APPENDIX A.1

HISTORIC SOIL BORING STRATIGRAPHIC LOGS

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-001
Page 1 of 2

General Information

Client: **Ohio EPA**	Boring No.: **SD-001**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 19, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **ESP/1.25 in.**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **22**
Sampling Device: **1 x 24" split spoon**	Depth to Water Observed During Drilling (ft): **12**
Headspace Screening Instrument: ☐ PID ☒ FID	Well Installed: ☐ Yes ☒ No Well No.: —

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) Total Organic	Headspace Reading (ppm) Total Methane
No samples collected	0	2	13		6 in. brown loamy soil over ≈4 in. black asphalt over ≈8 in. brown silty clay with brick.		
	2	4	6		Brown silty clay with minor amount (<5%) of very small gravel. Stiff.		
	4	6	0		No recovery.		
	6	8	6		Clay; brown silty to sandy clay with limestone fragments. Minor amount (<1%) of small gravel. Moist.		
	8	10	10		Silty sand with gravel. Approximately 4 in. over clay; brown silty clay with small gravel. green to gray staining. Faint hydrocarbon odor.		
	10	12	0		No recovery - limestone cobble.		
	12	14	4		Sand; fine to medium grained sand with minor silt. Wet.		
	14	16	4		Sand and gravel: coarse grained sand with gravel - few fines. Wet.		

Notes

Ent'd by: SLW
Ck'd by: MES
Date: 3/26/96

FORM NO. 001.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-001
Page 2 of 2

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) Total Organic	Headspace Reading (ppm) Total Methane
Auger, Split Spoon	12	14	0	1-1-1-1	No recovery - spoon wet at ≈13 ft.		
SD001-01	14	16	8	5-3-2-2	Sand; fine to medium grained sand overlaying medium size gravel.	280	
SD001-02	16	18	20	7-6-6-8	Sand and gravel; medium to coarse sand with large gravel (up to 2 in.), wet. Some silt.	160	
SD001-03	18	20	22	20-17-16-18	Coarsening downward sequence of fine to medium grained sand down to coarse clean gravel at bottom of spoon. Some clay/silt in sandy units.	300	
SD001-04	20	22	14	11-14-18-21	Sand; fine to medium sand (≈4 ") overlying tight sand with abundant silty clay and gravel. Dry spots throughout tight clayey sand. Wet above.	18	
SD001-05	22	24	0		≈2 ft of heaving sand.		

Notes

Ent'd by: SLW
Ck'd by: MZS
Date: 3/26/96

FORM NO. 302.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-002
Page 1 of 2

General Information

Client: Ohio EPA	Boring No.: SD-002
Site Location: South Dayton Dump, Dayton, Ohio	Date(s) Drilled: February 20, 1996
PSARA Geologist: R. Stuck	Drilling Method / Borehole Size: 2.25-in. I.D. HSA/4.75 in.
Drilling Contractor: CAS	Total Depth of Borehole (ft): 26
Sampling Device: 2 x 24 in. split spoon	Depth to Water Observed During Drilling (ft): 12
Headspace Screening Instrument: ☐ PID ☒ FID	Well Installed: ☐ Yes ☒ No Well No.: —

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) Total Organic	Headspace Reading (ppm) Total Methane
SD002-1	0	2	18	7-7-6-5	Clay; brown silty clay with large gravel upper 4 in. Minor (<5%) small gravel with black mottling throughout. Tight.	0.0	
SD002-2	2	4	12	3-3-3-3	Clay; brown silty clay with black mottles and minor amount of small gravel. Tight. Moist upper 2 in. Glass and other debris fragments.	0.2	
SD002-3	4	6	18	3-4-4-4	Clay; light brown silty clay (upper 6 in.) overlaying brown silty to sandy clay with abundant small gravel. Sand lower 2 in. of spoon.	0.0	
SD002-4	6	8	12	6-21-16-14	Sand; poorly sorted sand with up to 10% small to medium gravel. Clean on fine end. Larger cobble fragments.	0.0	
SD002-5	8	10	12	14-35-21-24	Sand; poorly sorted sand with up to 15% small round gravel. Minor amount of silt. Loosely compacted.	0.0	
SD002-6	10	12	12	15-17-16-15	Sand; poorly sorted sand with up to 15% small gravel. Silty, loosely compacted. Faint odor.	0.0	

Notes

Ent'd by: SLW
Ck'd by: MES
Date: 3/26/96

FORM NO. 301.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-002
Page 2 of 2

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) Total Organic	Headspace Reading (ppm) Total Methane
SD002-7	12	14	10	12-27-22-22	Sand; poorly sorted sand with abundant small gravel, silt and clay. Numberous rusty brown mottles and streaks. Wet. Tight.	6.8	
SD002-8	14	16	14	30-8-7-7	Sand; poorly sorted fine to coarse sand with gravel and silt (upper 6 in.) overlaying fine to medium sand with minor small gravel/coarse sand and no silt. Wet throughout.	14	
SD002-9	16	18	12	4-7-10-10	Sand and gravel - ≈6 in. of coarse sand and gravel with no visible fines overlaying 6 in. of medium grained, well saturated sand.	6.6	
SD002-10	18	20	8	14-16-4-4	Sand; poorly sorted sand with small gravel and silt. Wet.	60	
SD002-11	20	22	6	6-6-4-4	Gravel; coarse angular gravel with few medium to fine sand and silt. Wet.	400	
SD002-12	22	24	6	---	Sand; tightly compacted sand with abundant clay and gravel. Wet throughout.	180	
SD002-13	24	26	28	50-32-32-25	Sand; wet fine to medium grained sand overlaying tight sandy clay with gravel, moist to damp (≈6 in.) overlaying fine to medium grained wet sand.	160	

Notes

Ent'd by: SLW
Ck'd by: MGS
Date: 3/26/96

FORM NO. 002 0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-003
Page 1 of 1

General Information

Client: **Ohio EPA**	Boring No.: **SD-003**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 22, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **2.25-in. I.D. HSA/4.75 in.**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **6**
Sampling Device: **2 x 24 in. split spoon**	Depth to Water Observed During Drilling (ft):
Headspace Screening Instrument: [X] PID [X] FID	Well Installed: [ ] Yes [X] No Well No.:

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD003-01	0	2	18	2-2-2-27	Sequence of mixed units: 6" of black to brown wet clay with organics overlaying ≈4 in. of black mottled clayey sand over ≈4 in. of wet pinkish medium grained sand over wet brown silt.	8.4	2.8
SD003-02	2	4	8	2-16-21-26	Sand; black to brown sand with abundant silt and clay (?). Wet. Very sticky. Black staining throughout.	540	5.2
SD003-03	4	6	12	4-4-5-5	Sand; variegated black, gray and white sand with tight clayey zones.	22	16.8
					Boring stopped due to buried waste.		

Notes

Cutting "sludgy" on auger when we withdrew.

Ent'd by: SLW
Ck'd by:
Date: 3/27/96

FORM NO. 301.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-004
Page 1 of 1

General Information

Client: **Ohio EPA**	Boring No.: **SD-004**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 22, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **ESP/1.25 in.**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **12**
Sampling Device: **1 x 24" split spoon**	Depth to Water Observed During Drilling (ft):
Headspace Screening Instrument: [X] PID [X] FID	Well Installed: [ ] Yes [X] No Well No.:

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD004-1	0	2	6	---	Clay; brown to black silty to sandy clay with cinders, slag, and other debris.	6.0	5.1
SD004-2	2	4	8	---	Brown clay with abundant glass fragments and assorted debris (5") over coarse pink brick fragments.	1.4	3.8
SD004-3	4	6	14	---	Clay; brown silty to sandy clay with small gravel and gravel fragments, rusty brown mottling and few brick fragments.	2.2	5.0
SD004-4	6	8	4	---	Sand; buff colored medium grained sand overlain by limestone cobble fragments.	2.4	4.8
SD004-5	8	10	14	---	Sand: coarse to fine grained sand with abundant silt. Up to 5% small angular gravel.	5.8	4.8
SD004-6	10	12	8	---	Sand; poorly sorted fine to coarse sand with gravel up to 20%, very well compacted. Silty.	18	40
					Probe refusal @ 12 ft		

Notes

Ent'd by: SLW
Ck'd by:
Date: 3/27/96

FORM NO. 1010

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-004A
Page 1 of 2

General Information

Client: **Ohio EPA**	Boring No.: **SD-004A**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 22 - 23, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **ESP /1.25 in.**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **28**
Sampling Device: **1 x 24" split spoon**	Depth to Water Observed During Drilling (ft): **17**
Headspace Screening Instrument: ☒ PID ☒ FID	Well Installed: ☐ Yes ☒ No Well No.:

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD004A-1	**0**	**2**	**12**	---	**Clay; black organic rich clay with abundant cinders.**	**2.8**	**4.2**
SD004A-2	**2**	**4**	**0**	---	**No recovery, rock in spoon.**		
SD004A-3	**4**	**6**	**4**	---	**Clay; brown silty clay with abundant coarse sand, moist.**	**1.8**	**3.0**
SD004A-4	**6**	**8**	**12**	---	**Clay; brown silty clay with abundant sand and small gravel (upper 5") overlaying poorly sorted sand with gravel and silt. Numerous limestone cobble fragments.**	**4.0**	**3.2**
SD004A-5	8	10	14	---	Sand; poorly sorted sand with silt and abundant small subangular gravel (up to 15%).	3.8	4.2
SD004A-6	10	12	18	---	Sand: poorly sorted fine to coarse sand with abundant gravel and silt. Gravel up to 15% and up to 1" diameter. Dry and loosely compacted.	3.0	4.0
SD004A-7	12	14	16	---	Sand; poorly sorted sand with gravel and silt. Numerous cobble fragments including 1 broken granite cobble.	7.2	6.8

Notes

Ent'd by: SLW
Ck'd by: MES
Date: 3/27/96

FORM NO. 631.0

PSARA TECHNOLOGIES, INC.	Soil Boring Log	Project No. 60003.06 Boring No. SD-004A Page 2 of 2

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD004A-8*	14	16	18	—	Sand; poorly sorted sand with gravel and silt, ≈20% small subrounded gravel. Oxidized zone ≈1" thick 2 inches from bottom of spoon.	4.2	3.8
SD004A-9**	16	18	12	12-13-16-9	Sand; poorly sorted sand with abundant gravel and few fines (upper 4 in.) overlaying poorly sorted silty sand with gravel (≈3 in.) overlaying wet silty sand with gravel.	24	8.0
SD004A-10***	18	20	6	—	Sand and gravel; poorly sorted sand with gravel and silt. Wet.	2.8	4.0
SD004A-11	20	22	8	—	Sand; poorly sorted sand with gravel and silt. Several cobble fragments. Very silty near bottom of spoon. Wet.	22	7.5
SD004A-12	22	24	6		Sand and gravel; poorly sorted sand with gravel and silt. Appears to have segregated during sampling. Wet.	5.2	5.8
SD004A-13	24	26	6		Gravel; poorly sorted rounded gravel with coarse sand. Wet.	8.6	5.4
SD004A-14	26	28	2		Sand and gravel; poorly sorted medium to coarse sand and minor amount of silt. Wet.	4.8	4.6
					BOH at 28 ft.		

Notes

* Lost probe tools down hole at 16-18 ft interval. Unable to retrieve. Grouted hole. Offset ≈2 ft.

Will continue with 2.25 HSA.

** Boring continued with 2.25 HSA offset ≈2 ft from SD004A initial attempt.

*** Switch back to ESP through augers.

Ent'd by: SLW
Ck'd by: MES
Date: 3/27/96

FORM NO. 002.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-005
Page 1 of 2

General Information

Client: **Ohio EPA**	Boring No.: **SD-005**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 23, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **HSA /4.75 and ESP/1.25**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **43**
Sampling Device: **2 x 24 in. and 1 x 24 in. split spoons**	Depth to Water Observed During Drilling (ft): **18**
Headspace Screening Instrument: ☒ PID ☐ FID	Well Installed: ☐ Yes ☒ No Well No.: —

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD005-1	0	2	18	4-6-4-4	**Black organic rich clay overlaying ≈6 in. of variegated black to gray clay with cinders, slag burnt wood over 6 in. of rusty brown and sandy clay with assorted debris.**	3.6	1.2
SD005-2	2	4	18	3-3-3-6	**Black to gray cinder rich clay with glass, brick, and slag. Gray streaks. Moist zone (upper 1"). Overlaying brown sandy clay to clayey sand lower 6 in.**	4.0	1.6
SD005-3	4	6	8	6-8-6-3	**Clay; brown to black silty clay with gravel. Loosely compacted.**	3.2	1.6
SD005-4	6	8	18	4-4-4-4	Clay; brown silty clay with black streaks. Few sandy clay zones. Small gravel up to 5%. Hard.	2.6	2.0
SD005-5	8	10	18	3-4-3-3	Clay; brown silty clay with abundant coarse sand and small gravel throughout. Black mottling upper 6 in. Fewer gravel near bottom of spoon.	2.8	1.0
SD005-6	10	12	20	4-4-4-4	Clay; brown silty clay with coarse sand and small gravel. Single burnt wood at 5 in. from top of spoon.	3.0	1.2

Notes

Ent'd by: SLW
Ck'd by:
Date: 3/27/96

FORM NO. 001.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-005
Page 2 of 2

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD005-7	12	14	14	5-5-11-12	Clay; brown silty clay upper 4 in. overlaying buff colored clayey sand to sandy clay with up to 10% small rounded gravel.	14	10.2
SD005-8	14	16	12	31-21-19-17	Sand; poorly sorted sand with abundant silt and clay - gravel up to 5%. Single broken limestone cobble.	10	16
SD005-9	16	18	18	27-18-15-16	Sand; poorly sorted sand with up to 20% small rounded gravel and abundant silt/clay. Wet lower 4 in.	12	6.2
SD005-10	18	20	6	21-19-14-7	Sand and gravel; poorly sorted fine to coarse sand with up to 30% gravel. Wet.	7.8	3.6
SD005-11*	20	22	8	---	Sand and gravel; poorly sorted with clay and silt. Wet.	24	5.0
SD005-12	22	24	6	---	Sand and gravel; poorly sorted with clay and silt. Wet.	10	3.2
SD005-13	24	26	0	---	No recovery.	---	---
SD005-14	26	28			** Soil sampling abandoned ≈3 ft of heave into outer casing. Unable to clear.	---	---

Notes

* Switch to soil sampling with ESP system with augers at 18 ft.

Ent'd by: SLW
Ck'd by: MES
Date: 3/27/96

FORM NO. 002-0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-006
Page 1 of 1

General Information

Client: **Ohio EPA**	Boring No.: **SD-006**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 26, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **2.25-in. I.D. HSA/4.75 in.**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **4**
Sampling Device: **2 x 24 in. split spoon**	Depth to Water Observed During Drilling (ft): **---**
Headspace Screening Instrument: ☒ PID ☒ FID	Well Installed: ☐ Yes ☒ No Well No.: ---

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD006-1	0	2	12	3-4-6-4	**Fill: black slag rich fill with abundant cinders, burnt wood fragments and assorted debris.**	12	4
SD006-2	2	4	20	3-3-2-1	**Clay; brown to black sandy clay with silt and gravel, loosely compacted.**	500	4
					BOH at 2 ft. Boring abandoned due to toxic atmosphere and potentially explosvie vapors.		

Notes

Ent'd by: SLW
Ck'd by: HES
Date: 3/27/96

FORM NO. 001.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-006A
Page 1 of 1

General Information

Client: **Ohio EPA**	Boring No.: **SD-006A**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 26, 1996**
PSARA Geologist: **R. Stuck/C. Hall**	Drilling Method / Borehole Size: **2.25-in. I.D. HSA/4.75 in.**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **6**
Sampling Device: **2 x 24 in. split spoon**	Depth to Water Observed During Drilling (ft): **---**
Headspace Screening Instrument: [X] PID [X] FID	Well Installed: [ ] Yes [X] No Well No.: ---

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD006A-1	0	2	18	4-4-5-5	Fill; black slag rich with sand size material,	1	3
					numerous cinders with burnt wood fragments.		
					Loosely compacted.		
SD006A-2	2	4	16	4-4-4-4	Ash (?); black silt sized with small white and	>1000	6
					tan fragments. Slag-rich fill lower 5 in.		
SD006A-3	4	6	12	2-2-3-2	Fill; cinder and ash rich black fill with	>1000	11
					assorted debris including white plastic bag.		

Notes

Boring abandoned due to excessive waste and landfill material

Ent'd by: SLW
Ck'd by:
Date: 3/27/96

FORM NO. 1010

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-006B
Page 1 of 1

General Information

Client: Ohio EPA	Boring No.: SD-006B
Site Location: South Dayton Dump, Dayton, Ohio	Date(s) Drilled: February 26, 1996
PSARA Geologist: C. Hall	Drilling Method / Borehole Size: 2.25-in. I.D. HSA/4.75 In.
Drilling Contractor: CAS	Total Depth of Borehole (ft): 2
Sampling Device: 2 x 24 In. split spoon	Depth to Water Observed During Drilling (ft): ---
Headspace Screening Instrument: [X] PID [X] FID	Well Installed: [ ] Yes [X] No Well No.: ---

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD006B-1	0	2	4	4-1-2-3	Black fill slag material, slightly clayey. Moist.	6	12
					Abandon hole at 2 ft, strong organic odor.		

Notes

Ent'd by: SLW
Ck'd by: MES
Date: 3/27/96

FORM NO. 001 0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. SD-007
Page 1 of 1

General Information

Client: **Ohio EPA**	Boring No.: **SD-007**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **February 26, 1996**
PSARA Geologist: **C. Hall**	Drilling Method / Borehole Size: **2.25-in. I.D. HSA/4.75 in.**
Drilling Contractor: **CAS**	Total Depth of Borehole (ft): **14**
Sampling Device: **2 x 24 in. split spoon**	Depth to Water Observed During Drilling (ft): **---**
Headspace Screening Instrument: ☒ PID ☒ FID	Well Installed: ☐ Yes ☒ No Well No.: ---

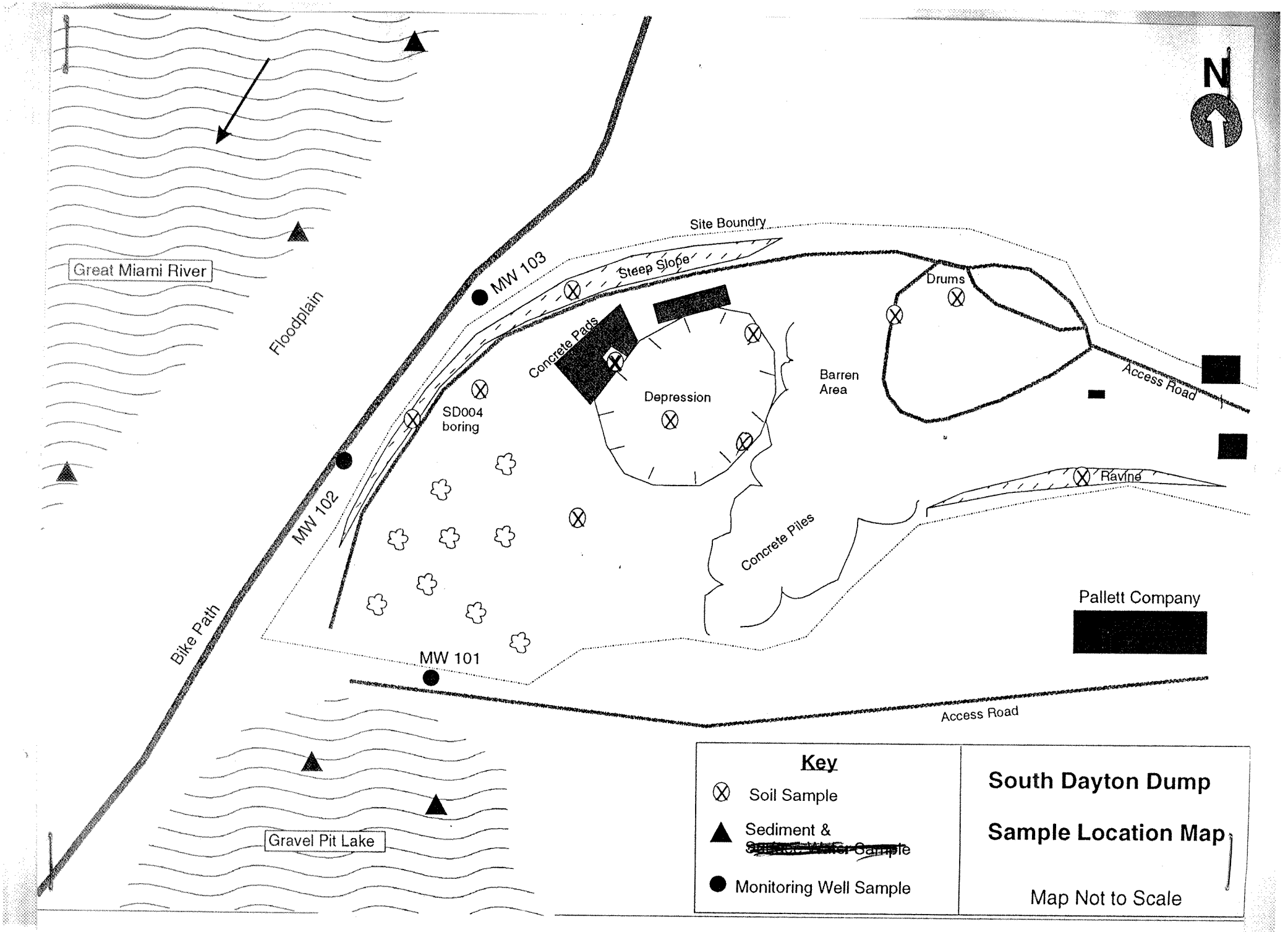
Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
SD007-1	0	2	20	2-3-4-6	Fill, coarse grained sand and gravel, large amount slag material, loosely compacted.	5	3
SD007-2	2	4	10	7-5-2-2	Fill, sand and gravel, cinder slag material, burnt wood fragments. Loosely compacted.	5	1
SD007-3	4	6	11	6-10-5-5	Sand, orangish-red, coarse grained, loosely compacted.	80	4
SD007-4	6	8	10	2-1-1-1	Fill, sand, ash, black burnt wood fragments, small amount slag material, loosely compacted.	20	1
SD007-5	8	10	6	1-1-2-1	Fill, black sand, and ash, coarse grained sand, small amount slag material, loosely compacted.	100	3
SD007-6	10	12	10	1-1-1-1	Fill, black sand and cinder, glass fragments, loosely compacted, clay in shoe of spoon.	300	2
SD007-7	12	14	10	2-1-1-1	Clay, dark brown, minor amount of sand, wood fragments at bottom of spoon, loosely compacted coarse grained sand in shoe of spoon.	20	3

Notes

Ent'd by: SLW
Ck'd by: MES
Date: 3/27/96

FORM NO. 301.0



EPA-R5-2016-005983 Outlook0000007

SOUTH DAYTON DUMP INVESTIGATION SCHEDULE

Tuesday, April 19

Leave office at 6:30 am, arrive on site at 8:00 am.

Soil Team	Well Team	Sediment Team
(11 Samples)	(5 samples)	(6 samples)
Karl Reinbold	Diane Crosby	~~Kim Wylie~~ Tori Sigler
Laura Marshall	Stephanie Simstad	Dawn Neiffer
Kerri Klocinski		Rick Cisler

- Well and Sediment teams will switch to soil when they are finished.
- A second day may be necessary (for one team anyway).

Media	# Samples	Sample #	Extra Numbers
Soil	15	96-DV-03-(S01-S14) Dup=D03	S20, S21
Sediment	6	96-DV-03-(S15-S19) Dup=D17	
MW	5	96-DV-03-(S22-S25) Dup=D23 TB=R01	

First sample per matrix is the MS\MSD

WELL SAMPLING USING THE MICROPURGE TECHNIQUE

1. Take the well measurements of depth to water and total depth. The water level indicator is needed to monitor the water level while pumping, so leave it in the well.

2. Using the well log, place the pump at the screened interval about 1/3 from top of screen.

3. Pump at a low rate and continuously monitor depth to water for draw down. If draw down is noticed, reduce the pumping rate(if available). There cannot be more than 1 foot draw down for this technique to be used.

4. Total purging may be either two pump and tubing volumes or stabilization of monitoring parameters.

5. Sample immediately.

6. Decon pump with liquinox, tap water, and ASTM rinse.

Site Name: South Dayton Dump

Sample Date: 7/9/96

Sample ID Number: 96-DY-03-S01

Sample Time: 10:10

Latitude/Longitude:

Weather Conditions: Sunny

Name(s) of Sampler(s): R. Cisler, J. Gitner, K. Klocinski

Sample Depth: ~~3'6"~~ - 4' - 4'6"

Camera ID#:

Photo Frame#: 1+2

Sample Type: [X] Grab [ ] Composite [ ] MS/MSD [ ] Background [X] ~~Dup~~ Replicate JSJ [ ] _____ Blank

Sample Media: [ ] Surface Water [ ] Sediment [X] Soil [ ] Ground Water [ ] Container [ ] Leachate

Field Measurements	Background	Reading	Instrument
PID/FIF (ppm)		0.0	
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description: Near Drum area on the fringe of high area. Sample taken 15 yards from road.

Recorded by: Kerry Klocinski

Soil/Sediment Description

Sample ID# 96-DV-03-S01

Soil/Sediment Profile:

0"

color- redish brown
soil type- silty clay
moisture- low
odor-

6"

color- black
soil type- soil / cinders
moisture- low
odor-

4'6"

~~color-~~ end of hole
~~soil type-~~
~~moisture-~~
~~odor-~~

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by K. Wlocmski

Site Name South Dayton Dump Sample Date 7/9/96

Sample ID Number 96-DV-03-S02 Sample Time 11:10 AM

Latitude/Longitude

Weather Conditions sunny, great!

Name(s) of Sampler(s) Wendy VORWERK IRENE VASILKOVS

Sample Depth Surface 0-1"

Camera ID# Photo Frame#

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [ ] Sediment
- [x] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description NORTH-SOUTH ACCESS ROAD

~~[illegible]~~

Recorded by:

Soil/Sediment Description

Sample ID# 96-DV-03-S02

Soil/Sediment Profile: Light grayish, with blue cast, very, very fine powdery substance. Does not look indigenous

0"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name South Dayton Dump Sample Date 7/9/96

Sample ID Number 96-DV-03-S03 + D03 Sample Time 11:30

Latitude/Longitude

Weather Conditions Sunny

Name(s) of Sampler(s) J. Geltner, K. Klocinski, R. Cisler

Sample Depth 18" - 26"

Camera ID# Photo Frame#

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [x] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [ ] Sediment
- [x] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)		0.0	
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description In depression area near concrete pads.

GW encountered at ~ 1 foot depth

Recorded by: Kerry Klocinski

Soil/Sediment Description

Sample ID# 96-DV-03- S03 + D03

Soil/Sediment Profile:

0"

color- brown
soil type- clay
moisture- high
odor-

6"

color- red, brown
soil type- clay
moisture- high
odor-

26"

color- hit water
soil type- after ~~26"~~ 1'
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name 96-DV-03-S04 Sample Date 7/9/96

Sample ID Number South Dayton Dump Sample Time 2:05

Latitude/Longitude

Weather Conditions Sunny

Name(s) of Sampler(s) J. Geltmur, R. Cisler, K. Klocinski

Sample Depth 18"-26"

Camera ID# Photo Frame#

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [ ] Sediment
- [x] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)		0.0	
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description Sample take East of depression area

Recorded by: Larry Klocinski

Soil/Sediment Description

Sample ID# 96-DV-03-S04

Soil/Sediment Profile: very granulary, + cinder water seeping in at about 2 feet.

0"

color- black
soil type- soil / stones
moisture- high
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

25"

color- end of hole
soil type- hit water
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by Kerry Klocinski

Site Name South Dayton Dump Sample Date 7/9/96

Sample ID Number 96-DV-03-S07 (BKG) Sample Time 1445

Latitude/Longitude

Weather Conditions

Name(s) of Sampler(s) W. Vorwerk,

Sample Depth 0-2"

Camera ID# Photo Frame#

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [ ] Sediment
- [x] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%0_2$/%LEL			

Sample Location Description

Background.

Recorded by: [signature]

Soil/Sediment Description

Sample ID#

Soil/Sediment Profile: ~~Hard Packed~~, Very Dry, Very Hard pack.

0"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name South Dayton Dump Sample Date 7/9/96

Sample ID Number 96-DV-Q3-S05 Sample Time 1600

Latitude/Longitude

Weather Conditions nice

Name(s) of Sampler(s) J. Giltner, R. Cicler

Sample Depth 5'

Camera ID# yes Photo Frame#

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [ ] Sediment
- [x] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%0_2$/%LEL			

Sample Location Description Boring hole #SD004 along access Road and steep slope to flood plain

Recorded by: Wak

Soil/Sediment Description

Sample ID# SQ5

Soil/Sediment Profile: Clay w/ Gravel/Cobble

0"

color- Gray
soil type- Fine
moisture- Dry
odor- none

1'

color- lgt Brown/Rd
soil type- Alluvium/Clay
moisture-
odor- long Chain Hydro Carbon

3'

color- lgt Brown
soil type- Clay/Gravel/Cobble
moisture-
odor-

4

color- lgt Brown
soil type- Clay
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by Wan

Site Name South Dayton Dump Sample Date 7/9/96

Sample ID Number 96-DV-03-S10 Sample Time 1720

Latitude/Longitude

Weather Conditions nice

Name(s) of Sampler(s) D. Giltner, R. Cissler

Sample Depth 0-4

Camera ID# Photo Frame#

Sample Type

- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media

- [ ] Surface Water
- [ ] Sediment
- [x] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description Slope of 1st Concrete Pad - Many Drums in Depression.

Recorded by: [signature]

Soil/Sediment Description

Sample ID# _____

Soil/Sediment Profile: Course, grainular, Drum pieces,

0"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID# _____

Surface Water Body Name: _____

Stream Width: _____

Stream Depth: _____

Recorded by _____

Site Name South Dayton Dump Sample Date 7-9-96

Sample ID Number 96-DU-03-S06 Sample Time 1800

Latitude/Longitude

Weather Conditions Partly Cloudy

Name(s) of Sampler(s) F. Zingales
V. Sigler B. Marlett

Sample Depth 18"-28"

Camera ID# Photo Frame# 11 & 12

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [ ] Sediment
- [x] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)	1.9	2.9	Microtip
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description Vegetated Area Between concrete piles & depression.

Recorded by: F. Sigler

Soil/Sediment Description

Sample ID# 96-SV-03-SO6

Soil/~~Sediment~~ Profile: layers varied w/ black-blue fine ash and cinders; colors were black-grayish blue and refusal was encountered at 3'1/2'-4' in depth.

0"

color- black/blue gray
soil type- cinder/fine ash
moisture- some
odor- no

12"

color-
soil type- SAME AS ABOVE
moisture-
odor-

28"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name: South Dayton Dump Sample Date: 7-9-96

Sample ID Number: 96-BV-03-S09 Sample Time: 16:30

Latitude/Longitude:

Weather Conditions: 80°F Cloudy, Breezy, Nice

Name(s) of Sampler(s): Kerry Klocinski, Diane Crosby

Sample Depth: 3-6"

Camera ID#: Photo Frame#: Yes

Sample Type: [X] Grab [ ] Composite [ ] MS/MSD [ ] Background [ ] Replicate [ ] _____ Blank

Sample Media: [ ] Surface Water [ ] Sediment [X] Soil [ ] Ground Water [ ] Container [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)	1.1 ppm	1.6 ppm	MicroTip 100
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description: North Slope drums

Sample was taken below four drums, rusted and empty adjacent to the bike path.

Recorded by: Diane Crosby / Irene

Soil/Sediment Description

Sample ID# 96-DU-03-S09

Soil/Sediment Profile: Soil was ashey, powdery and gray-brown-black in color

0"

color- Brown-gray-
soil type- Ashes Black
moisture- small-powdery grains
odor- N/A

6"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name: South Dayton Dump Sample Date: 7-9-96

Sample ID Number: 96-DV-03-S11 Sample Time: 17:00

Latitude/Longitude:

Weather Conditions: 80°F, Breezy, Cloudy, Nice

Name(s) of Sampler(s): Diane Crosby, Kerry Klocinski

Sample Depth: 3-4"

Camera ID#: Photo Frame#: Yes

Sample Type: [X] Grab [ ] Composite [ ] MS/MSD [ ] Background [ ] Replicate [ ] _____ Blank

Sample Media: [ ] Surface Water [ ] Sediment [X] Soil [ ] Ground Water [ ] Container [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)	0.0	0.0	100
pH			
Radioactivity (mR/Hr)			
%0_2/%LEL			

Sample Location Description: Sample was taken in the ravine (See Site Map)

Recorded by: Diane Crosby/Irene

Soil/Sediment Description

Sample ID# 96-DV-03-S11

Soil/Sediment Profile: Soil was grainy, ashey, powdery Gray-brown-black in color.

0"

color- Gray-Brown-Black
soil type- Powdery-Ashes
moisture- Non
odor- Non

4"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name: South Dayton Dump Sample Date: 7-9-96

Sample ID Number: 96-DV-03-SØ8 Sample Time: 15:30

Latitude/Longitude:

Weather Conditions: Breezy, Cloudy 80°F

Name(s) of Sampler(s): Diane Crosby, Kerry Klocinski

Sample Depth: 2-3"

Camera ID#: Pentax Photo Frame#: 4

Sample Type: [X] Grab [ ] Composite [ ] MS/MSD [ ] Background [ ] Replicate [ ] _____ Blank

Sample Media: [ ] Surface Water [ ] Sediment [X] Soil [ ] Ground Water [ ] Container [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)	.6	.7	MicroTip 100
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description: on slope adjacent to Bike Trail and G. Miami River Between MW-102 and MW 103

See map

Below broken drum with hard green product

Recorded by: D. Crosby

Soil/Sediment Description

Sample ID#

Soil/Sediment Profile: Grayish Brown, Silty, sandy soil

0"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name South Dayton Dump Sample Date 7-9-96

Sample ID Number 96-DV-03-515 Sample Time 1030

Latitude/Longitude

Weather Conditions Sunny 80°

Name(s) of Sampler(s) V. Sigler
F. Lingales

Sample Depth 15'-18'

Camera ID# Photo Frame#

Sample Type
- [x] Grab
- [ ] Composite
- [x] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [x] Sediment
- [ ] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%0_2$/%LEL			

Sample Location Description NW Gravel Pond

Recorded by V. Sigler

Soil/Sediment Description

Sample ID# 96-DV-03-515

Soil/Sediment Profile:

fines w/ sandy silt w/ organic humus (intermixed) brown in color

0"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name South Dayton

Sample Date 7-9-96

Sample ID Number 96-AV-03-S17 (D17)

Sample Time 1515

Latitude/Longitude

Weather Conditions Sunny 80°

Name(s) of Sampler(s) F. Zingales V. Sigler B. Marlett

Sample Depth 0-6"

Camera ID#

Photo Frame# 8

Sample Type

- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [x] Replicate D17
- [ ] _____ Blank

Sample Media

- [ ] Surface Water
- [x] Sediment
- [ ] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description Adjacent to 103 MW in the Great Miami River

Recorded by: V. Sigler

Soil/Sediment Description

Sample ID# 96-DV-03-S17 (D17)

Soil/Sediment Profile:

ght Greenish/brown clayey fine sands silt
no organic material "chuncky lumpy" sediment

0"	
see Above color- soil type- moisture- odor- No	color- soil type- moisture- odor-
6"	
color- soil type- moisture- odor-	color- soil type- moisture- odor-
color- soil type- moisture- odor-	color- soil type- moisture- odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name South Dayton Sample Date 7-9-96

Sample ID Number 96-DV-03-518 Sample Time 1445

Latitude/Longitude

Weather Conditions Sunny 80°

Name(s) of Sampler(s) F. Zingales B. Marlett V. Sigler

Sample Depth 0-6"

Camera ID# Photo Frame# #7

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [x] Sediment
- [ ] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description

Downstream of landfill approximately 150' upstream of riffle area. Along the east bank of Great Miami. Sample collected at water line.

Recorded by: V. Sigler

Soil/Sediment Description

Sample ID# 96-DV-03-S18

Soil/Sediment Profile:

Grayish/black organics present
fine silty sand "muddy"

0"	
color- gray/black soil type- moisture- odor- no	color- soil type- moisture- odor-
6"	
color- soil type- moisture- odor-	color- soil type- moisture- odor-
color- soil type- moisture- odor-	color- soil type- moisture- odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

Site Name South Dayton Dump

Sample Date 7-9-96

Sample ID Number 96-SV-03-S19

Sample Time 1545

Latitude/Longitude

Weather Conditions Sunny 80°

Name(s) of Sampler(s) F. Zingales V. Sigler B. Marlett

Sample Depth 0-6"

Camera ID#

Photo Frame# 9-16

Sample Type

- [ ] Grab
- [ ] Composite
- [ ] MS/MSD
- [x] Background upstream
- [ ] Replicate
- [ ] _____ Blank

Sample Media

- [ ] Surface Water
- [x] Sediment
- [ ] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%O_2/\%LEL$			

Sample Location Description Upstream. ~~of~~ vs Between South dayton dump and asphalt plant.

Recorded by: V. Sigler

Soil/Sediment Description

Sample ID# S96-DV-03-S19

Soil/Sediment Profile: Dark Brown ; no organic material
Clayey w/ some fine sand silt
Similiar to Adjacent samples D17) S17

0"

color- See Above
soil type-
moisture-
odor- no

6"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by W. Sigh

Site Name South Dayton Dump

Sample Date 7-9-96

Sample ID Number 96-SV-03-516

Sample Time 1100

Latitude/Longitude

Weather Conditions Sunny 80°

Name(s) of Sampler(s) F. Zingales
V. Sigler

Sample Depth 15-18'

Camera ID# ~~3-5~~ 3-6

Photo Frame#

Sample Type
- [x] Grab
- [ ] Composite
- [ ] MS/MSD
- [ ] Background
- [ ] Replicate
- [ ] _____ Blank

Sample Media
- [ ] Surface Water
- [x] Sediment
- [ ] Soil
- [ ] Ground Water
- [ ] Container
- [ ] Leachate

Field Measurements

	Background	Reading	Instrument
PID/FIF (ppm)			
pH			
Radioactivity (mR/Hr)			
$\%O_2$/%LEL			

Sample Location Description NE Gravel Pond
NE Bank approximately 200' SE of electric tower off of Sand & gravel outcrop

Recorded by: V. Sigler

Soil/Sediment Description

Sample ID# 96- SV- 03 - 516

Soil/Sediment Profile:

very fine sediment thick consistency
marbled brown & black.
organic debris (leaves; weeds)

0"

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

color-
soil type-
moisture-
odor-

Surface Water Description

Sample ID#

Surface Water Body Name:

Stream Width:

Stream Depth:

Recorded by

APPENDIX A.2

OU1 MONITORING WELL STRATIGRAPHIC AND INSTRUMENTATION LOGS

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. MW-101
Page 1 of 1

General Information

Client: **Ohio EPA**	Boring No.: **MW-101**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **April 5, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **4.25-in. I.D. HSA/8.25 in.**
Drilling Contractor: **JEDI**	Total Depth of Borehole (ft): **38**
Sampling Device: **N/A Logged from cuttings**	Depth to Water Observed During Drilling (ft): **15**
Headspace Screening Instrument: X PID ___ FID	Well Installed: X Yes ___ No Well No.:

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
	0	11			**Clay; brown silty to sandy clay with organic fragments and gravel. Concrete slabs at surface.**		
	11	12			**Cobble/boulder.**		
	12	29			**Sandy clay to clayey sand with gravel.**		
	29	38			**Wet sand to silt. Very fine grained, gray plastic.**		

Notes

Ent'd by: SLW
Ck'd by: MES
Date: 3/27/96

FORM NO. 001.0

PSARA TECHNOLOGIES, INC.

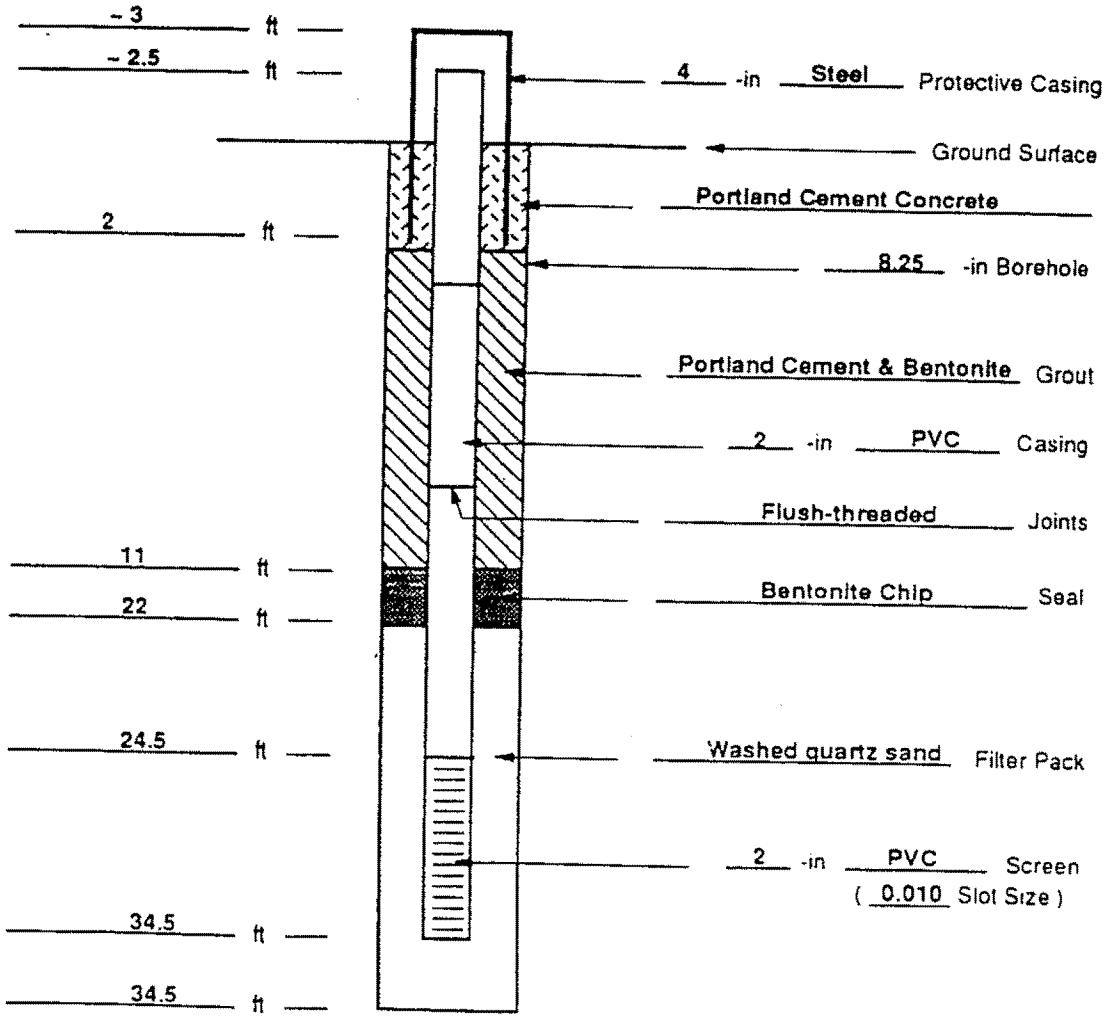
Well Construction Diagram

Project No 60003.06
Well No. MW-101

General Information

Client: Ohio EPA	Well No.: MW-101
Site Location: South Dayton Dump, Dayton, Ohio	Date Completed: April 5, 1996
PSARA Geologist: R. Stuck	Drilling Method: 4.25-in. I.D. HSA/8.25 in.
Drilling Contractor: JEDI	Depth to Static Water (ft): 15.10 (4/23/96)

Construction Details



NOT TO SCALE

000014a

Ent'd by: SLW
Ck'd by: HES
Date: 6/4/96

FORM NO. 005.0

PSARA TECHNOLOGIES, INC.

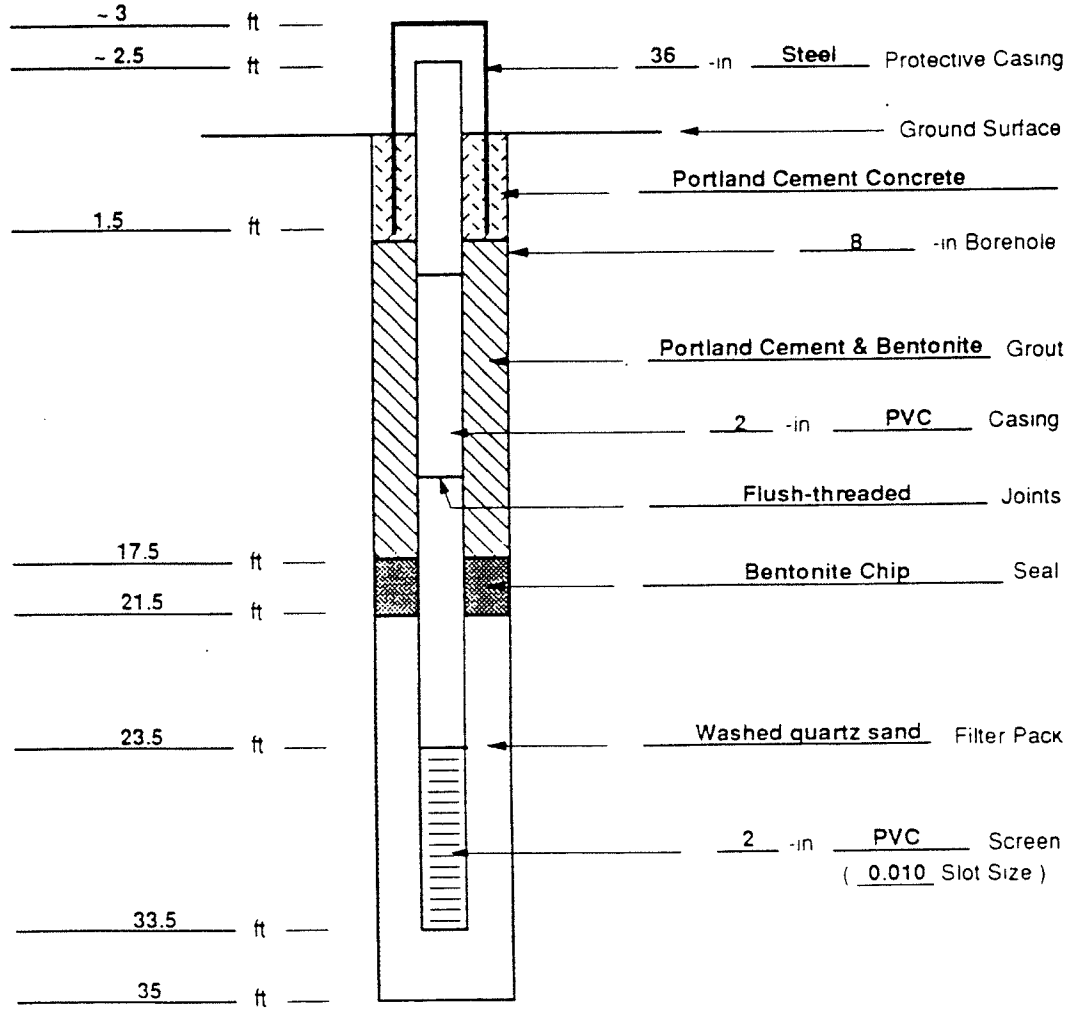
Well Construction Diagram

Project No 60003.06
Well No. MW-101A

General Information

Client: **Ohio EPA**	Well No.: **MW-101A**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date Completed: **May 7, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method: **4.25-in. I.D. HSA/8.25 in.**
Drilling Contractor: **JEDI**	Depth to Static Water (ft): **16**

Construction Details



NOT TO SCALE

Ent'd by: SLW
Ck'd by: MES
Date: 6/4/96

FORM NO. 005.0

DNR 7802.94
TYPE OR USE PEN
SELF TRANSCRIBING
PRESS HARD

WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources
Divison of Water, 1939 Fountain Square Drive
Columbus, Ohio 43224 Phone (614) 265-6739

Permit Number _____

COUNTY MONTGOMERY TOWNSHIP MIAMI SECTION/LOT No. _____ (Circle One)

OWNER/BUILDER (Circle One or Both) SOUTH DAYTON DUMP (First / Last) PROPERTY ADDRESS (Address of well location) 1975 ~~[illegible]~~ DRYDEN RD. MORAINE OH (Number / Street / City)

LOCATION OF PROPERTY ~~DAYTON OHIO~~ MORAINE OHIO _____ Zip Code + 4

CONSTRUCTION DETAILS

CASING *(Length below grade) Borehole Diameter 9 1/2 in.

1 Diameter 2 in. Length* 23 ft. Wall Thickness Sch 40 in.

2 Diameter _____ in. Length* _____ ft. Wall Thickness _____ in.

Type: 1 2 Steel 1 2 Galv. X 2 PVC 1 2 Other _____

Joints: X 2 Threaded 1 2 Welded 1 2 Solvent 1 2 Other _____

Liner: Length _____ Type _____ Wall Thickness _____ in.

SCREEN

Type (wire wrapped, louvered, etc.) _____ Material PVC

Length 10 ft. Diameter 2 in.

Set between 30 ft. and 20 ft. Slot .010

GROUT

Material Portland & BENT. Volume used 5 BAGS

Method of installation TRIMMIE

Depth: placed from 14 ft. to 1 ft

GRAVEL PACK (Filter Pack)

Material #5 SAND Volume used 3 1/2 bags

Method of installation GRAVITY

Depth: placed from 30 ft. to 18 ft

Pitless Device ☐ Adapter ☐ Preassembled unit

Use of Well MONITOR

☐ Rotary ☐ Cable ☒ Augered ☐ Driven ☐ Dug ☐ Other _____

Date of Completion 4-8-96

WELL LOG*

INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.

Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc. MW #102

	From	To
Brown Silty Clay w/GRAVEL	0	10
Brown Silty to Sandy wet clay	10	15
Sand & Gravel, coarse Gravel w/COBBLES	15	32

BTH 32'
SET WELL AT 30'
WATER ON RODS 15'
WATER AT COMP. 10'

WELL TEST

☐ Bailing ☐ Pumping* ☐ Other _____

Test rate NA gpm Duration of test _____ hrs

Drawdown _____ ft

Measured from: ☐ top of casing ☐ ground level ☐ Other _____

Static Level (depth to water) _____ ft. Date: _____

Quality (clear, cloudy, taste, odor) _____

*(Attach a copy of the pumping test record, per section 1521.05, ORC)

PUMP

Type of pump NA Capacity _____ gpm

Pump set at _____ ft

Pump installed by _____

WELL LOCATION

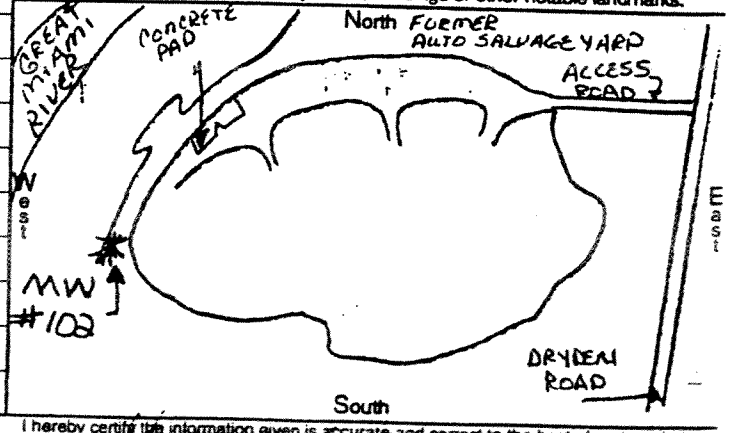
Location of well in State Plane coordinates, if available:

Zone _____ x _____ y _____

Elevation of well _____ ft./m. Datum plain: ☐ NAD27 ☐ NAD83

Source of coordinates: ☐ GPS ☐ Survey ☐ Other _____

Sketch a map showing distance well lies from numbered state highways, street intersections, county roads, buildings or other notable landmarks.



*(If additional space is needed to complete well log, use next consecutively numbered form.)

I hereby certify the information given is accurate and correct to the best of my knowledge.

Drilling Firm Jones Environmental Drilling Signed Gary Taylor

Address PO Box 190 Date 4-22-96

City, State, Zip VERSAILLES, IN 47042 ODH Registration Number _____

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

ORIGINAL COPY TO - ODNR, DIVISION OF WATER, 1939 FOUNTAIN SQ. DRIVE, COLS., OHIO 43224

PSARA TECHNOLOGIES, INC.

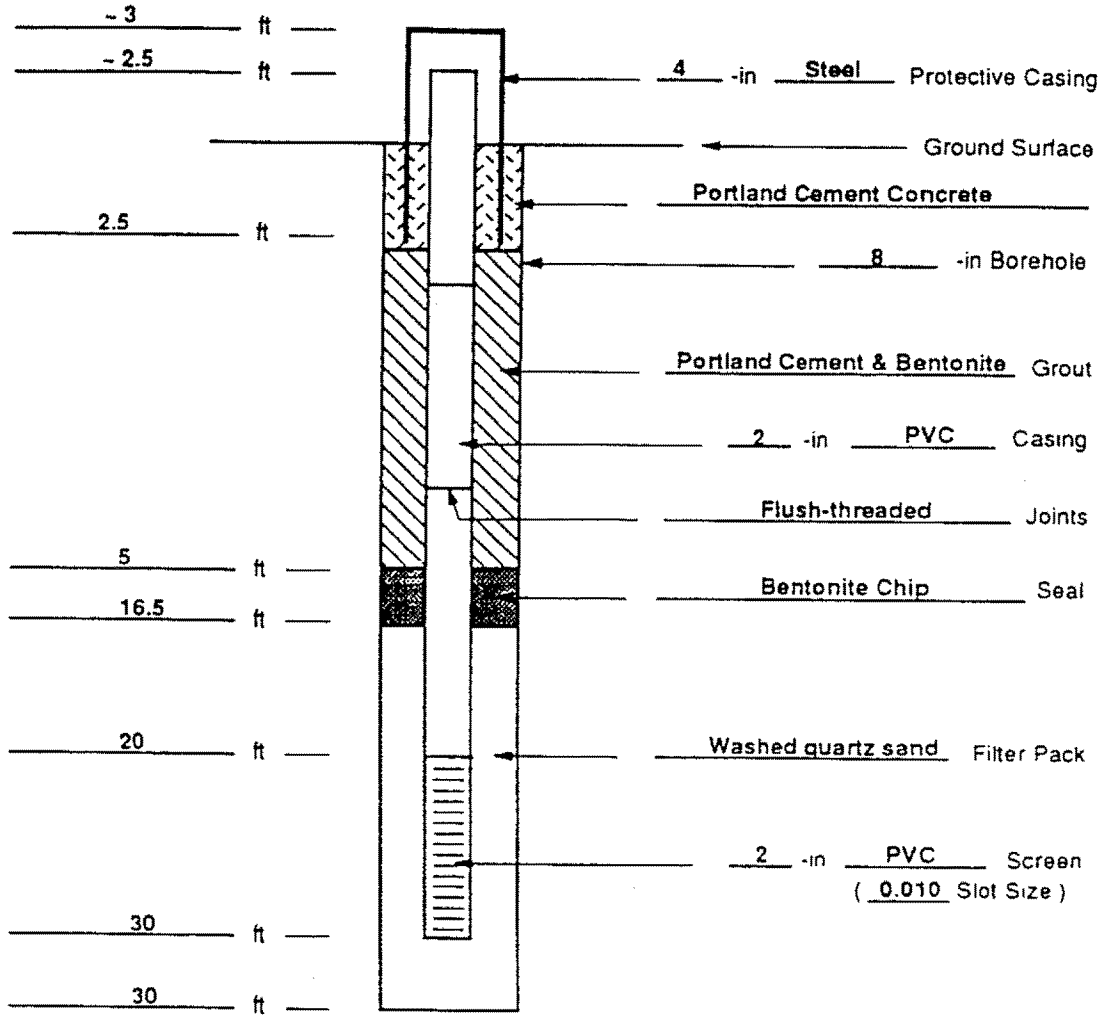
Well Construction Diagram

Project No 60003.06
Well No. MW-102

General Information

Client: **Ohio EPA**	Well No.: **MW-102**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date Completed: **April 8, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method: **4.25-In. I.D. HSA/8.25 In.**
Drilling Contractor: **JEDI**	Depth to Static Water (ft): **6.97 (4/23/96)**

Construction Details



NOT TO SCALE

000016

Ent'd by: SLW
Ck'd by: MCS
Date: 6/4/96

FORM NO 005.0

PSARA TECHNOLOGIES, INC.

Soil Boring Log

Project No. 60003.06
Boring No. MW-103
Page 1 of 1

General Information

Client: **Ohio EPA**	Boring No.: **MW-103**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date(s) Drilled: **April 9, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method / Borehole Size: **4.25-in. I.D. HSA/8.25 in.**
Drilling Contractor: **JEDI**	Total Depth of Borehole (ft): **32**
Sampling Device: **N/A Logged by cuttings**	Depth to Water Observed During Drilling (ft): **10**
Headspace Screening Instrument: ___ PID ___ FID	Well Installed: X Yes ___ No Well No.: **MW-103**

Summary of Boring

Sample No.	Sample Depth (ft) From	Sample Depth (ft) To	Recovery (in)	Blow Count	Sample/Core Description	Headspace Reading (ppm) FID	Headspace Reading (ppm) PID
	0	8			**Clay; brown sandy clay with gravel.**		
	8	12			**Clay; brown sandy clay, damp to wet.**		
	12	32			**Sand and gravel; very few cuttings.**		

Notes

Ent'd by: DMW
Ck'd by: MES
Date: 4/30/96

FORM NO. 001.0

PSARA TECHNOLOGIES, INC.

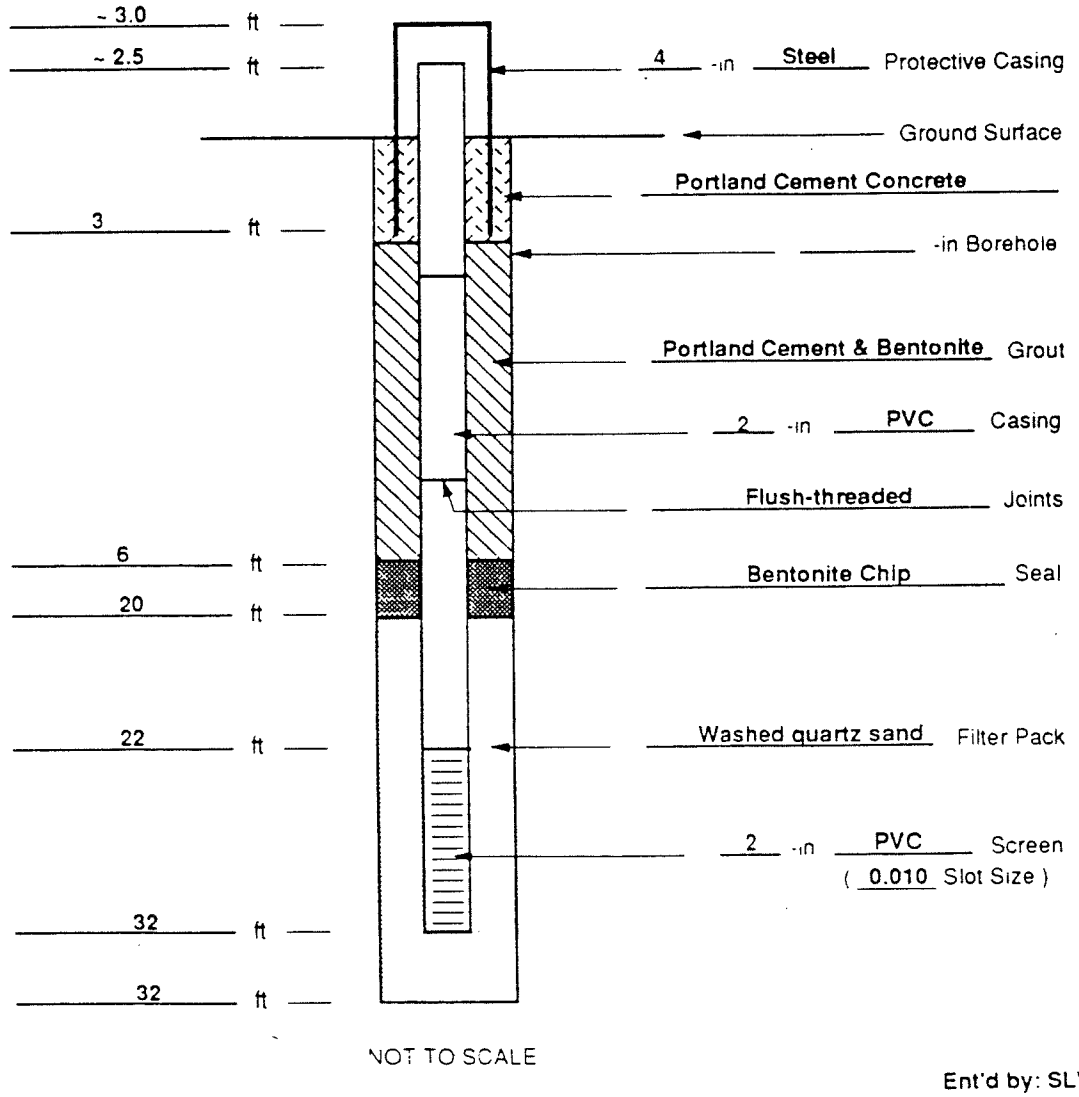
Well Construction Diagram

Project No 60003.06
Well No. MW-103

General Information

Client: **Ohio EPA**	Well No.: **MW-103**
Site Location: **South Dayton Dump, Dayton, Ohio**	Date Completed: **April 9, 1996**
PSARA Geologist: **R. Stuck**	Drilling Method: **4.25-in. I.D. HSA/8.25 in.**
Drilling Contractor: **JEDI**	Depth to Static Water (ft): **5.80 (4/23/96)**

Construction Details



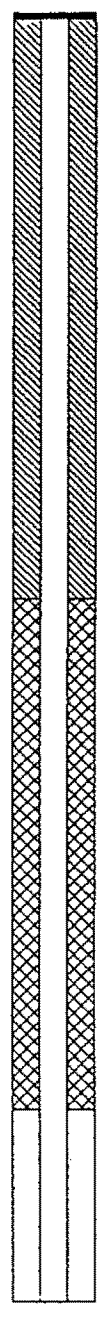
Ent'd by: SLW
Ck'd by: MES
Date: 6/4/96

FORM NO. 305.0

LOG OF BORING .W-201

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



LITHOLOGY

DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
0							CLAY AND SILT; dark brown; moist
5	708.3	13					- brown; moist
		21		13			
		21					SAND (coarse) AND GRAVEL (fine); brown; wet
		18					
		14					CLAY AND SILT; brown; wet
		12		12			
		10					SAND (coarse) AND GRAVEL (fine); brown; wet; trace of cobbles
		12					
		7					
10	703.3	7		8			
		10					
		10					
		7					- medium and fine sand; brown; wet
		14		9			
		10					- course gravel and cobbles; brown; wet
		12					
		9					- medium and fine sand; brown; wet
		9		10			
		11					
15	698.3	10					
		7					
		58		13			- fine gravel
		12					
		12		15			
		13					
		12					
		5					- fine sand; brown; wet
20	693.3	8		15			

00018

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): 32.0
DATE STARTED: 05/21/98
DATE FINISHED: 05/21/98
GEOLOGIST: Mark E. Berkich
PROJECT NO: 0279.44.07

GS ELEVATION (MSL): 713.3
TOP OF CASING (MSL): 715.27
WELL DEVELOPED: 05/21/98

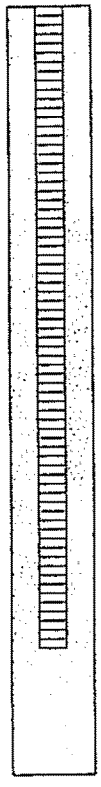
DATE PRINTED: 06/25/1998

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING .W-201

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
20		11					- medium and course sand, fine gravel and cobbles; wet
		13					
		5					
		12		15			
		17					
		13					
		10					
		20		17			
		14					
		17					
25	688.3	6					
		10		18			
		15					
		17					
		8					
		11		17			
		13					
		17					
30	683.3	8					
		12		20			
		16					
		18					
							Boring terminated at 32.0 feet
35	678.3						
40	673.3						

LITHOLOGY

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *32.0*
DATE STARTED: *05/21/98*
DATE FINISHED: *05/21/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

GS ELEVATION (MSL): *713.3*
TOP OF CASING (MSL): *715.27*
WELL DEVELOPED: *05/21/98*

DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-202

COOLIDGE, WALL, WOMSLEY & LOMBARD

Grillot/Moraine, Ohio

WELL DIAGRAM

STICK-UP WITH STEEL CASTING/ LOCKED

VOLCLAY GROUT

2 INCH PVC CASING

DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							SILT, ROCK FRAGMENTS AND GLASS (FILL)
5	726.3	5					CLAY AND SILT; rock fragments; brown; moist
		13		18			
		22					
		22					
		14					SAND (medium) AND GRAVEL; light brown, slightly moist
		20		13			
		25					
		25					
		33					
		45		14			
10	721.3	29					
		38					
		10					
		16		10			
		14					
		19					
		18					
		20		11			
		22					
		24					
15	716.3	18					
		24		13			- medium and course sand; trace of fine gravel; light brown; moist
		24					
		23					
		24					
		16		12			- medium sand; light brown; moist
		20					
		39					
		35					
20	711.3	68		7			

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *41.0*
DATE STARTED: *05/21/98*
DATE FINISHED: *05/21/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

GS ELEVATION (MSL): *731.3*
TOP OF CASING (MSL): *733.39*
WELL DEVELOPED: *05/21/98*

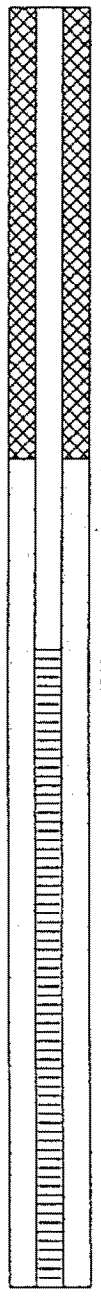
DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-202

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
20		33					- medium sand and fine gravel; trace of cobbles; light brown; moist
		22					
		7					
		17		0			
		10					- spoon wet
		7					
		8					- course sand and gravel; trace of cobbles; gray; wet; some black
		16		20			
		18					- medium sand; trace of gravel; reddish-orange; wet
		21					
25	706.3	28					- course and medium sand; reddish-orange; wet
		34		17			
		20					
		19					
		6					
		10					
		12					
		11		15			
		12					
		46					
30	701.3	24					- course sand and fine gravel; trace of cobbles; light gray; wet
		26		20			
		11					
		18					- course and medium sand; reddish-orange; wet
		42					
		26		14			- course sand and fine gravel; trace of cobbles; gray; wet
		6					
		16					- course and medium sand; reddish-orange; wet
		19					
35	696.3	10		16			
		11					
		20					
		30					
		45		10			
		5					
		7					
		25					
		50					
		17					
40	691.3	9					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *41.0*
DATE STARTED: *05/21/98*
DATE FINISHED: *05/21/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

GS ELEVATION (MSL): *731.3*
TOP OF CASING (MSL): *733.39*
WELL DEVELOPED: *05/21/98*

DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-202

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM

LITHOLOGY

DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
40		14					
		28					
							Boring terminated at 41.0 feet
45	686.3						
50	681.3						
55	676.3						
60	671.3						

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *41.0*
DATE STARTED: *05/21/98*
DATE FINISHED: *05/21/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

GS ELEVATION (MSL): *731.3*
TOP OF CASING (MSL): *733.39*
WELL DEVELOPED: *05/21/98*

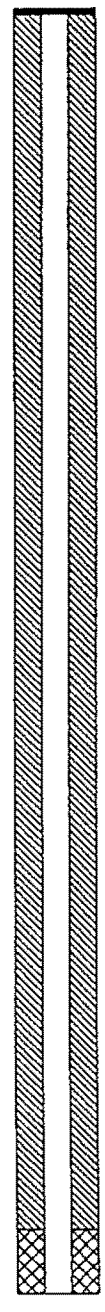
DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-203

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (Ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							SILT AND CLAY; brown; dry (FILL)
							- concrete fragments
5	723.5						
		4					- no recovery; augered to 10.0 feet
		3					
		6					
		2					
10	718.5	5					- medium sand and gravel; brown; dry-moist
		7		14			
		12					
		10					
		7					- red brick and wood fragments mixed with black clay and medium sand; slight petroleum odor
		8		23			
		5					SAND; fine; light brown; moist
		8					
		7					
15	713.5	10		17			- medium sand and gravel; light brown, moist
		25					
		16					
		15					
		21		13			
		26					
		17					
		29					- course sand and gravel; brown; very moist
		20		14			
		28					
20	708.5	24					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *38.0*
DATE STARTED: *05/21/98*
DATE FINISHED: *05/21/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

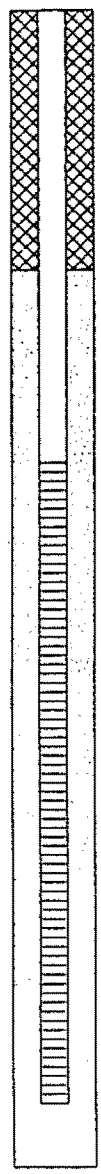
GS ELEVATION (MSL): *728.5*
TOP OF CASING (MSL): *730.33*
WELL DEVELOPED: *05/21/98*

DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-203
COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
20		20					- wet
		25		15			
		29					
		19					
		15					
		37		12			- clay lamanations: wet
		34					
		24					
		20					
25	703.5	10		14			- yellowish orange
		40					
		75					
		6					- course sand and gravel; tellowish orange; wet
		12		15			
		23					
		24					
		11					- medium sand; trace of gravel; yellowish orange
		11		18			- course sand and gravel; gray; wet
		10					
		12					
30	698.5	11					
		17		13			
		16					
		15					
		11					
		13		14			- black course sand and gravel; slight petroleum odor
		12					
		14					- medium sand and gravel; gray; wet
		14					
		13		17			
35	693.5	16					
		25					
		17					
		23					
		27					
		25					
40	688.5						Boring terminated at 38.0 feet

LITHOLOGY

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *38.0*
DATE STARTED: *05/21/98*
DATE FINISHED: *05/21/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

GS ELEVATION (MSL): *728.5*
TOP OF CASING (MSL): *730.33*
WELL DEVELOPED: *05/21/98*

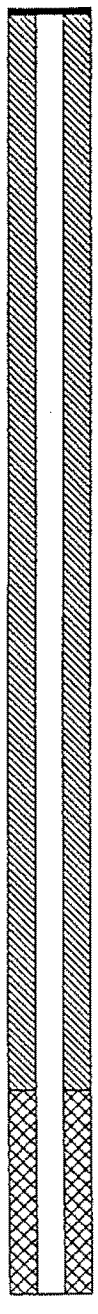
DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-204

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							- FINE SAND AND CLAY; brown; concrete fragments; dry (FILL)
5	715.8	1					- sand; foundry; moist
		2		5			
		2					- fine grained; trace of foundry; little clay; brown; dry; stiff
		2					
		4					
		4		1			
		3					
		3					- clay; brown; some fine sand; several cobbles; moist
		3					
10	710.8	2		18			
		3					
		4					
		4					
		5		12			
		5					
		4					
		4					
		3		24			
		5					
		5					
15	705.8	5					
		5		5			
		4					
		4					
		5					- coarse sand and clay
		4		17			- clay and fine sand
		5					- clay and black foundry sand; wet
		14					
		13					
20	700.8	4		16			

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *33.0*
DATE STARTED: *05/19/98*
DATE FINISHED: *05/19/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

GS ELEVATION (MSL): *720.8*
TOP OF CASING (MSL): *722.89*
WELL DEVELOPED: *05/19/98*

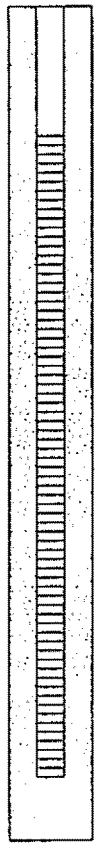
DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-204

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
20		7					~~coarse sand and gravel; brown, little~~ clay; wet
		7					- little course foundry sand; odor
		5					
		4		4			- brown clay and fine sand
		4					
		3		21			
		3					- course sand and gravel
		4					CLAY AND SILT; brown; trace of gravel
		2					
		3		0			
25	695.8	1					
		1					
		2					
		1		1			
		1					
		3					SAND (course) AND GRAVEL
		2					
		7		23			
		23					
		33					
30	690.8	48					- gray silty clay; moist
		12					- course sand and gravel; gray; wet
		25					
		34					
		55					
		3					
							Boring terminated at 33.0 feet
35	685.8						
40	680.8						

LITHOLOGY

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *33.0*
DATE STARTED: *05/19/98*
DATE FINISHED: *05/19/98*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.07*

GS ELEVATION (MSL): *720.8*
TOP OF CASING (MSL): *722.89*
WELL DEVELOPED: *05/19/98*

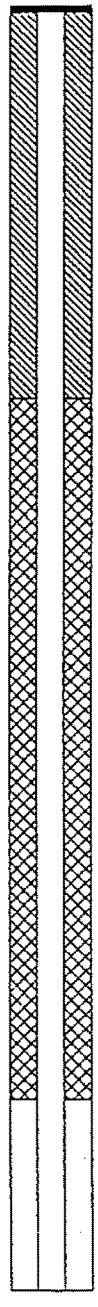
DATE PRINTED: *06/25/1998*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-206

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (Ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							CLAY AND SILT; brown; moist; some fine sand
		5		16			
		8					- some fine gravel; light brown; wet
5		18					
		25					
		7		20			- mottled brown gray; wet
		13					
		12					- grades coarse sand and gravel; light brown; wet
		15					
		16		22			SAND AND GRAVEL; coarse sand; light brown; wet
		12					
		10					
		10					
10		13		24			SAND; coarse; little silt; light brown; wet
		11					- grades to silt; light brown; changing to gray; very moist
		19					
		36					
		2		24			
		4					- medium grained; little silt and clay
		6					- grades to fine sand and silt; light brown; wet
		15					
		2		24			
		15					- medium sand; little silt; light brown to gray; wet
15		26					
		16					
		7		24			SAND AND SILT; fine grained sand; trace of clay; light gray; moist
		15					
		32					
		26					
		7		20			- light gray; wet
		15					
		19					
20		27					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *33.0*
DATE STARTED: *02/11/99*
DATE FINISHED: *02/11/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

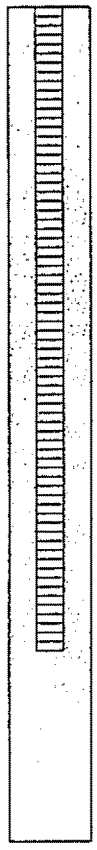
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-206

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
20		6		20			- light brown; moist
		12					- 3 inches of silt; light brown; moist
		24					- medium grained sand; light brown
		28					
		3		24			SAND; medium grained; grades to coarse, light brown; wet
		3					
		9					
		22					
		15		24			- fine and coarse sand; light brown; wet
25		18					
		28					
		26					
		15		24			
		26					
		36					
		34					
30							
35							
40							

Boring terminated at 33.0 feet

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *33.0*
DATE STARTED: *02/11/99*
DATE FINISHED: *02/11/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

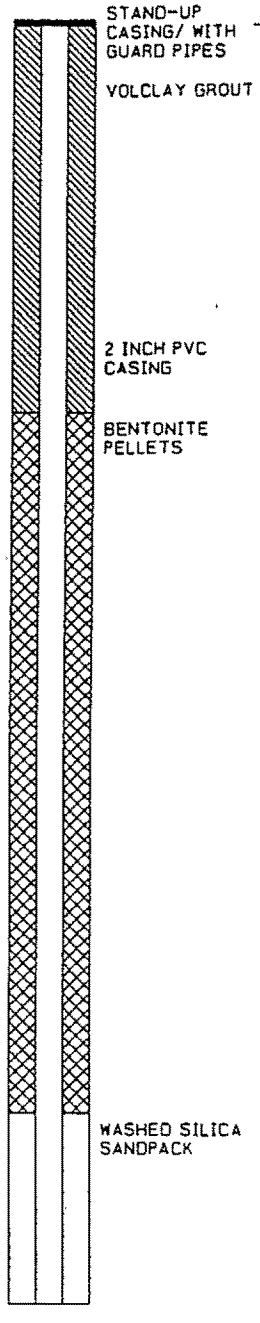
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-207

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							CLAY AND SILT: dark brown; moist
		7		8			SAND: coarse; some fine gravel; trace of silt; light brown; wet
5		13					
		13					
		21					
		20		11			SAND AND GRAVEL: coarse sand; light brown; trace of silt; wet
		20					
		50/3					
		8		24			- gray; moist to wet
		27					
		27					- grades yellow orange
		24					
10		10		24			SAND: medium; some silt; trace of fine gravel; light brown; wet
		15					
		11					
		15					- no samples taken from 12.0 - 18.0 feet
15							
		10		24			- coarse sand, little coarse gravel; light brown; wet
		14					
		18					
20		25					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *34.0*
DATE STARTED: *02/11/99*
DATE FINISHED: *02/11/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

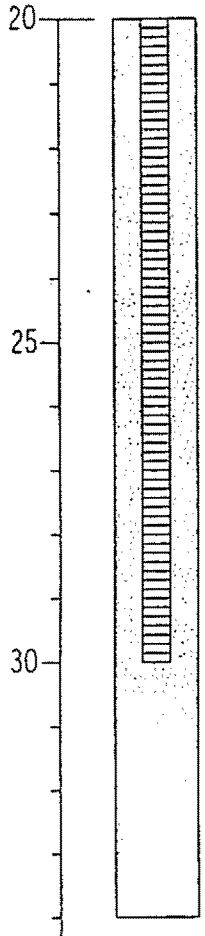
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-207

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
20							~~- no samples taken from 20.0 - 24.0~~ feet
		20 2 5 17		24			- medium sand; light brown; wet
25							
		10 6 7 17		24			- grading to coarse sand and fine grained gravel
30							
							Boring terminated at 34.0 feet
35							
40							

LITHOLOGY

▽ – initial ground-water level
▼ – stabilized ground-water level

TOTAL DEPTH (Ft.): *34.0*
DATE STARTED: *02/11/99*
DATE FINISHED: *02/11/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

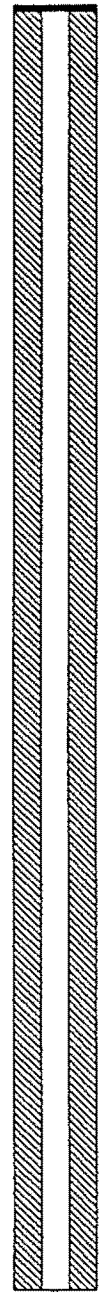
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-208

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							SILTY SAND; red brick; some cobbles; moist (FILL)
5		4		14			- silt and sand; brown; glass fragments
		8					- grades to light brown; rock fragments; moist
		10					
		18					
		50/1		2			- brown
10		13		10			SAND; medium; little coarse gravel; light brown; moist
		27					
		27					
		35					
		10		13			SILT AND SAND; brown
		25					
		44					
		50					
		7		14			SAND (medium) AND GRAVEL (coarse); light brown; moist
15		25					
		45					
		50/5					
		22		14			
		32					
		50/5					
		25		20			
		30					
		34					
20		33					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *43.0*
DATE STARTED: *02/09/99*
DATE FINISHED: *02/09/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

DATE PRINTED: *03/04/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-208
COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM

DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
20		11		17			
		19					- coarse sand; light brown; wet
		16					
		25					
		24		12			
		26					
		50/4					
		8		13			- medium sand and fine gravel; light brown; wet
25		7					
		5					
		6					
		6		24			- grades fine sand; light brown; wet
		6					
		10					
		12					
		16		24			SAND; fine grained; little silt; light brown; wet
		14					
		17					
		18					
30		6		24			
		20					
		19					
		18					
		12		24			- trace of coarse gravel and silt; wet
		16					
		23					
		19					
		7		24			
		40					
35		50/5					
		5		24			- trace of silt
		20					
		30					
		32					
		5		24			
		27					
		50/5					SAND (coarse) AND GRAVEL (fine); gray; wet
40		33					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *43.0*
DATE STARTED: *02/09/99*
DATE FINISHED: *02/09/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

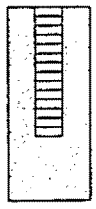
GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

DATE PRINTED: *03/04/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-208
COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
40		50/3		24			SAND; fine grained; light brown,
							Boring terminated at 43.0 feet
45							
50							
55							
60							

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *43.0*
DATE STARTED: *02/09/99*
DATE FINISHED: *02/09/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

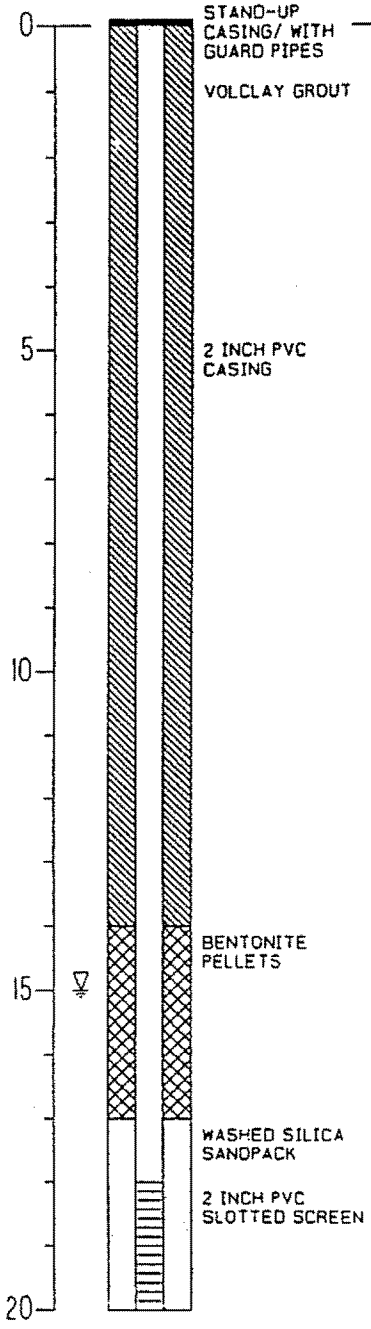
DATE PRINTED: *03/04/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-209

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
						CLAY AND SILT; brown; very moist
	15		13			- sand (fine) and silt; some clay; trace of rock and red brick fragments; brown; moist
	4					
	6					
	13					
	7		12			- grades to brown clay; rock fragments; moist
	6					
	7					
	8					
	4		14			- silty sand; some fine gravel; trace of red brick fragments; brown; moist
	2					
	2					
	4					
	7		12			- silty sand, red brick and black asphalt; moist
	30					
	9					
	14					
	3		0			NO RECOVERY
	3					
	7					
	7					
	1		24			SAND (FINE) AND SILT; trace of clay; gray
	2					- wet
	2					
	1					
	7		13			SAND (coarse) AND GRAVEL; gray; wet
	12					
	17					
	30					
	50/5/2		6			

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *26.0*
DATE STARTED: *02/15/99*
DATE FINISHED: *02/15/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

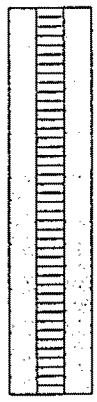
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-209

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
20		50/2		5			
		7		20			- light gray - some silt
		6					
		12					
		27					
		17		24			- light gray; wet
		15					
25		24					
		24					
							Boring terminated at 26.0 feet
30							
35							
40							

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *26.0*
DATE STARTED: *02/15/99*
DATE FINISHED: *02/15/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

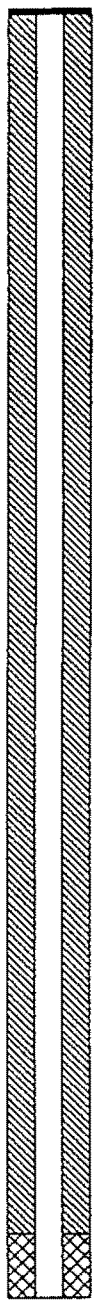
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-210

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							FILL MATERIAL
5							
		2		1			- sand and gravel; brown; dry
		3					- gray clay on tip
		3					
		7					
		3		8			- black slag; dry
		10					CLAY AND SAND; dark brown
		19					
		25					
10		5		10			SAND AND GRAVEL; brown; rock fragments
		15					
		13					
		7					
		9		15			
		23					
		19					
		19					
		23		16			
		21					
15		20					- light brown; rock fragments; dry
		15					
		12		14			
		17					
		12					
		11					
		11					NO RECOVERY
		30					
		35					
20		35					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *36.5*
DATE STARTED: *02/08/99*
DATE FINISHED: *02/08/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

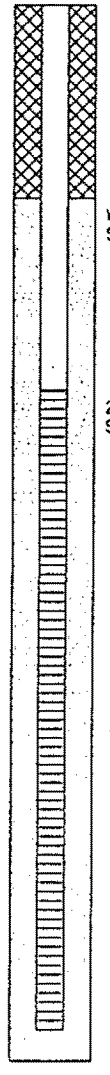
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-210

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (Ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
20		13		10			SAND (coarse) AND GRAVEL; grading to a medium to fine sand; brown; wet
		14					
		10					
		10					
		11		17			SAND; medium; brown; grades to coarse sand and gravel; wet
		18					
		37					
		28					
		15		18			SAND (coarse) AND GRAVEL; brown; wet
25		10					
		12					
		9					
		13		20			SAND; medium; some fine gravel; brown; wet
		14					
		17					
		9					
		12		12			
		50/1					
30		17		24			- rock fragments at bottom of spoon
		35					
		25					
		22					
		17		20			- fine sand; brown; grades coarse sand and gravel
		35					
		24					- medium sand, gray; some clay; wet
		24					
		22		18			- medium sand; brown; wet
		15					
35		35					TILL; gray; moist
		25					
		20					
40							Boring terminated at 36.5 feet

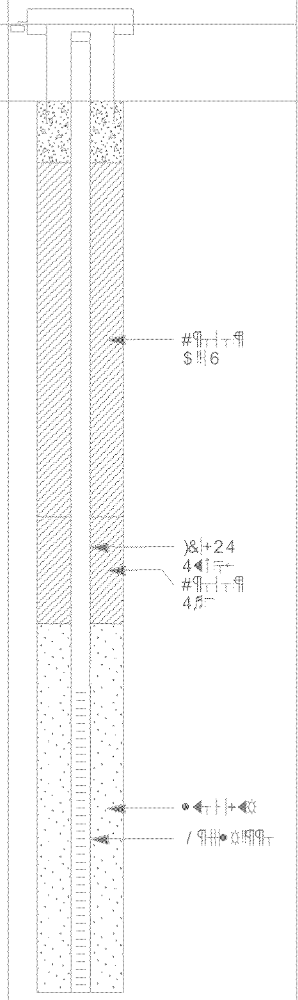
▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *36.5*
DATE STARTED: *02/08/99*
DATE FINISHED: *02/08/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio



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+1>@34 |-:└#31A|%'"%C .,3|4>└+┘3 3.A|@6┐¶|(|) 8

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┘>4, ⊡>-A||└┤╟◄⊡¶|>♫⊡ B⊡3┘.|+31•>--3┘A|.┐|1□¶╟

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)	• /0$ / ├•,-.├|$1,23┘ ⊡B⊡┘=╟┤ !¶╟╫ ╟◄⊡¶╟ ╟◄⊡¶╟ ⊡◄⊡ ! ◄⊡ ├┬¶├ ||¶├6! ├◄┬¶├ ⊡◄¶├ ├◄!! ├◄⊡ ||┤╫	• └ ├•⊡ 5•,-.⊡B⊡┘= ⊡◄ ! ◄⊡ ├┬¶├ ├◄┬¶├	┤┤╟╫ ├◄⊡¶├ ├◄!! ├◄⊡	¶╟╫ !┤╫		C%*┐*%	
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7	4┘├4┘,5⊡B⊡┘=⊡♫╫ ├◄┬├ ├┬¶├ ⊡◄!!¶ ↑◄┬├ ├!! ╟♂| ├◄↑⊡⊡	╟♂┬ ||┤╫	C%(┐)% C% ┐7%	
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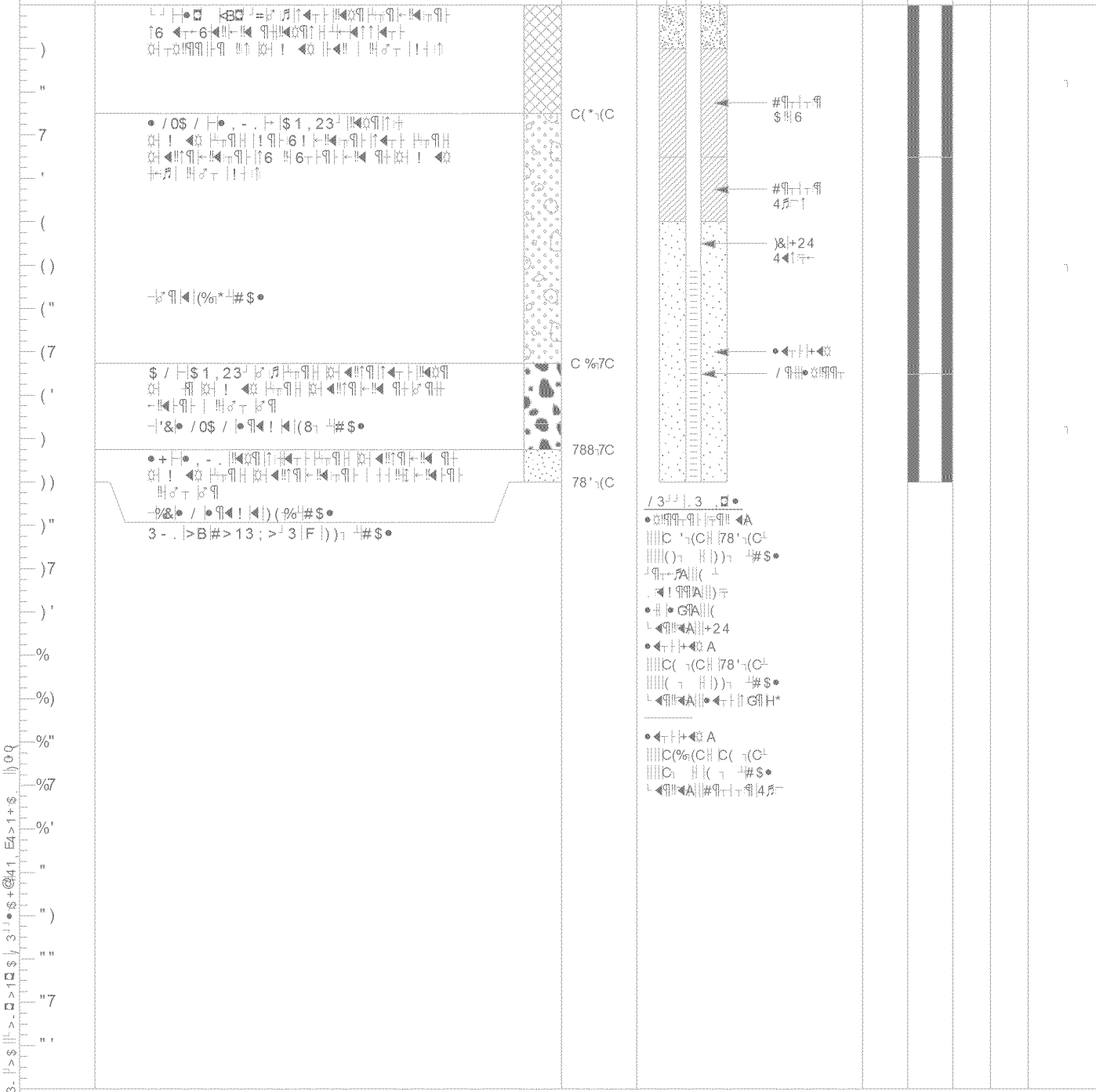

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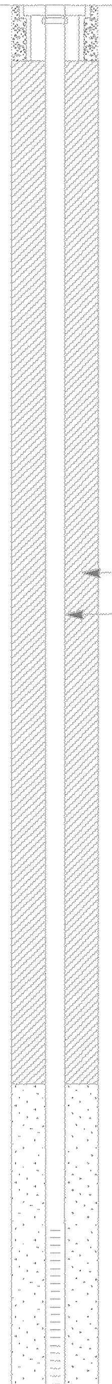

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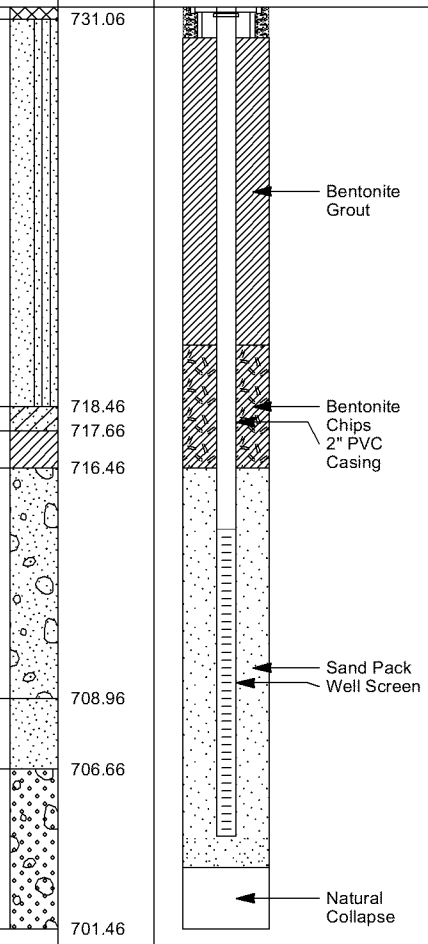
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-225
DATE COMPLETED: 25 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
	GROUND SURFACE	731.46
	SM - SILTY SAND (FILL), with clay; trace fine to coarse gravel; compact; fine to coarse grained; poorly graded; dark brown; moist	731.06
	SP/SM - SAND & FLY ASH (FILL), compact, fine grained sand; silt to sand size fly ash; gray; moist; trace brick and slag debris - no clay; light brown at 2.0ft BGS - trace fly ash; medium brown at 2.7ft BGS - with fine gravel at 8.0ft BGS	
	SC - CLAYEY SAND (FILL), trace silt and fine gravel; compact; fine to coarse grained; poorly graded; brown; moist	718.46 717.66
	CL - SANDY CLAY (FILL), with fine to coarse gravel; firm; fine to coarse sand; low plasticity; brown; moist	716.46
	SP/GP - SAND & GRAVEL, trace silt; compact; fine to coarse sand; fine to coarse gravel; light brown; moist - wet at 19.8ft BGS	
	SP - SAND, trace silt and fine gravel; compact; fine to coarse grained; poorly graded; brown; wet	708.96
	SW/GW - SAND & GRAVEL, trace silt; compact; fine to coarse sand; fine to coarse gravel; well graded; brown; wet	706.66
	END OF BOREHOLE @ 30.0ft BGS	701.46



WELL DETAILS
Screened interval:
714.46 to 704.46ft
17.00 to 27.00ft BGS
Length: 10ft
Diameter: 2in
Slot Size: 10
Material: PVC
Sand Pack:
716.46 to 703.46ft
15.00 to 28.00ft BGS
Material: Sand size #5

Sand Pack:
730.46 to 720.46ft
1.00 to 11.00ft BGS
Material: Bentonite Grout

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	Headspace PID (ppm)
				0.7
				0.5
				0.8
				1.0
				0.8
				0.9

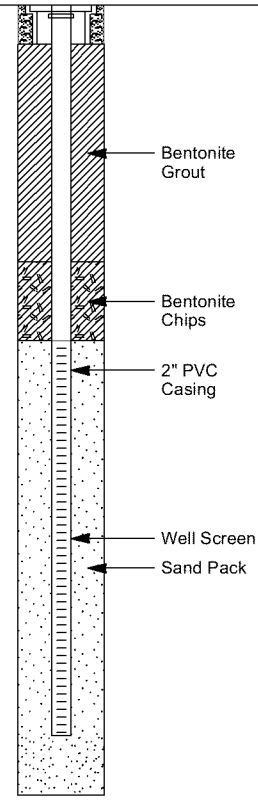
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-226
DATE COMPLETED: 26 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
	GROUND SURFACE	721.42
2	CL - SANDY CLAY (FILL), with silt; trace fine gravel; soft; fine to coarse sand; low plasticity; brown; moist	
		718.42
4	SC - CLAYEY SAND (FILL), trace fine gravel; loose to compact; fine to coarse grained; poorly graded; brown; moist to wet	718.22
6	CL - SILTY CLAY (FILL), trace fine sand to fine gravel; firm; low plasticity; light brown and gray; moist; trace metal and glass debris	
8		
10	CL - SANDY CLAY, trace silt and fine gravel; very soft; fine to medium sand; low plasticity; brown and gray; moist	711.92
12		
14	SM/SC - SAND, with silt and clay; trace fine gravel; loose; fine to coarse grained; poorly graded; brown; wet	708.92
16	SP - SAND, trace silt and fine gravel; compact; fine to coarse grained; poorly graded; brown; wet	705.92
18		
20	END OF BOREHOLE @ 20.0ft BGS	701.42
22		
24		
26		
28		
30		
32		
34		



WELL DETAILS
Screened interval:
712.92 to 702.92ft
8.50 to 18.50ft BGS
Length: 10ft
Diameter: 2in
Slot Size: 10
Material: PVC
Sand Pack:
714.92 to 701.42ft
6.50 to 20.00ft BGS
Material: Sand size #5

Sand Pack:
720.42 to 714.92ft
1.00 to 6.50ft BGS
Material: Bentonite Grout

SAMPLE				
NUMBER	INTERVAL	REC (%)	'N' VALUE	Headspace PID (ppm)
				0.5
				1.8
				1.6
				1.8

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-227
DATE COMPLETED: 25 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE Headspace PID (ppm)
	GROUND SURFACE	736.23						
	SM - SILTY SAND (FILL), with fine gravel; compact; fine to coarse grained; poorly graded; dark gray; moist; trace metal and asphalt debris							
2	SP - SAND (FILL), with fine gravel; compact; fine to coarse grained; poorly graded; brown and gray; moist	734.23						0.5
4	FLY ASH (FILL), compact, silt size; dark gray; moist; with wood and metal debris - no debris at 5.0ft BGS	732.23						
6								
8	SP - SAND (FILL), with fine gravel; trace silt; compact; fine to coarse grained; poorly graded; brown; moist; trace metal and glass debris	729.23	Bentonite Grout					0.2
10								
12	- with fine to coarse gravel; trace cobble; no debris at 11.0ft BGS							1.3
14								
16			2" PVC Casing					
18	- with silt; trace fine to coarse gravel at 17.5ft BGS		Bentonite Chips					2.9
20								
22								1.8
24	SW - SAND; with fine gravel; trace silt; compact; fine to coarse grained; well graded; brown; moist	713.23						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-227
DATE COMPLETED: 25 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE Headspace PID (ppm)
26	SP - SAND, with silt and fine to coarse gravel; compact; fine to coarse grained; poorly graded; brown-gray; wet - trace silt; no gravel; fine to medium grained at 26.0ft BGS	711.23	Sand Pack Well Screen					2.6
28	SW/GW - SAND & GRAVEL, trace silt; compact; fine to coarse sand; fine gravel; brown-gray; wet	708.03						
30								
32								2.0
34			Natural Collapse					
	END OF BOREHOLE @ 35.0ft BGS	701.23						
36								
38								
40								
42								
44								
46								
48								

WELL DETAILS
Screened interval:
714.23 to 704.23ft
22.00 to 32.00ft BGS
Length: 10ft
Diameter: 2in
Slot Size: 10
Material: PVC
Sand Pack:
716.23 to 703.23ft
20.00 to 33.00ft BGS
Material: Sand size #5

Sand Pack:
735.23 to 721.23ft
1.00 to 15.00ft BGS
Material: Bentonite Grout

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-228
DATE COMPLETED: 26 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE Headspace PID (ppm)
	GROUND SURFACE	735.88						
	ASPHALT	735.68						
2	SP/GP - SAND & GRAVEL (FILL), trace silt; compact; fine to coarse sand; fine gravel; dark brown; moist	732.88						0.8
4	CL - CLAY (FILL), with fine to coarse sand and fine gravel; firm; low plasticity; brown & gray; moist; trace brick debris	731.88						
	RED BRICK DEBRIS (FILL)	731.28						
6	MIX OF SAND & RED BRICK DEBRIS (FILL), compact; fine to coarse sand; poorly graded; dark gray to black sand; red & tan brick; moist	730.28	Bentonite Grout					1.7
8	MIX OF SAND, FLY ASH & BRICK DEBRIS (FILL), compact; fine to coarse sand; silt size fly ash; gray to black sand and fly ash; red and tan brick; moist	727.88						
10	FLY ASH (FILL), compact; silt size; dark gray; wet; trace slag, glass and brick debris	723.88						
12	CL - CLAY (FILL), with silt; trace fine sand; firm; low plasticity; brown to dark gray; moist; trace fly ash	721.38	2" PVC Casing Bentonite Chips					1.8
14	SP/GP - SAND & GRAVEL (FILL), trace silt; fine to coarse sand; fine to coarse gravel; brown; moist; trace brick and concrete debris	718.38						
16	SM - SILTY SAND, trace fine to coarse gravel;							1.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-228
DATE COMPLETED: 26 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE Headspace PID (ppm)
20	compact; fine to coarse grained; poorly graded; light brown; moist							
		714.88						
22	SP - SAND, with fine to coarse gravel; trace silt; compact; fine to coarse grained; poorly graded; brown; moist							3.8
		712.88						
24	SW/GW - SAND & GRAVEL, trace silt; compact; fine to coarse sand; fine to coarse gravel; well graded; brown; moist to wet - wet at 23.5ft BGS		Sand Pack; Well Screen					
26								
28								2.9
30	END OF BOREHOLE @ 30.0ft BGS	705.88						
32								
34								

WELL DETAILS
Screened interval:
716.88 to 706.88ft
19.00 to 29.00ft BGS
Length: 10ft
Diameter: 2in
Slot Size: 10
Material: PVC
Sand Pack:
718.88 to 705.88ft
17.00 to 30.00ft BGS
Material: Sand size #5

Sand Pack:
734.88 to 722.88ft
1.00 to 13.00ft BGS
Material: Bentonite Grout

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-229
DATE COMPLETED: 26 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE Headspace PID (ppm)
	GROUND SURFACE	737.35						
2	SC/CL - SAND & CLAY (FILL/TOPSOIL), compact, fine to coarse sand; low to non plastic; dark brown; moist							
	FLY ASH, silt size; soft; dark gray; wet	734.85						1.5
4								
6								
8								1.9
	- mix of fine to coarse sand, slag, brick and fly ash debris at 9.0ft BGS		Bentonite Grout					
10	- fly ash at 10.0ft BGS							
	- 0.5' red brick and wood debris seam at 11.0ft BGS							
12								2.7
14	SP/GP - SAND & GRAVEL (FILL), trace silt; compact; fine to coarse sand; fine to coarse gravel; brown to dark brown; moist; trace to with brick and concrete debris	723.35						
16			2" PVC Casing					
18			Bentonite Chips					2.8
20	CL - SANDY CLAY, with silt; soft; fine to coarse sand; low plasticity; brown; moist	717.35						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SOUTH DAYTON DUMP AND LANDFILL SITE
PROJECT NUMBER: 038443-70
CLIENT: PRP Group
LOCATION: Moraine, Ohio

HOLE DESIGNATION: MW-229
DATE COMPLETED: 26 March 2010
DRILLING METHOD: SONIC
FIELD PERSONNEL: D. Rivers

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE Headspace PID (ppm)
22	- dark brown at 22.0ft BGS - brown at 22.5ft BGS							2.7
24	- with fine to coarse gravel at 24.8ft BGS							
26	SP/GP - SAND & GRAVEL, trace silt and clay; compact; fine to coarse sand; fine to coarse gravel; poorly graded; brown; wet	711.85						
	SW/GW - SAND & GRAVEL, trace silt; compact; fine to coarse sand; fine to coarse gravel; well graded; brown; moist to wet	710.75	Sand Pack Well Screen					2.4
28								
30	SP - SAND, trace silt and fine gravel; compact; fine to coarse grained; poorly graded; brown; wet	707.35						
	SP/GP - SAND & GRAVEL, trace silt and clay; compact; fine to coarse sand; fine to coarse gravel; poorly graded; brown; wet; trace 1-2" clay nodules	706.35						
32								2.3
34			Natural Collapse					
	END OF BOREHOLE @ 35.0ft BGS	702.35						
36								
38								
40								

WELL DETAILS
Screened interval:
715.35 to 705.35ft
22.00 to 32.00ft BGS
Length: 10ft
Diameter: 2in
Slot Size: 10
Material: PVC
Sand Pack:
717.35 to 704.35ft
20.00 to 33.00ft BGS
Material: Sand size #5

Sand Pack:
736.35 to 721.35ft
1.00 to 16.00ft BGS
Material: Bentonite Grout

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

APPENDIX A.3

OU2 MONITORING WELL STRATIGRAPHIC AND INSTRUMENTATION LOGS

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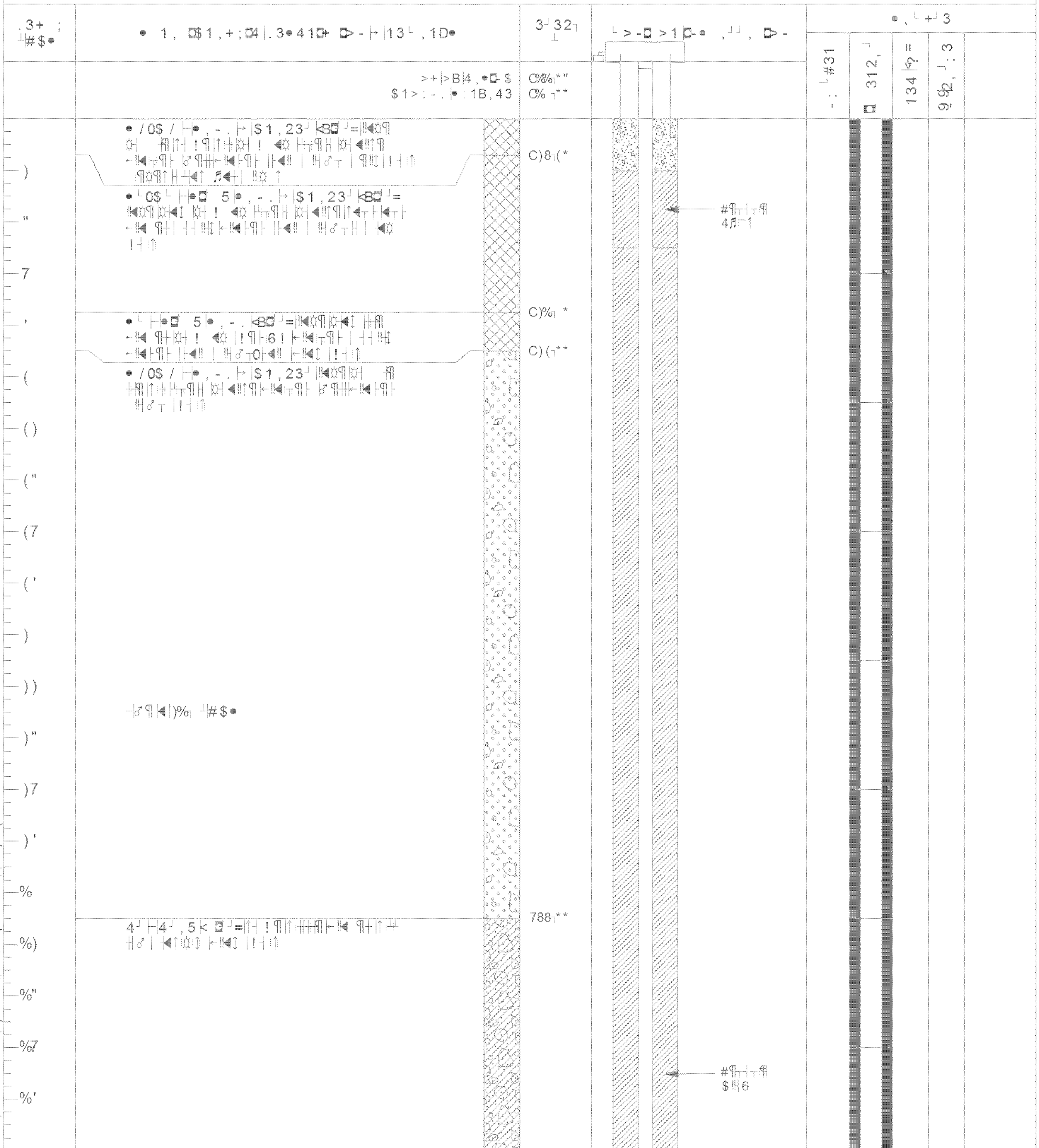

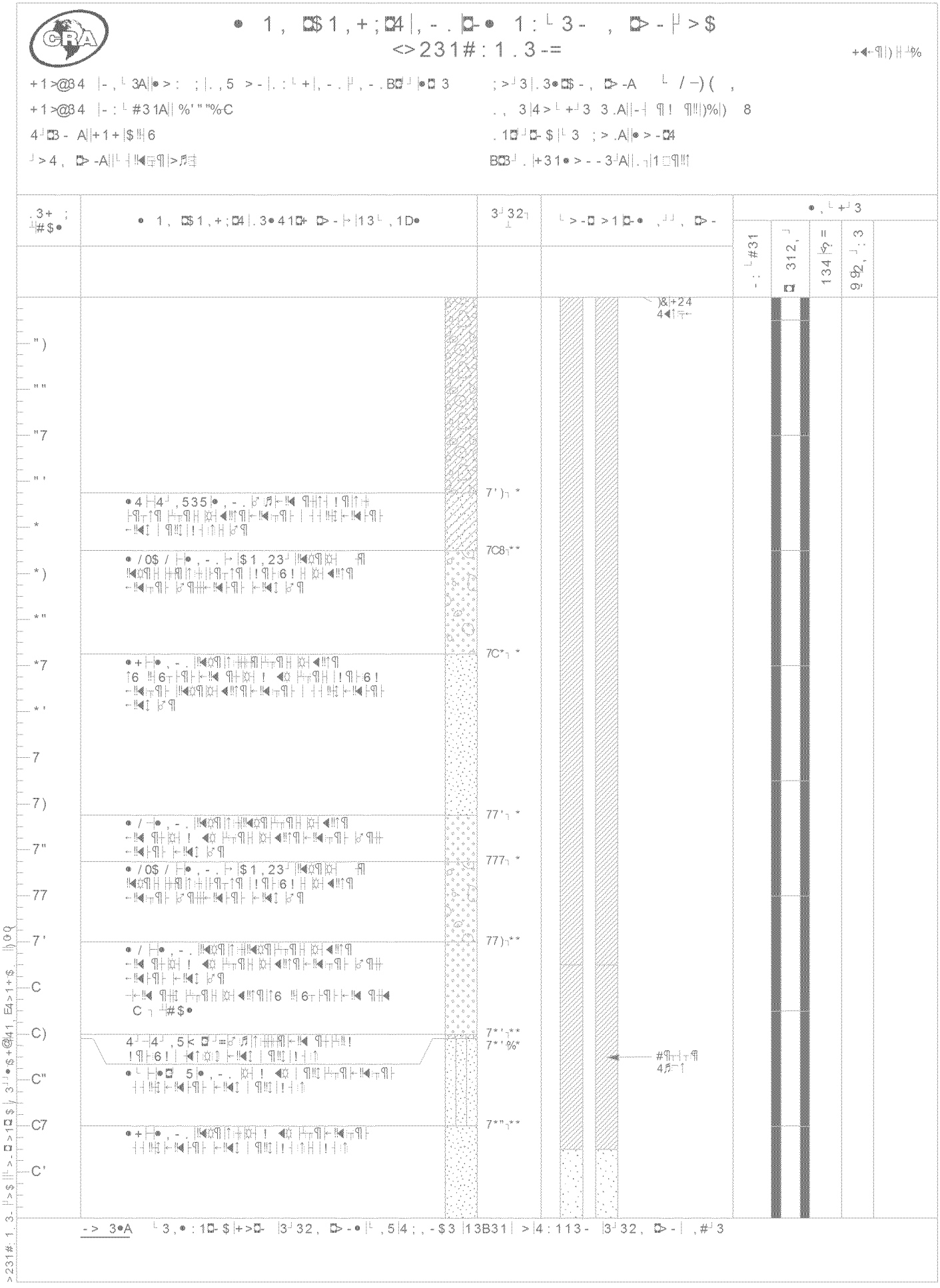
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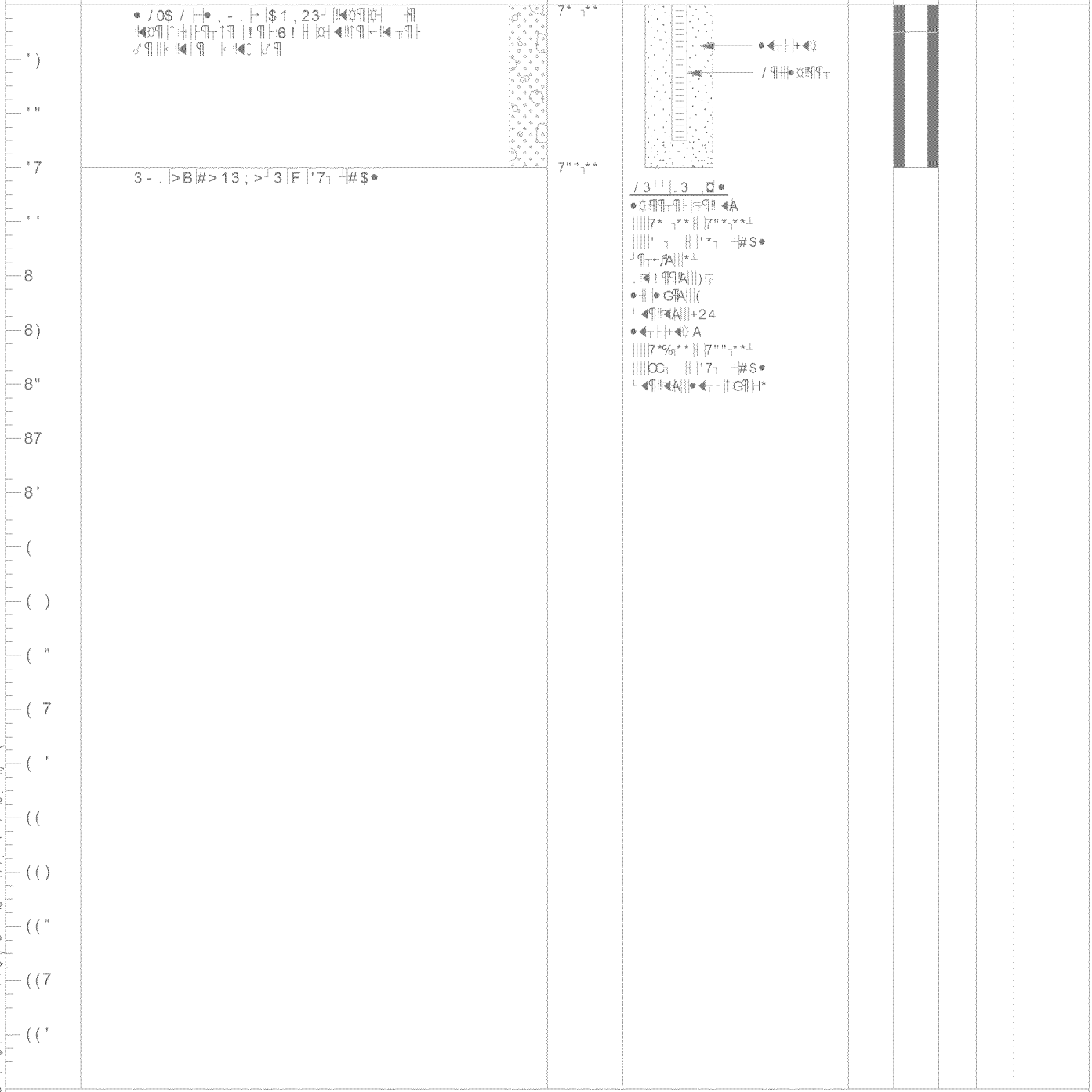

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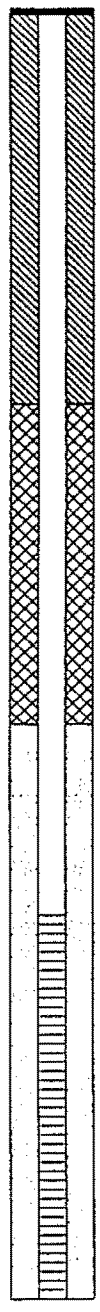
LOG OF BORING P-211

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							CLAY AND SILT; black; some gravel; moist (FILL)
		20		6			- black cinder, recd brick and fine gravel
		12					
5		16					
		13					
		5		2			CLAY AND SILT; light brown; wet
		2					- fine gravel; black
		2					
		2					
		1		8			- dark gray; roots; wet
		2					
		2					
		10					
10		5		10			SAND; some clay and fine gravel; dark gray; wet
		17					
		7					
		8					
		3		1			SAND (fine) AND SILT; dark gray; wet
		2					
		3					
		4					
		2		2			
		1					
15		2					
		8					
		5		12			- trace of fine gravel; light gray; wet
		7					
		10					
		13					
		14		18			SAND; fine; light gray; wet
		13					- grades to silt; trace of clay and fine gravel; moist
		17					
20		24					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *24.0*
DATE STARTED: *02/12/99*
DATE FINISHED: *02/12/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

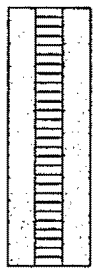
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING P-211

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
20		18					SILT; trace of clay and fine gravel; light gray; moist
		28					
		24					
		40					
		18					SAND; fine; trace of silt and clay; light gray; wet (TILL)
		50/5					
							Boring terminated at 24.0 feet
25							
30							
35							
40							

▽ – initial ground-water level
▼ – stabilized ground-water level

TOTAL DEPTH (Ft.): *24.0*
DATE STARTED: *02/12/99*
DATE FINISHED: *02/12/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

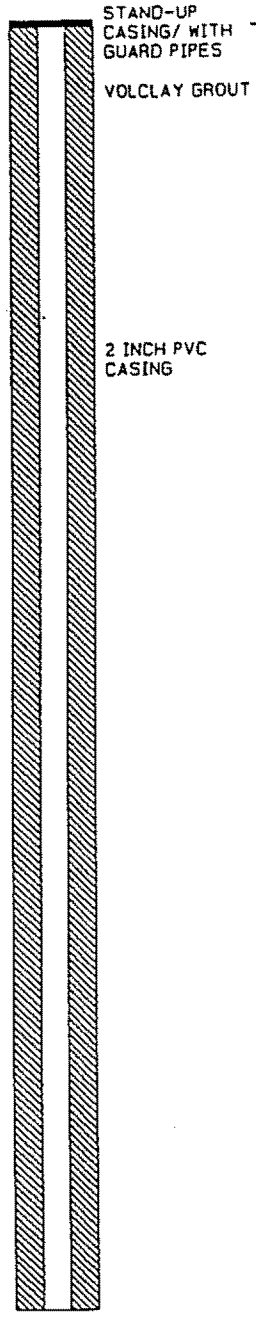
DATE PRINTED: *03/03/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-212

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0							FILL MATERIAL
		16		18			- silt and sand (fine); rock and wood fragments; black; moist
		7					
		11					
		10					
10		11		5			- black silt and brown fine sand; very moist
		9					
		4					
		1					
		1/24		10			- foundary sand; black; very moist
		50/5		12			- red brick fragments; very moist
15							
		11		4			- asphalt, wood fragments and red brick, moist
		10					
		7					
		6					
		16		9			- medium sand, gravel and wood fragments; black; wet
		12					
		6					
20		7					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *58.0*
DATE STARTED: *02/06/99*
DATE FINISHED: *02/06/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

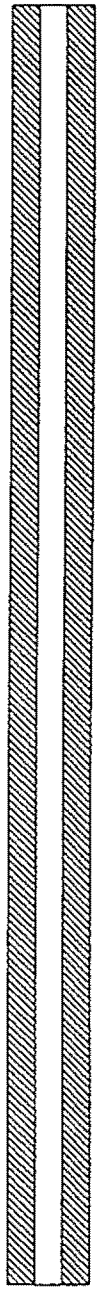
DATE PRINTED: *03/04/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-212

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



DEPTH (ft.)	ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	DESCRIPTION
20		16		5			- medium sand and coarse gravel; cobbles and wood fragments; black; wet
		12					
		6					
		7					
		36		20			- coarse sand and gravel; foundary sand and wood fragments; wet
		50/5					- white/gray; chalk/paste; moist
		19		24			- coarse sand; some gravel; black wet
25		13					
		19					
		22					
		6		24			- white/gray chalk; moist
		13					
		14					
		24					
		8		24			- wet
		9					
		7					
30		6					
		19					
		24					
		38					
35		12		18			TILL: moist
		25					
		26					
		31					
		18		20			
		22					
		25					
40		30					

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *58.0*
DATE STARTED: *02/06/99*
DATE FINISHED: *02/06/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

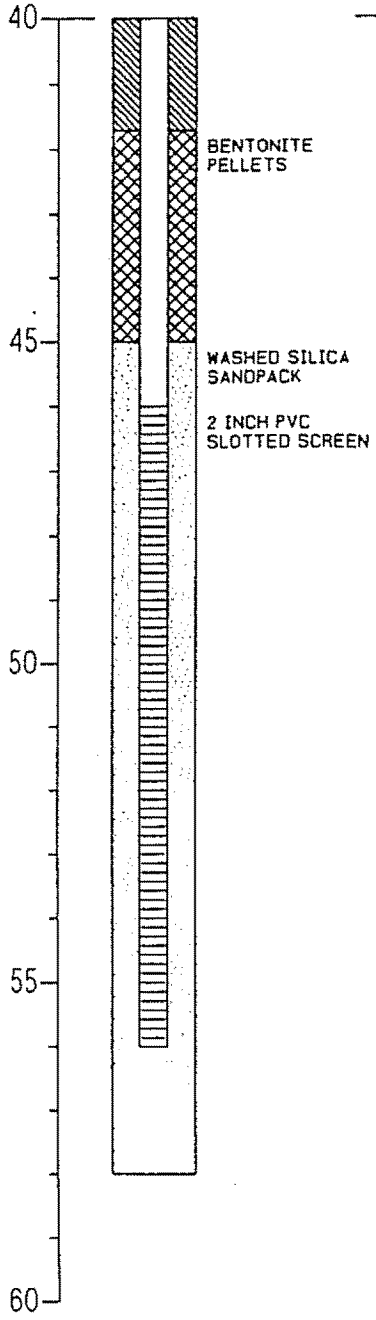
DATE PRINTED: *03/04/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

LOG OF BORING MW-212

COOLIDGE, WALL, WOMSLEY & LOMBARD
Grillot/Moraine, Ohio

WELL DIAGRAM



ELEVATION	BLOWS/6 in.	HSO (ppm)	RECOVERY (in.)	SAMPLES	GRAPHIC LOG	LITHOLOGY DESCRIPTION
	8		18			
	22					
	28					
	28					
	11		4			- wet
	34					
	50/4					
	2		17			- fine sand; light gray; wet
	2					
	4					
	7					
	13		23			- sand; coarse grades fine; light gray; wet
	22					
	21					
	21					
	12		24			
	40					
	50/4					
	27					
	50/5					
						No sample
	50		24			TILL; moist
	50/4					

Boring terminated at 58.0 feet

▽ - initial ground-water level
▼ - stabilized ground-water level

TOTAL DEPTH (Ft.): *58.0*
DATE STARTED: *02/06/99*
DATE FINISHED: *02/06/99*
GEOLOGIST: *Mark E. Berkich*
PROJECT NO: *0279.44.05*

GS ELEVATION (MSL):
TOP OF CASING (MSL):
WELL DEVELOPED:

DATE PRINTED: *03/04/1999*

The Payne Firm, Inc.
Environmental Consultants
Cincinnati, Ohio

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97	♂%&' % ├♂◘ ( ) * ' +◘ , ┘ ╟ !"¶┴↕├┤┬↕ !┬├← ! ‼¶┤┬├├¶↑├ ├┤┬ ‼¶┤┬├├-#‼ -↑├┬├ ‼¶ ┬ #‼ $↑							
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84	♂% ├♂◘ ( )◄‼¶┴┬├-↕╟ !"¶┴↕├┤┬↕ !┬├← ! ‼¶┤┬├ $┬ ‼¶├┬├ #‼ $↑	884┐71	♂¶↑├3¶┴F %┬ ♂┴‼┬↑					┐
81	♂3 ├♂◘ ( )◄‼¶┴┬├←◄‼¶┴┬├┤┬← ‼¶┤┬├ ┤-#‼ -↑├┬├ ‼¶ ┬ ╟ !"¶┴↕ !┬├← ! ‼¶┤┬├ " ‼.│ ‼¶├┬├ ‼¶.	88 ┐71						
88	♂% ├♂◘ ( )◄‼¶┴┬├┤┬ ‼¶┤┬├├-#‼ -↑├┬├ ‼¶ ┬◄‼¶┴┬├-↕╟ !"¶┴↕├┤┬↕ !┬├← ! ‼¶┤┬├ $┬ ‼¶├┬├ #‼ $↑	897┐71						
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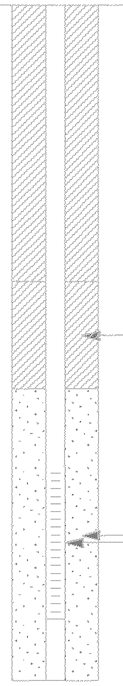

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	>+|>B|4,•⊡$ / $1>:-.|•:1B,43	C%"-78 / C%(-78		- :└#31	⊡312,┘	134└?=	9 92,┘.;3	¶◄|┤|<|+⊡
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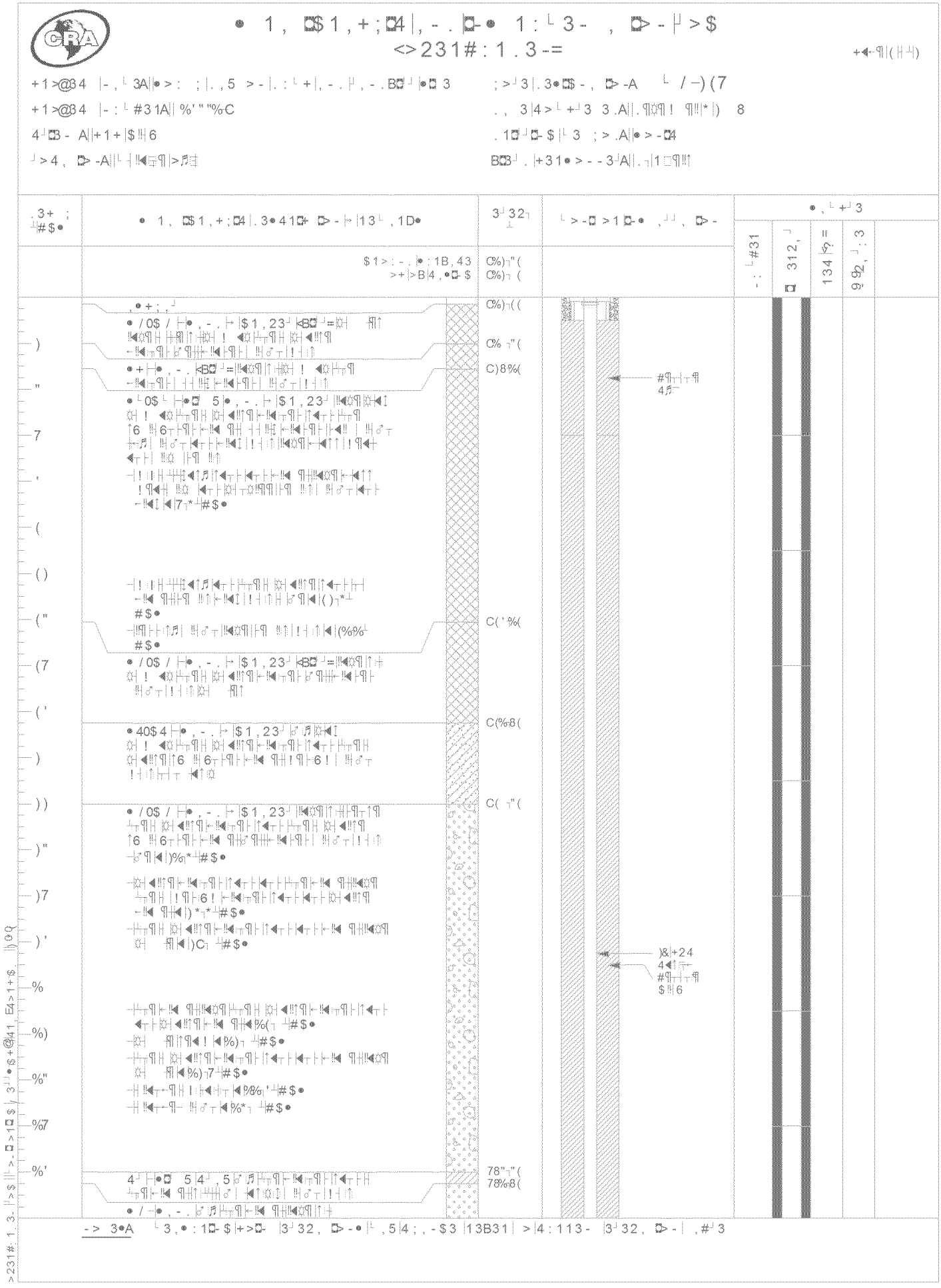

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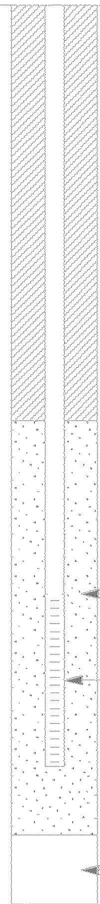

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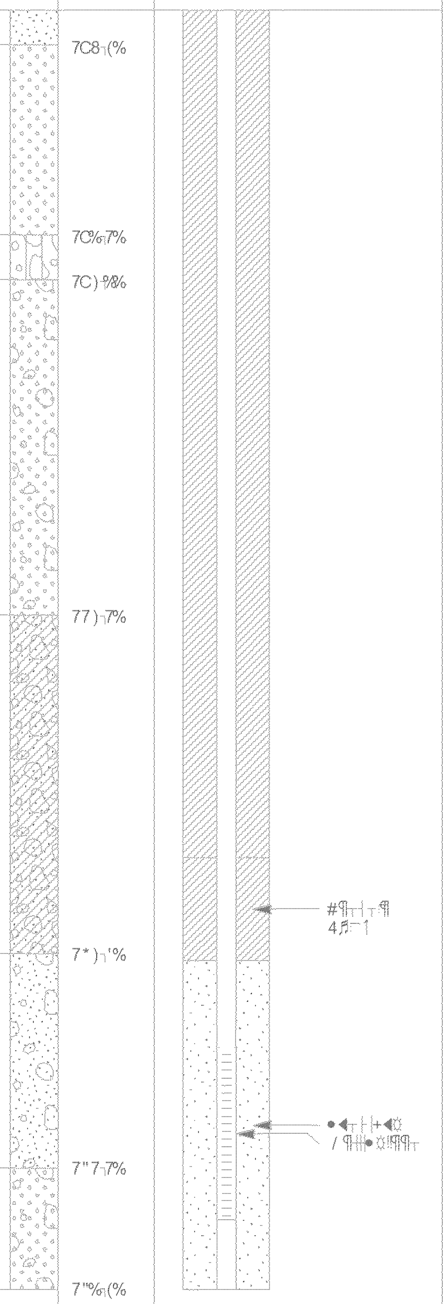

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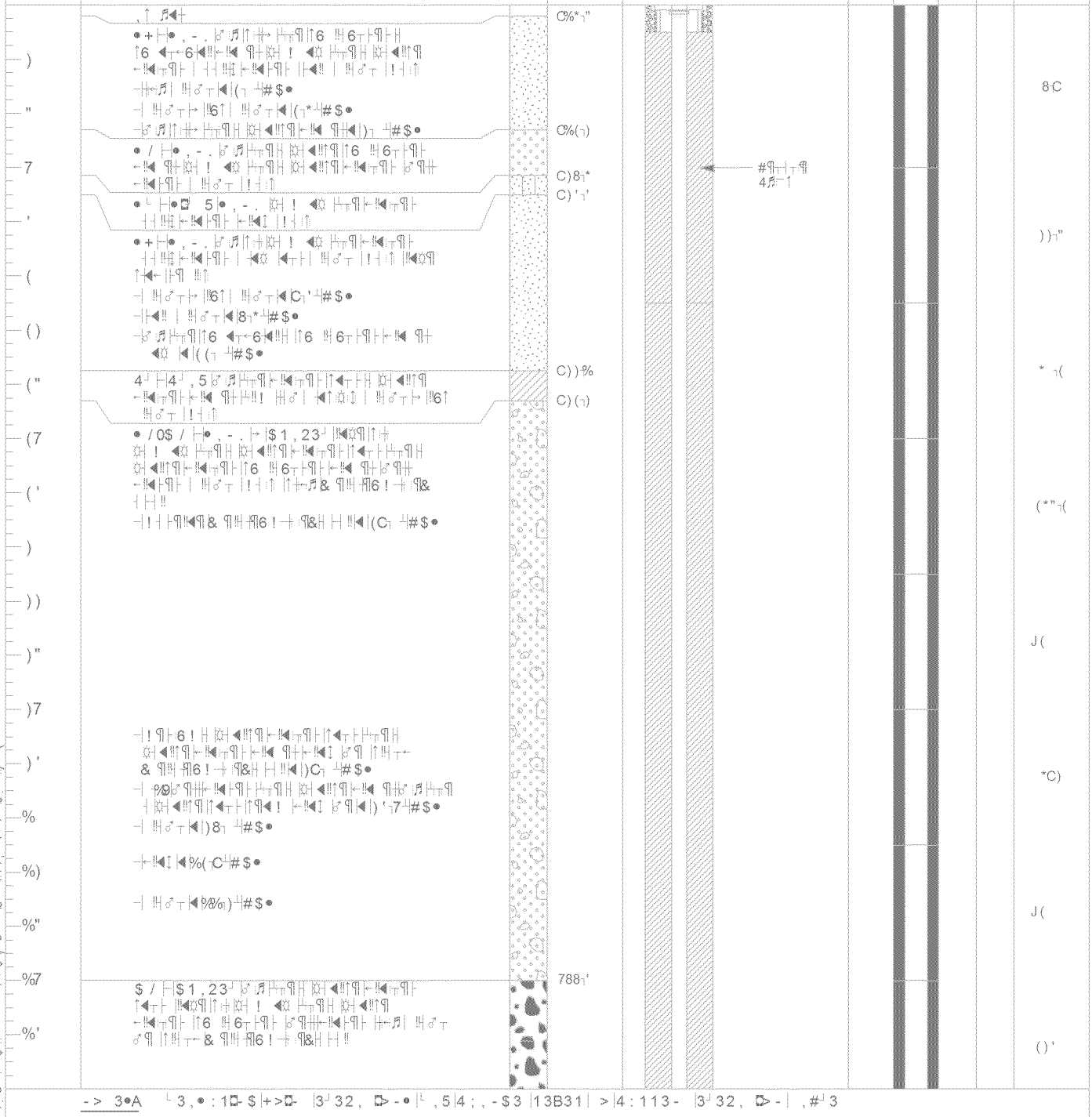

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4┘⊡3- A|+1+|$‼6 .1⊡┘⊡-$|└3 ;>.A|•>-⊡4

┘>4, ⊡>-A||└┤‼◄⊡¶|>♫⊡ B⊡3┘.|+31•>--3┘A|.┐1⊡¶‼

;3+ #$•	• 1, ⊡$1,+;⊡4|.3•41⊡+ ⊡>-├|13└,1D•	3┘32┐	└>-⊡>1⊡-• ,└└, ⊡>-	• ,└+┘3			
					- ; └#31	⊡ 312,┘	134 ⊡ =	9 92,┘.3	¶◄┤v ⊡
")	┤┐)9| ┤┤‼⊡├◄├¶├⊡◄┤├◄├├◄ ¶‼♂♫⊡┤ ⊡¶◄! ├┬¶‼ ⊡◄‼¶├◄┬¶├⊡◄┤├◄├├◄ ¶‼ ├┬♫| ‼♂┬ ♂¶ ⊡‼┬← & ¶‼ ⊡6! ┤ ⊡¶&‼ ├‼ ◄|"(┐'┴#$•	78"%	)&|+24 4◄┤┬← #¶┤┬¶ $‼6				
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"'	• / ├•, -. ♂♫├┬¶‼ ⊡◄‼¶⊡6 ‼6┬├¶├ ←◄┬¶├◄ ¶‼ ⊡◄ ! ◄⊡ ├┬¶‼ ⊡◄‼¶ ←◄┬¶├ ♂¶‼ ◄├¶├ ├◄↕ ♂¶ ⊡‼┬← & ¶‼ ⊡6! ┤ ⊡¶&‼ ├‼ ◄‼♂┬◄|"8┐*┴#$•	7''%							()*8
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7)	• /0$ / ├•, -. ├ |$1,23┘ ‼◄⊡¶⊡⊡ ⊡¶ ⊡◄‼¶├◄┬¶├⊡◄┤├◄├ ├┬¶‼ ⊡◄‼¶├◄┬¶├⊡6 ‼6┬├¶├◄ ¶‼ ├◄↕ ♂¶ !┤├¶‼◄¶& ¶‼ ⊡6! ┤ ⊡¶&‼ ├‼								
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	4┘├|4┘,5♂♫├┬¶‼ ⊡◄‼¶├◄┬¶├⊡◄┤├	7*7┐' 7*7┐*							

-> 3•A └3,•:1⊡-$|+>⊡- |3┘32, ⊡>-•|└,5|4;,-$3 |13B31| >|4:113- |3┘32, ⊡>-| ,#┘3

>231#.1 3-┘>$ ‼└>-⊡>1⊡$ ⊡ 3┘└•$+@41 E4>1+$ ‼⊡Q

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;3+ #$•	• 1, ⊡$1,+;⊡4|.3•41⊡+ ⊡>-├|13└,1D•	3┘32┐	└>-⊡>1⊡-• ,┘┘, ⊡>-	•,└+┘3 -:└#31	⊡ 312,┘	134 ⊡=	9 92,┘.:3	¶◀⊡¶ .:+⊡
	◀┐├├‼◀ ¶├┼‼! ‼♂| ◀↑⊡↕├‼◀↕ |!┤↑							
')	•/0$/├•,-.├|$1,23┘♂♫↑⊡‼◀⊡¶ ⊡◀↕ ⊡‼! ◀⊡ ├┬¶‼ ⊡‼◀‼¶├‼◀┬¶├↑◀┬├ ├┬¶ ┤⊡‼◀‼¶├‼◀┬¶├↑6 ‼6┬├¶├├‼◀ ¶├‼◀⊡¶ ⊡‼ ♂¶‼├‼◀├¶├ ├‼◀↕ ♂¶								
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'7	├‼◀⊡¶↑‼◀┬├⊡‼ ‼|↑├┬♫‼├‼◀|'7┐ ┼#$•								
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8	├‼◀⊡¶↑‼◀┬├⊡‼ ‼◀|8(┐ ┼#$•								
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87	$/├‼$1,23┘♂♫⊡‼ ‼├┬¶‼ ⊡‼◀‼¶ ├‼◀┬¶├↑◀┬├ ⊡‼! ◀⊡ ├┬¶‼ ⊡‼◀‼¶├‼◀┬¶├ ♂¶‼├‼◀├¶├ ├‼◀↕ ♂¶ ├┤‼├‼	7%8┐'							
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-> 3•A └3,•:1⊡-$|+>⊡- |3┘32, ⊡>-•|└,5|4;,-$3 |13B31| >|4:113- |3┘32, ⊡>-| ,#┘3

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┘>4, ⊡>-A||└┤‼◀⊡¶|>♫⊡ B⊡3┘.|+31•>--3┘A||.┐|1□¶‼

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;3+ ; #$•	• 1, ⊠$1,+;⊠4|.3•41⊡+ ⊡>-├|13└,1D•	3┘32┐	└>-⊡>1⊡-• ,┘┘, ⊡>-	• ,└+┘3				
				- ; └#31	⊡ 312,┘	134 <?=	9 92,┘.;3	¶◄|┤|v ⊡ ◄¶ ! ; ⊡ +⊡
(7)	┤╟┐¶╟ ⊠|◄⁉¶├⁉◄┐¶├|↑◄┐├|◄┐├|↑6 ⁉6┐├¶├ ←⁉◄ ¶╟⁉◄⊠¶⊠| ⁉◄|(*8%└#$•							
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(7'	┤ ⁉♂┐←⁉◄↕|◄|(7C┐*└#$•							
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(C)	┤┐*9| ┤┤⁉╟├⁉◄├¶├╟┐¶╟| ⊠|◄⁉¶|↑◄┐├|↑¶◄ ! ⁉◄⊠¶╟┐¶╟| ⊠|◄⁉¶├⁉◄┐¶├⁉◄ ¶╟◄|(C)┐'└ #$•		┐◄6⁉◄┤ ⊠|⁉◄ ↑¶				
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(C'	┤╟┐¶╟| ⊠|◄⁉¶├⁉◄┐¶├|↑◄┐├|╟┐¶├⁉◄┐¶├ ↑6 ⁉6┐├¶├⁉◄ ¶╟◄|(C'┐ └#$•							%%┐'
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('7	• / ├• , - . ⊠♫╟┐¶╟| ⊠|◄⁉¶├⁉◄┐¶├ ↑6 ⁉6┐├¶├⁉◄ ¶╟⊠| ! ◄⊠ ├┐¶╟| ⊠|◄⁉¶ ←⁉◄┐¶├ ⊠¶⁉◄⁉◄├¶├	⁉♂┐							
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(8	• / 0$ / ├• , - . ├ |$1,23┘ |⁉◄⊠¶↑⁉◄┐├ ⊠◄↕ ⊠| ! ◄⊠ ├┐¶╟| ⊠|◄⁉¶├⁉◄┐¶├|↑◄┐├ ├┐¶ ┤⊠|◄⁉¶├⁉◄┐¶├|↑6 ⁉6┐├¶├⁉◄ ¶╟⊠¶⁉ ←⁉◄├¶├	⁉♂┐							)┐
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-> 3•A └3,•:1⊡-$|+>⊡- |3┘32, ⊡>-•|└,5|4;,-$3|13B31| >|4:113- |3┘32, ⊡>-| ,#┘3

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. 1⧈┘⧈- $ |└ 3 ; > .A||• > -⧈4

B⧈3┘ . |+31• > - - 3┘A||. ┐|1 □¶|||

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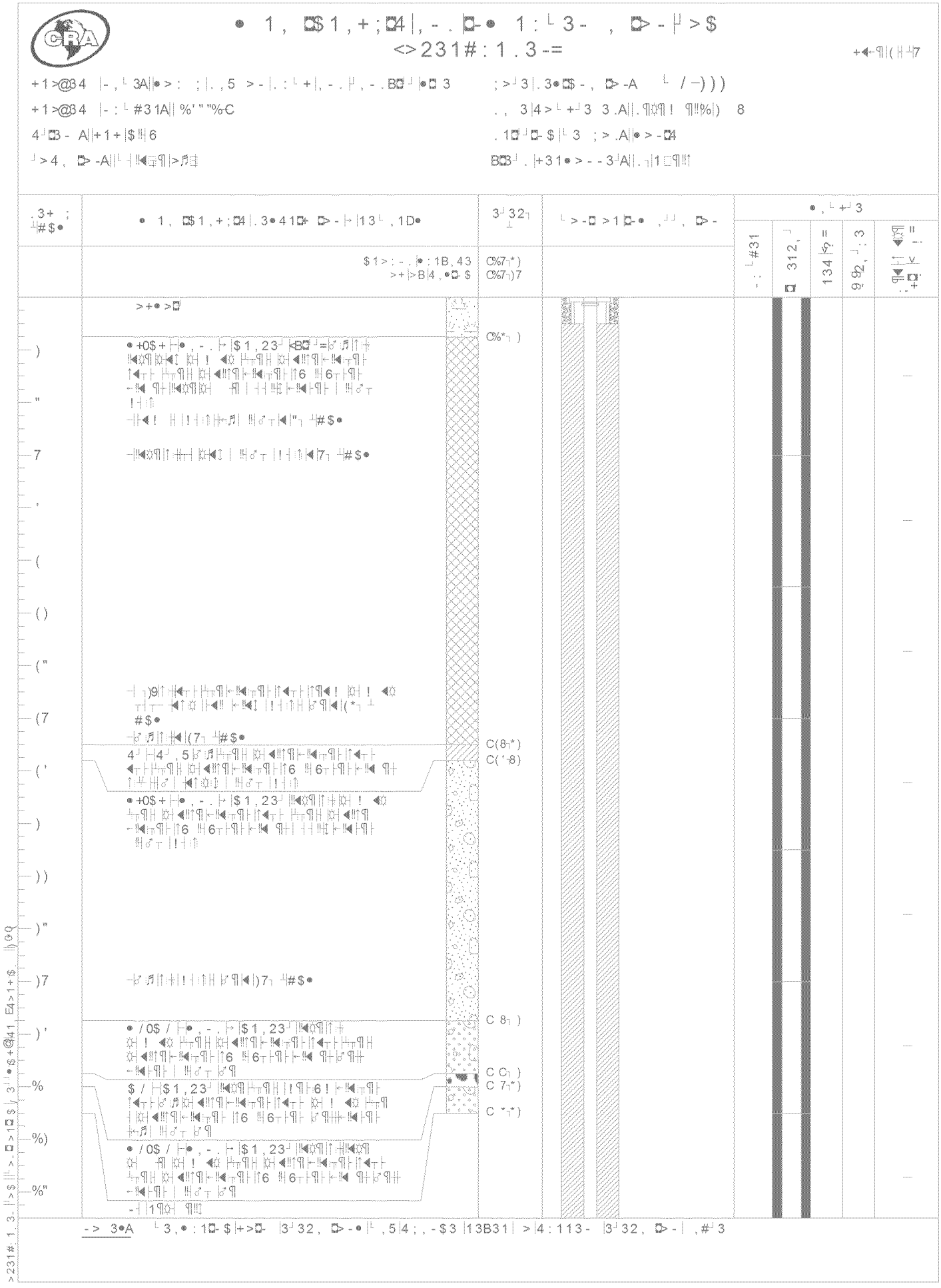

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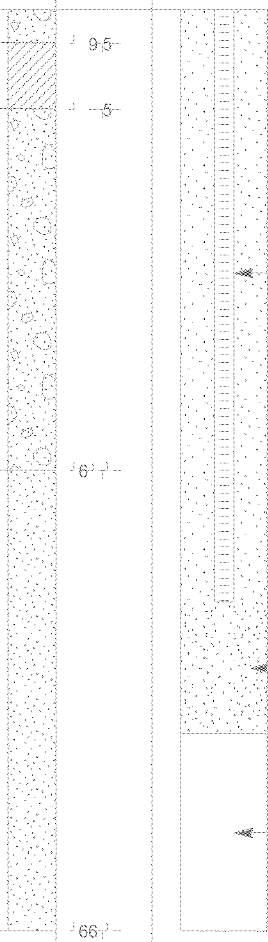

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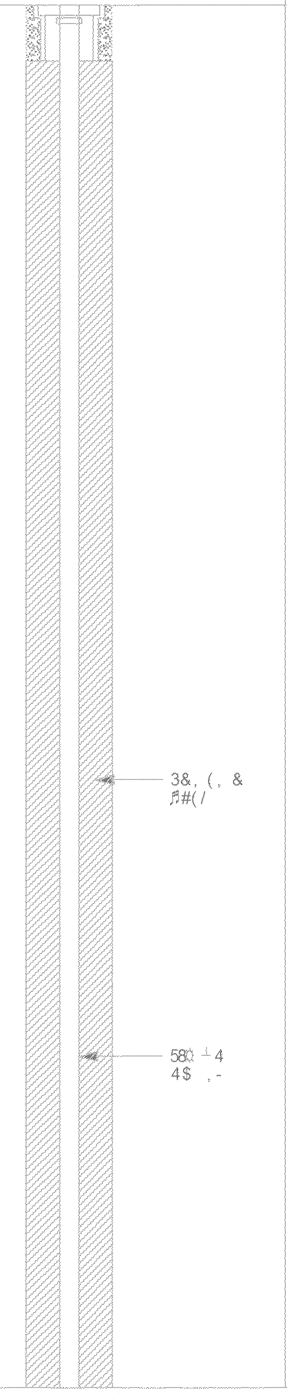

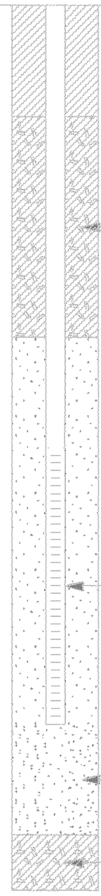

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◀ ; ┬ ◘ A = ┬ ● ◘ < ¶ ◀ ♬ ◘ ; ◀ ◘ ◘ ┬ ┴ ● ◘ ├; ◀ ◘ ◘ = ● 7 ◘ 4 ● ◀ ♬ ┬ " ◘ ¶ ┬ ↕ ┬ ¶ ◘ ; ◘ 4 < ¶ ¶ ┬ ◀ ◘ ◘ ┬ ┴ ● ◘ ├; ◀ ◘ ◘ ● 3 ┬

◻ ◻¶ ● ◻⊮ ¶ ● |4✡◀↕✡◀◻ ◻¶ < = ┬◀ ◻● ◻├; ◀✡ ; ♬
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4 ♂|┬ ◀ ◻A✡ ¶ ✡#(/ *

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↑ |┬ ♂ ↕ ✡ ┬¶◻ ; ◀◀ ┬ ♂A✡ ✡¶ 1#

↕┬ ↕↕ + ✡3♬◻	◻ ¶ ● ◻⊮ ¶ ● |4✡ ┬◻ 4¶ ├ ◻ ├; ◀✡ ✡¶ ┬ = ● ¶ C◻	┬♂┬┴┐ +	= ; ◀ ├ ◻ ; ¶ ✡◀◻ ◻ ● ♂♂ ● ◻ ├; ◀	◻● = ♂┬ ◀ < = 3 ┬ ¶	◀ ◻┬ ¶ ┴ ● ♂	¶┬ 4 ✡> →	◀ ✡● ♂ < ┬	&$ * $%& ✡ ✡*) →
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:9	◻ @♬ @✡◻ ● ◀↕ ✡ ✡♬ ¶ ● ┴┬ ♂ ✡#$%&✡ ! " %( ) *$%" ✡ , &✡ (%($# &✡ $, . "✡ , &✡ (%($# & -#$1&!"✡#$%&%(00!&"✡ &!!✡ #$. &. "✡ #$ ' "✡ &	└95 − 62	3&, (, & 4 *		5┐
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66	◻ ✡◻ ● ◀↕ ✡#$%&✡ ! ✡! ✡ , &✡ #$1&!"%( ) *$%" + , &✡ (%($# &✡ #$, &. "✡ ((# ' ✡ #$. &. "✡ #$ ' "✡ & ✡#$%&✡ , &✡ (%($# &✡ #$1&!$ ✡ 66 ✡2+ ✡3♬◻	└└ − 62	◻$, . ✡ $%E		
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↕ ● ◻┬ ⌘4 ; = ⌘┬ ◻┬ ↕A⌘= $#% ⌘5−⌘56 6

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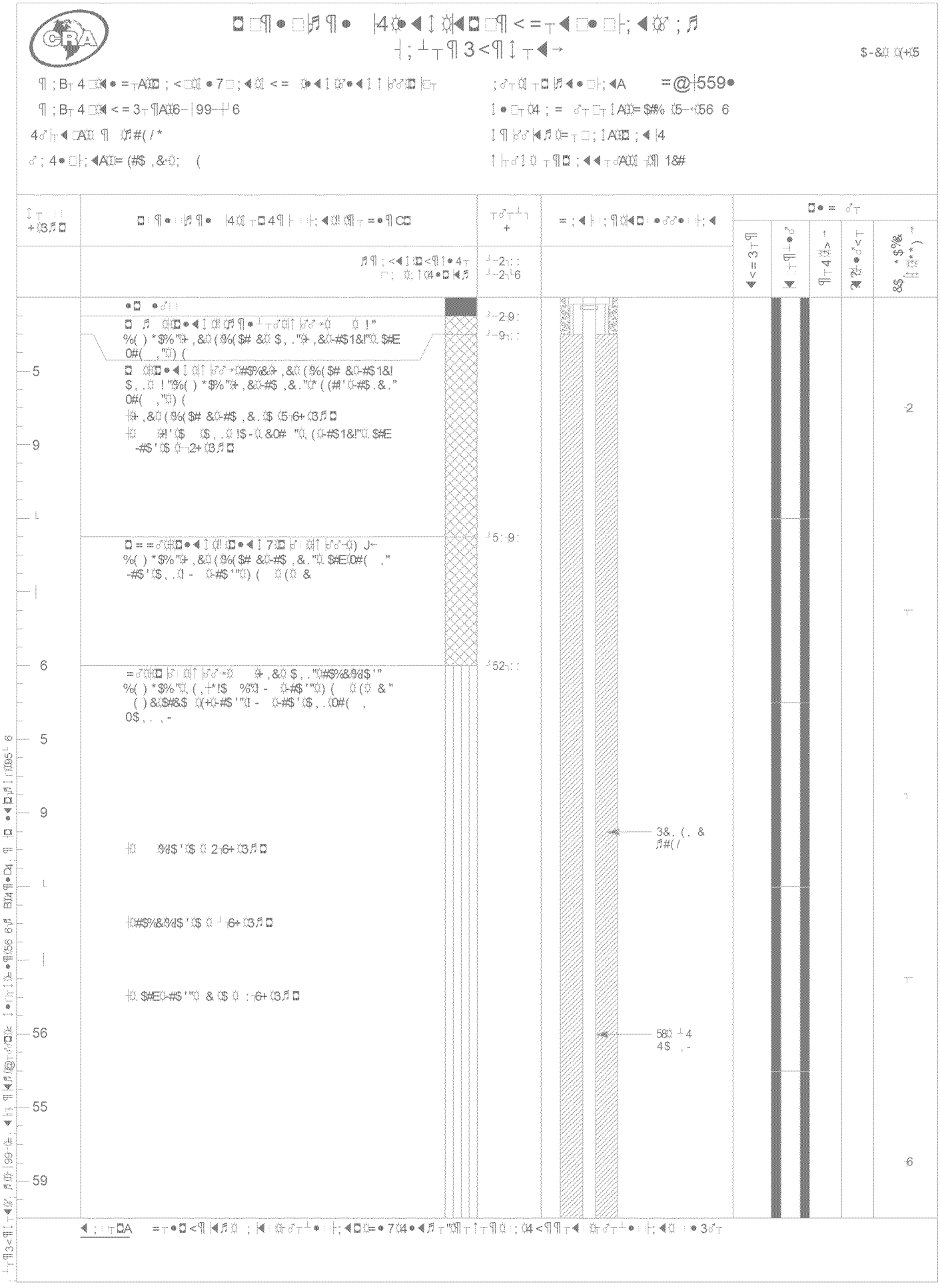

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; ⌘┬⌘ ┬◻ ⊩◀● ◻├; ◀A = @┤559●

↕● ◻┬⌘4 ; = ⌘┬ ◻┬↕A⌘= $#% ⌘5−⌘56 6

↕¶ ⊩⌘◀♬⌘=┬◻ ; ↕A⌘◻ ; ◀ |4

↑├┬⌘↕⌘ ┬¶◻ ; ◀◀┬⌘A⌘ ┤⌘¶ 1&#

↕┬ ↕↕ +⌘3♬◻	◻ ¶ ● ◻⊩ ¶ ● |4⌘ ┬◻ 4¶ ├ ◻ ◻├; ◀⌘ ⌘¶┬ = ● ¶ C◻	┬⌘┬┴┐ +	= ; ◀ ├ ◻ ; ¶⌘◀◻ ◻ ● ⌘⌘● ◻ ◻├; ◀	◻● = ⌘┬
				◀ < = 3┬¶ ◀ ◻┬¶┴●⌘ ¶┬4⌘> → ◀⌘● ⌘<┬ &$ * $%& ⌘ ⌘* *) →
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	◻ = ⌘◻ ⌘ 7◻ ● ◀↕ +⌘#$%&+ , &⌘-#$ 1&!"⌘ ((&" + , &⌘-#$, &. "⌘ ((#' ⌘-#$. &. "⌘ $#E⌘-#$ ' "⌘ &	┘6−9 :		
−9	◻ ⌘◻ ● ◀↕ -⌘ ⌘+ , &⌘ (%($# &⌘-#$ 1&!"⌘#$%& ! "%( ) * $% "⌘+ , &⌘ (%($# &⌘-#$, &. "⌘ ((#' -#$. &. "⌘#(, "⌘ & ⌘#$%&⌘ ! "⌘+ , &⌘ (%($# &⌘-#$ 1&!⌘$, . %(00!&⌘$ −9 ┤6+ ⌘3♬◻	┘65−9 :		┐
	◻ @♬ @⌘◻ ● ◀↕ ⌘ ⌘¶ ● ┴┬ ⌘-⌘#$%&⌘ ! ⌘$, . %(00!&"%( ) * $% "⌘+ , &⌘ (%($# &⌘ $, . ⌘$, . -#$ 1&!"⌘ &!!⌘-#$. &. "⌘#(, "⌘ & ⌘#$%&⌘ ┤58⌘ ! ' %⌘$ ' ⌘, (. / !& ⌘$ ⌘ └2+ ⌘3♬◻	┘66┐ : :	◻$, . ⌘ $%E	
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	┬◀↕ ⌘; ↑ ⌘3 ; ¶┬ ; ⌘┬ ⌘F ⌘9 ┐6+ ⌘3♬◻	└ : 9┐ : :	@┬⌘⌘⌘ ┬◻● ⊩◻ ◻%#&&, & . ⌘, &#1$A ⌘⌘⌘ 66┐ : : ⌘ (⌘ : 2┐ : : + ⌘⌘⌘ -2 ┤66⌘ (⌘96 ┤66+ ⌘3♬◻ ⌘&, - A⌘⌘2+ ↕ $) & &#A⌘⌘5 , ◻!(⌘◻ G&A⌘⌘ 6 = $ &# $A⌘⌘ ┴ 4 ◻$, . ⌘ $%EA ⌘⌘⌘ 6 −┐ : : ⌘ (⌘ : 9┐ : : + ⌘⌘⌘ -5 ┤66⌘ (⌘9 ┤66+ ⌘3♬◻ = $ &# $A⌘⌘◻$, . ⌘ G&⌘H2 ↕↕↕↕↕↕↕↕ ◻$, . ⌘ $%EA ⌘⌘⌘ −9┐ : : ⌘ (⌘ 6┘┐ : : + ⌘⌘⌘ ┤66⌘ (⌘5 | ┤66+ ⌘3♬◻ = $ &# $A⌘⌘3&, (, &⌘♬#(/		
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◀ ; ┬◻A = ┬● ◻ <¶ |◀♬⌘ ; |◀ ⌘┬⌘┬┴● ⌘├; ◀◻⌘= ● 7⌘4● ◀♬┬"⌘¶┬↑┬¶⌘ ; ⌘4 <¶¶┬◀ ⌘┬⌘┬┴● ⌘├; ◀⌘ ⌘● 3⌘┬

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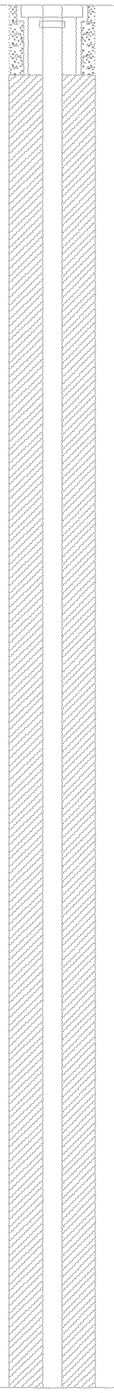

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◻ ◻¶ ● ◻⊩ ¶ ● |4 ◀ ↕ ◀◻ ◻¶ < = ◀ ◻● ◻⊢; ◀ ; ⊩
⊢; ⊥ ¶ 3<¶ ↕ ◀→

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¶ ; B 4 ◻◀ ● = A ◻ ; < ◻ ● 7 ◻ ; ◀ < = ◀ ↕ ● ◀ ↕ ↑ ◻ ◻ ◻

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; ◻ ◻ ◻ ⊩ ◀ ● ◻⊢; ◀ A = @ ⊢ 5593

↕ ● ◻ 4 ; = ◻ ◻ ↕ A = $#% 5 − 56 6

↕ ¶ ◻ ◻ ◀ ⊩ = ◻ ; ↕ A ◻ ; ◀ |4

↑ ⊢ ◻ ↕ ◻ ◻ ¶ ◻ ; ◀ ◀ ◻ A ⊩ ¶ 1&#

↕ + 3 ⊩ ◻	◻ ¶ ● ◻ ⊩ ¶ ● |4 ◻ ◻ 4 ¶ ⊢ ◻ ⊢; ◀ ◻ ¶ ◻ = ● ¶ C ◻	◻ +	= ; ◀ ⊢ ◻ ; ¶ ◻ ◀ ◻ ◻ ● ◻ ◻ ● ◻ ⊢; ◀	◻ ● = ◻
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◀ ; ⊩ ◻ A = ● ◻ < ¶ ◀ ◻ ; ◀ ⊩ ◻ ◻ = ● 7 4 ● ◀ ◻ ⊢ " ¶ ⊢ ↑ ⊢ ¶ ◻ ; 4 < ¶ ¶ ⊢ ◀ ⊩ ◻ ◻ ⊥ ● ⊩ ◻ ; ◀ ◻ ⊩ ● 3 ◻ ⊢

⊥ ⊢ ¶ 3 < ¶ ↑ ◀ ◻ ◻ ◻

◻ ◻¶ ● ◻⊮ ¶ ● |4✡◀↕✡◀◻ ◻¶ < =┬◀ ◻● ◻├; ◀✡ ; ♬ ┤; ┴┬¶ 3<¶↕┬◀→

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4♂|┬ ◀ ◻A✡ ¶ ✡⊮#(/ *

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; ♂┬ ✡ ┬◻ ⊮◀ ● ◻├; ◀A =@┼5593

↕ ● ◻┬ ✡4 ; = ♂┬ ◻┬ ↕A✡= $#% ✡5 − ✡56 6

↕ ¶ ⊮♂ |◀♬ ✡=┬ ◻ ; ↕A✡◻ ; ◀ |4

↑ |┬♂↕ ✡ ┬¶◻ ; ◀◀┬♂A✡ ✡¶ 1&#

↕┬ ↕↕ +✡3♬◻	◻ ¶ ● ◻⊮ ¶ ● |4✡┬◻ 4¶ ├ ◻ ├; ◀✡ ✡¶┬ = ● ¶ C◻	┬♂┬┴┐ +	= ; ◀ ├ ◻ ; ¶✡◀◻ ◻ ● ♂♂ ● ◻ ├; ◀	◻ ● = ♂┬
				◀ < = 3┬¶ / ◀ ┬¶┴● ♂ / ¶┬ 4✡> ↑ / ◀✡ ● ♂ < ┬ / &$ * $%& ↕✡ *) ↑
	◻@♬ @✡◻ ● ◀↕✡ ♬ ¶ ● ┴┬♂✡#$%&✡ ! " %( ) * $% "✡ , &✡ (%($# &✡ $, . "✡ , &✡ (%($# & -#$1&!"✡#$%&%(00!&"✡ &!!✡-#$. & . "✡#(, "✡ &	└9┘:			
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	◻ ✡◻ ● ◀↕ ✡#$%&✡ ! ✡$, . ✡ , &✡ (%($# &✡-#$1&!" %( ) * $% "✡ , &✡ (%($# &✡-#$, & . "✡ ((# ' ✡-#$. & . " ✡#(, "✡ &	└└6┐: :		
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┴┬¶3<¶↕┬◀✡ ♬✡ |99 ✡ ◀↕¶ ◀♬ @✡ ♂◻✡ ↕ ● ↕↕ ✡ ● ¶56 6♬ B✡4¶ ● ◻4 ¶ ◻ ● ◀◻♬↕✡85 6

◻ ◻¶ ● ◻⊩ ¶ ● |4✡◀↕✡◀◻ ◻¶ < =┬◀ ◻● ◻├; ◀✡ ; ♬ ┤; ┴┬¶ 3<¶↕┬◀→

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¶ ; B┬ 4 ◻◀ ● =┬A✡◻ ; < ◻✡ ● 7◻ ; ◀✡ < = ✡● ◀↕✡ ● ◀↕↑ ⊩♂◻ |◻┬

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4♂├┬◀ ◻A✡ ¶ ✡#(/ *

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; ♂┬✡ ┬◻ ⊩ ◀● ◻├; ◀A =@┼5593

↕● ◻┬✡4 ; = ♂┬ ◻┬ ↕A✡= $#% ✡5−✡56 6

↕¶ ⊩♂ ◀♬✡=┬◻ ; ↕A✡◻ ; ◀ |4

↑ ├┬♂↕✡ ┬¶◻ ; ◀◀┬♂A✡ ✡¶ 1&#

↕┬ ↕↕ +✡3♬◻	◻ ¶● ⊩⊩ ¶●	4✡┬◻4¶├ ⊩├; ◀✡ ⊩¶┬ =●¶C◻	┬♂┬┴┐ +	= ; ◀ ├ ; ¶✡◀◻ ⊩●♂♂● ⊩├; ◀	◻● = ♂┬ ◀ < = 3┬¶	◀ ┬¶┴●♂	¶┬4✡> →	◀ ✡● ♂<┬	&$ * $%& ⊩✡* *) →
| 5	✡#$%&✡ ,&✡-#$1&!✡$ ✡ 5-6+✡3♬◻												
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| 9	✡ ✡ ,&✡ (%(($# &✡-#$1&!✡$ ✡ 9┐ +✡3♬◻												6┬
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| └	◻@♬ @✡✡◻●◀↕✡ ♬¶●┴┬♂✡#$%&✡ !" %( ) *$%"✡ ,&✡ (%(($# &✡ $, ."✡ ,&✡ (%(($# & -#$1&!"✡#$%&%(00!&"✡ &!!✡-#$.&."✡-#$ '✡ &		└9┐┤ :										
| |	✡#$%&✡ !✡%$'✡$, .%(00!&✡$ ✡ | ├6+✡3♬◻												✡9
	4♂✡✡◻ ⊩ 7✡4♂● 7✡✡ ,&"✡ (✡!$ % '"#/ O#(,✡$, .✡-#$ '"✡) (		└9┐┐ : :										
:6	✡6┐ ?%d$ '&'"✡ ,&✡ (%(($# &✡ $, .✡ &$) "✡-#$ '" & ✡$ ✡ 6-6+✡3♬◻												
	✡& ✡ ,&✡ (%(($# &✡ $, ."✡& ✡ ,&✡-#$1&!"✡-#$ '") (✡$ ✡ 6┐ +✡3♬◻		└99┐ : :										
	◻ ✡✡◻●◀↕✡#$%&✡ !✡%$'✡$, .✡ ,&✡-#$1&!" %( ) *$%"✡ ,&✡ (%(($# &✡-#$,&."✡ ((#'✡-#$.&." -#$ '"✡ &		└99┐└ :										
:5	4♂◻✡✡◻●◀↕7✡4♂●7✡✡& ✡ !"✡#$%&✡ ,&✡ (%($# &✡-#$1&!✡$, .%(00!&"✡#) "✡ (✡!$ % '" -#$ '"✡) (		└9—9 :										
	◻4✡✡4♂●7┬7✡◻●◀↕✡ ✡-#$1&!"%( ) *$%" + ,&✡ (%(($# &✡-#$,&."✡ ((#'✡-#$.&."✡-#$ '" & "✡#$%&%d$'✡ (. / !& ✡/ *✡ (✡ (✡58		└95┐ :										✡2
:9	◻ ♬ ✡✡◻●◀↕✡ ♬¶●┴┬♂✡#$%&✡ !✡%d$'✡$, . %(00!&"%( ) *$%"✡ ,&✡ (%(($# &✡ $, .✡$, . -#$1&!"✡ ((#'✡-#$.&."✡-#$ '"✡ &						3&, (, & 4 *						
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◀ ; ⊩┬◻A =┬●◻<¶ |◀♬✡ ; |◀ ⊩✡♂┬┴● ⊩├; ◀◻✡=● 7✡4●◀♬┬"✡¶┬↑┬¶✡ ⊩; ✡4<¶¶┬◀ ⊩✡♂┬┴● ⊩├; ◀✡ ⊩● 3♂┬

.┴┬¶3<¶↕┬◀✡ ♬✡ |99 ✡ . ◀↕↕ ¶ ◀♬ |@ ♂◻✡ ↕ ● ↕↕↕ ● ¶✡56 6♬ B✡4¶● ◻4 ¶ |◻ ● ◀◻♬↕↕✡85 ↕ 6

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◻ ◻¶ ● ◻⊩ ¶ ● |4◻● ◀ ↕ ◻◀◻ ◻¶ < = ┬ ◀ ◻● ◻├; ◀ ◻ ; ♬ ┤; ┴┬ ¶ 3<¶ ↕ ┬ ◀→

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¶ ; B┬ 4 ◻◀ ● = ┬A◻◻ ; < ◻◻ ● 7 ◻ ; ◀ ◻ < = ◻● ◀ ↕ ◻ ● ◀ ↕ ↑ ◻◻ ◻ ◻┬

¶ ; B┬ 4 ◻◀ < = 3┬ ¶A◻6─ | 99─┼ 6

4 ├┬ ◀ ◻A◻ ¶ ◻#(/ *

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↕ ● ◻┬ ◻4 ; = ┬ ◻┬ ↕A◻= $#% ◻5─◻56 6

↕ ¶ ◻ ◻ ◀ ♬ ◻= ┬ ◻ ; ↕A◻◻ ; ◀ |4

↑ ├┬ ↕ ◻ ┬ ¶ ◻ ; ◀◀ ┬ A◻◻ ┼◻¶ 1#

↕┬ ↕↕ +◻3♬◻	◻ ¶ ● ◻⊩ ¶ ● |4◻ ┬ ◻ 4¶ ├ ◻├; ◀◻◻ ◻¶ ┬ = ● ¶ C◻	┬┬┴┐ +	= ; ◀ ├ ◻ ; ¶ ◻◀ ◻ ● ◻◻ ● ◻├; ◀	◻● = ┬ ◀ < = 3┬ ¶	◀ ┬ ¶ ┴ ● ┬	¶┬ 4 ◻> ┬	◀ ◻● ┬ < ┬	&$ * $%& ◻◻*) ┬
55	◻ ◻◻◻ ● ◀ ↕ ┼◻ ◻ ┼, &◻ (%($# &◻┼#$ 1&!"◻#$%& ! "%( ) * $% "┼, &◻ (%($# &◻ $, . "◻#(┼-#$ '" &		└ 2┐ :			◀ $ /#$! 4 (!!$* &							
59	◻◻#$%&┼, &◻ (%($# &◻┼#$ 1&!◻$ ◻ 52┼6+ ◻3♬◻																
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−6	◻@♬ @◻◻◻ ● ◀ ↕ ◻● ◀ ↕ ◻ ♬ ¶ ● ┴┬ ┬ ◻┼#$%& ◻ ! " %( ) * $% "┼, &◻ (%($# &◻ $, . "┼, &◻ (%($# & -#$ 1&!"◻#$%&%(00!&"◻ &!!◻┼#$. & . "◻┼#$ ' "◻ &		└6└ :													
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◀ ; ┬ ◻A = ┬ ● ◻ < ¶ |◀ ♬ ◻ ; |◀ ◻ ┼ ┬ ┴ ● ◻├; ◀ ◻ ◻= ● 7 ◻4 ● ◀ ♬ ┬ "◻¶ ┬ ↑ ┬ ¶ ◻ ; ◻4 < ¶ ¶ ┬ ◀ ◻ ┼ ┬ ┴ ● ◻├; ◀ ◻ ◻ ● 3 ┬

◻ □¶ ● □⊮ ¶ ● |4✲● ◀ ↕ ✲◀ ◻ □¶ < = ┬ ◀ □● □├; ◀ ✲ ; ♬ ┤; ┴┬ ¶ 3<¶ ↕ ┬ ◀→

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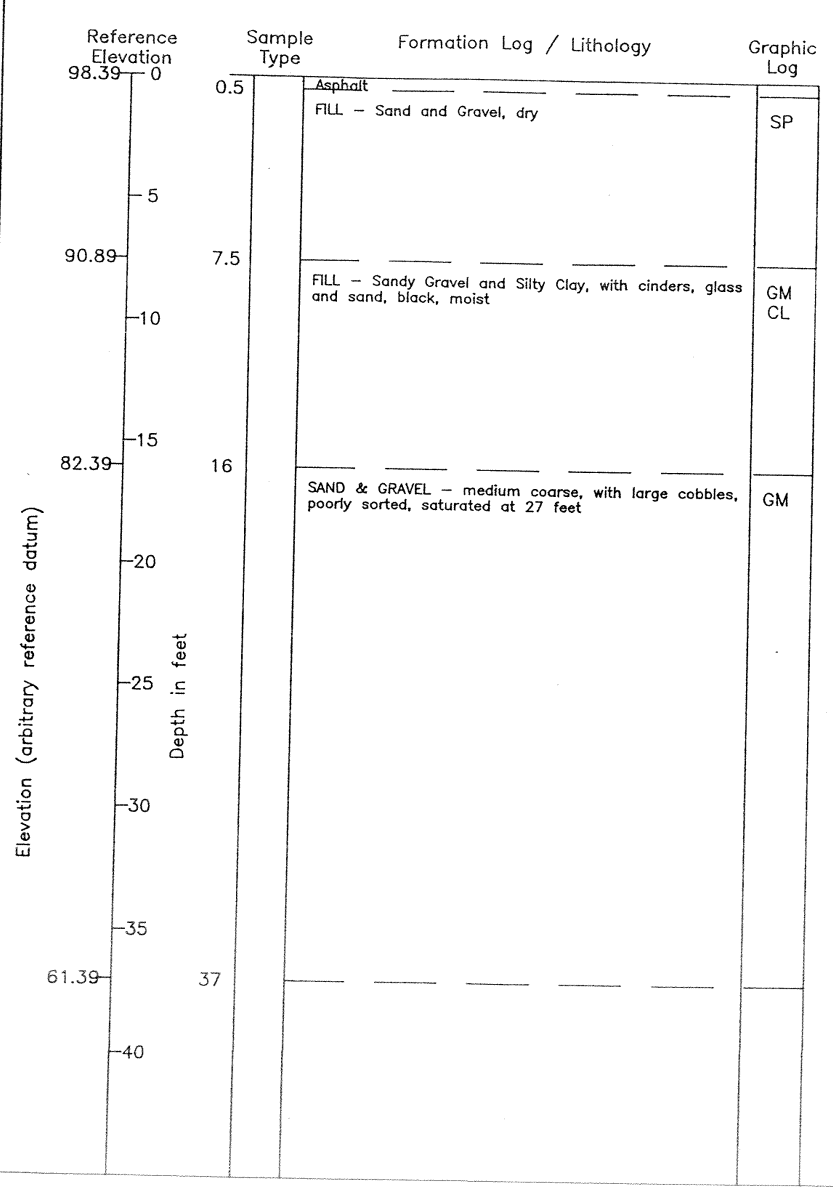
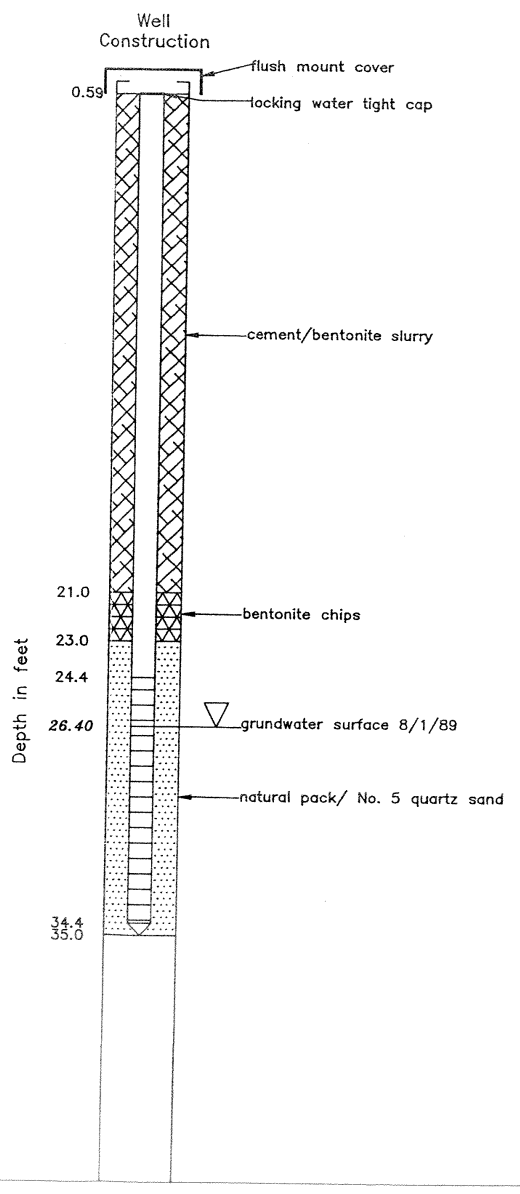




KECK CONSULTING SERVICES, INC.
WELL INSTALLATION INFORMATION

Well Number: MW-1 Total Depth: 34.45 Feet Below Top of Casing

KCS Representative: Tim Hebert

Started: 8/01/89 Completed: 8/01/89

Drilling Method: 4 1/4-inch Hollow Stem Auger

Well Cover: Flush Mount Cap: Locking Water Tight

Riser: Diameter: 2.0 inches
Material: PVC
Joints: Machine Flush Threaded
Length: 23.80 Feet
Riser Interval: -0.59 to 24.4'

Screen: Diameter: 2.0 inches
Material: PVC
Type: Machine
Slot: 0.010 inches
Length: 10.0 Ft.
Screened Interval: 24.4 Ft. to 34.4 Ft.

Grout Material: Cement/Bentonite Slurry
Quantity: 75 Gallons
Interval: Surface to 21.0 Feet

Seal Material: Bentonite Chips
Quantity: 100 lbs.
Seal Interval: 21.0 Ft. to 23.0 Ft.

Filter Pack Material: Natural Pack/ No. 5 Quartz Sand
Quantity: 200 lbs.
Filter Interval: 23.0 Ft. to 35.0 Ft.

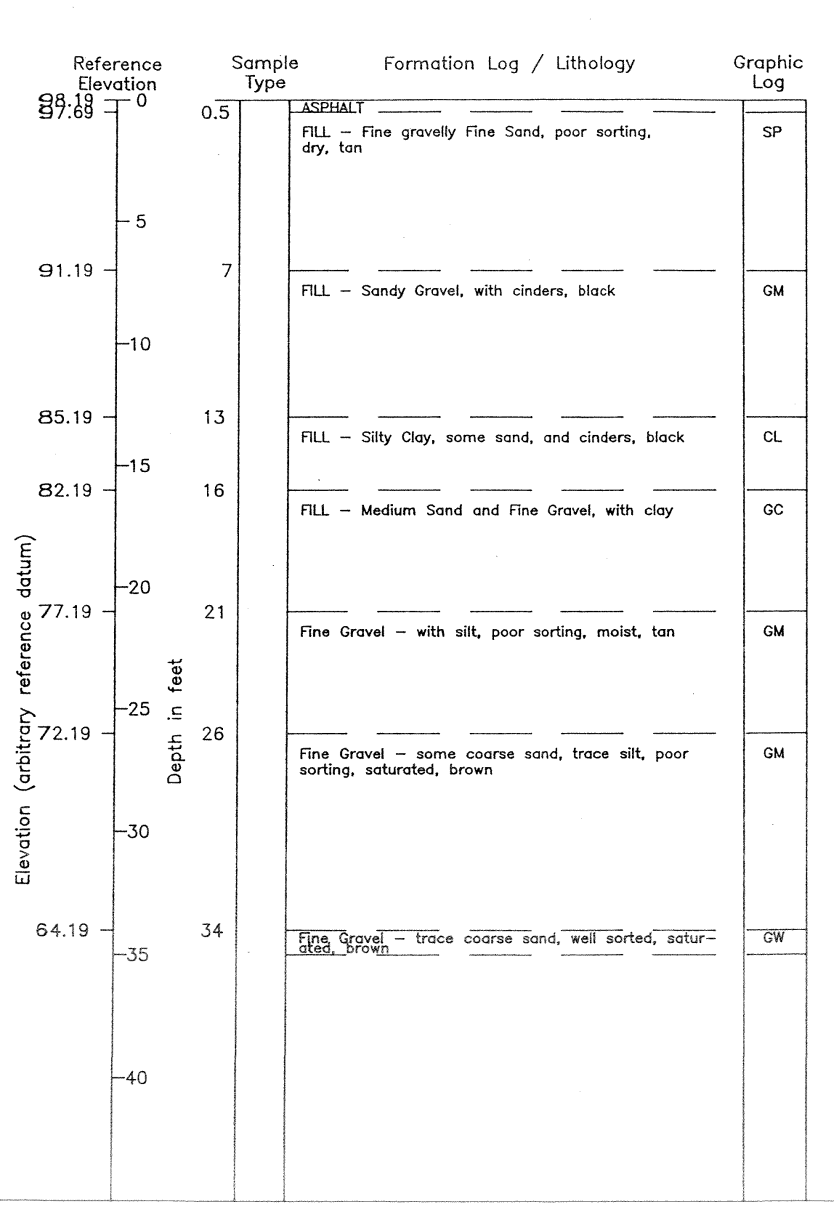
Depth to Groundwater: 26.40 Ft. BTOC

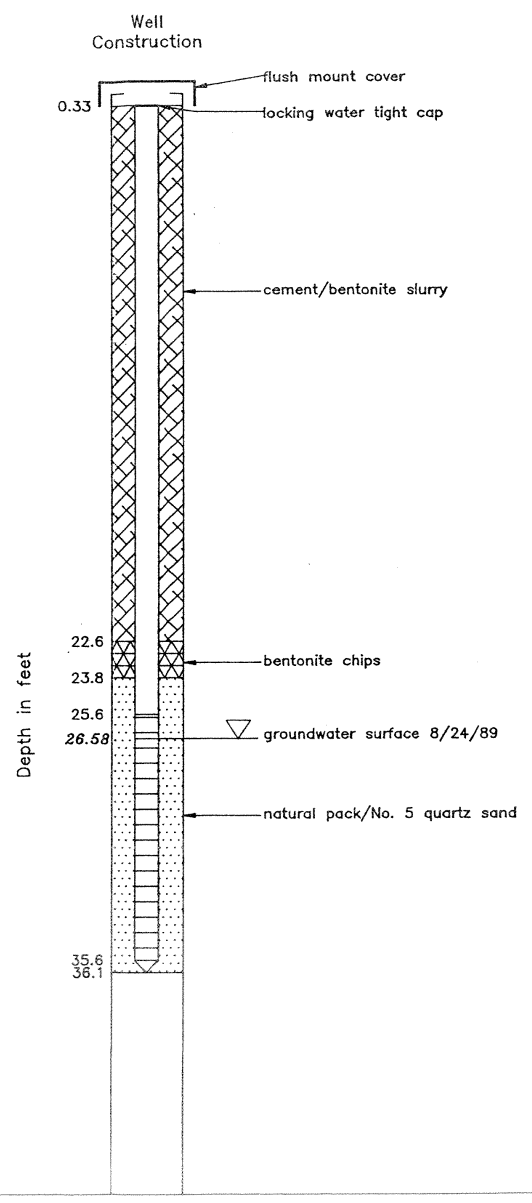
Date: 9/12/89

GROUNDWATER MONITORING WELL COMPLETION DIAGRAM

TEST BORING	B-1
WELL	MW-1
SHEET	1 of 1 DATE 10/4/89
CLIENT	Dayton Power & Light
LOCATION	Dryden Road
PROJECT	447-2477

HUNTER/KECK





KECK CONSULTING SERVICES, INC.
WELL INSTALLATION INFORMATION

Well Number: MW-2 Total Depth: 35.62 Feet Below Top of Casing

KCS Representative: Paul Stork

Started: 8/24/89 Completed: 8/24/89

Drilling Method: 4 1/4-inch Hollow Stem Auger

Well Cover: Flush Mount Cap: Locking Water Tight

Riser: Diameter: 2.0 inches
Material: PVC
Joints: Machine Flush Threaded
Length: 25.30 Feet
Riser Interval: -0.33 to 25.6 Feet

Screen: Diameter: 2.0 inches
Material: PVC
Type: Machine
Slot: 0.010 inches
Length: 10.0 Ft.
Screened Interval: 25.6 Ft. to 35.6 Ft.

Grout Material: Cement/Bentonite Slurry
Quantity: 80 Gallons
Interval: Surface to 22.6 Feet

Seal Material: Bentonite Chips
Quantity: 50 lbs.
Seal Interval: 22.6 Ft. to 23.8 Ft.

Filter Pack
Material: Natural Pack/ No. 5 Quartz Sand
Quantity: 100 lbs.
Filter Interval: 23.8 Ft. to 36.1 Ft.

Depth to Groundwater: 26.58 Ft. BTOC

Date: 9/12/89

GROUNDWATER MONITORING WELL COMPLETION DIAGRAM

TEST BORING B-2

WELL MW-2

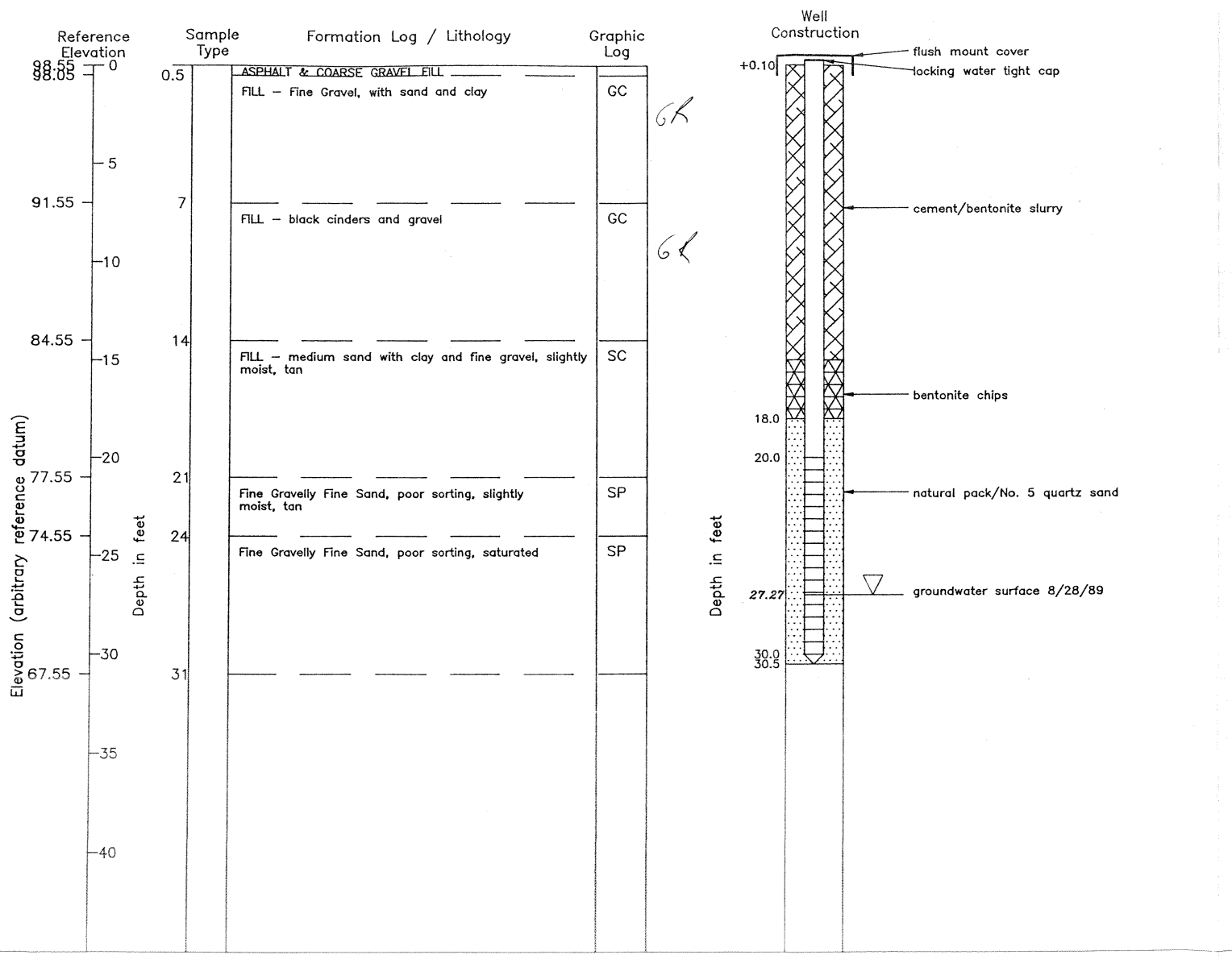
SHEET 1 of 1 DATE 10/4/89

CLIENT Dayton Power & Light

LOCATION Dryden Road

PROJECT 447-2477

HUNTER / KECK



KECK CONSULTING SERVICES, INC.
WELL INSTALLATION INFORMATION

Well Number: MW-3 Total Depth: 30.46 Feet Below Top of Casing

KCS Representative: Tim Hebert

Started: 8/28/89 Completed: 8/28/89

Drilling Method: 4 1/4-inch Hollow Stem Auger

Well Cover: Flush Mount Cap: Locking Water Tight

Riser: Diameter: 2.0 inches
Material: PVC
Joints: Machine Flush Threaded
Length: 20.10 Feet
Riser Interval: +0.10' to 20.0'

Screen: Diameter: 2.0 inches
Material: PVC
Type: Machine
Slot: 0.010 inches
Length: 10.0 Ft.
Screened Interval: 20.0 Ft. to 30.0 Ft.

Grout Material: Cement/Bentonite
Quantity: 75 Gallons
Interval: Surface to 15.0 Feet

Seal Material: Bentonite Chips
Quantity: 100 lbs.
Seal Interval: 15.0 Ft. to 18.0 Ft.

Filter Pack Material: Natural Pack/ No. 5 Quartz Sand
Quantity: 500 lbs.
Filter Interval: 18.0 Ft. to 30.5 Ft.

Depth to Groundwater: 27.27 Ft. BTOC

Date: 9/12/89

GROUNDWATER MONITORING WELL COMPLETION DIAGRAM

TEST BORING B-3

WELL MW-3

SHEET 1 of 1 DATE 10/4/89

CLIENT Dayton Power & Light

LOCATION Dryden Road

PROJECT 447-2477

HUNTER/KECK

Log of Boring No. GW-1

S.C.S. ENGINEERS, DRYDEN ROAD, DAYTON, OHIO

Boring Location: As shown on boring location plan
Surface Elevation:
Date Started: 5-7-90
Date Completed: 5-7-90

Stratum:	Description of Material	Sample # & Type	Sample Depth	Blows Per 6"	"N" Blows/ft. Or Core Rec.
0.0'	(Fill) Asphalt				
0.5'	(Fill) Brown sand and gravel, trace of cobbles - moist	1A	0.5 - 2.5	4 - 5 - 7 - 9	16
2.0'	(Fill) Foundry sand, some cobbles, trace of cinders, trace of gravel - moist	2A	2.5 - 4.5	8 - 9 -10- 7	17
5'		3A	4.5 - 6.5	2 - 3 - 5 - 5	10
		4A	6.5 - 8.5	9 -4 -3 - 4	7
10'		5A	8.5 -10.5	4 - 5 -4 - 6	10
		6A	10.5-12.5	4 - 3 - 3 - 7	10
14.0'					
15'	(Original) Medium stiff dark brown silt, some clay, trace of sand, trace of gravel - moist	7A	12.5-14.5	7 - 5 - 4 - 4	8
16.5'	Very dense brown sand and gravel, some cobbles, trace of silt- moist	8A	17.5-19.5	35-25-25-35	60
20'					
		9A	22.5-24.5	44-21-11- 9	20
	(Becomes medium dense at 23.5')				
25'	(Becomes wet at 25.5')				
	(Becomes dense at 27.5')	10A	27.5-29.5	22-21-22-23	45
30'	Bottom of Boring at 31.0'				

Method: Hollow Stem Auger
Technician: TA/SA
Job No. 46826

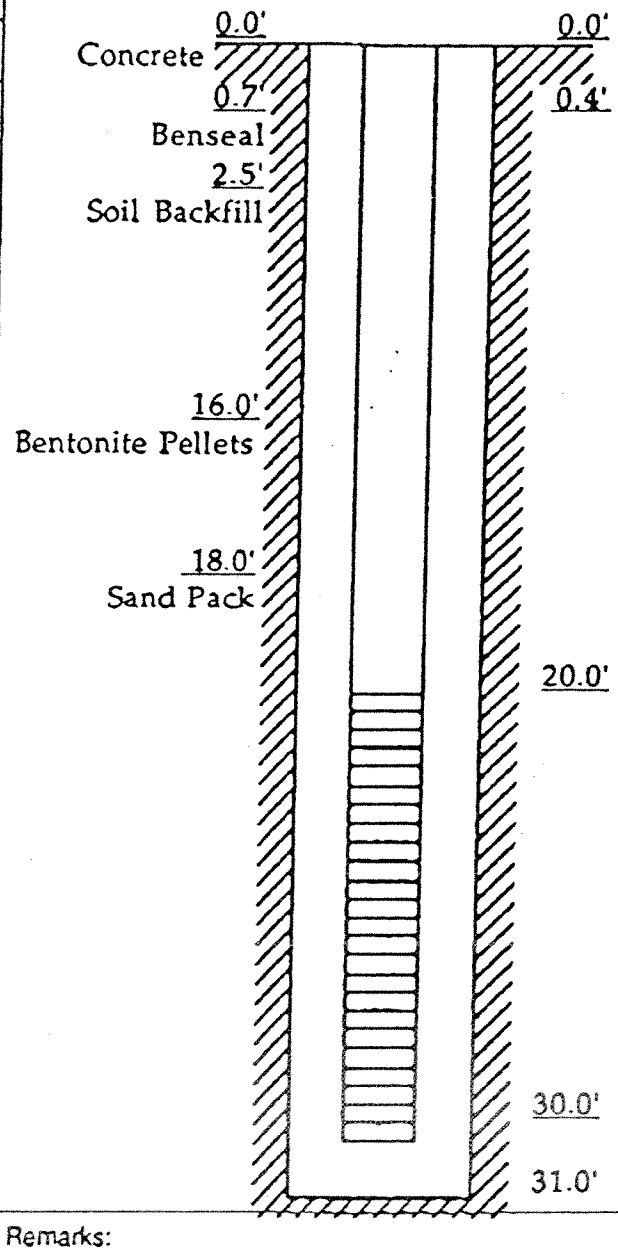
Water Observations
Initial Depth: 25.5'
Completion Depth: 26.1'
Depth After: hrs.

Type Sampler
[X] A. Split-Spoon
[ ] B.
[ ] C. Shelby Tube
[ ] D.

LOG OF WELL NO. GW-1

S.C.S. ENGINEERS, DRYDEN ROAD, DAYTON, OHIO

46826	Job Number
5-7-90	Date Installed
TA	Technician
---	Surface Elevation
PVC	Riser Pipe Material
PVC	Screen Material
2"	Screen Diameter
0.010"	Screen Slot Size
31.0'	Bottom of Boring
30.0'	Bottom of Screen
20.0'	Top of Screen
18.0'	Top of Sand
16.0'	Top of Bentonite Pellet
0.7'	Top of Bentonite Powder
0.0'	Top of Concrete
2.5'	Top of Soil Backfill
0.4'	Top of Well Riser Pipe
0.0'	Top of M.H. Cover
25.5'	Initial Water Depth
26.1'	Completion of Water Depth
	24 Hour Water Depth
	48 Hour Water Depth
	Hour Water Depth



Remarks:

BOWSER MORNER

Log of Boring No. GW-2

S.C.S. ENGINEERS, DRYDEN ROAD, DAYTON, OHIO

Boring Location: As shown on boring location plan
Surface Elevation:
Date Started: 5-8-90
Date Completed: 5-8-90

Stratum:	Description of Material	Sample # & Type	Sample Depth	Blows Per 6"	"N" Blows/ft. Or Core Rec.
0.0'	(Fill) Asphalt				
0.2'	(Fill)Brown sand and gravel, some silt - moist	1A	0.5 - 2.5	7-10-11-16	27
2.0'	(Fill) Medium dense brown sand and gravel, trace of silt, trace of cobbles - moist	2A	2.5 - 4.5	26-21-19-16	35
5'		3A	4.5 - 6.5	9 -13-14-10	24
6.0'	(Fill) Black cinders and foundry sand - moist	4A	6.5 - 8.5	6 - 4 - 4 - 5	9
7.5'	(Fill) Medium stiff brown silt and clay, trace of gravel - moist				
8.5'	(Fill) Black cinders and foundry sand - moist	5A	8.5 -10.5	4 - 5 - 5 - 6	10
10'		6A	10.5-12.5	4 - 4 - 2 - 4	6
15'		7A	12.5-14.5	7 - 5 - 5 - 4	9
16.0'	(Original) Dark brown silt, some sand, some clay - moist	8A	17.5-19.5	12-14-15-12	27
17.5'	Medium dense brown sand and gravel, trace of silt, trace of cobbles - moist				
20'	(Becomes very dense at 23.5')	9A	22.5-24.0	22-23-110	100+
	(Becomes wet at 25.8')				
25'		10A	27.5-29.5	25-44-35-42	77
	Bottom of Boring at 31.5'				
30'					

Method: Hollow Stem Auger
Technician: TA/SA
Job No. 46826

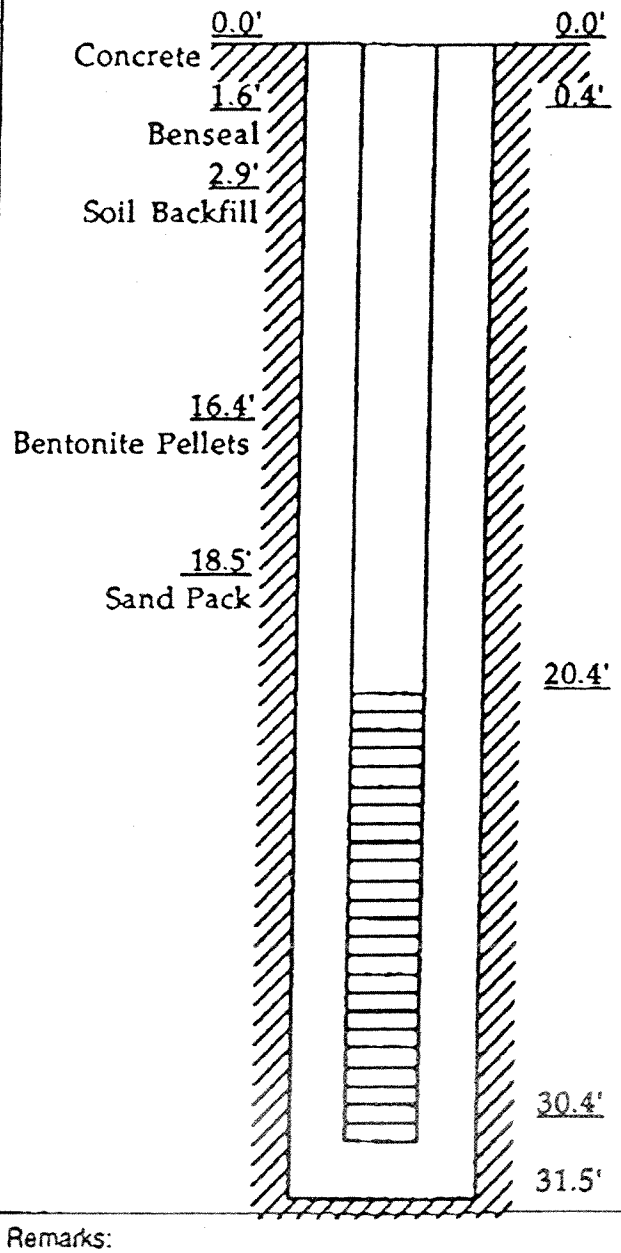
Water Observations
Initial Depth: 25.8'
Completion Depth: 25.3'
Depth After: hrs.

Type Sampler
[X] A. Split-Spoon
[ ] B.
[ ] C. Shelby Tube
[ ] D.

LOG OF WELL NO. GW-2

S.C.S. ENGINEERS, DRYDEN ROAD, DAYTON, OHIO

46826	Job Number
5-8-90	Date Installed
TA	Technician
---	Surface Elevation
PVC	Riser Pipe Material
PVC	Screen Material
2"	Screen Diameter
0.010"	Screen Slot Size
31.5'	Bottom of Boring
30.4'	Bottom of Screen
20.4'	Top of Screen
18.5'	Top of Sand
16.4'	Top of Bentonite Pellet
1.6'	Top of Bentonite Powder
0.0'	Top of Concrete
2.9'	Top of Soil Backfill
0.4'	Top of Well Riser Pipe
0.0'	Top of M.H. Cover
25.8'	Initial Water Depth
25.3'	Completion of Water Depth
	24 Hour Water Depth
	48 Hour Water Depth
	Hour Water Depth



Remarks:

BOWSER

Log of Boring No. GW-3

S.C.S. ENGINEERS, DRYDEN ROAD, DAYTON, OHIO

Boring Location: As shown on boring location plan
Surface Elevation:
Date Started: 5-8-90
Date Completed: 5-8-90

Stratum:	Description of Material	Sample # & Type	Sample Depth	Blows Per 6"	"N" Blows/ft. Or Core Rec.
0.0'	(Fill) Dense brown sand and gravel, some cobbles, trace of silt - moist (Becomes very dense at 2.0')	1A	0.0 - 2.0	7-11-13-20	33
		2A	2.0 - 4.0	24-32-37-21	58
5'		3A	4.0 - 5.9	16-16-90-70/4"	100+
6.5'	(Fill) Cinders and foundry sand, - moist (Trace of glass at 8.5')	4A	6.0 - 8.0	27- 8 -7 - 5	12
10'	(Trace of water at 10.0')	5A	8.0 -10.0	8 - 3 - 1 - 2	3
	(Trace of water at 13.0')	6A	10.0-12.0	3 - 3 - 3 - 3	6
15'	(Trace of metal and glass at 14.0')	7A	12.0-14.0	3 - 2 - 2 - 2	4
		8A	14.0-16.0	6 - 6 - 8- 9	17
18.0'	(Original) Dense brown sand and gravel, trace of silt, trace of cobbles - moist	9A	16.0-18.0	12-16-16-16	32
20'		10A	18.0-20.0	21-33-26-18	44
		11A	23.0-25.0	14-14-16-16	32
25'	(Becomes wet at 26.7')				
		12A	28.0-30.0	13-28-21-16	37
30'	Bottom of Boring at 33.0'				

Method: Hollow Stem Auger
Technician: TA/SA
Job No. 46826

Water Observations
Initial Depth: 26.7
Completion Depth: 27.4'
Depth After: hrs.

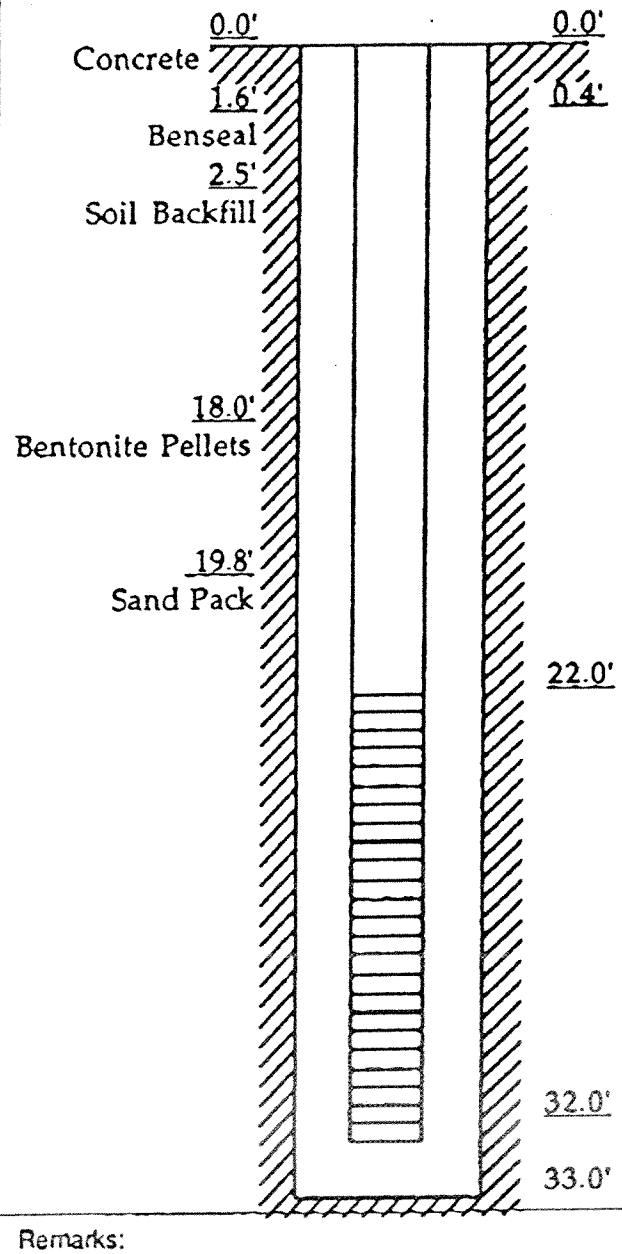
Type Sampler
[X] A. Split-Spoon
[ ] B.
[ ] C. Shelby Tube
[ ] D.

JUL-25-90 WED 14:12

LOG OF WELL NO. GW-3

S.C.S. ENGINEERS, DRYDEN ROAD, DAYTON, OHIO

46826	Job Number
5-8-90	Date Installed
TA	Technician
---	Surface Elevation
PVC	Riser Pipe Material
PVC	Screen Material
2"	Screen Diameter
0.010"	Screen Slot Size
33.0'	Bottom of Boring
32.0'	Bottom of Screen
22.0'	Top of Screen
19.8'	Top of Sand
18.0'	Top of Bentonite Pellet
1.0'	Top of Bentonite Powder
0.0'	Top of Concrete
2.5'	Top of Soil Backfill
0.4'	Top of Well Riser Pipe
0.0'	Top of M.H. Cover
26.7'	Initial Water Depth
27.4'	Completion of Water Depth
	24 Hour Water Depth
	48 Hour Water Depth
	Hour Water Depth



Remarks:

BOWSER MORNER

Client: Dayton Power & Light
Location: Dayton, Ohio
Date Drilled: 07/28/94
Drilled by: United Geosciences

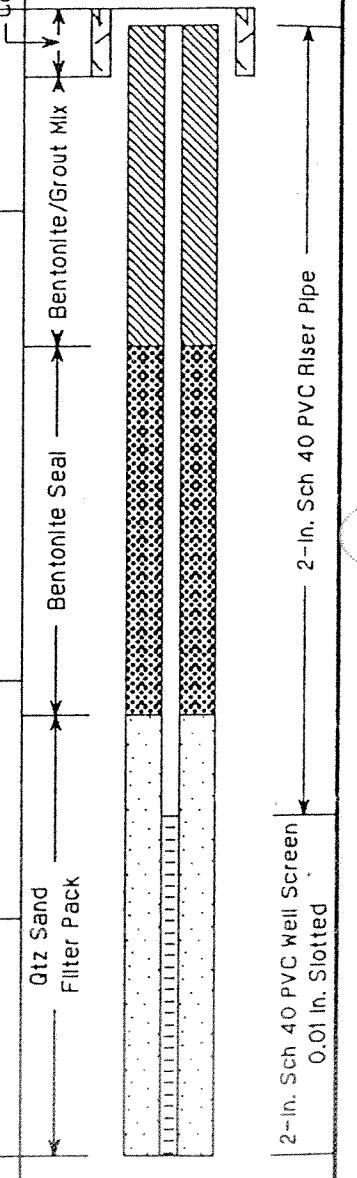
Surface Elevation: ft. MSL
Coordinates:N ; E
Total borehole depth: 34 ft.
Logged by: Jim O'Brien

MONITORING WELL WP-4, GW-4
Project No: 0590005.03

SCS ENGINEERS

Well Construction

DEPTH (ft.)	ELEVATION (ft. MSL)	SAMPLE INTERVAL (ft.)	% RECOVERY	BLOWS	HEADSPACE (ppm)	SYMBOL LOG	DESCRIPTION
							Brown fill with rock and gravel.
5							
							Black fly ash fill, contains metal, brick and miscellaneous debris.
10							
15							
20							GRAVEL with rock and cobbles (GP).
25							
		WP-4A	50		0.5		SAND and GRAVEL with rock, wet (SP). Water has a petroleum odor.
30							
35							Boring terminated at 34 ft on 7/28/94. Set well point from 29 to 32 ft.
40							



Client: Dayton Power & Light
Location: Dayton, Ohio
Date Drilled: 07/28/94
Drilled by: United Geosciences

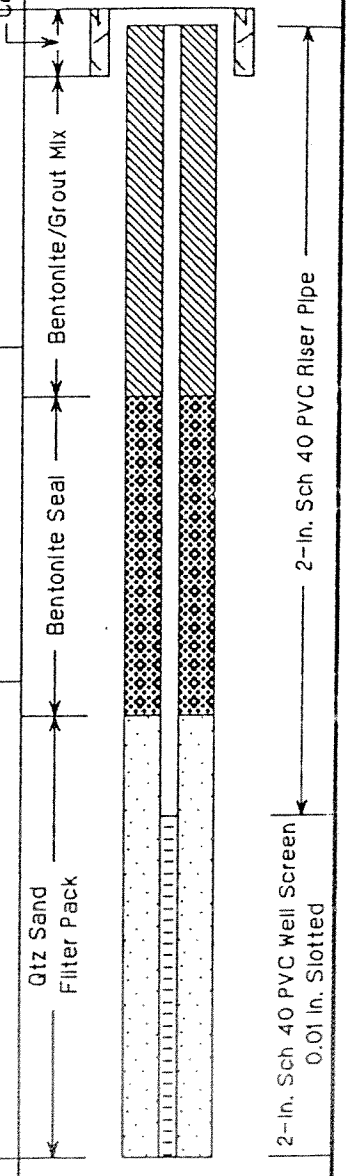
Surface Elevation: ft. MSL
Coordinates:N ; E
Total borehole depth: 34 ft.
Logged by: Jim O'Brien

MONITORING WELL WP-5, GW-5
Project No: 0590005.03

SCS ENGINEERS

Well Construction

DEPTH (ft.)	ELEVATION (ft. MSL)	SAMPLE INTERVAL (ft.)	% RECOVERY	BLOWS	HEADSPACE (ppm)	SYMBOL LOG	DESCRIPTION
							Dense rock and gravel fill.
5							
10							GRAVEL with rock and cobbles (GP).
15							
20							Brown SAND and coarse GRAVEL (SP).
25							
		WP-5A	75		5.0		Becomes rocky at 28 ft. wet. Water has a petroleum odor.
30							
35							Boring terminated at 34 ft on 7/28/94. Set well point from 31 to 34 ft.
40							



Client: Dayton Power & Light
Location: Dayton, Ohio
Date Drilled: 07/29/94
Drilled by: United Geosciences

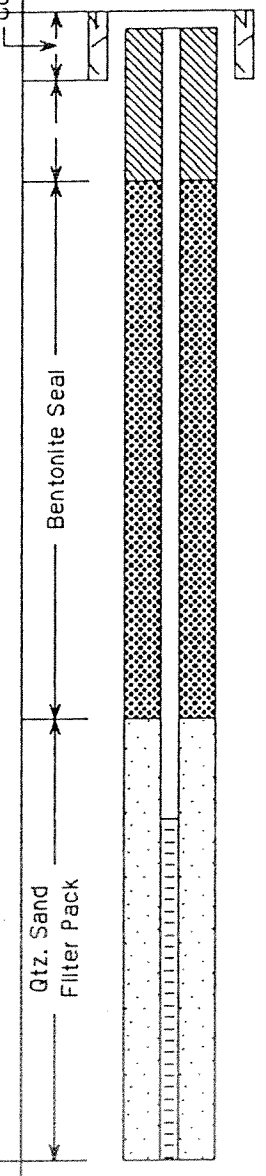
Surface Elevation: ft. MSL
Coordinates:N ; E
Total borehole depth: 34 ft.
Logged by: Jim O'Brien

MONITORING WELL WP-7, GW-6
Project No: 0590005.03

SCS ENGINEERS

Well Construction

DEPTH (ft.)	ELEVATION (ft. MSL)	SAMPLE INTERVAL (ft.)	% RECOVERY	BLOWS	HEADSPACE (ppm)	SYMBOL LOG	DESCRIPTION
							Brown SAND and GRAVEL, with rock (GP).
5							Loses sand at 8 ft, more gravelly.
10							
15							
20							
25							Becomes rocky and sandy at 28 ft, wet.
30		WP-7A	50		2.0		Water has strong petroleum odor.
35							Boring terminated at 34 ft on 7/29/94. Set well point from 31 to 34 ft.
40							



Client: Dayton Power & Light
Location: Dayton, Ohio
Date Drilled: 07/29/94
Drilled by: United Geosciences

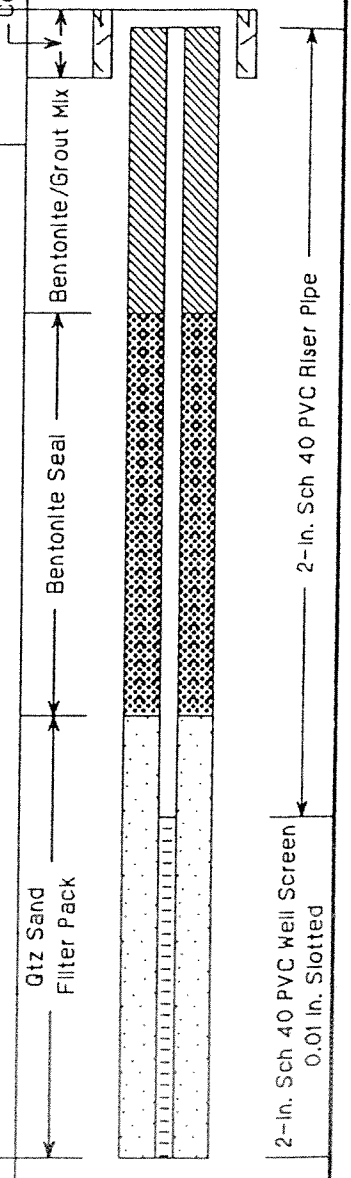
Surface Elevation: ft. MSL
Coordinates:N ; E
Total borehole depth: 34 ft.
Logged by: Jim O'Brien

MONITORING WELL WP-8, GW-7
Project No: 0590005.03

SCS ENGINEERS

Well Construction

DEPTH (ft.)	ELEVATION (ft. MSL)	SAMPLE INTERVAL (ft.)	% RECOVERY	BLOWS	HEADSPACE (ppm)	SYMBOL LOG	DESCRIPTION
							Brown silty CLAY fill.
5							GRAVEL with rock and cobbles (GP).
10							
15							
20							
25							
		WP-8A	75		1.5		Becomes sandy at 28 ft, wet.
30							
35							Boring terminated at 34 ft on 7/29/94. Set well point from 31 to 34 ft.
40							



Client: Dayton Power & Light
Location: Dayton, Ohio
Date Drilled: 07/30/94
Drilled by: United Geosciences

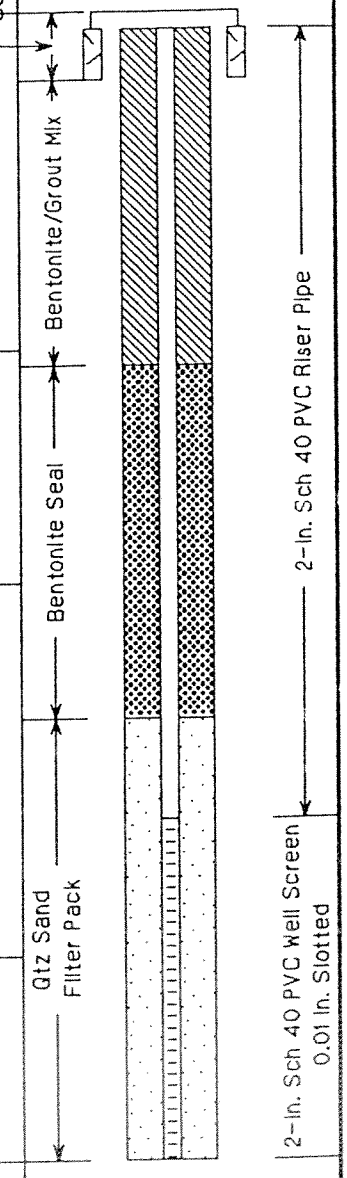
Surface Elevation: ft. MSL
Coordinates:N ; E
Total borehole depth: 34 ft.
Logged by: Jim O'Brien

MONITORING WELL WP-10,GW-8
Project No: 0590005.03

SCS ENGINEERS

Well Construction

DEPTH (ft.)	ELEVATION (ft. MSL)	SAMPLE INTERVAL (ft.)	% RECOVERY	BLOWS	HEADSPACE (ppm)	SYMBOL LOG	DESCRIPTION
							Rock and gravel.
5							
10							Black fly ash fill.
15							
							GRAVEL with rock and cobbles (GP).
20							
25							
		WP-10A	75		1.0		SAND and GRAVEL, wet (SP).
30							
35							Boring terminated at 34 ft on 7/30/94. Set well point from 31 to 34 ft.
40							



APPENDIX A.4

TEST PIT AND TEST TRENCH STRATIGRAPHIC LOGS

9⊥ 93|9 9‼☼9|□‼☼3>|?☼┼◀|┼ 9‼<=⊥┼9☼9|8┼┬8□

3 (% "

3‼ 8@⊥ ?9┼☼=⊥A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9⊥

3‼ 8@⊥ ?9┼<=2⊥‼A⊥□||–♬4⊥

?┬|┼┼9A3‼ 3□& .

┬8?☼9|8┼A= & #$%-8 1#

>8┬⊥◀⊥ |□┼☼9|8┼A 93♬

◀☼9⊥?8=3┬⊥9⊥◀A % !% ,%&⊥–⊥⊥⊥□

9⊥ 93|9=⊥9>8◀A⊥6?☼¶☼98‼

↑|┼┬◀3⊥‼ 8┼┼⊥┬AC┐¶ $)%&=%.+%$

◀⊥39> "!2	9‼☼9|⊥‼☼3>|?◀⊥ ?‼|39|8┼↕‼⊥=☼‼C	⊥┬⊥¶┐ "!	9⊥ 93|9	☼=3┬⊥		
	⊏‼8<┼◀ <‼↑☼?⊥	0⊥└┬;		┼<=2⊥‼	┼9⊥‼¶☼┬	>%)' % 3|◀┼ →
	♂♬☼┼◀↕⊥‼☼¶⊥┬┼↑|┬┬→ !← "#$%d &'%(& #$%)←*%+(&)%)←,& *$← #'!+ &(% , ,+%'←,&# -'← $ &%d%← " .$)&/♬/ %' $)' ♬0♬#$ 1,+ -' $)+ /%& ! ┐0"!2⊥⊥					
	3♬☼┼◀┼↑|┬┬→ !←#$%(& #$%)← &+/(&)%)←(&%/← #'!← $ &%d% #% %' ♬#& .+ & #% % " $ &%d%| ┐456|5)# %d%&→ !●┐└"!2⊥⊥	0 ●┐└;		└└┤	|┐└	┐└
	3♬☼┼◀┼↑|┬┬→ !←#$%(& #$%)← &+/(&)%)←,+ -← #'!← &' &#$('← $ &%d%← +%$ + '# &%'#($┼ +#%% + &← &. , ,%&1 '%" .$)&/♬/ %' $)' ♬ +# %d + $! #$%&*#1 %d +'1 7#$(! ⊥┐└"!2⊥⊥ ♬ !%& ! ─┐└"!2⊥⊥	0 ─┐; ;	9⊥ 93|9 38┼	└└─	●┐└	⊥┐└
				└└┘	□┐└	⊥┐└
		0⊥0┬;	▽	└└	─┐└	⊥┐└
	⊥┼◀8↑9⊥ 93|9 : ─┐└"!2⊥⊥					

┼89⊥ A =⊥☼ <‼|┼⊥⊥38|┼9⊥┬⊥¶☼9|8┼ =☼B?>☼┼⊥⊥D‼⊥↑⊥‼98?<‼‼⊥┼9⊥┬⊥¶☼9|8┼ 9☼2┬⊥

☼9⊥‼↑8<┼◀ ▽

?>⊥=|?☼┬☼┼☼┬B ┼ ◯

9⊥ 93|9┬8|⊥9⊥ 93|9♬⊥ 99‼⊥┼?>┬8|⊥ ┐|13@‼☼E?8 ‼3┐|◀9⊥♬4♬⊥

9⊥ 93|9 9‼☼9|□‼☼3>|?☼┼◀|┼ 9‼<=⊥┼9☼9|8┼┬8□

3 (% "

3‼ 8@⊥ ?9┼☼=⊥A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9⊥

3‼ 8@⊥ ?9┼<=2⊥‼A⊥□||–♬4⊥

?┬|┼┼9A3‼ 3□& .

┬8?☼9|8┼A= & #$%8 1#

>8┬⊥◀⊥ |□┼☼9|8┼A 93♬

◀☼9⊥?8=3┬⊥9⊥◀A % !% ,%&|↵⊥⊥□

9⊥ 93|9=⊥9>8◀A⊥6?☼¶☼98‼

↑|┼┬◀3⊥‼ 8┼┼⊥┬AC┐¶ $)%&=%.+%$

◀⊥39> "!2	9‼☼9|:‼☼3>|?◀⊥ ?‼|39|8┼↕‼⊥=☼‼C	⊥┬⊥¶┐ "!	9⊥ 93|9	☼=3┬⊥		
	⌐‼8<┼◀ <‼↑☼?⊥	0 –□⊥		┼<=2⊥‼	┼9⊥‼¶☼┬	>%)' % 3|◀┼ →
	3♬ ☼┼◀┤↑|┬┬←*#1(& 7%+& !%'← !←#$%(& #$%)← &+/(&)%)←,& *$← #'!	0 ┘┐⊥		⊥⊥4	┐⊥	┐⊥
	=┬♬ |┬9┤↑|┬┬←#!%7%&/#$%' $)← !← (&%/← #'!←#%%' "*)← $ &%%← %! + '1 7#$(' ♬)# ! $!← !%& !●┐⊥"!2	0 ⊥●□⊥	9⊥ 93|9 38┼┬	⊥⊥●	4┐⊥	┐⊥
	⊥┼◀8↑9⊥ 93|9 : 0┐⊥"!2					

⊥89⊥ A =⊥☼ <‼|┼ 38|┼9⊥┬⊥¶☼9|8┼ =☼B?>☼┼ ⊥D‼⊥↑⊥‼98?<‼‼⊥┼9⊥┬⊥¶☼9|8┼ 9☼2┬⊥

☼9⊥‼↑8<┼◀ ▽

?>⊥=|?☼┬☼┼☼┬B ┼ ◯

9⊥ 93|9┬8|9⊥ 93|9♬⊥ 99‼⊥┼?>┬8|1 ┐|13@‼☼E?8 ‼3┐|◀9⊥♬4⊥

9⊥ 93|9 9!! ☼9|□!! ☼3>|?☼┼◀ ╫ 9!! <=⊥┼9☼9|8┼┬8□

3 (% "

3!! 8@⊥ ?9┼☼=⊥A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9⊥

3!! 8@⊥ ?9┼<=2⊥!!A└□||–♫4└

?┬╫┼9A3!! 3□& .

┬8?☼9|8┼A= & #$%-8 1#

>8┬⊥◀⊥ |□┼☼9|8┼A 93♫

◀☼9⊥?8=3┬⊥9⊥◀A % !% ,%&⊥|↵└└□

9⊥ 93|9=⊥9>8◀A⊥6?☼¶☼98!!

↑╫┬◀3⊥!! 8┼┼⊥┬AC┐¶ $)%&=%.+%$

◀⊥39> "!2::	9!! ☼9├:!! ☼3>|?◀⊥ ?!! |39|8┼↕!!⊥=☼!!C	⊥┬⊥¶┐ "!	9⊥ 93|9	☼=3┬⊥		
	⌐!!8<┼◀ <!!↑☼?⊥	0⊥→●⊥		┼<=2⊥!!	╫9⊥!!¶☼┬	>%)' 3◀┼ % →
	♂:♫ ☼┼◀↕::!!☼¶⊥┬┼↑|┬┬→+ &(% , ,+%'← !-#$%d &'%(& #$%)←*%+ (&)%)←;& *$← #' !+ &(% $ &%d% #% %'← &. , ,%& !← $ &%d%, .#)#$ (,+ -'←' & %d +┼#$ 1)# %d%&' !%&+ # %- $ &%d% "+ & &%' ♫ #F!.&% ",+ - $)" .$)&/♫/ %' $)' ! ┘┐└"!2::					
	3♫ ☼┼◀┼↑|┬┬← !! + '%- %)#. (& #$%)← &+/ (&)%)←,+ -← #' !← $ &%d% *#1&%♫, &	0 ;┐┘		└└0	|┐└	└┐└
			9⊥ 93|9 38╫	└└□	□0	└┐└
	%&$.$!%&%)!*%+7%' └(+- $ +/! $-' ! └┐|"!2::			└└:	└┐|	┐└
	%&$.$!%&%)!1&%% &. '1%) '!%&+)&. ' ! ¬┐4"!2::					
	%&$.$!%&%)G #, ' -'G' %#$! ! !1%&'H. '!!1%$%d ¥$ (!%&# + ! 4┐└"!2:: ♫ !%& ! ●┐└"!2::	0└0┐┘		└	●┐└	┐└
	⊥┼◀8↑9⊥ 93|9 : ●┬┘"!2::					

┼89⊥ A =⊥☼ <!! ╫::38╫9⊥┬⊥¶☼9|8┼ =☼B?>☼┼::⊥D!!⊥↑⊥!!98?<!!!!⊥┼9⊥┬⊥¶☼9|8┼ 9☼2┬⊥

☼9⊥!!↑8<┼◀ ▽

?>⊥=|?☼┬☼┼☼┬B ├ ◯

9⊥ 93|9┬8|!9⊥ 93|9⊥ 99!!⊥┼?>┬8!!↑!!3@!!☼□?8 !!3┬!◀9⊥!4♫└

9⊥ 93|9 9‼☼9|□‼☼3>|?☼┼◀|┼ 9‼<=⊥┼9☼9|8┼┬8□

3 (% "

3‼ 8@⊥ ?9┼☼=⊥A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9⊥

3‼ 8@⊥ ?9┼<=2⊥‼A⊥□||–♬4⊥

?┬|┼┼9A3‼ 3□& .

┬8?☼9|8┼A= & #$%-8 1#

>8┬⊥◀⊥ |□┼☼9|8┼A 93♬|

◀☼9⊥?8=3┬⊥9⊥◀A % !% ,%&⊥|↵⊥⊥□

9⊥ 93|9=⊥9>8◀A⊥6?☼¶☼98‼

↑|┼┬◀3⊥‼ 8┼┼⊥┬AC┐¶ $)%&=%.+%$

◀⊥39> "!2	9‼☼9|⊥‼☼3>|?◀⊥ ?‼|39|8┼↕‼⊥=☼‼C	⊥┬⊥¶┐ "!	9⊥ 93|9	☼=3┬⊥		
	⌐‼8<┼◀ <‼↑☼?⊥	0– ┐⊥4		┼<=2⊥‼	┼9⊥‼¶☼┬	>%)' % 3|◀┼ →
	♂♬☼┼◀↕⊥‼☼¶⊥┬┼↑|┬┬← !← #$%d &'%(& #$%)←*%+(&)%)←) &← ,& *$← #'!+ &(% , ,+%'←,&# -'←#$)%&'← *)			⊥⊥	4┐⊥	⊥┐⊥
	3♬☼┼◀┤↑|┬┬←' %(& 7%← !← %)#. (& #$%)← &+/ (&)%)←(&%/♂,+ -← #'!←#$)%&'←" .$)&/♬/ %' $)'	0⊥4┐⊥4	9⊥ 93|9 38|┬	⊥–	⊥┐⊥	⊥┐⊥
	♬%$.$!%&%)+ !' " #& .+ & #% %' " # ← (+ ''← %! +'!& ' ! ┐4"!2⊥⊥					
	♬*#$) *(+ ''←*#&%← $ &%!%#$! 4┐⊥"! 2⊥⊥					
	♬# #" 1#$%&% 1 ! □┐●"!2⊥⊥	0 ⊥┐|4		⊥|	□┐●	⊥┐⊥
	⊥┼◀8↑9⊥ 93|9 : □┐●"!2⊥⊥					

⊥89⊥ A =⊥☼ <‼|┼⊥⊥38|┼9⊥┬⊥¶☼9|8┼ =☼B?>☼┼⊥⊥D‼⊥↑⊥‼98?<‼‼⊥┼9⊥┬⊥¶☼9|8┼ 9☼2┬⊥

?>⊥=|?☼┬☼┼☼┬B ┼ ◯

9⊥ 93|9┬8|19⊥ 93|9♬9⊥ 99‼⊥┼?>┬8|1 ┐|13@‼☼E?8 ‼3┐|◀9⊥♬4♬⊥

9⊥ 93|9 9‼☼9|□‼☼3>|?☼┼◀|┼ 9‼<=⊥┼9☼9|8┼┬8□

3 (% "

3‼ 8@⊥ ?9┼☼=⊥A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9⊥

3‼ 8@⊥ ?9┼<=2⊥‼A⊥□||–♬4⊥

?┬|┴┼9A3‼3□& .

┬8?☼9|8┼A= & #$%-8 1#

>8┬⊥◀⊥ |□┼☼9|8┼A 93♬4

◀☼9⊥?8=3┬⊥9⊥◀A8 ! ,%&•⊥⊥⊥□

9⊥ 93|9=⊥9>8◀A⊥6?☼¶☼98‼

↑|┴┬◀3⊥‼ 8┼┼⊥┬AC┐¶ $)%&=%.-%$

◀⊥39> "!2	9‼☼9|⊥‼☼3>|?◀⊥ ?‼|39|8┼↕‼⊥=☼‼C	⊥┬⊥¶┐ "!	9⊥ 93|9	☼=3┬⊥		
	⊏‼8<┼◀ <‼↑☼?⊥	0–0┐|0		┼<=2⊥‼	┼9⊥‼¶☼┬	>%)' % 3|◀┼ →
	3♬☼┼◀┤↑|┬┬← !‹#$%(& #$%)← &+/(&)%)←,& *$← #'!					
	♬!' "*)←*#&%←#%%' " %d +←,+ - ' $)←(+ '', !!+%'←#$ $'←*)%$,+ -'← & "#$(%&←#$)%&'← $ &%d%,+ -'←#&%← ;44$%*' %&'←" $,%+!'&.,,%& !┘┐└"! 2					
	♬) & ! ┘┐└"!2		9⊥ 93|9 38|┬	└44	┘┐└	□;┬
	♂♬☼┼◀↕ ‼☼¶⊥┬← ,,-%'← %)#. ! &'%(& #$%)←*%+(&)%)←,& *$← #'!	0┘|┐|0				
				└4•	0┐└	└┐└
	⊥┼◀8↑9⊥ 93|9 :┘|┐└"!2	0 ┐|0				

┼89⊥ A =⊥☼ <‼|┼38|┼9⊥┬⊥¶☼9|8┼ =☼B?>☼┼⊥D‼⊥↑⊥‼98?<‼‼⊥┼9⊥┬⊥¶☼9|8┼ 9☼2┬⊥

?>⊥=|?☼┬☼┼☼┬B ┼ ◯

9⊥ 93|9┬8|19⊥ 93|9♬9⊥ 99‼⊥┼?>┬8|1 ┐|13@‼☼E?8 ‼3┐|◀9⊥♬4⊥

9⊥ 93|9 9‼☼9|□‼☼3>|?☼┼◀|╫ 9‼<=⊥┼9☼9|8┼┬8□

3 (% "

3‼ 8@⊥ ?9┼☼=⊥A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9⊥

3‼ 8@⊥ ?9┼<=2⊥‼A⊥□||–♬4⊥

?┬|⊥┼9A3‼3□& .

┬8?☼9|8┼A= & #$%8 1#

>8┬⊥◀⊥ |□┼☼9|8┼A 93♬

◀☼9⊥?8=3┬⊥9⊥◀A8 ! ,%&•⊥⊥⊥□

9⊥ 93|9=⊥9>8◀A⊥6?☼¶☼98‼

↑|⊥┬◀3⊥‼ 8┼┼⊥┬AC┐¶ $)%&=%.+%$

◀⊥39> "!2	9‼☼9|⊥‼☼3>|?◀⊥ ?‼|39|8┼↕‼⊥=☼‼C	⊥┬⊥¶┐ "!	9⊥ 93|9	☼=3┬⊥		
	⊏‼8<┼◀ <‼↑☼?⊥	0–0┬		┼<=2⊥‼	╫9⊥‼¶☼┬	>%)' % 3|◀┼ →
	♬☼┼◀┤↑|┬┬←*#1(& 7%← !←#$% ! %)#. (& #$%)←*%+(&)%)←,+ -← #'!← ,&# -'←*#$%(+ '', !!%'←' +#% %' " %! +← ' 1 +!←#$ $'← %! +'!& '← #		9⊥ 93|9 38|┬	⊥40	┐⊥	⊥┐⊥
	♬ %&('-%!'+ !' "⊥♬(+# $!#$,. -%!'♂ $'← ! & #' ! 4┐⊥"!2					
	♂♬☼┼◀↕‼☼¶⊥┬← ,,+%'← %)#. ! &'%(& #$%)←*%+(&)%)←,& *$← #'!	0 ;□		⊥4□	⊥⊥┐⊥	⊥┐⊥
	⊥┼◀8↑9⊥ 93|9 : ⊥⊥┐⊥"!2	0 4┬				

┼89⊥ A =⊥☼ <‼|╫38|╫9⊥┬⊥¶☼9|8┼ =☼B?>☼┼⊥D‼⊥↑⊥‼98?<‼‼⊥┼9⊥┬⊥¶☼9|8┼ 9☼2┬⊥

?>⊥=|?☼┬☼┼☼┬B ├ ◯

9⊥ 93|9┬8|19⊥ 93|9♬9⊥ 99‼⊥┼?>┬8|1 ┐13@‼☼E?8 ‼3┐|◀9⊥♬4♬⊥

9!! ¤ 9|□!! ¤ 3>|?¤+◀ ╫ 9!! <=┴+9¤9|8+┬8□

3 (% "

3!! 8@┴ ?9+¤=┴A 8<9>◀¤B98+◀<=3¤+◀┬¤+◀↑|┬┬ |9┴

3!! 8@┴ ?9+<=2┴!!A└□||–♫4└

?┬╫+9A3!! 3□& .

┬8?¤9|8+A= & #$%-8 1#

>8┬┴◀┴ |□+¤9|8+A 99♫

◀¤9┴?8=3┬┴9┴◀A % !% ,%&┘●↵└└□

◀!! |┬┬╫□=┴9>8◀A┴6?¤¶¤98!!

↑╫┬◀3┴!! 8++┴┬AC┐¶ $)%&=%.+%$

◀┴39> "!2::	9!! ¤ 9|+:!! ¤ 3>|?◀┴ ?!! |39|8+↕!!┴=¤!! C	┴┬┴¶┐ "!	9┴ 99!! ┴+?>	¤=3┬┴		
	¬!! 8<+◀ <!!↑¤?┴	0┘□0		┴<=2┴!!	╫9┴!!¶¤┬	>%)' 3◀+ % →
	♂:♫ ¤+◀↕::!! ¤¶┴┬+↑|┬┬← !← %)#. ! &'%(& #$%)←*%+(&)%)←,& *$← #'!		9┴ 9 9!!┴+?> 38╫	└□	□┐└	└┐└
	♫ %$.$!%&%)' +(+ ' ', !!%' $),& -%$ & %+ #$)#' 1%' !–┐└"!2::					
	♫+)")%) +/'1%%#$(↵' & %d +(+ ' '←)#' 1%'←#$)%&' !□┐└"!2::					
	♂:♫ ¤+◀↕::!! ¤¶┴┬← !←'#$%d &'%(& #$%)←*%+(&)%)←,& *$← #'!← , ,+%'	0 □0				
	┴+◀8↑9┴ 93|9: 4┐└"!2::	0 –0		└;	4┐└	└┐└

┴89┴ A =┴¤ <!! ╫::38╫9┴┬┴¶¤9|8+ =¤B?>¤+::┴D!!┴↑┴!!98?<!!!!┴+9┴┬┴¶¤9|8+ 9¤2┬┴

?>┴=|?¤┬¤+¤┬B ╟ ◯

9┴ 93|9┬8||9┴ 93|9┬0┴ 99!!┴+?>┬8||:!!13@!!¤□=8 !!3:!◀9┴4┐└

9‼☼9|□‼☼3>|?☼┼◀╫ 9‼<=┴┼9☼9|8┼┬8□

3 (% "

3‼ 8@┴ ?9┼☼=┴A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9┴

3‼ 8@┴ ?9┼<=2┴‼A└□||-♬4└

?┬|┴┼9A3‼ 3□& .

┬8?☼9|8┼A= & #$%-8 1#

>8┬┴◀┴ |□┼☼9|8┼A 99♬☼

◀☼9┴?8=3┬┴9┴◀A % !% ,%&┘4←┘└└□

◀‼ |┬┬╫□=┴9>8◀A┴6?☼¶☼98‼

↑|┴┬◀3┴‼ 8┼┼┴┬AC┐¶ $)%&=%.-%$

◀┴39> "!2	9‼☼9|:‼☼3>|?◀┴ ?‼ |39|8┼↕‼┴=☼‼C	┴┬┴¶┐ "!	9┴ 99‼┴┼?>	☼=3┬┴		
	⌐‼8<┼◀ <‼↑☼?┴	0┘□00		┼<=2┴‼	╫9┴‼¶☼┬	
	♂:♬ ☼┼◀↕::‼☼¶┴┬|↑|┬┬← !← '#$%d &'%(& #$%)←*%+(&)%)←,& *$← #'!← , ,-%' ♬*#1 #$)%&' !┘┐└"!2::		9┴ 9 9‼┴┼?> 38|┬			
□	┴┼◀8↑9┴ 93|9:□┐└"!2::	0┘└00				

┼89┴ A =┴☼ <‼╫::38╫9┴┬┴¶☼9|8┼ =☼B?>☼┼::┴D‼┴↑┴‼98?<‼‼┴┼9┴┬┴¶☼9|8┼ 9☼2┬┴

9┴ 93|9┬8|19┴ 93|9♬┴ 99‼┴┼?>┬8|1 ┐13@‼☼E?8 ‼3┐|◀9┘♬4♬└

9!! ☼ 9|□!! ☼ 3>|?☼┼◀ ╟ 9!! <=┴┼9☼9|8┼┬8□

3 (% "

3!! 8@┴ ?9┼☼=┴A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9┴

3!! 8@┴ ?9┼<=2┴!!A└□||–⁄4└

?┬╟┼9A3!! 3□& .

┬8?☼9|8┼A= & #$%⁄-8 1#

>8┬┴◀┴ |□┼☼9|8┼A 99⁄!!

◀☼9┴?8=3┬┴9┴◀A % !% ,%&┘●↵└└□

◀!! |┬┬╟ □=┴9>8◀A┴6?☼¶☼98!!

↑╟┬◀3┴!! 8┼┼┴┬AC┐¶ $)%&=%.+%$

◀┴39> "!2	9!! ☼9|┼!! ☼3>|?◀┴ ?!! |39|8┼↕!!┴=☼!!C	┴┬┴¶┐ "!	9┴ 99!! ┴┼?>	☼=3┬┴		
	□!!8<┼◀ <!!↑☼?┴	0┘0-4□		┼<=2┴!!	╟9┴!!¶☼┬	>%)' % 3◀┼ →
	♂ ♫ ☼┼◀↕ !!☼¶┴┬↑|┬┬→4□%&d '& *%' !%&$'%$ %#$%⁄-' %'#!←' % + /←)%$ '%⁄-'#$%d &'%(& #$%)←*%#+(&)%)← % %$!%)←(&%/♂) &- ,& *$← #'!← , ,+%'← #$)%&'← +/ ' 1%&d#$ (← $ &d%⁄-'!. '		9┴ 9 9!!┴┼?> 38|┬			
	凡 '!%$.$!%&%) * !%&-# # " 1#$% &% 1 ! –4"!2 ┴┼◀8↑9┴ 93|9 : –4"!2	0 |┬┴□		;┬┴	┐┴
	┼89┴ A =┴☼ <!! ╟ 38╟9┴┬┴¶☼9|8┼ =☼B?>☼┼ D!!┴↑┴!!98?<!!!!┴┼9┴┬┴¶☼9|8┼ 9☼2┬┴ ☼9┴!!↑8<┼◀ ▽ ?>┴=|?☼┬☼┼☼┬B ├ ◯					

9┴ 93|9┬8||9┴ 93|9⁄8 99!!┴┼?>┬8||┬13@!!☼□⁄28 !!3┬|◀9┴⁄4⁄└

9!! ☼ 9|□!! ☼ 3>|?☼+◀ ╫ 9!! <=⊥+9☼9|8+┬8□

3 (% "

3!! 8@⊥ ?9+☼=⊥A 8<9>◀☼B98+◀<=3☼+◀┬☼+◀↑|┬┬ |9⊥

3!! 8@⊥ ?9+<=2⊥!!A⊥□||–♫4⊥

?┬╫+9A3!! 3□& .

┬8?☼9|8+A= & #$%-8 1#

>8┬⊥◀⊥ |□+☼9|8+A 99♫

◀☼9⊥?8=3┬⊥9⊥◀A % !% ,%&⊥ ;↵ ⊥⊥□

◀!! |┬┬╫□=⊥9>8◀A⊥6?☼¶☼98!!

↑╫┬◀3⊥!! 8++⊥┬AC┐¶ $)%&=%.+%$

◀⊥39> "!2	9!! ☼9+!! ☼3>|?◀⊥ ?!! |39|8+↕!!⊥=☼!!C	⊥┬⊥¶┐ "!	9⊥ 99!!⊥+?>	☼=3┬⊥		
	⌐!! 8<+◀ <!!↑☼?⊥	0⊥4┐;⊥		⊥<=2⊥!!	╫9⊥!!¶☼┬	>%)' % 3◀+ →
	3♫ ☼+◀↑	┬┬← !<#$%(& #$%)← &+/ (&)%)←) &- ,& *$♂,+ -← #'!-(+ ' ' ╫#(1!, .+, '← ,%&, !!%'← $) (+ ' ' ' 1)%'→ ,&# - '← +) +/ ' 1%%&#$ (-#$ #← +) (+ ' ' % '#, !!%'-#!!% $ &%P%,+ - ' ♫1% ,%&(+ ' ', !!%'d '&%)G!!# 'G- ' '#,+% &% , !!%' ♫ ,%&(+ ' ',) /&%) 'G=%) * : : +)G			
	3♫ ☼+◀← !<#$%(& #$%)← &+/ (&)%)←,%#(%- #'!	0	┐;⊥			
	♂ ♫ ☼+◀↕ : :!! ☼¶⊥┬← , ,+%'←)%$ '%- %)#. ! &'%(& #$%)←*%+(&)%)←,& *$← 7%&/ #'! ♫ !%& ! •┐⊥"!2 : :	0 ┐;⊥			
	⊥+◀8↑9⊥ 93	9 : •┐4"!2 : :	0⊥;┐⊥			

9⊥ 9
9!!⊥+?>
38|┬

⊔⊔	4┐⊥	┐⊥
⊔–	┐⊥	┐⊥

⊥89⊥ A =⊥☼ <!! ╫ : : 38 ╫ 9⊥┬⊥¶☼9|8+ =☼B?>☼+ : : ⊥D!!⊥↑⊥!!98?<!!!!⊥+9⊥┬⊥¶☼9|8+ 9☼2┬⊥

☼9⊥!!↑8<+◀ ▽

?>⊥=|?☼┬☼+☼┬B ├ ◯

9⊥ 93|9┬8 : 9⊥ 93|9♫⊥ 99!!⊥+?>┬8 : : 13@!!☼□?8 !!3┐◀9⊥♫⊥

9⁞ ☼ 9 |□⁞ ☼ 3 > |? ☼ ┼ ◀ ╫ 9⁞ < = ┴ ┼ 9 ☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁞ 8@┴ ? 9┼ ☼ = ┴A 8 < 9 > ◀ ☼ B 9 8 ┼ ◀ < = 3 ☼ ┼ ◀ ┬ ☼ ┼ ◀ ↑ |┬┬ |9┴

3⁞ 8@┴ ? 9┼ < = 2┴ ⁞A┴ □ | | ─ ♬4┴

? ┬ ╫ ┼ 9A3⁞ 3 □& .

┬ 8 ? ☼ 9 |8 ┼ A= & #$% 8 1#

> 8 ┬┴ ◀┴ |□┼ ☼ 9 |8 ┼ A 99♬

◀ ☼ 9┴ ? 8 = 3 ┬┴ 9┴ ◀ A % ⁞% ,%&┘ ; ↵ ┴┴ □

◀ ⁞ |┬┬ ╫ □ = ┴ 9 > 8 ◀ A┴ 6 ? ☼ ¶ ☼ 9 8 ⁞

↑ ╫ ┬ ◀ 3┴ ⁞ 8 ┼ ┼ ┴ ┬ AC ┐¶ $)%& = %. ⁞%$

◀┴ 39 > "!2	9⁞ ☼ 9 |⁞ ⁞ ☼ 3 > |? ◀┴ ? ⁞ |39 |8 ┼ ↕ ⁞ ┴ = ☼ ⁞ C	┴ ┬┴ ¶┐ "!	9┴ 99⁞ ┴ ┼ ? >	☼ = 3 ┬┴		
	⌐⁞ 8 < ┼ ◀ < ⁞ ↑ ☼ ? ┴	0 ┘┬		┼ < = 2┴ ⁞	╫ 9┴ ⁞ ¶ ☼ ┬	>%) ' % 3 ◀ ┤ →
	3┴ ☼ 98 ┼ ┴ ┤ ↑ |┬┬ →				
	3♬ ☼ ┼ ◀ ┤ ↑ |┬┬ ←' %(& 7%← !←#$% (& #$%) ← &+/ (&)%) ←,+ -← #' !← ┬ "%%!) &- ,+ -+ /%&*#!1 ┘ ♬$ 1&%) '%	0┘ ; □		□	┐┴	┘┴
	♬(+ ' ' ←#$ &. , ,%&1 '% !	┐0"!2		□4	4┐┴	┘┴
	♬ ┬ "%%G* 1#%G- /%&|# %#-% ⁞%&# + ! ●┐┴"!2			□●	;┐┴	┘┴
			9┴ 9 9⁞ ┴ ┼ ? > 38 ╫	□0	┘┐┴	┘┴
	♂ ⁞♬ ☼ ┼ ◀ ↕ ⁞ ⁞ ☼ ¶ ┴ ┬ ← , ,⁞%' ←)%$ '% %)#. ! &'%(& #$%) ←*%+(&)%) ←,%#(% #'!	0 ; 4				
	♬ ⁞%& ⁞┘ ┘┴"!2	0 ┘┐	▽	□□	┘┴┐┴	┘┴
	┴ ┼ ◀ 8 ↑ 9┴ 93 |9 : ┘ ┴┐┴"!2				

┼ 8 9┴ A = ┴ ☼ < ⁞ ╫ ⁞ 38 ╫ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ = ☼ B ? > ☼ ┼ ⁞ ┴ D ⁞ ┴ ↑ ┴ ⁞ 98 ? < ⁞ ⁞ ┴ ┼ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ 9 ☼ 2 ┬┴

☼ 9┴ ⁞ ↑ 8 < ┼ ◀ ▽

? > ┴ = |? ☼ ┬ ☼ ┼ ☼ ┬ B ┼ ◯

9┴ 93 |9 ┬ 8 ⁞ 9┴ 93 |9 ♬ 9┴ 99⁞ ┴ ┼ ? > ┬ 8 ⁞ ┐ ⁞ 13 @ ⁞ ☼ E ? 8 ⁞ 3 ┐ ⁞ ◀ 9┴ ♬4┴

9!! ¤ 9|□!! ¤ 3>|?¤|◀ ╫ 9!! <=⊥|9¤9|8|┬8□

3 (% "

3!! 8@⊥ ?9|¤=⊥A 8<9>◀¤B98|◀<=3¤|◀┬¤|◀↑|┬┬ |9⊥

3!! 8@⊥ ?9| <=2⊥!!A⊥□||–⊿4⊥

?┬╫|9A3!! 3□& .

┬8?¤9|8|A= & #$%-8 1#

>8┬⊥◀⊥ |□|¤9|8|A 99⊿4

◀¤9⊥?8=3┬⊥9⊥◀A % !% ,%&⊥↵⊥⊥□

◀!! |┬┬╫□=⊥9>8◀A⊥6?¤¶¤98!!

↑╫┬◀3⊥!! 8||⊥┬AC┐¶ $)%&=%.+%$

◀⊥39> "!2::	9!! ¤9|:!! ¤3>|?◀⊥ ?!! |39|8|↕!!⊥=¤!!C	⊥┬⊥¶┐ "!	9⊥ 99!! ⊥|?>	¤=3┬⊥		
	⌐!!8<|◀ <!!↑¤?⊥	0–|┐□		⊥<=2⊥!!	╫9⊥!!¶¤┬	>%)' 3◀| % →
	3⊿ ¤|◀|↑|┬┬←' %(& 7%⌐ !-#$% (& #$%)← &+/(&)%)←,& *$⊿,+ -← #'!← *)# ,%&'←(+ ''. !!+%'↵' & %⊿ +← ,&# -'←#!+% #$)%&'← ' 1 +!				C ;	¬⊥	┐⊥
	⊿┬'%%⊿ '&%))#'1 +&' $)'#& $'! #$#$(→ !4┐⊥"!2::						
	⊿,+ #$ +& !□┬"!2::				L⊥	0┐⊥	┐⊥
				9⊥ 9 9!!⊥|?> 38|┬			
					L	|┐⊥	┐⊥
	⊿!⊿ ¤|◀↕::!! ¤¶⊥┬← ,-+%'←)%$'%⌐ %)#. ! &'%(& #$%)→%⌐+(&)%)←,%#(%⌐ #'!		0 □┐;□				
					L	0┐⊥	┐⊥
	⊥|◀8↑9⊥ 93|9: ;┐●"!2::		0 |-4□			

⊥89⊥ A =⊥¤ <!! ╫::38|╫9⊥┬⊥¶¤9|8| =¤B?>¤|::⊥D!!⊥↑⊥!!98?<!!!!⊥|9⊥┬⊥¶¤9|8| 9¤2┬⊥

?>⊥=|?¤┬¤|¤┬B |

!!3┐|◀9|⊿4⊿⊥

!!3┐|◀9|⊿4⊿⊥ 99!!⊥|?>┐8|!! !!13@!!¤E⊿8

93|9⊥ 93|9⊥ 93|9⊥ 93|9⊥

9!! ¤ 9|□!! ¤ 3>|?¤┤◄ ╟ 9!! <=┴┤9¤9|8┤┬8□

3 (% "

3!! 8@┴ ?9┤¤=┴A 8<9>◄¤B98┤◄<=3¤┤◄┬¤┤◄↑|╥┬ |9┴

3!! 8@┴ ?9┤<=2┴!!A└□||–♫4└

?┬╟┤9A3!! 3□& .

┬8?¤9|8┤A= & #$%–8 1#

>8┬┴◄┴ |□┤¤9|8┤A 99♫D

◄¤9┴?8=3┬┴9┴◄A8 ! ,%&0–┘└└□

◄!! |╥┬╟□=┴9>8◄A┴6?¤¶¤98!!

↑╟┬◄3┴!! 8┤┤┴┬AC┐¶ $)%&=%.+%$

◄┴39> "!2::	9!! ¤9|:!! ¤3>|?◄┴ ?!! |39|8┤↕!!┴=¤!!C	┴┬┴¶┐ "!	9┴ 99!!┴┤?>	¤=3┬┴		
	⌐!!8<┤◄ <!!↑¤?┴	0–•┬4		┤v=2┴!!	╟9┴!!¶¤┬	>%)' 3|◄┤ % →
	3♫ ¤┤◄┤↑ |╥┬→' %(& 7%/– !-#$% (& #$%)← &+/ (&)%)←,+ -← #'!←,&# -'← #%/–*)← $ &%/%/–$%*' %&|◄% % ,%& ;44→					
	♫) & !•┐└"!2::			└•	•┐└	→•
	♫ +% + &$$' .+ # $-&. , ,%&–*)%$,+ -'← #+/' $)'←*#&/– #'#+%&' ! └┐└"!2::		9┴ 9 9!!┴┤?> 38╟			
	♂ ♫ ¤┤◄↕::!!¤¶┴┬← , ,+%'← %)#. ! &'%(& #$%)←*%+(&)%)←,& *$← #'!	0 ;┬4		└•	•┐└	┐
	┴┤◄8↑9┴ 93|9 : ┘└┐└"!2::	0 •┬4				

┴89┴ A =┴¤ <!! ╟::38╟9┴┬┴¶¤9|8┤ =¤B?>¤┤::┴D!!┴↑┴!!98?<!!!!┴┤9┴┬┴¶¤9|8┤ 9¤2┬┴

?>┴=|?¤┬¤┤¤┬B ├ ◯

!!3┐◄9┴♫└

99!!┴┤?>┬8!!13@!!¤E>8

93|9┬8!!9┴ 93|9♫┴

9⁞ ☼ 9 |□⁞ ☼ 3 > |? ☼ ┼ ◀ ╫ 9⁞ < = ┴ ┼ 9 ☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁞ 8@┴ ? 9┼ ☼ = ┴A 8 < 9 > ◀ ☼ B 9 8 ┼ ◀ < = 3 ☼ ┼ ◀ ┬ ☼ ┼ ◀ ↑ |┬┬ |9┴

3⁞ 8@┴ ? 9┼ < = 2┴ ⁞A┴ □ | | ─ ♫4┴

? ┬ ╫ ┼ 9A3⁞ 3 □& .

┬ 8 ? ☼ 9 |8 ┼ A= & #$% 8 1#

> 8 ┬┴ ◀┴ |□┼ ☼ 9 |8 ┼ A 99♫□

◀ ☼ 9┴ ? 8 = 3 ┬┴ 9┴ ◀A8 ! ,%&•┘ ┴ ┴ □

◀ ⁞ |┬┬ ╫ □ = ┴ 9 > 8 ◀A┴ 6 ? ☼ ¶ ☼ 9 8 ⁞

↑ ╫ ┬ ◀ 3┴ ⁞ 8 ┼ ┼ ┴ ┬AC┐¶ $)%&=%.-%$

◀┴ 39 > "!2	9⁞ ☼ 9 |⁞ ⁞ ☼ 3 > |? ◀┴ ? ⁞ |39 |8 ┼ ↕ ⁞ ┴ = ☼ ⁞ C	┴ ┬┴ ¶┐ "!	9┴ 99⁞ ┴ ┼ ? >	☼ = 3 ┬┴		
	⌐⁞ 8 < ┼ ◀ < ⁞ ↑ ☼ ? ┴	0 ─ 0		┼ < = 2┴ ⁞	╫ 9┴ ⁞ ¶ ☼ ┬	>%) ' 3 ◀ ┤ % →
	3♫ ☼ ┼ ◀ ┤↑ |┬┬ ←' %(& 7%←' %'#!← !←#$%(& #$%)← &+/ (&)%)← (& /♂,+ -← #'!←,&# - '←(+ ' '←' & %! +← ,& -%$)#' 1%' ♫+ /)& #$ (% # % !┘┬┘"!2 ♫ ,+#♫ + &%)+ /%&' "' $)←,&# - '←*) ! ─┐┴"!2			┴4┴	┤┐┴	┐
	♂ ⁞♫ ☼ ┼ ◀ ↕ ⁞ ⁞ ⁞ ☼ ¶┴┬← , ,-%'←#!+% '#!← %)#. ! &'%(& #$%)←*%+(&)%)← ,& * $← #'!	0┘┘ 0	9┴ 9 9⁞ ┴ ┼ ? > 38 ┤┬	┴4	4┐┴	┴┐┴
	┴ ┼ ◀ 8 ↑ 9┴ 93 |9 : ┘┘┐┴"!2	0 0				

┼ 8 9┴ A = ┴ ☼ < ⁞ ╫ ⁞ 38 ╫ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ = ☼ B ? > ☼ ┼ ⁞ ┴D⁞ ┴ ↑ ┴ ⁞ 98 ? < ⁞ ⁞ ┴ ┼ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ 9 ☼ 2 ┬┴

? > ┴ = |? ☼ ┬ ☼ ┼ ☼ ┬ B ┼ ◯

9┴ 93 |9 ┬ 8 ⁞ 9┴ 93 |9 ♫ 9┴ 99⁞ ┴ ┼ ? > ┬ 8 ⁞ ┐ ⁞ 13 @ ⁞ ⁞ ☼ E ? 8 ⁞ 3 ┐ ⁞ ◀ 9┴ ♫4┴

9⁉☼9|□⁉☼3>|?☼┼◀╫ 9⁉<=┴┼9☼9|8┼┬8□

3 (% "

3⁉ 8@┴ ?9┼☼=┴A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9┴

3⁉ 8@┴ ?9┼<=2┴⁉A└□||└♬4└

?┬|┴┼9A3⁉ 3□& .

┬8?☼9|8┼A= & #$%-8 1#

>8┬┴◀┴ |□┼☼9|8┼A 99♬;

◀☼9┴?8=3┬┴9┴◀A8 ! ,%&-┘└└□

◀⁉|┬┬╫□=┴9>8◀A┴6?☼¶☼98⁉

↑|┴┬◀3┴⁉ 8┼┼┴┬AC┐¶ $)%&=%.-%$

◀┴39> "!2	9⁉☼9|⁉☼3>|?◀┴ ?⁉|39|8┼↕⁉┴=☼⁉C	┴┬┴¶┐ "!	9┴ 99⁉┴┼?>	☼=3┬┴		
	□⁉8<┼◀ <⁉↑☼?┴	0┘□0		┼<=2┴⁉	╫9┴⁉¶☼┬	>%)' % 3|◀┼ →
	♂♬☼┼◀↕⁉☼¶┴┬┼↑|┬┬← !← #$%d &'%(& #$%)←*%+(&)%)←,+ -← #'!←#$)%&'←,&# -'←(+ ''← $ &%d%-+) 1%)'←,& -%$'! #$%) (+ ''*#$) *'←+) (+ '' #-, !!%'					
	♬♬&.'1%) %d + $! #$%&'←+!1, ('←) & !0┐└"!2			└|0	0┐└	┐|
	♬ .$)&/♬/ %' $)'←(+ ''←,&# -'←#$%(& #$%) ' $) #F←) &' !;┐└"!2		9┴ 9 9⁉┴┼?> 38|┬			
	♬* 1#%G !%&# +' &#$('←,&# -'←& ('←(+ ''← #'!! 7%&/ #'!←) & ! 0┐└"!2			└|□	0┐└	┐└
	♬) & !┘┘┐└"!2 ┴┼◀8↑9┴ 93|9 :┘┘┐└"!2	0 └□0		└|;	┘┘┐└	┘┐;•

┼89┴ A =┴☼ <⁉╫38╫9┴┬┴¶☼9|8┼ =☼B?>☼┼⁉┴D⁉┴↑┴⁉98?<⁉⁉┴┼9┴┬┴¶☼9|8┼ 9☼2┬┴

?>┴=|?☼┬☼┼☼┬B ┼ ◯

9┴ 93|9┬8|19┴ 93|9♬┴ 99⁉┴┼?>┬8|1 ┐|13@⁉☼E?8 ⁉3┐|◀9┴♬4♬└

9!! ¤ 9|□!! ¤ 3>|?¤+◀ ╫ 9!! <=⊥+9¤9|8+┬8□

3 (% "

3!! 8@⊥ ?9+¤=⊥A 8<9>◀¤B98+◀<=3¤+◀┬¤+◀↑|┬┬ |9⊥

3!! 8@⊥ ?9+<=2⊥!!A└□||–♫4└

?┬╫+9A3!! 3□& .

┬8?¤9|8+A= & #$%-8 1#

>8┬⊥◀⊥ |□+¤9|8+A 99♫ └

◀¤9⊥?8=3┬⊥9⊥◀A8 ! ,%&←┘└└□

◀!! |┬┬╫□=⊥9>8◀A⊥6?¤¶¤98!!

↑╫┬◀3⊥!! 8++⊥┬AC┐¶ $)%&=%.-%$

◀⊥39> "!2::	9!! ¤9|-!! ¤3>|?◀⊥ ?!! |39|8+↕!!⊥=¤!! C	⊥┬⊥¶┐ "!	9⊥ 99!! ⊥+?>	¤=3┬⊥		
	⌐!! 8<+◀ <!!↑¤?⊥	0⊢ ┬□		┼<=2⊥!!	╫9⊥!!¶¤┬	>%)' % 3◀+ →
	♂♫ ¤+◀↕::!! ¤¶⊥┬+↑|┬┬← , ,-%'←)%$ '%-#$%d &'%(& #$%)←*%-+(&)%)← ,& * $← #'!					
	" .$)&/♫/ %' $)	0⌋□□		└||	4┐⊥	┐⊥
			9⊥ 9 9!!⊥+?> 38╫	└|4	└┐⊥	┐⊥
	3♫ ¤+◀+↑|┬┬←' %'#!← !← %#. (& #$%)← &-/ (&)%)←,+ -← #'!	0 □□				
	♫,& * $, ,-%'← $ &%P% &%'← $ &%P% ,+ -'←,&! -' ! •┐└"!2::			└|•	4┐⊥	└┐⊥
	♂♫ ¤+◀↕::!! ¤¶⊥┬← , ,-%'← %)#. ! &'%(& #$%)←*%-+(&)%)←,& * $← #'!	0 ⌋□□				
	♫ P%& !⌋ ┐4"!2::	0└;□□				
	⊥+◀8↑9⊥ 93|9 :⌋ ┐4"!2::					

┼89⊥ A =⊥¤ <!! ╫::38╫9⊥┬⊥¶¤9|8+ =¤B?>¤+::⊥D!!⊥↑⊥!!98?<!!!!⊥+9⊥┬⊥¶¤9|8+ 9¤2┬⊥

¤9⊥!!↑8<+◀ ▽

?>⊥=|?¤┬¤+¤┬B ├ ◯

9⊥ 93|9┬8||9⊥ 93|9⊥ 99!!⊥+?>┬8||┐13@!!¤P>8 !!3┐|◀9⊥♫⊥└

9!! ¤ 9|□!! ¤ 3>|?¤+◀ ╫ 9!! <=⊥+9¤9|8+┬8□

3 (% "

3!! 8@⊥ ?9+¤=⊥A 8<9>◀¤B98+◀<=3¤+◀┬¤+◀↑|┬┬ |9⊥

3!! 8@⊥ ?9+<=2⊥!!A└□||–♫4└

?┬╫+9A3!! 3□& .

┬8?¤9|8+A= & #$%-8 1#

>8┬⊥◀⊥ |□+¤9|8+A 99♫

◀¤9⊥?8=3┬⊥9⊥◀A8 ! ,%&⊥↵└└□

◀!! |┬┬╫□=⊥9>8◀A⊥6?¤¶¤98!!

↑╫┬◀3⊥!! 8++⊥┬AC┐¶ $)%&=%.-%$

◀⊥39> "!2::	9!! ¤9|+!! ¤3>|?◀⊥ ?!! |39|8+↕!!⊥=¤!! C	⊥┬⊥¶┐ "!	9⊥ 99!!⊥+?>	¤=3┬⊥		
	⌐!! 8<+◀ <!!↑¤?⊥	0–└•–		+<=2⊥!!	╫9⊥!!¶¤┬	>%)' 3◀+ % →
	♂♫ ¤+◀↕::!! ¤¶⊥┬↑|┬┬← , ,-%'←)%$'%#$%d &'%(& #$%)←*%d+(&)%)← ,& *$← #'!← $ &%d%← %d +'#($-%l .# %$! &%$! +← ' 1 +!← #% %' "*)←,&# -'← $ &%d%'+ ,╫5F|5F⊥5 1# -← %$ 1)# %d%& %d +#% └5← $(↵!%&d, . %& '!↵ % *#&%%$ % %d&# +					
	♫ #$+/ ,& *$' $) $)(& 7%d← , ,-%' ! ¬┐└"!2::		9⊥ 9 9!!⊥+?> 38╫	└┘	4┐└	└┐
	♂♫ ¤+◀↕::!! ¤¶⊥┬← %)#. ! &'%(& #$%)←*%d+(&)%)←(& /♂,& *$ ♫ %& !⊥ ¬4"!2:: ⊥+◀8↑9⊥ 93|9:⊥ ¬4"!2::	0└¬ 0└;┐–		└┘–	⊥┐└	└┐

┼89⊥ A =⊥¤ <!! ╫::38╫9⊥┬⊥¶¤9|8+ =¤B?>¤+::⊥D!!⊥↑⊥!!98?<!!!!⊥+9⊥┬⊥¶¤9|8+ 9¤2┬⊥

¤9⊥!!↑8<+◀ ▽

?>⊥=|?¤┬¤+¤┬B ╫ ◯

9⊥ 93|9┬8!!9⊥ 93|9⊥ 99!!⊥+?>┬8!! !!13@!!¤□?8 !!3!!◀9⊥♫4♂└

9⁞ ☼ 9 |□⁞ ☼ 3 > |? ☼ ┼ ◀ ╫ 9⁞ < = ┴ ┼ 9 ☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁞ 8@┴ ? 9┼ ☼ = ┴A 8 < 9 > ◀ ☼ B 9 8 ┼ ◀ < = 3 ☼ ┼ ◀ ┬ ☼ ┼ ◀ ↑ |┬┬ |9┴

3⁞ 8@┴ ? 9┼ < = 2┴ ⁞A┴ □ | | ─ ♬4┴

? ┬ ╫ ┼ 9A3⁞ 3 □& .

┬ 8 ? ☼ 9 |8 ┼ A= & #$% 8 1#

> 8 ┬┴ ◀┴ |□┼ ☼ 9 |8 ┼ A 99♬ ┘

◀ ☼ 9┴ ? 8 = 3 ┬┴ 9┴ ◀A8 ! ,%&┘ ┘ ┴ ┴ □

◀ ⁞ |┬┬ ╫ □ = ┴ 9 > 8 ◀A┴ 6 ? ☼ ¶ ☼ 9 8 ⁞

↑ ╫ ┬ ◀ 3┴ ⁞ 8 ┼ ┼ ┴ ┬AC┐¶ $)%&=%.+%$

◀┴ 39 > "!2	9⁞ ☼ 9 |⁞ ⁞ ☼ 3 > |? ◀┴ ? ⁞ |39 |8 ┼ ↕ ⁞ ┴ = ☼ ⁞ C	┴ ┬┴ ¶┐ "!	9┴ 99⁞ ┴ ┼ ? >	☼ = 3 ┬┴		
	⌐⁞ 8 < ┼ ◀ < ⁞ ↑ ☼ ? ┴	0 ─ ┴ □		┼ < = 2 ┴ ⁞	╫ 9┴ ⁞ ¶ ☼ ┬	>%) ' % 3 ◀ ┼ →
	♂ ⁞ ♬ ☼ ┼ ◀ ↕ ⁞ ⁞ ⁞ ☼ ¶ ┴ ┬ ┼ ↑ |┬┬ →)%$ '% ⁞#$%d &'%(& #$%) ←*%+(&)%) ←) &- ,& * $ ♂,+ -← #'!← #$+/ ,&# - '← ' 1 +!← $ &%d%← #$)%&' ← #% %' " + / !#% # %			┴ □	4┐┴	┴┐┴
	♬ ☼ ┼ ◀ ┼ ↑ |┬┬ → ⁞#$%d &'%(& #$%) ←*%+ (&)%) ←#(1!,& * $← #'!	0┘ □	┴ ;	┴┐┴	┴┐┴
	♬ ☼ ┼ ◀ ←*#1 (& 7%← !← %)#. ! &'%(& #$%) ←*%+(&)%) ←,& * $← #'!	0 □ □			
	♬ !%& ! ┐4"!2 ⁞		▽	┴ ┼ ┴	┘ ┐┴	┴┐┴
	┴ ┼ ◀ 8 ↑ 9┴ 93 |9 : ┘ ┘ ┐┴ "!2 ⁞	0┴ □ □			

9┴ 9
9⁞ ┴ ┼ ? >
38 |┬

┼ 8 9┴ A = ┴ ☼ < ⁞ ╫ ⁞ 38 ╫ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ = ☼ B ? > ☼ ┼ ⁞ ┴ D ⁞ ┴ ↑ ┴ ⁞ 98 ? < ⁞ ⁞ ┴ ┼ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ 9 ☼ 2 ┬┴

☼ 9┴ ⁞ ↑ 8 < ┼ ◀ ▽

? > ┴ = |? ☼ ┬ ☼ ┼ ☼ ┬ B ┼ ◯

9┴ 93 |9 ┬ 8 ⁞ 9┴ 93 |9 ♬ 9┴ 99⁞ ┴ ┼ ? > ┬ 8 ⁞ ┐ ⁞ 13 @ ⁞ ☼ E ? 8 ⁞ 3 ┐ ⁞ ◀ 9┴ ♬4♂ ┴

9⁞⁞ ☼ 9 |□⁞⁞ ☼ 3 > |?☼ ┼ ◀ ╫ 9⁞⁞ < = ┴ ┼ 9☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁞⁞ 8@┴ ?9┼ ☼ = ┴A 8 <9> ◀ ☼B98┼ ◀ < = 3☼ ┼ ◀ ┬☼ ┼ ◀ ↑ |┬┬ |9┴

3⁞⁞ 8@┴ ?9┼ < = 2┴ ⁞⁞A┴ □ | | – ♬4┴

?┬ |┴ ┼ 9A3⁞⁞ 3□& .

┬8 ?☼ 9 |8 ┼A= & #$%-8 1#

> 8┬┴ ◀┴ |□┼ ☼ 9 |8 ┼A 99♬ –

◀ ☼ 9┴ ? 8 = 3┬┴ 9┴ ◀A8 ! ,%& ↵ ┴ ┴□

◀ ⁞⁞ |┬┬ ╫ □ = ┴ 9 > 8 ◀A┴ 6 ?☼ ¶ ☼ 98⁞⁞

↑ |┴ ┬ ◀ 3┴ ⁞⁞ 8 ┼ ┼ ┴ ┬AC┐¶ $)%&=%.-%$

◀┴ 39> "!2	9⁞⁞ ☼ 9 |⁞ ⁞⁞ ☼ 3 > |?◀┴ ?⁞⁞ |39 |8 ┼ ↕ ⁞⁞ ┴ = ☼ ⁞⁞ C	┴┬┴ ¶┐ "!	9┴ 99⁞⁞ ┴ ┼ ?>	☼ = 3┬┴		
	⌐⁞⁞ 8 <┼ ◀ <⁞⁞ ↑ ☼ ?┴	0┘4┐•;		┼ < = 2┴⁞⁞	╫ 9┴ ⁞⁞ ¶ ☼ ┬	>%) ' % 3 |◀┼ →
	♂ ⁞♬ ☼ ┼ ◀ ↕ ⁞⁞ ⁞⁞ ☼ ¶┴┬┼ ↑ |┬┬ ← !← ⁞#$%d &'%(& #$%)←*%+(&)%)←,& * $← #'!← , ,-%'←,&# -'← ' 1 +! #% %'					
	♂ ⁞♬ ☼ ┼ ◀ ↕ ⁞⁞ ⁞⁞ ☼ ¶┴┬← !←⁞#$%d &'%(& #$%)←*%+(&)%)←,& * $← #'!← , ,-%'	0┘┘┐;				
			9┴ 9 9⁞⁞ ┴ ┼ ?> 38 |┬	0	0┐┴	┴┐┴
	┴ ┼ ◀ 8 ↑ 9┴ 93 |9 : ┘ ┐┴"!2	0┴ |┐•;	▽			

┼ 89┴ A = ┴ ☼ <⁞⁞ ╫ ⁞⁞ 38 ╫ 9┴┬┴ ¶ ☼ 9 |8 ┼ = ☼B ?> ☼ ┼ ⁞⁞ ┴D⁞⁞ ┴ ↑ ┴ ⁞⁞ 98 ?<⁞⁞ ⁞⁞ ┴ ┼ 9┴┬┴ ¶ ☼ 9 |8 ┼ 9☼ 2┬┴

☼ 9┴ ⁞⁞ ↑ 8 <┼ ◀ ▽

?>┴ = |?☼┬ ☼ ┼ ☼┬B ┼ ◯

9┴ 93 |9 ┬ 8 ⁞⁞ 9┴ 93 |9 ♬ 9┴ 99⁞⁞ ┴ ┼ ?> ┬ 8 ⁞⁞ ┬ ⁞⁞ 3 @ ⁞⁞ ☼ E ?8 ⁞⁞ 3 ┬ ⁞⁞ ◀ 9┴ 4♬┴

9!! ¤ 9|□!! ¤ 3>|?¤+◀ ╫ 9!! <=⊥+9¤9|8+┬8□

3 (% "

3!! 8@⊥ ?9+¤=⊥A 8<9>◀¤B98+◀<=3¤+◀┬¤+◀↑|┬┬ |9⊥

3!! 8@⊥ ?9+<=2⊥!!A⊥□||–♫4⊥

?┬╫+9A3!! 3□& .

┬8?¤9|8+A= & #$%-8 1#

>8┬⊥◀⊥ |□+¤9|8+A 99♫ |

◀¤9⊥?8=3┬⊥9⊥◀A % !% ,%&⊥4↵⊥⊥□

◀!! |┬┬╫□=⊥9>8◀A⊥6?¤¶¤98!!

↑╫┬◀3⊥!! 8++⊥┬AC┐¶ $)%&=%.-%$

◀⊥39> "!2	9!! ¤ 9|+!! ¤ 3>|?◀⊥ ?!! |39|8+↕!!⊥=¤!!C	⊥┬⊥¶┐ "!	9⊥ 99!!⊥+?>	¤=3┬⊥		
	⌐!!8<+◀ <!!↑¤?⊥	0⊥ ┐⊥		⊥<=2⊥!!	╫9⊥!!¶¤┬	>%)' 3◀+ % →
	♂♫ ¤+◀↕!!¤¶⊥┬↑|┬┬← !← #$%d &'%(& #$%)←*%#(&)%)←,& *$← #'!+ &(% ,,-%'#& $&)'←,&# -'← $ &%d%-*)← %d +'1%%d←+ /)& #$ (%d#% ♫ !%& !←┐⊥"!2	0 0┐⊥	9⊥ 9 9!!⊥+?> 38╫	⊥4	¬⊥	⊥¬⊥
	⊥+◀8↑9⊥ 93|9 : |┐⊥"!2					

+89⊥ A =⊥¤ <!! ╫ 38╫9⊥┬⊥¶¤9|8+ =¤B?>¤+ ⊥D!!⊥↑⊥!!98?<!!⊥+9⊥┬⊥¶¤9|8+ 9¤2┬⊥

¤9⊥!!↑8<+◀ ▽

?>⊥=|?¤┬¤+¤┬B ├ ◯

9⊥ 93|9┬8|19⊥ 93|9A⊥ 99!!⊥+?>┬8|1 ┬13@!!¤E?8 !!3┬|◀9⊥♫⊥

9⁞ ☼ 9 |□⁞ ☼ 3 > |? ☼ ┼ ◀ ╫ 9⁞ < = ┴ ┼ 9 ☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁞ 8@┴ ? 9┼ ☼ = ┴A 8 < 9 > ◀ ☼ B 9 8 ┼ ◀ < = 3 ☼ ┼ ◀ ┬ ☼ ┼ ◀ ↑ |┬┬ |9┴

3⁞ 8@┴ ? 9┼ < = 2┴ ⁞A└─□ | |─♬4└

? ┬ |┴ ┼ 9A3⁞ 3□& .

┬ 8 ? ☼ 9 |8 ┼ A= & #$%─8 1#

> 8 ┬┴ ◀┴ |□┼ ☼ 9 |8 ┼ A 99♬ 4

◀ ☼ 9┴ ? 8 = 3 ┬┴ 9┴ ◀A8 ! ,%&┘ ┘ └ └□

◀ ⁞ |┬┬ ╫ □ = ┴ 9 > 8 ◀A┴ 6 ? ☼ ¶ ☼ 9 8 ⁞

↑ |┴ ┬ ◀ 3┴ ⁞ 8 ┼ ┼ ┴ ┬AC┐¶ $)%&=%.┬%$

◀┴ 39 > "!2 ⁞	9⁞ ☼ 9 |⁞ ⁞ ☼ 3 > |? ◀┴ ? ⁞ |39 |8 ┼ ↕ ⁞ ┴ = ☼ ⁞ C	┴ ┬┴ ¶┐ "!	9┴ 99⁞ ┴ ┼ ? >	☼ = 3 ┬┴		
	⌐⁞ 8 < ┼ ◀ < ⁞ ↑ ☼ ? ┴	0 •┬• |		┼ < = 2 ┴ ⁞	╫ 9┴ ⁞ ¶ ☼ ┬	>%) ' % 3 |◀ ┼ →
	♂ ⁞ ♬ ☼ ┼ ◀ ↕ ⁞ ⁞ ⁞ ☼ ¶ ┴ ┬ ┼ ↑ |┬┬ ← ! ← ⁞#$%/ &'%(& #$%) ←*%┼(&)%) ←,& * $ ← #' !+ &(% , ,┬%' ←*) ⁞# ,%&' ← + ' ⁞#)&#$ ┬#$ (, !⁞%' ←' !/& " ← $ &%/% #% %' ← #% %' " +/ *) ←' ┼ #% %' " %/ ← ,&# ┬ ← ' 1 ┼!+ &(% #% % " #$)%&┘ ┐456 ┐45 1# ┬ → ⁞% !/ &. ' 1%) %$ $! #$%& !□┐└"!2 ⁞ ♬ ⁞%& ! ; ┬"!2 ⁞	0 └•┬• |	9┴ 9 9⁞ ┴ ┼ ? > 38 ┼	└ •	□┬•	└┐└
	┴ ┼ ◀ 8 ↑ 9┴ 93 |9 : └┐└"!2 ⁞					

┼ 8 9┴ A = ┴ ☼ < ⁞ ╫ ⁞ 38 ╫ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ = ☼ B ? > ☼ ┼ ⁞ ┴ D ⁞ ┴ ↑ ┴ ⁞ 98 ? < ⁞ ⁞ ┴ ┼ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ 9 ☼ 2 ┬┴

☼ 9┴ ⁞ ↑ 8 < ┼ ◀ ▽

? > ┴ = |? ☼ ┬ ☼ ┼ ☼ ┬ B ┼ ◯

9┴ 93 |9 ┬ 8 ⁞ 9┴ 93 |9 ♬ 9┴ 99⁞ ┴ ┼ ? > ┬ 8 ⁞ ┬ ⁞ 13 @ ⁞ ☼ E ? 8 ⁞ 3 ┬ ⁞ ◀ 9┴ ♬ 4 ♬ └

9⁞ ☼ 9 |□⁞ ☼ 3 > |? ☼ ┼ ◀ ╫ 9⁞ < = ┴ ┼ 9 ☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁞ 8@┴ ? 9┼ ☼ = ┴A 8 < 9 > ◀ ☼ B 9 8 ┼ ◀ < = 3 ☼ ┼ ◀ ┬ ☼ ┼ ◀ ↑ |┬┬ |9┴

3⁞ 8@┴ ? 9┼ < = 2┴ ⁞A└ ◘ | | ─ ♬4┴

? ┬ ╫ ┼ 9A3⁞ 3 □& .

┬ 8 ? ☼ 9 |8 ┼ A= & #$%─ 8 1#

> 8 ┬┴ ◀┴ |□┼ ☼ 9 |8 ┼ A 99♬ ●

◀ ☼ 9┴ ? 8 = 3 ┬┴ 9┴ ◀A % !% ,%&─ └┘ └└ ◘

◀ ⁞ |┬┬ ╫ □ = ┴ 9 > 8 ◀A┴ 6 ? ☼ ¶ ☼ 9 8 ⁞

↑ ╫ ┬ ◀ 3┴ ⁞ 8 ┼ ┼ ┴ ┬AC┐¶ $)%&=%.─%$

◀┴ 39 > "!2 ⁞	9⁞ ☼ 9 |⁞ ⁞ ☼ 3 > |? ◀┴ ? ⁞ |39 |8 ┼ ↕ ⁞ ┴ = ☼ ⁞ C	┴ ┬┴ ¶┐ "!	9┴ 99⁞ ┴ ┼ ? >	☼ = 3 ┬┴		
	⌐⁞ 8 < ┼ ◀ < ⁞ ↑ ☼ ? ┴	0 └┐└		┼ < = 2 ┴⁞	╫ 9┴ ⁞ ¶ ☼ ┬	>%) ' % 3 |◀ ┼ →
	♂ ⁞ ♬ ☼ ┼ ◀ ↕ ⁞ ⁞ ☼ ¶┴ ┬ ┼ ↑ |┬┬ ← , ,─%' ←)%$ '%─ %)#. ! &'%(& #$%) ←*%#+(&)%) ←) &─ ,& * $← #' !← $ &%/%─ $ &%/%*#!1 &%♬, & ♬ !%& ! |┐└"!2 ⁞	0└ |┐4	9┴ 9 9⁞ ┴ ┼ ? > 38 |┬	└─	┘┐└	└┐└
	┴ ┼ ◀ 8 ↑ 9┴ 93 |9 : 4┐4"!2 ⁞					

┼ 8 9┴ A = ┴ ☼ < ⁞ ╫ ⁞ 38 ╫ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ = ☼ B ? > ☼ ┼ ⁞ ┴D⁞ ┴ ↑┴ ⁞ 9 8 ? < ⁞ ⁞ ┴ ┼ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ 9 ☼ 2 ┬┴

☼ 9┴ ⁞ ↑ 8 < ┼ ◀ ▽

? > ┴ = |? ☼ ┬ ☼ ┼ ☼ ┬ B ├ ◯

9┴ 93 |9 ┬ 8 ⁞ 9┴ 93 |9 ♬ 9┴ 99⁞ ┴ ┼ ? > ┬ 8 ⁞ ┐ ⁞ 13 @ ⁞ ☼ E ? 8 ⁞ 3 ┐ ⁞ ◀ 9┴ ♬4┴

9!! ☼ 9|□!! ☼ 3>|?☼┼◀ ╫ 9!! <=┴┼9☼9|8┼┬8□

3 (% "

3!! 8@┴ ?9┼☼=┴A 8<9>◀☼B98┼◀<=3☼┼◀┬☼┼◀↑|┬┬ |9┴

3!! 8@┴ ?9┼<=2┴!!A└□||–♪4└

?┬╫┼9A3!! 3□& .

┬8?☼9|8┼A= & #$%-8 1#

>8┬┴◀┴ |□┼☼9|8┼A 99♪ ●☼

◀☼9┴?8=3┬┴9┴◀A % !% ,%&┴└┘└└□

◀!! |┬┬╫□=┴9>8◀A┴6?☼¶☼98!!

↑╫┬◀3┴!! 8┼┼┴┬AC┐¶ $)%&=%.+%$

◀┴39> "!2	9!! ☼9|┼!! ☼3>|?◀┴ ?!! |39|8┼↕!!┴=☼!!C	┴┬┴¶┐ "!	9┴ 99!!┴┼?>	☼=3┬┴		
	┌!!8<┼◀ <!!↑☼?┴	0 –4;		┼<=2┴!!	╫9┴!!¶☼┬	
	♂♪ ☼┼◀↕!!☼¶┴┬┼↑|┬┬* !← ¥$%d &'%(& #$%)–*%+(&)%)–,& * $← #'!					
	♪,+ #$ + &– $ &%%– $ &%%,+ –'← ' 1 +!←,&# –'–*)'& (%$!' !–4"!2		9┴ 9 9!!┴┼?> 38╫			
	♪ !%& !0┐└"!2					
	┴┼◀8↑9┴ 93|9 : ;┐└"!2	0└┼4;				

┼89┴ A =┴☼ <!! ╫ 38╫9┴┬┴¶☼9|8┼ =☼B?>☼┼ ┴D!!┴↑┴!!98?<!!!!┴┼9┴┬┴¶☼9|8┼ 9☼2┬┴ ☼9┴!!↑8<┼◀ ▽

9┴ 93|9┬8|!9┴ 93|9A┴ 99!!┴┼?>┬8|!! ┐!!3@!!☼E┐8 !!3┐!◀9┴!4┴

9⁞ ☼ 9 |□⁞ ☼ 3 > |? ☼ ┼ ◀ ╫ 9⁞ < = ┴ ┼ 9 ☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁞ 8@┴ ? 9┼ ☼ = ┴A 8 < 9 > ◀ ☼ B 9 8 ┼ ◀ < = 3 ☼ ┼ ◀ ┬ ☼ ┼ ◀ ↑ |┬┬ |9┴

3⁞ 8@┴ ? 9┼ < = 2┴ ⁞A└□ | |─♬4┴

? ┬ |┴ ┼ 9A3⁞ 3□& .

┬ 8 ? ☼ 9 |8 ┼ A= & #$%─8 1#

> 8 ┬┴ ◀┴ |□┼ ☼ 9 |8 ┼ A 99♬ 0

◀ ☼ 9┴ ? 8 = 3 ┬┴ 9┴ ◀A % !% ,%&─┴↵┴┴□

◀ ⁞ |┬┬ ╫ □ = ┴ 9 > 8 ◀A┴ 6 ? ☼ ¶ ☼ 9 8 ⁞

↑ |┴ ┬ ◀ 3┴ ⁞ 8 ┼ ┼ ┴ ┬AC┐¶ $)%&=%.─%$

◀┴ 39 > "!2	9⁞ ☼ 9 |⁞ ⁞ ☼ 3 > |? ◀┴ ? ⁞ |39 |8 ┼ ↕ ⁞ ┴ = ☼ ⁞ C	┴ ┬┴ ¶┐ "!	9┴ 99⁞ ┴ ┼ ? >	☼ = 3 ┬┴		
	⌐⁞ 8 < ┼ ◀ < ⁞ ↑ ☼ ? ┴	0┘0─0		┼ < = 2┴ ⁞	╫ 9┴ ⁞ ¶ ☼ ┬	>%) ' % 3 |◀┼ →
	3♬ ☼ ┼ ◀ ┼ ↑ |┬┬ ┼ '%─#$%(& #$%)← &+/ (&)%)←,& *$← #' !┼ &(% #% %' " $ &%/%─ &%♬, &─*)←' & %/ +─,&# -'─'!. '					
				└─┤	4┐┴	└┐┴
			9┴ 9 9⁞ ┴┼ ? > 38 |┬			
	♬ %)#. (& #$%) ' $)← ' 1 +!← +/ + '!# ' 1%%#$ (←&%%'!. '← +/ *)← $ &%/% ,+ -' ! └┐┴"!2					
	♬&%$ 1 '#)%' +┼ '% ! |┐┴"!2	0 ─0		└─4	|┐┴	└┐┴
	┴┼ ◀ 8 ↑ 9┴ 93 |9 : |┐┴"!2					

┼ 8 9┴ A = ┴ ☼ < ⁞ ╫ ⁞ 38 ╫ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ = ☼ B ? > ☼ ┼ ⁞ ┴D⁞ ┴ ↑┴ ⁞ 98 ? < ⁞ ⁞ ┴ ┼ 9┴ ┬┴ ¶ ☼ 9 |8 ┼ 9 ☼ 2 ┬┴

? > ┴ = |? ☼ ┬ ☼ ┼ ☼ ┬ B ┼ ◯

9⁉ ☼ 9 |□ ⁉ ☼ 3 > |? ☼ ┼ ◀ ╫ 9⁉ < = ┴ ┼ 9 ☼ 9 |8 ┼ ┬ 8 □

3 (% "

3⁉ 8@┴ ?9┼ ☼ = ┴A 8 <9> ◀ ☼ B98 ┼ ◀ < = 3 ☼ ┼ ◀ ┬ ☼ ┼ ◀ ↑ |┬┬ |9┴

3⁉ 8@┴ ?9┼ < = 2┴ ⁉A┴ □ | | ─ ♬4┴

?┬ ╫ ┼ 9A3⁉ 3□& .

┬ 8 ? ☼ 9 |8 ┼ A= & #$%─8 1#

> 8┬ ┴ ◀ ┴ |□ ┼ ☼ 9 |8 ┼ A 99♬ □

◀ ☼ 9┴ ? 8 = 3┬ ┴ 9┴ ◀A8 ! ,%& ┘ ┴ ┴ □

◀ ⁉ |┬┬ ╫ □ = ┴ 9 > 8 ◀A┴ 6 ? ☼ ¶ ☼ 98⁉

↑ ╫ ┬ ◀ 3┴ ⁉ 8 ┼ ┼ ┴ ┬ AC┐¶ $)%& = %. ─%$

◀┴ 39> "!2	9⁉ ☼ 9 |┼ ⁉ ☼ 3 > |? ◀┴ ?⁉ |39 |8 ┼ ↕ ⁉ ┴ = ☼ ⁉ C	┴ ┬ ┴ ¶┐ "!	9┴ 99⁉ ┴ ┼ ? >	☼ = 3┬┴		
	┌ ⁉ 8 < ┼ ◀ < ⁉ ↑ ☼ ? ┴	0┴ └ ●●		┼ < = 2┴ ⁉	╫ 9┴ ⁉ ¶ ☼ ┬	>%) ' % 3 |◀ ┼ →
	♂ ♬ ☼ ┼ ◀ ↕ ⁉ ☼ ¶ ┴ ┬ ┤ ↑ |┬┬ ← ! ← #$%d & '%(& #$%) ← * %+(&)%) ←,& * $♂ ,+ - ← #' !					
	3♬ ☼ ┼ ◀ ┤ ↑ |┬┬ ← #! ! %(& 7%─ ! ← 7%& / #$%(& #$%) ← & +/ (&)%) ← (& / ♂,+ - ← & #&) ! %' ┤ ' ! & $ ( ) & ' ←,& # - ' ┘ & %d + ← $ &%d%	0 0┬●●		└ ●	4┐┴	└┐┴
	♬ $ &%d%'+ , ┼ '%%d ' ! . &%, / ─4 '%%d ! 1# - → ! ● ┬ ┘ "!2		9┴ 9 9⁉ ┴ ┼ ? > 38 ╫			
	⁉ 3♬ ⁉ ☼ ¶ ┴ ┬ ┤ ↑ |┬┬ ← #! ! %#$%' $) ' ← ! ← %)#. (& 7%─ & +/ (&)%) ← ! #&%─ * #&%─ # ,%&	0 └ ●●				
	♬ ! %& ─' 1%%$ ─$) & ! ┘ ┐ └ "!2	0 └ □ ●●	▽	└ 0	┘┐┴	└┐┴
	┴ ┼ ◀ 8 ↑ 9┴ 93 |9 : ┘ ┐ └ "!2					

┼ 89┴ A = ┴ ☼ < ⁉ ╫ ⁉ 38 ╫ 9┴ ┬ ┴ ¶ ☼ 9 |8 ┼ = ☼ B ? > ☼ ┼ ⁉ ┴ D ⁉ ┴ ↑ ┴ ⁉ 98 ? < ⁉ ⁉ ┴ ┼ 9┴ ┬ ┴ ¶ ☼ 9 |8 ┼ 9 ☼ 2┬┴

☼ 9┴ ⁉ ↑ 8 < ┼ ◀ ▽

? > ┴ = |? ☼ ┬ ☼ ┼ ☼ ┬ B ┼ ◯

9┴ 93 |9 ┬ 8 ⁉ 9┴ 93 |9 ♬ 9┴ 99⁉ ┴ ┼ ? > ┬ 8 ⁉ ⁉ 13 @ ⁉ ☼ E ? 8 ⁉ 3 ⁉ ◀ 9┴ ♬4 ♬ ┴

9!! ¤ 9|□!! ¤ 3 > |?¤ ┤◄ ╫ 9!! < = ┴ ┤ 9¤ 9|8┤┬ 8 □

3 (% "

3!! 8@┴ ? 9┤¤ = ┴A 8 < 9 > ◄¤B 9 8┤◄ < = 3¤┤◄┬¤┤◄↑|┬┬ |9┴

3!! 8@┴ ? 9┤ < = 2┴ !!A└□ | | –♫4└

?┬╫┤9A3!! 3□& .

┬8 ?¤ 9|8┤A= & #$%-8 1#

> 8┬┴◄┴ |□┤¤ 9|8┤A 99♫ ;

◄¤ 9┴ ? 8 = 3┬┴ 9┴ ◄A8 ! ,%&0┘└└□

◄!! |┬┬╫ □ = ┴ 9 > 8 ◄A┴ 6 ?¤ ¶¤ 9 8 !!

↑╫┬◄ 3┴!! 8┤┤┴┬AC┐¶ $)%&=%.-%$

◄┴ 39 > "!2	9!! ¤ 9 ├ !! ¤ 3 > |?◄┴ ?!! |39|8┤↕!! ┴ = ¤!! C	┴┬┴¶┐ "!	9┴ 99!! ┴┤? >	¤ = 3┬┴		
	⌐!! 8 < ┤◄ < !! ↑ ¤ ? ┴	0┘└ •		┼ < = 2┴!!	╫ 9┴!! ¶¤┬	>%) ' 3 ◄┤ % →
	3♫ ¤┤◄┤↑ |┬┬← !-%$%(& #$%)← &+/ (&)%)←,& * $← #' !-(+ ' ' #-, !!+%'← ,&# - '↩ & %d +← *%&#$%&%'#' ! &'-#!!+% #$)%&'← $ &%d%,+ - '	0 ┘└ •	9┴ 9 9!! ┴┤? > 38 ╫	└4;	0┐┴	└┐┴
	♂ ♫ ¤┤◄↕!! ¤¶┴┬← , ,-%'← %)#. ! &'%(& #$%)←%+(&)%)←,& * $← #' !			└• ┴	;┐┴	└┐┴
	♫ %& ! –┐└"!2					
	┴┤◄ 8↑9┴ 93 |9 : |┐4"!2	0└4-••				

┴ 89┴ A = ┴¤ < !! ╫ 38 ╫ 9┴┬┴¶¤ 9|8┤ = ¤B ? > ¤┤ ┴D!! ┴↑┴!! 98 ? < !! !! ┴┤9┴┬┴¶¤ 9|8┤ 9¤ 2┬┴

¤ 9┴!! ↑ 8 < ┤◄ ▽

? > ┴ = |?¤┬¤┤¤┬B ├ ◯

9┴ 93 9┬8 ||9┴ 93 9A9 99!! ┴┤? > ┬8 || ┬13@!! ¤ E?8 !! 3┬|◄9┴ 4♫└

9!! ¤ 9|□!! ¤ 3>|?¤┤◄ ╟ 9!! <=┴┤9¤9|8┤┬8□

3 (% "

3!! 8@┴ ?9┤¤=┴A 8<9>◄¤B98┤◄<=3¤┤◄┬¤┤◄↑|┬┬ |9┴

3!! 8@┴ ?9┤<=2┴!!A└─□||─♪4└

?┬╟┤9A3!! 3□& .

┬8?¤9|8┤A= & #$%-8 1#

>8┬┴◄┴ |□┤¤9|8┤A 99♪└

◄¤9┴?8=3┬┴9┴◄A8 ! ,%&0─┘└└□

◄!! |┬┬╟□=┴9>8◄A┴6?¤¶¤98!!

↑╟┬◄3┴!! 8┤┤┴┬AC┐¶ $)%&=%.+%$

◄┴39> "!2::	9!! ¤9|:!! ¤3>|?◄┴ ?!! |39|8┤↕!!┴=¤!!C	┴┬┴¶┐ "!	9┴ 99!!┴┤?>	¤=3┬┴		
	⌐!!8<┤◄ <!!↑¤?┴	0─4┐└┤		┤<=2┴!!	╟9┴!!¶¤┬	>%)' 3◄┤ % →
	3♪ ¤┤◄┤↑|┬┬← !<#$%(& #$%)← &#/(&)%)←) &- ,& *$♂,+ -← #'!←,&# -'← (+ ''←#%%" %d +←+ '# ←*)← ,,+%'← +)(+ '' #-, !!#%'←#$)%&'					
	♪ %'#! ! └┐└"!2::			└•4	0┐└	└┐└
			9┴ 9 9!!┴┤?> 38╟			
				└•┤	4┐└	└┐└
	♪(& /#$ +& ! ;┐└"!2::					
	┴┤◄8↑9┴ 93|9:┘4┐└"!2::	0 └┐└┤				

┤89┴ A =┴¤ <!!╟::38╟9┴┬┴¶¤9|8┤ =¤B?>¤┤::┴D!!┴↑┴!!98?<!!!!┴┤9┴┬┴¶¤9|8┤ 9¤2┬┴

?>┴=|?¤┬¤┤¤┬B ├ ◯

!!3┐◄9┴4♪└ 13@!!¤E?8 ?>┬8!!┐!!13 99!!┴┤?>┬8!!┐ 93|9R┴ 93|9R┴ 93|9R┴ 93|9R┴ 93|9R┴

9!! ¤ 9|□!! ¤ 3>|?¤+◀ ╫ 9!! <=┴+9¤9|8+┬8□

3 (% "

3!! 8@┴ ?9+¤=┴A 8<9>◀¤B98+◀<=3¤+◀┬¤+◀↑|┬┬ |9┴

3!! 8@┴ ?9+<=2┴!!A└□||–♫4└

?┬╫+9A3!! 3□& .

┬8?¤9|8+A= & #$%-8 1#

>8┬┴◀┴ |□+¤9|8+A 99♫

◀¤9┴?8=3┬┴9┴◀A8 ! ,%&□┘└└□

◀!! |┬┬╫+□=┴9>8◀A┴6?¤¶¤98!!

↑╫┬◀3┴!! 8++┴┬AC┐¶ $)%&=%.+%$

◀┴39> "!2::	9!! ¤9+!! ¤3>|?◀┴ ?!! |39|8+↕!!┴=¤!!C	┴┬┴¶┐ "!	9┴ 99!!┴+?>	¤=3┬┴		
	⌐!!8<+◀ <!!↑¤?┴	0–□┐0		┼<=2┴!!	╫9┴!!¶¤┬	>%)' 3|◀+ % →
	♂♫ ¤+◀↕::!!¤¶┴┬↑|┬┬→ !← #$%d &'%(& #$%)←*%+(&)%)←) &← (& /♂,+ -← #'!					
	♫ $ &%d%) !┴┬"!2::					
	♫ , ,+%'←,& *$!┴+4"!2::					
	3♫ ¤+◀↑|┬┬→ !→#$%(& #$%)← &+/ (&)%)←(& /← #'!←#% %' " %d +← F#)#.P%)'! #$%)' $)←(% & &d'←' &← +.('← '#(1!) &	0–4┐0				
	♫,+ -←,&# -'←(+ ''←#% %' "' & %d +← *#&%-' +← #% %' " $ &%d%-*)%$,+ -' !|┐└"!2::					
	♫!' .!1%$) "!&%$ 1%$.$!%&%))&. ← '!& $( ) &← %&" & %))&. ' #$(! 0┐└"!2::					
	♫&.'1%) #←'!& $( ) & !;┐└"!2::					
	♫* + &(%!&%%'!. '┤ŒF ┬G)# %d%&← %d +'!& '← #+'←' &$('←(+ ''←*#&%- &# + %d + #+&& $, &← #$)%&'←(+ '' , !!+%'♂ $! #$%&←,&# -' ! ┐└"!2::					
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	☼ 3 > ☼ ┬ 9	0 ─4 □ ─				
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	♫ + & 1 $ (%(& / ←' & %d + ←)#"%&%$!) & !1 $, 7%←,& # - ' ← #$)%&' ←"#$%' $) ' ← +/ *) ←%% !& # +*#&#$ (←'#! !•┐└"!2 ⁞⁞			└••	•┐└	; ┐
			9┴ 9 9⁞⁞ ┴┼ ?> 38 ╫			
	♫)#"%&%$!) &+ !' "*#&%← +/ *) ←' & ← (+ ' ' !┘ ┐└"!2 ⁞⁞			└•0	┘ ┐└	
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APPENDIX A.5

VERTICAL AQUIFER SAMPLING STRATIGRAPHIC LOGS

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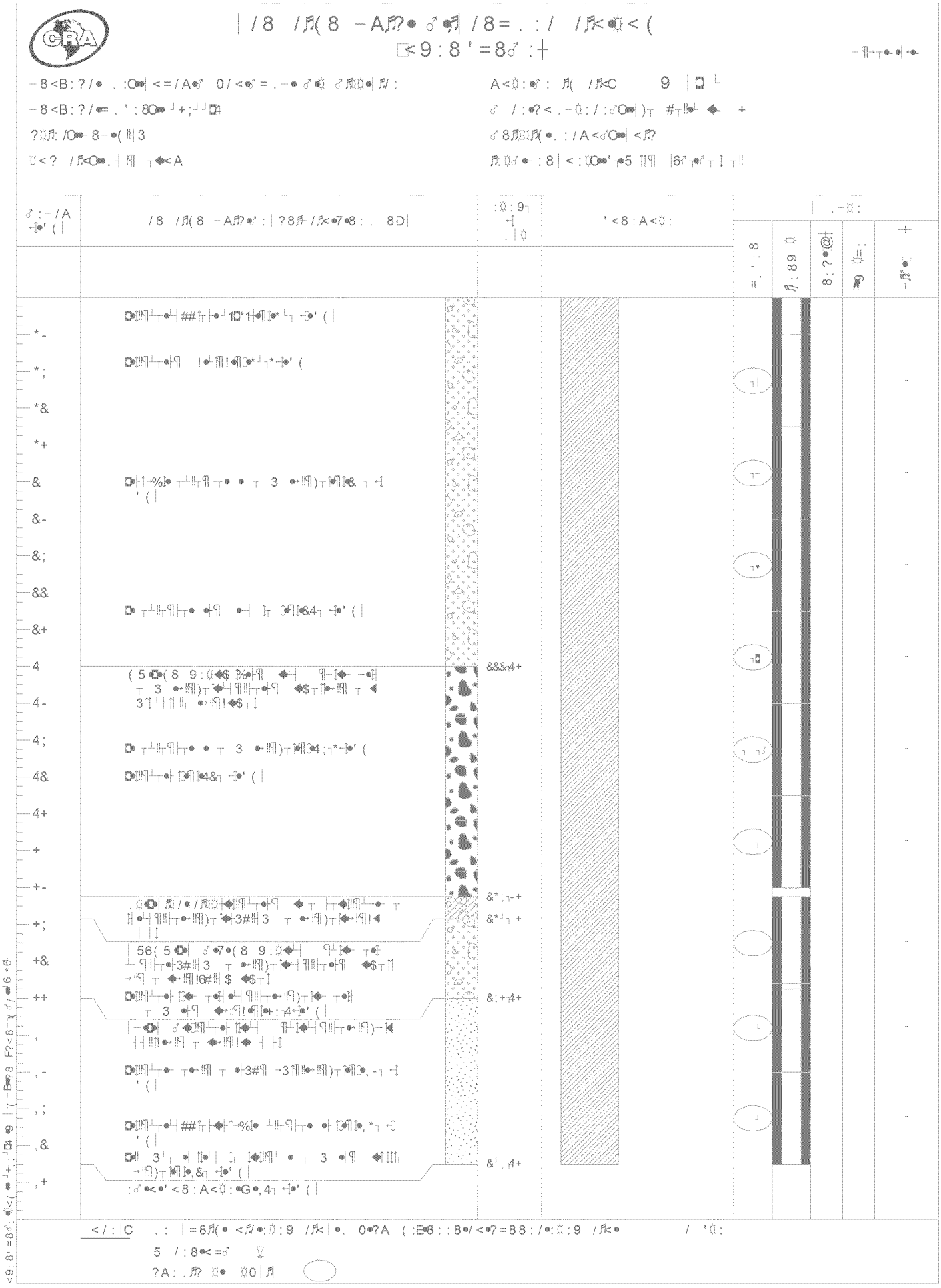

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| 56(5 ◆| ♂●7●(8 9 : ☼◆↕↕↕┴┬●┤ ↕◆
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  O●╢¶┴┬●┤●→╢¶├◆ ╢¶├↑┴●╢ ● ┬↑╢¶● ┬#╢ ├●╢↕
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→╢¶ ┬ ◆ ┤┤ ╢!●→╢¶ ┬ ◆#╢ $ 6 ¶╢"●→╢¶!◆ ┤ ├↧

☐●| ☐ ┴%●┬ ├●┤ ↑!●┼¶ ●¶ ●→╢¶)┬↑◆#╢ $ ◀
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¶↧●└└┐ ┼●' (|
☐●;☐ ┴%●↑!●¶|%●! ┬● ¶↧┬╢¶↑◆¶↧●└┐*┼●' (|
☐●→╢¶)┬↑◆¶ ●┼¶→●┤↧● ╢┬├┬ ↧◆)┬╢!● ┤ ├↧●¶↧
└;┐ ┼●' (|

| . ☐● | ♫ / 0●| ♂●♫☼┼◆╢¶┴┬●→╢¶)┬↑◆╢¶┴┬
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→╢¶ ┬ ◆ ¶╢"●→╢¶!◆ ┤ ├↧●¶ ●)┬╢!● ┤ ├↧
☐●☐ ┴%●┬ ├●┤ ↑!●┼¶ ●¶ ●→╢¶)┬↑◆#╢ $ ●¶↧
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☐&☐ ┴%●↑!●¶|%●! ┬● ¶↧┬╢¶↑◆╢¶┴┬●→¶├┤● ┬#╢├
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| − ☼● ♂●♫☼┼◆ | 3 ╢!●!! ┬●┼¶ ◆╢¶┴┬
├¶→◆┤ ¶┴↧◆ ┬●→╢¶ ┬ ◆ ┤┤ ╢!●→╢¶ ┬ ◀
¶╢"●→╢¶!◆ ┤ ├↧●¶ ●)┬╢!● ┤ ├↧
☐●→%↑●!┬↑¶ $ |%☐#╢ $ ◆╢¶┴┬● ┬●→╢¶ ┬
╢3 ┬ ●→╢¶)┬↑◆ ┤● ┤╢┬●┤ 3 ╢!●!! ┬●┼¶ ├
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| 5 ☐● | ♂◆╢¶┴┬● ┬●→╢¶ ┬ ●┤3#╢ 3 ┬
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→╢¶ ┬ ◆$┬↑●→╢¶ ┬ ◆#╢ $ |%☐→╢¶!◆$┬↧

| 56(5 ☐● | ♂●7●(8 9 : ☼◆┤ ¶┴↧◆
┬ 3 ●┤ ●┤ ¶╢!┬●→╢¶ ┬ ●┤¶ ◆ ┬●¶
┴┤¶╢!┬●→╢¶ ┬ ●┤ 3 ┬ ●→╢¶)┬↑◆$┬↑●→╢¶ ┬ ◀
#╢ $ ◆%→%↑●| 2 ├┬ ◆$┬↧
☐●→╢¶)┬↑↑●¶ ◆┤┬ 3┴┬ ●→╢¶)┬↑●→╢¶ ●├┬●¶↧
┘ -┐*┼●' (|

| 5 ☐● | ♂◆╢¶┴┬●→╢¶)┬↑◆┤ ¶┴↧◆ ┬●┤
┬ 3 ●→╢¶ ┬ ◆$┬↑●→╢¶ ┬ ◆#╢ $ ◆$┬↧

| 56(5 ☐● | ♂●7●(8 9 : ☼◆┤ ¶┴↧◆ ┬●┤
┬ 3 ●→╢¶ ┬ ◆$┬↑●→╢¶ ┬ ◆#╢ $ ◆$┬↧

. ☼☐● | ♫ / ● / ♫☼┼◆$ %●¶ ◆╢¶┴┬● ┬●→╢¶ ┬
├3#╢ 3 ┬ ●→╢¶)┬↑◆╢¶┴┬●┤ ¶!◆ ┬ ├┬◆→╢¶!◆
┤ ├↧

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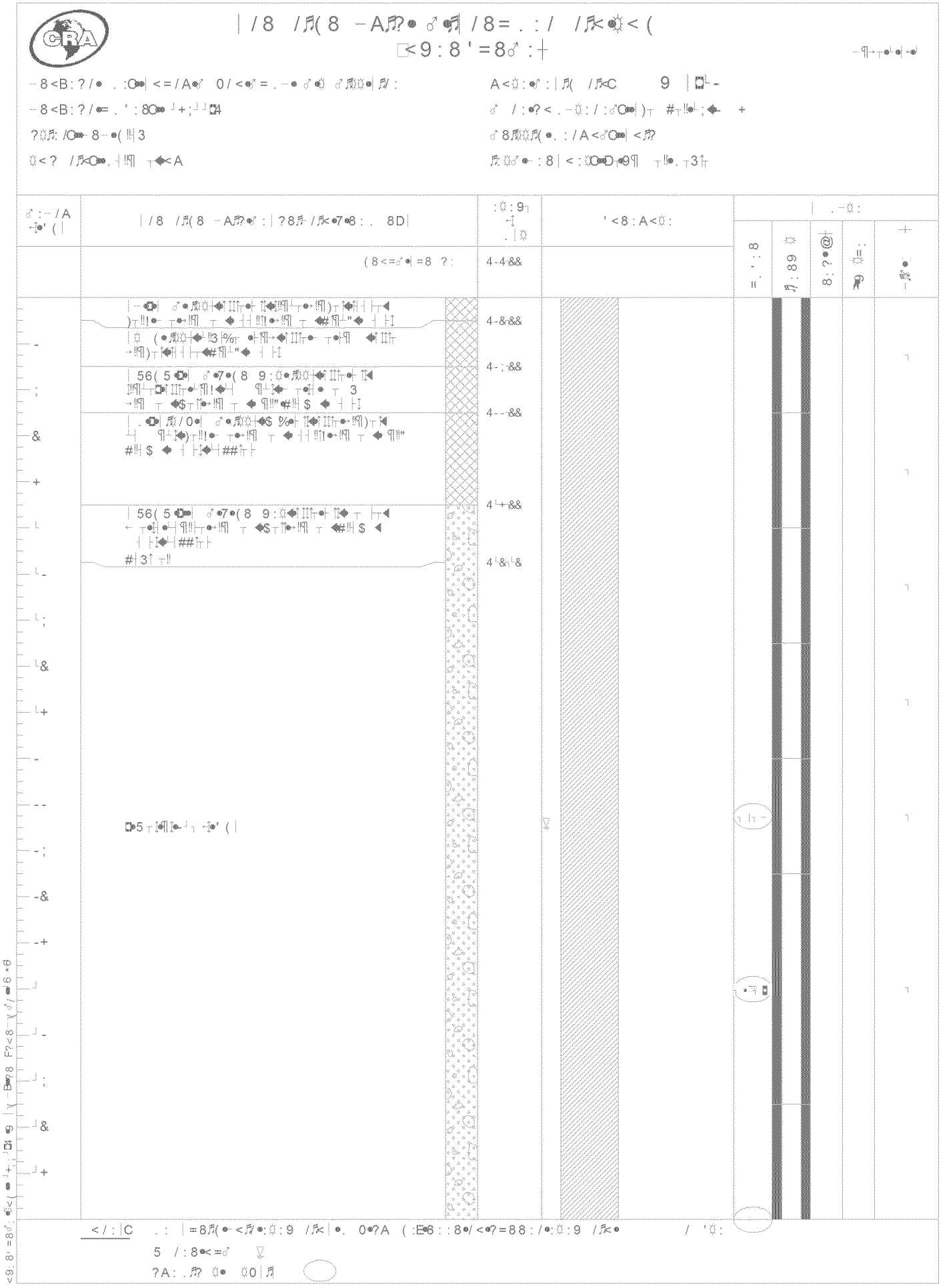

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. ☼O● | ♫ / ● ♫☼ ┼◆$ %● ¶ ◆╢¶└┬● ┬●→╢¶ ┬
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└┤¶╢└┬●→╢¶ ┬ ●┤3#╢ 3 ┬ ●→╢¶)┬1◆┤ ¶└1◆
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- ├☼◆╢¶└┬●┤¶!◆┤ ¶└☼◆)┬!!●- ┬●→╢¶ ┬ ◆$┬☼
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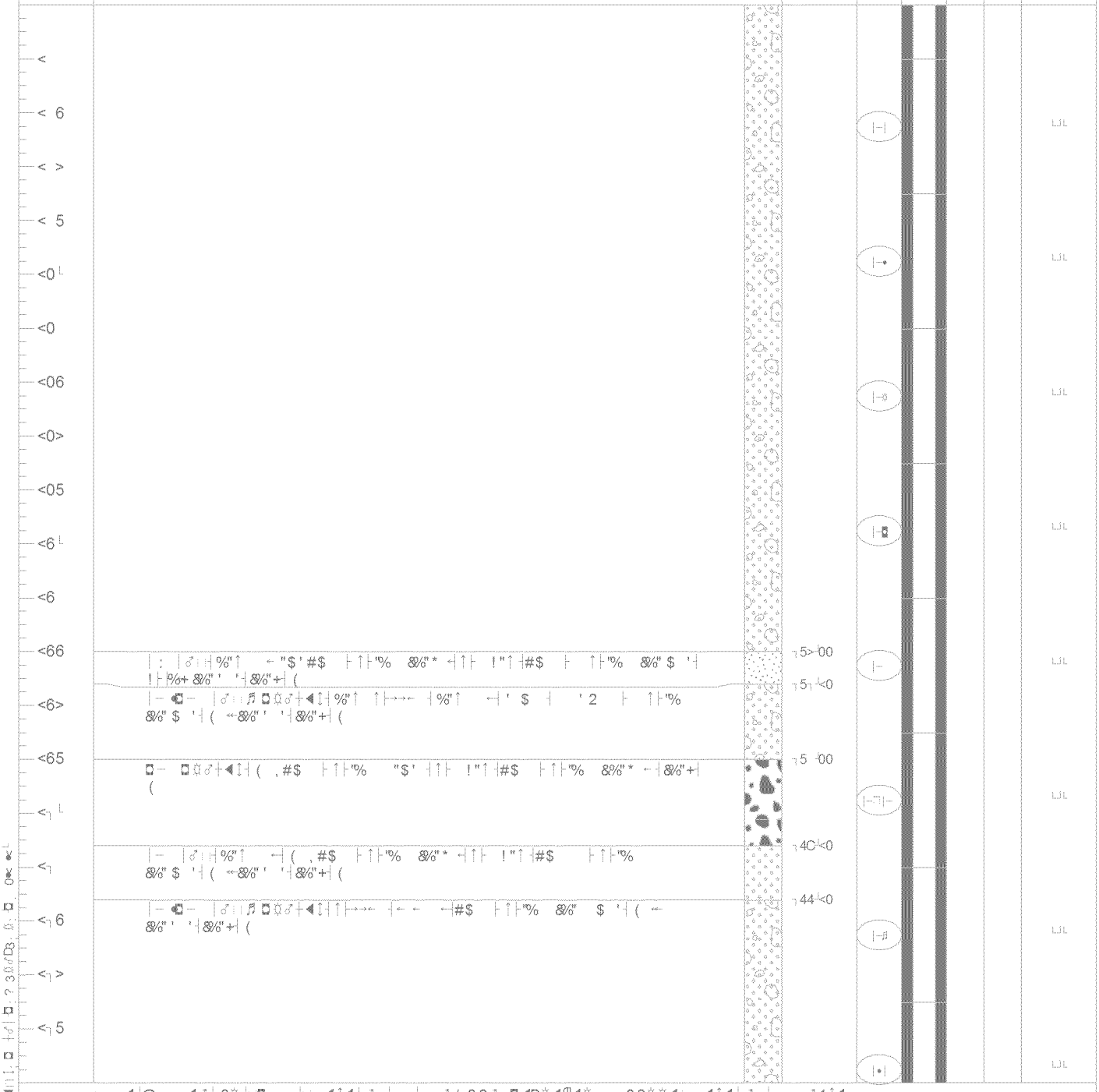

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►└●			┘►►				►┐└6└┘
►└┘	¶►┬;¶!┤(¶►☼" "-¶►┤ ¶►►&!☼ ::¶☼ "¶:☼'-¶►☼& ¶►┤ ¶►►&! ☼ ::¶►☼├ " #☼$ ¶►►◄►└┘┐◄►+↕						
►└└	¶ !↑ ¶► "¶☼ # ┴ !↑ ¶►►◄►└┐●┤◄►+↕						
►└3							
►└	¶►┤ ¶►►&!☼ ::¶►☼├ "¶☼ "-¶►┤ ¶►☼├ "¶: ! " "¶►☼$ ¶►►◄►└┐●┤◄►+↕						
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►┘	¶►┤ ¶►►&!☼ ::¶►☼├ "¶☼ "-¶►┤ ¶►☼├ "¶: ! " "¶►☼$ ¶►►☼& ►&!☼ :: #☼├ "¶►☼$ ¶►► "►&! ┤¶►►►4●┤◄►+↕						
►└	↕,¶¶♂┬┤-¶►►►¶►┤ ¶►►&!☼ ::¶►☼├ "-¶: ! " "¶►☼$ %►&!' ☼&►►┤ ¶►► &!☼ ::¶►☼├ "%►► ┤¶►►☼" "%►► !↑ %►► ►►► !¶"!	►►►4●					
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►	↕,6+,¶¶♂┬┤¶► "¶+7♂890-¶►☼& ¶ ┤►►► "►&►►(%►&!'☼&►►┤ ¶►►¶&!☼ :: #☼├ "¶☼ "%►► ┤¶►►&!☼ ::¶►☼├ "¶: ! " "¶►☼$ %►► !┤(¶#☼" "%►► !↑ % ↑◄	►└└4●					
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┬@19↕C .9♂↕<7/┬+¶‼@/┬1¶►098♂1/@┬↕¶.♂2¶►5=♂┬+9►►►79E97¶►►@¶►5<779┬1¶►098♂1/@┬¶►►♂*09

5=9./5♂0¶►┬♂02↕/↕ ◯

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◀├ □◀ ‼ ├ □♫☼ : ¶ ? ‼
?→←├ 8 >├┤←┬

♫# /%¶ ¶ -¶

♫├ ?A← : ◀¶ □ ; ←B¶¶? > ◀☼ ¶ □C◀ ?┬ ¶ > ; ♫¶□┬ ┤ ¶ □┬ ┤ ┼┤¶◀←

♫├ ?A← : ◀¶ > ; 8← ├B¶¶ □9 ├ │□┴ └

: ┤ ←┬ ◀B¶¶ ├ ♫¶ "*1 ,

┤? : □◀ ?┬B¶¶; *"#'.%¶?6'*

☼ ?├←¶ ← ‼ ┬ □◀ ?┬B → □┴♂

┤ □◀←¶: ? ; ♫├←◀←├ B¶¶ *3%+2%"¶ 9 ¶ └└

┤ ├ ┤┤┬ ‼ ¶; ←◀☼ ?├ B¶¶? ┬ :

←┤┤ ¶ ←├ ?┬┬←├ B¶¶ ┬¶ '3%"&

┤←♫◀☼ -!¶B‼	◀├ □◀ ‼ ├ □♫☼ : ¶ ← : ├ ♫◀ ?┬ ¶ ¶ ← ; □├ D	←┤←→┐ -!	□ ; ♫┤←				
	‼ ├ ?>┬┤ ¶ ├ □ :←	◘•♂♂	┬ 8←┴	┬◀←┴→□┴	┴←: ¶@	¶ □┴> ←	☼%#O&, #$% ♫┤¶, ; +
	□♫☼ □┤◀						
	♫ ‼ ♫ ¶¶□┬ ┤ ¶ ¶ ├ □→←┤¶ ┼┤ ¶"#$%&'(!)$* + , #$!)¶' .%¶*$*#"&%¶"#' .%0 &#. 0)¶' .%¶*$*#"&%¶"#' .%0&12#. / 1(#"¶"#3%()¶, * *"(4¶"#0%0)¶2"* 5 .)¶+ *'&! ┴¶' .%¶*¶+%0'1 + ¶"#' .%0&#. 0)¶"#$%$*#"&%¶"#' .%0&#. 0)¶5'!6¶ .%¶*$*#"&% &12"* 1 . 0%0¶"#3%()¶0#"7¶"#4)¶+ *'&!¶#!¶┐└-!¶B‼ ┴¶' .%¶*$*#"&%¶"#' .%0&#. 0¶#. 0&12"* 1 . 0%0¶"#3%()¶2"* 5 . ¶#!¶┐9-!¶B‼	◘┬♂					┐└
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	; ↕; ┤¶¶□┬ ┤ ¶ ¶┤◀¶ ┼┤)$* + , #$!)¶' .%¶"#' .%0&#. 0)¶0#"7¶"#4)¶5 %!	♂ ┐┤♂					
	┼┤)$6#(7 ('7%¶+ #!%"#()¶0%. &%)¶6' . (4¶2%00%0)¶#(!%" . #!' . /¶5'!%¶ ¶2% /%)¶5%!	♂•┐ ♂ ♂•◘♂					
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	‼ ♫¶¶ ├ □→←┤ 5'!6¶' .%¶*$*#"&%¶"#' .%0&#. 0)¶0%. &%)¶' .%¶*$*#"&%¶"#' .%0) &12"* 1 . 0%0)¶2"* 5 .)¶+ *'&!	┘•♂♂					
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┬ ?◀←B ; ←□>├ ┬ ‼ ¶ ? ┬ ◀¶ ├←→□◀ ?┬ ¶; □C¶: ☼ □┬ ‼ ←)¶ ← ←├ ¶◀ ? ¶: > ├ ├ ←┬ ◀¶ ├←→□◀ ?┬ ¶ ◀□8├←

: ☼← ; : □├¶□┬ □├C

◀├ □◀ !! ├ □♫☼ : ¶ ? !!
?→← ├ 8 > ├ ┤ ←┬

♫#/%&'¶-¶

♫├ ?A← : ◀¶ □ ; ←B¶¶? > ◀☼ ¶ □C◀ ?┬ ¶ > ; ♫¶□┬ ┤ ¶ □┬ ┤ ┼┼¶◀←

♫├ ?A← : ◀¶ > ; 8← ├B¶¶ □9 ├ ├□┴ └

: ┤ ←┬ ◀B¶¶ ├ ♫¶ "*1 ,

┤? : □◀ ?┬B¶¶; *"#'.% ¶? 6'*

☼ ?┤←¶ ← !! ┬ □◀ ?┬B → □┴♂

┤ □◀← ¶: ? ; ♫┤← ◀← ┤B¶¶ *3%+ 2%'¶ 9 ¶' └└

┤ ├ ┼┼ ┬ !! ¶; ← ◀☼ ? ┤B¶¶? ┬ :

← ┤┤ ¶¶ ← ├ ? ┬ ┬ ← ├B¶¶ ┤¶ '3%'&

├ ←♫◀☼ -!¶B !!	◀├ ◀ !! ├ ♫☼ : ¶ ← : ├ ♫◀ ?┬ ¶ ¶ ← ; ├D	←┤←→┐ -!	├ ; ♫├←				
			├ < ; -	├ ◀ ┤ ┤	├ @ ¶ : .	├ ┤ ┤ <	☼ %&'¶ ¶ ♫ ├ ¶ , ; +
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□●	!! < ¶¶ ├ ├ → ← ┤ ¶"#$%¶' .%¶ * ¶+%0'1 + ¶/ "#' .%0¶&#. 0 ¶5'!6¶$* #"&%¶/ "#' .%0¶&#. 0) $* + , #$!)¶' .%¶ * ¶$ * #"&%¶/ "#' .%0)¶&12" * 1 . 0%0)¶5%(¶/ "#0%0)¶' /6!¶2" * 5 .)¶5%/						
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|♂	: !!! : ¶¶ ┬ ┤ ¶ ¶! ├ ├ → ← ┤ ¶5'!6¶$(#4¶# . 0¶&'(!)¶$* + , #$!)¶' .%¶ * ¶$ * # "&%¶/ "#' .%0 &#. 0)¶' .%¶ * ¶$ * #"&%¶/ "#' .%0¶&12" * 1 . 0%0¶/ "#3%()¶/ "#4)¶5%/						
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||	♫!!! ♫¶¶ ┬ ┤ ¶ ¶! ├ ├ → ← ┤ ¶"#$%¶&'(!¶#. 0¶$(#4)¶0%. &%)¶' .%¶ * ¶$ * #"&%¶/ "#' .%0 &#. 0)¶' .%¶ * ¶$ * #"&%¶/ "#' .%0¶&12" * 1 . 0%0¶/ "#3%()¶/ "#4)¶5%/						
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♂							
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9	¶┬ =$(#4%4¶&#. 0¶#. 0¶/ "#3%(¶&%/# +)¶* * &%)¶' .%¶ * ¶$ * #"&%¶/ "#' .%0¶&#. 0)¶' .%¶ * $ * #"&%¶/ "#' .%0¶&12" * 1 . 0%0¶/ "#3%()¶/ "#4)¶+ *'&!¶ * ¶5%/¶#!¶ ┬ -!¶B !!						

┬ ?◀←B ; ← : > ├ ┬ !! ¶¶ ? ┬ ◀¶ ├ ← → : ◀ ?┬ ¶; : C¶: ☼ : ┬ !! ←) ¶ ← ← ├ ¶ ? ¶: > ├ ├ ← ┬ ◀¶ ├ ← → : ◀ ?┬ ¶ ◀ : 8 ├ ←

: ☼ ← ; : : ┼¶ ┬ : ┼C

? ← ├ 8 > ├ ┤ ← ¶ ? !! ¶¶ ? ┬ ◀? ├ !! ¶¶ ← ├ ┼ !! ♫A¶¶ ├ ├ E ? ├ ♫ !! ! ◀¶ ¶ ♂ ¶ └

◀├ □◀ ‼ ├ □♫☼ : ¶ ? ‼
?→←├ 8 > ├ ┤ ←┬

♫#/%&¶-¶

♫├ ?A← : ◀¶ □ ; ←B¶¶? > ◀☼ ¶ □C◀ ?┬ ¶ > ; ♫¶□┬ ┤ ¶ □┬ ┤ ┼┼¶◀←

♫├ ?A← : ◀¶ > ; 8← ├B¶¶ ¤9 | | ¤ ┴ └

: ┤ ←┬ ◀B¶¶ ├ ♫¶ "*1 ,

┤? : □◀ ?┬B¶¶; *"#'.% ¶? 6'*

☼ ? ┤←¶ ← ‼ ┬ □◀ ?┬B → □┴♂

┤ □◀←¶: ? ; ♫┤←◀←┤B¶¶ *3%+ 2%"¶ 9 ¶♂ └└

┤ ├ ┼┼ ┬ ‼ ¶; ←◀☼ ? ┤B¶¶?┬ :

←┼┤ ¶¶←├ ?┬┬←┼B¶¶ ┤¶ '3%"&

├ ←♫◀☼ -!¶B‼	◀├ : ◀ ‼ ├ : ♫☼ : ¶ ← : ├ ♫◀ ?┬ ¶ ¶ ← ; : : ┼D	←┼←→┐ -!	: : ; ♫┼←			
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•♂							
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|	♫¶¶ ┬ ┼ ¶"#$%&'(!¶#.0¶'.%¶*¶$*#"&%¶&12"*1.0%0¶"#3%()¶0%.&%)¶'.%¶* $*#"&%¶"#'.%0)¶, * *"(4¶"#'.%0)¶"#4)¶5%! ┴¶'.%¶*¶+%0'1+¶"#'.%0¶&#.0)¶"#$%¶$*#"&%¶"#'.%0¶&#.0¶#.0¶'.%¶&12"*1.0%0 /"#3%(¶#!¶ ─┘-!¶B‼	••					
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99							

┬ ?◀←B ; ← : : > ├ ┬ ‼ ¶¶ ? ┬ ◀¶ ├ ← → : ◀ ?┬ ¶; : C¶: ☼ : ┬ ‼ ─)¶ ← ← ├ ¶ ? ¶: > ├ ├ ←┬ ◀¶ ├ ← → : ◀ ?┬ ¶ ◀ : 8 ├ ←

: ☼ ← ; : : ┼¶ ┬ : ┼C

?→←├ 8 >

◀├ □◀ ‼ ├ □♫☼ : ╫ ? ‼
?→←├ 8 > ├┤←┬

♫#/%╫ ╫-╫

♫├ ?A← : ◀╫ □ ; ←B╫? > ◀☼ ╫ □C◀ ?┬ ╫ > ; ♫╫□┬┤╫ □┬┤ ┼┼╫◀←

☼ ?┼←╫ ← ‼┬ □◀ ?┬B → □┴♂

♫├ ?A← : ◀╫ > ; 8←├B╫ □9│ │□┴ └

┤□◀←╫: ? ; ♫┼←◀←┤B╫ *3%+ 2%"╫ 9 ╫' └└

: ┤←┬ ◀B╫ ├♫╫ "*1,

┤ ├ ┼┼┬ ‼ ╫; ←◀☼ ?┤B╫?┬ :

┤? : □◀ ?┬B╫; *"#'.% ╫? 6'*

←┼┤ ╫ ←├ ?┬┬←┼B╫ ┼╫ '3%"&

├←♫◀☼ -!╫8‼	◀├ ◀ ‼ ├ ♫☼ : ╫ ← : ├ ♫◀ ?┬ ╫ ╫ ← ; ┼D	←┼←┐ -!	┼; ♫┼←				
			┴ ^ 8 ↓	┴ ↑ ┴ ↓ ◀	┴ @ ╫ ↓	┴ ↓ ^ ╫	☼ %#O&, #$% ♫ ┼ ╫ ', +
♂	╫┬=╫5%((╫/ "#0%O╫' .%╫ *$* #"&%╫/ "#' .%O%12"*1 . 0%O╫/ "#3%(%&# + ╫5'!6╫' .%╫* $*#"&%╫/ "#' .%O%# . 0)╫"#$%$*22(%#!╫ ┐└-!╫8‼						
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┘└└	╫┬=╫5%((╫/ "#0%O╫' .%╫ *$* #"&%╫/ "#' .%O%12"*1 . 0%O╫/ "#3%(%&# + ╫5'!6╫' .%╫* $*#"&%╫/ "#' .%O%# . 0)╫"#$%$*22(%#!╫ ┐-!╫8‼						
	←┬┤ ╫? ╫8 ? ├←☼ ? ┼← ╫F ╫ └┘┐└-!╫8‼	•□←┬♂					
┘└♂							
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┬ ?◀←B ; ←│ >├ ┬‼ ╫? ┬◀╫ ├←→│◀ ?┬╫; │ C╫: ☼│┬‼ ←)╫ ← ←├╫ ?╫: >├├←┬◀╫ ├←→│◀ ?┬╫ ◀│ 8├←

: ☼← ; : │ ┼╫ ┬│ ┼C

? ←← ├8 >

|┐☼♂┐– ☼♂┘ >–6●└
↕└┼◀☼ / =☼◀□¶

┘ ' 4'%5

┘☼└A◀6┐□♂?◀B|└=┐>♂7┐└□=?┘♂□●♂□!!–●●|┐◀ >└●◀◀|– □♂┐┴□B ┼♂| 1<

┘☼└A◀6┐□=?/◀☼B. :<, , : 9. ♂┐◀6└?┘●◀┐◀B

6●–◀□┐B|☼┘ ")$ ☼–●●–□ ?◀┐>└B|└□–6

●└6♂┐┴□B?" &⊥⊥ ├┤" !!–◀●┘◀☼|└□□◀●B☼+ →

◀┘┐> %/	|┐☼♂┐– ☼♂┘ >–6◀| 6☼┘┐┴ ♬☼◀?♂☼C|	◀●◀┼- %/	|♂?┘●◀
	☼└=⌐|=☼!!♂6◀	9:0-51	
	┐└┘|└–●		
1	|┘□┘|♂:♬ ☼♂┼◀●↕!!–●●¶┬↑↑↑→┼↑↑ ← ! "#$!%& ↑ " " → ' &(→ &(%& ↑" " → ' &(→)* ")&((' + ┼↑ " **← !$"" ← ' ((!* "┬&!#"┼→↑	9:5-.1
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4<	6● 6●♂7┬┼↑↑%& ↑" " → ' &(→ &(&(%& ↑" " → ' &(→)* ")&((' + ┼→%%←┬$←→┼↑┼↑ !* "┬&!#"┼→↑	94;-51 94<-;1	
	|┘□┘|♂:♬ ☼♂┼◀●┼↑ →┼↑↑ "#$!%& ↑" " → ' &(→ &(%& ↑" " → ' &(→)* ")&((' + ┼$"" ← ' ((!* "┬&!#"┼→↑		
1.			
11			
1,			
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1<	|8□ 8|♂:♬ ☼♂┼◀●┼↑ →┼↑↑ "#$!%& ↑" " → ' &(→ &(┴ %& ↑" " → ' &(→)* ")&((' + ┼┬ ←' ((!* "┬&! ┬ ↑	9.;-.1
:.	8 ☼♂┼◀●┼↑ %& ↑"# (┼)#' &(→ &(┼┬┼↑↑ " → ' ┼ & (→ &(! "#$!%& ↑" " → ' &(!→)* ")&((!┬ ←' ((!┼' ┼↑* "┬&!┬ ↑	9.9-.1 9.0-51 9.5-51
:1	|8□ 8|♂:♬ ☼♂┼◀●┼↑ →┼↑↑ "**←! "#$!%& ↑" " → ' &(→ &(%& ↑" " → ' &(→)* ")&((' + ┼┬ ← ' ((!* "┬&!┬ ↑	
	::"☼ "+		
:,			
:0	|8□ 8|♂:♬ ☼♂┼◀●┼↑ →┼↑↑ "**←! "#$!%& ↑" " → ' &(→ &(%& ↑" " → ' &(→)* ")&((' + ┼┬ ← ' ((!* "┬&!┬ ↑	9..-51
:<	.-92┬ ←' ((%& ↑" " → ' &(!→)* ")&((' + ← → #!┬┼↑↑%& ↑" " → ' &(→ &(↑:;-%/		

::└┐◀|B ?◀♂|=☼⌐:: ┘└¬:┐◀●◀┼♂┐┴::| ?♂76>♂:: ◀!☼◀!!◀☼┐└6=☼☼◀:┐◀●◀┼♂┐┴:: ┐♂/●◀

6>◀?–6♂●♂:♂●7|┤

└┼◀☼/=☼◀┐●└ ?└┐┐└☼┐└ ◀●└ 8◀●|└ ┘A6☼♂D6└☼┘└ ┐ ☼1☼

|┐☼♂┐– ☼♂┘ >–6●└
↕└┼◀☼ / =☼◀□¶

┘ ' 1'%⅝

┘☼└A◀6┐□♂?◀B|└=┐>♂7┐└□=?┘♂□●♂□‼–●●|┐◀ >└●◀◀|– □♂┐┴□B ┼♂| 1<

┘☼└A◀6┐□=?/◀☼B.:<,,:9. ♂┐◀6└?┘●◀┐◀B

6●–◀□┐B|☼┘ ")$ ☼–●●–□ ?◀┐>└B|└□–6

●└6♂┐┴□B?" ‼& ‼ ├┤" ‼◀●┘◀☼|└□□◀●B☼┼ →

| ◀┘┐> %⅞/ | |┐☼♂┐– ☼♂┘ >–6◀| 6☼┘┐┴ ♂☼◀?♂☼C| | ◀●◀┼- %⅞ | |♂?┘●◀ | | | | |
|---|---|---

[illegible]

Depth	Description	Sample	Reading
<1	[illegible]	050-51	.-4◘-0
<,	[illegible]	051-51	
<0	[illegible]	05.-51	
<<			
;.			1-0◘-4
;1			
;,			
;0			
;<			
4..			:-4◘-;
4.1			
4.,			
4.0	[illegible]	0:4-51	
4.<			
44.	[illegible]	019-51	.-<◘-5
441			
44,	[illegible]	01:-.1	
440	[illegible]	011-.1	
44<			

[illegible]

|┐☼♂┐– ☼♂┘ >-6●└
↕└┼◀☼ / =☼◀□¶

┘ ' ,'%5

┘☼└A◀6┐□♂?◀B|└=┐>♂7┐└□=?┘♂□●♂□‼-●●|┐◀ >└●◀◀|– □♂┐┴□B ┼♂| 1<

┘☼└A◀6┐□=? / ◀☼B. :<, , : 9. ♂┐◀6└?┘●◀┐◀B

6●-◀□┐B┘☼┘ ")$ ☼-●●-□ ?◀┐>└B|└□-6

●└6♂┐┴□B?" &⇈ ├|" ‼-◀●┘◀☼|└□□◀●B☼┼ →

◀┘┐> %/	|┐☼♂┐– ☼♂┘ >-6◀| 6☼-┘┐┴□♬☼◀?♂☼C|	◀●◀┼- %♂	|♂?┘●◀ □=? / ◀☼	┐└┐◀☼┼♂●	☼◀6¦@¶	2¦2♂●=◀	> ┘ (→$ -$$#¶
411	| ┘ | ♂□┤ →┤┤┐┤%& →)* ")&((' + ┤ "#$ %& ↑" " → ' & (!$"" ←' ((!' !┐ ↑	040-.1	┘┘				.-:□-0
41,							
410	| 8□ 8 | ♂□♬ ☼♂┼◀●┤ →┤┤ &("**←! "#$ %& ↑" " → ' & (→ &(%& ↑" " → ' & (→)* ")&((' + ┤┐ ← ' ((! * "┐& ' !┐ ↑	041-.1					
41<	| ┘ | ♂□┤ →┤┤┐┤%& →)* ")&((' + ┤ "#$ %& ↑" " → ' & (!$"" ←' ((!' !┐ ↑	04.-51					
4:.							
4:1			┘┘				.-:□-,
4:,	| 8□ 8 | ♂□♬ ☼♂┼◀●┤ →┤┤ &("**←! "#$ %& ↑" " → ' & (→ &(%& ↑" " → ' & (→)* ")&((' + ┤┐ ← ' ((! * "┐& ' !┐ ↑	0.,-.1					
4:0							
4:<							
4,.	| ┘ | ♂□┤ →┤┤┐┤%& →)* ")&((' + ┤ "#$ %& ↑" " → ' & (!$"" ←' ((!' !┐ ↑	5;<-.1					
	| 8□ 8 | ♂□♬ ☼♂┼◀●┤ →┤┤ &("**←! "#$ %& ↑" " → ' & (→ &(%& ↑" " → ' & (→)* ")&((' + ┤┐ ← ' ((! * "┐& ' !┐ ↑	5;0-<1					
4,1	| ┘ | ♂□┤ →┤┤ &(%& ↑" " → →)* ")&((' + ┤ "#$ ↑ %& ↑" " → ' & (!$"" ←' ((!' !┐ ↑ %& ↑"# (┤)#' & (↑4,4-%/ |	5;0-.1	┘┘●				.-1□-:
4,,	| ? | -●┐7| ♂□! "#$ %& ' & (!$"" ←' ((!' !┐ ↑	5;1-51					
4,0	| ┘ | ♂□┤ →┤┤┐┤%& →)* ")&((' + ┤ "#$ %& ↑" " → ' & (!$"" ←' ((!' !┐ ↑	5;.-51					
4,<							
45.	| 8□ 8 | ♂□♬ ☼♂┼◀●┤ →┤┤ &("**←! "#$ %& ↑" " → ' & (→ &(%& ↑" " → ' & (→)* ")&((' + ┤┐ ← ' ((! * "┐& ' !┐ ↑	5<<-.1					
	| 6□□6● | ♂□♬6●♂7┐┤|→┤%& #%& ' & (→ &(!&"& $←→┤| !' ! #"┤→┤|"┐ ↑	5<0-.1	┘┘□				.-,□-:
451	6● | -●┐76●♂7┤ %& → &(%& #!-"┐$←→┤| ┤| !' !#"┤→↑	5<5-.1					
	| 8□ 8 | ♂□♬ ☼♂┼◀●┤ →┤┤ &("**←! "#$ %& ↑" " → ' & (→ &(%& ↑" " → ' & (→)* ")&((' + ┤┐ ← ' ((! * "┐& ' !┐ ↑	5<,-11					
45,							
450							
45<	| 8 | ♂□┤┐┤|%& ↑" " → ' & (→)* ")&((' + ┤↑ →┤| "#$ ‼ %& ↑" " → ' & (!┐ ←' ((!* "┐& ' !┐ ↑	59<-51					

□└┐◀|B ?◀♂| =☼-□ ┘└-□┐◀●◀┼♂┐┴□| ?♂76>♂□ ◀!☼◀‼◀☼┐└6=☼☼◀□┐◀●◀┼♂┐┴□ ┐♂/●◀

6>◀?-6♂●♂□♂●7|┤

CRA

5"%5

1<

401		
40,		
400		50;-51
40<		
49.		
491		
49,		501-51
490		50.-51
49<		55<-51
4<.		559-.1
4<1		
4<,		
4<0		55.-51
4<<		
4;.		
4;1		5,5-.1
4;,		5,:-51
4;0	E4;0-%/	5,.-51
4;<		

.-<-9

.-:-:

.-0-4

.-9-5

CRA

⊥ ◘ ⊸ ⊥ ◘ ♂ ⊸ 2 ⊸ ◘ < ☼
↑ < ⊤ ⊸ ⊥ 7 = ⊥ ‼ ⊸ ↕ ←

, ! ⊸ &) ⊸ :

⊥ < A ⊸ 2 ⊸ ◘ 5 ⊸ @ ⊸ < = ♂ ‼ ◘ 3 < ↕ ‼ = 5 ◘ ↕ ‼ ⊸ ◘ ↕ ‼ ⊸ ◘ ⊸ ◘ ⊸ ⊸

⊥ < A ⊸ 2 ⊸ = 5 7 ⊸ ⊥ @ ⊸ ⊸ B ; ⊸ ◀ :

2 ◘ ⊸ ↕ @ ‼ ⊸ ☼ &6 (

◘ < 2 ◘ ⊸ ↕ @ ⊸ 5 & #* ! ⊸ < ♂

♂ < ◘ ⊸ ‼ ⊸ ⊸ ☼ ↕ ◘ ⊸ ↕ @ ⊸ ⊤ ◘ ◀ ⊥

‼ ◘ ⊸ ⊸ 2 < 5 ◘ ⊸ ‼ @ ⊸ 5 / ⊸ ‼ –

‼ ⊥ ⊸ ◘ ◘ ⊸ ☼ ⊸ 5 ⊸ ♂ < ‼ @ ⊸ < ↕ ⊸ 2

⊸ ⊸ ◘ ‼ ⊸ ⊥ < ↕ ↕ ⊸ @ ‼ ⊸ ‼ # ! "

‼ ⊸ ♂) ⊸ 7 ☼	⊥ ◘ ⊸ ☼ ⊥ ◘ ♂ ⊸ 2 ‼ ⊸ 2 ⊥ ⊸ < ↕ ⊸ ‼ ⊸ ⊸ 5 ◘ ⊥ C	⊸ ⊸ ⊸) ◘ 5 ⊸	◘ 5 ⊸ ⊸				
	☼ ⊥ < = ↕ ‼ ⊸ = ⊥ ⊸ ◘ 2 ⊸	⊸ 8 ⊸ 88				
	◘ ♂ ◘ ⊸	⊸ 8 ⊸ 8				
	♂ ◀ ⊸ ◘ ↕ ‼ ⊸ ‼ ☼ ⊥ ◘ ⊤ ⊸ ⊸ ‼ ⊸ → ⊸ ← ⊸ ! ⊸ ‼ ⊸ ⊸ & ' (% ⊸ ⊸ ! ⊸ & ⊸ & " ! ⊸ " * ⊸ % ⊸ ⊸ ! & ⊸ & " ! ⊸, - ! ⊸ ⊸ (&& $. ⊸, + ! ⊸ ⊸ ⊸, / ⊸ 0 & 1 ⊸ ⊸ ' & ⊸	⊸ ⊸ 8 ⊸ 8				
	2 ⊸ ◀ 2 ⊸ ◘ 3 ⊸ ⊸ ⊸ ← ⊸ 1 # / ⊸ ⊸ ! ⊸ & ⊸ & " ! ⊸ " * ⊸ ⊸ *⊸, - ! ⊸ ⊸ ⊸

⊥ ◘ ⊥ ◘ ♂ 2 □ < ☼
↑ < ┬ ┤ ⊥ 7 = ⊥ ‼ ┤ ↕ ←

, ! ‼ &) ‼:

⊥ <A| 2 ‡ ◘ 5 @‼ < = ♂ ‼ ◘ 3 < ↕ ‼ = 5 ◘ ↕ ‼ ‼ ◘ ↕ ‼ ‼ ◘ ‼ ‼

⊥ <A| 2 ‡ = 5 7 ‡ @‼ |B; | |◄:

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♂ < ◘ ‼ ‼ ‼ ☼ ↕ ◘ ≺ ↕ @ ┬ ◘ ◄ ⊥

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‼ ⊥ ◘ ‼ ☼ ‼ 5 ‼ ♂ < ‼ @‼ < ↕ 2

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			↕ = 5 7 ⊥	↕ ⊥ ┬ ◘	⊥ 2 ‼ ←	? ? ‼ ◘ = ‼	‼ ‼ (, ←
	◄ ! ‼ &00$! ‼ ‼ ¬) ‼ 7 ☼						
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2 ♂ ‼ 5 ‼ 2 ◘ : ‼ ◘ ↕ ◘ : 3 →

⊥◘→☼⊥◘♂→2┼□<☼
↑<┬┤⊥7=⊥‼┤↕←

, !┼&)┼:

⊥<A┤2┼↕◘5┤@┼ <=♂‼◘3<↕‼=5┤◘↕‼┼◘↕‼├→□□┼ →┤

⊥<A┤2┼↕=57┤⊥@┼ |B;||◄:

2□→┤↕@‼┼☼ &6(

□<2◘→<↕@┼5& #*!┼<♂

♂<□┤‼┤ →☼↕◘→<↕@ ┬◘ ◄ └

‼◘┤┼2<5□┤‼@┼5 /┼●┼‼ –

‼⊥→□□┤☼┼5┤♂<‼@┼ <↕→2

├→┤□‼┼‼⊥ <↕↕┤@‼‼┼‼#!"

‼┼♂) ┼7☼	⊥◘→☼⊥◘♂→2‼┤ 2⊥→<↕┼‼┼‼┤5◘⊥C	┤:┤┬) ◘5 ::	◘5:┤				
			↕=57┤⊥	↕┤⊥┬◘:	⊥┤2┼↕→	?↕┼◘:=┤	‼┼‼(,←
	2:┤◄2:◘3┼1#/┼"$)!1┼#*!┼&┼ & "!┼" *+┼ *+┼#*!┼, -!$%-! .┼"#)┼%&&1 ($ "##%, %'&#"	●:8·88					
●└	◄┼?)┼#*!┼&┼ & "!┼" *+┼"! ' ┼1!┼ ┼● ┼B)┼7☼						
	◄┼?)┼#*!┼&┼ & "!┼" *+┼"! ' ┼1!┼ ┼●→┼)┼7☼						
	◄┼8?)┼#*!┼&┼ & "!┼" *+┼"! ' ┼1!┼ ┼●→└)┼7☼						
●;	◄ !┼#*!┼&┼ & "!┼" *+ ┼)!1┼#*!┼&┼ & "!┼, -!$%/ +%+ ' (%)# 0$!┼ ●┼┬┼)┼7☼						E
	◄)!1┼#*!┼&┼ & "!┼" *+┼ *+┼, -!$┼ ┼●8:8)┼7☼						
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:●	◄┼# '%-' !┼#6 '┼($ "##.┼ ┼:●┐)┼7☼						
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	◄)!1┼#*!┼&┼ & "!┼" *+┼ *+┼, -!$┼ !┼&00$!%/ +%$&1┼($ "##.┼ ┼:B:B) 7☼						E
B							
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	9┼◄ ◘↕‼ ┼1#/┼#*!┼, -!$┼ !┼%$%&&"!%┼#*!┼&┼ & "!┼, #*!┼%1!$, +!┼%, %1!	●:;┬8					┐└
	↕<┤@ 5┤◘ =⊥┤☼┼<┤‼:┤┬◘→<↕ ┼5◘3┼2♂◘↕☼┼%┼┼┼⊥┼<┼2=⊥⊥┤↕‼:┤┬◘→<↕┼		◘7:┤				
	2♂┤5→2◘:┼◘↕◘:3 →						

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⊥◘→☼⊥◘♂→2→□<☼
↑<┬→┤⊥7=⊥‼→┤↕←

, !→8→&)→:

⊥<A→ 2→↕ ◘ 5→@→ <=♂→‼ ◘ 3<↕ →‼ = 5→◘↕ ‼ →→◘↕ ‼ →→□□→ →

⊥<A→ 2→↕ = 5 7→⊥@→ →B; | |◄:

2 □→ ↕@→‼ →☼ &6(

□< 2◘→<↕@→5& #* ! →<♂

♂<□→ ‼→ →☼↕◘→<↕@ ┬◘ ◄ └

‼◘→ →2 < 5 □→ →‼@→5 /→● →‼ –

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→→ □‼→‼⊥ <↕↕→ @→‼ →‼# ! "

‼→♂) →7☼	⊥◘→☼⊥◘♂→2→‼→ 2⊥→<↕→‼→‼→5◘⊥C	⊥→→┬) ◘ 5	◘ 5→→ ↕=5 7→⊥	⊥→⊥┬◘→	⊥→2→>	? ?→◘→=→	→→‼→(, →
	9 ⊥ 9 ◄ ◘↕ ‼ →‼→☼⊥◘┬→ !→*%% & ' (%)#* !→&→ & "!→" *+ →#* !→& & "!→, -!$→ !→&00$!%→1 !$→, +!→%→, %→1 !	● └88					
	→◄ ◘↕ ‼ →1# / →#* !→&→ & "!→, -!$→ !→*%% & ' (%)#* !→ &→ & "! , #* !→%→(&&$.→, +!→%→, %→1 !	8└B88	♂				
	☼ 9 →◄☼⊥◘┬→ →1# / → & "!→" *+→ !→#* !→&→' !→*%6 ' →" *+→ *+→ &00$!% & ' (%)#* !→&→ & "!→, -!$→1 !$→, +!→%→, %→1 !	8└●88					
	→◄ ◘↕ ‼ →1# / →#* !→&→ & "!→, -!$→ !→*%% & ' (%)#* !→ &→ & "! , #* !→%→(&&$.→, +!→%→, %→1 ! ◄→, -!$.→" *+→ →; →8) →7☼ ◄→1# / →#* !→&→ & "!→, -!$→ !→&00$!→ →;→) →7☼	8└8·88					
	9 ⊥ 9 ◄ ◘↕ ‼ →‼→☼⊥◘┬→ !→*%% & ' (%)#* !→&→ & "!→" *+ →#* !→& & "!→, -!$→ !→&00$!%→1 !$→, +!→%→, %→1 !	8└—88					
	☼ 9 →◄☼⊥◘┬→ →1# / →#* !→&→ & "!→" *+→ !→&00$!%→&&" !%→#* !→&→ & "! , -!$→1 !$→, +!→%→, %→1 !	8BB·88					

↕<→ @ 5→◘ =⊥→↕☼→<→↕→‼→:→┬◘→<↕ →5◘3→2♂◘↕☼→%→⊥→→⊥→<→2=⊥⊥→↕↕→‼→:→┬◘→<↕→ ◘7→→

2♂→ 5→2◘→:◘↕◘→3 →

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⊥◘→☼⊥◘♂→2→□<☼
↑<┬→┤⊥7=⊥‼→┤↕←

, !→●&)→:

⊥<A→ 2→↕ ◘ 5→@→ <=♂→‼ ◘ 3<↕ ‼ = 5→◘↕ ‼ →◘↕ ‼ →□□→ →

⊥<A→ 2→↕ = 5 7→⊥@→ |B; | |◄:

2□→↕@→‼ ☼ &6(

□<2◘→<↕@→5& #* ! →<♂

♂<□→‼→ →☼↕◘→<↕@ ┬◘ ◄ ⊥

‼◘→2<5□→‼@→5 /→● ‼ –

‼⊥→□□→☼→5→♂<‼@→ <↕→2

→□‼→‼⊥ <↕↕→@‼ →‼# ! "

‼→♂) →7☼	⊥◘→☼⊥◘♂→2‼→ 2⊥→<↕→‼→ 5◘⊥C		→:→┬) ◘5 ::	◘5:→ ↕=57→⊥	→⊥→◘:	→2→>	??→◘:=→	→‼→(,→
–8⊥								
	9 ☼ 9 ◄→ ◘↕ ‼ →‼ ☼ ⊥◘┬→:: → ! →%% & ' (%#* ! →&→ & "!→" *+ →#* ! →& & "!→, -!$→ !→&00$%1 !$→, +!→%, %1!		8B→┐8					;→8
–8;								
	→◄→ ◘↕ ‼ →1# / →#* ! →&→ & "!→, -!$→ !→%% & ' (%#* ! → &→ & "! , #* ! →%(&&$.→, +!→%, %1! →0 &1 *◄, .		8B →B8					
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	◄#* ! →&→' ! →#6 ' →, #* ! +→ !→#* ! →&→ & "!→, -!$→ →8:┐) →7☼							
–8B								
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	9 ☼ 9 ◄→ ◘↕ ‼ →‼ ☼ ⊥◘┬→:: → ! →%% & ' (%#* ! →&→ & "!→" *+ →#* ! →& & "!→, -!$→ !→&00$%1 !$→, +!→%, %1!		8:8→88					
–●⊥								
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–●;								
–●●	◄#* ! →&→ & "!→" *+ →#* ! →, -!$→ →●●┐) →7☼							
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	◄#* ! →&→ & "!→" *+ →#* ! →&→ & "!→, -!$→ →●B→B) →7☼							→8
–:								
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↕<→ @ 5→◘ =⊥→↕☼→<→↕→‼ :: →┬◘→<↕ →5◘3→2♂◘↕☼→%⊥→→→⊥→<→2=⊥⊥→↕↕→‼ :: →┬◘→<↕→ ◘7:→

2♂→ 5→2◘ :: →◘↕◘ :: 3 →

⊥ ◘ ⊣ ⊥ ◘ ♂ ⊣ 2 ⊣ □ < ⊥

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, ! ⊣ &) ⊣

⊥ < A ⊣ 2 ⊣ ◘ 5 ⊣ @ ⊣ < = ♂ ‼ ◘ 3 < ↕ ‼ = 5 ◘ ↕ ‼ ⊣ ◘ ↕ ‼ ⊣ ⊣ ◘ ⊣ ⊣

⊥ < A ⊣ 2 ⊣ = 5 7 ⊣ ⊥ @ ⊣ ⊣ B ; ⊣ ◀ :

2 ◘ ⊣ ↕ @ ‼ ⊣ ◘ &6 (

◘ < 2 ◘ ⊣ ↕ @ ⊣ 5 & #* ! ⊣ < ♂

♂ < ◘ ⊣ ‼ ⊣ ⊣ ◘ ↕ ◘ ⊣ ↕ @ ⊤ ◘ ◀ ⊥

‼ ◘ ⊣ ⊣ 2 < 5 ◘ ⊣ ‼ @ ⊣ 5 / ⊣ ● ‼ –

‼ ⊥ ⊣ ◘ ⊣ ◘ ⊣ 5 ⊣ ♂ < ‼ @ ⊣ < ↕ ⊣ 2

⊣ ⊣ ◘ ‼ ⊣ ⊥ < ↕ ↕ ⊣ @ ‼ ⊣ ‼ # ! "

‼ ⊣ ♂) ⊣ 7 ◘	⊥ ◘ ⊣ ◘ ♂ ⊣ 2 ‼ ⊣ 2 ⊥ ⊣ < ↕ ⊣ ‼ ⊣ ⊣ 5 ◘ ⊥ C	⊣ ⊣ ⊣ ⊤) ◘ 5	◘ 5 ⊣ ↕ = 5 7 ⊣ ⊥	⊣ ⊣ ⊥ ⊤ ◘	⊥ ⊣ 2 ⊣ >	? ? ⊣ ◘ = ⊣	‼ ⊣ (' ⊣
B ⊥	◀ ⊣ ◘ ↕ ‼ ⊣ 1 # / ⊣ ‼ * ! ⊣ , - ! $ ⊣ ! ⊣ ‼ $ ⊣ $. ⊣ * + ⊣ & " ! ⊣ , - ! $ & ' (% ‼ * ! ⊣ & & " ! ⊣ , # * ! ⊣ & (& & $. ⊣ , + ! ⊣ & 0 & 1 * & 1 !	88 ; ⊣ 88					
B ;							
B ●	2 ⊣ 2 ◀ ⊣ 2 ⊣ ◘ 3 ⊣ 3 ⊣ ◘ ↕ ‼ ⊣ ⊣ ◘ ⊥ ◘ ⊤ ⊣ ⊣ ⊣ ! ⊣ ‼ & & ⊣ & ' (% ‼ * ! ⊣ & ⊣ & " ! ⊣ " * + * + ⊣ , - ! $ & (& & $. ⊣ , + ! ⊣ & , & 1 !	8 ; ⊣ 88					
B B	2 ⊣ ◀ ⊣ 2 ⊣ ◘ 3 ⊣ 1 # / ⊣ ‼ $ ‼ * ! ⊣ & ⊣ & " ! ⊣ " * + ⊣ * + ⊣ , - ! $ & ‼ ' & & 1 ⊣ ($ " # # % 0 & 1 * ◀ , & ⊣ ' & ‼	8 ; ⊣ 88					
⊣	9 ⊣ ◘ ♂ ⊣ ⊥ ⊣ ‼ ⊣ 7 ⊣ ‼ ⊥ < 2 C ⊣ " * + ⊣ , - ! $ ⊣ * + ⊣ & 0 0 $! ⊣ ‼ F ! ⊣ (‼ ! ⊣ ‼ &) ‼ ' ! " & * ! ‼ * ⊣ $. ⊣ ‼ F ! ‼ ' ! . ⊣ ' ‼ & - ! . ⊣ / ⊣ & , & + ' (	8 ; 8 ⊣ 88					
⊣	⊣ ↕ ‼ ⊣ < ⊣ ⊣ 7 < ⊥ ⊣ ♂ < ⊣ ⊣ H ⊣ ⊥ ⊥ ⊤) ⊣ 7 ◘	8 ; ⊣ 88					
⊣ ;							
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↕ < ⊣ @ 5 ⊣ ◘ = ⊥ ⊣ ◘ ⊣ < ⊣ ↕ ‼ ⊣ ⊣ ⊤ ◘ ⊣ < ↕ ⊣ 5 ◘ 3 ⊣ 2 ♂ ◘ ↕ ◘ ⊣ % ⊥ ⊣ ⊣ ⊥ ⊣ < ⊣ 2 = ⊥ ⊥ ⊣ ↕ ‼ ⊣ ⊣ ⊤ ◘ ⊣ < ↕ ⊣ ◘ 7 ⊣

2 ♂ ⊣ 5 ⊣ 2 ◘ ⊣ ◘ ↕ ◘ ⊣ 3 →

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, ! &) B

⊥ <A 2 5 @ < = ♂ ‼ ◘ 3 < ‼ = 5 ◘ ‼ ◘ ‼ ◘ ‼ ♂ < ◘ ‼ @ ⊤ ◘ ◀

⊥ <A 2 = 5 7 ⊥ @ B; ◀:

‼ ◘ 2 < 5 ◘ ‼ @ 5 / ‼ –

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◘ < 2 ◘ < ‼ @ 5 & #' ! < ♂

‼ ♂) 7 ⊥ ◘ ♂ ◘ 2 ‼ 2 ⊥ < ‼ 5 ◘ ⊥ C

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⊥ = 5 7 ⊥ | ⊥ ⊥ ◘ | ⊥ 2 ⊥ | ? ? ◘ | ⊥ (' ⊥

⊥ < ‼ ‼ ⊥ = ⊥ ◘ 2 | 8 ⊥ ⊥

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⊥ < A 2 ◘ 5 @ < = ♂ ‼ ◘ 3 < ‼ = 5 ◘ ‼ ◘ ‼ ◘ ‼ ◘ ◘ ◘

⊥ < A 2 = 5 7 ⊥ @ B; ◀:

2 ◘ ‼ @ ‼ ☼ &6(

◘ < 2 ◘ ◘ ‼ @ 5 & #* ! < ♂

♂ < ◘ ‼ ☼ ‼ ◘ < ‼ @ ‼ 2 < 5 ◘ ‼ @ 5 / ‼ –

‼ ◘ ‼ 2 < 5 ◘ ‼ @ 5 / ‼ –

‼ ⊥ ◘ ◘ ☼ 5 ♂ < ‼ @ < ‼ 2

◘ < ‼ ‼ ⊥ < ‼ ‼ ‼ @ ‼ ‼ # ! "

‼ ♂) 7 ☼	⊥ ◘ ☼ ⊥ ◘ ♂ 2 ‼ 2 ⊥ < ‼ ‼ ‼ 5 ◘ ⊥ C	‼ ‼ ⊤) ◘ 5	◘ 5 ‼ ⊥ = 5 7 ⊥	‼ ⊥ ⊤ ◘	⊥ 2 ‼ >	? ? ‼ ◘ = ⊥	‼ ‼ (' ←
⊥ ●	◀ 1# / ⊥ $. ⊥ ! ‼ * ! ‼ * + ⊥ ‼ 8 8) ⊥ 7 ☼					
	◀ 1# / ⊥ $. ⊥ * + ‼ * ! ‼ * ‼ ' & ‼ ⊥ ‼ ● ⊤) ⊥ 7 ☼					
⊥ B						
	◀ $&& " ! ‼ 1 ! ⊥ ‼ ⊤) ⊥ 7 ☼					
⊥	◀ ! ⊥ &00$! ⊥ ‼ ⊥ ⊤) ⊥ 7 ☼					
;	5 ♫ 5 ◀ → 3 ⊥ ◘ ‼ ‼ ☼ ⊥ ◘ ⊤ ⊥ ⊥ ⊥ ! ⊥ $ ‼ & ' (‼ ‼ * ! ⊥ & ⊥ & " ! ⊥ " * + ⊥ * + , - ! $ ‼ , ‼ 1 !	; ⊥ ⊤ ; ⊥	⊤			⊥ ⊤
	◀ ◘ ‼ ! ⊥ ! ⊥ " $ ⊥ * + ‼ * ! ⊥ , - ! $ ‼ & ' (‼ ‼ * ! ⊥ & ⊥ & " ! ⊥ , ‼ * ! ‼ (&& $. , + ! ‼ 0 & 1 ‼ 1 !	⊥ ⊤ ; ⊥ ⊥					
●	☼ ◀ ☼ ⊥ ◘ ⊤ ⊥ ⊥ ⊥ 1# / ‼ * ! ⊥ & ⊥ & " ! ⊥ " * ‼ ! ⊥ $ ‼ & ' (‼ ‼ * ! ⊥ , - ! $ ‼ 0 & 1 ‼ 1 !	; ⊥ ⊤ ; ⊥ ⊥ ⊥ ⊤ ⊥ ⊥					
	◀ ◘ ‼ ! ⊥ ! ⊥ " $ ⊥ * + ‼ * ! ⊥ , - ! $ ‼ & ' (‼ ‼ * ! ⊥ & ⊥ & " ! ⊥ , ‼ * ! ‼ (&& $. , + ! ‼ 0 & 1 ‼ 1 !						
	9 ♫ 9 ◀ ◘ ‼ ‼ ☼ ⊥ ◘ ⊤ ⊥ ⊥ ⊥ ! ⊥ " $ ‼ & ' (‼ ‼ * ! ⊥ & ⊥ & " ! ⊥ " * ‼ ! ⊥ & & " ! ⊥ , - ! $ ‼ ! ⊥ &00$ ‼ 1 ! $ ⊥ , + ! ‼ 0 & 1 ‼ 1 !						
⊥ B						⊥ B
;	◀ ◘ ‼ ! ⊥ 1# / ‼ * ! ⊥ & ⊥ & " ! ⊥ , - ! $ ⊥ ! ⊥ " $ ‼ & ' (‼ ‼ * ! ⊥ & ⊥ & " ! , ‼ * ! ‼ (&& $. ⊥ , + ! ‼ 0 & 1 ‼ 1 !	● ⊥ ● ⊤ ; ⊥					
	9 ♫ 9 ◀ ◘ ‼ ‼ ☼ ⊥ ◘ ⊤ ⊥ ⊥ ⊥ ! ⊥ " $ ‼ & ' (‼ ‼ * ! ⊥ & ⊥ & " ! ⊥ " * + ‼ * ! ⊥ & & " ! ⊥ , - ! $ ⊥ ! ⊥ &00$ ‼ 1 ! $ ⊥ , + ! ‼ 0 & 1 ‼ 1 !	● ⊥ ; ⊤ ⊥ ⊥					
; ⊥	◀ 1# / ⊥ &00$! ⊥ ⊥ ; ⊤) ⊥ 7 ☼					
	◀ ! ⊥ &00$! ⊥ ⊥ ; ⊤ 8) ⊥ 7 ☼					⊥ 8
; ;	◀ 1# / ⊥ &00$! ⊥ ⊥ ; ; ⊤ 8) ⊥ 7 ☼					
	◀ ! ⊥ &00$! ⊥ ⊥ ; 8 8) ⊥ 7 ☼					
; ●						
	5 ♫ 2 ◀ ◘ ‼ ! ⊥ 1# / ‼ * ! ⊥ & ⊥ & " ! ⊥ , - ! $ ⊥ ‼ * ! ⊥ $ ‼ & ' (‼ ‼ * ! ⊥ & ⊥ & " ! , ‼ * ! ‼ (&& $. ⊥ , + ! ‼ 0 & 1 ‼ 1 !	● BB ; ⊥ ⊥					
; B						⊥ ⊤

⊥ < ⊥ @ 5 ⊥ ◘ = ⊥ ⊥ ☼ ⊥ < ⊥ ‼ ‼ ⊥ ⊤ ◘ < ⊥ ⊥ 5 ◘ 3 ⊥ 2 ♂ ◘ ⊥ ☼ ⊥ ‼ ⊥ ⊥ ⊥ ⊥ < ⊥ 2 = ⊥ ⊥ ⊥ ⊥ ‼ ‼ ⊥ ⊤ ◘ < ⊥ ⊥ ◘ 7 ⊥

2 ♂ ⊥ 5 2 ◘ ‼ ◘ ⊥ ◘ ‼ 3 →

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⊥◘→☼⊥◘♂→2⊣□<☼
↑<┬┤⊥7=⊥‼┤↕←

, !⊣⊣&)⊣B

⊥<A⊣ 2⊣⊣◘5⊣@⊣ <=♂⊣‼◘3<↕⊣‼ = 5⊣◘↕‼⊣⊣◘↕‼⊣→◘◘⊣ →⊣

⊥<A⊣ 2⊣⊣ = 5 7⊣⊥@⊣ ⊣B; ⊣◄:

2◘→⊣ ↕@⊣⊣ ⊣☼ &6(

◘< 2◘→≺↕@⊣5& #* ! ⊣<♂

♂<◘⊣ ‼⊣ ⊣ →☼↕◘→≺↕@ ┬◘ ◄

‼◘⊣⊣2<5◘⊣⊣‼@⊣5 /⊣ ⊣‼ −

‼⊥→◘◘⊣☼⊣5⊣♂<‼@⊣ <↕→2

⊣→⊣◘‼⊣⊣⊥ <↕↕⊣ @‼⊣ ⊣⊣# ! "

‼⊣♂) ⊣7☼	⊥◘→☼⊥◘♂→2‼⊣ 2⊥→≺↕⊣‼⊣⊣5◘⊥C	⊣:⊣⊣┬) ◘5 ::	◘5:⊣ ↕=57⊣⊥	⊣⊣⊥┬◘:	⊥⊣2⊣☼←	?⊣⊣◘:=⊣	⊣⊣⊣(,←
8⌋	9⊣☼ 9⊣◄ ◘↕‼⊣⊣☼⊥◘┬⊣::⊣ ⊣⊣%⊣ &'(%⊣#*!⊣&⊣ & "!⊣" *+⊣#*!⊣& & "!⊣, -!$⊣ ⊣&00$!%⊣1!$⊣, +!⊣%⊣0&1%⊣1!	•B8⌋LL	♂				
8;	◄⊣?⊣#*!⊣, -!$⊣"! ' ⊣1#/⊣#*!⊣&⊣ & "!⊣" *+⊣ ⊣8⌋⊣B)⊣7☼						⊣•
8•	⊣◄◘↕‼⊣ ⊣ ⊣⊣%$⊣ *+⊣#*!⊣&⊣ & "!⊣, -!$⊣ &'(%⊣#*!⊣& ⊣& "!⊣, #*!⊣% (&&$.⊣, +!⊣%⊣0&1%⊣1!	•:⌋LL					
8B	9⊣◄◘↕‼⊣⊣1#/⊣#*!⊣, -!$⊣ ⊣⊣%$⊣ *+⊣& "!⊣, -!$⊣ &'(%⊣#*!⊣& & "!⊣, #*!⊣%⊣1!$⊣, +!⊣%⊣0&1%⊣1!	•:B•⌋					
•	⊣◄◘↕‼⊣ ⊣ ⊣⊣%$⊣ *+⊣#*!⊣&⊣ & "!⊣, -!$⊣ &'(%⊣#*!⊣& ⊣& "!⊣, #*!⊣% (&&$.⊣, +!⊣%⊣0&1%⊣1!	•:•⌋LL					⌋;
•⌋	9⊣☼ 9⊣◄ ◘↕‼⊣⊣☼⊥◘┬⊣::⊣ ⊣⊣%⊣ &'(%⊣#*!⊣&⊣ & "!⊣" *+⊣#*!⊣& & "!⊣, -!$⊣ ⊣&00$!%⊣1!$⊣, +!⊣%⊣0&1%⊣1!	•::•⌋	⌋◘⌋				
•;							⊣8
••							
•B	◄⊣1#/⊣⊣%$.⊣$.⊣*&+6$!"⊣6(⊣&⊣⌋⊣ ⊣•B:8)⊣7☼						⌋
:	◄⊣*&⊣$.⊣*&+6$!"⊣ ⊣•⌋→8)⊣7☼						
:⌋	◄⊣1#/⊣&00$!⊣ ⊣:→⌐)⊣7☼ ◄⊣#*!⊣&⊣ & "!⊣" *+⊣#*!⊣, -!$⊣*&⊣&00$!⊣ ⊣:→⌐8)⊣7☼		⌋				
:;	◄⊣#*!⊣&⊣ & "!⊣" *+⊣ *+⊣, -!$⊣ ⊣&00$!⊣ ⊣:;⌐)⊣7☼						⌐

↕<⊣ @ 5⊣◘ =⊥→⊣☼⊣<→↕⊣‼⊣:⊣┬◘→≺↕ ⊣5◘3⊣2♂◘↕☼⊣%⊣⊥⊣⊣⊥⊣<⊣2=⊥⊥⊣↕⊣‼⊣:⊣┬◘→≺↕⊣ ◘7⊣:⊣

2♂⊣5→2◘⊣:◘↕◘⊣:3 →

<┬⊣⊥7=⊥‼⊣↕⊣‼<☼⊣‼⊣B;⊣◄ ⊣◘ ☼A⊣2⊥◘D2<⊥◄◘↕→♂ ☼‼⊣‼⊣•⌋

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⊥ ◘ ⊸ ⊥ ◘ ♂ ⊸ 2 ⊸ ◘ < ☼
↑ < ⊤ ⊸ ⊥ 7 = ⊥ ‼ ⊸ ↕ ←

, ! ⊸ &) B

⊥ < A ⊸ 2 ⊸ ◘ 5 ⊸ @ ⊸ < = ♂ ‼ ◘ 3 < ↕ ‼ = 5 ◘ ↕ ‼ ⊸ ◘ ↕ ‼ ⊸ ◘ ⊸ ⊸

⊥ < A ⊸ 2 ⊸ = 5 7 ⊸ ⊥ @ ⊸ B ; ⊸ ◀ :

2 ◘ ⊸ ↕ @ ‼ ⊸ ☼ &6 (

◘ < 2 ◘ ⊸ ↕ @ ⊸ 5 & # ! ⊸ < ♂

♂ < ◘ ⊸ ‼ ⊸ ⊸ ☼ ↕ ◘ ⊸ ↕ @ ⊤ ◘ ◀

‼ ◘ ⊸ 2 < 5 ◘ ⊸ ‼ @ ⊸ 5 / ⊸ ‼ –

‼ ⊥ ⊸ ◘ ⊸ ☼ ⊸ 5 ⊸ ♂ < ‼ @ ⊸ < ↕ ⊸ 2

⊸ ◘ ‼ ⊸ ⊥ < ↕ ↕ ⊸ @ ‼ ⊸ ‼ # ! "

‼ ⊸ ♂) ⊸ 7 ☼	⊥ ◘ ⊸ ☼ ⊥ ◘ ♂ ⊸ 2 ‼ ⊸ 2 ⊥ ⊸ < ↕ ⊸ ‼ ⊸ ⊸ 5 ◘ ⊥ C	⊸ ⊸ ⊸ ⊤) ◘ 5	◘ 5 ⊸ ⊸ ⊥ = 5 7 ⊸ ⊥	⊸ ⊸ ⊤ ◘	⊥ ⊸ 2 ⊸ ⊥	? ? ⊸ ◘ ⊸ = ⊸	‼ ⊸ ( ) ⊸ ⊸
	◀ ◘ ↕ ‼ ⊸ ! ⊸ ‼ $ ⊸ * + ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ , - ! $ ⊸ & ' (% ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ , # * ! ⊸ % (&& $. ⊸ , + ! ⊸ % 0 & 1 * % ⊸ 1 !	•• ⊸ ⊸				
:•	9 ◀ ◘ ↕ ‼ ⊸ 1 # / ⊸ ‼ * ! ⊸ , - ! $ ⊸ ! ⊸ ‼ $ ⊸ * + ⊸ & " ! ⊸ , - ! $ ⊸ & ' (% ⊸ ‼ * ! ⊸ & & " ! ⊸ , # * ! ⊸ % ⊸ 1 ! $ ⊸ , + ! ⊸ % 0 & 1 * ◀ , % ⊸ 1 !	•8 ⊸ ⊸				
:B	◀ 1 # / ⊸ ‼ * ! ⊸ , - ! $ ⊸ ! ⊸ & " ! ⊸ , - ! $ ⊸ ⊸ B ; 8) ⊸ 7 ☼					⊸ 8
B						
B⊸	◀ ! ⊸ ‼ * ! ⊸ , - ! $ ⊸ B ⊸ ⊸) ⊸ 7 ☼					
	◀ ! ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ , - ! $ ⊸ B ⊸) ⊸ 7 ☼					
B;	◀ 1 # / ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ , - ! $ ⊸ B ; ⊤) ⊸ 7 ☼					⊸ ⊸
	◀ ◘ ↕ ‼ ⊸ ! ⊸ ‼ $ ⊸ * + ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ , - ! $ ⊸ & ' (% ⊸ ‼ * ! ⊸ & ⊸ & " ! , # * ! ⊸ % (&& $. ⊸ , + ! ⊸ % 0 & 1 * % ⊸ 1 !	•8 ⊸ ⊸				
B•	9 ☼ 9 ◀ ◘ ↕ ‼ ⊸ ☼ ⊥ ◘ ⊤ ⊸ ⊸ ⊸ ! ⊸ ‼ $ % ⊸ & ' (% ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ * + ⊸ ‼ * ! ⊸ & & " ! ⊸ , - ! $ ⊸ ! ⊸ & 0 0 $! % ⊸ 1 ! $ ⊸ , + ! ⊸ % , % ⊸ 1 !	•; ⊸ B ⊸				
BB	◀ ! ⊸ ‼ $ ⊸ $. ⊸ * + ⊸ & 0 0 $! ⊸ BB ⊸) ⊸ 7 ☼					⊸ ;
	2 ⊸ ◀ ⊸ 3 ⊸ 2 ⊸ ◘ 3 ⊸ ‼ * ! ⊸ & & 1 ⊸ ($ " # # . ⊸ 6 " ⊸ 0 & 1 * ⊸ * + ⊸ , % ⊸ ' & # "	•; •⊸				
⊸	◀ ⊤ ? ⊸ $. ! . ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ " * + ⊸ " ! ' % ⊸ , % ⊸ 1 ! ⊸ ‼ ⊸) ⊸ 7 ☼ ◀) ! 1 ⊸ ‼ * ! ⊸ & ⊸ & " ! ⊸ " * + ⊸) ! 1 ⊸ ‼ * ! ⊸ , - ! $ ⊸ , % ⊸ ' & # " ⊸ ‼ ⊸ ⊤) ⊸ 7 ☼					
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2 ♂ ⊸ 5 ⊸ 2 ◘ ⊸ ◘ ↕ ◘ ⊸ 3 →

[illegible]

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, !⊣•⊣&)⊣B

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⊥<A⊣2⊣=57⊣⊥@⊣|B;||◀:

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□<2◘→↕@⊣5& #*!⊣<♂

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‼⊥→◘◘⊣☼⊣5⊣♂<‼@⊣ <↕→2

⊣→⊣◘‼⊣‼⊥ <↕↕⊣@‼⊣‼#!"

‼⊣♂)⊣7☼	⊥◘→☼⊥◘♂→2‼⊣ 2⊥→↕⊣‼⊣‼⊣5◘⊥C	⊣:⊣⊤⊣) ◘5 ::	◘5:⊣ ↕=57⊣⊥	⊣⊥⊤◘:	⊥⊣2⊣→	?⊣◘:=⊣	⊣‼⊣(,→
	◀⊣ !⊣#*!⊣&⊣& "!⊣, -!$⊣ ⊣⊣8⊣) ⊣7☼						
	9⊣☼ 9⊣◀⊣ ◘↕‼⊣‼⊣☼⊥◘⊤⊣::⊣ !⊣*$%⊣&'(%⊣#*!⊣&⊣& "!⊣" *⊣%⊣#*!⊣& & "!⊣, -!$⊣ !⊣&0C$P⊣1!$⊣, +!⊣%⊣, %⊣1!	• •⊣LL					
	⊣◀⊣ ◘↕‼ ⊣1#/⊣#*!⊣&⊣& "!⊣, -!$⊣ !⊣*$%⊣&'(%⊣#*!⊣ &⊣& "!⊣" *⊣% 0&1*◀, %⊣1!	• ⊣LL					
	9◀☼ 9⊣◀⊣ ◘↕‼⊣‼⊣☼⊥◘⊤⊣::⊣ !⊣*$%⊣&'(%⊣#*!⊣&⊣& "!⊣" *+ ⊣#!, -!$⊣1!$⊣, +!⊣%⊣0&1*◀, %⊣1!	8L:⊤L					8⊣B
	◀1#/⊣#*!⊣, -!$⊣ ⊣;⊣) ⊣7☼	8L8⊤L					
	⊣◀⊣ ◘↕‼ ⊣1#/⊣#*!⊣&⊣& "!⊣, -!$⊣ !⊣*$%⊣&'(%⊣#*!⊣ &⊣& "!⊣" *⊣% 0&1*◀, %⊣1!						
	◀⊣?⊣#*!⊣&⊣& "!⊣, -!$⊣"! '⊣ ⊣;⊣) ⊣7☼						
	◀1#/⊣& "!⊣, -!$⊣ ⊣;⊣B) ⊣7☼						
	◀⊣?⊣#*!⊣&⊣& "!⊣, -!$⊣"! '⊣ ⊣;⊣8) ⊣7☼						⊣8
	◀⊣8?⊣#*!⊣&⊣& "!⊣, -!$⊣"! '⊣ ⊣;8⊣8) ⊣7☼						
	2⊣☼ 2⊣◀2⊣◘3⊣3⊣◘↕‼⊣‼⊣☼⊥◘⊤⊣::⊣ !⊣*$%⊣&'(%⊣#*!⊣&⊣& "!⊣" *+ *+⊣, -!$⊣(&&$.⊣, +!⊣%⊣, %⊣1!	8BB⊤LL					

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CRA

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	2 ♂ 5 2 ! ! 3 →	

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├?┤↑┬5>┬¶↑‼←

□&) ☼☼!☼4

□┬ ?A↑ .♂☼!─□↑B☼● 7%2☼¶&1$ #☼¶7 - /☼&#(☼&#(!" ☼●'$

□┬ ?A↑ .♂☼! >□5↑┬B☼ :<44:┼;

.◀‼♂B☼□┬□☼♬' 7/

? .─♂◀?‼B☼□ '&'# ☼?2"

?↑☼¶↑●◀‼─♂◀?‼B □6┼8└:┼─●

¶─♂↑☼. ?□□↑♂↑¶B☼A7# ☼└ ☼8 3

¶┬◀‼♬☼□↑♂ ?¶B☼● ?‼◀.

→◀¶☼□↑┬● ?‼‼↑B☼¶─☼ "* '

¶↑□♂ $☼5♬●	●♂┬─♂◀┬─□ ◀.☼¶↑● .┬◀□♂◀?‼☼☼↑□─┬C●	↑↑┼┐ $	●─□□↑ ‼>□5↑┬	◀♂↑┬┼─	┬↑.☼@	┬─>↑ ##	&%/&%/─↑ □◀☼◀□
	♬┬?>‼¶●>┬→─.↑	;83┼└					
	→●□ ─♂	;83┐└					
	●□♬□☼☼●◀↑☼─‼¶☼☼♬┬─┤↑☼→◀☼ ☼'# $ %&' ☼&#(☼&#( )'&* ☼+' ,#☼- "$	;8<└					
8	□.☼☼●◀☼☼.─↑ $'&% ☼'# ☼&#($ ☼'# ☼)'&* ☼'" - ☼ ,☼ $ ☼# #┼/&$% +' ,#$ ☼(&'0☼+' ,#☼- "$						
4							
└	●□☼☼●◀↑☼─‼¶ %- /&%$☼'# ☼)'&'# (☼ '1☼)'&((☼+' ,#☼- "$	;8:┐└					
	.☼☼●◀↑☼.─↑ $'&% ☼'# ☼&#($ ☼'# ☼)'&* ☼ $☼ ,☼ & $%$1☼(&'0☼+' ,# - "$	;88┐└					
<	●□☼☼●─‼¶ $'&% ☼"$% - /&%$☼'# ☼)'&'# (☼ '1☼)'&((☼+' ,#☼- "$	;8└┼└					
	☼,'%2☼"$&$3-4$'5♬●						
└	●6☼☼●─‼¶☼,'%2☼'# $ %&' ☼)'&* $'&% ☼"$% - /&%$☼'# $ %&')'&'# (☼, ☼)'&((☼+' ,#☼- "$	;└3<└					
└8							
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└							
└<	●.☼☼.─↑↑↑☼─‼¶ $'&% ☼"$% - /&%$☼'# $ %&' ☼&#(☼+' ,#☼- "$	;└8┼└					
	●6♬6☼☼●─‼¶☼☼♬┬─┤↑ $'&% ☼"$% - /&%$☼'# $ ☼- ("7 - ☼)'&'# (☼'# $ %&' ☼)'&'# (☼7+' 7#((☼)'&* ☼, ☼)'&((☼+' ,# ☼, $&$8 ┐│$'5♬●	;└ ┐└					
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:└	☼9♬6☼ &-☼☼♬┬─┤↑☼,'%2☼'# $ %&' ☼&#(%- /&%$☼'# $ %&')'&* ☼+' ,#☼, $&$☼│┐8$'5♬●						
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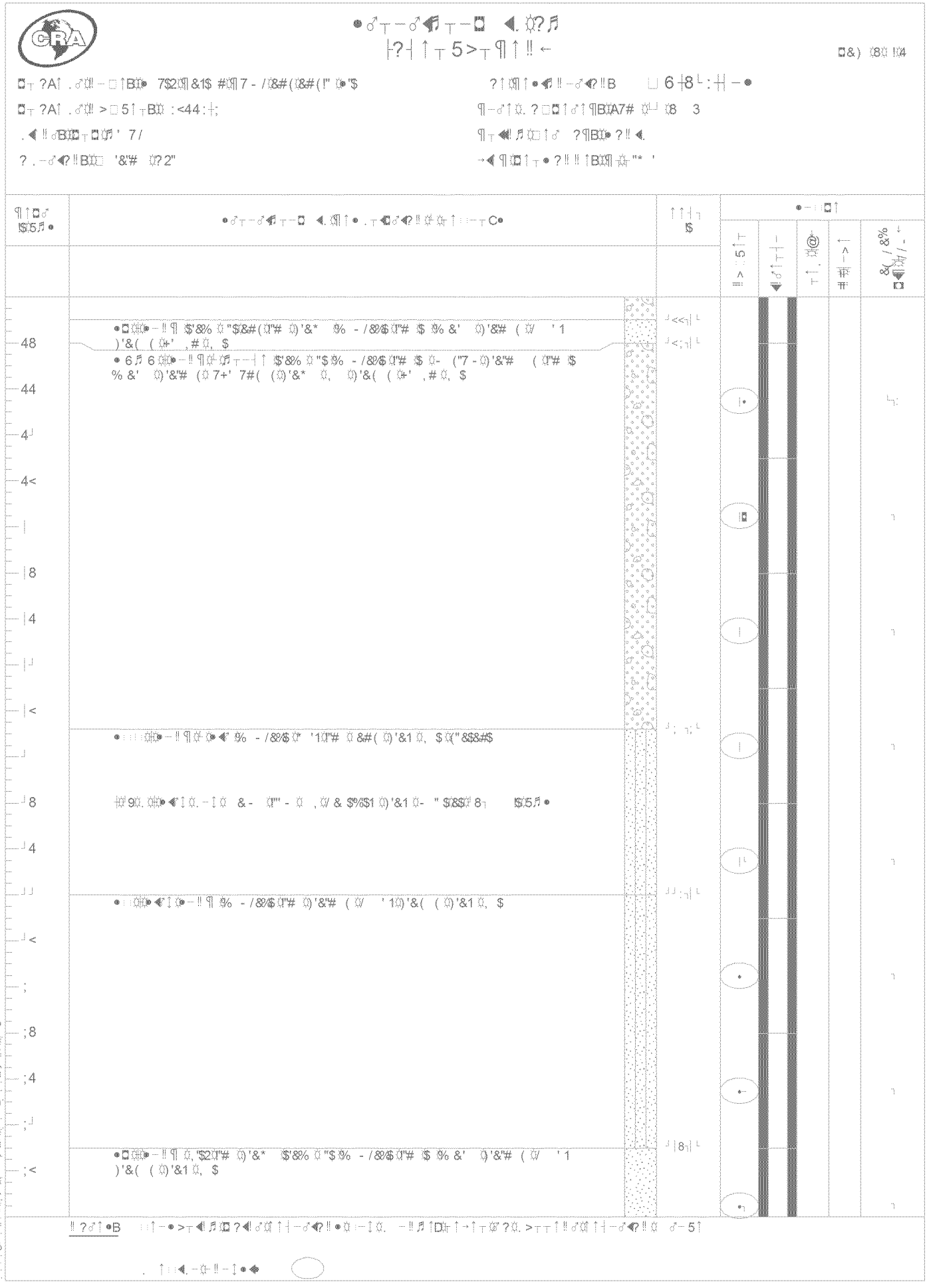
‼?♂↑●B □↑─●>┬◀♬☼□?◀♂☼↑┤─♂◀?‼●☼□─↑☼. ─‼♬↑D☼↑→↑┬☼?☼.>┬┬↑‼♂☼↑┤─♂◀?‼☼ ♂─5↑

. ↑□◀.─☼‼─↑●◆



●♂┬−♂◀◀┬−◘ ◀.☼?♬
├?┤↑┬5>┬¶↑‼←

◘&) ☼☼!◘4

◘┬ ?A↑ .♂☼!−□↑B☼● 7$2☼¶&1$ #☼¶7 - /☼&#(☼&#(!" ☼●'$

◘┬ ?A↑ .♂☼! >□5↑┬B☼ :<44:┼;

.◀‼♂B☼◘┬◘☼♬ ' 7/

? .−♂◀?‼B☼□ '&'# ☼?2"

?↑☼¶↑●◀♬‼−♂◀?‼B □6┼8└:┼┼−●

¶−♂↑☼. ?□◘↑♂↑¶B☼A7# ☼└┘ ☼8 3

¶┬◀◀♬☼□↑♂ ?¶B☼● ?‼◀.

→◀¶◘↑┬● ?‼‼↑B☼¶☼┬"* '

¶↑◘♂ ☼5♬●	●♂┬−♂◀◀┬−◘ ◀.☼¶↑● .┬◀◘♂◀?‼☼☼↑::−┬C●	↑↑┼┐ $	●−::◘↑ ‼>::5↑┬	◀♂↑┬┼−	┬↑.☼@	‼ ┬−>↑	&%/ &% ◀◀/ - ↑ ◘
	●::☼☼●◀'↑☼●−‼¶ % - /&%$☼"# ☼)'&'# (☼/ ' 1☼)'&((☼)'&1☼, $	┘43┐└ ┘43┐└					
<8	● 6♬ 6☼☼●−‼¶☼☼♬┬−┤↑ ☼"$% - /&%$☼- ("7 - $ % &' ☼)'&" # (☼,)'&((☼)'&1☼, $						
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<└	♬ 6☼☼♬┬−┤↑☼,"$2☼"# $ % &' ☼&#(% - /&%$☼"# $ % &' ☼) '&* ☼)'&1 , $$'&% % ++	┘4:┐┤└					
<<	● 6♬ 6☼☼●−‼¶☼☼♬┬−┤↑ ☼"$% - /&%$☼- ("7 - $ % &' ☼)'&" # (☼,)'&((☼)'&1☼, $	┘48┐└ ┘4└┐└					
3	●◘♬◘☼☼●−‼¶☼☼♬┬−┤↑ $'&% ☼"$% - /&%$☼"# $ % &' ☼&#(☼"# ☼)'&* / ' 1☼)'&((☼)'&1☼, $		●◘				┐
38	♬ 6☼☼♬┬−┤↑☼,"$2☼"# $ % &' ☼&#(% - /&%$☼"# $ % &' ☼) '&* ☼)'&1 , $$'&% % ++	┘:3┐└					
34	● 6♬ 6☼☼●−‼¶☼☼♬┬−┤↑ ☼"$% - /&%$☼- ("7 - $ % &' ☼)'&" # (☼,)'&((☼)'&1☼, $	┘:└┤└	●				┐
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└	●◘☼☼●−‼¶ $'&% ☼"$&#(☼"# $ % &' ☼)'&* % - /&%$☼"# $ % &' ☼)'&"# (/ ' 1☼)'&((☼)'&1☼, $		●☼				┐
└ 8	♬ 6☼☼♬┬−┤↑☼,"$2☼"# $ % &' ☼&#(% - /&%$☼"# $ % &' ☼) '&* ☼)'&1 , $$'&% % ++	┘8:┐┤└ ┘8┤┐└					
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‼?♂↑●B ::↑−●>┬◀♬☼◘?◀♂☼↑┤−♂◀?‼●☼::−[☼. −‼♬↑D☼↑→↑┬☼?☼.>┬┬↑‼♂☼↑┤−♂◀?‼☼ ♂−5↑

. ↑::◀.−☼‼−[●◆

?┤↑┬6>┬¶↑‼↑↑♬♬☼ −●♬◘A☼┬−E ?┬◘♬¶♂☼ └8└

●♂┬−♂◀┬−□ ◀.☼?♬
├?┤↑┬5>┬¶↑‼←

□&) ☼4☼ !☼4

□┬ ?A↑ .♂☼! − □↑B☼● 7$2☼¶&1$ #☼¶7 - /☼&#(☼&#(!" ☼●'$

□┬ ?A↑ .♂☼! >□5↑┬B☼ :<44:┼;

.◀‼♂B☼□┬□☼♬' 7/

?.−♂◀?‼B☼□ '&'# ☼?2"

?↑☼¶↑●◀‼−♂◀?‼B □6┼8└:┼┼−●

¶−♂↑☼.?□□↑♂↑¶B☼A7# ☼└┘ ☼8 3

¶┬◀‼♬☼□↑♂ ?¶B☼●?‼◀.

→◀¶☼□↑┬●?‼‼↑B☼¶☼┬"* '

¶↑□♂ ☼5♬●	●♂┬−♂◀┬−□ ◀.☼¶↑●.┬◀□♂◀?‼☼☼↑‼−┬C●	↑↑↑┐ $	●−‼□↑				
			‼>‼5↑┬	◀♂↑┬┼−	┬↑.☼@	┬<−┬┼↑	&%/8%◀☼/−↓ □
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└:<	↑‼¶☼?→☼5?┬↑ ?↑☼F☼:;┐ ☼5♬●	├38┼┤└					
└4							
└48							
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‼?♂↑●B ‼↑−●>┬◀♬☼□?◀♂☼↑┼−♂◀?‼●☼‼−↕☼. −‼♬↑□☼↑→↑┬☼?☼.>┬┬↑‼♂☼↑┼−♂◀?‼☼ ♂−5↑

. ↑‼◀.−☼‼−↕●◆

?┼↑┬6>┬¶↑‼☼♬☼−●♬□A☼┬−E ?┐□♬¶♂☼└8┘

APPENDIX A.6

GAS PROBE STRATIGRAPHIC AND INSTRUMENTATION LOGS

⊥◘→♫⊥◘♂→; ¶◘↕ !! ¶↕ ⊥C0┤↕◘→9↕¶_9♫
↑9┬┤⊥5C⊥ !! ┤↕←

%* ¶◘#)¶◘

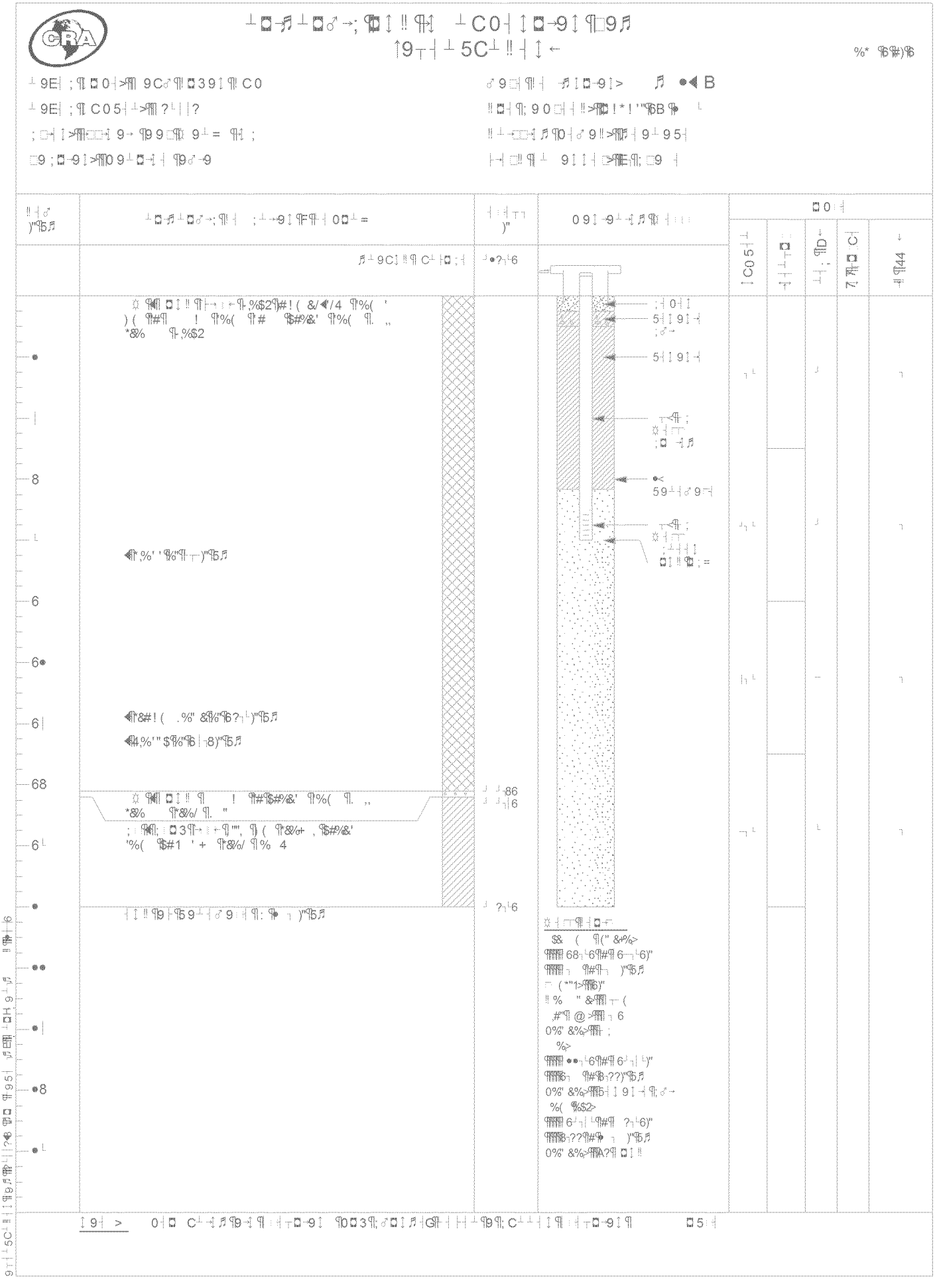
⊥9E┤ ;¶◘0┤>¶ 9C♂¶◘39↕¶C0
⊥9E┤ ;¶C05┤⊥>¶ ?└│?
;└┤↕>¶└└┤ 9→ ¶99└¶ 9⊥= ¶↕ ;
└9 ;◘→9↕>¶D 9⊥◘→┤ ¶9♂→9

♂9└┤¶┤ →♫↕◘→9↕> ♫ 6◄B
!!◘┤¶; 90└┤!!>¶D !*!''¶►→ ¶► B
!!⊥→└┤♫¶D┤♂9!!>¶D┤9⊥95┤
├→┤└!!¶⊥ 9↕↕┤└>¶E¶; └9 ┤

!!┤♂)"¶5♫	⊥◘→♫⊥◘♂→; ¶└┤ ;⊥→9↕¶F¶┤0◘⊥=	┤◘┤┬)"	09↕→9⊥→┤♫¶◘┤◘◘	◘0◘				
				↕C05┤⊥	↕┤⊥┬┤◘	⊥┤; ¶D→	7¶◘C	⊥!!¶44 ←
	♫⊥9C↕!!¶C⊥├◘;┤	┘?8┐┘						
	◘ ♂◘◘	┘?8→●●	;┤0┤↕ 5┤↕9↕→ ;♂→ 5┤↕9↕→ ⊥┤¶; ☼┤◘◘ ;◘ →↕♫ ⊥┤¶; ☼┤◘◘ ;⊥┤┤↕	┐⊥		⊥		┐
	♫☼┤☼◄◘↕!!¶◘↕!!¶⊥◘┬┤◘¶├→◘◘→¶ ! "#¶$#/&' ¶%(¶(¶*&/+ ,¶##' ¶&#.(¶&/ ↑-%' ←							
	0◘◄ →◘¶├→◘◘→¶%&$ ¶(¶%(¶$#1 '+ -,%$2¶&/	┘??B┘						
	♫☼┤☼◄◘↕!!¶◘↕!!¶⊥◘┬┤◘¶├→◘◘→¶ ! "#¶$#/&' ¶%(¶(¶*&/+ ,¶##' ¶&#.(¶&/ ↑-%' ←	┘?●→8┘ ┘?●┐┘						
	0◄ →◘3¶◘↕!!¶├→◘◘→¶(¶%($#('#, %" ¶###&,/¶*&% ¶,%$2¶&/ ◄¶*,%' '¶%"¶┐└)"¶5♫ ◄¶#$2¶%* ("'¶%"¶→6)"¶5♫ ◄¶#$2¶%* ("'¶%"¶┬)"¶5♫ ◄¶┬7¶. "¶%"¶┐)"¶5♫		●< 59⊥┤♂9◘ ◘↕!!¶; =	┘┐└		┘│		┐
	☼◄◘↕!!¶├→◘◘→¶%&$ ¶(¶*&/+ ,¶,"/ ! ¶#¶$#/&' ¶%(¶##' ¶&#.(┼-,%$2 &/ ◄¶. ## ┼*,%' '¶%"¶5●┬)"¶5♫	┘●8┐┘		┐┐└		┐		┐
	◄¶$ (&¶#&¶,%*◄2 ¶%* ("¶%"¶68┬)"¶5♫			┐└		┐│		┐
	♫☼┤☼¶◄◘↕!!¶◘↕!!¶⊥◘┬┤◘¶(%"+ ← ! ¶#¶$#/&' ¶%(¶(¶*&/+ ,¶##' -&#.(┼%(¶&/	┘6┐┘						
	┤↕!!¶D┤¶5 9⊥┤♂9◘┤¶; ¶►┐)"¶5♫	┘66┐┘	☼┤┬¶┤◘← S& (¶(" &+%> ¶¶¶¶¶ ??┐┘¶#¶?●┐┘)" ¶¶¶¶¶┐ ¶#¶┐)"¶5♫ ◘ (*"┐>¶¶6)" !% " &¶¶¶┬(,#"¶ @ >¶¶¶┐6 0%" &%>¶¶¶; %> ¶¶¶¶¶ ?¬┐┘¶#¶?┤┐6┤)" ¶¶¶¶¶6┐ ¶#¶►┐??)"¶5♫ 0%" &%>¶¶¶5┤↕9↕┤¶; ♂→ %(¶&$2> ¶¶¶¶¶ ?┤┐6┤¶#¶66┐┘)" ¶¶¶¶►┐??¶#¶►┐)"¶5♫ 0%" &%>¶¶¶A?¶◘↕!!	●┐└		┘●		┐

↕9┤ > 0┤◘ C⊥→┤♫¶D→┤¶ ◘┤┬◘→9↕ ¶D◘3¶; ♂◘↕♫┤G¶┤├┤⊥¶D¶; C⊥⊥┤↕¶ ◘┤┬◘→9↕¶ ◘5◘

9┬┤⊥5C└!!┤↕¶9♫¶►└└┤?►¶ ¶►◘ ¶95┤ ♫E¶ ⊥◘H 9⊥♫ !!¶►┤6



⊥◘→♫⊥◘♂→; ¶◘↕ ‼ ¶¶↕ ⊥C0┤↕◘→9↕¶□9♫
↑9┬┤⊥5C⊥ ‼ ┤↕ ←

%* ¶6¶#)¶6

⊥9E┤ ;¶ ◘0┤>¶¶ 9C♂¶‼◘39↕¶‼C0

⊥9E┤ ;¶ C05┤⊥>¶¶?└│|?

; □┤↕>¶¶□□┤ 9→ ¶9 9□¶‼ 9⊥= ¶¶ ;

□9 ;◘→9↕>¶¶09⊥◘┤┤ ¶9♂→9

♂9□┤¶‼┤ →♫↕◘→9↕> ♫ ?◀ B

‼◘┤¶; 90□┤┤‼>¶¶!*!''¶6B¶▶ B

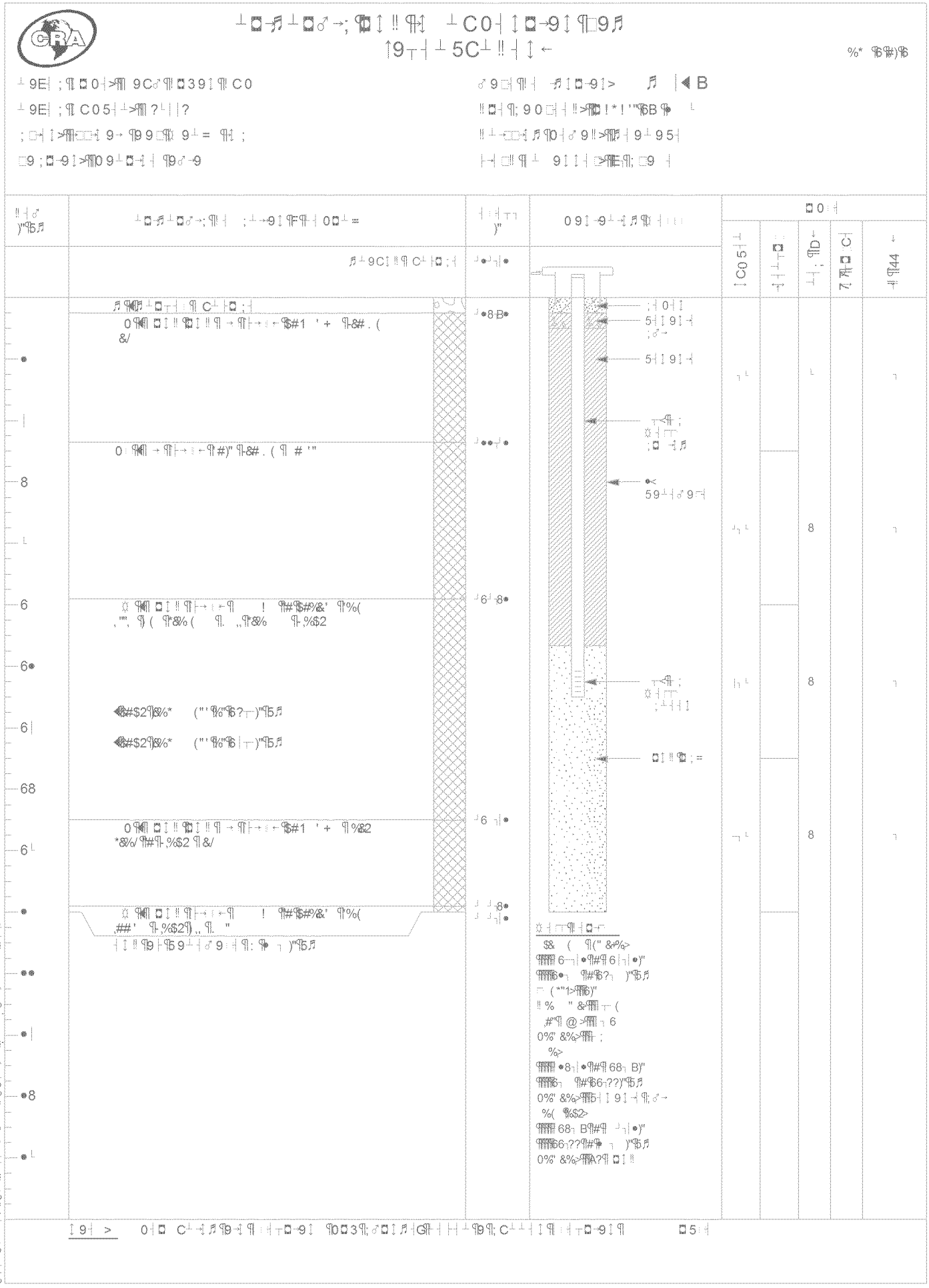
‼⊥→□□┤♫¶0┤♂9‼>¶¶┤9⊥95┤

├┤□‼¶⊥ 9↕↕┤□>¶¶¶; □9 ┤

‼┤♂)"¶5♫	⊥◘→♫⊥◘♂→; ¶‼┤ ;⊥→9↕¶F¶┤0◘⊥=	┤:┤┬┐)"	09↕→9⊥→↕♫¶¶┤::	◘0:⊥				
	♫⊥9C↕‼¶C⊥├◘;┤	┘6┤B-		↕C05┤⊥	┤┤⊥┬◘:	⊥┤;¶D←	7,¶¶◘:C┤	⊥‼¶44 ←
	♫☼┼☼¶¶◘↕‼¶◘↕‼¶‼⊥◘┬┤:¶├→:← ! ¶#¶$#%&' ¶%(¶(¶&♂+ ,¶##' ¶. ,, *&% ¶&#.(¶&/		;┤0┤↕ 5┤↕9↕┤ ;♂↕ 5┤↕9↕┤ ┬┴¶; ☼⊥┬┬ ;◘ ⊥↕♫ ●< 59⊥┤♂9┬ ┬┴¶; ☼┤┬┬ ;⊥┤↕ ◘↕‼◘;=	┬⊥	8		┐
	☼¶¶◘↕‼¶├→:←¶(¶#¶$#%&' ¶%(¶##' .,,¶&% ¶;%$2¶#'"	┘6●┤-						
	◀¶&#!(.%" &¶%¶┬)"¶5♫			┬⊥	8		┐
	┤↕‼¶9├¶59⊥┤♂9:┤¶:¶6┐)"¶5♫	8BB-B-	☼┤┬¶┤◘← $& (¶(" &#%> ¶¶¶¶6 B-¶#¶ B-B-)" ¶¶¶¶┐ ¶#¶┐)"¶5♫ ┬ (*"1>¶¶6)" ‼% " &¶¶┬(#"¶@ >¶¶┐6 0%" &%>¶¶ ; %> ¶¶¶¶6?B-¶#¶66-8●)" ¶¶¶6┐ ¶#¶?-??)"¶5♫ 0%" &%>¶¶5┤↕9↕┤¶;♂→ %(%$2> ¶¶¶¶66-8●¶#¶BBB-)" ¶¶¶¶?-??¶#¶6┐)"¶5♫ 0%" &%>¶¶A?¶◘↕‼	┬⊥				

↕9┤ > 0┤◘ C⊥→↕♫¶9→↕¶:┤┬◘→9↕ ¶0◘3¶;♂◘↕♫┤G¶┤├┤⊥¶9¶;C⊥┤↕↕¶:┤┬◘→9↕¶ ◘5:┤
☼◘┤⊥¶9C↕‼ ⊽

6┬┤⊥5C⊥‼┤¶9♫¶¶┤?◀B‼┤¶9♫◘ ¶95┤ ♫E¶⊥◘H9⊥♫ ‼¶¶┤6



⊥◘→♫⊥◘♂→; ¶◘↕‼¶⌇ ⊥C0┤↕◘→9↕¶□9♫
↑9┬┤⊥5C⊥‼┤↕←

%* ¶&¶#)¶&

⊥9E┤ ;¶◘0┤>¶ 9C♂¶◘39↕¶C0

⊥9E┤ ;¶C05┤⊥>¶?└│?

;□┤↕>¶□□┤9→ ¶9□¶ 9⊥= ¶⌇ ;

□9 ;◘→9↕>¶0 9⊥◘┤┤ ¶9♂→9

♂9□┤¶┤ →♫↕◘→9↕> ♫ →◀B

‼◘┤¶;90□┤‼>¶!*!''¶&B¶ B

‼⊥→□□┤♫¶0┤♂9‼>¶┤9⊥95┤

├┤□‼¶⊥ 9↕↕┤□>¶;□9 ┤

‼┤♂)"¶♫	⊥◘→♫⊥◘♂→; ¶┤ ;⊥→9↕¶F¶┤0◘⊥=	┤:┤┬)"	09↕→9⊥→↕♫¶┤::	◘0:┤				
	♫⊥9C↕‼¶C⊥◘;┤	⊥●┬┤		↕C05┤⊥	┤┤⊥┬◘:	⊥┤;¶D←	7,¶◘.C┤	‼¶44 ←
	¶◘◘↕‼¶├→:←¶ ! ¶#$#%&' ¶%(%&2¶&#.(			┐└		8		┐
	☼┤♫☼¶◘↕‼¶◘↕‼¶⊥◘┬┤:¶├→:← ! ¶#$#%&' ¶%(¶)(¶&σ+ , *&%/#))◀.1" ◀*1"¶&(%¶"┐)"¶♫	┘6B6┤		┐└		└		6┬
	☼┤♫☼¶◘↕‼¶◘↕‼¶⊥◘┬┤:¶├→:←¶ $#%&' ¶%(%(¶)(¶&σ+ ,¶%&2¶&#.(┼%$2	┘68┬┤						
	¶◘◘↕‼¶├→:←¶ ! ¶#$#%&' ¶%(%&2¶&#.(	┘6┐┤		┐└		—		┐
	☼┤♫☼¶⊥◘┬┤:¶◘↕‼¶◘↕‼¶(%"+ ← ! ¶#$#%&' ¶%(¶)(¶&σ+ ,	┘66?┤		┐└		└		6┤6
	◀¶&#!(.%" &%"¶6B┐)"¶♫							
	┤↕‼¶┤¶♫9⊥┤♂9:┤¶: ¶● ┐)"¶♫	┘ ┐┤						

☼┤□¶┤◘┬
$& (¶(" &%>
¶◘◘◘6└┤¶#¶6┘└┤)"
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□ (*"1>¶◘◘◘)"
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#"¶ @ >¶◘◘◘┐6
0%" &%>¶◘◘◘;
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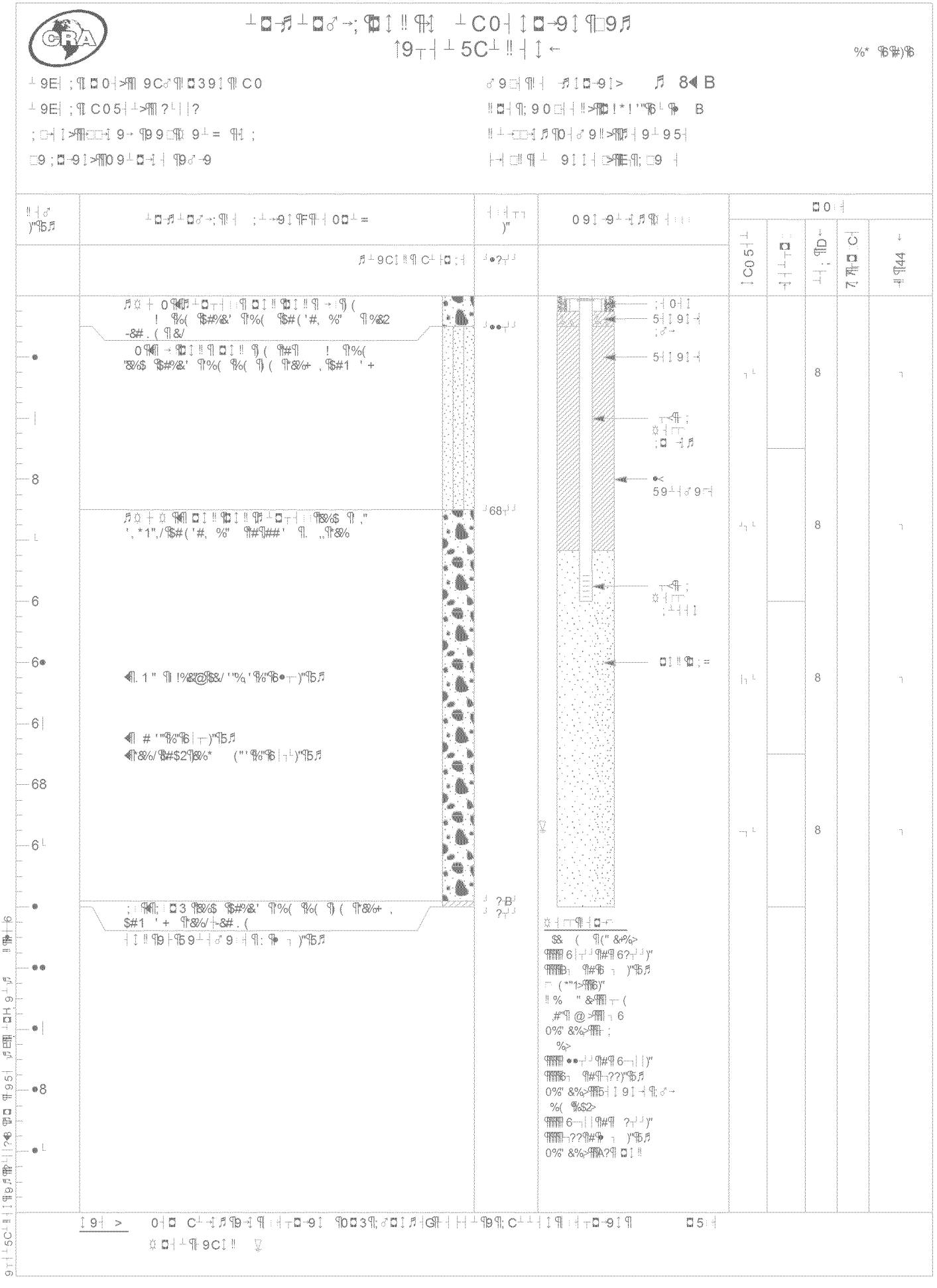
0%" &%>¶◘◘◘┤↕9↕→¶;♂→
%(%$2>
¶◘◘◘6B┬6¶#¶ ┐└┤)"
¶◘◘◘??¶#¶● ┐)"¶♫
0%" &%>¶◘◘◘A?¶◘↕‼

↕9┤ > 0┤◘ C⊥→↕♫¶9→↕¶:┤┬◘→9↕ ¶0◘3¶;♂◘↕♫┤G¶┤├┤⊥¶9¶;C⊥→┤↕¶:┤┬◘→9↕¶ ◘5:┤
☼◘┤⊥¶9C↕‼ ⌄



CRA

⊥□→♬⊥□♂→; ¶□↕ ‼ ¶↕ ⊥C0┤↕□→9↕¶□9♬
↑9┬┤⊥5C⊥‼┤↕←

%* ¶6¶#)¶6

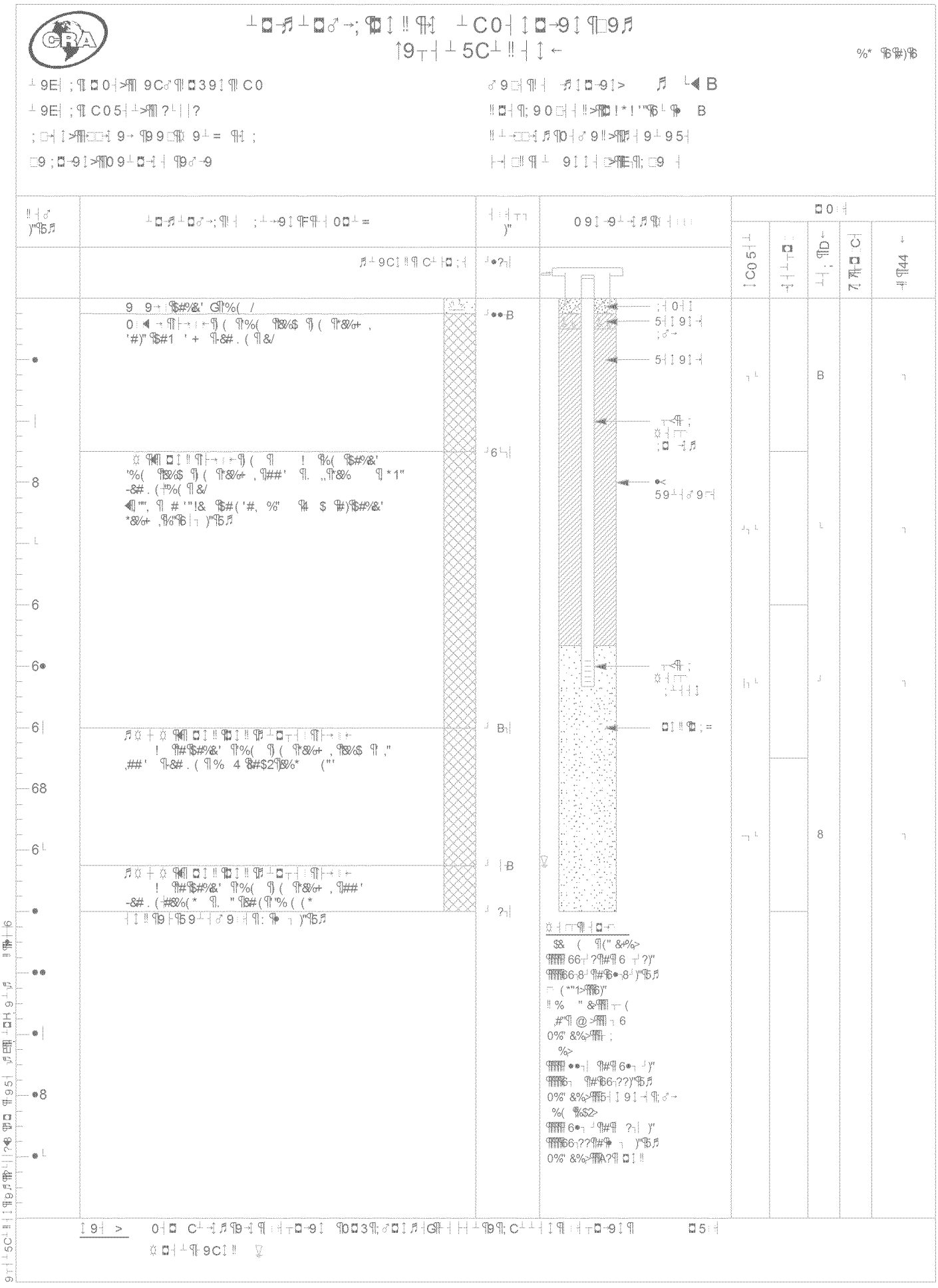
⊥9E┤ ; ¶□0┤>¶ 9C♂¶□39↕¶C0
⊥9E┤ ; ¶C05┤⊥>¶?⊥||?
; □┤↕>¶□□┤9→ ¶99□¶ 9⊥= ¶↕ ;
□9 ; □→9↕>¶09⊥□→┤ ¶9♂→9

♂9□┤¶┤ →♬↕□→9↕> ♬ ⊥◀B
‼□┤¶; 90□┤ ‼>¶□!*!'"¶6⊥¶ B
‼⊥→□□┤♬¶0┤♂9‼>¶♬┤9⊥95┤
├→┤□‼¶⊥ 9↕↕┤□>¶E¶; □9 ┤

‼┤♂)"¶5♬	⊥□→♬⊥□♂→; ¶┤ ; ⊥→9↕¶F¶┤0□⊥=	┤:┤┬┐)"	09↕→9⊥┤♬¶ ┤::	□0:┤ ↕C05┤⊥	┤┤⊥┬□:	⊥┤; ¶D←	7 ¶□:C┤	┤‼¶44 ←
	♬⊥9C↕‼¶C⊥┤□;┤	⊥●?┐?						
	0:¶¶ →:¶$#1 ' +							
	☼¶¶□↕‼¶)(¶#¶$#%&' ¶%(¶##' ¶. ,, *&% ¶&#.(¶&/	⊥● ┬?		┐⊥		6		┐
	♬☼┤☼¶¶□↕‼¶□↕‼¶⊥□┬┤:¶ ! ¶# $#%&' ¶%(¶%(¶)(¶&%+ ,¶##' ¶&#.(┤%(&/	⊥68┐?		┐⊥		⊥		┐
	◀¶┬7&#$2¶&%* ("'¶%"¶6?┬)"¶5♬			┐⊥		⊥		┐
	◀6┐7&#$2¶&%* ("¶%"¶6⊥┐6)"¶5♬			┐⊥		8		┐
	;:¶¶; :□3¶→:←¶&%$ ¶)(¶&%+ ,¶%(¶$#%&' '%(¶$#1 ' + ¶&%/	⊥┤┬?						
	┤↕‼¶9┤¶59⊥┤♂9:┤¶: ¶● ┐)"¶5♬	⊥?┐?						

⊥9┤ > 0┤□ C⊥→┤♬¶9→┤¶:┤┬□→9↕ ¶0□3¶; ♂□↕♬┤G¶┤┤┤⊥¶9¶; C⊥┤↕┤¶:┤┬□→9↕¶ □5:┤
☼□┤⊥¶9C↕‼ ▽

9┬┤⊥5C⊥‼┤↕¶9♬¶⊥||?◀8 ¶□ ¶95┤ ♬E¶⊥□H 9⊥♬ ‼¶┤6



⊥◘→♫⊥◘♂→; ¶◘↕ ‼ ¶¶ ⊥C0┤↕◘→9↕¶□9♫
↑9┬┤⊥5C⊥ ‼ ┤↕ ←

%* ¶6¶#)¶6

⊥9E┤ ;¶◘0┤>¶¶ 9C♂¶‼◘39↕¶‼C0
⊥9E┤ ;¶C05┤⊥>¶¶?└││?
;□┤↕>¶¶□□┤ 9→ ¶9 9□¶¶ 9⊥= ¶¶ ;
□9 ;◘→9↕>¶¶09⊥◘┤┤ ¶9♂→9

♂9□┤¶‼┤ →♫↕◘→9↕> ♫ B◀ B
‼◘┤¶;90□┤‼>¶¶!*!''¶ ¶ B
‼⊥→□□┤♫¶0┤♂9‼>¶¶┤9⊥9┤
├┤□‼¶⊥ 9↕↕┤□>¶¶¶;□9 ┤

‼┤♂)"¶5♫	⊥◘→♫⊥◘♂→; ¶‼┤ ;⊥→9↕¶F¶┤0◘⊥=	┤:┤┬┐)"	09↕→9⊥→↕♫¶¶┤::	◘0:┤				
	♫⊥9C↕‼¶C⊥┤◘;┤	┘●└8┤		↕C05┤⊥	┤┤⊥┬◘:	⊥┤;¶D←	7¶◘:C┤	⊥‼¶44 ←
	♫☼┤☼ ¶¶ ◘↕‼¶◘↕‼¶¶⊥◘┬┤:¶├→:← ! ¶#¶$#%&' ¶%(¶ (¶&♂+ ,¶ ", ¶ ,"' . ,,¶&% ¶&# . (¶%(¶&/		;┤0┤↕ 5┤↕9↕┤ ;♂↕ 5┤↕9↕┤ ┬┤♫¶ ; ☼⊥┬□ ;◘ ⊥↕♫	┐└	8		┐
	0¶¶ ◘↕‼¶◘↕‼¶→¶├→:←¶$#1 ' + ¶%&2 -&# . (¶&/	┘●└6┤	●< 59⊥┤♂9┬┤				
8							
└			¶┤┬┐ ; ☼┤┬□ ;⊥┤↕↕	┘└	┘		┐
6	☼ ♫☼ ¶¶ ◘↕‼¶◘↕‼¶¶⊥◘┬┤:¶&%$ ¶ ,"' ! ¶#¶$#%&' ¶%(¶ (¶&♂+ ,¶## ' ¶ ,, *&% ¶&# . (¶&/	┘└8┤	◘↕‼¶◘; =				
6●	◀#$2¶&%* ("'¶%"¶6●┬)"¶5♫			┐└	8		┐
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6└	◀#$2¶&%* ("'¶%"¶6B┐)"¶5♫			┐└	┘		┐
●	┤↕‼¶9┤¶5 9⊥┤♂9:┤¶: ¶ ┐)"¶5♫	┘ └8┤	☼┤┬¶┤◘┬ $& (¶(" &%> ¶¶¶ ●●6┤¶#¶ ●6┤6┤)" ¶¶¶6┬ ¶#¶┬)"¶5♫ ┬ (*"1>¶¶6)" ‼% " &¶¶┬(#"¶ @ >¶¶┐6 0%" &%>¶¶ ; %> ¶¶¶ ●┘8┤¶#¶ ●┤8┤)" ¶¶¶6┐ ¶#¶┐)"¶5♫ 0%" &%>¶¶5┤↕9↕┤¶;♂→ %(¶$2> ¶¶¶ ●┤8┤¶#¶ └8┤)" ¶¶¶┐ ¶#¶● ┐)"¶5♫ 0%" &%>¶¶A?¶◘↕‼				
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↕9┤ > 0┤◘ C⊥→↕♫¶9→↕¶:┤┬◘→9↕ ¶0◘3¶;♂◘↕♫┤G¶┤├┤⊥¶9¶;C⊥┤↕↕¶:┤┬◘→9↕¶ ◘5:┤
☼◘┤⊥¶ 9C↕‼ ⊽

⊥◘→♫⊥◘♂→; ¶◘↕ ‼ ¶↕ ⊥C0┤↕◘→9↕ ¶□9♫
↑9┬┤⊥5C⊥ ‼ ┤↕ ←

%* ¶6¶#)¶6

⊥9E┤ ; ¶ ◘ 0┤>¶¶ 9C♂¶‼ ◘ 3 9 ↕ ¶‼ C 0

⊥9E┤ ; ¶ C 0 5┤⊥>¶¶ ? └ | | ?

; □┤↕>¶¶□□┤ 9→ ¶9 9 □¶‼ 9⊥ = ¶↕ ;

□9 ; ◘→9↕>¶¶0 9⊥◘→┤┤ ¶9♂→9

♂9□┤¶‼┤ →♫↕◘→9↕> ♫6 ◀ B

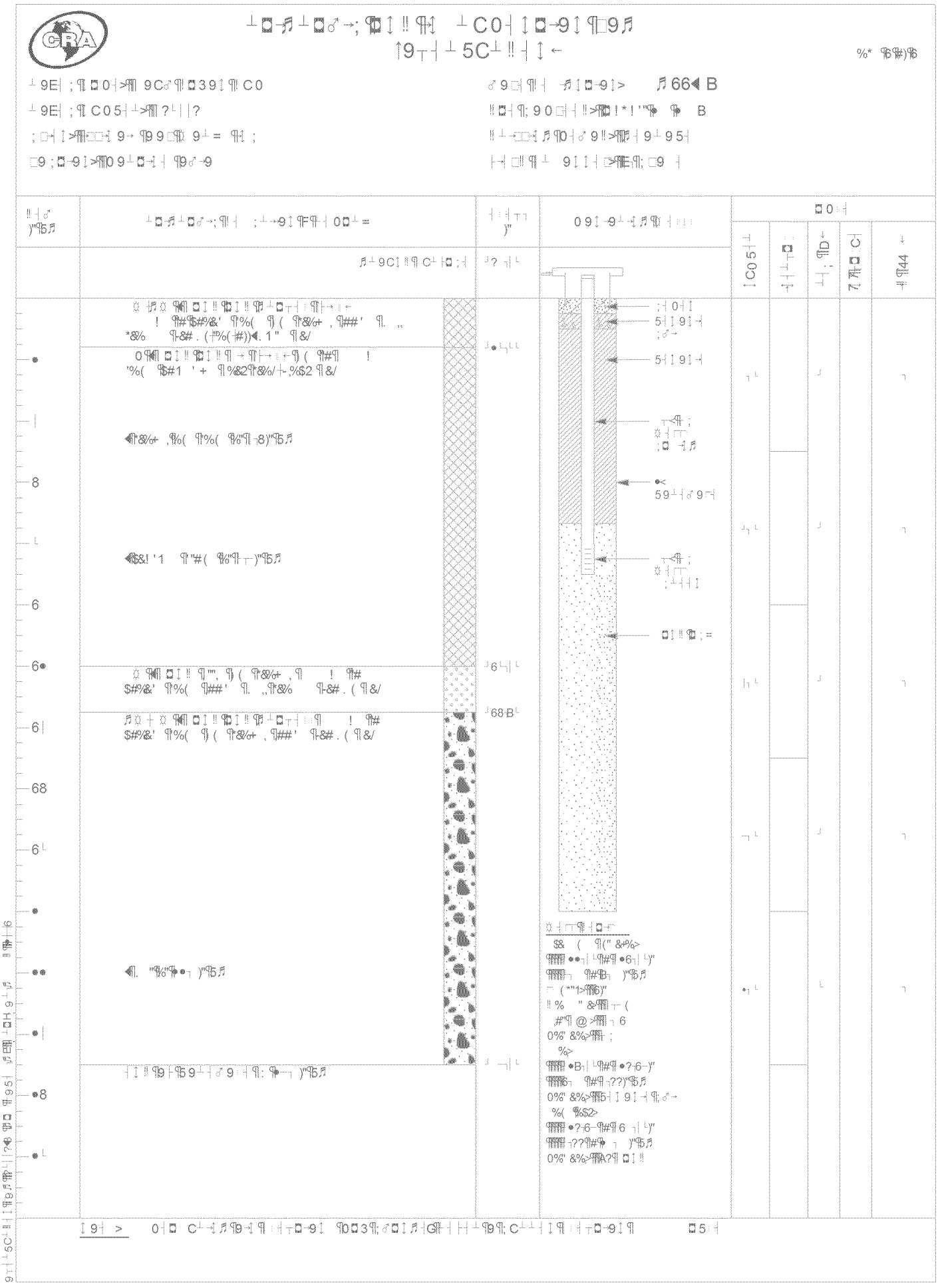
‼◘┤¶; 9 0 □┤┤‼>¶¶ ! * ! ' '¶ ¶ B

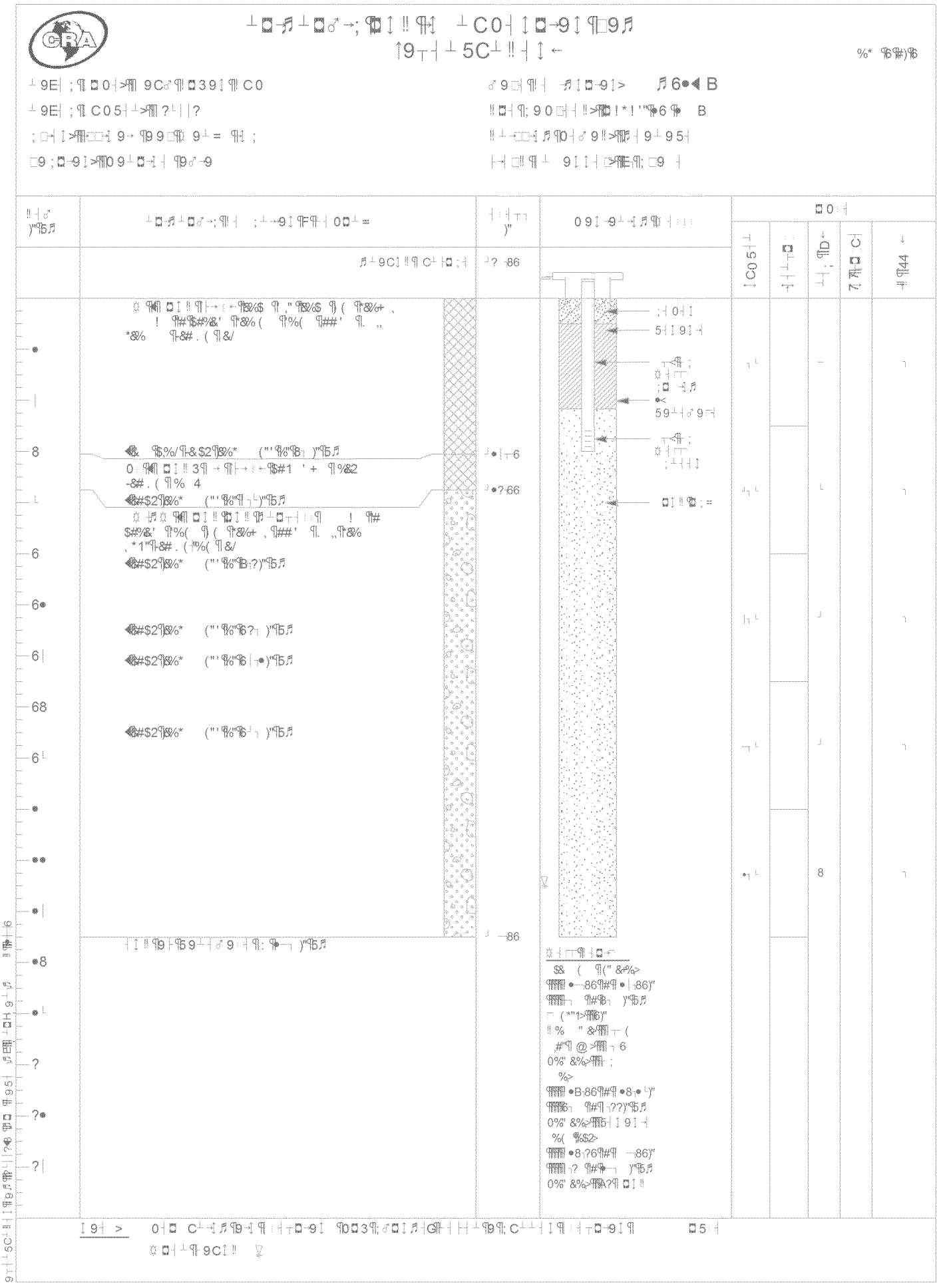
‼⊥→□□┤♫¶0┤♂9‼>¶¶┤9⊥95┤

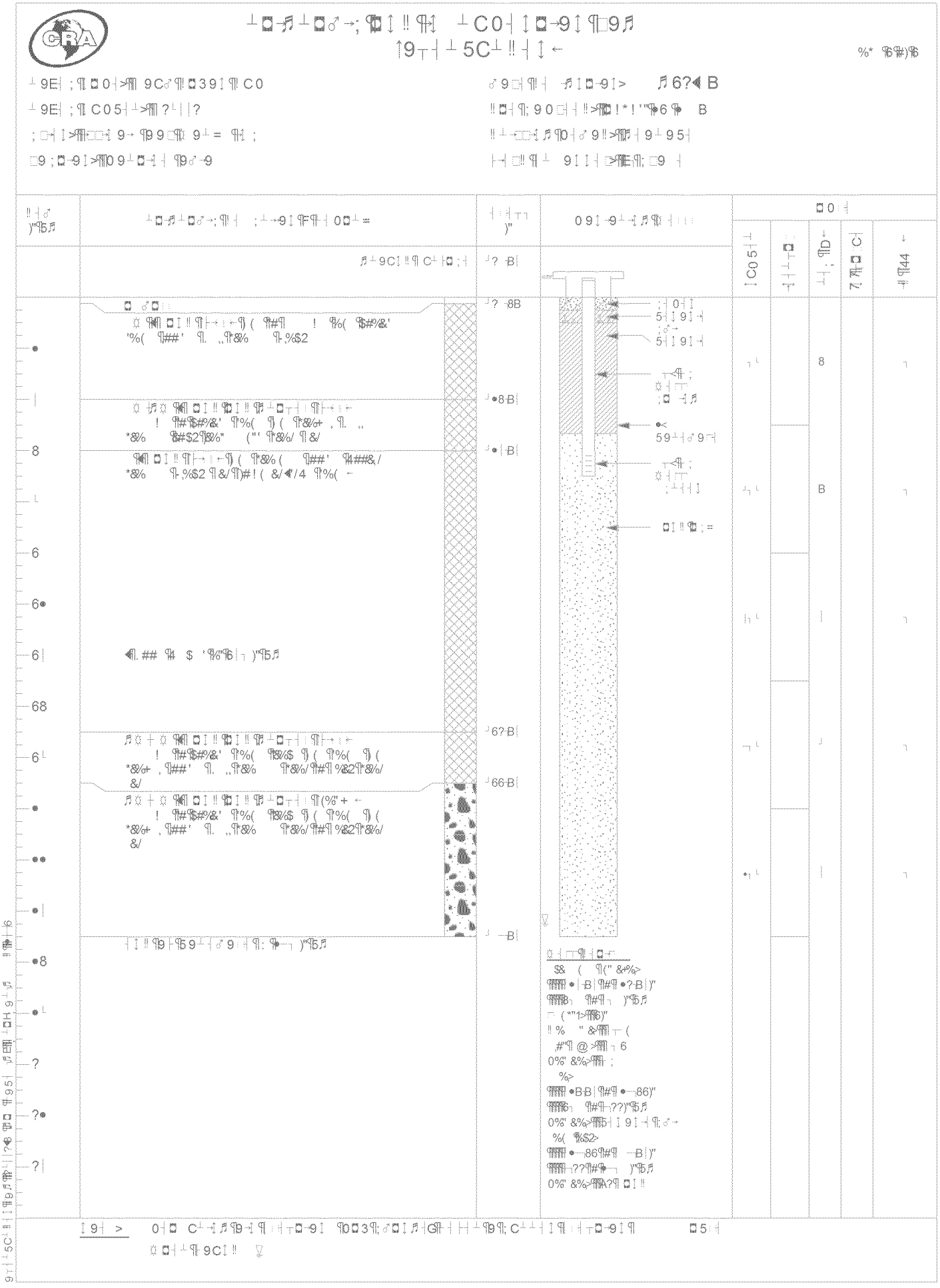
├→┤□‼¶⊥ 9↕↕┤□>¶¶E¶; □9 ┤

‼┤♂)"¶5♫	⊥◘→♫⊥◘♂→; ¶‼┤ ; ⊥→9↕¶F¶┤0◘⊥ =	┤:┤┬┐)"	0 9↕→9⊥→↕♫¶◘┤::	◘0:┤				
	♫⊥9C↕‼¶C⊥├◘;┤	┘? ┐B		↕C0 5┤⊥	↕┤┤⊥┬◘:	⊥┤; ¶D←	7, ¶¶◘ :C┤	‼¶44 ←
	0¶¶ ◘↕‼ ¶◘↕‼ ¶ → ¶¶├→ : ← ¶%/$ ¶) (¶&/+ , $#1 ' + ¶%&2¶&/┤-,%$2 ¶&/		;┤0┤↕ 5┤↕9↕┤ ;♂→ 5┤↕9↕┤	┐└		6		┐
	0♫ 0¶¶ ◘↕‼ ¶ → ¶◘↕‼ ¶♫⊥◘┬┤:¶├→ : ←) (¶#¶$#/&' ¶%(¶) (¶&/+ , ¶$# ('#, %" . „¶&/	┘●┘┤B	☼┤┬┐¶; ;◘ ┤♫ ●< 59⊥┤♂9┬┤					
	0¶¶ → ¶◘↕‼ ¶ ◘↕‼ ¶├→ : ← ¶) (¶&/ (*&/+ , ¶$#1 ' + ¶ * 1"¶&/ ¦$& % ¶$#,#& ¶ # ' " '#¶ &/ ◀¶ # ' "¶U¶B<¶1 $2¶/¶ ┬)"¶5♫ ◀●7¶-&#. (¶ ,"/¶%(¶/"¶6 ┬)"¶5♫	┘●?┤B		┘└		6		┐
	☼ ┤♫☼ ¶¶ ◘↕‼ ¶◘↕‼ ¶♫⊥◘┬┤:¶├→ : ← ! ¶#¶$#/&' ¶%(¶) (¶&/+ ,	┘6┘BB		┐└		6		┐
	◀¶ (2¶#$2¶&/* ("'¶/"¶6B┬)"¶5♫		☼┤┬┐¶; ;⊥┤↕ ◘↕‼ ¶ ; =	┐└		┌		┐
	◀#, + ¶& (¶%(U¶6┤●<¶1 $2¶/"¶● │┐)"¶5♫			•┐└		8		┐
	┤↕‼ ¶9├¶5 9⊥┤♂9:┤¶: ¶●┬┐)"¶5♫	┘ ┬┐B	☼┤□┬¶┤◘→ $& (¶(" &#%> ¶¶¶¶ 6?┐│B¶#¶ 6●┐│B)" ¶¶¶¶6┘┐ ¶#¶6└┐)"¶5♫ ┬ (*"1>¶¶6)" ‼ % " &¶¶ ┬ (#"¶ @ >¶¶ ┐ 6 0%" &%>¶¶ ; %> ¶¶¶¶ ●B┐│B¶#¶ 6│┐68)" ¶¶¶¶6┐ ¶#¶68┐??)"¶5♫ 0%" &%>¶¶5┤↕9↕┤¶; ♂→ %(¶%$2> ¶¶¶¶ 6│┐68¶#¶ ┬┐│B)" ¶¶¶¶68┐??¶#¶●┬┐)"¶5♫ 0%" &%>¶¶A?¶ ◘↕‼				

↕9┤ > 0┤◘ C⊥→↕♫¶9→↕¶:┤┬◘→9↕ ¶0◘3¶; ♂◘↕♫┤G¶┤├┤⊥¶9¶; C⊥┤↕¶:┤┬◘→9↕¶ ◘5:┤
☼◘┤⊥¶ 9C↕‼ ⊽







⊥◘→♫⊥◘♂→; ¶◘↕ ‼ ¶¶ ⊥C0┤↕◘→9↕¶□9♫
↑9┬┤⊥5C⊥ ‼ ┤↕ ←

%* ¶6¶#)¶6

⊥9E┤ ;¶◘0┤>¶¶ 9C♂¶‼◘39↕¶‼C0

⊥9E┤ ;¶C05┤⊥>¶¶?└│|?

;□┤↕>¶¶□□┤ 9→ ¶¶9□¶‼ 9⊥= ¶¶ ;

□9;◘→9↕>¶¶09⊥◘┤┤ ¶¶♂→9

♂9□┤¶‼┤ →♫↕◘→9↕> ♫6|◀B

‼◘┤¶;90□┤‼>¶¶!*!''¶ ¶ B

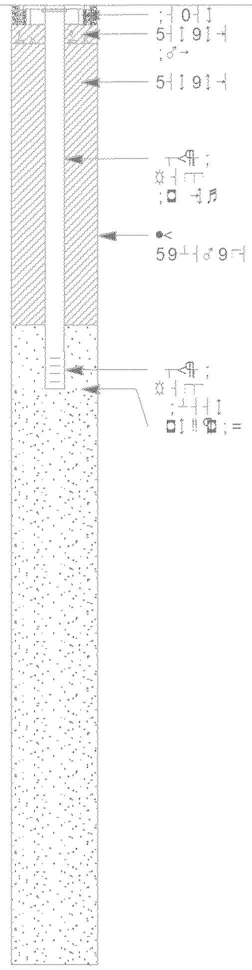
‼⊥→□□┤♫¶0┤♂9‼>¶¶┤9⊥95┤

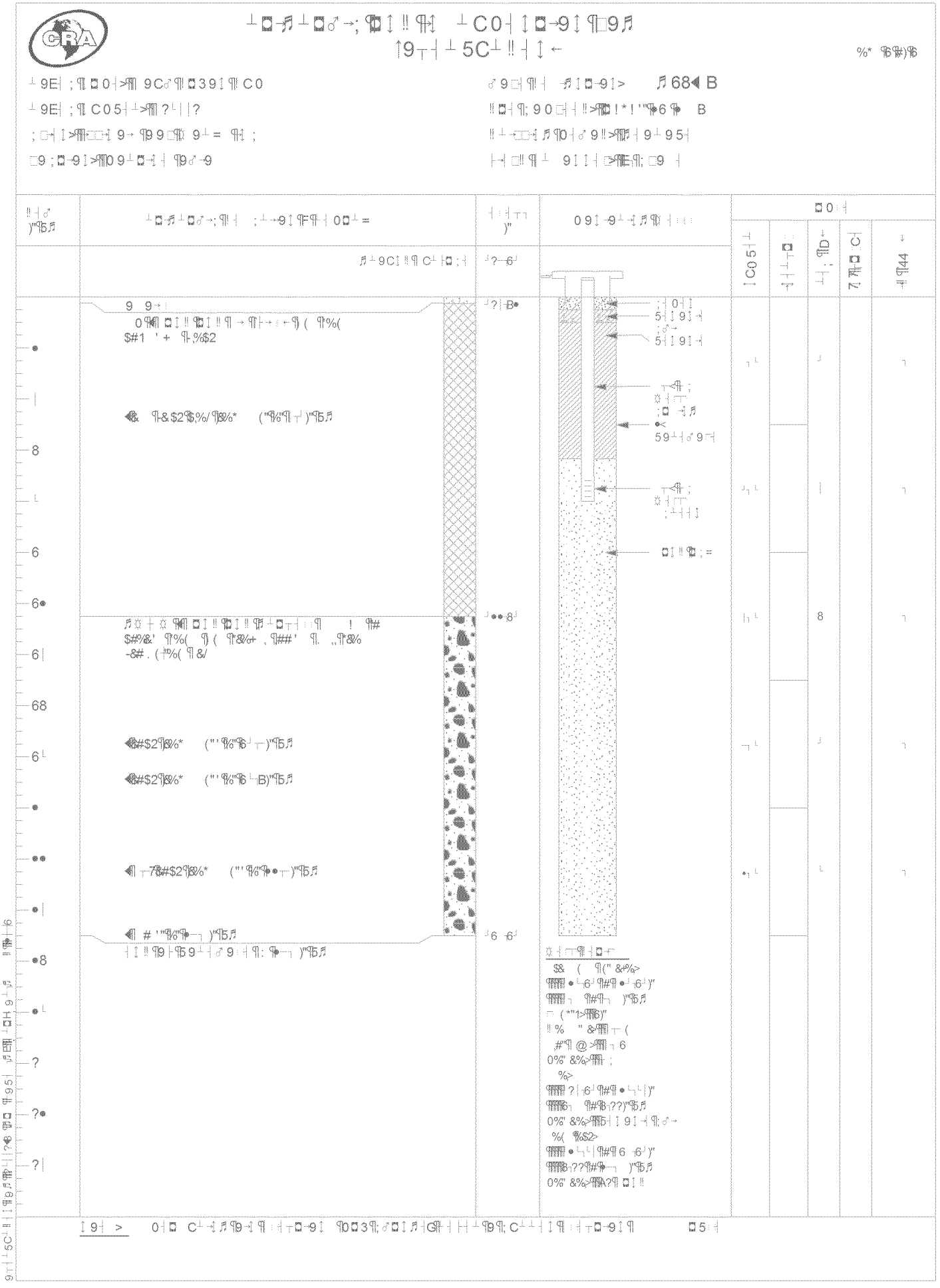
├┤□‼¶⊥ 9↕↕┤□>¶¶¶;□9 ┤

‼┤♂)"¶5♫	⊥◘→♫⊥◘♂→;¶‼┤ ;⊥→9↕¶F¶┤0◘⊥=	┤:┤┬)"	09↕→9⊥→↕♫¶¶┤::	◘0:⊥				
	♫⊥9C↕‼¶C⊥┤◘;┤	┘?6┐┘		↕C05⊥	┤┤⊥┬◘:	⊥┤;¶D←	7¶◘:C┤	‼¶44 ←
	☼ ┤♫☼ ¶¶ ◘↕‼¶◘↕‼¶⊥◘┬┤:¶┤→:← ! ¶#¶$#%&' ¶%(¶ (¶&♂+ ,¶##' ¶. ,, *&% ¶&#.(┬%(		;┤0┤↕ 5┤↕9↕┤ ;♂→ 5┤↕9↕┤ ┬┤¶ ;☼┬┬ ;◘ ┬↕♫ ●< 59⊥┤♂9┬┤ ┬┤¶ ;☼┬┬ ;┬┤↕↕	┘└	8			
	├→:¶¶ ,"¶##2 (*¶ %" &%¶.1" ¶ #'"	┘●┤┬┘		┘└		┘		┐
	☼ ┤♫☼ ¶¶ ◘↕‼¶◘↕‼¶⊥◘┬┤:¶ ! ¶# $#%&' ¶%(¶ (¶&♂+ ,¶##' ¶. ,,¶&% -&#.(┬%(	┘●?┐┘	◘↕‼¶◘;=					
	┤↕↕‼¶┤¶:¶●┐)"¶5♫	┘ 8┬┘	☼┤□¶┤◘← $& (¶(" &#%> ¶¶¶¶ ●8┬┘¶#¶ ●┐┬┘)" ¶¶¶¶┐ ¶#¶┐)"¶5♫ ┬ (*"1>¶¶¶5)" ‼% " &¶¶┬ (#"¶ @ >¶¶┐6 0%" &%>¶¶ ; %> ¶¶¶¶ ? ┬┘¶#¶ ●┘┐│)" ¶¶¶¶┐ ¶#¶┐??)"¶5♫ 0%" &%>¶¶5│↕9↕┤¶;♂→ %(¶%$2> ¶¶¶¶ ●┘┐│¶#¶ 8┬┘)" ¶¶¶¶┐??¶#¶┐)"¶5♫ 0%" &%>¶¶A?¶◘↕‼							

↕9┤ > 0┤◘ C⊥→↕♫¶9↕¶:┤┬◘→9↕ ¶0◘3¶;♂◘↕♫┤¶┤┤⊥¶9¶;C⊥┤↕¶:┤┬◘→9↕¶ ◘5:┤

☼◘┤⊥¶9C↕‼ ⊽





⊥◘→♫⊥◘♂→; ¶◘↕‼¶↕ ⊥C0┤↕◘→9↕¶□9♫
↑9┬┤⊥5C⊥‼┤↕←

%* ¶6¶#)¶6

⊥9E┤ ;¶◘0┤>¶ 9C♂¶◘39↕¶C0 | ♂9□┤¶┤ ♫↕◘→9↕> ♫6┘◀B

⊥9E┤ ;¶C05┤⊥>¶?└||? | ‼◘┤¶;90□┤‼>¶!*!''¶▶┤¶▶ B

;□┤↕>¶□□┤9→ ¶▶9□¶ 9⊥= ¶↕ ; | ‼⊥→□□┤♫¶0┤♂9‼>¶┤9⊥95┤

□9;◘→9↕>¶0 9⊥◘┤¶ ¶▶♂→9 | ├┤□‼¶⊥ 9↕↕ □>¶;□9 ┤

‼┤♂)"¶♫	⊥◘→♫⊥◘♂→;¶‼┤ ;⊥→9↕¶F¶┤0◘⊥=	┤:┤┬)"	09↕→9⊥→↕♫¶▶┤::	◘0:⊥				
	♫⊥9C↕‼¶C⊥├◘;┤	┘?┘B•		↕C05┤⊥	┤┤⊥┬◘:	⊥┤;¶D←	7,¶◘:C┤	⊥‼¶44 ←
•	☼ ┤♫☼ ¶◘↕‼¶◘↕‼¶⊥◘┬┤:¶├→:←¶##') (¶ ! ¶%(¶$#%&' ¶%(¶ (¶&%+ , '%(┤-&#. (¶&/			┘└		┘		┐
	¶◘↕‼¶├→:←¶-%$2¶#!(&/◀/4 ¶%(') (¶#¶ ! ¶&%(¶##' ¶-%$2	┘??B•		┘└		8		┐
	◀¶-%$2┤*& (┤/ ,,#. '1¶&%(* ¶-%('¶6┼¶1 $2 %"¶┐•)"¶♫ ◀¶&%/¶#!(&/◀/4 ¶%(¶%"¶┼B)"¶♫			┐└		•		┐
				┐└		•		┐
				•┐└		┐		┐
	♫☼┤☼ ¶◘↕‼¶◘↕‼¶⊥◘┬┤:¶ (¶#¶&#%&' '%(¶ (¶&%+ , ¶##' ¶&%/ ┤%(¶&/	┘?B• ┘6•B•						
	┤↕‼¶9├¶5 9⊥┤♂9:┤¶: ¶▶┐)"¶♫		☼┤┬¶┤◘┤ ‼ $& (¶(" &#%> ¶¶¶¶ ??B•¶#¶ ?•B•)" ¶¶¶¶┐ ¶#¶┐)"¶♫ ─ (*"1>¶¶6)" ‼% " &¶¶┬(#"¶ @ >¶¶┐6 0%' &%>¶¶ ; %> ¶¶¶¶ ?8B•¶#¶ ?┤┬B)" ¶¶¶6┐ ¶#¶-??)"¶♫ 0%' &%>¶¶5┤↕9↕┤ %(¶$2> ¶¶¶¶ ?┤┬B¶#¶6•B•)" ¶¶¶¶┐??¶#¶▶┐)"¶♫ 0%' &%>¶¶A?¶ ◘↕‼				

↕9┤ > 0┤◘ C⊥┤♫¶9↕¶:┤┬◘→9↕¶ ¶0◘3¶;♂◘↕♫┤G¶┤├┤⊥¶9¶;C⊥┤↕¶:┤┬◘→9↕¶ ◘5:┤

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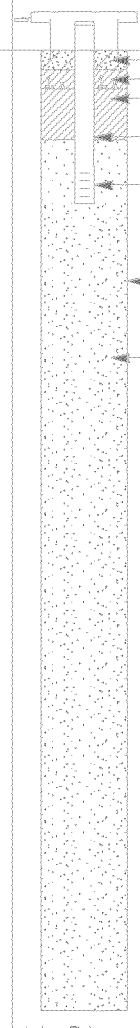
⊥ ◘ ⊥ ◘ ♂ →; ¶ ↕ ‼ ¶ ⊥ C0 ⊣ ↕ ◘ →9 ↕ ¶ □9 ♬
↑9 ⊤ ⊣ ⊥ 5C ⊥ ‼ ⊣ ↕ ←

%* ¶ ¶ ¶ ¶

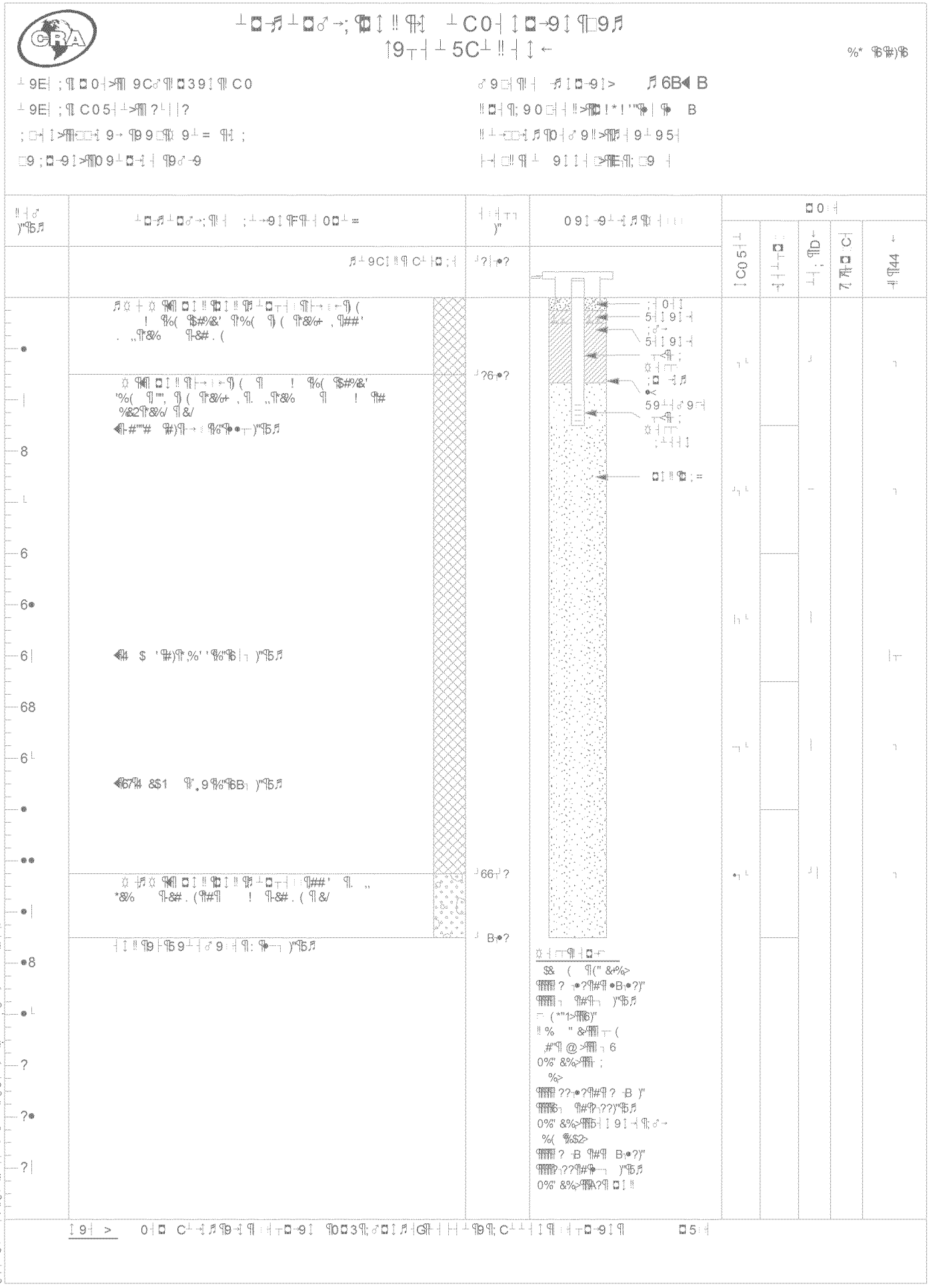
⊥ 9E ⊣ ; ¶ ◘ 0 ⊣ > ¶ 9C ♂ ¶ ◘ 39 ↕ ¶ C0
⊥ 9E ⊣ ; ¶ C05 ⊣ ⊥ > ¶ ? ⊥ ⊣ ⊣ ?
; □ ⊣ ↕ > ¶ □ □ ⊣ 9 → ¶ 99 □ ¶ 9 ⊥ = ¶ ⊣ ;
□9 ; ◘ →9 ↕ > ¶ 09 ⊥ ◘ → ⊣ ⊣ ¶ 9 ♂ →9

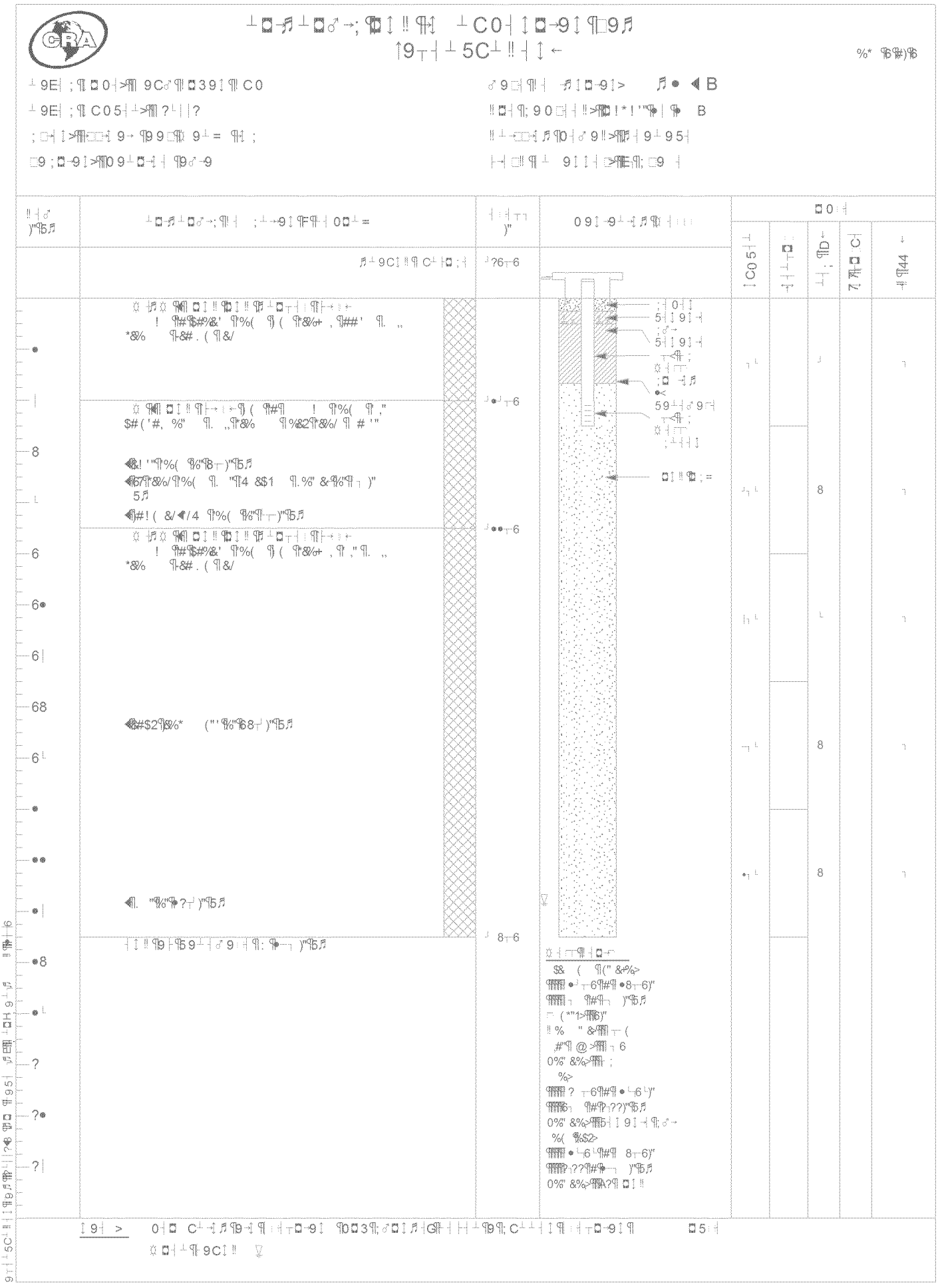
♂ 9 □ ⊣ ¶ ⊣ ⊣ ♬ ↕ ◘ →9 ↕ > ♬ 6 ⊥ ◀ B
‼ ◘ ⊣ ¶; 90 □ ⊣ ⊣ ‼ > ¶ ! * ! ' " ¶ ⊣ ¶ B
‼ ⊥ → □ □ ⊣ ♬ ¶ 0 ⊣ ♂ 9 ‼ > ¶ ⊣ 9 ⊥ 95 ⊣
⊢ ⊣ □ ‼ ¶ ⊥ 9 ↕ ↕ ⊣ □ > ¶ E ¶; □9 ⊣

‼ ⊣ ♂)" ¶ 5 ♬	⊥ ◘ ♬ ⊥ ◘ ♂ →; ¶ ⊣ ; ⊥ →9 ↕ ¶ F ¶ ⊣ 0 ◘ ⊥ =	⊣ ⊣ ⊣ ⊤ ⊣)"	09 ↕ →9 ⊥ ⊣ ♬ ¶ ⊣ ⊣ ⊣ ⊣	◘ 0 ⊣ ⊣				
	♬ ⊥ 9C ↕ ‼ ¶ C ⊥ ⊣ ◘ ; ⊣	⊥ ? ⊥ 8 –		↕ C05 ⊣ ⊥	⊣ ⊣ ⊥ ⊤ ◘ ⊣	⊥ ⊣ ; ¶ D ←	7 ¶ ◘ ⊣ C ⊣	⊣ ¶ 44 ←
	☼ ¶ ◘ ↕ ‼ ¶ ⊢ → ⊣ ← ¶ (¶ ! ¶ % (¶ $ # % & ' *& % (¶ & % $ ¶ (¶ & % + , ¶ # # ' ¶ . ,, ¶ & % -,% $2 ¶ # ! (& / ◀ / 4 ¶ % (							
	◀ ¶ # ' " ¶ % " ¶ ⊣)" ¶ 5 ♬			⊣ ⊥		⊥		KBBBB
	◀ ¶ $ # $2 ¶ & % * (" ¶ % " ¶ 8 ⊤)" ¶ 5 ♬							
	◀ ¶ ,"/ ¶ % (' ¶ ⊢ → ⊣ ← ¶ & % / ¶ % " ¶ 8 ⊣)" ¶ 5 ♬			⊥ ⊣ ⊥		⊥		⊥ ?
	◀ & ¶ $ % / ¶ - & $2 ¶ $ ' ¶ % " ¶ 6 ⊥ ⊤)" ¶ 5 ♬							
	◀ ¶ 6 ⊣ 87 ¶ . " ¶ % " ¶ 6 ⊣ 6)" ¶ 5 ♬			⊣ ⊥		⊣ 8		⊥ ⊣
	☼ ⊣ ♬ ☼ ¶ ◘ ↕ ‼ ¶ ◘ ↕ ‼ ¶ ⊥ ◘ ⊤ ⊣ ⊣ ¶ (¶ # ¶ $ # % & ' *& % + , ¶ ! ¶ # ¶ $ # % & ' ¶ % (¶ & % $ ¶ ," ,# # ' ¶ - & # . (⊣ * & % / ¶ & /	⊥ 6 ⊣ 8 –							
	⊣ ↕ ‼ ¶ 9 ⊣ ¶ 5 9 ⊥ ⊣ ♂ 9 ⊣ ⊣ ¶ : ¶ ⊣ ⊣)" ¶ 5 ♬	⊥ 6 ⊣ 8 –						
			☼ ⊣ ⊤ ¶ ⊣ ◘ ⊣ ⊤ $ & (¶ (" & + % > ¶ ¶ ¶ ? ⊣ 8 – ¶ # ¶ ? ? ⊣ 8 –)" ¶ ¶ ¶ ? ⊣ ¶ # ¶ ⊣)" ¶ 5 ♬ ⊤ (* " 1 > ¶ ¶ 6)" ‼ % " & > ¶ ¶ ⊤ (, # " ¶ @ > ¶ ¶ ⊣ 6 0 % " & % > ¶ ¶ ⊣ ; % > ¶ ¶ ¶ ? 8 ⊣ 8 – ¶ # ¶ ? ⊣ ? ●)" ¶ ¶ ¶ 6 ⊣ ¶ # ¶ ⊣ ? ?)" ¶ 5 ♬ 0 % " & % > ¶ ¶ 5 ⊣ ↕ 9 ↕ ⊣ ¶; ♂ → % (¶ % $2 > ¶ ¶ ¶ ? ⊣ ? ● ¶ # ¶ 6 ● ⊣ 8 –)" ¶ ¶ ¶ ⊣ ? ? ¶ # ¶ ⊣)" ¶ 5 ♬ 0 % " & % > ¶ ¶ A ? ¶ ◘ ↕ ‼							



↕ 9 ⊣ > 0 ⊣ ◘ C ⊥ → ⊣ ♬ ¶ 9 → ↕ ¶ ⊣ ⊣ ⊤ ◘ →9 ↕ ¶ 0 ◘ 3 ¶; ♂ ◘ ↕ ♬ ⊣ G ¶ ⊣ ⊣ ⊣ ⊥ ¶ 9 ¶; C ⊥ ⊥ ⊣ ↕ ¶ ⊣ ⊣ ⊤ ◘ →9 ↕ ¶ ◘ 5 ⊣ ⊣





⊥◘→♫⊥◘♂→; ¶◘↕ ‼ ¶↕ ⊥C0┤↕◘→9↕¶□9♫
↑9┬┤⊥5C⊥ ‼ ┤↕ ←

%* ¶$¶#)¶$

⊥9E┤ ;¶◘0┤>¶ 9C♂¶◘39↕¶C0

⊥9E┤ ;¶C05┤⊥>¶?└│?

;□┤↕>¶□□┤9→ ¶9□¶ 9⊥= ¶↕ ;

□9;◘→9↕>¶0 9⊥◘┤┤ ¶9♂→9

♂9□┤¶┤ →♫↕◘→9↕> ♫●6◀ B

‼◘┤¶;90□┤‼>¶!*!''¶→ ¶ B

‼⊥→□□┤♫¶0┤♂9‼>¶┤9⊥95┤

├┤□‼¶⊥ 9↕↕┤□>¶;□9 ┤

‼┤♂)"¶5♫	⊥◘→♫⊥◘♂→; ¶‼┤ ;⊥→9↕¶F¶┤0◘⊥=	┤:┤┬┐)"	09↕→9⊥→↕♫¶┤::	◘0:┤				
	♫⊥9C↕‼¶C⊥┤◘;┤	⊥●┘┤?		↕C05┤⊥	┤┤⊥┬◘:	⊥┤;¶D←	7,¶◘:C┤	⊥‼¶44 ←
	☼ ┤♫0¶ ◘↕‼ ¶→¶◘↕‼¶⊥◘┬┤:¶├→:←) (¶ ! %($#%&' ¶%(¶ (¶&%+ , $#('#, %" ¶. ,,¶&% ¶%&2¶&#.(┬%(¶&/		;┤0┤↕ 5┤↕9↕┤ ;♂→ 5┤↕9↕┤ ☼⊥┬┬┬┤; ;◘ ┤♫ ☼⊥┬┬┬┤; ;⊥┤↕ ●< 59⊥┤♂9┬┤ ◘↕‼◘;=	┬└		B│		┐
	┤↕‼¶9├¶59⊥┤♂9:┤¶:¶┐)"¶5♫	⊥●●┐┤?	☼┤□¶┤◘┬ $& (¶(" &%> ¶¶¶¶ ●┤┐│?¶#¶ ●?┐│?)" ¶¶¶¶?┐ ¶#¶┐)"¶5♫ ┬ (*"1>¶¶¶6)" ‼% " &¶¶¶┬(#"¶ @ >¶¶¶┐6 0%" &%>¶¶¶ ; %> ¶¶¶¶ ●8┐│?¶#¶ ●┬6)" ¶¶¶¶6┐ ¶#¶●┐??)"¶5♫ 0%" &%>¶¶¶5┤↕9↕┤¶;♂→ %(¶%$2> ¶¶¶¶ ●┬6 ¶#¶ ●●┐│?)" ¶¶¶●┐??¶#¶┐)"¶5♫ 0%" &%>¶¶¶A?¶ ◘↕‼						

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↕9┤ > 0┤◘ C⊥┤♫¶9┤↕¶┤:┤┬◘→9┤¶ ¶0◘3¶;♂◘↕♫┤¶¶┤┤┤⊥¶9¶;C⊥┤↕⊥┤↕¶┤:┤┬◘→9┤¶ ◘5:┤

6┬┤⊥5C⊥‼┤¶9♫¶┤?●¶ ¶5 ◘ ¶9⊥ ♫ ◘H⊥6 ♫ ¶E¶┤ ♫ ‼ ¶●⊥6

APPENDIX A.7

LNAPL SOIL BORING STRATIGRAPHIC LOGS

■ - . ♂ -, ' . ♂ 6,>■ ■■ ■■ - . =) 0 ■ -♂ -,4 ■■ 4 '
84 / 0 . &= . 0 ■9

. 4@0 > - ■ ♂) 0: ■■ 4 = - 6 ■ + - 4 ■ ■ =) ■ ■,-0

. 4@0 > - ■ =) &0 . : ■ ■ 22

> *,0 ■ -: ■ ** ,■ 4,■ ■ 4 4 * ■ A 4 . B ■ ■ >

* 4 >♂ -,4 ■: ■) 4 . ♂,■ 0 ■ 4 6,4

6 4 * 0 ■ ■,' ■♂ -,4 ■: &6 ┘ <

♂ - 0 ■ 4) *0 - 0: ■ @ ' → ■ ■ < ■ ■ ┘ <

. ,**,■ ' ■) 0 - 6 4: ■ . 0 > - ■ = ■ 6

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0 -6 ■& ' ■	■ - . ♂ -, ' . ♂ 6,> ■ ■ > . , -,4 : ■ ■. 0) ♂ . B ■	0 -6 ■& ' ■	&↑◀■$↑¶	■♂) *0				
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	■ ■♂ : ■ ◀ ‼¶ ┬ ■ ◀ ├→							
1			1 ● ┘					
	■ ■♂ : ■ → ¶ ■ ◀ → ¶ ■ ◀ ┬ ■ ↑ ¶ ■ ¶ ◀ ¶" ↑ ↑◀							
2								
	■ ↑↑ ■#$"→% ■ "◀ ■ ↑◀ ■ ■ ┘ ┴ ■& ' ■							
	■ ◀ ┬ ┤ ◀ ├→ ■ ■ ┘ ┴ ■& ' ■							
1								
2								
	■ ¶ ■ ■ ● ┤ ┴ ■& ' ■ ■ ◀ ■ ◀ ■#% ■ ■ ● ┤ ┴ ■& ' ■							
	) *■ ♂ : + ■,* - ■ → ¶ ■ ◀ → ¶ ■ ◀ ┬ ■ ¶!		┘ ┤┴┴					
1	' (■ ■ ♂ : ■ ' : ■ ' . ♂ / 0 * ■ → ¶ ■ ◀ → ¶ ↕→ ■ ↕ → ■ ↕ → ■ ◀ ├→		1 ┤┴┴					
11								
12	■#↑↕◀ ¶ ■ ↕→ ■ → ■ ◀ ‼¶ ■ $¶¶ → ■ ¶ ◀ ¶" ↑ ↑◀ ■ ■ 12 ┤┴ ■& ' ■							
1								
	■ ◀ ┬ ■ ¶ ■ ■ 13 ┤┴ ■& ' ■							
1			1 ┤┴┴					
	0 : ■ 4 5 ■& 4 . 0 6 4 * 0 ■ 7 ■ ┤┴ ■& ' ■							
	■ " ↕→ ■ / (,■ 6 ¶ ↕ ↕ # ¶ ■ 8 9:							
	┘ 2;■ ■ ■ → ¶ ┼ ↕ ! ‼ ¶ ■ ¶ ■ ┤							
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	┤ 1;■ ■ ■ → ¶ ┼ ↕ ! ‼ ¶ ■ ¶ ■ ┤ 1							
1	┤ 1 ┤ ■ → ¶ ┼ ↕ ! ‼ ¶ ■ ¶ ■ ┤ <							
	┤ 1 ┘ ■ → ¶ ┼ ↕ ! ‼ ¶ ■ ¶ ■							
2	1 ┘ 12 ■ → ¶ ┼ ↕ ! ‼ ¶ ■ ¶ ■							
	121 ┤ ■ ↑ ! ‼ ¶ ■ ■							

: 4 - 0 ■ :) 0 ♂ ■ = . , : ' ■ 4, : - ■ 0 * 0 / ♂ -,4 : ■ ■) ♂ + ■ 6 ♂ : ' ■ ■. 0 5 0 . ■ - 4 ■ = . . 0 : - ■ 0 * 0 / ♂ -,4 : ■ - ♂ & * 0

> 6 0) ,> ♂ * ■ : ♂ * + ■,■

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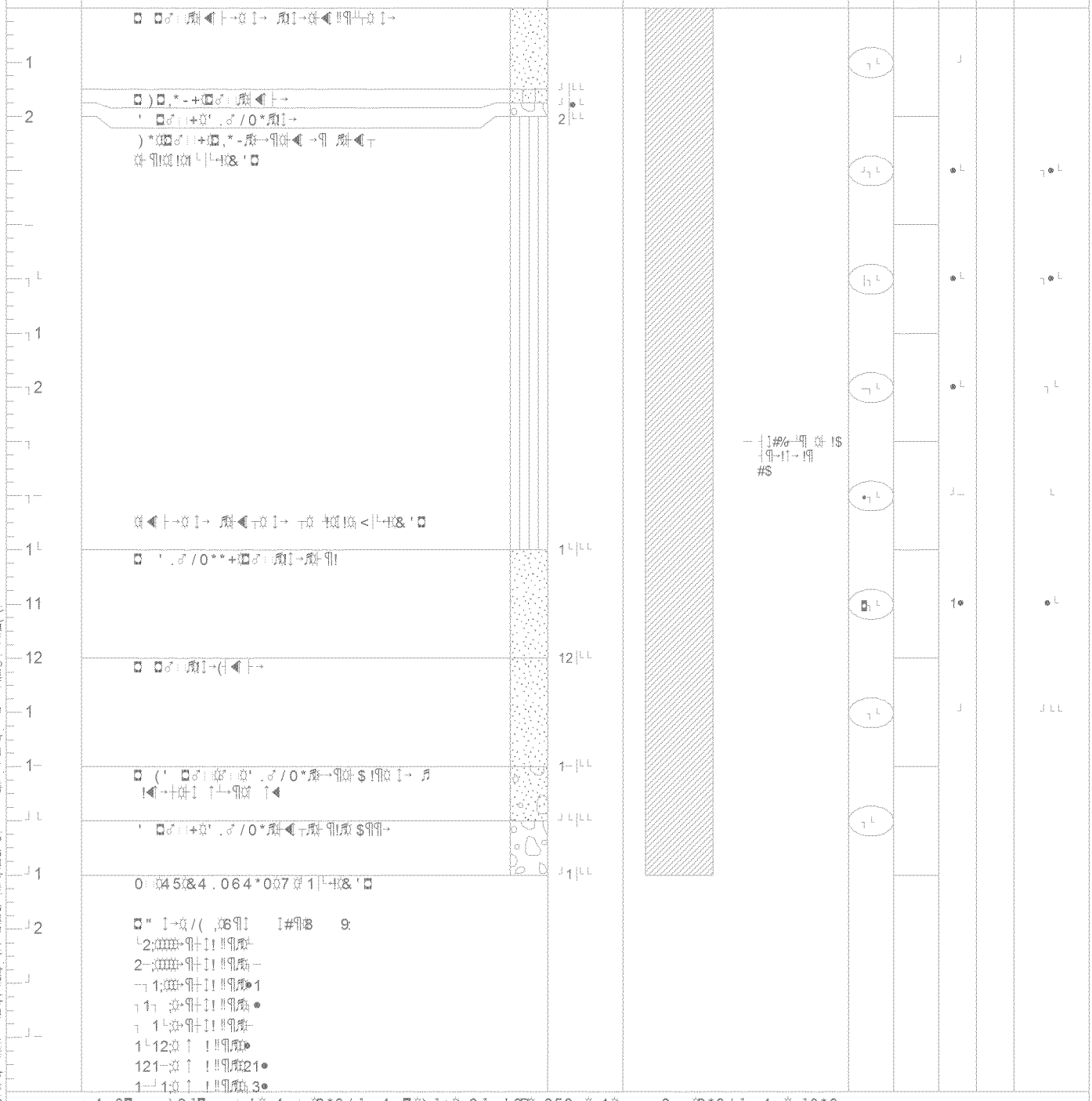
□ - . ♂ -, ' . ♂ 6,>☼♂ □☼□□ - . =) 0 □ -♂ -,4 □☼* 4 '
84 / 0 . &= . 0 □9

↕┼¶☼ ☼→☼

. 4@0 > -☼□♂) 0:☼□ 4 = - 6☼ + - 4 □☼=) □,-0
. 4@0 > -☼□=) &0 . :☼┘ –22┘
>*,0□ -:☼**,□4,□☼- 4 4*☼A 4 . B□☼□>
*4>♂ -,4□:☼) 4 . ♂,□0♂46,4

64*0☼0□, ' □♂ -,4□: &6└1└<
♂ -0☼>4) *0 - 0:☼@"→¶☼<♂1└└<
. ,**,□ ' ☼) 0 - 6 4:☼ . 0 > -☼ =□6
5,0*☼ 0 . □ 4 □□0*:☼@☼A,□ - 0 . ,□B

0 -6 ┼☼& ' □	□ - . ♂ -, ' . ♂ 6,>☼0□ > . , -,4 :☼C□. 0) ♂ . B□	0 -6 ┼☼& ' □	&↑◀¶$↑¶	□♂) *0				
				□=) &0 .	□ - 0 . / ♂*	□ . 0 > ☼□ 9	□ ☼ ♂* = 0	□ 9



4 - 0□:) 0♂□ = . , ' ☼ 4, □ - ☼0*0 / ♂ -,4 □☼) ♂ + ☼>6♂ ' 0□0. 050 . ☼ - 4 ☼> = . . 0 □ - ☼0*0 / ♂ -,4 □ ☼-♂&*0

>60) , >♂*☼ □ ♂* + □,□

◻ - . ♂ -, ' . ♂ 6,>◻ ◻◻◻ - . =) 0 ◻ -♂ -,4 ◻◻ 4 '
84 / 0 . &= . 0 ◻9

. 4@0 > - ◻ ♂) 0: ◻ 4 = - 6 ◻ + - 4 ◻ =) ◻, - 0

. 4@0 > - ◻ =) &0 . : ◻ –22

> *,0 ◻ - : ◻ **,◻4,◻ - 4 4 * ◻A 4 . B◻ ◻ >

* 4 >♂ -,4 ◻ : ◻) 4 . ♂,◻0◻4 6,4

6 4 * 0 ◻◻, ' ◻♂ -,4 ◻: &6 <

♂ - 0 ◻ > 4) *0 - 0: ◻@' → ◻ < ◻ <

. ,**,◻ ' ◻) 0 - 6 4: ◻ . 0 > - ◻ = ◻ 6

5,0 * ◻ 0 . ◻ 4 ◻◻ 0 *: ◻@◻A,◻ - 0 . ,◻B

0 -6 ◻& ' ◻	◻ - . ♂ -, ' . ♂ 6,> ◻◻ > . , -,4 : ◻ ◻. 0) ♂ . B◻	0 -6 ◻& ' ◻	&↑◻$↑◻	◻♂) *0				
				=) &0.	- 0 . / ♂*	6 ◻ > 0 .	0 = ♂* ◻	6 ◻
	5,** ' . ♂ / 0 * ◻ 6♂ * - ◻ > 4♂ * ◻&, - ◻							
1	◻ ' !- ◻ ◻ ↑→ ◻ ↑→ ◻ ↑→ ◻ ◻ !$ ◻ ◻ ◻

■ - . ♂ -, ' . ♂ 6,>☼♂ □☼□■ - . =) 0 □ - ♂ -, 4 □☼* 4 '
84 / 0 . &= . 0 □9

↕+¶☼ ☼+☼

. 4@0 > - ☼□♂) 0:☼■ 4 = - 6☼ + - 4 □☼=) ☼■, - 0

. 4@0 > - ☼□ =) & 0 . :☼┘ – 22┘

> *, 0 □ - :☼, * *, □ 4, ■☼- 4 4 *☼A 4 . B■☼, □ >

* 4 > ♂ -, 4 □:☼) 4 . ♂, □ 0,♂4 6, 4

6 4 * 0☼■, ' □♂ -, 4 □: & 6 └ 2 └ <

♂ - 0☼▷ 4) * 0 - 0:☼@' → ¶☼<♂♂ └└ <

. , * *, □ ' ☼) 0 - 6 4 :☼, . 0 > - ☼ = ■ 6

5, 0 * ☼ 0 . ■ 4 □ □ 0 *:☼@☼A, □ - 0 . , □ B

0 - 6 ☼+☼& ' ■	■ - . ♂ -, ' . ♂ 6,>☼■ > . , - ,4 : ☼C☼. 0) ♂ . B■	0 - 6 ☼+☼& ' ■	&↑◀¶$↑¶	■♂) * 0				
				=) &0.	. - 0 . / ♂*	6 ☼>0 .	0 = ♂* ☼	6 ☼'
1	' ' . ♂ / 0 * ☼85, * * 9♂¶◀ ┬♂¶◀ ☼ ◀#% ♂¶◀ ├ → ♂ ¶+☼#¶┬♂¶+¶ ♂¶◀ ┬♂¶→¶☼ ↕ → ☼ → ☼ ¶+			┐└				└
2	) * ■♂ : + ☼■, * - ♂¶→¶☼¶◀ → ¶ ♂¶◀ ┬	2 ┘└└		┐└		┘ —		└
—	) * ■, * - ♂¶◀ #¶☼¶ ↑ ↑ ♂¶◀ ┬ ☼ ↑ ¶☼¶ ◀#%☼¶◀ + ¶→! ☼ ☼ ☼ - ┘└+☼& ' ■	— ┘└└		┐└		┘ —		—
┐ 1	☼¶◀ #¶☼ ↕ → ♂☼ ↑ ¶☼¶◀ ↑ ! ♂¶+ ¶+ #%☼ ☼ 1 ┘└+☼& ' ■							
┐ 2	☼+ ¶☼☼ ☼ • ┘└+☼& ' ■		— ┘ ↕#%┐ ¶ ☼ ☼ !$ ┤ ¶→!↑→ ¶ #$	┐└		┘ —		
┐	■) ■, * - + ☼■♂ : ♂¶◀ ┬	┐ ┘└└						
┐ —	☼↕ → ☼+◀ !! ¶+☼ ☼ — ┘└+☼& ' ■			┐└		• └		
1 └	■ ■♂ : ♂¶+ !$☼#¶┬♂¶◀ ┬	1 ┘└└						
11				┐└		┘ —		
12	' (') ■, * - + ☼' . ♂ / 0 * ♂¶+ ¶!	12 ┘└└						
1				┐└		• └		
1 —	0 : ☼4 5☼&4 . 0 6 4 * 0☼7 ☼ — ┘└+☼& ' ■	1 — ┘└└						
┘ └	■ " ↕ → ☼ / (, ☼6¶↕ ↕#¶☼8 9:							
┘ 1	└ 2; ☼☼☼ + ¶+↕! !¶♂¶+							
	2 — ; ☼☼☼ + ¶+↕! !¶♂¶+ ┘							
	— ┐ 1; ☼☼☼ + ¶+↕! !¶♂¶+							
	┐ 1 ┐ ☼ ↑ ! !¶♂¶☼ | •							
	┐ 1 └ ☼ ↑ ! !¶♂¶☼ •							
┘ 2	1 └ 12 ☼+ ¶+↕! !¶♂¶+							
	121 — ☼ ↑ ! !¶♂¶☼ | 1							

: 4 - 0 ■ :) 0 ♂ ■ = . , : ' ☼ 4, : - ☼0 * 0 / ♂ -, 4 : ■☼) ♂ + ☼▷ 6 ♂ : ' ☼☼. 050 . ☼- 4 ☼▷ = . . 0 : - ☼0 * 0 / ♂ -, 4 : ☼- ♂ & * 0

> 6 0) , > ♂ * ☼ : ♂ * + ■, ■

4 / 0 . &= . 0 ☼ ☼ 4 - ☼ ♂ * ■ 4 , * ☼ 4 . ☼ ■ & ┐ ☼ 4 ■ & ┘ 3 ┘ @▷ ♂ ▷ 4 ■ ♂ ☼ ■ 6 ┘ . ☼ 2 (0 └

◻ - . ♂ -, ' . ♂ 6,>⌘ ◻⌘◻◻ - . =) 0 ◻ - ♂ -, 4 ◻⌘ 4 '
84 / 0 . &= . 0 ◻ 9

↕+¶⌘ ⌘+⌘

. 4@0 > - ⌘◻♂) 0:⌘◻ 4 = - 6⌘ + - 4 ◻⌘=) ◻, - 0
. 4@0 > - ⌘◻ =) &0 . :⌘⌘ ⌋ –22⌋
> *,0 ◻ - :⌘⌘ * *,◻ 4,◻⌘- 4 4 *⌘A 4 . B◻⌘◻ >
* 4 > ♂ -, 4 ◻:⌘⌘) 4 . ♂,◻0⌘4 6,4

6 4 * 0⌘◻, ' ◻♂ -, 4 ◻: &6 ⌊● ⌊<
♂ - 0⌘ > 4) * 0 - 0:⌘@' → ¶⌘<⌘⌘1 ⌊⌊⌊<
. ,* *,◻ ' ⌘) 0 - 6 4:⌘⌘ . 0 > - ⌘ = ◻ 6
5,0 * ⌘ 0 . ◻ 4 ◻◻ 0 *:⌘@⌘A,◻ - 0 . ,◻B

0 - 6 ↕⌘& ' ◻	◻ - . ♂ -, ' . ♂ 6,>⌘◻ > . , - ,4 ◻⌘. 0) ♂ . B◻	0 - 6 ↕⌘& ' ◻	&↑◀¶$↑¶	◻♂) * 0				
				=) &0.	- 0 . / ♂*	6 &0 < 0 .	0 = ♂ * ⌘ ⌘	6 ⌘
	- 4 ◻ 4,*	┐⌊⌊						
1	> * > * ♂ + ⌘ ↑ ↕ ⌘ ◀ ├ →			┐⌊				⌊
	◻ ◻♂ ⌘ ⌘ ◀ ├ → ⌘ ↕ → ⌘ ⌘ # ⌘ ↕	┘⌊⌊						
2	) * ◻♂ + ⌘◻, * - ⌘ → ¶⌘ ◀ → ¶ ⌘ ◀ ┬	2⌊⌊						
				┐⌊				⌊
┐⌊				┐⌊				⌊
┐1	⌘ → ¶⌘ ↕ → ⌘ ⌘ # ⌘ ↕ ⌘ 1 ⌊ ↕ ⌘ & ' ◻							
┐2				┐⌊		●⌊		⌊
┐	⌘ 4 ⌘. 0 > 4 / 0 . +	┐ ⌊⌊	– ↕ ↕ # ♂ ⌋ ¶ ⌘ ⌘ !$ ↕ ¶ → ↕ ↑ → ↕ ¶ #$					
┐–				┐⌊				
1⌊								
11				◻⌊				
12	◻ ◻♂ ⌘ ⌘ → ¶⌘ ◀ → ¶ ⌘ ◀ ├ → ⌘ ↕ →	12⌊⌊						⌊
1	' (') ◻, * - + ⌘' . ♂ / 0 * ⌘ ↕ → ⌘ # ◀ ↕ ⌘ ◀ ┬ ⌘ ¶ ⌘ ⌘ 13 ⌊ ↕ ⌘ & ' ◻	1 ⌊⌊		┐⌊		●⌊		⌊
1–	' ◻♂ + ⌘' . ♂ / 0 * ⌘ ¶ ⌘ ↕ $ ⌘ $ ¶¶ → ⌘ → ↑ ↑◀	1–⌊⌊						●
⌋⌊	⌘ ↕ → ⌘ ¶ ⌘ ⌘ ⌋ ⌊ ↕ ⌘ & ' ◻			┐⌊		●⌊		⌊
⌋1	0 ⌘ 4 5 ⌘ & 4 . 0 6 4 * 0 ⌘ 7 ⌘ 1 ⌊ ↕ ⌘ & ' ◻	⌋1⌊⌊						
⌋2	◻ " ↕ → ⌘ / (,⌘ 6 ¶ ↕ ↕ # ¶ ⌘ 9:							
	⌊2;⌘⌘⌘ → ¶ ↕ ↕ ! ! ¶ ⌘ ⌘							
	2–;⌘⌘⌘ → ¶ ↕ ↕ ! ! ¶ ⌘ ⌘							
⌋	¬ 1;⌘⌘⌘ → ¶ ↕ ↕ ! ! ¶ ⌘ ⌘ ⌘1							
	┐1┐ ⌘ → ¶ ↕ ↕ ! ! ¶ ⌘ ⌘							
⌋–	┐ 1 ⌊ ⌘ → ¶ ↕ ↕ ! ! ¶ ⌘ ⌘							
	1 ⌊ 12;⌘ → ↑ ⌘ ◀ ⌘ # ↑ ! ! ¶ ◀							
	121 – ⌘ ↑ ! ! ¶ ⌘ ⌘ 2 ⌊ <							
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⌘ 4 - 0◻:) 0 ♂ ◻ = . , ⌘ ' ⌘ 4, ⌘ - ⌘ 0 * 0 / ♂ -, 4 ⌘ ◻⌘) ♂ + ⌘ > 6 ♂ ⌘ ' ⌘⌘. 050 . ⌘ - 4 ⌘ > = . . 0 ⌘ - ⌘ 0 * 0 / ♂ -, 4 ⌘ ⌘ - ♂ & * 0

> 60) , > ♂ * ⌘ ⌘ ♂ * + ◻, ◻

4 / 0 . &= 0 ⌘ 4 + ⌘ ♂ * ◻ 4 * ⌘ & 4 . ⌘ ◻◻ & ⌋ ⌘ 4 ◻ & ⌋ 3 ⌋ @> ♂ ⌘ 5 4 ◻ ♂ ⌘ ◻ 6 ⌋ . ◻ ⌘ (0 ⌊

[illegible]

84 / 0 . &= . 0 [illegible]9

. 4@0 > - [illegible]) 0: [illegible] 4 = - 6 [illegible] + - 4 [illegible] =) [illegible] , - 0

. 4@0 > - [illegible] =) & 0 . : [illegible] – 22

> *, 0 [illegible] - : [illegible] * *, [illegible] 4, [illegible] - 4 4 * [illegible] A 4 . B [illegible] >

* 4 > [illegible] - , 4 [illegible] : [illegible]) 4 . [illegible], [illegible] 0, [illegible] 4 6, 4

6 4 * 0 [illegible], ' [illegible] - , 4 [illegible] : & 6

[illegible] - 0 [illegible] 4) * 0 - 0 : [illegible] @ ' [illegible] [illegible]

. , **, [illegible] ' [illegible]) 0 - 6 4 : [illegible] . 0 > - [illegible] = [illegible] 6

5, 0 * [illegible] 0 . [illegible] 4 [illegible] 0 * : [illegible] @ [illegible] A, [illegible] - 0 . , [illegible] B

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	[illegible]) [illegible], * - + [illegible]		[illegible]	[illegible]		[illegible]		[illegible]
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1	) * [illegible], * - [illegible]	1	[illegible]					
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12	[illegible]) [illegible], * - + [illegible] [illegible] [illegible]	12	[illegible]					
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1	0 [illegible] 4 5 [illegible] & 4 . 0 6 4 * 0 [illegible] 7 [illegible] 1 [illegible] & ' [illegible]	1	[illegible]					
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[illegible] 4 - 0 [illegible] :) 0 [illegible] = . , [illegible] ' [illegible] 4, [illegible] - [illegible] 0 * 0 / [illegible] - , 4 [illegible] [illegible]) [illegible] + [illegible] 6 [illegible] ' [illegible]. 0 5 0 . [illegible] - 4 [illegible] = . . 0 [illegible] - [illegible] 0 * 0 / [illegible] - , 4 [illegible] [illegible] - [illegible] & * 0

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> *, 0 [illegible] - : [illegible] * *, [illegible] 4, [illegible] - 4 4 * [illegible] A 4 . B [illegible] >

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4 / 0 . &= . 0 [illegible] 4 - [illegible] [illegible] * [illegible] 4 . * [illegible] 4 . [illegible] [illegible] & [illegible] 4 [illegible] & [illegible] 3 [illegible] @ [illegible] [illegible] 4 [illegible] [illegible] 6 [illegible] . [illegible] (0 [illegible]

■ - . ♂ -, ' . ♂ 6,>☼♂ □☼□■ - . =) 0 □ -♂ -,4 □☼* 4 '
84 / 0 . &= . 0 □9

↕┼¶◊ ☼ ┼☼

. 4@0 > - ☼□♂) 0:☼■ 4 = - 6☼ + - 4 □☼=) ☼■, - 0

. 4@0 > - ☼□ =) & 0 . :☼└┘ –22┘

> *,0 □ - :☼; * *,□ 4,■☼- 4 4 *☼A 4 . B■☼; □ >

* 4 >♂ -,4 □:☼) 4 . ♂,□ 0♂4 6,4

6 4 * 0☼■, ' □♂ -,4 □: & 6 └─ └<

♂ - 0☼▷ 4) *0 - 0:☼@' →¶☼ └♂☼ └└<

. ,* *,□ ' ☼) 0 - 6 4:☼■ 4 □,>

5,0 * ☼ 0 . ■ 4 □□ 0 *:☼☼. ‼¶◀

0 -6 ┼☼& ' ■	■ - . ♂ -, ' . ♂ 6,>☼■ > . , -,4 ☼■☼. 0) ♂ . B■	0 -6 ┼☼& ' ■	┼↑◀‖$↑┼¶	■♂) *0				
				) = &0.	. 0 - / *♂	6 &☼<0 .	0 =♂ * ☼ ☼ :	
1	♂■ 6♂ * -							
	■) (') ☼■, * - + ☼■♂ : ☼' : ☼' . ♂ / 0 * ☼85, * *9♂							
	#↑ ↕#!♂→¶☼↑☼#↑↕◀ ¶☼ ↕→ ☼→ ☼┼◀ ‼¶┼♂							
	↑↑◀┼☼┼◀ ¶ ♂┼$!☼ ◀ ├→♂ ↑ !		1 ●└					
2	■ ☼■♂ : ☼85, * *9♂┼ " → ◀┼%¶☼ ↕→ ♂#↑ ↕#!♂							
	→¶☼┼◀ →¶ ♂ ↑↑◀┼☼┼◀ ¶ ♂┼┼#%♂ ↑ !♂◀ #¶							
	┼◀#%☼→ ☼#↑→#◀!¶☼ ¶┼◀ ♂ ┼$!☼ ↑◀							
	■ (' ☼■♂ : ☼' : ☼' . ♂ / 0 * ☼85, * *9♂┼ !$☼ ┼♂		●└└					
	#↑ ↕#!♂→¶☼↑☼#↑↕◀ ¶☼ ↕→ ☼→ ☼┼◀ ‼¶┼♂							
	↑↑◀┼☼┼◀ ¶ ♂┼◀┼☼↑☼┼#%♂ ↑ !♂ ┼$!☼ ↑◀♂							
	◀¶ ☼┼◀#%☼ ¶┼◀		─└└ ─●└					
1└	■ ☼■♂ : ☼85, * *9♂┼ !$☼ ┼♂┼ " → ◀┼%¶☼ ↕→ ♂							
	#↑ ↕#!♂‼¶◀┼☼→¶☼┼◀ →¶ ♂ ↑↑◀┼☼┼◀ ¶ ♂							
	┼◀┬♂ ↑ !♂◀ #¶☼┼ ☼ ¶┼◀							
1								
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1└	☼◀ #¶☼┼ ☼→ ☼ ¶!↕┼♂ ↑ ┼¶☼ ┼☼ ¶┼◀ ☼!							
	┐<|●<☼& ' ■							
11	) * ☼■♂ : +☼■, * - ☼85, * *9♂# ↑ ↕#!♂→¶☼ ↕→ ♂		1┐●└					
	↕◀☼┼◀┬♂¶◀☼ ↑ !♂◀ #¶☼↑↑ ♂┼ ☼→							
	¶↕↕☼ ¶┼◀		1┘●└					
12	■ A (' A ☼■♂ : ☼' : ☼' . ♂ / 0 * ♂◀ #¶☼ ┼☼→							
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