

**ENSR**

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April 9, 2007

Ms. Susan Crowley  
Tronox LLC  
P. O. Box 55  
Henderson, Nevada 89009

**ENSR Project: 04020-023-420**

**Subject: Volume Determination of Manganese Tailings Pile, Tronox Facility, Henderson, Nevada.**

Dear Ms. Crowley:

At your direction, ENSR drilled and sampled nine soil borings in the manganese tailings (Mn tailings) pile on the Tronox LLC (TRX) facility in Henderson, Nevada. The scope of work also included estimating the in-place volume of the Mn tailings. Field work was conducted on September 13 and 14, 2006, under the Master Services Agreement OKC MWA C-1488-11 between TRX Corporation and ENSR, and as described in the ENSR proposal dated August 23, 2006. Mr. Edward J. Krish was mobilized as the project supervising geologist and Mr. Eric Nelson as the staff geologist. Mr. David Gerry was the Nevada Certified Environmental Manager directing the activities.

### **Task 1: Drill and Sample Nine Soil Borings**

According to existing maps and aerial photographs provided by Tronox, the Mn tailings pile is estimated to encompass an area of approximately eight-acres. ENSR contracted with WDC Exploration & Wells in Las Vegas, Nevada, to drill nine borings on the Mn tailings pile. The borings were laid out as a grid of three borings on three parallel traverses. Borings were drilled through the Mn tailings pile and terminated in the underlying native soil at depths ranging between 10 feet below ground surface (bgs) and 31 feet bgs. In general, the Mn tailings are composed of various combinations of dark gray to dark brown silty clay, silty sand and sandy clay with minor amounts of fine gravel. The underlying alluvium consists of light brown silty sand and silty gravelly sand. A total of 180 feet were drilled between the nine boring locations.

The borings were drilled using a hollow-stem auger. Split-spoon and bulk soil samples were collected approximately every ten feet, or from the approximate top, middle, and bottom of the pile. Additional split-spoon soil samples were collected, as needed, to confirm the location of the interface between the overlying Mn tails and the underlying native soil. The split-spoon and bulk samples are archived at the Tronox Henderson facility. The boring locations were surveyed using a high resolution GPS and are shown on **Plate 1**, the Manganese Tailings Reserve Map. Lithologic descriptions of the Mn tailings material were recorded for the nine borings (**Appendix A**). The soil boring drilling statistics and soil samples collected during this drilling activity are listed in **Table 1**. Three bulk samples of approximately 15 pounds each, MN-

Ms. Susan Crowley  
Tronox LLC  
Page 2

1-1-5, MN-6-10-15, and MN-9-25-30, were shipped to McClelland Labs in Sparks, Nevada on behalf of AIG for Profile 1 testing per the Meteoric Water Mobility Procedure.

### **Task 2: Calculation of the Volume of the Manganese Tailings Pile**

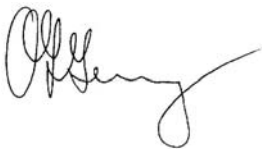
A search of the old Basic Magnesium, Inc. drawings collection yielded the pre-tails 1944 as-built drawings of the area. **Plate 2**, the Pre-Tailings Surface Configuration Map, shows the locations of the old cooling tower, roads, railroad grades, berms, and basins with spot elevations. These data, combined with the current topographic map of the Mn tailings pile, **Plate 1**, and the base elevations of the tailings from the drill holes, were used to construct the three cross sections of the Mn tailings pile (**Figures 1, 2, and 3**).

To calculate the volume of the Mn tailings pile, a cross-sectional block model technique was used. The pile was subdivided into three blocks as shown on **Plates 1 and 2**, each with a width extending half way between the adjacent drill hole and/or the edge of the pile.

The area of Mn tails in each cross section was measured and extrapolated across the width of the block to arrive at the cubic feet of tailings in each block. These cubic feet values were converted to cubic yards and summed to arrive at the total cubic yards of tailings in the pile. The calculation for each block is shown on its' respective figure. The results show that approximately 40,023 cubic yards of tails are in Block A, approximately 67,453 cubic yards are in Block B and approximately 105,555 cubic yards are in Block C, for a grand total of approximately 213,031 cubic yards of Mn tailings in the pile.

If you have any questions or concerns please contact me at 405-760-5777 or [ekrish@frontiernet.net](mailto:ekrish@frontiernet.net).

Sincerely,



David L. Gerry, R.G., C.E.G.  
Senior Program Manager



Ed Krish  
Supervising Geologist

Attachments:

Plate 1: Manganese Tailings Reserve  
Plate 2: Pre-Tailings Surface Configuration

Figure 1: Manganese Tailings – Block A North-South Cross Section A-A'  
Figure 2: Manganese Tailings – Block B North-South Cross Section B-B'  
Figure 3: Manganese Tailings – Block C North-South Cross Section C-C'

Ms. Susan Crowley  
Tronox LLC  
Page 3

Table 1: Drilling Statistics, Manganese Tailings Pile, September 2006

Appendix A: Lithology Logs

## PLATES



J:\TronoxGIS\mxd\Manganese tailings\mn-tailings600.mxd



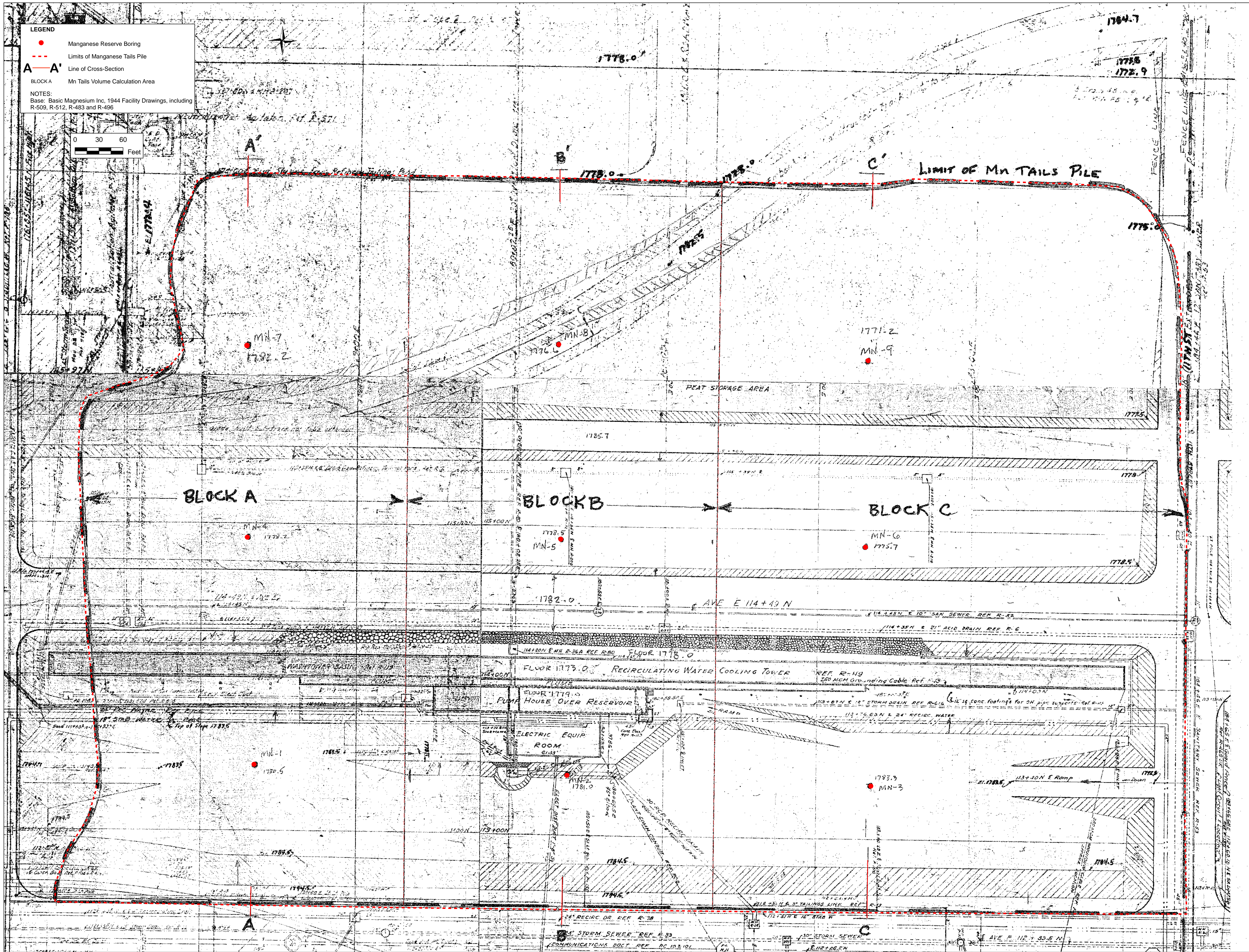
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EK		TM		EK		EK	
NO.		DESCRIPTION		DATE		BY	

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<b>MANGANESE TAILINGS RESERVE</b>	
SITE INVESTIGATION Tronox Facility Henderson, Nevada	
SCALE: 1:600	PROJECT NUMBER: 04020-023-420
DATE: 2/28/2007	

PLATE NUMBER:	<b>1</b>
SHEET NUMBER:	X



DESIGNED BY:	REVISIONS
E. Kish	NO.:
T. Madson	DESCRIPTION:
CHECKED BY:	DATE:
E. Kish	BY:
APPROVED BY:	
D. Gentry	

**ENSR AECOM**

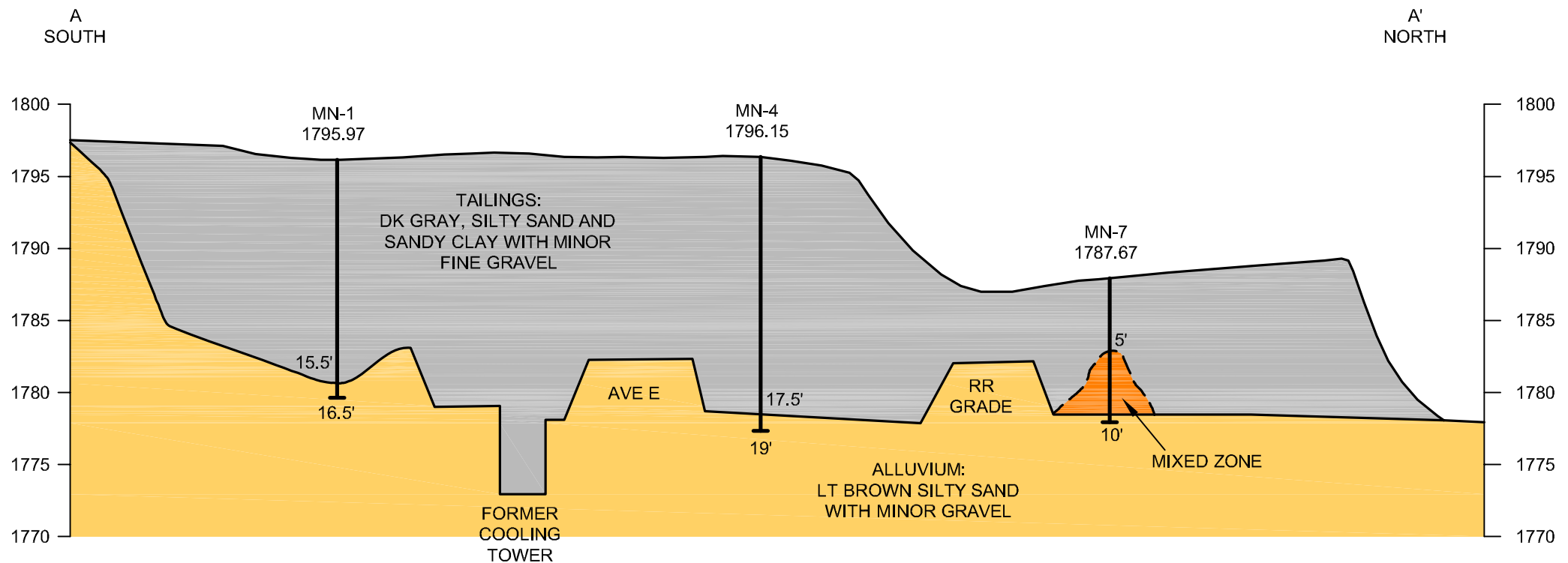
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**PRE-TAILINGS SURFACE CONFIGURATION**  
 MANGANESE TAILINGS RESERVE  
 SITE INVESTIGATION  
 TRONOX FACILITY  
 HENDERSON, NEVADA

PROJECT NUMBER: 04020-023-420  
 DATE: 3/14/2007  
 SCALE: 1:360

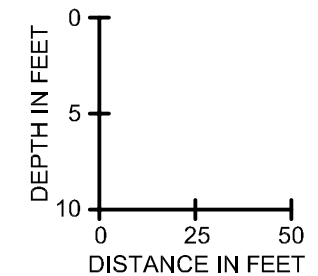
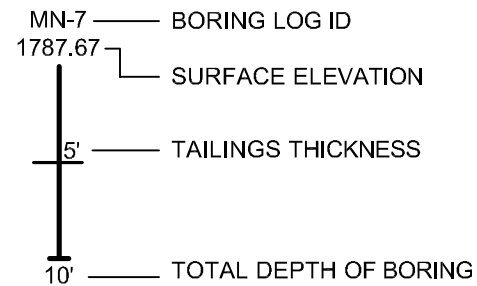
J:\Tronox\GIS\med\Manganese tailings\tailings\scan.mxd

## FIGURES



**BLOCK A**

CROSS SECTIONAL AREA (FT<sup>2</sup>) = 5687.5  
 BLOCK WIDTH (FT) = 190 (wt. ave)  
 TOTAL CUBIC FEET = 1,080,625  
 TOTAL CUBIC YARDS = 40,023



DESIGNED BY:		DRAWN BY:		CHECKED BY:		APPROVED BY:	
E. Krish		M. Scop		E. Krish		E. Krish	

NO.	DESCRIPTION	DATE	BY:

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**MANGANESE TAILINGS - BLOCK A**  
**NORTH - SOUTH CROSS SECTION A-A'**

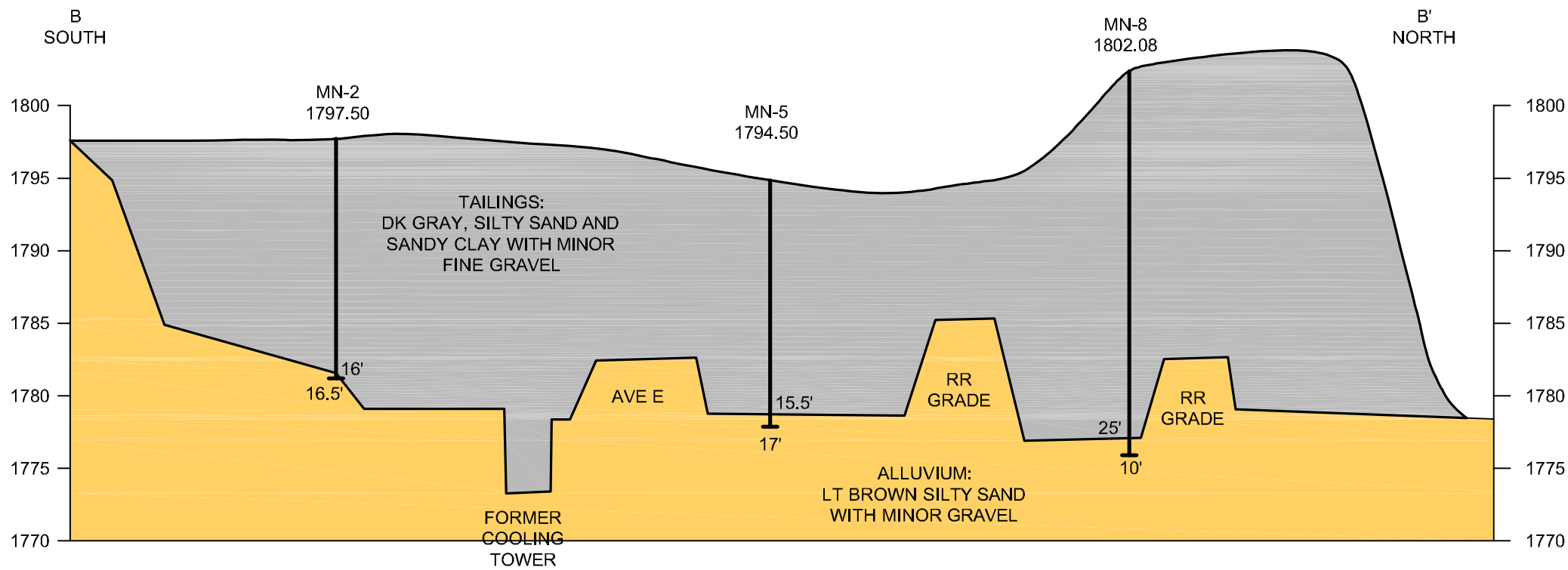
Tronox Facility  
 Henderson, Nevada

SCALE:	DATE:	PROJECT NUMBER:
as noted	3/28/2007	04020-023-420

FIGURE NUMBER:
<b>1</b>
SHEET NUMBER:
X

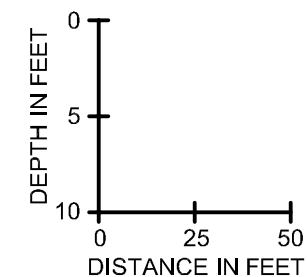
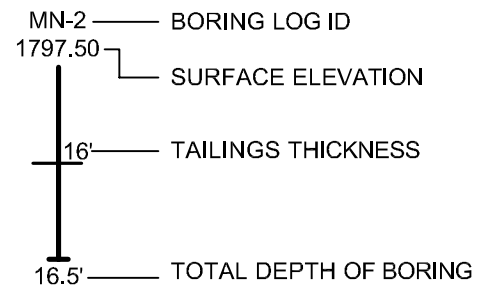
FILENAME:





**BLOCK B**

CROSS SECTIONAL AREA (FT<sup>2</sup>) = 7750  
 BLOCK WIDTH (FT) = 235  
 TOTAL CUBIC FEET = 1,821,250  
 TOTAL CUBIC YARDS = 67,453



DESIGNED BY:		DRAWN BY:		CHECKED BY:		APPROVED BY:	
E. Krish		M. Scop		E. Krish		E. Krish	
NO.:		NO.:		NO.:		NO.:	
REVISIONS		DESCRIPTION:		DATE:		BY:	

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**MANGANESE TAILINGS - BLOCK B**  
**NORTH - SOUTH CROSS SECTION B-B'**

Tronox Facility  
 Henderson, Nevada

DATE: 3/28/2007  
 PROJECT NUMBER: 04020-023-420  
 SCALE: as noted

FIGURE NUMBER:  
**2**

SHEET NUMBER:  
 X



## TABLES

**Table 1. Drilling Statistics for the Manganese Tailings Pile**

Tronox Facility, Henderson Nevada

Boring ID	Easting <sup>1</sup>	Northing <sup>1</sup>	Surface Elevation (feet)	Total Depth (feet)	Thickness of Mn Tails (feet)	Depth of Water Perched in Mn Tails (feet bgs)	Bottom Elevation of Mn Tails (feet bgs)	Split Spoon Samples Collected (feet bgs)	Bulk Samples Collected (feet bgs)
<b>MN-1</b>	828446.716	26718384.506	1795.97	16.5	15.5	dry	1780.47	0-1.5	1-5*
								5-6.5	5-10
								10-11.5	10-15
								12.5-14	
								15-16.5	
<b>MN-2</b>	828648.251	26718415.216	1797.50	16.5	16.0	15.0	1781.50	0-1.5	1-5
								5-6.5	5-10
								10-11.5	10-15
								15.5-16.5	
<b>MN-3</b>	828845.441	26718445.992	1797.81	16.5	15.0	14.5	1782.81	0-1.5	1-5
								5-6.5	5-10
								10-11.5	10-15
								15-16.5	
<b>MN-4</b>	828417.304	26718529.372	1796.15	19.0	17.5	17.5	1778.65	0-1.5	5-10
								10-11.5	10-15
								17.5-19	15-18
<b>MN-5</b>	828617.569	26718565.853	1794.50	17.0	15.5	10.0	1779.00	0-1.5	1-5
								10-11.5	5-10
								15.5-17	10-15
<b>MN-6</b>	828816.869	26718596.661	1801.70	26.5	25.5	12.0	1776.20	0-1.5	1-5
								15-16.5	10-15*
								25-26.5	20-25
<b>MN-7</b>	828394.842	26718653.665	1787.67	10.0	5.0	dry	1782.67	0-1.5	1-5
								5-6.5	5-10
<b>MN-8</b>	828593.194	26718692.603	1802.08	26.5	25.0	dry	1777.08	0-1.5	1-5
								15-16.5	10-15
								25-26.5	20-25
<b>MN-9</b>	828795.182	26718716.346	1802.22	31.5	30.5	13.0	1771.72	0-1.5	1-5
								15-16.5	15-20
								25-26.5	25-30*
								30-31.5	

**NOTES:**


1) NV State Plane Coordinates


bgs = below ground surface


Mn - Manganese

\* Bulk samples sent to McClelland Labs, Sparks, Nevada


## APPENDIX A


		Client: <i>Tronox</i>					BORING ID: <i>Mn-1</i>			
		Project Number: <i>04020-023-420</i>								
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>					Sheet: <i>1 of 1</i>			
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>			Elevation:		Monitoring Well Installed: <i>No</i>			
		Drilling Method: <i>Hollow Stem Auger</i>			Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i> Screened Interval:			
Weather: <i>Sunny, Windy</i>					Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/13/06 1010</i>		Depth of Boring: <i>16.5'</i>	
Drilling Contractor: <i>WDC Drilling Inc.</i>					Ground Elevation:		Date/Time Finished: <i>9/13/06 1046</i>		Water Level: <i>NA</i>	
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)	
1		0-1.5	17,25,19	18	--	SM	MANGANESE TAILINGS from 0 to 15.5 feet SILTY SAND, dark gray, 60% subangular, fine grained sand, 40% fines, dry, med. density, no odor or staining observed. The top 6 inches of this area are covered with SANDY GRAVEL, light gray, 70% subangular, fine grained gravel, max gravel size is 0.75 inch, 20% sand, 10% silt, dry, medium density, no odor or staining observed.	Mn-1-0-1.5	0-1.5	
2										
3										
4										
5		5-6.5	7,8,8	18	--	SM	SILTY SAND, dark gray, subangular, medium grained sand, fine grained gravel, 65% sand, 30% fines, 5% gravel, low density, dry, some Mn ore, max gravel size 0.75, no odor or staining observed.	Mn-1-5-6.5	5-6.5	
6										
7										
8										
9										
10		10-11.5	2,10,30	18	--	SM	SILTY SAND, dark gray, subangular, medium grained sand, coarse grained gravel, 60% sand, 30% fines, 10% gravel, medium density, moist, some Mn ore, max gravel size 2.5 inchs, no odor or staining observed.	Mn-1-10-11.5	10-11.5	
11										
12										
13		12.5-14	11,12,21	14	--	SM	SILTY SAND, dark gray, subangular, medium grained sand, fine grained gravel, 65% sand, 30% fines, 5% gravel, low density, moist, some Mn ore, max gravel size 0.25 inch, no odor or staining observed.	Mn-1-12.5-14	12.5-14	
14										
15		15-15.5 15.5-16.5	7,21,30	14	--	SM	<b>Mn Tailings-Alluvium Contact</b>	Mn-1-15-16.5	15-16.5	
16						SM	<b>ALLUVIUM at 15.5 feet</b> SILTY SAND, light brown, subangular, medium grained sand, 65% sand, 30% fines, low density, dry, alluvium contact at 15.5 feet, no odor or staining observed. Boring Terminated at 16.5 Feet target depth achieved			
17										
18										
19										
20										
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling	
									NA	
Checked by _____ SWB							Date: 04/09/07 _____			

		Client: <i>Tronox</i>					BORING ID: <i>Mn-2</i>			
		Project Number: <i>04020-023-420</i>								
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>					Sheet: <i>1 of 1</i>			
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>			Elevation:		Monitoring Well Installed: <i>No</i>			
		Drilling Method: <i>Hollow Stem Auger</i>			Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i> Screened Interval:			
Weather: <i>Sunny, Windy</i>					Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/13/06 1245</i>		Depth of Boring: <i>16.5'</i>	
Drilling Contractor: <i>WDC Drilling Inc.</i>					Ground Elevation:		Date/Time Finished: <i>9/13/06 1302</i>		Water Level: <i>15' (perched)</i>	
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)	
1		0-1.5	5,4,8	18	--	CL	<b>MANGANESE TAILINGS from 0 to 16 feet</b> SANDY CLAY, dark gray, 80% medium plastic fines, 20% subangular, fine grained sand, moist, medium density, medium plasticity, no odor or staining observed The top 6 inches are covered with SILTY GRAVEL, gray, 70% subangular, fine gravel, max gravel size 0.75, 10% fine grained sand, 20% non to low plastic fines, dry, low density, no odor or staining observed	Mn-2-0-1.5	0-1.5	
2										
3										
4										
5		5-6.5	2,3,3	18	--	CL	SANDY CLAY, dark gray, subangular, fine grained sand, 10% sand, 90% fines, soft, high plasticity, moist, no odor or staining observed.	Mn-2-5-6.5	5-6.5	
6										
7										
8										
9										
10		10-11.5	1,1,2	16	--	CL	SANDY CLAY, dark gray, subangular, fine grained sand, 10% sand, 90% fines, very soft, high plasticity, moist, no odor or staining observed.	Mn-2-10-11.5	10-11.5	
11										
12										
13										
14										
15		15-16	6,12,15	9	--	CL	SANDY CLAY, as above, wet.	Mn-2-15-16.5	15-16.5	
16		16-16.5					<b>Mn Tailings-Alluvium Contact</b>			
17						SM	ALLUVIUM at 16 feet SILTY SAND, light brown, subangular, fine grained sand, 60% sand, 40% fines, medium density, dry, alluvium contact 16-16.5 feet, no odor or staining observed. Boring Terminated at 16.5 Feet, target depth achieved.			
18										
19										
20										
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling	
							9/13/06	1302	15' perched	
Checked by _____ SWB							Date: 04/09/07 _____			

		Client: Tronox					BORING ID: Mn-3				
		Project Number: 04020-023-420									
		Site Location: Manganese tailings pile, Henderson, NV					Sheet: 1 of 1				
		Coordinates: T 22S, R 62E, SE 1/4 sec 12			Elevation:		Monitoring Well Installed: No				
		Drilling Method: Hollow Stem Auger			Sample Type(s): Split Spoon		Boring Diameter: 8"		Screened Interval:		
Weather: Sunny, Windy					Logged By: E. Nelson		Date/Time Started: 9/13/06 1314		Depth of Boring: 16.5'		
Drilling Contractor: WDC Drilling Inc.					Ground Elevation:		Date/Time Finished: 9/13/06 1330		Water Level: 15' (perched)		
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)		
1		0-1.5	5,7,5	18	--	CL	MANGANESE TAILINGS from 0 15 feet SILTY CLAY, dark gray, subangular, fine grained sand, 5% sand, 80% fines, dry, medium stiffness, high plasticity, no odor or staining observed. The top 6 inches are	Mn-3-0-1.5	0-1.5		
2							SANDY GRAVEL, gray, 90% subangular, fine grained gravel, max gravel size 0.5 inches, 5% fine grained sand, dry, low density, no odor or staining observed				
3											
4											
5		5-6.5	2,3,4	18	--	CL	SILTY CLAY, dark gray, 90% clay, moist, medium stiffness, high plasticity, no odor or staining observed.	Mn-3-5-6.5	5-6.5		
6											
7											
8											
9											
10		10-11.5	1,1,2	16	--	CL	SANDY CLAY, dark gray, subangular, fine grained sand, 10% sand, 90% fines, very soft, high plasticity, moist, no odor or staining observed.	Mn-3-10-11.5	10-11.5		
11											
12											
13											
14											
15		15-16.5	10,34,40	9	--	CH	SILTY CLAY, dark gray, 95% clay, wet, stiff, high plasticity, no odor or staining observed. <b>Mn Tailings-Alluvium Contact</b>	Mn-3-15-16.5	15-16.5		
16						SM	ALLUVIUM SILTY SAND, light brown, subangular, coarse grained sand, fine grained gravel, 65% sand, 30% fines, 5% gravel, dense, dry, alluvium contact 15-15.5 feet, max gravel size .1, no odor or staining observed.				
17							Boring Terminated at 16.5 Feet, target depth achieved.				
18											
19											
20											
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling		
							9/13/2006	1330	15' perched		
Checked by _____ SWB							Date: 04/09/07 _____				





		Client: <i>Tronox</i>					<b>BORING ID: Mn-4</b>		
		Project Number: <i>04020-023-420</i>							
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>					Sheet: <i>1 of 1</i>		
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>			Elevation:		Monitoring Well Installed: <i>No</i>		
		Drilling Method: <i>Hollow Stem Auger</i>			Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i> Screened Interval:		
Weather: <i>Sunny, Windy</i>					Logged By: <i>E. Nelson</i>	Date/Time Started: <i>9/13/06 1353</i>	Depth of Boring: <i>19'</i>		
Drilling Contractor: <i>WDC Drilling Inc.</i>					Ground Elevation:	Date/Time Finished: <i>9/13/06 1407</i>	Water Level: <i>17.5' (perched)</i>		
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
1		0-1.5	6,4,6	18	--	SM/ML	<b>MANGNESE TAILINGS from 0 to 17.5 feet</b> SILTY SAND TO SANDY SILT, dark gray, 50% subangular, fine grained sand, 50% silt, low density, dry, low plasticity, some iron staining, no odor observed. The top 6 inches are SANDY GRAVEL, light gray, 70% subangular, fine grained gravel, max gravel size 0.25 inches, 20% fine grained sand, 10% silt, dry, low density, no odor or staining observed	Mn-4-0-1.5	0-1.5
2									
3									
4									
5									
6									
7									
8									
9									
10		10-11.5	6,7,5	18	--	ML	SANDY SILT, dark gray, subangular, medium grained sand, 30% sand, 70% fines, low density, moist, medium plasticity, no odor or staining observed.	Mn-4-10-11.5	10-11.5
11									
12									
13									
14									
15									
16									
17						CL	SANDY CLAY, dark gray, subangular, fine grained sand, 30% sand, 70% fines, medium plasticity, stiff, no odor or staining observed.		
18		17.5-19	19,23,20	15	--		<b>Mn Tailings-Alluvium Contact</b>	Mn-4-17.5-19	17.5-19
19						SM	<b>ALLUVIUM at 17.5</b> SILTY SAND, light brown, subangular, medium grained sand, 65% sand, 30% fines, low density, dry, alluvium contact at 17.5 feet, no odor or staining observed. Boring Terminated at 19 Feet, target depth achieved.		
20									
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored						Date	Time	Depth to groundwater while drilling	
						9/13/06	1407	17.5' perched	
Checked by _____ SWB						Date: <u>04/09/07</u>			

		Client: <i>Tronox</i>					<b>BORING ID: Mn-5</b>			
		Project Number: <i>04020-023-420</i>								
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>					Sheet: <i>1 of 1</i>			
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>			Elevation:		Monitoring Well Installed: <i>No</i>			
		Drilling Method: <i>Hollow Stem Auger</i>			Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i>		Screened Interval:	
Weather: <i>Sunny, Windy</i>					Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/13/06 1437</i>		Depth of Boring: <i>17'</i>	
Drilling Contractor: <i>WDC Drilling Inc.</i>					Ground Elevation:		Date/Time Finished: <i>9/13/06 1459</i>		Water Level: <i>10' (perched)</i>	
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)	
1		0-1.5	6,7,12	18	--	CL	<b>MANGANESE TAILINGS from 0 to 16 feet</b> SILTY CLAY, dark brown, 90% clay, moist, stiff, medium plasticity, no odor or staining observed. The top 6 inches are SANDY GRAVEL, light gray, 80% subangular, fine grained gravel, max gravel size 0.25 inches, 15% coarse grained sand, 5% silt, dry, low density, no odor or staining observed	Mn-5-0-1.5	0-1.5	
2										
3										
4										
5										
6										
7										
8										
9										
10		10-11.5	6,5,6	12	--	CL	SANDY CLAY, dark gray to black, subangular, coarse grained sand, 15% gravel, 30% sand, 55% fines, max gravel size 0.2 inches, stiff, wet, low plasticity, no odor or staining observed.	Mn-5-10-11.5	10-11.5	
11										
12										
13										
14										
15										
16		15.5-17	11,15,16	18	--	CL	SANDY CLAY, dark gray, subangular, fine grained sand, fine grained gravel, 15% gravel, 35% sand, 50% fines, max gravel size .2, medium plasticity, medium density, no odor or staining observed.	Mn-5-15.5-17	15.5-17	
17						SM	<b>ALLUVIUM at 16 feet</b> SILTY SAND, light brown, subangular, coarse grained sand, fine grained gravel, max gravel size .2, 10% gravel, 40% sand, 50% fines, low density, dry, non-plastic, alluvium contact at 16 feet, no odor or staining observed. Boring Terminated at 17 Feet, target depth achieved.			
18										
19										
20										
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling	
							9/13/06	1448	10' perched	
Checked by _____ SWB      Date: 04/09/07 _____										



		Client: <i>Tronox</i>				<b>BORING ID: Mn-6</b>			
		Project Number: <i>04020-023-420</i>							
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>				Sheet: <i>2 of 2</i>			
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>		Elevation:		Monitoring Well Installed: <i>No</i>			
		Drilling Method: <i>Hollow Stem Auger</i>		Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i>			
Weather: <i>Rainy, Windy</i>				Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/14/06 0728</i>			
Drilling Contractor: <i>WDC Drilling Inc.</i>				Ground Elevation:		Date/Time Finished: <i>9/14/06 0756</i>			
						Depth of Boring: <i>26.5'</i>			
						Water Level: <i>12' (perched)</i>			
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
21							MANGANESE TAILINGS (continued)		
22									
23									
24							SANDY CLAY, black, 75% low plastic fines, 25% medium grained subangular sand, wet, stiff, no odor or staining observed		
25		25-26.5	21,45,41	14	--	CL	<b>Mn Tailings-Alluvium Contact</b>	Mn-6-25-26	25-26.5
26						SM	<b>ALLUVIUM at 26 feet</b> SILTY GRAVELLY SAND, light brown, 40% coarse grained, subangular sand, 30% coarse grained gravel, max gravel size 2.5", 30% non-plastic fines, dry, dense, no odor or staining observed. Boring Terminated at 26.5 Feet, target depth achieved.		
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling
							9/14/06	0740	12' perched
Checked by _____ SWB                      Date: ____/____/2007									

		Client: <i>Tronox</i>					<b>BORING ID: Mn-7</b>		
		Project Number: <i>04020-023-420</i>							
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>					Sheet: <i>1 of 1</i>		
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>			Elevation:		Monitoring Well Installed: <i>No</i>		
		Drilling Method: <i>Hollow Stem Auger</i>					Sample Type(s): <i>Split Spoon</i>		
Weather: <i>Rainy, Windy</i>					Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/14/06 0816</i>		Depth of Boring: <i>10'</i>
Drilling Contractor: <i>WDC Drilling Inc.</i>					Ground Elevation:		Date/Time Finished: <i>9/14/06 0824</i>		Water Level: <i>NA</i>
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
1		0-1.5	4,3,3	18	--	CL	<b>MANGANESE TAILINGS from 0 to 5.5 feet</b> SANDY CLAY, dark gray, 70% low plastic fines, 30% coarse grained, subangular sand, moist, medium stiffness, no odor or staining observed. The top 6" are covered with GRAVELLY SAND, light gray, 40% fine grained gravel, max gravel size 0.2", 40% coarse grained, subangular sand, 20% non-plastic fines, dry, low density, no odor or staining observed	Mn-7-0-1.5	0-1.5
2									
3									
4									
5		5-6.5	18,38,42	14	--	SM	SILTY SAND, gray mixed with brown, 60% coarse grained, subangular sand, 40% low plastic fines, low density, no odor or staining observed at 5 ft. <b>Mn Tailings-Alluvium Contact</b>	Mn-7-5-6.5	5-6.5
6						GM	ALLUVIUM at 5.5 feet SILTY GRAVELLY SAND, light brown, 40% coarse grained, subangular sand, 35% fine grained gravel, max gravel size 0.75", 25% low plastic fines, dense, dry, no odor or staining observed.		
7									
8									
9									
10							Boring Terminated at 10 Feet		
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling
									NA
Checked by _____ SWB                      Date: ____/4/9/2007									

		Client: <i>Tronox</i>					<b>BORING ID: Mn-8</b>		
		Project Number: <i>04020-023-420</i>							
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>					Sheet: <i>1 of 2</i>		
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>			Elevation:		Monitoring Well Installed: <i>No</i>		
		Drilling Method: <i>Hollow Stem Auger</i>			Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i>		Screened Interval:
Weather: <i>Rainy, Windy</i>					Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/14/06 0839</i>	Depth of Boring: <i>26.5'</i>	
Drilling Contractor: <i>WDC Drilling Inc.</i>					Ground Elevation:		Date/Time Finished: <i>9/14/06 0908</i>	Water Level: <i>NA</i>	
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
1		0-1.5	5,6,9	18	--	CL	<b>MANGANESE TAILINGS from 0 to 25 feet</b> SANDY CLAY, dark gray, 70% medium plasticity clay, 25% medium grained, subangular sand, dry, stiff, no odor or staining observed. The top 6" are SANDY GRAVEL, light gray, 60% fine grained gravel, max gravel size 0.5", 30% coarse grained, subangular sand, 10% non-plastic fines, dry, low density, no odor or staining observed.	Mn-6-0-1.5	0-1.5
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15		15-16.5	25,33,35	12	--	SM	SILTY SAND, dark gray, 50% coarse grained, subangular sand, 45% low plastic fines, 5% fine grained gravel, max gravel size 0.2, dry, dense, 6" concrete slab encountered at 15.5', no odor or staining observed	Mn-8-15-16.5	15-16.5
16									
17									
18									
19									
20									
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling
									NA
Checked by _____ SWB							Date: 4/9/2007		

		Client: <i>Tronox</i>				<b>BORING ID: Mn-8</b>			
		Project Number: <i>04020-023-420</i>							
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>							
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>		Elevation:		Sheet: <i>2 of 2</i>			
		Drilling Method: <i>Hollow Stem Auger</i>				Monitoring Well Installed: <i>No</i>			
Sample Type(s): <i>Split Spoon</i>			Boring Diameter: <i>8"</i>		Screened Interval:				
Weather: <i>Rainy, Windy</i>				Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/14/06 0839</i>			
Drilling Contractor: <i>WDC Drilling Inc.</i>				Ground Elevation:		Date/Time Finished: <i>9/14/06 0908</i>			
						Depth of Boring: <i>26.5'</i>			
						Water Level: <i>NA</i>			
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	<b>MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)</b>	Lab Sample ID	Lab Sample Depth (Ft.)
21							MANGANESE TAILINGS (continued)		
22									
23									
24							SANDY SILT, dark gray, 60% low plastic fines, 40% coarse grained, subangular sand, moist, medium density, no odor or staining observed at 25 feet.		
25		25-26.5	11,20,26	18	--	ML	<b>Mn Tailings-Alluvium Contact</b>	Mn-8-25-26	25-26.5
26						SM	<b>ALLUVIUM at 25.5 feet</b> SILTY GRAVELLY SAND, light brown, 40% coarse grained, subangular sand, 30% fine grained gravel, max gravel size 0.2" 30% non-plastic fines, dry, medium density, no odor or staining observed Boring Terminated at 26.5 Feet, target depth achieved.		
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling
									NA
Checked by _____ SWB      Date: ____/4/9/2007									

		Client: <i>Tronox</i>				<b>BORING ID: Mn-9</b>			
		Project Number: <i>04020-023-420</i>							
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>				Sheet: <i>1 of 2</i>			
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>		Elevation:		Monitoring Well Installed: <i>No</i>			
		Drilling Method: <i>Hollow Stem Auger</i>		Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i>		Screened Interval:	
Weather: <i>Rainy, Windy</i>				Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/14/06 0922</i>		Depth of Boring: <i>26.5'</i>	
Drilling Contractor: <i>WDC Drilling Inc.</i>				Ground Elevation:		Date/Time Finished: <i>9/14/06 0952</i>		Water Level: <i>13' (perched)</i>	
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
1		0-1.5	7,7,7	18	--	CL	<b>MANGANESE TAILINGS from 0 to 31 feet</b> CLAY to SANDY CLAY, dark gray, 90% medium plastic fines, 10% fine grained, subangular sand, moist, medium stiffness, no odor or staining observed. The top 6" are covered SANDY GRAVEL, light gray, 60% fine grained gravel, max gravel size 0.3, 30% coarse grained, subangular sand, 10% non-plastic fines, dry, low density, no odor or staining observed	Mn-9-0-1.5	0-1.5
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15		15-16.5	1,2,3	18	--	CH		CLAY, dark gray to black, 90%-100% high plastic fines, wet, very soft, some white clay material encountered, no odor observed	Mn-9-15-16.5
16									
17									
18									
19									
20									
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling
							9/14/06	0930	13' perched
Checked by _____ SWB                      Date: ____/____/2007									



		Client: <i>Tronox</i>				<b>BORING ID: Mn-9</b>			
		Project Number: <i>04020-023-420</i>							
		Site Location: <i>Manganese tailings pile, Henderson, NV</i>				Sheet: <i>2 of 2</i>			
		Coordinates: <i>T 22S, R 62E, SE 1/4 sec 12</i>		Elevation:		Monitoring Well Installed: <i>No</i>			
		Drilling Method: <i>Hollow Stem Auger</i>		Sample Type(s): <i>Split Spoon</i>		Boring Diameter: <i>8"</i>			
Weather: <i>Rainy, Windy</i>				Logged By: <i>E. Nelson</i>		Date/Time Started: <i>9/14/06 0922</i>			
Drilling Contractor: <i>WDC Drilling Inc.</i>				Ground Elevation:		Date/Time Finished: <i>9/14/06 0952</i>			
						Screened Interval:			
						Depth of Boring: <i>26.5'</i>			
						Water Level: <i>13' (perched)</i>			
Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
21							MANGANESE TAILINGS (continued)		
22									
23									
24									
25		25-26.5	6,8,7	1.5	--	CH	CLAY, black, 100% high plastic fines, wet, medium stiffness, no odor or staining observed	Mn-9-25-26	25-26.5
26									
27									
28									
29									
30		30-31.5	10,27,31	18	--	CL	CLAY to SANDY CLAY, black, 85% medium plastic fines, 15% coarse grained, subangular sand, wet, stiff, no odor or staining observed	Mn-9-30-31	30-31.5
31						SM	<b>ALLUVIUM at 31 feet</b> SILTY SAND, brown, 50% coarse grained, subangular sand, 40% low plastic fines, 10% fine grained gravel, max gravel size .2", dry, medium density, no odor or staining observed. Boring Terminated at 31.5 Feet, target depth achieved.		
32									
33									
34									
35									
36									
37									
38									
39									
40									
<b>NOTES:</b> The boring was backfilled with native soil and the surface restored							Date	Time	Depth to groundwater while drilling
							9/14/06	0930	13' perched
Checked by _____ SWB      Date: ____/____/2007									