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WELL NUMBER ARP-2A

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 7/6/10 **COMPLETED** 7/6/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 24.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES: ARP-2A is 50' north of ARP-2. See lithology log of ARP-2 for lithologic description

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–35			▽ at 24	Cement/Bentonite Grout; 2" Schedule 40 PVC Capped Riser; Hydrated Bentonite Pellets

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WELL NUMBER ARP-2A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36				8-12 Filter Pack Sand
37				
38				
39				2" Schedule 40 PVC 0.020" Slotted Well Screen
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				
54				2" Schedule 40 PVC End Cap
55				

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WELL NUMBER ARP-3A

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 7/2/10 **COMPLETED** 7/2/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 26.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES: ARP-3A is 50' north of ARP-3. See lithology log of ARP-3 for lithologic description.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–35			▽ at 26	Cement/ Bentonite Grout; 2" Schedule 40 PVC Riser; Hydrated Bentonite Chips; 8-12 Filter Pack Sand; 2" Schedule 40 PVC 0.020" Slotted Well Screen

GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER ARP-3A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36				
37				
38				
39				
40				
41				2" Schedule 40 PVC End Cap

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WELL NUMBER ART-7B

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/22/10 **COMPLETED** 6/28/10
TOC ELEVATION **HOLE SIZE** 18"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 32.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: ART-7B is 5' north of ART-7. See lithology log of ART-7 for lithology above 39'.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–35					▽ at 32	Cement/ Bentonite Grout; 6" Schedule 40 PVC Riser; Hydrated Bentonite Chips

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WELL NUMBER ART-7B

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36						8-12 Filter Pack Sand
37					WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM); light brownish gray (10YR 6/2), 60-70% angular to sub angular volcanic granules/pea gravel to 1/2", 20-30% fine to very coarse angular to sub rounded sand, 10% silt, moderately calcareous.	6" Stainless Steel V-Wire 0.040" Well Screen
38						
39						
40						
41			GW-GM			
42						
43						
44						
45						End Cap
46					LEAN CLAY (CL); yellowish gray (5GY 6/2), non-calcareous.	
47						
48			CL			
49						
50					Bottom of borehole at 50.0 feet bgs.	

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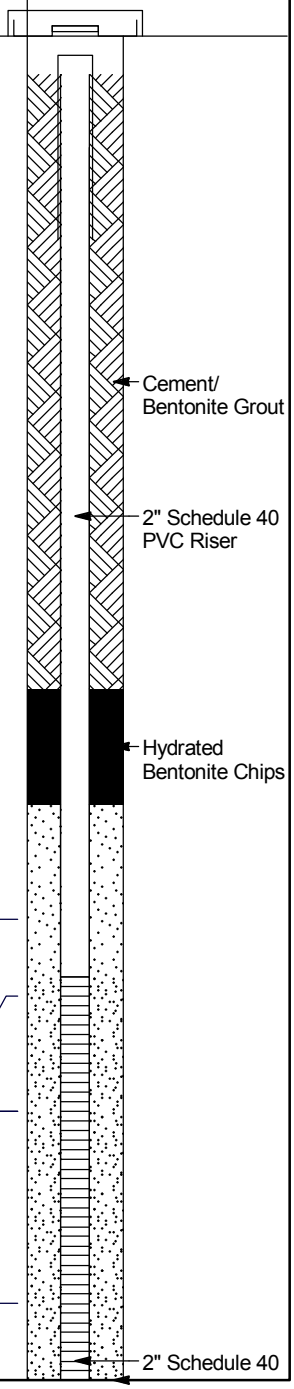
WELL NUMBER I-AC

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/14/10 **COMPLETED** 6/15/10
TOC ELEVATION **HOLE SIZE** 9"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 33.00 ft
DRILLING METHOD Sonic
▼ **AFTER DRILLING** 26.2 ft **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SP-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); reddish brown (5YR 5/4), 75% fine to medium grain with common coarse to very coarse angular to sub rounded well graded sand, 15% granules/pea gravel to 3/4", 10% silt, moderate caliche cement and grain coatings.
11–15		Qal	SP-SM		
16–20		Qal	SP-SM		Common calcareous cement and coatings from 17-23'.
21–23		Qal	SP-SM		
24–25		Qal	SM		SILTY SAND (SM); yellowish brown (10YR 5/4), 80% fine to medium grain with trace coarse to very coarse grain sub angular to sub rounded moderately well sorted sand, 10-25% silt, 5% angular to sub angular volcanic granules, damp at 24'..
26		Qal	SM		Sp(?) calcareous cement/coatings from 23-25'.
27–28		Qal	SM		▼ Common calcareous cement/coatings from 25-28'.
29–30		Qal	ML		SILT WITH SAND (ML); yellowish brown (10YR 5/4), 70% calichified silt, 30% fine to coarse grain sub angular to sub rounded sand, common calichification and grain coatings.
31–33		Qal	ML		▽
34–35		UMC?	ML		SILT INTERBEDDED WITH SANDY SILT (ML); yellowish brown (10YR 5/4), 10% very fine grain sand, 20-30% very fine grain sand locally, non-calcareous. Sandy zones at: 43-44' 20-30% very fine grain sand, 47.5-50' 20-30% very fine grain sand.

WELL DIAGRAM



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WELL NUMBER I-AC

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36					SILT INTERBEDDED WITH SANDY SILT (ML); yellowish brown (10YR 5/4), 10% very fine grain sand, 20-30% very fine grain sand locally, non-calcareous. Sandy zones at: 43-44' 20-30% very fine grain sand, 47.5-50' 20-30% very fine grain sand. *(continued)*	PVC 0.010" Slotted Well Screen 10-20 Filter Pack Sand
37						
38						
39						
40						
41						
42						
43		UMCf	ML		20-30% very fine grain sand from 43-44' bgs.	
44						
45						
46						
47						2" Schedule 40 PVC Blank Casing
48					20-30% very fine grain sand from 47.5' to 50' bgs.	
49						
50						2" Schedule 40 PVC End Cap
					Bottom of borehole at 50.0 feet bgs.	

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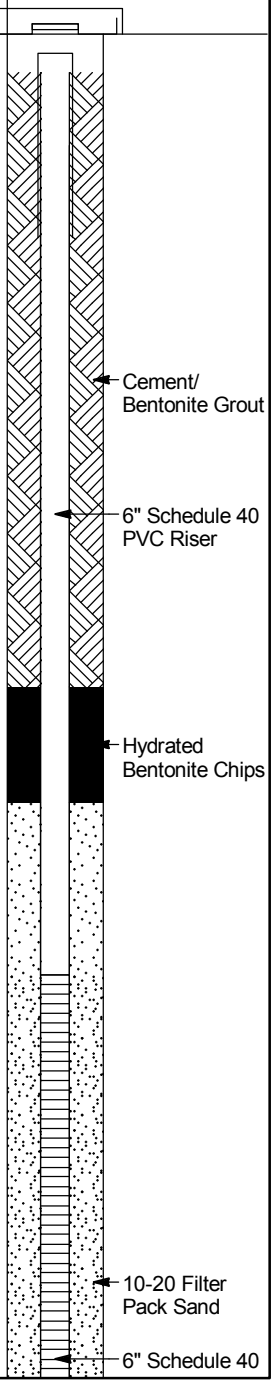
WELL NUMBER I-AD

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/15/10 **COMPLETED** 6/16/10
TOC ELEVATION **HOLE SIZE** 9"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 33.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: I-AD is 10 ' north of M-180. Lithologic descriptions from M-180

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5					FILL; brown and dark yellowish brown, sands, gravels, cement debris.
6–15			SM		SILTY SAND (SM); reddish brown (5Y 5/4), 60-65% very fine to medium grain with common coarse to very coarse grain sub angular to sub rounded sand, 5-10% angular to sub angular volcanic gravel to 3/4", 20% silt, common calcareous coatings and soft cement t
16–20					Varying amount of calichification, abundant and hard from 18.5-19' and 23-24'.
21–25			SW-SM		WELL GRADED SAND WITH SILT (SW-SM); grayish brown (10YR 5/2), fine to coarse grain sand, <10% silt to 26' then 20% silt, 10-15% volcanic angular to sub angular gravel to 1/2" with trace to 1-2", non calcareous to 26' then moderately calcareous to 28'.
26–28			ML		SILT (ML); yellowish brown (10YR 5/4), common to abundant hard to soft caliche zones and nodules.
29–30			SW		SAND (SW); yellowish brown (10YR 5/4), fine to coarse grain poorly sorted sub angular to sub rounded sand, 5-10% volcanic angular to sub angular gravel to 3/8", 6" bed of angular to sub angular gravel to 1" in silty matrix at 30'.
31–32			CL		CLAY (CL); very pale brown (10YR 8/2), abundant caliche zones and nodules to 3-4".
33–35			ML	▽	SILT WITH SAND (ML); very pale brown (10YR 7/4), coarse grain silt, 10-20% very fine grain sand, non calcareous.

WELL DIAGRAM



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WELL NUMBER I-AD

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			ML		SILT (ML); very pale brown (10YR 7/4), coarse grain silt, trace very fine grain sand.	PVC 0.010" Slotted Well Screen
37						
38						
39						
40			ML			
41						
42						
43						
44						
45						6" Schedule 40 PVC End Cap
46						
47						
48						Native Fill
49						
50					Bottom of borehole at 50.0 feet bgs.	

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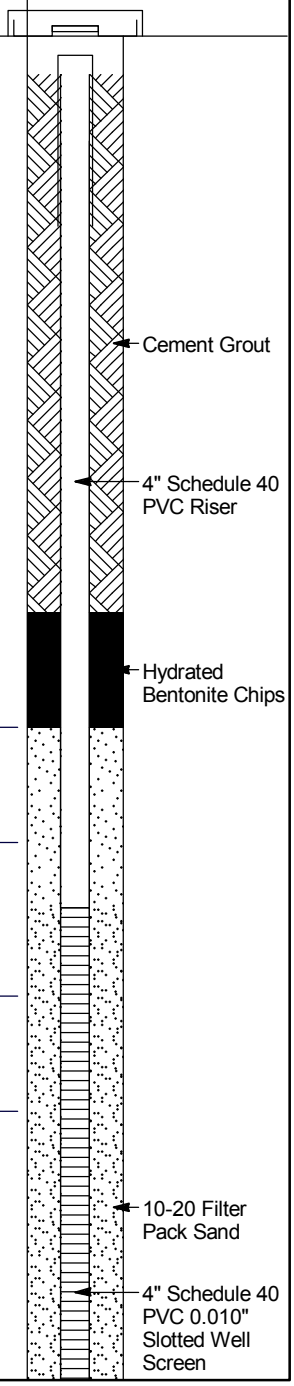
WELL NUMBER M-140

PROJECT NAME Tronox
BORING LOCATION
PROJECT NUMBER 2027.02
PROJECT LOCATION Henderson, NV
DATE STARTED 6/7/10 **COMPLETED** 6/8/10 **TOC ELEVATION** **HOLE SIZE** 8"
DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 22.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4) and pinkish gray (5YR 7/2) where common calcareous cement/coatings, 60% very fine to medium grain with common coarse to very coarse grain sub angular to sub rounded poorly sorted sand, 20% granules/pea gravel to 3/4" (predominately 1/4-5/8"), 20% silt. Moderate calcareous coatings and cement throughout. Common to abundant cement coatings at 6-8', 10-10.5', and 17-18'.
19–20		Qal	SW-SM		WELL GRADED SAND WITH SILT (SW-SM); light yellowish brown (10YR 6/4), fining upward sequence.
22–25		Qal	SM		SILTY SAND (SM); Light gray (10YR 7/2), very fine to medium with coarse to very coarse angular to sub angular sand, 5-10% angular to sub rounded volcanic gravels and caliche nodules, 20% silt.
26–28		UMCf	ML		SILT (ML); very pale brown (10 YR 7/4), 10-20% very fine grain sand, 2-3% floating sand/gravel grains to 1/4", moderately calcareous.
29–35		UMCf	ML		SILT INTERBEDDED WITH SANDY SILT(ML); very pale brown (10YR 7/4) and light yellowish brown (10YR 6/4). Sandy silt, 20% very fine grain sand, 32-34', 6" zone of common caliche nodules to 3" @ 33'.

WELL DIAGRAM



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WELL NUMBER M-140

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36					SILT INTERBEDDED WITH SANDY SILT(ML); very pale brown (10YR 7/4) and light yellowish brown (10YR 6/4). *(continued)*	
37						
38					Sandy silt, 20-30% very fine grain sand at 38'-39', 40'-45'.	
39						
40		UMCf	ML			
41						
42						
43						4" Schedule 40 PVC End Cap
44						
45					Bottom of borehole at 45.0 feet bgs.	

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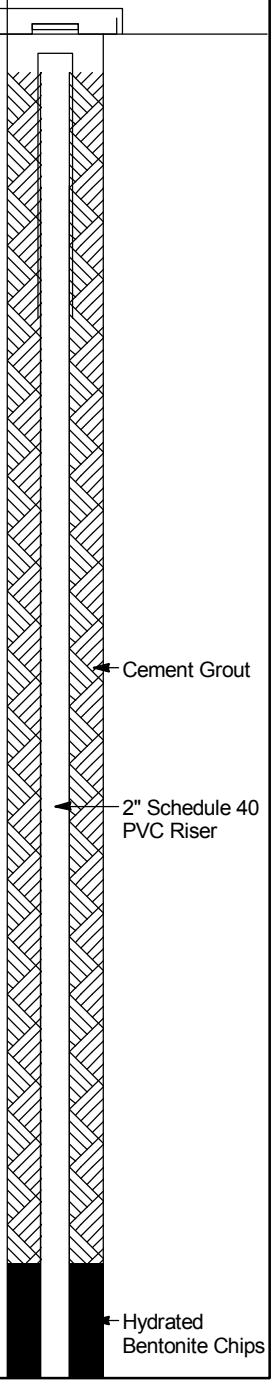
WELL NUMBER M-148A

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/2/10 **COMPLETED** 6/2/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: **AT TIME OF DRILLING** ---
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: M-148A is 10' east of M-186. Lithologic descriptions from M-186.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10			SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); reddish brown (5YR 5/4), 70% very fine to medium grain with coarse to very coarse grain poorly sorted sub angular to sub rounded sand, 20% volcanic angular to sub angular pea gravel to 1/2", 10% silt, moderate calcareous grain coatings.
11–22			SM		SILTY SAND (SM); reddish brown (5 YR 5/4), 70-80% very fine to medium grain with common coarse to very coarse grain poorly sorted sub angular to sub rounded sand, 20-30% silt, 1-2% gravel to 1/4", common calcareous cement and grain coatings.
23–35			SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60% very fine to coarse grain sub angular to sub rounded moderately poorly sorted sand, 20% pea gravel to 3/4" trace to 2-3", 20% silt. Slight to moderate calcareous coatings.

WELL DIAGRAM



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WELL NUMBER M-148A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60% very fine to coarse grain sub angular to sub rounded moderately poorly sorted sand, 20% pea gravel to 3/4" trace to 2-3", 20% silt. *(continued)*	
37						
38						
39			SW-SM		WELL GRADED SAND WITH SILT (SW-SM); reddish brown (5YR 5/4), 80% fine to medium grain with minor coarse to very coarse grain sub angular to sub rounded moderately well sorted sand, 10% volcanic sub angular gravels to 3/8", 10% silt.	
40						
41						
42					Common caliche nodules and calcareous cement (semi-hard) 42-45'.	10-20 Filter Pack Sand
43						
44						
45						2" Schedule 40 PVC 0.010" Slotted Well Screen
46			ML		SILT (ML); very pale brown (10YR 7/4).	
47						
48						
49						
50					Bottom of borehole at 50.0 feet bgs.	2" Schedule 40 PVC End Cap

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WELL NUMBER M-159

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/22/10 **COMPLETED** 5/23/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 29.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60-70% very fine to very coarse grain sub angular to sub rounded sand, 10-20% volcanic angular to sub angular gravel/granules to 1", locally large gravel to 3" @ 11-11.5' and 13-14', 20% silt in matrix, slight to moderate calcareous grain coatings.
15–19		Qal			Abundant caliche, moderate hard with calcite veins, white (5Y 8/1) and (N9), 17-19'.
20–24		Qal	SM		SILTY SAND (SM); very pale brown (10YR 7/4) and white (5Y 8/1) where calichified, 70% very fine to fine grain with minor medium to coarse grain sub angular to sub rounded sand, 30% silt in matrix, slight to moderate calcareous grain coatings throughout.
25		Qal			Calichified with abundant <1/4" nodules and grain coatings, very pale brown (10YR 7/4), 24-25'.
25–26		UMCf			Gravelly sand, light gray (10YR 7/2), common calcareous nodules and coatings, 60% very fine to medium sub angular to sub rounded sand, 20% pea gravel/granules to 3/8", 20% silt, 25-25.5'.
29				▽	
26–35		UMCf	ML		SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), sandy silt contains 20-30% very fine grain sand. Sandy intervals: 30-32', 39-45', 51-55', 58-60', 62-68'. Calichified intervals: 45-54' caliche nodules to 1/4", 56-56.5' common nodules to 1", 62-68' common nodules to 1/4".
36–40					

WELL DIAGRAM: Cement Grout Seal; 2" Schedule 40 PVC Riser

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WELL NUMBER M-159

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
41–45					SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), sandy silt contains 20-30% very fine grain sand. Sandy intervals: 30-32', 39-45', 51-55', 58-60', 62-68'. Calichified intervals: 45-54' caliche nodules to 1/4", 56-56.5' common nodules to 1", 62-68' common nodules to 1/4". *(continued)*	
46–50						
51–55		UMCf	ML			
56–60						Hydrated Bentonite Chips
61–65						
66–68						10-20 Filter Pack Sand
69–70		UMCf	ML		SILT WITH SAND (ML); very pale brown (10YR 7/4), 70-75% silt, 20% very fine grain sand, 5-10% floating volcanic sub angular to sub rounded gravels to 3/8".	
71–75					SILT (ML); very pale brown (10YR 7/4) to 79.5, very pale brown (10YR 8/2) 79.5-85. Trace caliche nodules to 1/2" 71-78', common to abundant caliche nodules to 1/2" 78-85'.	2" Schedule 40 PVC 0.010" Slotted Well Screen
76–80		UMCf	ML			2" Schedule 40 PVC End Cap
81–85						
					Bottom of borehole at 85.0 feet bgs.	

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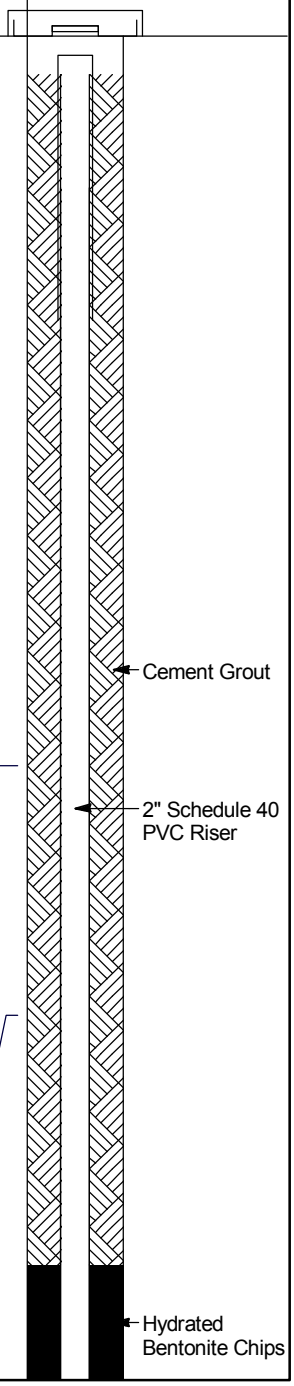
WELL NUMBER M-160

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/23/10 **COMPLETED** 5/23/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 29.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: M-160 is 10' east of M-159. See M-159 lithology log for lithology.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10			SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60-70% very fine to very coarse grain sub angular to sub rounded sand, 10-20% volcanic angular to sub angular gravel/granules to 1", locally large gravel to 3" at 11-11.5' and 13-14', 20% silt in matrix. Slight to moderate calcareous grain coatings.
11–20			SM		SILTY SAND (SM); very pale brown (10YR 7/8), white (5Y 8/1) where calichified, 70% very fine to fine grain with minor medium to coarse grain sub angular to sub rounded sand, 30% silt in matrix, slight to moderate calcareous grain coatings throughout.
21–25			SM		
26–30			ML		Gravelly sand, light gray (10YR 7/2), common calcareous nodules and coatings, 60% very fine to medium sub angular to sub rounded sand, 20% pea gravel/granules to 3/8", 20% silt, 25-25.5'. SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), sandy silt contains 20-30% very fine grain sand. Sandy Intervals: 30-32', 39-45'. Calichified intervals: caliche nodules to 1/4", 45-50'. ▽
31–35					

WELL DIAGRAM



GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

(Continued Next Page)

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WELL NUMBER M-160

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			ML		SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), sandy silt contains 20-30% very fine grain sand. Sandy Intervals: 30-32', 39-45'. Calichified intervals: caliche nodules to 1/4", 45-50'. *(continued)*	
37						
38						
39						
40						
41						
42						
43						10-20 Filter Pack Sand
44						
45						2" Schedule 40 PVC 0.010" Slotted Well Screen
46						
47						
48						
49						
50						2" Schedule 40 PVC End Cap
					Bottom of borehole at 50.0 feet bgs.	

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WELL NUMBER M-161

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/22/10 **COMPLETED** 5/22/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 28.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1					M-161 is 30' east of M-136. See M-136 lithology log from 0-90'.	
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
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35						

GENERAL NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-161

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36					M-161 is 30' east of M-136. See M-136 lithology log from 0-90'. *(continued)*	
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						Cement Grout
48						
49						
50						
51						2" Schedule 40 PVC Riser
52						
53						
54						
55						
56						
57						
58						
59						
60						
61						
62						
63						
64						
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74						
75						

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WELL NUMBER M-161

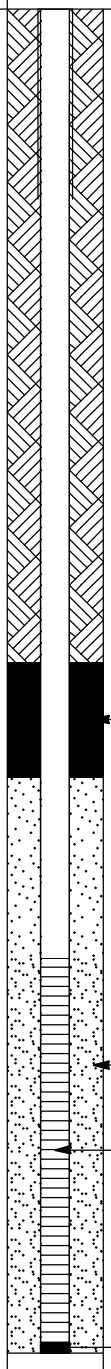
PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
76					M-161 is 30' east of M-136. See M-136 lithology log from 0-90'. *(continued)*
77					
78					
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					
91			SM		SILTY SAND (SM); light yellowish brown (10YR 6/4), 60% very fine grain sub angular to sub rounded sand, locally contains minor coarse sand and fine gravel, 40% silt, overall slight calcareous grain coatings. Minor medium to coarse grain sub rounded sand from 90-92'.
92					
93					
94					
95					
96					Minor very coarse sand and gravel to 1/4" from 95-96'.
97			ML		SILT WITH SAND (ML); light yellowish brown (10YR 6/4), 10-20% very fine grain sand.
98					
99					
100					
101					Abundant calichification, very pale brown (10YR 8/2) mottled with very pale brown (10YR 7/4) from 100-103'.
102					
103					
104			ML		SILT (ML); dark yellowish brown (10YR 4/4).
105					
106					
107					
108					
109					
110			CL		CLAY (ML); Mottled white (5Y 8/1) and very pale brown (10YR 7/4), 6" yellowish gray clay bed (volcanic ash?) at 109.5'.

Bottom of borehole at 110.0 feet bgs.

WELL DIAGRAM



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WELL NUMBER M-162

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/21/10 **COMPLETED** 5/21/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 26.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: Lithologic descriptions from 0' - 60' are from M-104

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1						M-162 is 15' east of M-104.	
2							
3							
4							
5							
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8							
9							
10							
11							
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WELL NUMBER M-162

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36						M-162 is 15' east of M-104. *(continued)*	
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							Cement Grout
48							
49							
50							2" Schedule 40 PVC Riser
51							
52							
53							
54							
55							
56							
57							
58							
59							
60							
61						SILT WITH SAND (ML); reddish brown (5YR 5/4) and very pale brown (10YR 7/4), 10-30% very fine grain sand, slight calcareous with minor 1/8" caliche nodules scattered throughout.	
62							
63							
64							
65							
66							
67				ML			
68	M-162 Split Spoon #1		100				
69							
70							
71							
72							
73							
74							
75				CL		CLAY, pinkish gray (5YR 7/2), silty.	

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WELL NUMBER M-162

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
76–85						SILT (ML); yellowish brown (10YR 5/4), sandy intervals with 20-30% very fine grain sand.	
86–87	M-162 Split Spoon #2		100				
88–95				ML			Hydrated Bentonite Chips
96–98						Abundant calichification, common nodules to 3/8" from 96.5-97'.	
99–100						Light yellowish brown (10YR 6/4), slight to moderate caliche nodules to 1/4" from 99-100'.	
101–105						Sandy silt, 10-20% very fine grain sand.	10-20 Filter Pack Sand
106–107	M-162 Split Spoon #3		100				2" Schedule 40 PVC 0.010" Slotted Well Screen
108–110						Bottom of borehole at 110.0 feet bgs.	2" Schedule 40 PVC End Cap

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WELL NUMBER M-163

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/20/10 **COMPLETED** 5/20/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 26.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: Lithologic descriptions are from M-104 for 0' - 60', and for 60' - 90' are from M-162

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1					M-163 is 10' SE of M-104 and 10' SW of M-162.	
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WELL NUMBER M-163

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36–40					M-163 is 10' SE of M-104 and 10' SW of M-162. *(continued)*	Cement Grout; 2" Schedule 40 PVC Riser
41–60						
61–70			ML		SILT WITH SAND (ML); reddish brown (5YR 5/4) and very pale brown (10YR 7/4), 10-30% very fine grain sand, slight calcareous with minor 1/8" caliche nodules scattered throughout.	
71–75			CL		CLAY, pinkish gray (5YR 7/2), silty.	Hydrated Bentonite Chips

GENERAL NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-163

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
76					M-163 is 10' SE of M-104 and 10' SW of M-162. *(continued)* SILT (ML); yellowish brown (10YR 5/4), sandy intervals with 20-30% very fine grain sand.	
77						
78						
79						
80						
81						
82						
83						10-20 Filter Pack Sand
84						
85						2" Schedule 40 PVC 0.010" Slotted Well Screen
86						
87						
88						
89						
90						2" Schedule 40 PVC End Cap
			ML		Abundant calichification, common nodules to 3/8" from 96.5-97'.	
					Light yellowish brown (10YR 6/4), slight to moderate caliche nodules to 1/4" from 99-100'.	
					Sandy silt, 10-20% very fine grain sand.	
					Bottom of borehole at 90.0 feet bgs.	

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WELL NUMBER M-164

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/19/10 **COMPLETED** 5/19/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 26.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: Lithologic descriptions from 0' - 60' are from M-104 and for 60' - 70' are from M-162.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1					M-164 is 10' NE of M-104 and 10'NW of M-162. See lithology log of M-104 for lithology to 70'.	
2						
3						
4						
5						
6						
7						
8						
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13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26					▽	
27						Cement Grout
28						
29						
30						2" Schedule 40 PVC Riser
31						
32						
33						
34						
35						

GENERAL NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-164

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36–40					M-164 is 10' NE of M-104 and 10'NW of M-162. See lithology log of M-104 for lithology to 70'. *(continued)*	
41–45						
46–50						
51–55						Hydrated Bentonite Chips
56–60						
61–65			ML		SILT WITH SAND (ML); reddish brown (5YR 5/4) and very pale brown (10YR 7/4), 10-30% very fine grain sand, slight calcareous with minor 1/8" caliche nodules scattered throughout.	10-20 Filter Pack Sand 2" Schedule 40 PVC 0.010" Slotted Well Screen
66–70						2" Schedule 40 PVC End Cap
					Bottom of borehole at 70.0 feet bgs.	

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WELL NUMBER M-165

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/18/10 **COMPLETED** 5/19/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 32.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: Lithologic descriptions for 0' - 90' are from M-132.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1					M-165 is 10' west of M-132. See lithology log of M-132 for lithology from 0-92'.	
2						
3						
4						
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WELL NUMBER M-165

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36					M-165 is 10' west of M-132. See lithology log of M-132 for lithology from 0-92'. *(continued)*	
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						Cement Grout
53						
54						
55						
56						2" Schedule 40 PVC Riser
57						
58						
59						
60						
61						
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WELL NUMBER M-165

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
76					M-165 is 10' west of M-132. See lithology log of M-132 for lithology from 0-92'. *(continued)*	
77						
78						
79						
80						
81						
82						
83						
84						
85						
86						
87						
88						
89						
90						
91					SILT INTERBEDDED WITH SANDY SILT (ML); reddish brown (5YR 5/4) and very pale brown (10YR 7/4).	
92						
93						
94						
95						
96					2' zone of common caliche nodules to 1" from 95-97'.	
97						
98						
99						
100						
101						
102						
103			ML			
104						Hydrated Bentonite Chips
105						
106					1" semi-hard caliche layer at 105'.	
107						
108					6" zone with common caliche nodules to 1/2" at 107.5'.	
109						
110						
111						
112						
113						10-20 Filter Pack Sand
114						
115						2" Schedule 40

(Continued Next Page)

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WELL NUMBER M-165

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
116 117 118 119 120			ML		SILT INTERBEDDED WITH SANDY SILT (ML); reddish brown (5YR 5/4) and very pale brown (10YR 7/4). *(continued)* 6" zone with common caliche nodules to 1/2" at 115.5'.	PVC 0.010" Slotted Well Screen 2" Schedule 40 PVC End Cap
					Bottom of borehole at 120.0 feet bgs.	

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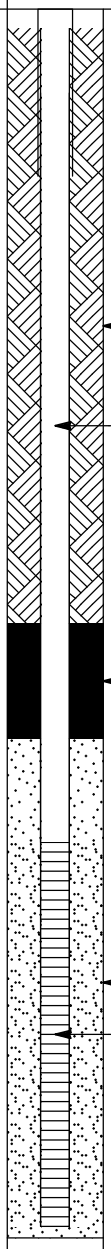
WELL NUMBER M-166

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/24/10 **COMPLETED** 4/24/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 26.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SM		SILTY SAND WITH GRAVEL (SM): yellowish brown (10YR 5/4), 50% very fine to very coarse sub-angular to sub-rounded sand with 30% volcanic angular to subangular pea gravel to 1/2" (trace to 2"), and 20% silt.
6–10		Qal	SM		Calcareous grain coatings and scattered thin calichified layers
18–20		Qal	SM		SILTY SAND (SM): yellowish brown (10YR 5/4), 60% very fine to fine grained with minor medium to coarse grained sub-rounded to sub-angular sand, 40% silt, some calcareous coatings.
20–25		Qal	SM		SILTY SAND WITH GRAVEL (SM): light brownish gray (10YR 6/2), 50% very fine to coarse grained with very coarse grained sub-angular sand with 20-30% volcanic sub-angular pea gravel to 1/2", 20-30% silt, some calcareous grain coating.
24–25		Qal	SM		Hard caliche layer 24'-25'
25–26		Qal			Dark grayish brown (10YR 4/2) ▽
26–27		Qal			Hard caliche layer 26'-27.5' Light brownish gray (10YR 6/2)
27–30		UMCf	ML		SILT & SANDY SILT (ML): very pale brown (10YR 7/4), up to 30% very fine grained sand locally, scattered 1/8"-1/4" caliche nodules
32					Bottom of borehole at 32.0 feet bgs.

WELL DIAGRAM



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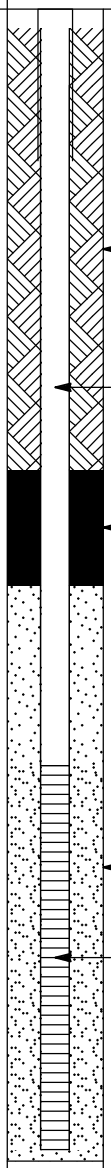
WELL NUMBER M-167

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/24/10 **COMPLETED** 4/24/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 24.50 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5		Qal	SM		SILTY SAND WITH GRAVEL (SM): yellowish brown (10YR 5/4), 50% very fine to very coarse sub-angular to sub-rounded sand,30% volcanic angular to sub-rounded pea gravel to 3/4", 20% silt.
6–10		Qal	SM		Some calcareous grain coatings, few caliche nodules to 1/2".
11–15		Qal	SM		SILTY SAND (SM): yellowish brown (10YR 5/4),70% very fine to fine grained with trace medium to coarse grained sub-angular to sub-rounded sand, 30% silt, some calcareous grain coatings to 22', common caliche nodules to 2" to 24'.
16–20		Qal	SM		Light gray (10YR 7/2)
21–25		Qal	SP-SM	▽	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM): grayish brown (10YR 5/2), 60% very fine to very coarse sand, 30% pea gravel to 1/2", 10% silt, some calcareous coatings and caliche nodules.
26–30		UMCf	ML		SILT INTERBEDDED WITH SANDY SILT (ML): up to 40% very fine grained sand, calcareous throughout and scattered caliche nodules to 1/4".
					Bottom of borehole at 30.0 feet bgs.

WELL DIAGRAM



GENERAL NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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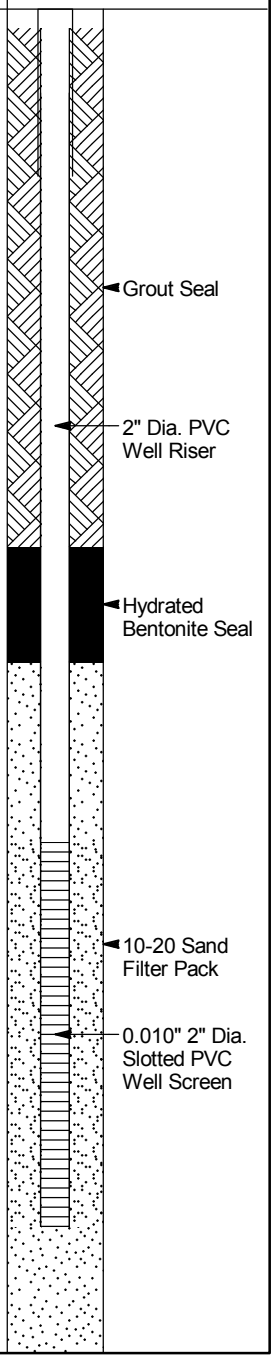
Telephone: 510-839-0688

WELL NUMBER M-168

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/23/10 **COMPLETED** 4/23/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 25.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SW-SM		POORLY GRADED SAND WITH SILT AND GRAVEL (SW-SM): yellowish brown (10YR 5/4), 55% very fine to very coarse sub-angular to sub-rounded sand, 30% volcanic angular to sub-rounded pea gravel to 3/4", trace gravel to 3", 15% silt. Some calcareous grain coatings and scattered caliche nodules up to 3".
11–20		Qal	SM		SILTY SAND (SM): very pale brown (10YR 7/4), 70% very fine to fine sub-angular to sub-rounded sand, trace medium to coarse grained sand, 30% silt. Few calcareous grain coatings, caliche nodules to 3" from 20.5'-22'.
21–25		Qal	SW-SM		SILTY SAND WITH GRAVEL (SW-SM): very pale brown (10YR 7/4), 50% very fine to very coarse sub-angular to sub-rounded sand, 30% volcanic angular to sub-rounded pea gravel to 1/2", 20% silt, calcareous grain coatings throughout. Hard caliche layer 24'-26.5'. ▽
26–35		UMCf	ML		SILT INTERBEDDED WITH SANDY SILT (ML): Up to 40% very fine grained sand, few caliche nodules 1/2"-1" to 28.5' bgs.

WELL DIAGRAM



Bottom of borehole at 35.0 feet bgs.

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WELL NUMBER M-169

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/23/10 **COMPLETED** 4/23/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 28.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): grayish brown (10YR 5/2), 55% very fine to very coarse sub-angular to sub-rounded sand, 30% volcanic angular to sub-rounded pea gravel to 3/4", trace gravel up to 3", 15% silt, calcareous grain coatings and scattered caliche nodules/thin layers up to 3".
18–20		Qal	SM		SILTY SAND (SM): yellow (10YR 7/6), 70% very fine to fine grained sand, 30% silt, few calcareous grain coatings.
22–25		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): very pale brown (10YR 7/4), 70% very fine to medium sand with trace coarse to very coarse sub-angular to sub-rounded sand, 20% volcanic sub-angular pea gravel to 1/2", 10% silt, with calcareous coatings from 22'-26', caliche layers from 26'-27'.
28–31		UMC	ML		▽ SILT (ML): very pale brown (10YR 7/4), scattered caliche nodules to 1", hard caliche layer from 27'-27.5'.

WELL DIAGRAM

- Grout Seal
- 2" Dia. PVC Well Riser
- Hydrated Bentonite Seal
- 10-20 Sand Filter Pack
- 0.010" 2" Dia. Slotted Well Screen

Bottom of borehole at 35.0 feet bgs.

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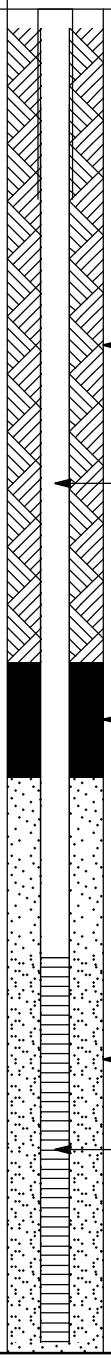
WELL NUMBER M-170

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/23/10 **COMPLETED** 4/23/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 29.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): reddish brown (5YR 5/5), 70% very fine to very coarse sub-angular to sub-rounded sand, 20% volcanic sub-angular gravel to 3/4" diameter, trace gravel to 3", 10% silt, few calcareous grain coatings throughout, semi-hard caliche zones at 6'-7', 9'-10', 10.5'-12', and 18'-19'.
20		Qal	SP		POORLY GRADED SAND (SP): light yellowish brown (10YR 6/4), 90% very fine to medium with trace coarse to very coarse sub-angular to sub-rounded sand, 5% granules to 1/3", 5% silt.
22		Qal	SM		SILTY SAND (SM): light brownish gray (10YR 6/2), 80% very fine to very coarse sub-angular to sub-rounded sand, 20% silt, with scattered caliche nodules to 2".
24–25		Qal	SW		WELL GRADED SAND (SW): yellowish brown (10YR 5/4), 90% very fine to medium with trace coarse to very coarse sub-angular to sub-rounded sand, 5% volcanic sub-rounded gravels to 1/4", 5% silt, abundant calcareous grain coatings.
29					▽ 40% silt in very fine to fine grained sand, light gray (5Y 7/2), abundant hard caliche.
30–35		UMCf	ML		SILT WITH TRACE SANDY SILT (INTERBEDDED) (ML): very pale brown (10YR 7/4), locally up to 30% very fine grained sand, with caliche nodules from 29'-30'.

WELL DIAGRAM



Bottom of borehole at 35.0 feet bgs.

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WELL NUMBER M-171

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/7/10 **COMPLETED** 6/7/10
TOC ELEVATION **HOLE SIZE** 8"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 27.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5 YR 5/4) and yellowish brown (10YR 5/4), 70% very fine to medium grain with common coarse to very coarse grain sub angular to sub rounded poorly sorted sand, 15% volcanic sub angular to angular gravel to 3/4" (predominately 3/8-5/8"), 15% silt, moderate to common calcareous coatings and cement throughout.
11–15		Qal	SM		Common calcareous cement 7-15'.
16–23		Qal	SM		SILTY SAND (SM); light yellowish brown (10YR 6/4), 80% fine to coarse grain sub angular to sub rounded sand and caliche grains, 20% silt in matrix, common calcareous cement.
24–26			SM		SILTY SAND (SM); yellowish brown (10YR 5/4), 70% very fine to medium grain with moderate to common coarse to very coarse sub angular to sub rounded volcanic sand, 10% volcanic sub angular to sub rounded gravel to 3/8", 20% silt, common calcareous coatings and cement.
27–30				▽	SANDY SILT (ML); very pale brown (10YR 7/4), 20-30% very fine grain sand, non-calcareous.
31–35		UMCf	ML		

WELL DIAGRAM

- Cement Grout
- 4" Schedule 40 PVC Riser
- Hydrated Bentonite Chips
- 10-20 Filter Pack Sand
- 4" Schedule 40

GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-171

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36					SANDY SILT (ML); very pale brown (10YR 7/4), 20-30% very fine grain sand, non-calcareous. *(continued)*	PVC 0.010" Slotted Well Screen
37						
38						
39		UMCf	ML			
40						
41						
42						
43					SILT (ML); very pale brown (10YR 7/4), non-calcareous.	
44			ML			
45					Bottom of borehole at 45.0 feet bgs.	4" Schedule 40 PVC End Cap

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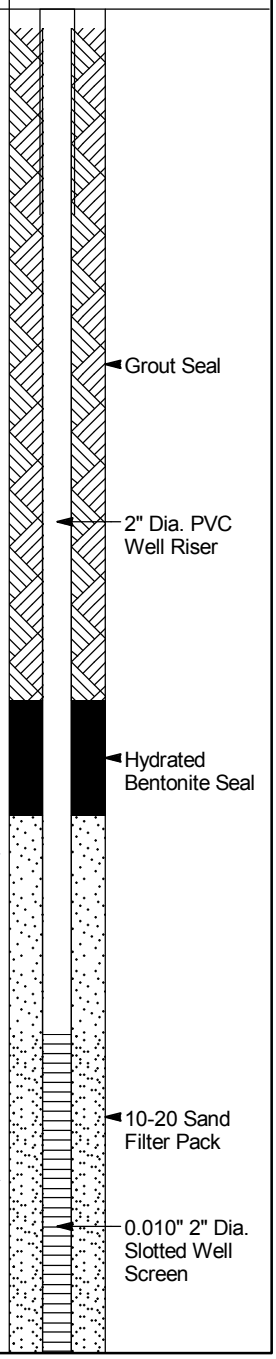
WELL NUMBER M-172

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/22/10 **COMPLETED** 4/23/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 30.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SP		SILTY SAND WITH GRAVEL (SM): reddish brown (5YR 5/5), 50% very fine to very coarse sub-angular to sub-rounded sand, 30% volcanic sub-angular gravel 10 2" diameter (locally up to 4"), 20% silt, gravel to 4" @ 2.5'-3', 7'-7.5', 14'-14.5', and 21'-21.5', with calcareous grain coatings.
11–25		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): pinkish gray (10YR 7/2), 60% very fine to very coarse sub-angular to sub-rounded sand, 25% sub-angular volcanic pea gravel to 1/2", 15% silt, common calcareous grain coatings and locally hard caliche zones, (22.5-30.5 common nodules to 2", and very hard 27'-27.3').
26–35		UMCf	ML		SILT AND SANDY SILT (ML): very pale brown (10YR 7/4), locally up to 30% very fine grained sand, scattered caliche nodules to 3/4".



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WELL NUMBER M-172

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36 37 38		UMCf	ML		SILT AND SANDY SILT (ML): very pale brown (10YR 7/4), locally up to 30% very fine grained sand, scattered caliche nodules to 3/4". *(continued)*	
					Bottom of borehole at 38.0 feet bgs.	

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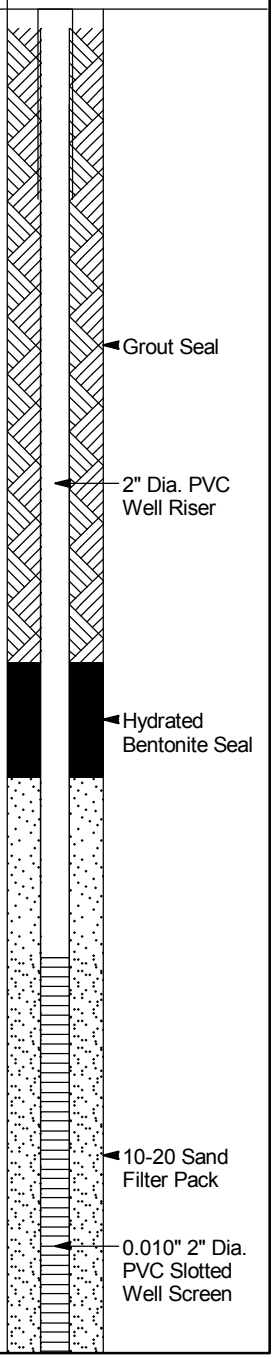
WELL NUMBER M-173

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/22/10 **COMPLETED** 4/22/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 29.50 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–15		Qal	SP-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): reddish brown (5Y 5/4), 60% very fine to very coarse sub-angular to sub-rounded sand, 30% volcanic sub-angular to sub-rounded pea gravel to 1/2", 10% silt, locally common calcareous grain coatings and caliche nodules (5'-6' hard calichified zone).
13–14					Hard calichified zone 13'-14'.
15–18		Qal	GW-GM		WELL GRADED GRAVEL WITH SILT AND SAND (GW): reddish brown (5YR 5/5), 60% volcanic sub-angular gravel to 2", 30% fine to very coarse sub-angular to sub-rounded sand, 10% silt.
18–20		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): yellowish brown (10YR 5/4), 60% fine to very coarse sub-angular to sub-rounded sand, 30% volcanic sub-angular gravel to 1", 10% silt.
20–23		Qal	SP		POORLY GRADED SAND (SP): very pale brown (10YR 7/4), 100% very fine to fine grained sub-angular sand.
23–25		Qal	SM		SILTY SAND WITH GRAVEL (SM): light yellowish brown (10YR 6/4), 60% fine to very coarse sub-angular to sub-rounded sand, 20% volcanic pea gravel to 3/8", 20% silt, minor calcareous grain coatings.
25–29		Qal	SM		SILTY SAND (SM): very pale brown (10YR 7/4), 60% fine to very coarse sub-angular to sub-rounded sand, 30% silt, 10% volcanic pea gravel to 1/4", abundant hard caliche layers 28'-29.5'.
30				▽	
30–35		UMCf	ML		SILT (ML): very pale brown (10YR 7/4)

WELL DIAGRAM



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WELL NUMBER M-173

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36		UMCf	ML		SILT (ML): very pale brown (10YR 7/4) *(continued)*	
37						
38						
39						
40					Bottom of borehole at 40.0 feet bgs.	

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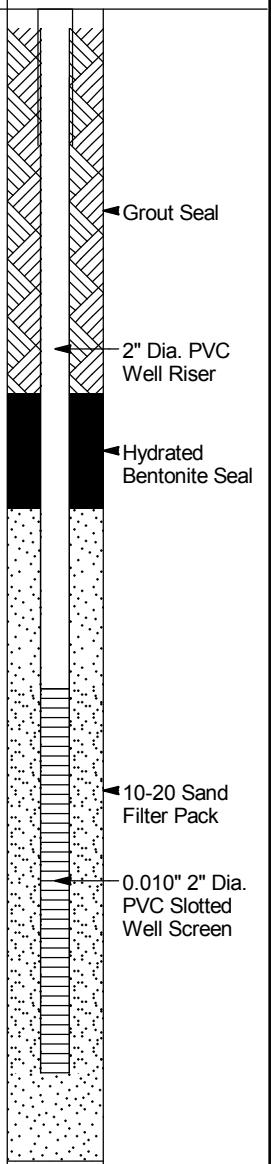
WELL NUMBER M-174

PROJECT NAME Tronox
BORING LOCATION
PROJECT NUMBER 2027.02
PROJECT LOCATION Henderson, NV
DATE STARTED 4/22/10 **COMPLETED** 4/22/10 **TOC ELEVATION** **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 20.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): reddish brown (5YR 5/4), 60% very fine to very coarse sub-angular to sub-rounded sand, 25% pea gravel to 1/2", 15% silt, common calcareous grain coatings.
11–15		Qal	GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM): grayish brown (10YR 5/2), 60% volcanic sub-angular to angular gravel to 1" diameter, 30% very fine to very coarse sub-angular to sub-rounded sand and 10% silt, common calcareous grain coatings
16–20		Qal	SM	▽	SILTY SAND (SM): light yellowish brown (10YR 6/4), 70% fine to medium with very coarse sand, 20% silt, 10% pea gravel to 1/4", common calichified layers
21–24		Qal	GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM): very pale brown (10YR 7/4), 70% pea gravel to 3/4", 20% very fine to very coarse sand, 10% silt, common hard caliche layers 3"-5" thick.
25–30		UMCf	ML		SILT AND SILT WITH SAND (ML): very pale brown (10YR 7/4), locally 30% very fine grained sand, scattered caliche nodules to 1/2".
					Bottom of borehole at 30.0 feet bgs.



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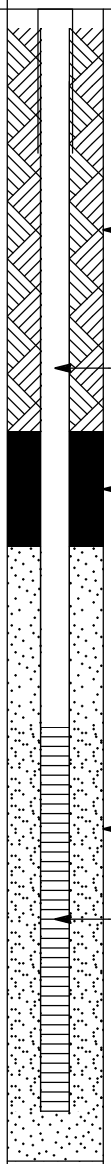
WELL NUMBER M-175

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/21/10 **COMPLETED** 4/21/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 21.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SM		SILTY SAND WITH GRAVEL (SM): reddish brown (5YR 5/4), 60% very fine to very coarse sub-angular to sub-rounded sand, 20% volcanic sub-angular pea gravel to 1/2", 20% silt, sparse calcareous grain coatings throughout.
11–25		Qal	GM		SILTY GRAVEL WITH SAND (GM): light brownish gray (10YR 6/2), 50% volcanic gravel to 1/2" trace gravel to 2-3", 30% very fine to very coarse sand, 20% silt. Silty sand (30% silt). ▽ Hard calichified zone (22.5'-25').
26–30		UMC	ML		SILT AND SANDY SILT (INTERBEDDED) (ML): very pale brown (10YR 7/4), locally 20-30% very fine grained sand, scattered caliche nodules to 1".
					Bottom of borehole at 30.0 feet bgs.

WELL DIAGRAM



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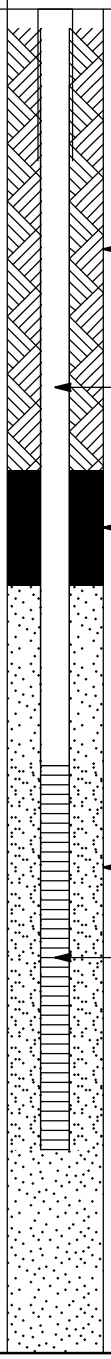
WELL NUMBER M-176

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/21/10 **COMPLETED** 4/21/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 23.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	GM		SILTY GRAVEL WITH SAND (GM): reddish brown (5YR 5/4), 50% volcanic angular to sub-rounded gravel 1/4"-2" trace to 3", 30% very fine to very coarse sub-angular to sub-rounded sand, 20% silt, common soft calcareous grain coatings @ 1.5'-2- and 5'-5.5'.
16–17					Gravel up to 3" diameter from 16'-17'.
18–20					Semi-hard calichified pea gravel (to 3/8") from 18'-20'.
21–22		Qal	SM		SILTY SAND WITH GRAVEL (SM): yellowish brown (10RY 5/4), 60% fine to very coarse sub-angular to sub-rounded sand, 20% pea gravel to 3/8", 20% silt.
23–24		Qal	ML	▽	SILT WITH SAND (ML): white (5Y 8/1), 20% very fine grained sand, common caliche nodules to 1".
25–27		Qal	SM		SILTY SAND (SM): light brownish gray (10YR 6/2), 70% very fine to medium sub-angular to sub-rounded sand, 30% silt
28–30		Qal	SM		SILTY SAND WITH GRAVEL (SM): light brownish gray (10YR 6/2), 60% very fine to very coarse sub-angular to sub-rounded sand, 20% volcanic gravel to 1/2", 20% silt.
31–35		UMCf	ML		SILT AND SILT WITH SAND (INTERBEDDED) (ML): very pale brown (10YR 7/4), 20% very fine grained sand, scattered caliche nodules to 1" Caliche zone 32.5'-33'.

WELL DIAGRAM



Bottom of borehole at 35.0 feet bgs.

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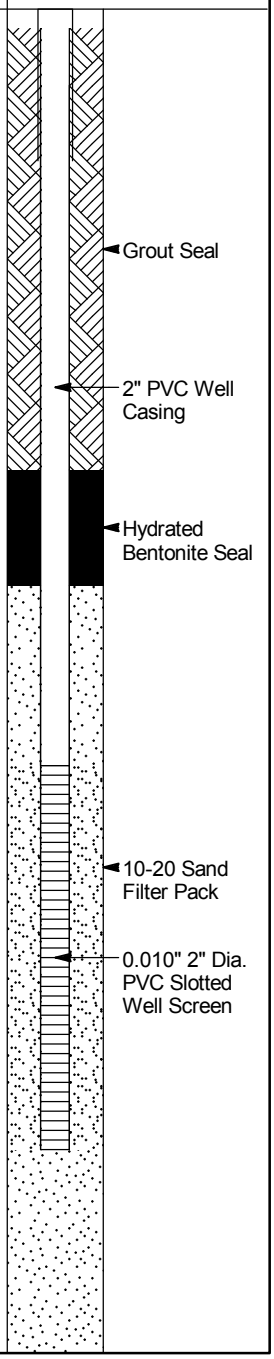
WELL NUMBER M-177

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 4/21/10 **COMPLETED** 4/21/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR Boart Longyear
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 23.50 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SM		SILTY SAND WITH GRAVEL (SM): reddish brown (5YR 5/4), 35% very fine to coarse with 15-25% very coarse sub-angular to sub-rounded sand, 20% volcanic angular to sub-angular gravel to 2" with minor scattered gravel to 3"-4", 20% silt, minor calcareous grain coatings and caliche nodules to 1".
11–23		Qal	SM		
▽ 23–24		Qal	SM		SILTY SAND (SM): white (5Y 8/1), 50-60% very fine grained sub-angular to sub-rounded sand, common caliche nodules to 1/2",
25–35		UMCf	ML		SILT AND SILT WITH SAND (INTERBEDDED) (ML): very pale brown (10YR 7/4), 20-30% very fine grained sub-angular sand, scattered caliche nodules to 1/2".

WELL DIAGRAM



Bottom of borehole at 35.0 feet bgs.

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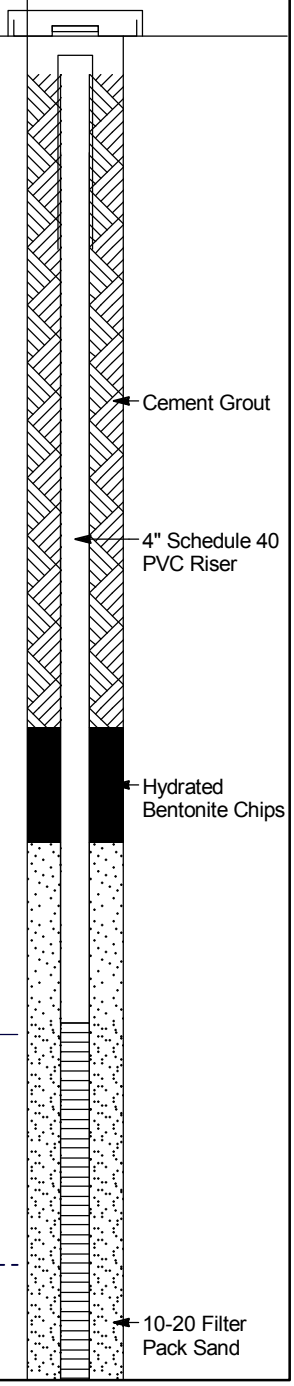
WELL NUMBER M-178

PROJECT NAME Tronox
BORING LOCATION
PROJECT NUMBER 2027.02
PROJECT LOCATION Henderson, NV
DATE STARTED 6/6/10 **COMPLETED** 6/7/10 **TOC ELEVATION** **HOLE SIZE** 8"
DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 27.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 70% very fine to medium with common coarse to very coarse sub angular to sub rounded poorly sorted sand, 10-20% volcanic angular to sub angular gravel to 1/2" with trace 1" diameter, 15-20% silt in matrix, moderate calcareous coatings and soft cement.
6–10					Common cement, 5-14'.
11–15					6" zone with volcanic cobble to 4" at 14'.
26–30		UMCf	ML		▽ SILT (ML); very pale brown (10YR 7/4), 10% very fine grain sand. Semi-hard calichified silt at 26-27'. Common caliche nodules to 1" at 27-30'.
31–35		UMCf	ML		SILT WITH SAND (ML); very pale brown (10YR 7/4), 20-30% very fine grain sand.

WELL DIAGRAM



GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-178

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36					SILT WITH SAND (ML); very pale brown (10YR 7/4), 20-30% very fine grain sand. *(continued)*	4" Schedule 40 PVC 0.010" Slotted Well Screen
37						
38						
39						
40					SILT, Very pale brown (10YR 7/4).	
41		UMCf	ML		SILT WITH SAND (ML), Very pale brown (10YR 7/4), 20-30% very fine grain sand.	
42						
43						
44						
45					Common caliche nodules to 1" at 44'-46'.	
46					Bottom of borehole at 46.0 feet bgs.	4" Schedule 40 PVC End Cap

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WELL NUMBER M-179

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DATE STARTED 6/5/10 **COMPLETED** 6/6/10 **TOC ELEVATION** **HOLE SIZE** 8"

DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 35.00 ft

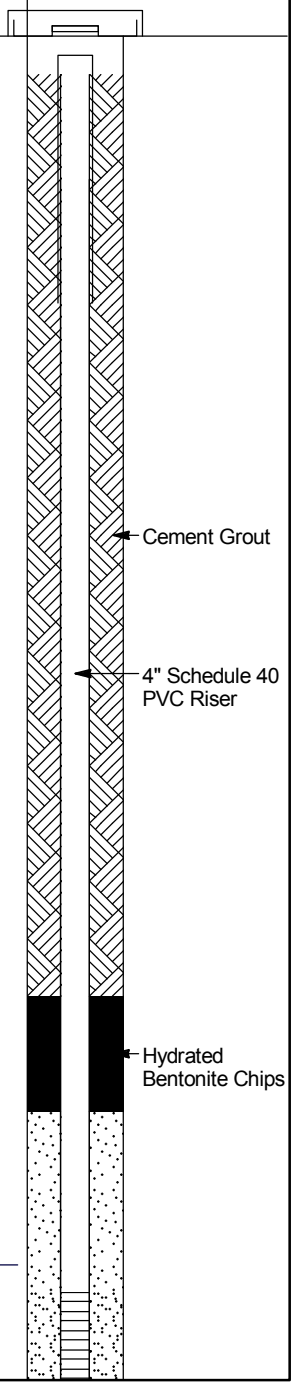
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---

LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**

NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60-70% very fine to medium with moderate to common coarse to very coarse grain moderately sorted sub angular to sub rounded sand, 10-15% angular to sub angular volcanic gravel to 5/8", 20% silt, moderate to common calcareous coatings throughout.
6–10					Semi-hard calcareous cement at 3-3.5', 8-15', and 30-32.5'.
11–15					
16–20					
21–25					
26–30					Layer with 20-30% angular to sub angular gravel, with pebbles to 2-3" at 29-30'.
31–35		Qal	GP-GM	▽	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM); white (5Y 8/1), 50% angular to sub angular volcanic granules to 1/2" trace 1" to 1-1/2", 40% fine to very coarse sub angular to sub rounded sand, 10% silt, common to abundant hard caliche.

WELL DIAGRAM



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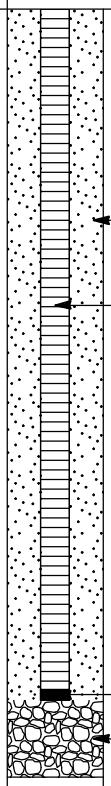
WELL NUMBER M-179

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
36		Qal	SM		SILTY SAND WITH GRAVEL (SM); yellowish brown (10YR 5/4), 60% very fine to medium with common coarse to very coarse poorly sorted sand, 25% silt, 15% angular to sub angular volcanic gravel to 1/2", common calcareous cement.
37		UMCf	ML		SILT (ML); very pale brown (10YR 7/4), 1-2% floating medium to coarse grain sub angular to sub rounded sand.
38					
39		UMCf	ML		SILT WITH SAND (ML); very pale brown (10YR 7/4), 10-20% very fine grain sand, scattered caliche nodules to 1-1/2".
40					
41					
42					SILT (ML); very pale brown (10YR 7/4), coarse grain silt to 50', then fine grain silt, minor scattered caliche nodules to 3/4".
43					
44					
45					
46					
47					
48		UMCf	ML		
49					
50					
51					
52					
53					
54					
55					
					Bottom of borehole at 55.0 feet bgs.

WELL DIAGRAM



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WELL NUMBER M-180

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/5/10 **COMPLETED** 6/5/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 24.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5		Qal			FILL; brown and dark yellowish brown, sands, gravels, cement debris.
6–15		Qal	SM		SILTY SAND (SM); reddish brown (5Y 5/4), 60-65% very fine to medium grain with common coarse to very coarse grain sub angular to sub rounded sand, 5-10% angular to sub angular volcanic gravel to 3/4", 20% silt, common calcareous coatings and soft cement throughout.
16–20		Qal	SM		Varying amount of calichification, abundant and hard from 18.5-19' and 23-24'.
24 ▽–25		Qal	SW-SM		WELL GRADED SAND WITH SILT (SW-SM); grayish brown (10YR 5/2), fine to coarse grain sand, <10% silt to 26' then 20% silt, 10-15% volcanic angular to sub angular gravel to 1/2" with trace to 1-2", non calcareous to 26' then moderately calcareous to 28'.
29		Qal	ML		SILT (ML); yellowish brown (10YR 5/4), common to abundant hard to soft caliche zones and nodules.
30		Qal	SW		SAND (SW); yellowish brown (10YR 5/4), fine to coarse grain poorly sorted sub angular to sub rounded sand, 5-10% volcanic angular to sub angular gravel to 3/8", 6" bed of angular to sub angular gravel to 1" in silty matrix at 30'.
31–32		UMCf	CL		CLAY (CL); very pale brown (10YR 8/2), abundant caliche zones and nodules to 3-4".
33–35		UMCf	ML		SILT WITH SAND (ML); very pale brown (10YR 7/4), coarse grain silt, 10-20% very fine grain sand, non calcareous.

WELL DIAGRAM

- Cement/ Bentonite Grout
- 2" Schedule 40 PVC Riser
- Hydrated Bentonite Chips
- 10-20 Filter Pack Sand
- 2" Schedule 40 PVC 0.010" Slotted Well Screen

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WELL NUMBER M-180

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36		UMCf	ML		SILT (ML); very pale brown (10YR 7/4), coarse grain silt, trace very fine grain sand.	2" Schedule 40 PVC End Cap
37						
38						
39						
40		UMCf	ML			Native Fill
41						
42						
43					Bottom of borehole at 43.0 feet bgs.	

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WELL NUMBER M-181

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/3/10 **COMPLETED** 6/4/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 32.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–10		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 70% fine to medium grain with common coarse to very coarse grain sub angular to sub rounded sand, 15% silt in matrix, 15% angular to sub angular volcanic gravel to 1/2". Moderate to common calcareous grain coatings throughout. Cobbles up to 2-3" at 2.5' and 4.5'.	
11–15		Qal	SM		SILTY SAND (SM); reddish brown (5YR 5/4), 65-70% very fine to fine grain with minor medium to coarse grain sand, 25-40% silt in matrix, 5% fine gravel to 3/8", common to moderate calcareous grain coatings.	
16–25		Qal	SM		Increasing grain size with common medium to coarse grain sub angular to sub rounded sand, 22-25'.	
26–32		Qal	SM		▽ 6" zone of abundant caliche cement and grain coatings (moderately soft) at 31.5'.	
33–37		UMC	ML		SILT (ML); light yellowish brown (10YR 6/4), 80% silt, 10% clay, 10% very fine grain sand, trace floating medium to coarse grain volcanic sub rounded sand, scattered caliche nodules to 3/8".	

GENERAL NORTHGATE ENV _FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-181

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
38					SILT (ML); light yellowish brown (10YR 6/4), 80% silt, 10% clay, 10% very fine grain sand, trace floating medium to coarse grain volcanic sub rounded sand, scattered caliche nodules to 3/8". *(continued)*	
39					6" zone of moderately hard caliche, clayey, very pale brown (10YR 8/2) at 38'.	
40						
41						
42						
43						
44						
45		UMCf	ML			
46						
47						
48						
49						Cement Grout
50						
51						
52						
53					SILT WITH SAND (ML); light yellowish brown (10YR 6/4), 20-30% very fine grain sand, 5-10% clay, non-calcareous.	2" Schedule 40 PVC Riser
54						
55						
56						
57		UMCf	ML			
58						
59						
60						
61						
62						
63					SILT (ML); very pale brown (10YR 8/2) and light yellowish brown (10YR 6/4) mottled, very pale brown material is clayey (10-20%) and calcareous.	
64		UMCf	ML			
65						
66					SILTY SAND (SM); light yellowish brown (10YR 6/4), 60% very fine grain sand, 40% silt.	
67						
68						
69		UMCf	SM			
70						
71					2-4% coarse and very coarse grain sand and fine sub angular to sub rounded gravel to 3/8" floating in sand/silt matrix.	
72						
73					SILT (ML); light yellowish brown (10YR 6/4), 10% very fine grain sand, non-calcareous.	
74						
75						
76		UMCf	ML			
77						
78						
79						

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WELL NUMBER M-181

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
80		UMCf	ML		SILT (ML); light yellowish brown (10YR 6/4), 10% very fine grain sand, non-calcareous. *(continued)*	
81						
82					SILTY SAND (SM); light yellowish brown (10YR 6/4), 65-70% very fine to fine grain sand with 2-5% floating medium to very coarse grain sand and gravel to 5/8", 20% silt in matrix, non-calcareous.	
83						
84		UMCf	SM			
85						
86					Silt decreases to <5%, clean sand (fine to medium with coarse to very coarse), 1-2% gravel to 1/2".	
87					SILT (ML); light yellowish brown (10YR 6/4), 10% very fine grain sand.	
88						
89						
90						
91						
92						
93						
94						
95						
96		UMCf	ML			
97						
98						
99						Hydrated Bentonite Chips
100						
101						
102						
103						
104						
105						
106					SILTY SAND (SM); grayish brown (10YR 5/2), 70% fine to medium grain with minor coarse to very coarse grain sub angular to sub rounded sand, 30% silt, trace clay.	
107						
108		UMCf	SM			10-20 Filter Pack Sand
109						
110						2" Schedule 40 PVC 0.010" Slotted Well Screen
111					6" calcareous zone, up to 40% silt/clay, common soft caliche and grain coatings (nodules and irregular zones) at 110'.	
112					SILT, light yellowish brown (10YR 6/4), 10% very fine grain sand.	
113						
114						
115		UMCf	ML			2" Schedule 40 PVC End Cap
116						
117						
118						
119						
120		UMCf	SP		WELL GRADED SAND (SW); grayish brown (10YR 5/2), 90% fine to medium grain with common coarse and very coarse grain sub angular to sub rounded volcanic sand, 10% granules to 3/8", common semi-hard calcareous grain coatings and cement, 10%	

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WELL NUMBER M-181

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
					silt in matrix.	
					Bottom of borehole at 120.0 feet bgs.	

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WELL NUMBER M-182

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/4/10 **COMPLETED** 6/4/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 32.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: M-182 is 10' north of M-181. Lithologic descriptions from M-181.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 70% fine to medium grain with common coarse to very coarse grain sub angular to sub rounded sand, 15% silt in matrix, 15% angular to sub angular volcanic gravel to 1/2". Moderate to common calcareous grain coatings throughout. Cobbles up to 2" - 3" in upper five feet.
6–10		Qal	SM		
11–13		Qal	SM		
13–15		Qal	SM		SILTY SAND (SM); reddish brown (5YR 5/4), 65-70% very fine to fine grain with minor medium to coarse grain sand, 25-40% silt in matrix, 5% fine gravel to 3/8", common to moderate calcareous grain coatings.
16–20		Qal	SM		
21–25		Qal	SM		Increasing grain size with common medium to coarse grain sub angular to sub rounded sand, 22-25'.
26–30		Qal	SM		
31–32		Qal	SM	▽	
32–35		UMCf	ML		SILT (ML); light yellowish brown (10YR 6/4), 80% silt, 10% clay, 10% very fine grain sand, trace floating medium to coarse grain volcanic sub rounded sand, scattered caliche nodules to 3/8".

WELL DIAGRAM

(Continued Next Page)

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WELL NUMBER M-182

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36–45		UMCf	ML		SILT (ML); light yellowish brown (10YR 6/4), 80% silt, 10% clay, 10% very fine grain sand, trace floating medium to coarse grain volcanic sub rounded sand, scattered caliche nodules to 3/8". *(continued)*	Cement Grout; 2" Schedule 40 PVC Riser
46–55		UMCf	ML		SILT WITH SAND (ML); light yellowish brown (10YR 6/4), 20-30% very fine grain sand, 5-10% clay, non-calcareous.	
56–60		UMCf	ML			
61–65		UMCf	ML		SILT (ML); very pale brown (10YR 8/2) and light yellowish brown (10YR 6/4) mottled, very pale brown material is clayey (10-20%) and calcareous.	
66–70		UMCf	SM		SILTY SAND (SM); light yellowish brown (10YR 6/4), 60% very fine grain sand, 40% silt.	
71–72					2-4% coarse and very coarse grain sand and fine sub angular to sub rounded granvel to 3/8" floating in sand/silt matrix.	
73–75		UMCf	ML		SILT (ML); light yellowish brown (10YR 6/4), 10% very fine grain sand, non-calcareous.	Hydrated Bentonite Chips

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WELL NUMBER M-182

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
76					SILT (ML); light yellowish brown (10YR 6/4), 10% very fine grain sand, non-calcareous. *(continued)*	
77						
78		UMCf	ML			
79						
80						
81						
82					SILTY SAND (SM); light yellowish brown (10YR 6/4), 65-70% very fine to fine grain sand with 2-5% floating medium to very coarse grain sand and gravel to 5/8", 20% silt in matrix, non-calcareous.	10-20 Filter Pack Sand
83						
84		UMCf	SM			
85						2" Schedule 40 PVC 0.010" Slotted Well Screen
86					Silt decreases to <5%, clean sand (fine to medium with coarse to very coarse), 1-2% gravel to 1/2".	
87					SILT (ML); light yellowish brown (10YR 6/4), 10% very fine grain sand.	
88		UMCf	ML			
89						
90						2" Schedule 40 PVC End Cap
					Bottom of borehole at 90.0 feet bgs.	

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WELL NUMBER M-186

PROJECT NAME Tronox
BORING LOCATION
PROJECT NUMBER 2027.02
PROJECT LOCATION Henderson, NV
DATE STARTED 6/1/10 **COMPLETED** 6/2/10 **TOC ELEVATION** **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 38.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–10		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); reddish brown (5YR 5/4), 70% very fine to medium with moderate coarse to very coarse grained sub angular to sub rounded sand, 20% volcanic angular to sub angular pea gravel to 1/2", 10% silt, moderate calcareous grain coatings.	
11–15		Qal	SM		6" zone of 2"-3" cobbles @10.5'. SILTY SAND (SM); reddish brown (5YR 5/4), 70-80% very fine to medium grain with common coarse to very coarse grain sub angular to sub rounded sand, 1-2% gravel to 1/4", 20-30% silt, common calcareous cement and grain coatings.	
16–25		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60% very fine to coarse grain sub rounded to sub angular moderately poorly sorted sand, 20% pea gravel to 3/4" trace 2"-3", 20% silt. Common calcareous coatings 22'-25', slight to moderate calcareous coatings elsewhere.	
26–35		Qal	SM			

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WELL NUMBER M-186

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60% very fine to coarse grain sub rounded to sub angular moderately poorly sorted sand, 20% pea gravel to 3/4" trace 2"-3", 20% silt. *(continued)*	
37						
38					▽	
39		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); reddish brown (5YR 5/4), wet, 80% fine to medium grain with minor coarse to very coarse grain sub angular to sub rounded moderately well sorted sand, 10% volcanic sub angular gravels to 3/8", 10% silt.	
40						
41						
42					Common caliche nodules and calcareous cement (semi-hard) 42'45'.	
43						
44						
45						
46		UMCf	ML		SILT (ML); very pale brown (10YR 7/4), 6" hard caliche @ 46'.	
47						
48						
49						Cement Grout
50						
51						
52						
53						2" Schedule 40 PVC Riser
54						
55						
56						
57		UMCf	SM		SILTY SAND (SM); very pale brown (10YR 7/4), 55% very fine to medium grain with minor coarse to very coarse grain sub angular to sub rounded sand, 2-5% floating sub rounded gravel to 1/4", 40% silt.	
58						
59						
60						
61						
62						
63						
64		UMCf	ML		SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), locally with very fine grain sand, 0-10% clay, non-calcareous.	
65						
66					Sandy with 20-30% very fine grain sand from 63'-70'.	
67						
68					Moderate caliche nodules to 3/4" from 67'-70'.	
69						
70						
71					Silt 70' - 75'.	
72						
73						
74						
75						

(Continued Next Page)

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WELL NUMBER M-186

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
76					SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), locally with very fine grain sand, 0-10% clay, non-calcareous. *(continued)*	
77					30-40% very fine grain sand, 75' - 80'.	
78						
79						
80						
81		UMCf	ML		Silt, 80' - 83'.	
82						
83						
84					20-30% very fine grain sand.	
85						
86		UMCf	SW		WELL GRADED SAND (SW); yellowish brown (10YR 5/4), 90% fine to medium grain with coarse to very coarse grain sand, 1-2" granules to 1/4", 5-10% silt.	
87					SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), 10YR 8/2 where calcareous, locally with very fine grain sand.	
88						
89						
90					20-30% very fine grain sand, non calcareous, 86'-90'	
91					Silt, 90' - 92'.	
92						
93					20-30% very fine grain 1-2% coarse to very coarse grain sand, 92' - 93'.	
94					Silt, abundant calcareous cement very pale brown (10YR 8/2), 93' - 95'.	
95						
96		UMCf	ML		Silt, 10% very fine grain sand, 95' - 106'.	
97						
98						
99						Hydrated Bentonite Chips
100						
101						
102						
103						
104						
105						
106						
107		UMCf	SW-SM		WELL GRADED SAND WITH SILT (SW-SM); yellowish brown (10YR 5/4), 75% very fine to medium grain with coarse to very coarse grain sub angular to sub rounded sand, 15% volcanic granules to 1/4" and pebbles to 1", 10% silt, common calcareous cement.	10-20 Filter Pack Sand
108						
109					SILT (ML); Very pale brown (10YR 8/2), common caliche nodules to 1".	
110		UMCf	ML			2" Schedule 40 PVC 0.010" Slotted Well Screen
111						
112						
113					SILT WITH SAND (ML); light yellowish brown (10YR 6/4), 20-30% very fine grain sand.	
114		UMCf	ML			
115						

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WELL NUMBER M-186

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
116		UMCf	ML		SILT WITH SAND (ML); light yellowish brown (10YR 6/4), 20-30% very fine grain sand. *(continued)*	2" Schedule 40 PVC End Cap
117						
118						
119						
120						
					Bottom of borehole at 120.0 feet bgs.	

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WELL NUMBER M-187

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/24/10 **COMPLETED** 5/25/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 40.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10				SM		SILTY SAND FILL (SM); gray black (N2), 60% very fine to medium grain sand, 40% silt.
11–17				GM		SILTY GRAVEL WITH SAND (GM); yellowish brown (10YR 5/4), 50% angular to sub angular gravel to 3/4", 30% very fine to medium grain sand, cobbles to 4" from 13-13.5' and 16.5-17', moderate calcareous coatings throughout.
18–25				SM		SILTY SAND (SM); grayish brown (10YR 5/2), 65% very fine to fine grain with minor sub angular medium to very coarse grain sand, 25% silt, 10% angular to sub angular volcanic gravel to 1/2".
26–30						Slight to common calichification from 30'-32'.
31–35						Abundant caliche and calcite veinlets, very pale brown (10YR 8/2) from 32-36'.

WELL DIAGRAM

(Continued Next Page)

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WELL NUMBER M-187

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36				SM		Abundant caliche and calcite veinlets, very pale brown (10YR 8/2) from 32-36'. *(continued)*	
37						SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), Silt from 36-40'.	
38							
39							
40						▽ Sandy silt, very fine grain sand with 1-2% medium to very coarse grain sub rounded sand.	
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							
51						Silt, very pale brown (10YR 8/2), common calcification.	
52							
53							
54							
55							
56				ML			
57							
58							
59							
60							
61							
62							
63						Sandy silt, 20-30% very fine grain with 2-3% floating medium to coarse grain sub rounded sand.	
64							
65							
66						Silt, moderate calcareous grain coatings, caliche nodules to 1/4".	
67							
68							
69							
70						Sandy silt, 20-30% very fine grain with 2-3% floating medium to coarse grain sub rounded sand.	
71							
72						Silt.	
73							
74							
75							

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WELL NUMBER M-187

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
76						SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), *(continued)*	
77						Sandy silt, 20-30% very fine grain sand.	Cement Grout
78							
79							
80							2" Schedule 40 PVC Riser
81							
82							
83						Silt with common caliche nodules to 1/2" and irregular zones, mottled very pale browns (10YR 7/4 and 10YR 8/2).	
84							
85							
86						Silt.	
87							
88						Silt with common irregular caliche zones from 87-94'.	
89							
90							
91							
92							
93							
94							
95				ML			
96							
97							
98							
99						Sandy silt, 20% very fine grain sand.	
100							
101						Silt, common caliche nodules and irregular calichified zones, mottled very pale browns (10YR 7/4 and 10YR 8/2).	
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							

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WELL NUMBER M-187

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
116	Split Spoon #1		100			SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), *(continued)*	
117						Sandy silt, 10-30% very fine grain sand.	
118							
119							
120							
121							
122							
123							
124				ML		Silt, common calichification.	
125							
126							
127						Sandy Silt, 10-20% very fine grain sand.	
128							
129						Silt.	
130							
131							
132							
133							
134						LEAN CLAY (CL); grayish yellowish green (5GY 6/2) to 136' then light gray (5Y 7/2), 80% clay, 20% silt.	
135							
136				CL			
137							
138							
139							
140						SILT (ML); Very pale brown (10YR 7/4).	
141							
142							
143							
144							
145							
146							
147				ML			
148							
149							
150							
151							
152							
153						Common calcareous zones, very pale brown mottles from 152'-155'.	
154							Hydrated Bentonite Chips
155							

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WELL NUMBER M-187

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
156				ML		SILT WITH SAND (ML); gray orange, trace caliche nodules to 1/2".	
157							
158							
159							
160							
161							
162							
163						SILT (ML); moderate to common caliche nodules to 1/2".	10-20 Filter Pack Sand
164							
165							2" Schedule 40 PVC 0.010" Slotted Well Screen
166	Split Spoon #2		100	ML		Clay, very pale brown (10YR 8/2), calcareous from 165.5' - 166'.	
167							
168							
169							
170							2" Schedule 40 PVC End Cap
						Bottom of borehole at 170.0 feet bgs.	

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WELL NUMBER M-188

PROJECT NAME Tronox
BORING LOCATION
PROJECT NUMBER 2027.02
PROJECT LOCATION Henderson, NV
DATE STARTED 5/25/10 **COMPLETED** **TOC ELEVATION** **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 40.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES: M-188 is 10' south of M-187. Lithologic descriptions are from M-187.

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–10			SM		SILTY SAND FILL (SM); gray black (N2), 60% very fine to medium grain sand, 40% silt.	
11–17			GM		SILTY GRAVEL WITH SAND (GM); yellowish brown (10YR 5/4), 50% angular to sub angular gravel to 3/4", 30% very fine to medium grain sand, cobblesto 4" from 13-13.5' and 16.5-17', moderate calcareous coatings throughout.	
18–35			SM		SILTY SAND (SM); grayish brown (10YR 5/2), 65% very fine to fine grain with minor sub angular medium to very coarse grain sand, 25% silt, 10% angular to sub angular volcanic gravel to 1/2". Slight to common calichification from 30' - 32'. Abundant caliche and calcite veinlets, very pale brown (10YR 8/2) from 32' - 36'.	

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WELL NUMBER M-188

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			SM		Abundant caliche and calcite veinlets, very pale brown (10YR 8/2) from 32' - 36'. *(continued)*	
37					SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), Silt from 36-40'.	
38						
39						
40					▽	
41					Sandy silt, very fine grain sand with 1-2% medium to very coarse grain sub rounded sand.	
42						
43						
44						
45						
46						
47						
48						
49						
50						
51					Silt, very pale brown (10YR 8/2), common calcification.	
52						Cement Grout
53						
54						
55						
56			ML			2" Schedule 40 PVC Riser
57						
58						
59						
60						
61						
62						
63					Sandy silt, 20-30% very fine grain with 2-3% floating medium to coarse grain sub rounded sand.	
64						
65						
66					Silt, moderate calcareous grain coatings, caliche nodules to 1/4".	
67						
68						
69						
70					Sandy silt, 20-30% very fine grain with 2-3% floating medium to coarse grain sub rounded sand.	
71						
72					Silt.	
73						
74						
75						

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WELL NUMBER M-188

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
76					SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), *(continued)*	
77					Sandy silt, 20-30% very fine grain sand.	
78						
79						
80						
81						
82						
83					Silt with common caliche nodules to 1/2" and irregular zones, mottled very pale browns (10YR 7/4 and 10YR 8/2) from 82-85'.	
84						
85						
86					Silt.	
87						
88					Silt with common irregular caliche zones from 87-94'.	
89						
90						
91						
92						
93						
94						
95			ML			
96						
97						
98						
99					Sandy silt, 20% very fine grain sand from 98-100'.	
100						
101					Silt, common caliche nodules and irregular calichified zones, mottled very pale browns (10YR 7/4 and 10YR 8/2).	
102						
103						
104						Hydrated Bentonite Chips
105						
106						
107						
108						
109						
110						
111						
112						
113						10-20 Filter Pack Sand
114						
115						2" Schedule 40

GENERAL NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-188

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
116 117 118 119 120			ML		SILT INTERBEDDED WITH SANDY SILT (ML); very pale brown (10YR 7/4), *(continued)* Sandy silt, 10-30% very fine grain sand.	PVC 0.010" Slotted Well Screen 2" Schedule 40 PVC End Cap
					Bottom of borehole at 120.0 feet bgs.	

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WELL NUMBER M-48A

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/16/10 **COMPLETED** 6/16/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 27.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: Replacement for damaged/plugged and abandoned monitoring well M-48

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5		Qal	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); reddish brown (5YR 5/4), 75% fine to coarse grain with common very coarse grain sub angular to sub rounded sand, 15% well graded granules/pea gravel to 3/8" (trace 3/8-3/4"), 10% silt.
6–10		Qal	SW-SM		Moderate calcareous cement and grain coatings, common soft calcareous cement from 10-15'.
11–15		Qal	SW-SM		Moderate calcareous cement and grain coatings, common soft calcareous cement from 10-15'.
16–20		Qal	SW-SM		Moderate calcareous cement and grain coatings, common soft calcareous cement from 10-15'.
21–22		Qal	SW-SM		Moderate calcareous cement and grain coatings, common soft calcareous cement from 10-15'.
23–24		Qal	GM		SILTY GRAVEL WITH SAND (GM); reddish brown (5YR 5/4), 50% angular to sub rounded volcanic granules/pea gravel to 1-1/2", trace cobbles to 3", 35% very fine to very coarse grain sub angular to sub rounded sand, 15% silt, moderate to common calcareous cement/coatings throughout.
25–27		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4) to 25', light gray (10YR 7/2) to 32'. 65% very fine to medium grain with sporadic coarse to very coarse grain sub angular to sub rounded sand, 20% volcanic angular to sub rounded granules to 1/4", 15% silt, common calichified sand from 25-27', damp at 25'.
28–30		Qal	SM		85% very fine to fine grain with minor medium to coarse grain sub angular to sub rounded sand, 15% silt, 10-20% sand size calichified silt grains, calcareous. Gravelly at 27-28', granules to 5/8". Silty at 27-28'.
31–32		Qal	SM		Gravelly at 24-27', granules/gravel to 3/4". Calichified zone with discontinuous hard caliche.
33–35		UMCf	ML		SANDY SILT (ML); brownish yellow (10YR 6/6), 10-20% very fine grain sand to 38', 20-30% very fine grain sand to 40'.

WELL DIAGRAM

- Cement/ Bentonite Grout
- 2" Schedule 40 PVC Riser
- Hydrated Bentonite Chips
- 10-20 Filter Pack Sand
- 2" Schedule 40 PVC 0.010" Slotted Well Screen

GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER M-48A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36 37 38 39 40		UMCf	ML		SANDY SILT (ML); brownish yellow (10YR 6/6), 10-20% very fine grain sand to 38', 20-30% very fine grain sand to 40'. *(continued)*	2" Schedule 40 PVC End Cap
					Bottom of borehole at 40.0 feet bgs.	

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WELL NUMBER M-85A

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/17/10 **COMPLETED** 5/17/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 25.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10		Qal	SM		SILTY SAND (SM); reddish brown (5YR 5/4), 80% very fine to coarse grained sub rounded to sub angular sand with up to 5% pea gravel to 3/8", 15-20% silt, calcareous coatings throughout. Moderately hard calichified zone 8-8.5'.
11–15		Qal	SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 60% very fine to very coarse sub angular to sub rounded sand, 25-30% volcanic sub angular gravel to 1/2", 15-20% silt, slight calcareous coatings throughout.
16–19		Qal	SM		SILTY SAND (SM); reddish brown (5YR 5/4), 80% very fine to coarse sand, 20% silt.
20–25		Qal Qal	GW-GM		WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM); reddish brown (5YR 5/4), 60% volcanic sub angular pea gravel to 1/2", 30% very fine to very coarse sub angular to sub rounded sand, 10% silt. Calcareous cemented with abundant calcareous grain coatings, white (5Y 8/1), silt up to 30%, wet at 25'.
26–30		UMCf	ML		SILT (ML); very pale brown (10YR 7/4), abundant calcareous grain coatings, 10-15% floating medium to coarse sub rounded sand grains.
31–35		UMCf	ML		SILT (ML); very pale brown (10YR 7/4), minor interbedded sandy silt, trace clay.
					Bottom of borehole at 35.0 feet bgs.

WELL DIAGRAM

- Cement Grout
- Schedule 40 2" PVC Riser
- Hydrated Bentonite Chips
- 10-20 Filter Pack Sand
- Schedule 40 2" PVC 0.010" Well Screen
- Schedule 40 2" End Cap

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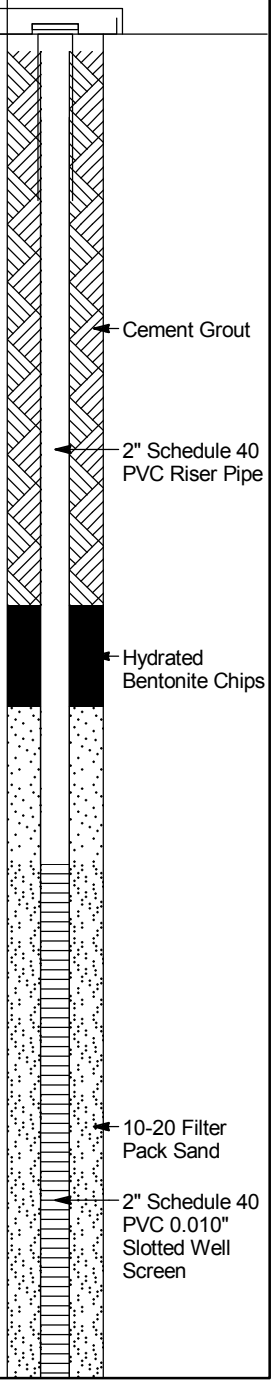
WELL NUMBER M-86A

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 5/17/10 **COMPLETED** 5/17/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 30.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5					SILTY SAND (SM); reddish brown (5YR 5/4), 70% very fine to medium with minor coarse to very coarse angular to sub rounded sand, 15% floating volcanic angular to sub angular granules/pea gravel to 3/8", 15% silt in matrix, calcareous grain coatings throughout.
6–10					Moderately cemented calichified layer at 9'-10'.
11–15		Qal	SM		Moderately cemented calichified layer at 12'-12.5'. Minor large gravel to 1". Moderately cemented calichified layer at 13'-14'.
16–20					Moderately cemented calichified layer at 19'-21'.
21–23					Gravel to 25% with clasts up to 1/2", 15% silt, moderate calcareous coatings, very pale brown (10YR 8/2), 21'-23'.
24–30		Qal	SM		SILTY SAND (SM); dark reddish brown (5YR 2.5/2) and very pale brown (10YR 8/2), 70% very fine to fine grained with trace medium to very coarse sub angular to sub rounded sand, 30% silt, semi-hard caliche, wet @ 30'.
31–40		UMC?	ML		▽ SILT (ML); very pale brown (10YR 7/4), 10% floating medium to coarse sub rounded sand grains.

WELL DIAGRAM



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WELL NUMBER M-86A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
41		UMCf	ML		SILT WITH GRAVEL (ML); yellowish brown (10YR 5/4), 70% silt, 10% very fine grain sand, 20% floating sub rounded gravel to 3/8".	
42						
43		UMCf	ML		SILT (ML); light yellowish brown (10YR 6/4), 10-15% floating medium to coarse grain sub rounded volcanic sand, trace sub rounded volcanic gravel to 3/4", caliche nodules throughout.	
44						
45					Bottom of borehole at 45.0 feet bgs.	2" Schedule 40 PVC End Cap

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WELL NUMBER PC-134A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DATE STARTED 6/21/10 **COMPLETED** 6/22/10 **TOC ELEVATION** **HOLE SIZE** 6"

DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 26.00 ft

DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---

LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**

NOTES: PC-134A is 15' north of PC-134. See lithology log of PC=134 for lithology

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–35			▽ at 26	Cement/ Bentonite Grout; 2" Schedule 40 PVC Riser

GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER PC-134A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
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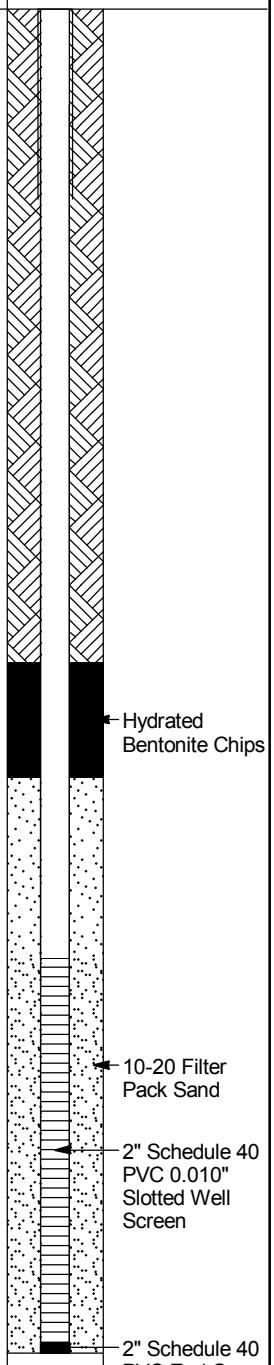

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WELL NUMBER PC-135A

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 7/1/10 **COMPLETED** 7/2/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 32.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES: PC-135A is 20' north of PC-135. See lithology log of PC-135 for lithologic description

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
1–35			▽ at 32	Cement/ Bentonite Grout; 2" Schedule 40 PVC Riser; Hydrated Bentonite Chips

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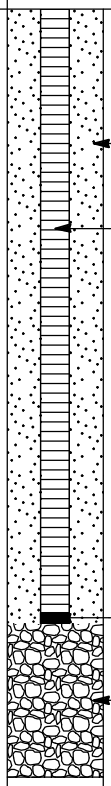
WELL NUMBER PC-135A

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				
54				
55				



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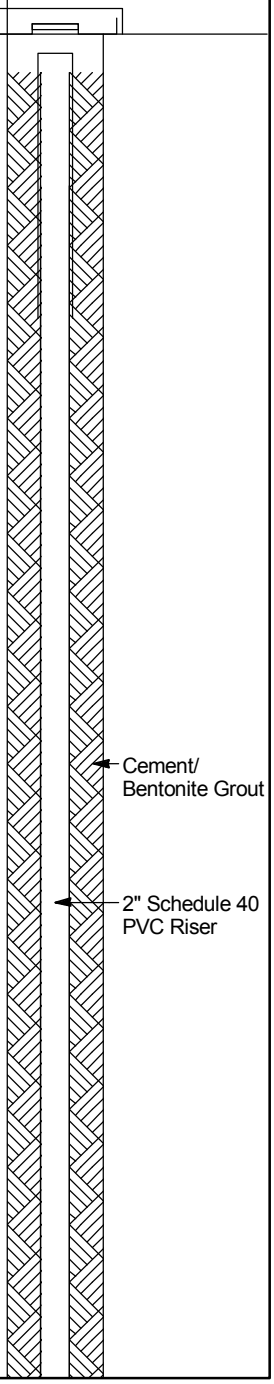
WELL NUMBER PC-141

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/17/10 **COMPLETED** 6/17/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 25.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–15			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL(SP-SM); reddish brown (5YR 5/4), 70% very fine to medium grain with minor coarse grain sub rounded to sub angular sand, 20% angular to sub angular volcanic granules/pea gravel to 1", 10% silt, moderate calcareous cement/grain coatings.
16–25			SM		SILTY SAND WITH GRAVEL (SM); light gray (10YR 7/2), 65% very fine to medium grain with minor very coarse grain sub angular to sub rounded sand, 15% angular to sub rounded volcanic granules/pea gravel to 1" (29-30' common cobbles to 4"), 20% silt, common calcareous coatings, locally common hard discontinuous caliche from 24-32'. ▽
26–35			CL		LEAN CLAY (CL); light greenish gray (5GY 8/1) to 35', yellowish gray to 40', common caliche nodules to 2" form 38-40'.

WELL DIAGRAM



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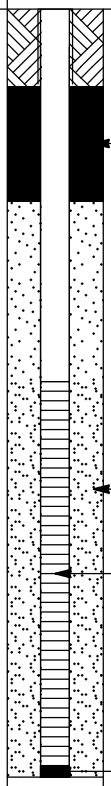
WELL NUMBER PC-141

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
36			CL		LEAN CLAY (CL); light greenish gray (5GY 8/1) to 35', yellowish gray to 40', common caliche nodules to 2" form 38-40'. *(continued)*
37					
38					
39					
40					
41					LEAN CLAY (CL); greenish gray (5GY 7/1). 20% very fine grain sand, 20% silt.
42					
43					
44			CL		20% silt.
45					
46					
47					
48					
49					SANDY SILT (ML) INTERBEDDED WITH SILTY SAND (sm); greenish gray (5GY 7/1) and light gray (10YR 7/2), sandy silt - 70% silt, 30% very fine grain sand, silty sand - 70% very fine grain sand, 30% silt.
50					
51			ML		
52					
53					
54					
55					
					Bottom of borehole at 55.0 feet bgs.

WELL DIAGRAM



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WELL NUMBER PC-142

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DATE STARTED 6/17/10 **COMPLETED** 6/17/10 **TOC ELEVATION** **HOLE SIZE** 6"

DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 25.00 ft

DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---

LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**

NOTES: PC-142 is 10' west of PC-141. See lithology lof of PC-141 for lithologic description

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–15			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL(SP-SM); reddish brown (5YR 5/4), 70% very fine to medium grain with minor coarse grain sub rounded to sub angular sand, 20% angular to sub angular volcanic granules/pea gravel to 1", 10% silt, moderate calcareous ce
16–32			SM		SILTY SAND WITH GRAVEL (SM); light gray (10YR 7/2), 65% very fine to medium grain with minor very coarse grain sub angular to sub rounded sand, 15% angular to sub rounded volcanic granules/pea gravel to 1" (29-30' common cobbles to 4"), 20% silt, common c
25					▽
32					Bottom of borehole at 32.0 feet bgs.

WELL DIAGRAM

- Cement/ Bentonite Grout
- 2" Schedule 40 PVC Riser
- Hydrated Bentonite Chips
- 8-12 Filter Pack Sand
- 2" Schedule 40 PVC 0.020" Slotted Well Screen
- 2" Schedule 40 PVC End Cap

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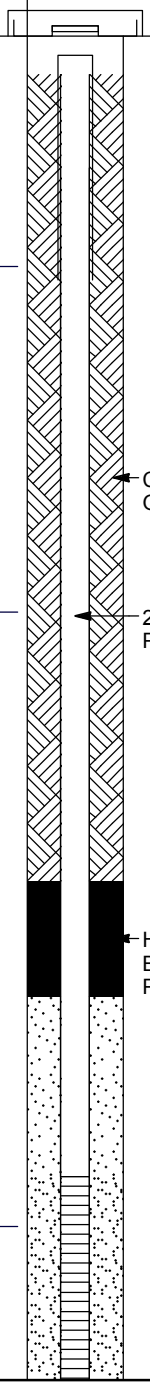
WELL NUMBER PC-143

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/18/10 **COMPLETED** 6/18/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 31.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL FILL (SP-SM)
6–15			SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); reddish brown (5YR 5/4), 70% very fine to medium grian with moderate coarse to very coarse grain angular to sub rounded sand, 20% angular to sub angular volcanic granules/pea gravel to 3/4", 10% silt, moderate calcareous cement/grain coatings throughout.
16–30			SM		SILTY SAND WITH GRAVEL (SM); light gray (10YR 7/2), reddish brown (5YR 5/4) from 22-25', 60% very fine to medium grain with common coarse to very coarse angular to sub rounded sand, 25% angular to sub rounded volcanic granules/pea gravel to 1-1/2", sp(?)-mod cobbles to 3-4" from 17-22, 15% silt, common calcareous cement/coating from 17-22' and 25-31'.
31–35			SM		▽ SILTY SAND WITH GRAVEL (SM); light brownish gray (10YR 6/2), 50% very fine to medium grain with common coarse to very coarse

WELL DIAGRAM



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WELL NUMBER PC-143

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
36			SM		SILTY SAND WITH GRAVEL (SM); light brownish gray (10YR 6/2), 50% very fine to medium grain with common coarse to very coarse *(continued)*
37					
38					
39					
40					
41			SP-SM		POORLY GRADED SAND WITH SILT (SP-SM); light brownish gray (10YR 6/2), 90% medium to coarse grain with minor very fine to fine grain and very coarse grain sub angular to sub rounded volcanic quartz and caliche sand, 1-2% sub angular to sub rounded volcanic granules to 1/4", 10% silt and clay.
42					
43			SM		SILTY SAND (SM); light brownish gray (10YR 6/2), 80% medium to coarse grain with fine and very coarse grain sub angular to sub rounded sand, 20% silt and clay, trace granules to 1/4".
44					
45					
46					WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); light brownish gray (10YR 6/2), 75% medium go coarse grain with minor fine and very coarse grain sub rounded to sub angular sand, 15% granules/pea gravel to 1", minor cobbles to 3", 10% silt, 25% silt locally.
47					
48					Reddish brown (5YR 5/4), 75% fine to medium grain sand, 25% silt from 47.5-48'.
49					
50					
51					
52					
53					
54					
55			SW-SM		
56					
57					80% fine to coarse grain sand, 20% silt from 57-65'.
58					
59					
60					
61					
62					
63					
64					
65					
66			ML		SILT (ML), light brownish gray (10YR 6/2).
67			SW-SM/CL		WELL GRADED SAND WITH SILT (SW-SM); light gray (N&7), very fine grain quartz sand, 10% silt.
68					LEAN CLAY (CL); light greenish gray (5GY 7/1).
69			ML		SANDY SILT (ML); light brownish gray (10YR 6/2), 30% very fine grain sand, moderate very fine grain gypsum.
70					
71			CL-ML		LEAN CLAY INTERBEDDED WITH SILT (CL-ML): light brownish gray (10YR 6/2), common very fine grain gypsum.
72					
73					
74					
75					

WELL DIAGRAM

- 10-20 Filter Pack Sand
- 2" Schedule 40 PVC Slotted Well Screen
- 2" Schedule 40 End Cap
- Native Fill

Bottom of borehole at 75.0 feet bgs.

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WELL NUMBER PC-144

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 7/1/10 **COMPLETED** 7/1/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 35.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5			SM		SILTY SAND WITH GRAVEL (SM); Reddish brown (5YR 5/4), 60% poorly sorted fine to medium grain with common coarse to very coarse grain angular to sub rounded sand, 25% angular to sub angular volcanic and caliche granules/pea gravel to 3/4" (locally contains cobbles to 2-3"), 15% silt, moderate to common calcareous grain coatings and soft cement.
6–10					
11–15					Common-abu(?), soft calcareous cement.
16–20					
21–25					
26–30					
31–35					▽

WELL DIAGRAM

- Cement/Bentonite Grout
- 2" Schedule 40 PVC Capped Riser
- Hydrated Bentonite Pellets
- 8-12 Filter Pack Sand
- 2" Schedule 40

GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER PC-144

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			GM		SILTY GRAVEL WTH SAND (GM); Brown (10YR 5/4), 60% volcanic angular to sub rounded granules/pea gravel to 3/8", 35% fine to coarse grain with common very coarse grain sand, 15% silt, non-calcareous.	PVC 0.020" Slotted Well Screen
37						
38					LEAN CLAY (CL); Light greenish gray (5GY 8/1), non-calcareous.	
39						
40						2" Schedule 40 PVC End Cap
41			CL			
42						
43						Native Fill
44						
45					Bottom of borehole at 45.0 feet bgs.	

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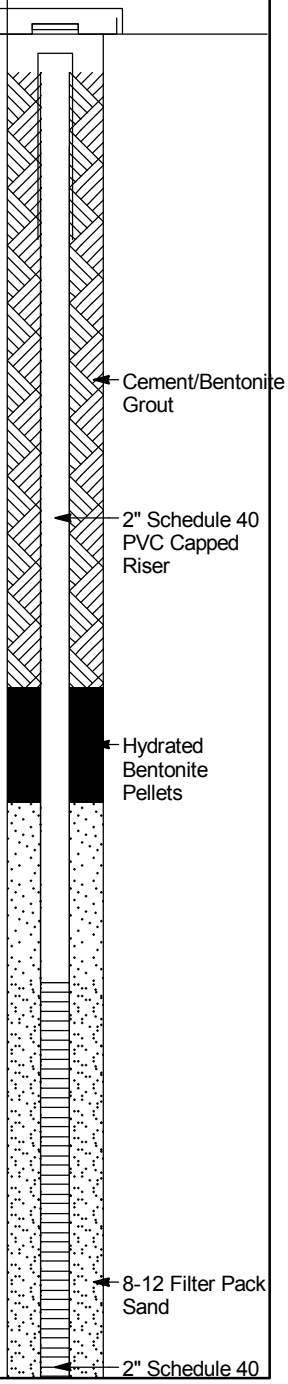
WELL NUMBER PC-145

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/23/10 **COMPLETED** 6/23/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 26.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–15			SP		POORLY GRADED SAND WITH SILT AND GRAVEL (SP); Reddish brown (5YR 5/4), 75% very fine to medium grain with minor to common coarse to very coarse sub angular to sub rounded sand, 15% angular to sub rounded volcanic granules/pea gravel to 1" (with local to 2-3"), 10% silt, moderate calcareous coatings and soft cement throughout.
16–19			GM		SILTY GRAVEL WITH SAND (GM), Reddish brown (5YR 5/4), 50% angular to sub rounded volcanic pea gravel to 1" (local to 2-3"), 30% fine to coarse grain with very coarse grain sub angular to sub rounded sand, 20% silt, moderate calcareous cement.
20–35			SM		SILTY SAND WITH GRAVEL (SM); reddish brown (5YR 5/4), 70% fine to medium grain with common coarse to very coarse sub angular to sub rounded sand, 15% angular to sub rounded volcanic granules/pea gravel to 5/8" (with local to 1-2"), 15% silt, moderate calcareous cement. ▽

WELL DIAGRAM



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WELL NUMBER PC-145

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			SM			PVC 0.020" Slotted Well Screen
37						
38			GP-GM		POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM); Brown (10YR 5/4), 60% angular to sub rounded volcanic granules/pea gravel to 5/8" (minor to 1"), 30% very fine to medium grain with common coarse to very coarse sub angular to sub rounded sand, 10% silt, common hard calichification in layers 2-3" thick.	
39						
40						
41			CL		LEAN CLAY (CL); Yellowish green (5Y 7/2).	
42						
43						
44						
45						2" Schedule 40 PVC End Cap
					Bottom of borehole at 45.0 feet bgs.	

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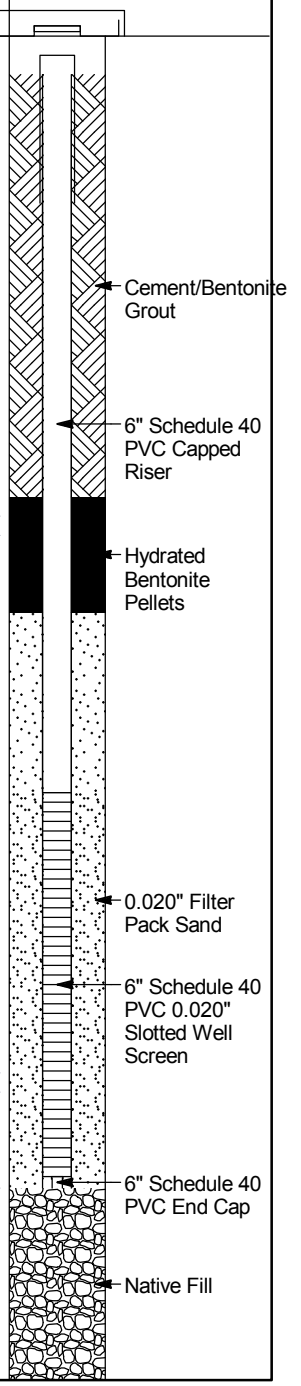
WELL NUMBER PC-146

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/20/10 **COMPLETED** 6/20/10
TOC ELEVATION
HOLE SIZE 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: **AT TIME OF DRILLING** Dry
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–13			SP-SM		POORLY GRADED SAND WITH SILT (SP-SM); Reddish brown (5YR 5/4), 80% very fine to medium grain with common coarse to very coarse grain sub angular to sub rounded sand, 10% volcanic angular to sub rounded granules to 1/4", 10% silt, moderately calcareous grain coatings and soft cement throughout.
13					Gravelly zone, gravels to 3" diameter.
13–30			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Reddish brown (5YR 5/4), 75% very fine to coarse grain with minor very coarse grain sub angular to sub rounded sand, 15% angular to sub angular volcanic granules/pea gravel to 1", 10% silt, moderate calcareous cement and coatings.
27–30			SP-SM		POORLY GRADED SAND WITH SILT (SP-SM); Brown (10YR 5/4), 85% very fine to medium grain with minor coarse to very coarse angular to sub rounded sand, 2-5% angular to sub angular volcanic granules to 1/4", 10% silt, moderately calcareous. Gravelly zone, gravels to 3" diameter.
30–35			CL		LEAN CLAY (CL); Yellowish gray (5Y7/2).



Bottom of borehole at 35.0 feet bgs.

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WELL NUMBER PC-147

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/20/10 **COMPLETED** 6/20/10
TOC ELEVATION **HOLE SIZE** 6"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: **AT TIME OF DRILLING** Dry
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10			SP-SM		POORLY GRADED SAND WITH SILT (SP-SM); Reddish brown (5YR 5/4), 80% very fine to medium grain with common coarse to very coarse grain sub angular to sub rounded sand, 10% volcanic angular to sub rounded granules to 1/4", 10% silt, moderate calcareous coatings and cement throughout.
11–15			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Reddish brown (5YR 5/4), 75% very fine to coarse grain with monor very coarse grain sub angular to sub rounded sand, 15% angular to sub rounded granules/pea gravel to 1", 10% silt, moderate calcareous cement/coatings throughout.
16–25			SP-SM		
26–30			SP-SM		POORLY GRADED SAND WITH SILT (SP-SM); Brown (10YR 5/4), 85% very fine to medium grain with minor coarse to very coarse grain angular to sub rounded sand, 2-5% angular to sub rounded volcanic granules to 1/4", 10% silt, moderately calcareous.
31–34			CL		LEAN CLAY (CL); Yellowish gray (10YR 7/2).
35					

WELL DIAGRAM

Bottom of borehole at 35.0 feet bgs.

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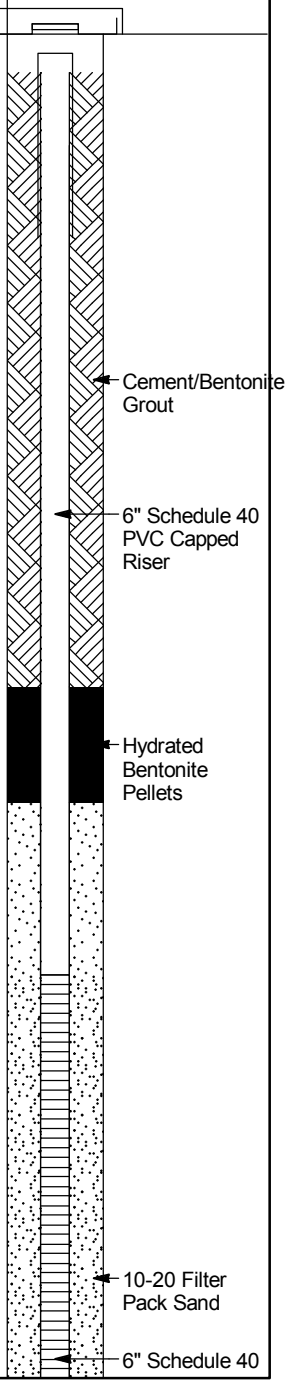
WELL NUMBER PC-148

PROJECT NAME Tronox
BORING LOCATION
PROJECT NUMBER 2027.02
PROJECT LOCATION Henderson, NV
DATE STARTED 6/19/10 **COMPLETED** 6/19/10 **TOC ELEVATION** **HOLE SIZE** 9"
DRILLING CONTRACTOR WDC **GROUNDWATER LEVELS:** ▽ **AT TIME OF DRILLING** 32.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO **SURFACE CONDITIONS:**
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10			SM		SILTY SAND (SM); Reddish brown (5YR 5/4), 75% very fine to medium grain with common coarse to very coarse grain angular to sub rounded sand, 15% silt, 10% angular to sub rounded volcanic granules/pea gravel to 1/2" (trace 1-1/2-3" pebbles locally), moderate calcareous cement and grain coatings throughout. Common-abu(?) calcareous cement from 12.5-15', 15-17' contains 25-30% silt.
11–25			SM		SILTY SAND WITH GRAVEL (SM); yellowish brown (10YR 7/2), 65% very fine to medium grain with common coarse to very coarse grain angular to sub rounded sand, 20% volcanic and caliche granules/pea gravel to 1" (locally to 3"), 15% silt, moderate to common calichification (discontinuous) and grain coatings (semi-hard).
26–35			CL		LEAN CLAY INTERBEDDED WITH SILTY CLAY (CL); yellowish gray (5Y 7/2) to 32.5 then pale greenish yellow (10Y 8/2), 3" lense of sandy silt with 30% very fine grain sand at 32.2'. ▽

WELL DIAGRAM



GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER PC-148

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			CL		LEAN CLAY INTERBEDDED WITH SILTY CLAY (CL); yellowish gray (5Y 7/2) to 32.5 then pale greenish yellow (10Y 8/2), 3" lense of sandy silt with 30% very fine grain sand at 32.2'. *(continued)*	PVC 0.010" Slotted Well Screen
37						
38						
39						
40						
41						
42						
43						
44						
45					Common caliche nodules, semi-hard.	6" Schedule 40 PVC End Cap
46						
47						
48						
49						
50						
					Bottom of borehole at 50.0 feet bgs.	

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WELL NUMBER PC-149

PROJECT NAME Tronox
PROJECT NUMBER 2027.02
BORING LOCATION
PROJECT LOCATION Henderson, NV
DATE STARTED 6/20/10 **COMPLETED** 6/23/10
TOC ELEVATION **HOLE SIZE** 9"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 30.00 ft
DRILLING METHOD Sonic **AFTER DRILLING** --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–10			SM		SIILTY SAND (SM); Reddish brown (5YR 5/4), 75% very fine to medium grain with coarse to very coarse grain angular to sub rounded sand, 15% silt, 10% angular to sub rounded volcanic granules/pea gravel to 1/2", moderate calcareous cement and grain coatings throughout.
11–20			SM		SILTY SAND WITH GRAVEL (SM); Yellowish brown (10YR 7/2), 65% very fine to medium grain with common coarse to very coarse grain angular to sub rounded sand, 20% volcanic and caliche granules/pea gravel to 1", 15% silt, moderate to common calcareous cement and calichification.
21–30			SP		POORLY GRADED SAND WITH SILT (SP); Grayish orange (10YR 7/4), 90% very fine to fine with medium to very coarse grain sub angular to sub rounded sand, 10% silt to 40' then 20% silt to 32', 1-2% volcanic granules to 1/4", moderate to common soft caliche cement and coatings, hard discontinuous caliche from 31.5-32'.
31–35			CL		LEAN CLAY (CL); Moderate yellowish gray (5GY 6/2) to 39' then yellowish gray to 41', pale greenish yellow (10YR 8/2) to 50'. 6" caliche zone at 36'.

WELL DIAGRAM

- Cement/Bentonite Grout
- 6" Schedule 40 PVC Capped Riser
- Hydrated Bentonite Pellets
- 10-20 Filter Pack Sand
- 6" Schedule 40

GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER PC-149

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			CL		LEAN CLAY (CL); Moderate yellowish gray (5GY 6/2) to 39' then yellowish gray to 41', pale greenish yellow (10YR 8/2) to 50'. 6" caliche zone at 36'. *(continued)*	PVC 0.010" Slotted Well Screen
37						
38						
39						
40						
41						
42						
43						
44						
45						6" Schedule 40 PVC End Cap
46						
47						
48					Common caliche nodules to 1-1/2".	
49						
50						
					Bottom of borehole at 50.0 feet bgs.	

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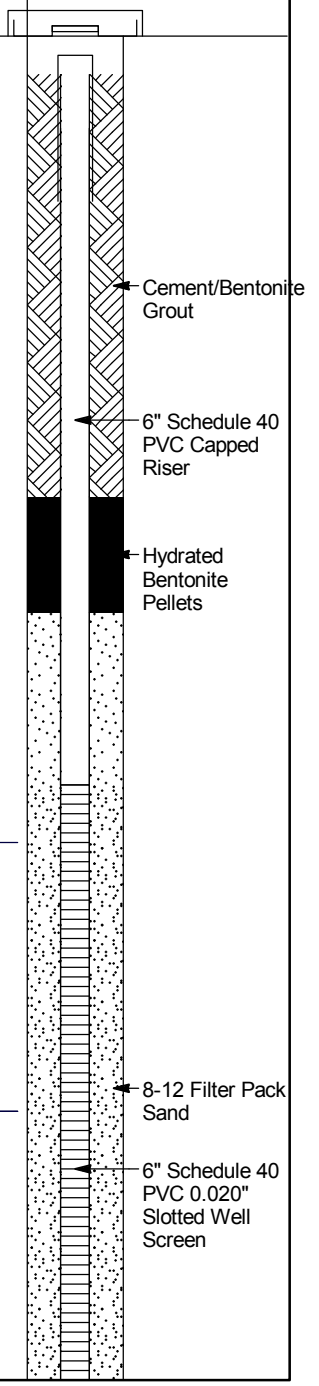
WELL NUMBER PC-150

PROJECT NAME Tronox
BORING LOCATION
PROJECT NUMBER 2027.02
PROJECT LOCATION Henderson, NV
DATE STARTED 6/29/10 **COMPLETED** 6/30/10
TOC ELEVATION **HOLE SIZE** 9"
DRILLING CONTRACTOR WDC
GROUNDWATER LEVELS: ▽ **AT TIME OF DRILLING** 26.00 ft
DRILLING METHOD Sonic
AFTER DRILLING --- **AT END OF DRILLING** ---
LOGGED BY EK **CHECKED BY** JWO
SURFACE CONDITIONS:
NOTES:

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
1–5			SM		SILTY SAND WITH GRAVEL (SM); Reddish brown (5YR 5/4), 65% fine to medium grain with common coarse to very coarse grain angular to sub angular sand, 20% angular to sub rounded volcanic and caliche granules/pea gravel to 3/4" with local 2-3" cobbles, 15% silt in matrix, moderate to common calcareous grain coatings and soft cement throughout.
6–10					Common-abu(?) soft cement.
11–15					
16–20					
21–25					
26–28					▽ Decrease in silt to 5-10%, increase in pea gravel to 25-30%, 6" layer of 3-4" cobbles at 28'.
29–35			SM		SILTY SAND WITH GRAVEL (SM); Brown (10YR 5/4), 60-75% fine to medium grain with minor coarse to very caorse grain sand, 10-20% angular to sub rounded volcanic granules/pea gravel to 1/2", 5-25% silt, slightly calcareous except 34-39'. Clean sand (<10% silt) at 28-28.5', 29-30', 31.5-32', 34-39'. Silty sand (20-25% silt) 28.5-29', 30-31.5', 32-34'.

WELL DIAGRAM



GENERAL_NORTHGATE ENV_FORMATION_OS 2027.02_T_23_BORING_LOGS.GPJ 11/16/10

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WELL NUMBER PC-150

PROJECT NAME Tronox **BORING LOCATION**

PROJECT NUMBER 2027.02 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	FORMATION	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
36			SM		SILTY SAND WITH GRAVEL (SM); Brown (10YR 5/4), 60-75% fine to medium grain with minor coarse to very caorse grain sand, 10-20% angular to sub rounded volcanic granules/pea gravel to 1/2", 5-25% silt, slightly calcareous except 34-39'. Clean sand (<10% silt) at 28-28.5', 29-30', 31.5-32', 34-39'. Silty sand (20-25% silt) 28.5-29', 30-31.5', 32-34'. *(continued)*	
37						
38						
39					Common 3-4" thick hard calichified sand and clean sand.	
40					Common 3-4" thick hard calichified sand and clean sand. *(continued)*	6" Schedule 40 PVC End Cap
41			CL		LEAN CLAY (CL); Light greenish gray (5GY 8/1), non-calcareous.	
42						
43						
44						
45					Bottom of borehole at 45.0 feet bgs.	