

Tronox Facility - Henderson, Nevada

**Goal of Closure:**• Closure for future commercial/industrial use.

Site Investigation Area:

- Size: <u>Diesel aboveground storage tank (AST):</u>
  500,000 gallon, approximately 170 feet by 140 feet
  (0.5 acre); <u>Overflow AST:</u> 18,000 gallon capacity AST
  (typical dimensions approximately 10 feet in diameter by
  24 feet in length). Total area approximately 400 feet by
  140 feet (1.3 acres).
- Location: Central portion of the Site, just north of the Chemstar property.
- Current Status/Features: LOU 45 is not currently active and the ASTs and piping have been removed. There are no structures except berms present at LOU45.

**Description:** 

- LOU 45 consisted of a 500,000-gallon diesel AST with an 18,000-gallon overflow AST [Ref 4] and two additional tanks of similar size.
- The Diesel Storage Tanks were operational from the early 1940s to 1994 (approximately 54 years) when the ASTs were removed [Ref. 1 and 4].
- Each AST was located within its own bermed area [Ref. 4].
- Both areas appear to be unpaved [Ref. 5].
- The overflow AST was located northwest of the diesel AST [Ref. 4].
- In 1991, soil staining was observed over approximately 30 percent of the surface soils surrounding the diesel AST and "diesel" odors were noted in localized areas [Ref. 4].
- No soil staining or visual evidence of impact was observed in the area of the overflow AST [Ref. 4].
- The 1979 aerial photographs shows a square building immediately south of the overflow AST; 1960 aerial photographs show an AST of similar or slightly larger size to the overflow tank at this location [Ref. 5].
- The 1960 and 1979 aerial photographs show a large, bermed AST, similar in size or larger than the diesel AST [Ref. 5]. The purpose of these two additional ASTs is not known [Ref. 5].



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Process Waste Stream Associated with LOU 45	Known or Potential Constituents Associated with LOU 45							
Diesel fuel releases	<ul><li>Metals</li><li>VOCs</li><li>SVOCs</li><li>TPH-DRO</li></ul>							

## Overlapping or Adjacent LOUs:

The following LOUs overlap or are adjacent to LOU 45: Overlapping LOUs

 LOU 60 (Acid Drain System) - A branch of the Acid Drain System from the Former Preparation Building passes through the length of LOU 45 near its southern boundary.

#### Adjacent LOUs

- LOU 7 (Old P-2 Pond and Associated Conveyance Facility) – Located north (downgradient) of LOU 45.
- LOU 8 (Old P-3 Pond and Associated Conveyance Facility) - Located north (downgradient) of LOU 45.
- LOU 14 (P-1 Pond and Associated Conveyance Facility) -Located northeast (downgradient) of LOU 45.
- LOU 34W (Former Manganese Tailings Area) Located east (crossgradient) of LOU 45.
- LOU 64 (Koch Materials Company Site) Located west (cross-gradient) of LOU 45.
- LOU 59 (Storm Sewer System) Located south (upgradient) of LOU 45.

LOUs 7, 8 and 14 are downgradient to LOU 45 and LOUs 34W and 64 are crossgradient to LOU 45; therefore, they are not considered to affect LOU 45. LOU 45 is downgradient of a branch of LOU 59. Potential releases from LOU 59 may have occurred that affected LOU 45; however, no releases have been documented. Therefore, the addition of other chemical classes to the Phase B Analytical Plan for LOU 45 is not required.

For detailed information on the LOUs listed above, please refer to the specific LOU data package.

## LOUs Potentially Affecting Soils in LOU 45:

LOU 60: A branch of the Acid Drain System passes along the southern length of LOU 45. The system carried effluent from onsite and offsite sources to the acid effluent neutralization plant. Potential releases from LOU 60 may have occurred that affected LOU 45; however, no releases have been documented.



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Known or potential chemical classes that are associated with LOU 60 are consistent with those listed for LOU 45; therefore, the addition of other chemical classes to the Phase B Analytical Plan for LOU 45 is not required.

For detailed information on these LOUs, please refer to the specific LOU data package.

## Known or Potential Chemical Classes:

- Metals
- VOCs
- SVOCs
- TPH DRO

# Known or Potential Release Mechanisms:

- No reported releases were documented for this LOU; however, stains on soils indicate releases.
- Potential infiltration to subsurface soils and groundwater.
- Possible impacts to surrounding soils from surface releases.
  - Soil staining and "diesel" odors were observed in the area of the diesel AST [Ref. 4].

### **Results of Historical Sampling:**

- Soil sampling was conducted in 1997 and 1999 [Ref. 1]:
  - In 1997, TPH-DRO was identified in soil samples.
  - The area was resampled in 1999 and only TPH-DRO was detected.
- One groundwater grab sample (SB5-5) showed detectable concentrations of TPH-DRO [Ref 1].
- An immediately downgradient monitoring well (M-21) and wells M-76, M-75, and M-2A are tested for chromium and perchlorate as part of periodic or routine groundwater monitoring program [Ref. 3].

Analytical results are summarized on LOU 45 Tables 3 through 5 (see attached) [Ref. 3].

# Did Historical Samples Address Potential Release?

No



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## **Summary of Phase A SAI:**

### Soil

 None specifically conducted for this LOU. The closest boring (SA11) is located approximately 150 feet northwest (cross-gradient) of LOU 45 and was not specifically sampled to evaluate this LOU [Ref. 2]. This boring is located within LOU 8 (Old P-3 Pond); therefore, is not considered to be representative of soil conditions at LOU 45.

## Groundwater

- None specifically conducted for this LOU. The closest well sampled (M-76) is located approximately 330 feet to the north (downgradient) of LOU 45 and was not specifically sampled to evaluate this LOU [Ref. 2]. However, since well M-76 is located directly downgradient of LOU 45, it is considered to be representative of groundwater conditions downgradient of LOU 45.
- Analytical results for soil and groundwater from the Phase A sampling event are summarized in LOU 45 Tables 1 and 2 and LOU 45 Tables 6 through 12.

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 45 consists of collecting soil samples from the following 12 locations:

- Twelve (12) soil borings will be drilled within the boundaries of LOU 45.
- All 12 borings along with the analytical program to evaluate soil samples from LOU 45 are listed on Table A – Soil Sampling and Analytical Plan for LOU 45.
- Soil sample locations consist of both judgmental and randomly-placed locations.
- Judgmental sample locations:
  - Designed to evaluate soil for known or potential chemical classes associated with LOUs, based on the known process waste streams.
  - Eleven (11) of the 12 sample locations are judgmental locations and include soil borings SA185, SA186, SA153, SA44, SA43, SA45, SA42, SA187, SA188, SA172, SA41, and SA40.



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- Random sample grid locations:
  - Designed to assess whether unknown constituents associated with the LOU are present.
  - One (1) of the 12 sample locations is a randomly-placed location. This boring is RSAO5.

## Proposed Phase B Constituents List for Soils:

Both judgmental and random sample grid locations will be analyzed for the following full list of Phase A Site-related chemicals for LOU-specific and area-wide coverage purposes:

- Metals (Phase A list)
- Hexavalent chromium
- Perchlorate
- Wet chemistry analytes
- VOCs
- SVOCs
- TPH-DRO/ORO
- Organochlorine pesticides
- Dioxins/furans
- Radionuclides
- Asbestos

# Proposed Phase B Groundwater Investigation/Rationale:

- The Phase B groundwater investigation of LOU 45 consists of collecting groundwater samples from five (5) locations to evaluate local groundwater conditions and as part of Site-wide evaluation of constituent trends in groundwater.
  - Wells M-21, M-76, M-75, and M-2A north (downgradient) of LOU 45 will be used to evaluate local and area-wide groundwater conditions.
  - Well M-97 south (upgradient) of LOU 45 will be used to evaluate local and area-wide groundwater conditions.
  - The sampling wells and the analytical program to evaluate groundwater samples associated with LOU 45 are listed on Table B – Groundwater Sampling and Analytical Plan for LOU 45.



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## 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:

Soil gas samples will be collected from two (2) locations to evaluate area conditions for the presence of vapor-phase VOCs in the vadose zone.

 SG95 and SG94 are located to evaluate VOCs beneath the two largest tanks observed in aerial photographs from 1960 and 1979.

Details of the soil gas sampling program are contained in the NDEP-approved (March 26, 2008) Soil Gas Survey Work Plan, Tronox LLC, Henderson, Nevada, dated March 20, 2008.

## Proposed Phase B Constituents List for Soil Gas:

VOCs (EPA TO-15)

### References:

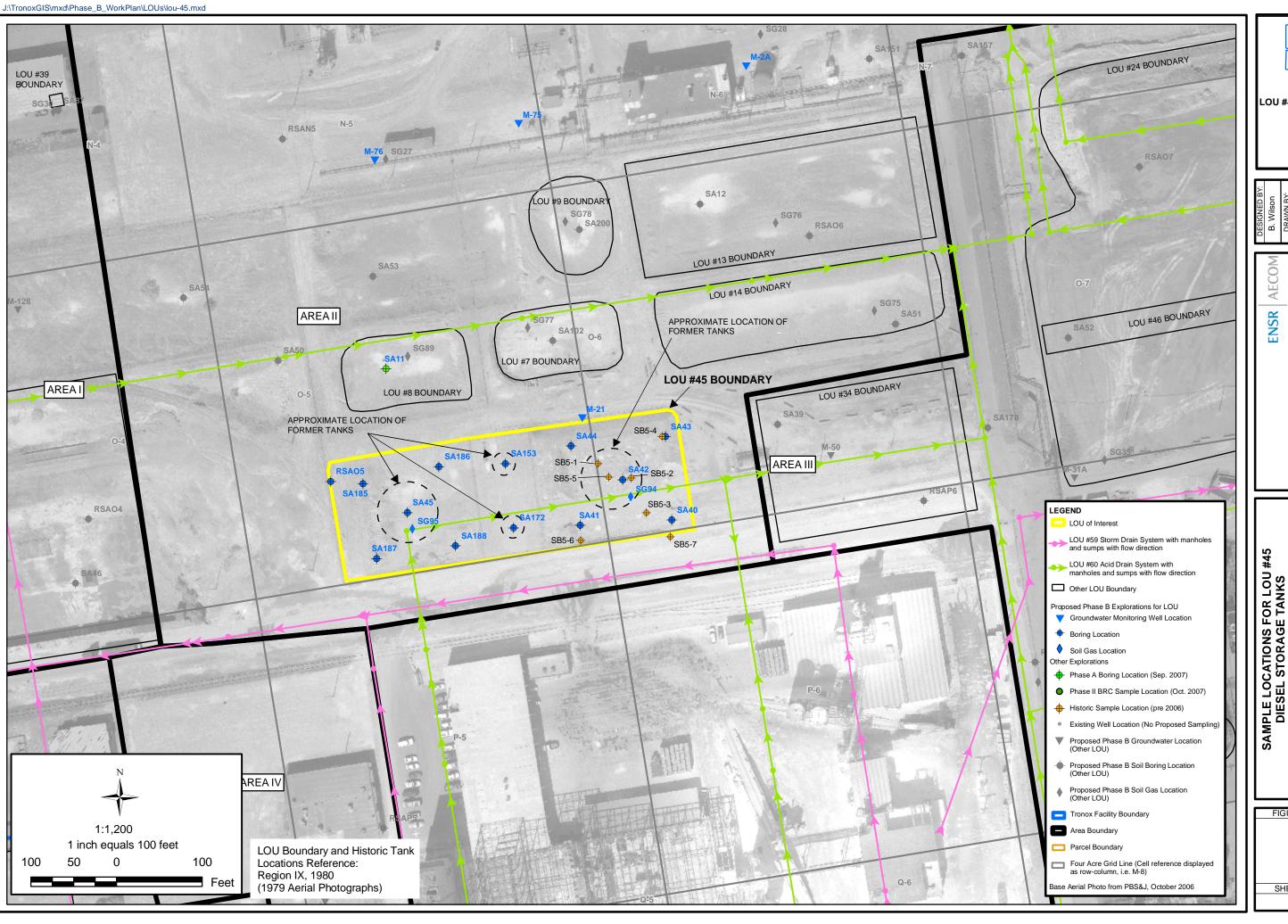
- 1. ENSR, 2005, Conceptual Site Model, Kerr-McGee Facility, Henderson, Nevada, ENSR, Camarillo, California, 04020-023-130, February 2005 and August 2005.
- 2. ENSR, 2007a, Phase A Source Area Investigation Results, Tronox Facility, Henderson, Nevada, September 2007.
- 3. ENSR, 2007b, Quarterly Performance Report for Remediation Systems, Tronox LLC, Henderson, Nevada, July-September 2007, November 2007.
- 4. Kleinfelder, 1993, Environmental Conditions Assessment, Kerr-McGee Chemical Corporation, Henderson, Nevada Facility, April 15, 1993 (Final).
- Region IX, 1980, Aerial Reconnaissance of Hazardous Waste Sources BMI Industrial Complex, Henderson, 1943-1979

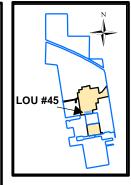


## **Summary of Available Data for LOU 45** Diesel Storage Tanks Tronox Facility – Henderson, Nevada

**LOU Figure** 

04020-023-430 - LOU 45 June 30, 2008





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	SCALE:	AS SHOWN	

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## Sampling and Analytical Plans for LOU 45

Table A – Soil Sampling and Analytical Plan for LOU 45 Table B – Groundwater Sampling and Analytical Plan for LOU 45

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Grid Location	LOU Number	Phase B Boring No.	Sample ID Number	Sample Depths <sup>1.</sup>	Perchlorate (EPA 314.0)		<sub>99)</sub> DRO/ORO	TPH-GRO VOCs <sup>2.</sup> (EPA 8015B) (EPA 8260B)	Wet Chemistry <sup>3.</sup>	Total Cyanide OCPs <sup>4.</sup> (EPA 9012A) (EPA 8081A	SVOCs <sup>5.</sup> (EPA 8270C)	Radio- nuclides <sup>6.</sup>	Dioxins/ Furans <sup>7.</sup>	Asbestos <sup>9.</sup> EPA/540/R-97/02	Geo- technical Rationale
				(ft. bgs)	, , ,		(EPA 8015B)			, ,	1				Tests <sup>10.</sup> the southeastern most grid in Area 2 (S-7).
O-5	45, 59, 60	SA41	SA41-0.0	0.0		Bollings a	le organized by	grid location as snow	Ton rate A - 3	tarting point is on the nor	ilwestern ille	Jac grid ili <u>Area</u>	a 2 (IVI-2) all	X	Boring located to evaluate LOU 45 (Diesel Storage Tanks), LOU 59 (Storm Sewer System), and LOU 60 Acid Drain
O-5	45, 59, 60		SA41-0.5	0.5	Х	X X	Х	X	X	Х	Х	X	Х		System). Located on the perimeter of the former aboveground storage tank to evaluate potential releases (see text
0-5	45, 59, 60		SA41-10	10	X	X X	X	X	X	Hold	X	X			for historic details) and between LOUs 59 and 60 to evaluate possible piping releases.
O-5 O-5	45, 59, 60 45, 59, 60		SA41-20 SA21-30	20 20	X	X X	X	X	X	Hold Hold	X	X			
O-5	45, 59, 60		SA21-30 SA21-40	40	X	XX	X	X	X	X	X	X			
0-5	45	SA44	SA44-0.0	0.0										Х	Boring located to evaluate LOU 45 (Diesel Storage Tanks), System). Located on the perimeter of the former
O-5	45		SA44-0.5	0.5	Х	X X	X	X	X	X	X	X	Х		aboveground storage tank to evaluate potential releases (see text for historic details).
O-5	45		SA44-10	10	X	X X	X	X	X	Hold	X	X			
O-5 O-5	45 45		SA44-20 SA44-30	20 30	X	X X	X	X	X	Hold Hold	X	X			
O-5	45		SA44-40	40	x	XX	X	X	X	X	X	X			
O-5	45, 60	SA45	SA45-0.0	0.0										Х	Boring located to evaluate LOU 45 (Diesel Storage Tanks) and LOU 60 (Acid Drain System). Located within the footprint
O-5	45, 60		SA45-0.5	0.5	Х	X X	X	X	Х	X	Х	X	Х		of a former tank to evaluate potential subsurface releases and near LOU 60 manhole which is a high risk release
O-5	45, 60		SA45-10	10	X	X X	X	X	X	Hold	X	X			location.
O-5 O-5	45, 60 45, 60		SA45-20 SA45-30	20 30	X	X X	X	X	X	Hold Hold	X	X		+	
O-5	45, 60		SA45-40	40	X	XX	X	X	X	X	X	X			
O-5	45	SA153	SA153-0.0	0.0										Х	Boring located to evaluate LOU 45 (Diesel Storage Tanks). Located beneath the footprint of a aboveground storage
O-5	45		SA153-0.5	0.5	Х	X X	Х	X	X	X	Х	Х	Х	1	tank to evaluate subsurface releases (See LOU 45 summary for historical data).
0-5	45	<u> </u>	SA153-10	10	X	X X	X	X	X	Hold	X	X		+	
O-5 O-5	45 45		SA153-20 SA153-30	20 30	X	X X	X	X	X	Hold X	X	X	-	1	
O-5	45, 59, 60	SA172	SA172-0.0	0.0	^	^ ^	^	^	^	^	^	^	+	Х	Boring located to evaluate LOU 45 (Diesel Storage Tanks) and LOU 59 (Storm Sewer System), and LOU 60 (Acid Drain
0-5	45, 59, 60		SA172-0.5	0.5	Х	X X	Х	X	X	Х	Х	X	Х		System). Located beneath the footprint of a aboveground storage tank to evaluate subsurface releases (See LOU 45
0-5	45, 59, 60		SA172-10	10	Х	X X	Х	X	Χ	Hold	Х	X			summary for historical data).
O-5	45, 59, 60		SA172-20	20	X	X X	X	X	X	Hold	X	X			
O-5	45, 59, 60		SA172-30	30	X	X X	X	X	X	Hold X	X	X			
O-5 O-5	45, 59, 60 45	RSAO5	SA172-35 RSAO5-0.0	35 0.0		_ ^ _ ^	X	^	^	^		X		X	Boring located to evaluate LOU 45 (Diesel Storage Tanks). Randomly located within LOU 45 to evaluate possible
0-5	45	110/100	RSAO5-0.5	0.5	Х	х х	Х	X	Х	X	Х	Х	Х		surface runoff releases and to evaluate site wide conditions.
O-5	45		RSAO5-10	10	Х	X X	Х	X	Χ	Hold	Х	Х			
O-5	45		RSAO5-20	20	Х	X X	X	X	X	Hold	Х	X			
O-5 O-5	45 45		RSAO5-30 RSAO5-35	30	X	X X	X	X	X	Hold X	X	X			
O-5	45	SA185	SA185-0.0	35 0.0		_ ^ _ ^	^	^	^	^		^		Х	Boring located to evaluate LOU 45 (Diesel Storage Tanks), System). Located on the perimeter of the former
O-5	45	0,1100	SA185-0.5	0.5	Х	X X	Х	Х	Х	Х	Х	Х	Х		aboveground storage tank to evaluate potential releases (see text for historic details).
0-5	45		SA185-10	10	Х	X X	Х	X	Χ	Hold	Х	X			
O-5	45		SA185-20	20	X	X X	X	X	X	Hold	X	X			
O-5 O-5	45 45		SA185-30 SA185-35	30	X	X X	X	X	X	Hold X	X	X			
O-5	45	SA186	SA186-0.0	35 0.0		_ ^ _ ^	^	^	^	^		Х		Х	Boring located to evaluate LOU 45 (Diesel Storage Tanks), System). Located on the perimeter of the former
0-5	45		SA186-0.5	0.5	Х	X X	Х	X	Х	X	Х	Х	Х		aboveground storage tank to evaluate potential releases (see text for historic details).
O-5	45		SA186-10	10	Х	X X	Х	X	Χ	Hold	Х	X			
0-5	45		SA186-20	20	X	X X	X	X	X	Hold	X	X			
O-5 O-5	45 45		SA186-30 SA186-35	30 35	X	X X	X	X	X	Hold X	X	X			
O-5	45, 59, 60	SA187	SA187-0.0	0.0	^	^ ^	^	^	^	^		^		Х	Boring located to evaluate LOU 45 (Diesel Storage Tanks), LOU 59 (Storm Sewer System), and LOU 60 Acid Drain
O-5	45, 59, 60	0,1101	SA187-0.5	0.5	Х	X X	Х	Х	Х	Х	Х	Х	Х		System). Located on the perimeter of the former aboveground storage tank to evaluate potential releases (see text
O-5	45, 59, 60		SA187-10	10	Х	X X	Х	X	Χ	Hold	Х	X			for historic details) and between LOUs 59 and 60 to evaluate possible piping releases.
0-5	45, 59, 60		SA187-20	20	X	X X	X	X	X	Hold	X	X		1	
O-5 O-5	45, 59, 60 45, 59, 60		SA187-30 SA187-35	30 35	X	X X	X	X	X	Hold X	X	X	1	1	
O-5	45, 59, 60	SA188	SA187-35 SA188-0.0	0.0		<del>  ^   ^</del>	^	^	^	^		^	1	X	Boring located to evaluate LOU 45 (Diesel Storage Tanks) and LOU 59 (Storm Sewer System), and LOU 60 (Acid Drain
O-5	45, 59		SA188-0.5	0.5	Х	X X	Х	Х	Х	X	Х	Х	Х	1	System). Located beneath the footprint of a aboveground storage tank to evaluate subsurface releases (See LOU 45
O-5	45, 59		SA188-10	10	Х	X X		X	X	Hold	Х	Х			summary for historical data).
0-5	45, 59		SA188-20	20	X	X X	X	X	X	Hold	X	X		<del>                                     </del>	
O-5 O-5	45, 59 45, 59		SA188-30 SA188-35	30 35	X	X X	X	X	X	Hold X	X	X		+	
O-5 O-6	45, 59 45, 59	SA40	SA166-35 SA40-0.0	0.0		<del>  ^   ^</del>	^	<del>                                     </del>	^	^			+	X	Boring located to evaluate LOU 45 (Diesel Storage Tanks), LOU 59 (Storm Sewer System), and LOU 60 Acid Drain
0-6	45, 59	5	SA40-0.5	0.5	Х	X X	Х	Х	Х	X	Х	Х	Х		System). Located on the perimeter of the former aboveground storage tank to evaluate potential releases (see text
0-6	45, 59		SA40-10	10	Х	X X	Х	X	X	Hold	Х	Х		1	for historic details) and between LOUs 59 and 60 to evaluate possible piping releases.
0-6	45, 59		SA40-20	20	X	X X		X	X	Hold	X	X		<del>                                     </del>	
O-6 O-6	45, 59 45, 59		SA40-30 SA40-40	30 40	X	X X	X	X	X	Hold X	X	X	1	1	
O-6	45, 59 45, 60	SA42	SA40-40 SA42-0.0	0.0		^   X	^	<del>                                     </del>	^	^		^	+	X	Boring located to evaluate LOU 45 (Diesel Storage Tanks) and LOU 60 (Acid Drain System). Located at a low spot
0-6	45, 60		SA42-0.5	0.5	Х	X X	Х	X	Х	X	Х	Х	Х		within the footprint of former aboveground storage tank to evaluate potential releases and near LOU 60 piping to evaluate
O-6	45, 60		SA42-10	10	Х	X X	X	X	Χ	Hold	Х	Х			possible local piping releases.
0-6	45, 60		SA42-20	20	X	X X	X	X	X	Hold	X	X	1	1	
0-6	45, 60 45, 60		SA42-30	30	X	X X	X	X	X	Hold X	X	X	1	+	
O-6 O-6	45, 60 45	SA43	SA42-40 SA43-0.0	40 0.0	Х	X X	X	X	X	X	X	Х	+	X	Boring located to evaluate LOU 45 (Diesel Storage Tanks), LOU 59 (Storm Sewer System), and LOU 60 Acid Drain
O-6	45	5,170	SA43-0.5	0.5	Х	X X	X	X	Х	X	Х	Х	Х	<u> </u>	System). Located on the perimeter of the former aboveground storage tank to evaluate potential releases (see text
0-6	45		SA43-10	10	Х	X X	Х	X	Χ	Hold	Х	X			for historic details) and between LOUs 59 and 60 to evaluate possible piping releases.
0-6	45		SA43-20	20	X	X X	X	X	X	Hold	X	X	1	1	
O-6	45	]	SA43-30	30	X	X X	X	X	X	Hold	X	X			

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Phase B Source Area Investigation Work Plan

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Grid Location	LOU Number	Phase B Boring No.	Sample ID Number	Sample Depths <sup>1.</sup> (ft. bgs)	Perchlorate (EPA 314.0)	Metals (EPA 6020)	Hex Cr (EPA 7199)	TPH- DRO/ORO (EPA 8015B)	TPH-GRO VOCs <sup>2.</sup> (EPA 8015B)	Wet Chemistry <sup>3.</sup>	Total Cyanide (EPA 9012A)	OCPs <sup>4.</sup> (EPA 8081A)	SVOCs <sup>5.</sup> (EPA 8270C)	Radio- nuclides <sup>6.</sup>	Dioxins/ Furans <sup>7.</sup>	Asbestos <sup>9.</sup> EPA/540/R-97/028	Geo- technical Tests <sup>10.</sup>	Rationale
						Во	rings are o	organized by	grid location as show	n on <u>Plate A</u> - S	Starting point is	on the nort	western mo	st grid in Area	2 (M-2) an	d ending with	the southea	stern most grid in Area 2 (S-7).
O-6	45		SA43-40	40	Х	Х	Χ	Χ	X	Х		X	X	X				
Numl	ber of Samples:				64	64	64	64	0 64	64	0	26	64	64	13	13	0	

- n/a Not applicable - boring is not associated with a specific LOU but is located to evaluate soil for general area-wide coverage.
- Sample will be collected and analyzed.
  - No sample collected under Phase B sampling program.
- Sample depth to be determined in the field where DD = sample depth (ft).
- H-DRO/ORO Total petroleum hydrocarbons Diesel-Range Organics/Oil-Range Organics.
  - The 0.5 ft bgs sample will be collected from the 0.0 to 0.5 ft bgs interval, unless the 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.
  - Samples for VOC analysis will be preserved in the field using sodium bisulfate (or DI water) and methanol preservatives per EPA Method 5035.
  - Consists of wet chemistry parameters (including pH) listed on Table 1 of the Phase B Source Area Work Plan.
  - Organochlorine Pesticides (includes analysis for hexachlorobenzene).
  - Semi-volatile Organic Compounds

  - Radionuclides consists of alpha spec reporting for isotopic thorium and isotopic uranium, and Radium-226, plus Radium-228 by beta counting (per NDEP).

    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.
  - Polychlorinated biphenyls
- Polychlorinated bipnenyis
  Soil samples for asbestos analyses will be collected from a depth of 0 to 2-inches bgs.
  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).
  SPLP samples will be analyzed by EPA method 1312 using two preparation methods: 1) with extraction fluid #2 (reagent water at pH 5.0\(\text{m}0.05\)), and 2) with extraction method #3 (reagent water); per NDEP.

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Grid Location	Location Area	Monitoring Well No.	Screen Interval (ft bgs)	Soil Type Expected Across Screen Interval <sup>1</sup>	Well Sampled for Phase A? (y/n)	Perchlorate (EPA 314.0)	Hex Cr (EPA 7199)	Metals	VOCs <sup>2</sup> (EPA 8260)	Wet Chemistry (a)	OCPs <sup>3</sup> (EPA 8081A)	SVOCs <sup>4</sup> (EPA 8270C)	Radionuclid es <sup>5</sup>	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).											nd ending with the southeastern-most grid covering Area II (S-7).		
N5	II	M-75	34.6 - 49.3	Qal/MCfg1	no	Х	Х	Х	Х	Х	Х	Х	ı x	Located to serve as a downgradient stepout for LOUs 7, 8, 9, and 45; as an upgradient stepout for LOUs 16, 17, 19, 53 and 57; and for general Site coverage.
N5	II	M-76	34.6 - 49.3	MCcg1	yes	Х	Х	Х	Х	Х	Х	Х	х	Located to serve as a downgradient stepout for LOUs 8 and 45; as an upgradient stepout for LOUs 53 and 57; and for general Site coverage.
N6	II	M-2A*	nr	nr	yes	Х	Х	Х	Х	Х	Х	Х	ı x	Located as a downgradient stepout for LOUs 7, 8, 9, 13, 14, 20, 34, and 45; as an upgradient stepout for LOUs 16, 17, 18, 22, 23, 53, and 57; and for general Site coverage.
O5	II	M-21	18 - 38	MCfg1	no	Х	Х	Х	Х	Х	Х	Х	Х	Located to evaluate LOU 45; as an upgradient stepout for LOUs 7, 9, 13 and 14; as a downgradient stepout for LOU 59; and for general Site coverage.
P5	IIS	M-97	35 - 45	MCfg1/MCcg1	yes	Х	Х	Х	Х	Х	Х	Х	Х	Located to serve as an upgradient stepout for LOU 45 and segments of LOU 59 located in Area II; and for general Site coverage.
				Number of F	ield Samples:	5	5	5	5	5	5	5	5	

## 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

04020-023-430 June 2008



# **Summary of Available Data for LOU 45** Diesel Storage Tanks Tronox Facility – Henderson, Nevada

**Soil and Groundwater Characterization Data** 

04020-023-430 - LOU 45 June 30, 2008



Tronox Facility - Henderson, Nevada

LOU-specific analytes identified include:

- Metals (Phase A list)
- VOCs
- SVOCs

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

## LOU 45 Table 1 - Soil Characterization Data - Wet Chemistry

### LOU 45 Table 2 - Groundwater Characterization Data - Metals

- LOU 45 Table 3a Groundwater Characterization Data Routine Monitoring
- LOU 45 Table 3b Groundwater Characterization Data Routine Monitoring
- LOU 45 Table 4a Summary of Groundwater Analytical Data
- LOU 45 Table 4b Summary of Groundwater Analytical Data
- LOU 45 Table 5 Summary of Soil Analytical Data
- LOU 45 Table 6 Groundwater Characterization Data Organochlorine Pesticides (OCP)
- LOU 45 Table 7 Groundwater Characterization Data Organophosphorus Pesticides (OPP)
- LOU 45 Table 8 Groundwater Characterization Data PCBs

## LOU 45 Table 9 - Groundwater Characterization Data - Perchlorate

- LOU 45 Table 10 Groundwater Characterization Data Radionuclides
- LOU 45 Table 11 Groundwater Characterization Data SVOCs
- LOU 45 Table 12 Groundwater Characterization Data VOCs

Notes for Phase A Data Tables are included at the end of the table

# LOU 45 Table 1 Groundwater Characterization Data - Wet Chemistry

## Diesel Storage Tanks Tronox Facility - Henderson, Nevada

		4	
Samp	ling Program	Ph A <sup>1</sup>	
	M-76		
	M-76		
	Sample Date	12/04/2006	
Wat Chamiatry Davamatara	MCL <sup>2</sup>		Unito
Wet Chemistry Parameters	mg/L		Units
Total Dissolved Solids	5.00E+02 j	3970	mg/L
Total Suspended Solids		20.0 J	mg/L
Alkalinity (as CaCO3)		5.0 U	mg/L
Bicarbonate		125	mg/L
Total Alkalinity		125	mg/L
Ammonia (as N)		50.0 U	ug/L
MBAS		0.21	mg/L
Cyanide	2.00E-01	R	ug/L
pH (liquid)		7.2 J	none
Specific Conductance		2320 J+	umhos/cm
Bromide		0.96	mg/L
Chlorate		820	mg/L
Chloride	2.50E+02	829	mg/L
Nitrate (as N)	1.00E+01	8.8	mg/L
Nitrite	1.00E+00	14.5	mg/L
ortho-Phosphate		15.0	mg/L
Sulfate	2.50E+02 j	770	mg/L
Total Organic Carbon		50.0 U	mg/L

- 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 45 Table 2 Groundwater Characterization Data - Metals

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

Samp	ling Program	Ph A <sup>1</sup>	
	Well ID:	M-76	
	Sample ID	M-76-Z	
	Sample Date	05/09/2007	
Metals	MCL <sup>2</sup>		Unit
Wetais	ug/L		Onit
Aluminum	5.00E+01 j	393 U	ug/L
Antimony	6.00E+00	25.0 U	ug/L
Arsenic	1.00E+01	100 U	ug/L
Barium	2.00E+03	23.5 U	ug/L
Beryllium	4.00E+00	4.4 U	ug/L
Boron	7.30E+03	3570	ug/L
Cadmium	5.00E+00	2.9 U	ug/L
Calcium		120000	ug/L
Chromium (Total)	1.00E+02	2380	ug/L
Chromium-hexavalent	1.09E+02	2590 J	ug/L
Cobalt	7.30E+02	15.7 U	ug/L
Copper	1.30E+03 p	12.5 U	ug/L
Iron	3.00E+02 j	470 UJ	ug/L
Lead	1.50E+01 u	24.6 U	ug/L
Magnesium	1.50E+05 a	74600	ug/L
Manganese	5.00E+01 j	17.1 U	ug/L
Molybdenum	1.82E+02	29.4 J	ug/L
Nickel	7.30E+02	25.8 U	ug/L
Platinum		5.0 U	ug/L
Potassium		16900	ug/L
Selenium	5.00E+01	50.0 U	ug/L
Silver	1.00E+02 j	10.1 U	ug/L
Sodium		978000	ug/L
Strontium	2.19E+04	3170	ug/L
Thallium	2.00E+00	16.0 U	ug/L
Tin	2.19E+04	10.0 U	ug/L
Titanium	1.46E+05	19.6 U	ug/L
Tungsten		25.0 U	ug/L
Uranium	3.00E+01	11.3 J	ug/L
Vanadium	3.65E+01	80.0 U	ug/L
Zinc	5.00E+03 j	96.5 J	ug/L
Mercury	2.00E+00	0.17 J+	ug/L

- 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) See footnote (b). 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 45 Table 3a Groundwater Characterization Data - Routine Monitoring<sup>1</sup>

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

						Total						Nitrate					
		Depth to	Perchlorate		MCL <sup>2</sup>	Chromium		MCL	TDS		MCL	(as N)		MCL	Chlorate		MCL
Well ID	Date	water (ft)	mg/L	Qual	mg/L	mg/L	Qual	mg/L	mg/L	Qual	mg/L	mg/L	Qual	mg/L	mg/l	Qual	mg/L
M-2A	5/5/2006		430	d	1.80E-02 a,m	18	d	1.00E-01 c	12100		5.00E+02 j			1.00E+01			
M-2A	5/4/2007		362		1.80E-02 a,m	17		1.00E-01 c	10200		5.00E+02 j			1.00E+01			
M-21	5/3/2006		32	d	1.80E-02 a,m		d	1.00E-01 c	3650		5.00E+02 j			1.00E+01			
M-21	5/2/2007		3.05		1.80E-02 a,m	1.4		1.00E-01 c	3460		5.00E+02 j			1.00E+01			
M-75	2/3/2006		140	d	1.80E-02 a,m	6.9	d	1.00E-01 c			5.00E+02 j			1.00E+01			
M-75	5/5/2006		110	d	1.80E-02 a,m		d	1.00E-01 c	5960		5.00E+02 j			1.00E+01			
M-75	11/3/2006		99.8	d	1.80E-02 a,m	5.2	d	1.00E-01 c	5090		5.00E+02 j			1.00E+01			
M-75	2/2/2007		91.3		1.80E-02 a,m	5.3		1.00E-01 c	4990		5.00E+02 j			1.00E+01			
M-75	5/4/2007		83.7		1.80E-02 a,m	4.7		1.00E-01 c	5080		5.00E+02 j			1.00E+01			
M-76	2/3/2006	39.05	80	d	1.80E-02 a,m	3.1	d	1.00E-01 c			5.00E+02 j			1.00E+01			
M-76	5/5/2006	39.08	83	d	1.80E-02 a,m	3.6	d	1.00E-01 c	4400		5.00E+02 j			1.00E+01			
M-76	11/3/2006	38.74	81.3	d	1.80E-02 a,m	4	d	1.00E-01 c	4200		5.00E+02 j			1.00E+01			
M-76	2/2/2007	38.80	97.6		1.80E-02 a,m	3.1		1.00E-01 c	3980		5.00E+02 j			1.00E+01			
M-76	5/4/2007	39.15	77.9		1.80E-02 a,m	3.7		1.00E-01 c	4320		5.00E+02 j			1.00E+01			
M-97	2/3/2006	39.83	60	d	1.80E-02 a,m	0.055	d	1.00E-01 c			5.00E+02 j			1.00E+01			
M-97	5/4/2006	39.89	61	d	1.80E-02 a,m		d	1.00E-01 c	3640		5.00E+02 j			1.00E+01			
M-97	8/2/2006	40.10	62	d	1.80E-02 a,m	0.067	d	1.00E-01 c	3140		5.00E+02 j			1.00E+01			
M-97	11/1/2006	40.07	80	d	1.80E-02 a,m	0.072	d	1.00E-01 c	3600		5.00E+02 j			1.00E+01			
M-97	1/31/2007	40.37	77.7		1.80E-02 a,m	0.066		1.00E-01 c	3660		5.00E+02 j			1.00E+01			
M-97	5/3/2007	40.43	76.8	J	1.80E-02 a,m	0.063		1.00E-01 c	3770	J	5.00E+02 j			1.00E+01			
M-97	8/1/2007	40.97	89.2		1.80E-02 a,m	0.61		1.00E-01 c	3730		5.00E+02 j			1.00E+01			

#### Notes:

- 1. ENSR, 2007, Quarterly Performance Report for Remediation Systems, Tronox Facility Henderson, Nevada, July September 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

## LOU 45 Table 3b Groundwater Characterization Data - Routine Monitoring

## Diesel Storage Tanks Tronox Facility - Henderson, Nevada

WELL#	Sample Date	Total Depth (ft bgs)	Depth to Water (ft TOC)	pH (Lab)	EC (Lab, µmho/cm)	Cr-total (ppm)	CIO <sub>4</sub> (ppm)	LAB	Well Location from Pond (Approximate)
M-2A	8/24/97						650	KMC	
M-2A	9/15/97		41.02	7.31	13000			KMC	
M-2A	4/27/98	46.71	41.41	7.28	6180		740	KMC	
M-2A	5/6/99	46.71	41.09	7.29	10900	20	800	KMC	
M-2A	5/5/00	46.71	41.78	7.39	14400	29	780	KMC	200 ft NE
M-2A	5/4/01	46.71	41.85	7.43	11700	25	580	KMC	
M-2A	4/30/02		40.55	7.3	12660	24	560	MW	
M-2A	4/30/03		41.37		14470		690	MW	
M-2A	5/6/04			7.3	13700	29	700	MW	
M-21	8/24/97						52	KMC	
M-21	9/15/97		41.50	7.35	6000		NS	KMC	
M-21	4/27/98	44.63	42.05	7.28	6180		NS	KMC	
M-21	5/6/99	44.63	41.10	7.02	6460	4.00	66	KMC	
M-21	5/5/00	44.63	41.67	7.52	6410	3.30	50	KMC	120 ft S
M-21	5/4/01	44.63	41.30		6200		49	KMC	0 0
M-21	4/30/02		40.00	6.9	5580	3.6	54	MW	
M-21	4/30/03		41.09		5720		49	MW	
M-21	5/6/04			7.0	2970	0.8	24	MW	
M-75	4/27/98		42.51	7.39	5130			KMC	
M-75	5/6/99	63.32	42.00	7.50	8610	8.80	160	KMC	
M-75	5/5/00	63.32	42.53	7.74	9140	12.00	180	KMC	
M-75	5/4/01	63.32	43.00	7.67	8180	11.00	150	KMC	100 ft N
M-75	5/1/02		41.44	7.7	7260	5.1	100	MW	100 1014
M-75	5/1/03		42.05		7410		24	MW	
M-75	5/6/04			7.7	6080	4.8	78	MW	
M-76	8/24/97						200	KMC	
M-76	9/15/97	54.17	39.79	7.57	8940			KMC	
M-76	4/27/98		39.85	7.52	5440		200	KMC	
M-76	10/21/98		39.52		<del></del>			TOVIC	
M-76	5/6/99	54.17	38.32	7.51	8570	14.00	220	KMC	
M-76	5/5/00	54.17	39.56	7.80	8000	11.00	160	KMC	
M-76	5/4/01	54.17	39.40	7.69	7480	11.00	130	KMC	
M-76	4/30/02	J <del>4</del> .17	37.84	7.6	6360	8	98	MW	
M-76	12/10/02		39.33	7.0	6370	6.1	90	MW	
M-76	1/21/03		39.33	7.9	6250	4.8		MW	200 ft NW
							120		200 IL INVV
M-76	5/1/03		38.65		6840			MW	
M-76 M-76	7/9/03		39.56						
M-76	8/13/03		39.64						
	9/8/03		39.74						
M-76	10/5/03		39.81						
M-76	11/4/03		39.93					-	
M-76	12/8/03		39.97					-	
M-76	1/8/04		40.02						
M-76	2/2/04		40.03					1	

# LOU 45 Table 3b (continued) Groundwater Characterization Data - Routine Monitoring

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

WELL#	Sample Date	Total Depth (ft bgs)	Depth to Water (ft TOC)	pH (Lab)	EC (Lab, µmho/cm)	Cr-total (ppm)	CIO <sub>4</sub> (ppm)	LAB	Well Location from Pond (Approximate)
M-76	3/1/04		39.90						
M-76	4/1/04		39.76						200 ft NW
M-76	5/7/04		39.27	7.7	6190	4.8	100	MW	200 11 1111
M-76	6/10/04		39.56					-	

## Notes:

 $\begin{array}{ll} \text{ft bgs = feet below ground surface} & \text{EC = Electrical Conductivity} \\ \mu\text{mho/cm = micromhos per centimeter} & \text{Cr-total: Total Chromium} \\ \text{ppm = parts per million} & \text{CIO}_4\text{: Perchlorate} \end{array}$ 

ft TOC = feet from Top of Casing

-- = Either no data was obtained or was not analyzed for the respective constituent.

Labs: KMC Kerr-McGee Chemical Corporation

MW Montgomery Watson

**Source:** Kerr-McGee Chemical Corporation, Mother-hen Database.

### LOU 45 Table 4a Summary of Groundwater Analytical Data

Diesel Storage Tanks Tronox Facility - Henderson, Nevad

Water Analysis Sample Number <sup>1</sup>	Date	Well Location	Sample Depth (ft bgs)	TPH-d (mg/kg)	RL	MCL <sup>2</sup> mg/L
M-21	4/10/1997	20 ft N	WATER	< 1.0	1.0 mg/l	
M-10	4/10/1997	1800 ft S/SE	WATER	<1.0	1.0 mg/l	

Sample Analyzed for: TPH diesel, BTEX, and PAHs

Sample Analysis by: LAS Laboratories

			Sample	TPH-d (mg/kg)			BTEX (mg/kg) EPA Method 8020				
Sample Number <sup>3</sup>	Date	Well Location	Depth (ft bgs)	EPA Method 8015M	RL	MCL <sup>2</sup> mg/L	Benzene	Toluene	Ethyl- benzene	Total Xylenes	PAHs* (μg/kg) EPA Method 8270
		Middle of									
SB5-5	3/29/1999	LOU	WATER	13 mg/l	0.5 mg/l		NA	NA	NA	NA	NA
M-21	3/29/1999	20 ft N	WATER	ND	0.5 mg/l		NA	NA	NA	NA	NA

#### Notes:

1. ENSR, 1997, Phase II Environmental Conditions Assessment (ECA) located at Kerr-McGee Chemical Corporation, Henderson, Nevada, August 7, 1997.

RL = Reporting Limit

- 2. U.S. EPA Maximum Contaminant Level (MCL) values unless noted.
- 3. ENSR, 2001, Supplemental Phase II ECA
- 4. U.S. EPA, Region 6, Medium Specific Screening Levels (MSSLs) for Industrial Outdoor Worker (March, 2008).

ft bgs = feet below ground surface

TPH-d = Total Petroleum Hydrocarbons, analyzed by EPA Metho -DUP = duplicate sample taken at the indicated deptl

8015 diesel range. (<34) = Not detected above the designated PQ

mg/kg = milligrams per kilogran ND (<5) = Non-detect above laboratory Reporting Limit (RL) of 5 mg/ł  $\mu$ g/kg = micrograms per kilogran ND (<2) = Non-detect above laboratory Reporting Limit of 2 mg/ł

NA = Not Analyzed, not tested <= not detected above the designated reporting lim

\* Analytes and detection limits for PAH's that were non-detect (µg/kg):

Analyte	PQL	MSSL⁴ mg/kg	Analyte	PQL	MSSL⁴ mg/kg	Analyte	PQL	MSSL⁴ mg/kg
Acenapthalene	500	3.30E+04	Benzo (a) pyrene	500	2.30E-01	Indeno (1,2,3-c,d) pyrene	500	2.30E+00
Acenapthylene	500	3.30E+04 (pp)	Chrysene	500	2.30E+02	Napthalene	500	2.10E+02
Anthracene	500	1.00E+05	Dibenzo(a,h)anthracene	500	2.30E-01	Phenanthrene	500	1.00E+05 (n)
Benzo (a) anthracene	500	2.30E+00	Flouranthene	500	2.40E+04	Pyrene	500	3.20E+04
Benzo(b) flouranthene	500	2.30E+00	Flourene	500	2.60E+04	Benzo(k) flouranthene	500	2.30E+01

## LOU 45 Table 4b Summary of Groundwater Analytical Data

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

Analysis of water from M-97

Water		Conductivity	TPH-d	<b>VOCs<sup>*</sup> (μg/l)</b> EPA 8240		VOCs <sup>*</sup> (μg/l) EPA 8240 SVOCs <sup>**</sup> (μg/l) Arsenic				
Sample	Date	(µS/cm) EPA 120.1	<b>(mg/l)</b> EPA 8015M	Acetone	Chloro- form		Di-n-butyl- phthalate		(μ <b>g/l)</b> ΕΡΑ 6010 ICP	<b>pH</b> EPA 150.1
M-97	4/9/1997	3690	<1.0	3.1 JB	18	ND	7.8	ND	0.124	7.72
PC	QL	1	1	10	5	various	10	various	0.01	0.1

Periodic analysis of water from M-97

r enounc a	allalysis c	water momit	1-31						
WELL#	Date	Total Depth (ft bgs)	Depth to Water (ft TOC)	pH (Lab)	EC (Lab, µmho/cm)	Cr-total (ppm)	CIO₄ (ppm)	LAB	Well Location from LOU (Approximate)
M-97	5/6/99	47.86	40.63	7.6	3290	0.09	11	KMC	
M-97	5/5/00	47.86	41.31	8.09	3550	0.10	22	KMC	
M-97	5/4/01	47.86	40.53	-	3980		31	KMC	320 ft N
M-97	5/1/02	47.86	39.00	7.5	4590	0.059	34	MW	
M-97	5/7/04	47.86	40.22	7.6	3640	0.076	18	MW	

#### Notes:

TPH-d = Total Petroleum Hydrocarbons, diesel range

VOCs = Volatile organic compounds

SVOCs = Semi-volatile organic compounds

ft bgs = feet below ground surface ft TOC = feet from Top of Casing

EC = Electrical Conductivity

Cr-total = Total Chromium

ClO₄ = Perchlorate

LOU = Letter of Understanding

ND = Not determined

PQL = Practical Quantitation Limit μS/cm = micro Siemens per centimeter

mg/l = milligrams per liter

μg/l = micrograms per liter ppm = parts per million

µmho/cm = micro Mhos per centimeter

< = not detected above the designated reporting limit.</p>

J = estimated value, consituent detected at a level less than the RDL or PQL and greater than the or equal to the MDL.

B = Reported value is less than the contract required detection limit but greater than or equal to the istrument detection limit.

-- = Either no data was obtained or was not analyzed for the respective constituent.

Labs: KMC Kerr-McGee Chemical Corporation

MW Montgomery Watson

Sources: M-97 on 4/9/1997 from ENSR, 1997 Phase II ECA; and Kerr-McGee Chemical Corporatoin, Mother-hen Database.

\*\* Analytes and detection limits for VOC's that were non-detect ( $\mu g/L$ ):

Analyte	PQL	Analyte	PQL	Analyte	PQL
Chloromethane	5	Chloroform	5	1,1,2-Trichloroethane	5
Vinyl Chloride	5	1,1,1-Trichloroethane	5	Tetrachloroethene (PCE)	5
Bromomethane	5	Carbon Tetrachloride	5	Dibromochloromethane	5
Chloroethane	5	1,2-Dichloroethane	5	Chlorobenzene	5
Trichlorofluoromethane	5	Benzene	5	Ethyl benzene	5
Acetone	10	Trichloroethene (TCE)	5	m, p-Xylenes	5
1,1-Dichloroethene	5	1,2-Dichloropropane	5	o-Xylene	5
Carbon Disulfide	5	Bromodichloromethane	5	Styrene	5
Methylene Chloride	5	2-Chloroethylvinyl ether	20	Bromoform	5
trans-1,2-Dichloroethene	5	4-Methyl-2-Pentanone	10	1,1,2,2-Tetrachloroethane	5
Vinyl Acetate	10	cis-1,3-Dichloropropene	5	1,3-Dichlorobenzene	5
1,1-Dichloroethane	5	Toluene	5	1,4-Dichlorobenzene	5
2-Butanone	10	trans-1,3-Dichloropropene	5	1,2-Dichlorobenzene	5
cis-1,2-Dichloroethene	5	2-Hexanone	10		

# LOU 45 Table 4b (continued) Summary of Groundwater Analytical Data

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

\*\* Analytes and detection limits for SVOC's that were non-detect (µg/L):

Analyte	PQL	Analyte	PQL	Analyte	PQL
Phenol	10	Hexachlorobutadiene	10	N-Nitrosodimethylamine	10
Bis (2-chloroethyl) ether	10	4-Chloro-3-methylphenol	20	4-Bromophenyl phenyl ether	10
2-Chlorophenol	10	2-Methylnaphthalene	10	Hexachlorobenzene	10
1,3-Dichlorobenzene	10	Hexachlorocyclopentadiene	10	Pentachlorophenol	50
1,4-Dichlorobenzene	10	2,4,6-Trichlorophenol	10	Phenanthrene	10
Benzyl alcohol	20	2,4,5-Trichlorophenol	10	Anthracene	10
1,2-Dichlorobenzene	10	2-Chloronaphthalene	10	Carbazole	10
2-Methylphenol	10	2-Nitroaniline	50	Di-n-butyl phthalate	10
Bis (2-chloroisopropyl) ether	10	Dimethyl phthalate	10	Fluoranthene	10
4-Methylphenol	10	Acenaphthylene	10	Pyrene	10
N-Nitroso-di-N-propylamine	10	2,6-Dinitrotoluene	10	Butylbenzylphthalate	10
Hexachloroethane	10	3-Nitroaniline	50	3,3-Dichlorobenzidine	20
Nitrobenzene	10	Acenaphthene	10	Benz (a) anthracene	10
Isophorone	10	2,4-Dinitrophenol	50	Chrysene	10
2-Nitrophenol	10	4-Nitrophenol	50	Bis (2-ethylhexyl) phthalate	10
2,4-Dimethylphenol	10	Dibenzofuran	10	Di-n-octyl phthalate	10
Benzoic Acid	50	2,4-Dinitrotoluene	10	Benzo (b) fluoranthene	10
Bis (2-chloroethoxy) methane	10	Diethyl phthalate	10	Benzo (k) fluoranthene	10
2,4-Dichlorophenol	10	4-Chlorophenyl phenyl ether	10	Benzo (a) pyrene	10
1,2,4-Trichlorobenzene	10	Fluorene	10	Indeno (1,2,3-c,d) pyrene	10
Naphthalene	10	4-Nitroaniline	20	Dibenzo (a,h) anthracene	10
4-Chloroaniline	20	4,6-Dinitro-2-methylphenol	50	Benzo (g,h,I) perylene	10

## LOU 45 Table 5 Summary of Soil Analytical Data<sup>1</sup>

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

Sample Analyzed for: TPH diesel by EPA 8015N

Sample Matrix: Soi

Sample Analysis by: LAS Laboratories

Sample Number	Date	Sample Depth (ft bgs)	TPH-d (mg/kg)	MSSL <sup>2</sup> mg/kg
SB5-1	4/9/1997	-1	16,000	1.00E+02
SB5-1	4/9/1997	-5	<34	1.00E+02
SB5-1	4/9/1997	-10	<34	1.00E+02
SB5-2	4/9/1997	-1	7,500	1.00E+02
SB5-2	4/9/1997	-5	9,100	1.00E+02
SB5-2	4/9/1997	-10	6,700	1.00E+02
SB5-3	4/9/1997	-1	4,500	1.00E+02
SB5-3	4/9/1997	-5	1,300	1.00E+02
SB5-3	4/9/1997	-10	520	1.00E+02
SB5-3	4/9/1997	-10-DUP	800	1.00E+02
	TPH Rep	porting Limit	34	

# LOU 45 Table 5 (continued) Summary of Soil Analytical Data<sup>1</sup>

Diesel Fuel Storage Tank Area Tronox Facility - Henderson, Nevada

Sample Analyzed for: TPH diesel by EPA 8015N

Sample Matrix: Soi

Sample Analysis by: LAS Laboratories

Cample 7 thanyold by. L		Sample Depth	TDU d (man/len)		BTEX (mg/kg) EPA Method 8020			DAUG (ver/lee)*
Sample Number	Date	-	TPH-d (mg/kg)	Bonzono		Ethyl-	Total	PAHs (µg/kg)*
		(ft bgs)	EPA Method 8015M	Benzene	Toluene	benzene	Xylenes	EPA Method 8270
SB5-4-5	3/29/1999	5	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-4-10	3/29/1999	10	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-4-15	3/29/1999	15	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-4-20	3/29/1999	20	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-4-25	3/29/1999	25	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-4-30	3/29/1999	30	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-4-35	3/29/1999	35	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-4-40	3/29/1999	40	50	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-5	3/29/1999	5	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-10	3/29/1999	10	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-15	3/29/1999	15	25	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-20	3/29/1999	20	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-25	3/29/1999	25	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-30	3/29/1999	30	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-35	3/29/1999	35	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-5-40	3/29/1999	40	90	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-5	3/29/1999	5	38	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-5D	3/29/1999	5	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-10	3/29/1999	10	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-15	3/29/1999	15	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-20	3/29/1999	20	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-25	3/29/1999	25	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-30	3/29/1999	30	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<0.5)
SB5-6-35	3/29/1999	35	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-6-40	3/29/1999	40	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-5	3/29/1999	5	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-10	3/29/1999	10	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-10D	3/29/1999	10	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
		MSSL <sup>2</sup>	1.00E+02 (w)	1.60E+00	5.20E+02	2.30E+02	2.10E+02	
		mg/kg	. ,					

## LOU 45 Table 5 (continued) Summary of Soil Analytical Data<sup>1</sup>

Diesel Fuel Storage Tank Area
Tronox Facility - Henderson, Nevada

Sample Analyzed for: TPH diesel by EPA 8015N

Sample Matrix: Soi

Sample Analysis by: LAS Laboratories

		Sample Depth	TPH-d (mg/kg)	BH_d (mg/kg) BTEX (mg/kg) EPA Method 8020				PAHs (µg/kg)*
Sample Number	Date	(ft bgs)	EPA Method 8015M	Benzene	Toluene	Ethyl- benzene	Total Xylenes	EPA Method 8270
SB5-7-15	3/29/1999	15	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-20	3/29/1999	20	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-25	3/29/1999	25	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-30	3/29/1999	30	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-35	3/29/1999	35	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
SB5-7-40	3/29/1999	40	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<2)	ND (<0.5)
		MSSL <sup>2</sup> mg/kg	1.00E+02 (w)	1.60E+00	5.20E+02	2.30E+02	2.10E+02	

#### Notes:

1. ENSR Corporation (ENSR), 1997, Phase II Environmental Conditions Assessment located at Kerr-McGee Chemical Corporation, Henderson, Nevada, August 7 1997

2. U.S. EPA, Region 6, Medium Specific Screening Levels (MSSLs) for Industrial - Outdoor Worker (March, 2008)

(w) Value for pyrene used as surrogate for benzo(g,h,i)perylene based on structural similarities

TPH-d = Total Petroleum Hydrocarbons, analyzed by EPA Method 8015 diesel range

-DUP = duplicate sample taken at the indicated depth

RL = Reporting Limit

mg/kg = milligrams per kilogram (<34) = Not detected above the designated PQL

 $\mu$ g/kg = micrograms per kilogram ND (<5) = Non-detect above laboratory Reporting Limit (RL) of 5 mg/kg NA = Not Analyzed, not testec ND (<2) = Non-detect above laboratory Reporting Limit of 2 mg/kg

ft bgs = feet below ground surface <= not detected above the designated reporting limit

Source: ENSR, 2001, Supplemental Phase II ECA

\* Analytes, detection limits and PRG values for PAHs that were non-detect (µg/kg)

Analyte	PQL	MSSL <sup>2</sup> mg/kg	Analyte	PQL	MSSL <sup>2</sup> mg/kg	Analyte	PQL	MSSL <sup>2</sup> mg/kg
Acenapthalene	500	3.30E+04	Benzo (a) pyrene	500	2.30E-01	Indeno (1,2,3-c,d) pyrene	500	2.30E+00
Acenapthylene	500	3.30E+04 (pp)	Chrysene	500	2.30E+02	Napthalene	500	2.10E+02
Anthracene	500	1.00E+05	Dibenzo(a,h)anthrace	500	2.30E-01	Phenanthrene	500	1.00E+05 (n)
Benzo (a) anthracene	500	2.30E+00	Flouranthene	500	2.40E+04	Pyrene	500	3.20E+04
Benzo(b) flouranthene	500	2.30E+00	Flourene	500	2.60E+04	Benzo(k) flouranthene	500	2.30E+01

# LOU 45 Table 6 Groundwater Characterization Data - Organochlorine Pesticides (OCPs)

## Diesel Storage Tanks Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A <sup>1</sup>	
	Well ID	M-76	
	Sample ID	M-76	
	Sample Date	12/04/2006	
Organochlorine Pesticides	MCL <sup>2</sup>		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 (I)	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 (I)	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 (I)	0.50 U	ug/L
Toxaphene	3.00E+00	2.0 U	ug/L

- 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.
- (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.
- (I) Value for chlordane used as surrogate for alpha-chlordane, chlordane (technical) and gamma-chlordane due to structural similarities.

# LOU 45 Table 7 Groundwater Characterization Data - Organophosphorus Pesticides (OPPs)

## Diesel Storage Tanks Tronox Facility - Henderson, Nevada

S	ampling Progra	m Ph A <sup>1</sup>	
	Well		
	Sample		
	Sample Da		
OPPs	MCL <sup>2</sup>		Unit
UFFS	ug/L		Onit
Azinphos-methyl		2.5 U	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 (cd	1.0 U	ug/L
Demeton-S	1.46E+00 (cd	1.0 UJ	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 UJ	ug/L
Disulfoton	1.46E+00	0.50 U	ug/L
EPN	3.65E-01	1.2 UJ	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 U	ug/L
Phorate	7.30E+00	1.2 UJ	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

- 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.
- (ff) Value for methyl parathion used as surrogate for fenthion based on structural similarities.
- (tt) Value for parathion-methyl used as surrogate for parathion-ethyl due to structural similarities.

# LOU 45 Table 8 Groundwater Characterization Data - PCBs

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

Sam	Sampling Program		
	Well ID	M-76	
	Sample ID	M-76	
	Sample Date	12/04/2006	
PCBs	MCL <sup>2</sup>		Unit
FGD5	ug/L		Offic
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

- 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 45 Table 9 Groundwater Characterization Data - Perchlorate

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

Well ID	Sample ID	Sample Date	Perchlorate ug/L	MCL <sup>1</sup>	Sampling
Number	Sample 1D	Sample Date	r ercinorate ug/L	ug/L	Program
M-76	M-76	12/04/2006	77300 J+	1.80E+01 a,(m)	Ph A <sup>2</sup>

- 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 45 Table 10 Groundwater Characterization Data - Radionuclides

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

			Ra-226	Ra-228	Th-228	Th-230	Th-232	U-233/234	U-235/236	U-238	
Well ID			pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	Sampling
Number	Sample ID	Date									Program
M76	M76-Z	05/09/2007	0.184 U	0.543 UJ							Ph A <sup>1</sup>

## Notes:

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

# LOU 45 Table 11 Groundwater Characterization Data - SVOCs

## Diesel Storage Tanks Tronox Facility - Henderson, Nevada

	Ph A <sup>1</sup>			
		- up	ling Program Well No.	M-76
			Sample ID	M-76
			Sample Date	12/04/2006
	MCL <sup>2</sup>		Analytic	12/04/2000
SVOCs			Method	ug/L
1,4-Dioxane	<b>ug/L</b> 6.11E+00		non-SIM	10 U
2-Methylnaphthalene	6.20E+00	(jj)	non-SIM	10 U
2-Methylnaphthalene	6.20E+00	(jj)	SIM	10 0
Acenaphthene	3.65E+02	(11)	non-SIM	10 U
Acenaphthene	3.65E+02		SIM	10 0
Acenaphthylene	3.65E+02	(pp)	non-SIM	10 U
Acenaphthylene	3.65E+02	(pp)	SIM	10 0
Anthracene	1.83E+03	(PP)	non-SIM	10 U
Anthracene	1.83E+03		SIM	10 0
Benz(a)anthracene	9.21E-02		non-SIM	10 U
Benz(a)anthracene	9.21E-02		SIM	10 0
Benzo(a)pyrene	2.00E-01		non-SIM	10 U
Benzo(a)pyrene	2.00E-01		SIM	10 0
Benzo(b)fluoranthene	9.21E-02		non-SIM	10 U
Benzo(b)fluoranthene	9.21E-02		SIM	100
Benzo(g,h,i)perylene	1.83E+02	(w)	non-SIM	10 U
Benzo(g,h,i)perylene	1.83E+02	(w)	SIM	100
Benzo(k)fluoranthene	9.21E-01	(**)	non-SIM	10 U
Benzo(k)fluoranthene	9.21E-01		SIM	100
bis(2-Ethylhexyl)phthalate	6.00E+00		non-SIM	10 U
Butyl benzyl phthalate	7.30E+03		non-SIM	10 U
Chrysene	9.21E+00		non-SIM	10 U
Chrysene	9.21E+00		SIM	
Dibenz(a,h)anthracene	9.21E-03		non-SIM	10 U
Dibenz(a,h)anthracene	9.21E-03		SIM	
Diethyl phthalate	2.92E+04		non-SIM	10 U
Dimethyl phthalate	3.65E+05		non-SIM	10 U
Di-N-Butyl phthalate	3.65E+03		non-SIM	10 U
Di-N-Octyl phthalate	1.46E+03		non-SIM	10 U
Fluoranthene	1.46E+03		non-SIM	10 U
Fluoranthene	1.46E+03		SIM	
Fluorene	2.43E+02		non-SIM	10 U
Fluorene	2.43E+02		SIM	
Hexachlorobenzene	1.00E+00		non-SIM	10 U
Hexachlorobenzene	1.00E+00		SIM	
Indeno(1,2,3-cd)pyrene	9.21E-02		non-SIM	10 U
Indeno(1,2,3-cd)pyrene	9.21E-02		SIM	
Naphthalene	6.20E+00		non-SIM	5.0 U
Naphthalene	6.20E+00		non-SIM	10 U
Naphthalene	6.20E+00		SIM	
Nitrobenzene	3.40E+00		non-SIM	10 U
Octachlorostyrene			non-SIM	10 U

# LOU 45 Table 11 (continued) Groundwater Characterization Data - SVOCs

## Diesel Fuel Storage Tank Area Tronox Facility - Henderson, Nevada

	Sampling Program					
		Well No.	M-76			
		Sample ID	M-76			
		Sample Date	12/04/2006			
SVOCs	MCL <sup>2</sup>	Analytic	ua/l			
30008	ug/L	Method	ug/L			
Phenanthrene	1.80E+03 (n)	non-SIM	10 U			
Phenanthrene	1.80E+03 (n)	SIM				
Pyrene	1.83E+02	non-SIM	10 U			
Pyrene	1.83E+02	SIM				
Pyridine	3.65E+01	non-SIM	20 UJ			

- 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 45 Table 12 Groundwater Characterization Data - VOCs

Diesel Storage Tanks Tronox Facility - Henderson, Nevada

	Sampling Program	Ph- A <sup>1</sup>
	Well ID	M-76
	Sample ID	M76
	Sample Date	12/04/2006
	MCL <sup>2</sup>	
VOCs	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 UJ
1,2-Dichlorobenzene	6.00E+02	5.0 U
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	0.86 J
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 U
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 UJ
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	10 UJ
Carbon tetrachloride	5.00E+00	1.0 J
Chlorobenzene	1.00E+02 o	5.0 U
Chloroethane	4.64E+00	5.0 U
Chloroform	8.00E+01 r	290 J+
Chloromethane	1.58E+02	5.0 U
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 U
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
Dibromomethane	6.08E+01 xx	5.0 U
Dichlorodifluoromethane	3.95E+02	5.0 U
Ethyl t-butyl ether	1.10E+01 kk	5.0 U
=j. : : ::::j: : ::::::::::		

## LOU 45 Table 12 (continued) Groundwater Characterization Data - VOCs

Diesel Fuel Storage Tank Area Tronox Facility - Henderson, Nevada

	Sampling Program	Ph A <sup>1</sup>
	Well ID	M-76
	M-76	
	Sample ID Sample Date	12/04/2006
VOCs	MCL <sup>2</sup> ug/L	ug/L
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	5.0 U
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 U
Vinylchloride	2.00E+00	5.0 U
Xylene (Total)	1.00E+04	10 U

- 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.
- (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.
- (o) See footnote (b). Listed under synonym monochlorobenzene.
- (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 ethyltert-butyl ether (ETBE) based on structural similarities.
- (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.
- (uu) NDEP, 1998. Oxygenated Fuel Corrective Action Guidance. Draft. October, 12 1998. URL [http://ndep.nv.gov/bca/mtbe\_doc.htm].

## LOU 45 Notes for Phase A Data Tables

Diesel Storage Tanks
Tronox Facility - Henderson, Nevada

Blank Not analyzed

**Bold** Bold values are constituents detected above the laboratory sample quantitation limit.

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. Soluable metals

S Soluable meta
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 measure.

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