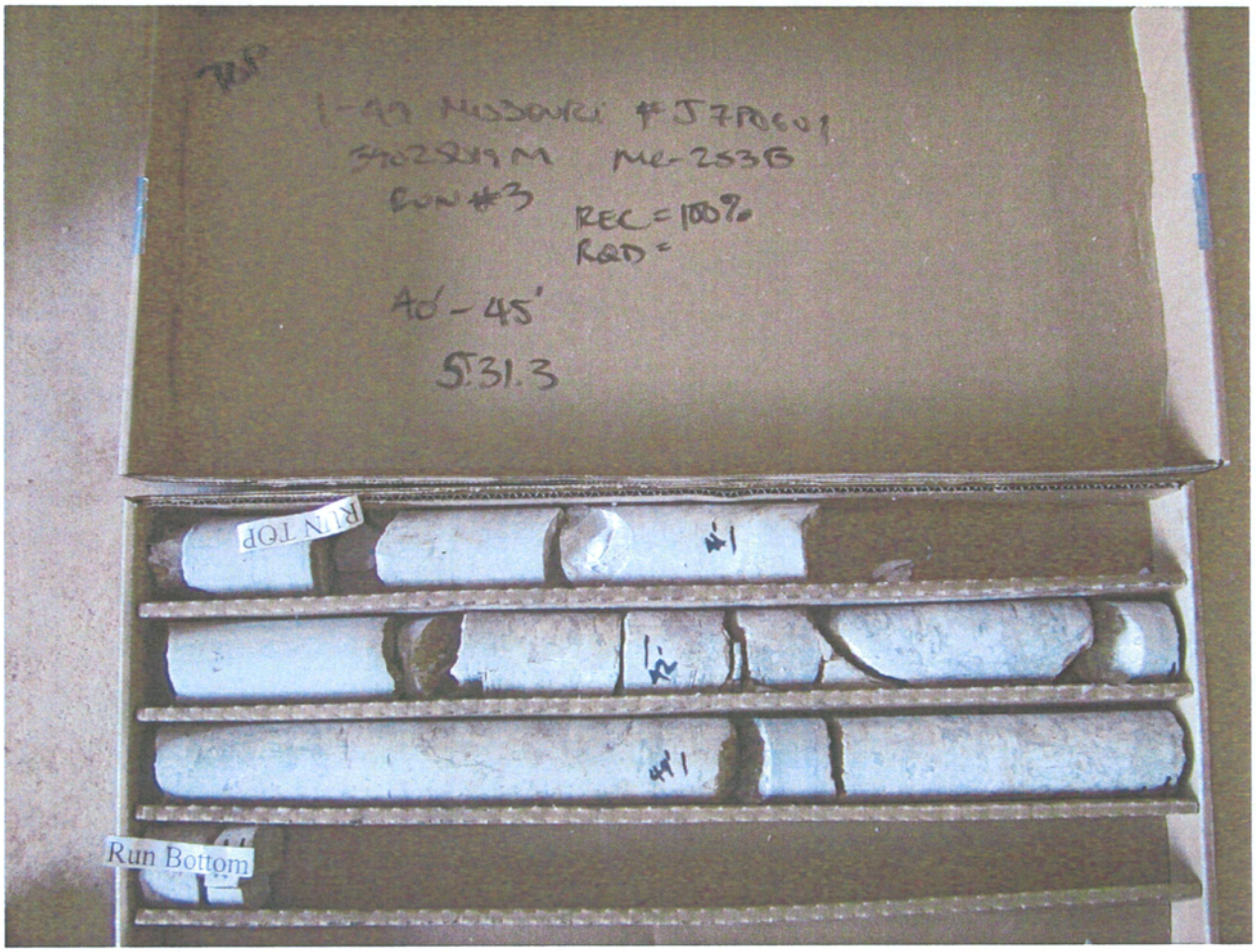
I 49 Missouri
Missouri J7P0601
Boring No. MC 253A
Run No. 2
34.5 Feet to 39.5 Feet
Run No. 3
39.5 Feet to 44.5 Feet



I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 1
30.0 Feet to 35.0 Feet

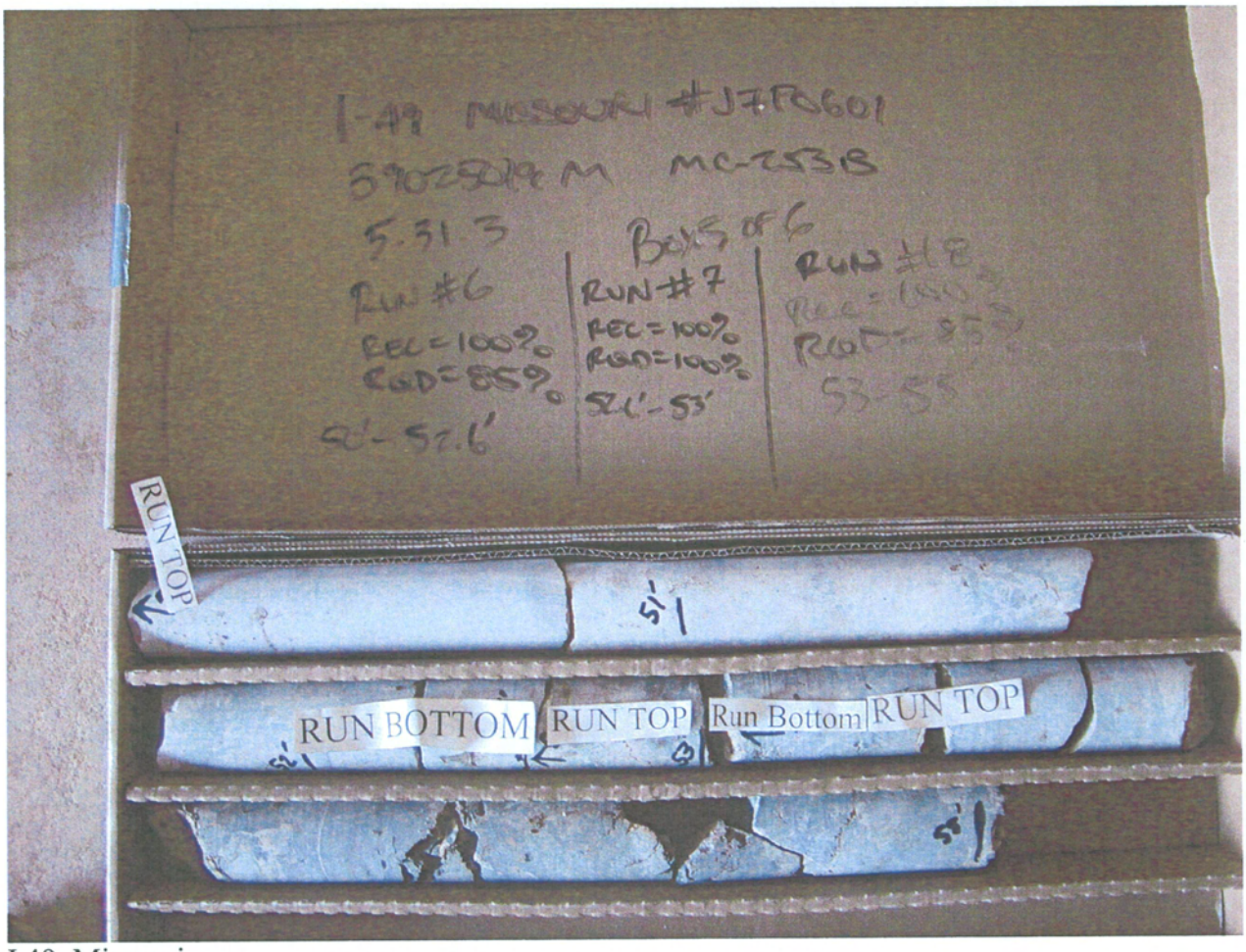


I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 2
35.0 Feet to 40.0 Feet

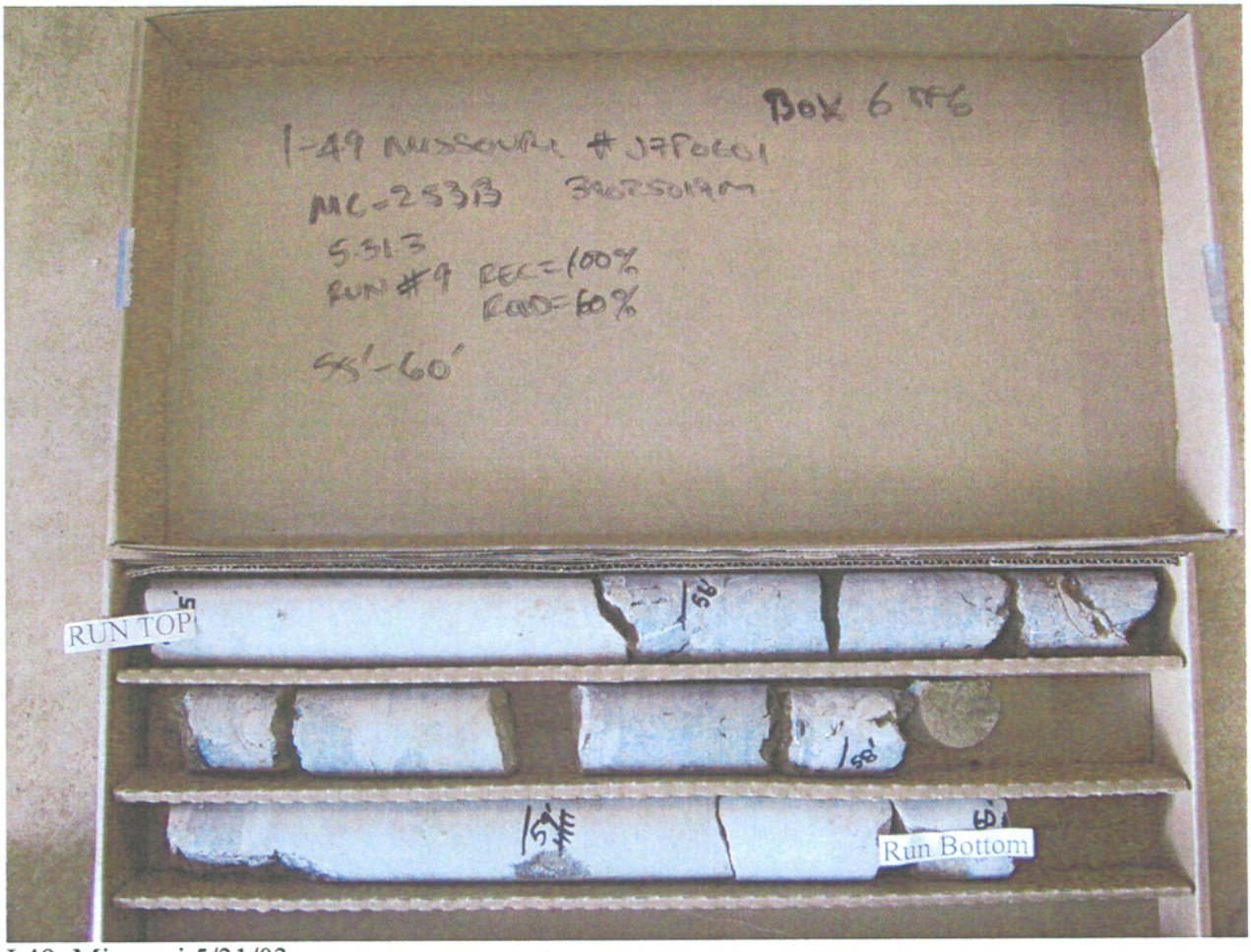


I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 3
40.0 Feet to 45.0 Feet

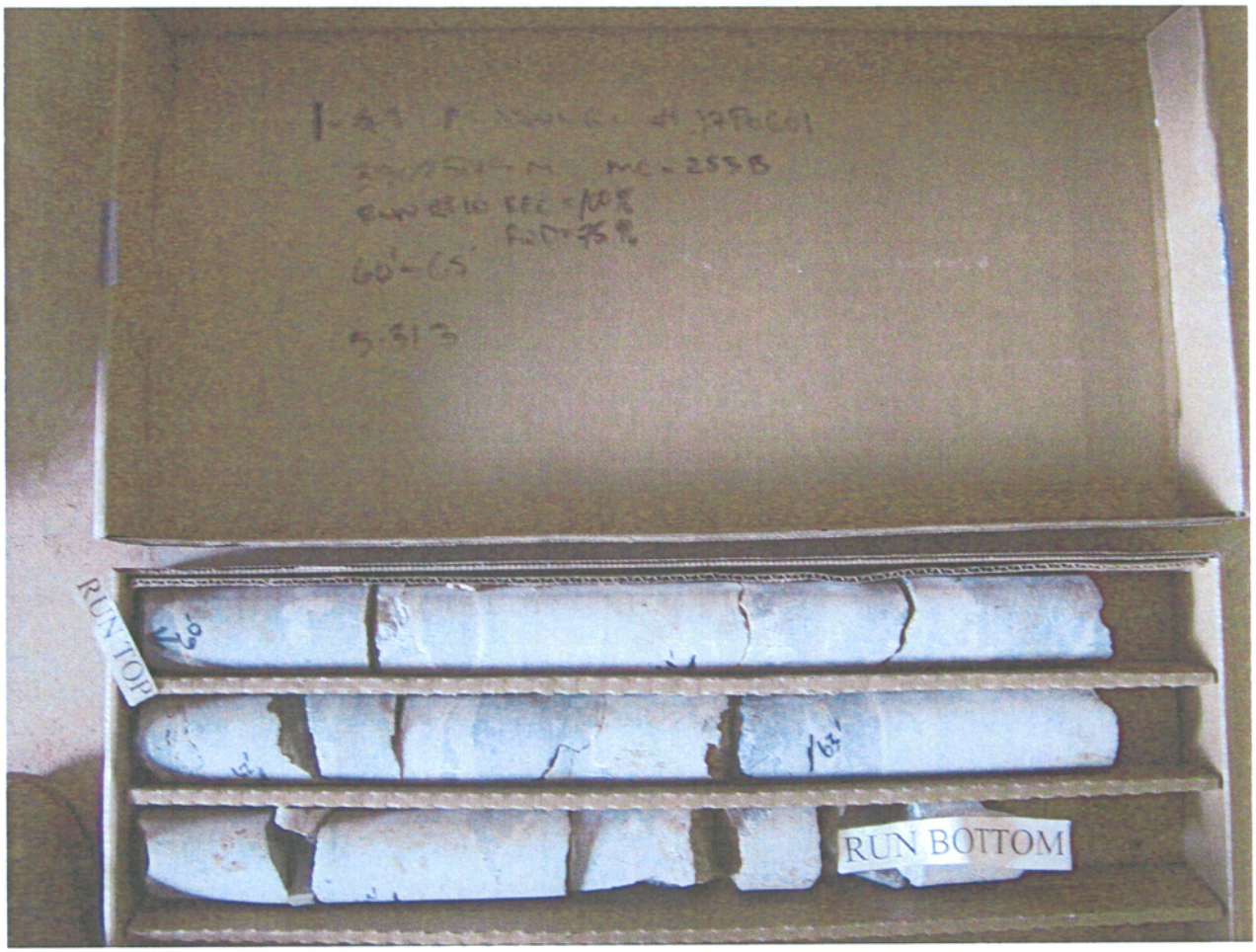
I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 4
45.0 Feet to 47.3 Feet
Run No. 5
47.5 Feet to 50.0 Feet



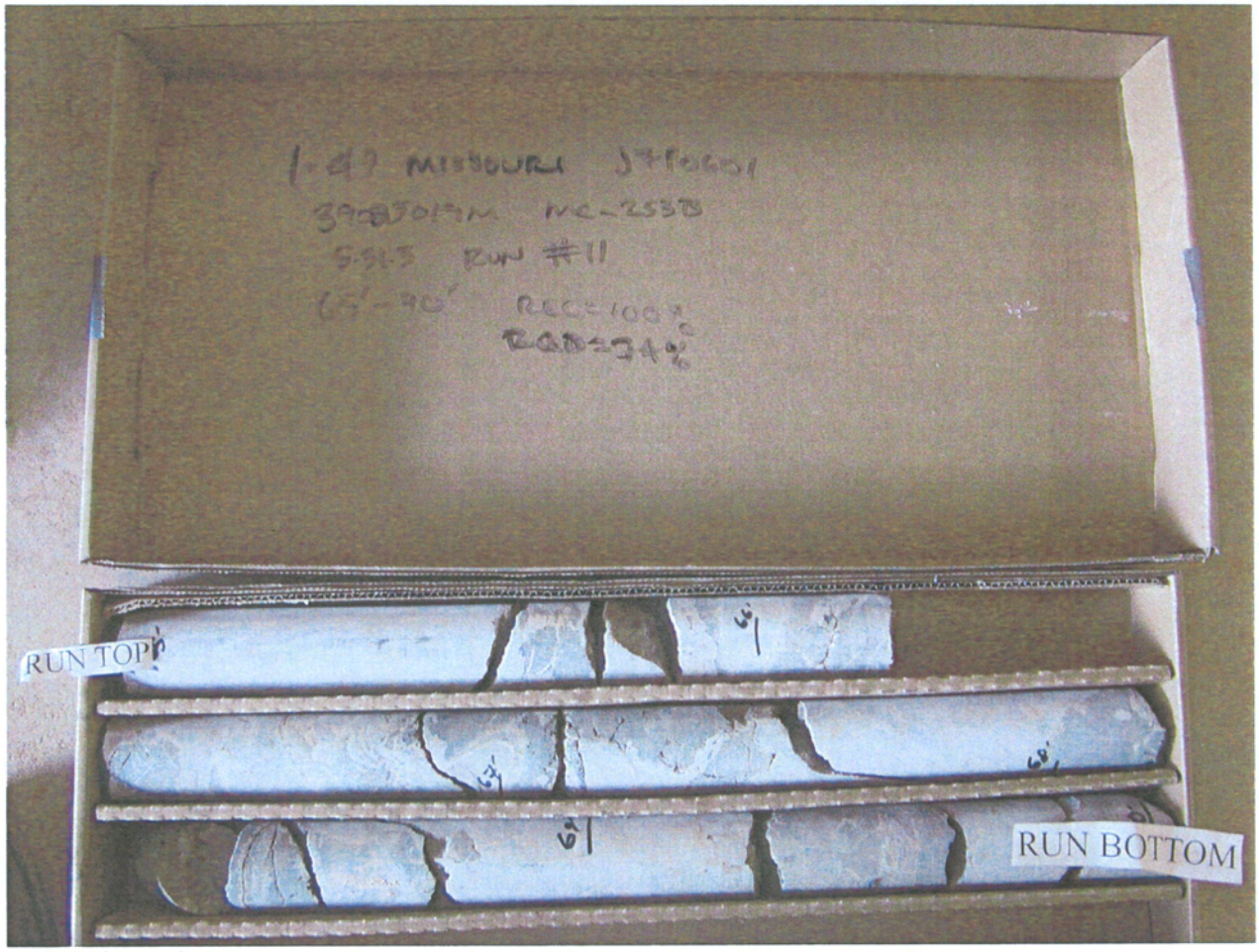
I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 6
50.0 Feet to 52.6 Feet
Run No. 7
52.6 Feet to 53.0 Feet
Run No. 8
53.0 Feet to 55.0 Feet



I 49 Missouri 5/31/03
Missouri J7P0601
Boring No. MC 253B
Run No. 9
55.0 Feet to 60.0 Feet

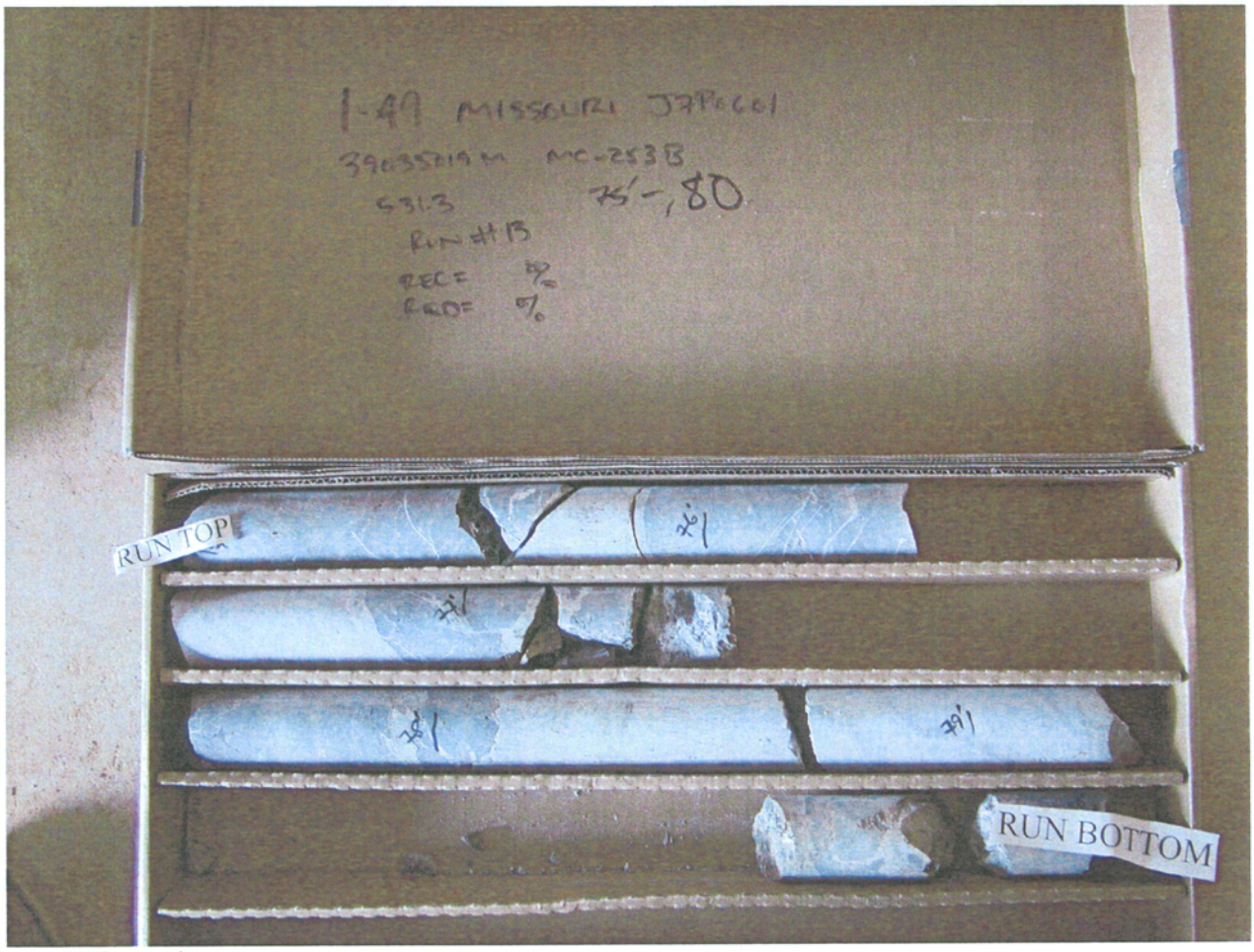


I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 10
60.0 Feet to 65.0 Feet



I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 11
65.0 Feet to 70.0 Feet

I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 12
70.0 Feet to 75.0 Feet



I 49 Missouri
Missouri J7P0601
Boring No. MC 253B
Run No. 13
75.0 Feet to 80.0 Feet