Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

Name of Facility: **LOU 31 – Drum Crushing and Recycling Area**

Goal of Closure:

- Closure for future commercial/industrial use.

Site Investigation Area:

- Size: Approximately 65 feet by 75 feet (0.11 acre) [Ref. 1].
- Location: Central portion of the Site, north of AP-5 pond (Grid L-5).
- Current Status/Features: The roof and concrete pad that housed the drum crushing machine is still present; however, this LOU is no longer in operation. A safety shower and jump tank supplied with Lake Mead water now occupy the pad.

Description:

- The hydraulic drum crusher was located on an approximately 18 foot by 18 foot roofed concrete pad without berms [Ref. 2].
- The hydraulic drum crusher was used to crush rinsed drums which previously contained ammonium perchlorate [Ref. 2].
- The drums were rinsed in the AP Process Areas [Ref. 2].
- LOU 31 was operational from 1984 to at least 1991 [Ref. 2].
- Prior to 1973, the drums were believed to have been disposed of in the BMI landfill [Ref. 2].
- Between 1973 and 1984, the drums were crushed and recycled off-site as scrap steel [Ref. 2].
- Approximately 300 empty drums were observed near the crusher and 50 crushed drums for recycling were observed to the north of LOU 31 in August 1991 [Ref. 2].
- The majority of drums were free of product and only a few contained small amounts of crystalline chlorate/perchlorate residue [Ref. 2].
- Surface run-off flows north through the drum storage area, continues for a short distance, and then flows to the east along an adjacent asphalt surfaced road [Ref. 2].
- The drums are classified as nonhazardous solid waste destined for recycling [Ref. 2].

Process Waste Stream Associated with LOU 31	Known or Potential Chemicals Associated with LOU 31
Residual crystalline chlorate/perchlorate in drums [Ref. 2].	• Metals • Crystalline Perchlorate • Crystalline Chlorate • Wet chemistry analytes

Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

Overlapping or Adjacent LOUs:

The following LOUs overlap or are adjacent to each other as shown on Figure 1:

Overlapping LOUs

- No other LOUs overlap the Drum Crushing and Recycling Area.

Adjacent LOUs

- LOU 57 (AP Plant Transfer Lines to Sodium Chlorate Process and Ponds) – Located south (upgradient) of LOU 31.
- LOU 19 (Pond AP-5) – Located southeast (upgradient and cross-gradient) of LOU 31.

LOUs Potentially Affecting Soils at LOU 31:

The following LOUs are upgradient of LOU 31; therefore, they have the potential to affect LOU 31:

- LOU 19 (Pond AP-5) – LOU 19 was used to temporarily store solutions from the AP production process and the AP plant cooling towers for recycling to the process systems. Solids from decommissioning other AP ponds were placed in the double-lined Pond AP-5. Currently the space between the Pond AP-5 liners is dry indicating that the top liner is intact). No documentation regarding pond overflow was found; however, LOU 19 is in close proximity (upgradient) of LOU 31 and has the potential to affect LOU 31.
- LOU 57 (AP Plant Transfer Lines to Sodium Chlorate Process and Ponds) – The footprint of LOU 57 is in close proximity to LOU 31. Minor leaks from pipes were repaired as needed. LOU 57 is upgradient of LOU 31 and has the potential to affect this area.

Known or Potential Chemical Classes:

- Metals
- Perchlorate
- Hexavalent Chromium
- Wet chemistry analytes

Known or Potential Release Mechanisms:

- No known releases were identified in the documents reviewed for LOU 31 [Ref. 2].
- Potential infiltration to subsurface soil and groundwater from trace crystalline residue in some drums [Ref. 2].

Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

Results of Historical Sampling:

- No historical soil sampling was identified in the documents reviewed for LOU 31.
- The closest wells I-AR and M-64 are routinely tested for hexavalent chromium, perchlorate, and TDS as part of routine groundwater monitoring program. See attached LOU 31 Table 3 for a summary of historical analytical results [Ref.1].

Did Historical Samples Address Potential Release?

- No

Summary of Phase A SAI:

Soil:

- No soil sampling was conducted specifically for this LOU. The closest boring (SA19) is approximately 170 feet to the west-northwest (downgradient) and was not sampled to evaluate LOU 31 [Ref. 3]. This boring is cross-gradient and not considered to be representative of soil conditions at LOU 31.

Groundwater:

- No groundwater sampling was conducted to specifically evaluate this LOU. The closest well sampled (I-AR) is approximately 80 feet to the southwest (upgradient) and was not sampled to evaluate LOU 31 [Ref. 3]. Water from well I-AR contains high concentrations (over 3000 mg/L) of perchlorate and is being pumped to the biological treatment plant.
- Analytical results for groundwater from the Phase A sampling event are summarized in LOU 31 Tables 1 through 2 and LOU 31 Tables 4 through 10 (see attached) [Ref.2].

Are Phase A Sample Locations in "Worst Case" Areas?

- No

Is Phase B Investigation Recommended?

- Yes

Proposed Phase B Soil Investigation/Rationale:

The Phase B investigation for LOU 31 consists of collecting soil samples from the following two (2) locations:

- Two (2) soil borings will be drilled within the boundaries of LOU 31.
- Both (2) soil borings along with the analytical program to evaluate soil samples from LOU 31 are listed on **Table A – Soil Sampling and Analytical Plan for LOU 31**.

Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

- Soil sample locations consist of judgmental locations only. The closest random grid sample (RSAM6) is located approximately 250 feet southeast of LOU 31.
- Judgmental sample locations:
  - Designed to evaluate soil for known or potential chemical classes associated with LOU 31, based on the known process waste streams.
  - Both (2) of the sample locations are judgmental locations and include soil borings SA72 and SA167.

Proposed Phase B Constituents List for Soils:

Judgmental sample locations will be analyzed for LOU-specific constituents consisting of the following:

- Metals (Phase A list)
- Hexavalent Chromium
- Perchlorate
- Wet chemistry analytes

Judgmental sample locations will also be analyzed for the following constituents for area-wide coverage purposes:

- VOCs
- Dioxins/furans
- Radionuclides
- Asbestos

Proposed Phase B Groundwater Investigation/Rationale:

The Phase B groundwater investigation of LOU 31 consists of collecting groundwater samples from two (2) locations to evaluate local groundwater conditions and as part of the Site-wide evaluation of constituent trends in groundwater. Groundwater at well I-AR contains over 3,000 mg/L of perchlorate; therefore, any impacts to groundwater from LOU 31 may not be distinguishable. The barrier wall and onsite groundwater collection system are about 200 feet downgradient of LOU 31. Perchlorate and other groundwater constituents will be handled on a Site-wide basis.

- Well I-AR is located approximately 85 feet southwest of LOU 31 (upgradient) will be used to evaluate local and area-wide groundwater conditions.
- Well M-64 is located approximately 170 feet northeast of LOU 31 (downgradient) will be used to evaluate local and area-wide groundwater conditions.
- The two sampling wells and the analytical program to evaluate groundwater samples associated with LOU 31 are listed on **Table B – Groundwater Sampling and Analytical Plan for LOU 31**.

Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

Proposed Phase B Constituents List for Groundwater:

Groundwater samples will be analyzed for the following analytes:

- Metals (Phase A list)
- Hexavalent chromium
- Perchlorate
- Wet chemistry analytes
- VOCs
- SVOCs
- Organochlorine pesticides
- Radionuclides

Proposed Phase B Soil Gas Investigation/Rationale:

- No soil gas samples are proposed specifically for LOU 31.

References:

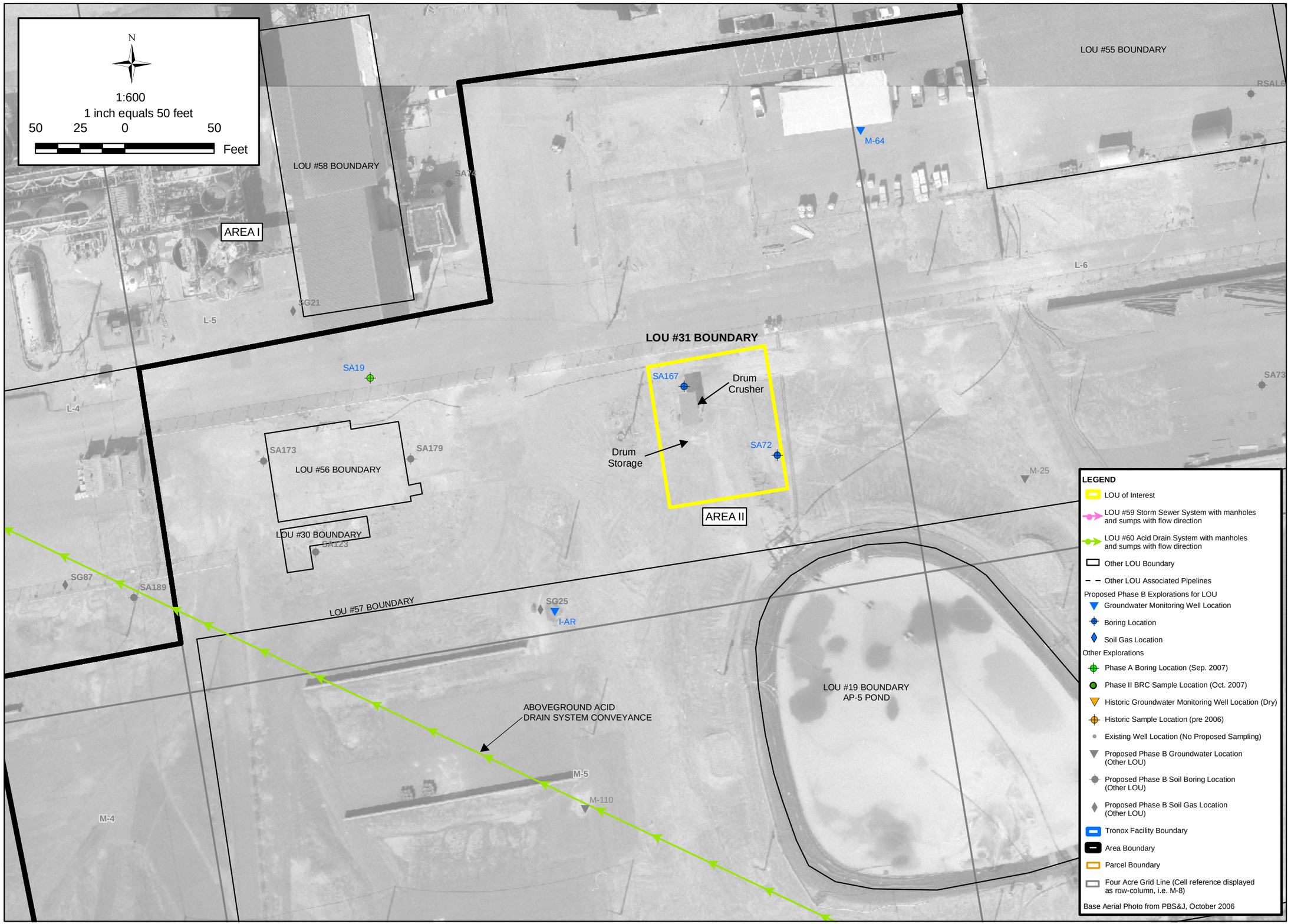
1. Kleinfelder, 1993, Environmental Conditions Assessment, Kerr-McGee Chemical Corporation, Henderson, Nevada Facility, April 15, 1993 (Final).
2. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility, Henderson, Nevada, September 2007.
3. Tronox - Susan Crowley, Verbal Communication, January 17, 2008.

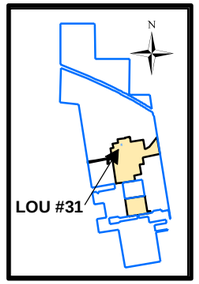
Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

LOU Figure

J:\TronoxGIS\mxd\Phase_B_WorkPlan\LOUs\lou-31.mxd





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SAMPLE LOCATIONS FOR LOU #31
DRUM RECYCLING AREA
Phase B Area II Source Area Investigation
Tronox Facility
Henderson, Nevada

SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/11/2008	04020-023-430

FIGURE NUMBER:

1

SHEET NUMBER:

X

Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

Sampling and Analytical Plans for LOU 31:

Table A – Soil Sampling and Analytical Plan for LOU 31
Table B – Groundwater Sampling and Analytical Plan for LOU 31

Table A
Soil Sampling and Analytical Plan for LOU 31 in Area II
Phase B Source Area Investigation Work Plan
Tronox Facility - Henderson, Nevada

Grid Location	LOU Number	Phase B Boring No.	Sample ID Number	Sample Depths[1.] (ft. bgs)	Perchlorate (EPA 314.0)	Metals (EPA 6020)	Hex Cr (EPA 7199)	TPH-DRO/ORO (EPA 8015B)	TPH-GRO (EPA 8015B)	VOCs[2.] (EPA 8260B)	Wet Chemistry[3.]	Total Cyanide (EPA 9012A)	OCPs[4.] (EPA 8081A)	SVOCs[5.] (EPA 8270C)	Radio-nuclides[6.]	Dioxins/ Furans[7.]	Asbestos[9.] EPA/540/R-97/028	Geo-technical Tests[10.]	Rationale
Borings are organized by grid location as shown on Plate A - Starting point is on the northwestern most grid in Area 2 (M-2) and ending with the southeastern most grid in Area 2 (S-7).																			
L-5	31	SA72	SA72-0.0	0.0													X		Boring located to evaluate LOU 31 and as a down gradient boring for LOU 19. (Drum Crushing and Recycling Area). Located in
L-5	31		SA72-0.5	0.5	X	X	X			X	X		X		X	X			the drum storage area of LOU 31 and in an accessible low area down slope of LOU 19 to evaluate potential releases.
L-5	31		SA72-10	10	X	X	X			X	X		Hold		X				
L-5	31		SA72-20	20	X	X	X			X	X		Hold		X				
L-5	31		SA72-30	30	X	X	X			X	X		X		X				
L-5	31	SA167	SA167-0.0	0.0													X		Boring located to evaluate LOU 31 (Drum Crushing and Recycling Area). Located at former drum chrusher location and
L-5	31		SA167-0.5	0.5	X	X	X			X	X		X		X	X			downslope of LOU 56. Phase A boring SA19 is located downslope of the drum storage area.
L-5	31		SA167-10	10	X	X	X			X	X		X		X				
Number of Samples:					**6**	**6**	**6**	**0**	**0**	**6**	**6**	**0**	**4**	**0**	**6**	**2**	**2**	**0**	

Notes:

n/a	Not applicable - boring is not associated with a specific LOU but is located to evaluate soil for general area-wide coverage.
X	Sample will be collected and analyzed.
	No sample collected under Phase B sampling program.
DD*	Sample depth to be determined in the field where DD = sample depth (ft).
TPH-DRO/ORO	Total petroleum hydrocarbons - Diesel-Range Organics/Oil-Range Organics.
1.	The 0.5 ft bgs sample will be collected from the 0.0 to 0.5 ft bgs interval, unless the area is paved. If area is paved, samples will be collected at 0.5 feet below or from a representative depth beneath the pavement. Alternately, if an unpaved area is within a reasonable distance, the sample will be moved to the unpaved area.
2.	Samples for VOC analysis will be preserved in the field using sodium bisulfate (or DI water) and methanol preservatives per EPA Method 5035.
3.	Consists of wet chemistry parameters (including pH) listed on Table 1 of the Phase B Source Area Work Plan.
4.	Organochlorine Pesticides (includes analysis for hexachlorobenzene).
5.	Semi-volatile Organic Compounds
6.	Radionuclides consists of alpha spec reporting for isotopic thorium and isotopic uranium, and Radium-226, plus Radium-228 by beta counting (per NDEP).
7.	Dioxins/furans will be analyzed by EPA Method 8290 for all samples. Screening reports will be provided for 90% of the samples and full data packages for 10% of the samples.
8.	Polychlorinated biphenyls
9.	Soil samples for asbestos analyses will be collected from a depth of 0 to 2-inches bgs.
10.	Geotechnical Tests consist of: moisture content (ASTM D-2216), grain size analysis (ASTM D-422 and C117-04), Soil Dry Bulk Density (ASTM D-2937), Grain Density (ASTM D-854, Soil-Water Filled Porosity (ASTM D-2216); Vertical Hydraulic Conductivity (ASTM D-5084/USEPA 9100).
11.	SPLP samples will be analyzed by EPA method 1312 using two preparation methods: 1) with extraction fluid #2 (reagent water at pH 5.0±0.05), and 2) with extraction method #3 (reagent water); per NDEP.

Table B
Groundwater Sampling And Analysis Plan for LOU 31 in Area II
Phase B Source Area Investigation Work Plan
Tronox Facility - Henderson Nevada

Grid Location	Location Area	Monitoring Well No.	Screen Interval (ft bgs)	Soil Type Expected Across Screen Interval[1]	Well Sampled for Phase A? (y/n)	Perchlorate (EPA 314.0)	Hex Cr (EPA 7199)	Metals	VOCs[2] (EPA 8260)	Wet Chemistry (a)	OCPs[3] (EPA 8081A)	SVOCs[4] (EPA 8270C)	Radionuclides[5]	Rationale
Wells are organized by grid location as shown on Plate A - Starting point is on the northwestern-most grid in Area II (L-4) and ending with the southeastern-most grid covering Area II (S-7).														
L5	II	I-AR	25 - 45	Qal/MCfg1	yes	X	X	X	X	X	X	X	X	Located as an upgradient stepout for LOUs 30, 31, and 56; and LOU 58 and for general Site coverage.
L6	II	M-64	12.7 - 37.3	Qal/MCfg1	no	X	X	X	X	X	X	X	X	Located to evaluate LOU 55; as a downgradient stepout for LOUs 30 and 56 and for general Site coverage.
					Number of Field Samples:	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	

Notes:

*	Well completion information or boring log not available. Soil type inferred from nearby wells and geologic cross-section provided in the Phase A Source Area Investigation Report (ENSR 2007). ENSR is in the process of obtaining information from BMI.
X	Sample will be collected and analyzed.
1	It is anticipated that the large majority of the flow to the well will be from the coarse-grained sediments. As such, in the cases where there are two lithologies present across the screen interval, the water sampled will represent conditions in the coarse-grained interval.
2	VOCs = Volatile organic compounds (to include analysis for naphthalene).
3	OCPs = Organochlorine pesticides (to include analysis for hexachlorobenzene).
4	SVOCs = Semi volatile organic compounds.
5	Radionuclides consists of alpha spec reporting for isotopic Thorium and isotopic Uranium, and Radium-226, plus Radium-228 by beta counting (per NDEP).
IIIN/E/W/S	Well located outside (north, east, west, or south) of Area II.
nr	Not recorded in the All Wells Database (June 2008).
TBD	To be determined when well is constructed
(a)	Complete list of wet chemistry parameters are shown on Table 1. All groundwater samples will have pH measured in the field.
Qal	Quaternary Alluvium
MCfg1	Muddy Creek Formation - first fine-grained facies
MCcg1	Muddy Creek Formation - first coarse-grained facies

Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

Soil and Groundwater Characterization Data

Summary of Available Data for LOU 31 Drum Crushing and Recycling Area

Tronox Facility – Henderson, Nevada

LOU-specific analytes identified include:

- Metals (Phase A list)
- Hexavalent Chromium
- Perchlorate
- Wet chemistry analytes

The tables in **BOLD** below present historical data associated with these LOU-specific analytes.

LOU 31 Table 1 – Groundwater Characterization Data – Wet Chemistry

LOU 31 Table 2 – Groundwater Characterization Data – Metals

LOU 31 Table 3 – Groundwater Characterization Data – Routine Monitoring

LOU 31 Table 4 – Groundwater Characterization Data – Organochlorine Pesticides (OCPs)

LOU 31 Table 5 – Groundwater Characterization Data – Organophosphorus Pesticides (OPPs)

LOU 31 Table 6 – Groundwater Characterization Data – PCBs

LOU 31 Table 7 – Groundwater Characterization Data – Perchlorate

LOU 31 Table 8 – Groundwater Characterization Data – Radionuclides

LOU 31 Table 9 – Groundwater Characterization Data – SVOCs

LOU 31 Table 10 – Groundwater Characterization Data – VOCs

Notes for Phase A Data Tables are presented at the end of the tables.

LOU 31 Table 1
Groundwater Characterization Data - Wet Chemistry

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

Sampling Program		Ph A[1]	
Well ID		IAR	
Sample ID		IAR	
Sample Date		12/01/2006	
Wet Chemistry Parameters	**MCL[2] mg/L**		**Units**
Total Dissolved Solids	5.00E+02 j	**7870**	mg/L
Total Suspended Solids	--	**18 J**	mg/L
Alkalinity (as CaCO3)	--	5.0 U	mg/L
Bicarbonate	--	**172 J+**	mg/L
Total Alkalinity	--	**172 J**	mg/L
Ammonia (as N)	--	**507000**	ug/L
MBAS	--	**2.3**	mg/L
Cyanide	2.00E-01	R	ug/L
pH (liquid)	--	**7.4 J**	none
Specific Conductance	--	**4470**	umhos/cm
Bromide	--	25.0 U	mg/L
Chlorate	--	**46.8**	mg/L
Chloride	2.50E+02	**518**	mg/L
Nitrate (as N)	1.00E+01	**283**	mg/L
Nitrite	1.00E+00	**138**	mg/L
ortho-Phosphate	--	5.0 U	mg/L
Sulfate	2.50E+02 j	**1250**	mg/L
Total Organic Carbon	--	50.0 U	mg/L

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.
2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
(j) Secondary Drinking Water Regulation value.

LOU 31 Table 2
Groundwater Characterization Data - Metals

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A[1]	
	Well ID:	IAR	
	Sample ID	IAR-Z	
	Sample Date	05/08/2007	
Metals	**MCL[2] ug/L**		**Unit**
Aluminum	5.00E+01 j	7.9 U	ug/L
Antimony	6.00E+00	**1.1**	ug/L
Arsenic	1.00E+01	**110**	ug/L
Barium	2.00E+03	**36.3**	ug/L
Beryllium	4.00E+00	1.8 U	ug/L
Boron	7.30E+03	**2980**	ug/L
Cadmium	5.00E+00	**0.10 J**	ug/L
Calcium	--	**540000**	ug/L
Chromium (Total)	1.00E+02	**291 J-**	ug/L
Chromium-hexavalent	1.09E+02	**302 J**	ug/L
Cobalt	7.30E+02	**0.94 J-**	ug/L
Copper	1.30E+03 p	2.7 U	ug/L
Iron	3.00E+02 j	188 UJ	ug/L
Lead	1.50E+01 u	0.49 U	ug/L
Magnesium	1.50E+05 a	**248000**	ug/L
Manganese	5.00E+01 j	29.8 U	ug/L
Molybdenum	1.82E+02	**26.8**	ug/L
Nickel	7.30E+02	10.3 UJ	ug/L
Platinum	--	**1.1**	ug/L
Potassium	--	**34800**	ug/L
Selenium	5.00E+01	1.0 U	ug/L
Silver	1.00E+02 j	0.20 U	ug/L
Sodium	--	**918000**	ug/L
Strontium	2.19E+04	**8820**	ug/L
Thallium	2.00E+00	0.71 U	ug/L
Tin	2.19E+04	0.20 U	ug/L
Titanium	1.46E+05	4.2 U	ug/L
Tungsten	--	0.82 UJ	ug/L
Uranium	3.00E+01	**37.5 J+**	ug/L
Vanadium	3.65E+01	32.0 U	ug/L
Zinc	5.00E+03 j	40.2 UJ	ug/L
Mercury	2.00E+00	0.093 U	ug/L

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.
2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
(j) Secondary Drinking Water Regulation value.
(p) The national primary drinking water regulations (b) lists a treatment technology action level of 1.3 mg/l as the MCL for Copper. Therefore, the secondary value is not used.
(u) See footnote (b). Treatment technology action level.
(a) NAC 445A.455 Secondary standards. Certain provisions of the National Primary Drinking Water Regulations are adopted by reference (NAC 445A.4525). These values are listed in the first column of this table and are therefore not listed again here. Only NAC 445A.455 Secondary standards are listed.

LOU 31 Table 3
Groundwater Characterization Data - Routine Monitoring[1]

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

Well ID	Date	Depth to water (ft)	Perchlorate mg/L	Qual	MCL[2] mg/L	Total Chromium mg/L	Qual	MCL[2] mg/L	TDS mg/L	Qual	MCL[2] mg/L	Nitrate (as N) mg/L	Qual	MCL[2] mg/L	Chlorate mg/L	Qual	MCL[2] mg/L
I-AR	2/2/2006	27.04	2800	d	1.80E-02 a,m	0.023	d	1.00E-01			5.00E+02 j			1.00E+01			--
I-AR	5/2/2006	28.10	2800	d	1.80E-02 a,m	<0.01	ud	1.00E-01	5830		5.00E+02 j			1.00E+01			--
I-AR	8/1/2006	28.64	2630	d	1.80E-02 a,m	0.058	d	1.00E-01	5090		5.00E+02 j			1.00E+01			--
I-AR	1/30/2007	28.78	3120		1.80E-02 a,m	0.14		1.00E-01	5940		5.00E+02 j			1.00E+01			--
I-AR	5/1/2007	42.33	3670		1.80E-02 a,m	0.53		1.00E-01	6850		5.00E+02 j			1.00E+01			--
I-AR	7/31/2007	41.99	4020		1.80E-02 a,m	0.49		1.00E-01	6850		5.00E+02 j			1.00E+01			--
M-64	1/31/2006	25.63	1000	d	1.80E-02 a,m	8	d	1.00E-01			5.00E+02 j			1.00E+01			--
M-64	5/2/2006	25.63	990	d	1.80E-02 a,m	7.3	d	1.00E-01	6090		5.00E+02 j			1.00E+01			--
M-64	8/1/2006	26.75	846	d	1.80E-02 a,m	8.2	d	1.00E-01	7040		5.00E+02 j			1.00E+01			--
M-64	10/31/2006	27.04	737	d	1.80E-02 a,m	6.4	d	1.00E-01	6290		5.00E+02 j			1.00E+01			--
M-64	1/30/2007	27.63	997		1.80E-02 a,m	8.8		1.00E-01	8550		5.00E+02 j			1.00E+01			--
M-64	5/4/2007	28.89	709		1.80E-02 a,m	7.2		1.00E-01	7900		5.00E+02 j			1.00E+01			--
M-64	7/31/2007	29.27	821		1.80E-02 a,m	8.2		1.00E-01	8170		5.00E+02 j			1.00E+01			--

Notes:
1. ENSR, 2007, Quarterly Performance Report for Remediation Systems, Tronox LLC, Henderson, Nevada, July-September 2007, November 2007.
2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
(a) NAC 445A.455 Secondary standards. Certain provisions of the National Primary Drinking Water Regulations are adopted by reference (NAC 445A.4525). These values are listed in the first column of this table and are therefore not listed again here. Only NAC 445A.455 Secondary standards are listed.
(m) Equal to the provisional action level derived by NDEP as referenced in "Defining a Perchlorate Drinking Water Standard". NDEP Bureau of Corrective Action. URL: [http://ndep.nv.gov/bca/perchlorate02_05.htm].
(j) Secondary Drinking Water Regulation value.

< = less than the reporting limit
Blank cell or --- = no data and or no qualifier
Qual = data qualifiers applied by laboratory or during data validation
TDS = Total Dissolved Solids
mg/l = milligram per liter

Laboratory Qualifiers:
d = the sample was diluted
u = the analyte was not detected above the sample reporting limit
ud = the sample was dilluted and was not detected above the sample reporting limit

Validation Qualifiers:
J = the result is an estimated quantity
J- = the result is an estimated quantity and the result may be biased low
U = the analyte was analyzed for, but was not detected above the sample reporting limit
UJ = the sample was not detected above the sample reporting limit and the reporting limit is approximate

LOU 31 Table 4
Groundwater Characterization Data - Organochlorine Pesticides (OCPs)

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A[1]	
	Well ID	I-AR	
	Sample ID	I-AR	
	Sample Date	12/01/2006	
	MCL[2] ug/L	ug/L	**Unit**
4,4'-DDD	2.80E-01	0.050 U	ug/L
4,4'-DDE	1.98E-01	0.050 U	ug/L
4,4'-DDT	1.98E-01	0.050 U	ug/L
Aldrin	4.00E-03	0.050 U	ug/L
Alpha-BHC	1.10E-02	0.050 U	ug/L
Alpha-chlordane	2.00E+00 (l)	0.050 U	ug/L
Beta-BHC	3.74E-02	0.050 U	ug/L
Delta-BHC	1.10E-02 (z)	0.050 U	ug/L
Dieldrin	4.20E-03 (z)	0.050 U	ug/L
Endosulfan I	2.19E+02 (aa)	0.050 U	ug/L
Endosulfan II	2.19E+02 (aa)	0.050 U	ug/L
Endosulfan Sulfate	2.19E+02 (aa)	0.050 U	ug/L
Endrin	2.00E+00	0.050 U	ug/L
Endrin Aldehyde	1.09E+01 (k)	0.050 U	ug/L
Endrin Ketone	1.09E+01 (k)	0.050 U	ug/L
Gamma-BHC (Lindane)	2.00E-01	0.050 U	ug/L
Gamma-Chlordane	2.00E+00 (l)	0.050 U	ug/L
Heptachlor	4.00E-01	0.050 U	ug/L
Heptachlor Epoxide	2.00E-01	0.050 U	ug/L
Methoxychlor	4.00E+01	0.10 U	ug/L
Tech-Chlordane	2.00E+00 (l)	0.50 U	ug/L
Toxaphene	3.00E+00	2.0 U	ug/L

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.
2. U.S. EPA Maximum containment Level (MCL) values unless noted.
(l) Value for chlordane used as surrogate for alpha-chlordane, chlordane (technical) and gamma-chlordane due to structural similarities.
(z) Value for alpha-BHC used as surrogate for delta-BHC based on structural similarities.
(aa) Value for endosulfan used as surrogate for endosulfan I, endosulfan II and endosulfan sulfate based on structural similarities.
(k) Value for endrin used as surrogate for endrin aldehyde and endrin ketone due to structural similarities.

LOU 31 Table 5
Groundwater Characterization Data - Organophosphorus Pesticides (OPPs)

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A[1]	
	Well ID	I-AR	
	Sample ID	I-AR	
	Sample Date	12/01/2006	
OPPs	**MCL[2] ug/L**		**Unit**
Azinphos-methyl	--	2.5 UJ	ug/L
Bolstar	--	1.0 U	ug/L
Chlorpyrifos	1.09E+02	1.0 U	ug/L
Coumaphos	--	1.0 U	ug/L
Demeton-O	1.46E+00 (cc)	1.0 U	ug/L
Demeton-S	1.46E+00 (cc)	1.0 U	ug/L
Diazinon	3.28E+01	1.0 U	ug/L
Dichlorvos	2.32E-01	1.0 U	ug/L
Dimethoate	7.30E+00	1.0 U	ug/L
Disulfoton	1.46E+00	0.50 U	ug/L
EPN	3.65E-01	1.2 U	ug/L
Ethoprop	--	0.50 U	ug/L
Ethyl Parathion	9.12E+00 (tt)	1.0 U	ug/L
Famphur	--	1.0 U	ug/L
Fensulfothion	--	2.5 U	ug/L
Fenthion	9.10E+00 (ff)	2.5 U	ug/L
Malathion	7.30E+02	1.2 U	ug/L
Merphos	1.09E+00	5.0 U	ug/L
Methyl parathion	9.12E+00	4.0 U	ug/L
Mevinphos	--	6.2 U	ug/L
Naled	7.30E+01	1.0 UJ	ug/L
Phorate	7.30E+00	1.2 U	ug/L
Ronnel	1.82E+03	10 U	ug/L
Stirphos	--	3.5 U	ug/L
Sulfotep	1.82E+01	1.5 U	ug/L
Thionazin	--	1.0 U	ug/L
Tokuthion	--	1.6 U	ug/L
Trichloronate	--	0.50 U	ug/L

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.
2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
(cc) Value for demeton used as surrogate for demeton-o and demeton-s based on structural similarities.
(tt) Value for parathion-methyl used as surrogate for parathion-ethyl due to structural similarities.
(ff) Value for methyl parathion used as surrogate for fenthion based on structural similarities.

LOU 31 Table 6
Groundwater Characterization Data - PCBs

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A[1]	
	Well ID	I-AR	
	Sample ID	I-AR	
	Sample Date	12/01/2006	
PCBs	**MCL[2] ug/L**		**Unit**
Aroclor-1016	5.00E-01 (bb)	0.10 U	ug/L
Aroclor-1221	5.00E-01 (bb)	0.10 U	ug/L
Aroclor-1232	5.00E-01 (bb)	0.10 U	ug/L
Aroclor-1242	5.00E-01 (bb)	0.10 U	ug/L
Aroclor-1248	5.00E-01 (bb)	0.10 U	ug/L
Aroclor-1254	5.00E-01 (bb)	0.10 U	ug/L
Aroclor-1260	5.00E-01 (bb)	0.10 U	ug/L

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.
2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
(bb) Value for total PCBs.

LOU 31 Table 7
Groundwater Characterization Data - Perchlorate

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

Well ID Number	Sample ID	Sample Date	Perchlorate	Units	MCL[1] ug/L	Sampling Program
I-AR	I-AR	12/01/2006	**4160000**	ug/L	1.80E+01 a,(m)	Ph A[2]

Notes:

1. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
2. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.
(a) NAC 445A.455 Secondary standards. Certain provisions of the National Primary Drinking Water Regulations are adopted by reference (NAC 445A.4525). These values are listed in the first column of this table and are therefore not listed again here. Only NAC 445A.455 Secondary standards are listed.
(m) Equal to the provisional action level derived by NDEP as referenced in "Defining a Perchlorate Drinking Water Standard". NDEP Bureau of Corrective Action. URL [http://ndep.nv.gov/bca/perchlorate02_05.htm].

LOU 31 Table 8
Groundwater Characterization Data - Radionuclides

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

			Ra-226	Ra-228	Th-228	Th-230	Th-232	U-233/234	U-235/236	U-238	
			pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	
Well ID Number	**Sample ID**	**Date**									**Sampling Program**
I-AR	I-AR-Z	05/08/2007	**1.67 J**	**1.30 B**							Ph A[1]

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility, Henderson, Nevada, September 2007.

LOU 31 Table 9
Groundwater Characterization Data - SVOC

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

		Sampling Program	Ph A[1]
		Well No.	I-AR
		Sample ID	I-AR
		Sample Date	12/01/2006
SVOCs		**MCL[2] ug/L**	ug/L
1,4-Dioxane	non-SIM	6.11E+00	10 U
2-Methylnaphthalene	non-SIM	6.20E+00 (jj)	10 U
2-Methylnaphthalene	SIM	6.20E+00 (jj)	
Acenaphthene	non-SIM	3.65E+02	10 U
Acenaphthene	SIM	3.65E+02	
Acenaphthylene	non-SIM	3.65E+02 (pp)	10 UJ
Acenaphthylene	SIM	3.65E+02 (pp)	
Anthracene	non-SIM	1.83E+03	10 U
Anthracene	SIM	1.83E+03	
Benz(a)anthracene	non-SIM	9.21E-02	10 U
Benz(a)anthracene	SIM	9.21E-02	
Benzo(a)pyrene	non-SIM	2.00E-01	10 U
Benzo(a)pyrene	SIM	2.00E-01	
Benzo(b)fluoranthene	non-SIM	9.21E-02	10 U
Benzo(b)fluoranthene	SIM	9.21E-02	
Benzo(g,h,i)perylene	non-SIM	1.83E+02 (w)	10 U
Benzo(g,h,i)perylene	SIM	1.83E+02 (w)	
Benzo(k)fluoranthene	non-SIM	9.21E-01	10 U
Benzo(k)fluoranthene	SIM	9.21E-01	
bis(2-Ethylhexyl)phthalate	non-SIM	6.00E+00	10 U
Butyl benzyl phthalate	non-SIM	7.30E+03	10 U
Chrysene	non-SIM	9.21E+00	10 U
Chrysene	SIM	9.21E+00	
Dibenz(a,h)anthracene	non-SIM	9.21E-03	10 U
Dibenz(a,h)anthracene	SIM	9.21E-03	
Diethyl phthalate	non-SIM	2.92E+04	10 U
Dimethyl phthalate	non-SIM	3.65E+05	10 U
Di-N-Butyl phthalate	non-SIM	3.65E+03	10 U
Di-N-Octyl phthalate	non-SIM	1.46E+03	10 U
Fluoranthene	non-SIM	1.46E+03	10 U
Fluoranthene	SIM	1.46E+03	
Fluorene	non-SIM	2.43E+02	10 U
Fluorene	SIM	2.43E+02	
Hexachlorobenzene	non-SIM	1.00E+00	10 U
Hexachlorobenzene	SIM	1.00E+00	
Indeno(1,2,3-cd)pyrene	non-SIM	9.21E-02	10 U
Indeno(1,2,3-cd)pyrene	SIM	9.21E-02	
Naphthalene	non-SIM	6.20E+00	5.0 U
Naphthalene	non-SIM	6.20E+00	10 U
Naphthalene	SIM	6.20E+00	
Nitrobenzene	non-SIM	3.40E+00	10 U

LOU 31 Table 9 (continued)
Groundwater Characterization Data - SVOC

Drum Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

		Sampling Program	Ph A[1]
		Well No.	I-AR
		Sample ID	I-AR
		Sample Date	12/01/2006
SVOCs		**MCL[2] ug/L**	ug/L
Octachlorostyrene	non-SIM	--	10 U
Phenanthrene	non-SIM	1.80E+03 (n)	10 U
Phenanthrene	SIM	1.80E+03 (n)	
Pyrene	non-SIM	1.83E+02	10 U
Pyrene	SIM	1.83E+02	
Pyridine	non-SIM	3.65E+01	20 U

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.
2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
(jj) Value for naphthalene used as surrogate for 2-methylnaphthalene based on structural similarities.
(pp) Value for acenaphthene used as surrogate for acenapthylene based on structural similarities.
(w) Value for pyrene used as surrogate for benzo(g,h,i)perylene based on structural similarities.
(n) Value for anthracene used as surrogate for phenanthrene due to structural similarities.

LOU 31 Table 10
Groundwater Characteristic Data - VOCs

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A[1]
	Boring No.	I-AR
	Sample ID	I-AR
	Sample Date	12/1/2006
	MCL[2] ug/L	ug/L
Naphthalene	6.20E+00	5.0 U
1,1,1,2-Tetrachloroethane	4.32E-01	5.0 U
1,1,1-Trichloroethane	2.00E+02	5.0 U
1,1,2,2-Tetrachloroethane	5.00E+00	5.0 U
1,1,2-Trichloroethane	5.00E+00	5.0 U
1,1-Dichloroethane	8.11E+02	5.0 U
1,1-Dichloroethene	7.00E+00	5.0 U
1,1-Dichloropropene	3.95E-01 gg	5.0 U
1,2,3-Trichlorobenzene	7.16E+00 hh	5.0 U
1,2,3-Trichloropropane	5.60E-03	5.0 U
1,2,4-Trichlorobenzene	7.00E+01	5.0 U
1,2,4-Trimethylbenzene	1.23E+01	5.0 U
1,2-Dibromo-3-chloropropane	2.00E-01	5.0 U
1,2-Dichlorobenzene	6.00E+02	**0.49 J**
1,2-Dichloroethane	5.00E+00	5.0 U
1,2-Dichloropropane	5.00E+00	5.0 U
1,3,5-Trimethylbenzene	1.23E+01	5.0 U
1,3-Dichlorobenzene	1.83E+02	5.0 U
1,3-Dichloropropane	1.22E+02	5.0 U
1,4-Dichlorobenzene	7.50E+01	5.0 U
2,2-Dichloropropane	1.65E-01 ii	5.0 U
2-Butanone	6.97E+03	10 U
2-Chlorotoluene	1.22E+02	5.0 U
2-Hexanone	2.00E+03 nn	10 UJ
2-Methoxy-2-methyl-butane	--	5.0 U
4-Chlorotoluene	1.22E+02 ww	5.0 U
4-Isopropyltoluene	--	5.0 U
4-Methyl-2-pentanone	1.99E+03	10 U
Acetone	5.48E+03	10 U
Benzene	5.00E+00	5.0 U
Bromobenzene	2.03E+01	5.0 U
Bromochloromethane	1.81E-01 qq	5.0 U
Bromodichloromethane	8.00E+01 r	5.0 U
Bromoform	8.00E+01 r	5.0 U
Bromomethane	8.66E+00	**0.92 J**
Carbon tetrachloride	5.00E+00	5.0 U
Chlorobenzene	1.00E+02 o	5.0 U
Chloroethane	4.64E+00	5.0 UJ

LOU 31 Table 10 (continued)
Groundwater Characteristic Data - VOCs

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A[1]
	Boring No.	I-AR
	Sample ID	I-AR
	Sample Date	12/1/2006
	MCL[2] ug/L	ug/L
Chloroform	8.00E+01 r	**21**
Chloromethane	1.58E+02	**2.7 J**
cis-1,2-Dichloroethene	7.00E+01	5.0 U
cis-1,3-Dichloropropene	3.95E-01 gg	5.0 U
Dibromochloromethane	8.00E+01 r	5.0 U
Dibromomethane	6.08E+01 xx	5.0 U
Dichlorodifluoromethane	3.95E+02	5.0 UJ
Ethyl t-butyl ether	1.10E+01 kk	5.0 U
Ethylbenzene	7.00E+02	5.0 U
Ethylene dibromide	--	5.0 U
Hexachlorobutadiene	8.62E-01	5.0 U
isopropyl ether	--	5.0 U
Isopropylbenzene	6.58E+02	5.0 U
Methyl tert butyl ether	2.00E+01 a,uu	5.0 U
Methylene chloride	5.00E+00	5.0 U
N-Butylbenzene	2.43E+02	5.0 U
N-Propylbenzene	2.43E+02	5.0 U
sec-Butylbenzene	2.43E+02	5.0 U
Styrene	1.00E+02	R
t-Butyl alcohol	--	10 UJ
tert-Butylbenzene	2.43E+02	5.0 U
Tetrachloroethene	5.00E+00	5.0 U
Toluene	1.00E+03	5.0 U
trans-1,2-Dichloroethylene	1.00E+02	5.0 U
trans-1,3-Dichloropropene	--	5.0 U
Trichloroethene	5.00E+00	5.0 U
Trichlorofluoromethane	--	5.0 UJ
Vinylchloride	2.00E+00	5.0 UJ
Xylene (Total)	1.00E+04	10 U

Notes:
1. ENSR, 2007, Phase A Source Area Investigation Results, Tronox Facility - Henderson, Nevada, September 2007.

LOU 31 Table 10 (continued)
Groundwater Characteristic Data - VOCs

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

Notes:
2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
(gg) Value for 1,3-dichloropropene used as surrogate for 1,1-dichloropropene, cis-1,3-dichloropropene and trans-1,3-dichloropropene based on structural similarities.
(hh) Value for 1,2,4-trichlorobenzene used as surrogate for 1,2,3-trichlorobenzene based on structural similarities.
(ii) Value for 1,2-dichloropropane used as surrogate for 2,2-dichloropropane based on structural similarities.
(nn) Value for methyl isobutyl ketone used as surrogate for 2-hexanone based on structural similarities.
(ww) Value for 2-chlorotoluene used as surrogate for 4-chlorotoluene based on structural similarities.
(qq) Value for bromodichloromethane used as surrogate for bromochloromethane due to structural similarities.
(xx) Value for methylene bromide used as surrogate for dibromomethane based on structural similarities.
(kk) Value for methyl tertbutyl ether (MTBE) used as surrogate for ethyl-tert-butyl ether (ETBE) based on structural similarities.

LOU 31
Notes for Phase A Data Tables

Drum Crushing and Recycling Area (South of Veolia Trailer Office)
Tronox Facility - Henderson, Nevada

Blank	Not analyzed.
Bold	Bold values are constituents detected above the laboratory sample quantitation limit.
Gray	Grayed out values are non-detected values with the laboratory sample quantitation limits shown.
B	The result may be a false positive totally attributable to blank contamination.
D	Dissolved Metals
DO	Dissolved Oxygen
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J-	The result is an estimated quantity and the result may be biased low.
J+	The result is an estimated quantity and the result may be biased high.
JB	The result may be biased high partially attributable to blank contamination.
JK	The result is an estimated maximum possible concentration.
R	The result was rejected and unusable due to serious data deficiencies. The presence or absence of the analyte cannot be verified.
S	Soluable metals
T	Total Metals
U	The analyte was analyzed for, but was not detected above the laboratory sample quantitation limit.
UJ	The analyte was not detected above the laboratory sample quantitation limit and the limit is approximate
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
ml/min	Milliliters per minute
ng/kg	Nanogram per kilogram
nm	Not measured
NTUs	Nephelometric Turbidity Units
ORP	Oxidation-reduction potential
pCi/g	PicoCuries per gram
pci/L	PicoCuries per liter
s/gPM10	Revised protocol structures per gram PM10 fraction dust.
TEF	Toxic Equivalency Factor.
TEQ	Toxic Equivalent Concentration
ug/kg	Micrograms per kilogram
ug/L	Micrograms per liter
umhos/cm	MicroSiemens per centimeter
L	Sample ID suffix indicating the sample was collected using low low-flow pumping rates (100-150 ml/min).
F	Sample ID suffix indicating the sample was collected using low-flow pumping rates (150-480 ml/min) and field filtered.
Z	Sample ID suffix indicating the sample was collected using low-flow pumping rates (150-480 ml/min).
*	No analytical data is available for this sample due to a laboratory error.
(a)	Calculated assuming 0 for non-detected congeners and 2006 toxic equivalency factors (TEFs).
(b)	Calculated assuming 1/2 detection limit as proxy for non-detected congeners and 2006 TEFs.
--	Not established