Summary of Available Data for LOU 36
Former Satellite Accumulation Point, Unit 3, Maintenance Shop
Tronox Facility – Henderson, Nevada

Name of Facility:

LOU 36 – Former Satellite Accumulation Point, Unit 3, Maintenance Shop

Goal of Closure:

- Closure for future commercial/industrial use.

Site Investigation Area:

- Size: Approximately 20 feet by 25 feet.
- Location: Southwestern corner of the Unit 3 building.
- Current Status/Features: LOU 36 is not currently used as a satellite accumulation point or for parts washing.

Description:

- The satellite accumulation point of LOU 36 included a parts washer and an adjacent open area where lead acid batteries and waste from parts washing were stored [Ref. 2].
- LOU 36 is concrete paved and partially walled with no berms for containment [Ref. 2].
- Adjacent to the unit is an unpaved soil area [Ref. 2].
- From 1989 to 1991 a solvent-based parts washer was used to remove chemicals, mainly 1,1,1-trichloroethane (1,1,1-TCA) [Refs. 1 and 2].
- Oily wastes recovered and drummed for transportation to a recycling facility [Refs. 1 and 2].
- From 1991 to early 2005 the parts washer used caustic detergent wash [Refs. 1 and 2].
- Waste stored in the area included oil, grease, solvents in drums, sludge, caustic detergent, metal parts, and lead acid batteries [Ref. 1].
- Minor cracks were noted in the floor in 1991 and 2008 [Refs. 2 and 4].

Process Waste Streams Associated with LOU 36	Known or Potential Chemicals Associated with LOU 36
Volatile releases from parts washer	• Metal and acid wastes (H_2SO_4) • VOCs (1,1,1-TCA)
Caustic releases from parts washer	• TPH • Wet chemistry analytes
Waste sludge releases from storage drum	• Caustics • TPH • VOCs
Battery acid releases from stored batteries	• Wet chemistry analytes • Metals

Summary of Available Data for LOU 36
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Overlapping or Adjacent LOUs:

The following LOUs overlap or are adjacent to LOU 36:

Overlapping LOUs

- No other LOUs overlap LOU 36.

Adjacent LOUs

- LOU 42 (Unit 2 Salt Conveyor) – Located west (cross-gradient) of LOU 36.
- LOU 59 (Storm Sewer System) – A branch of LOU 59 runs adjacent to the western boundary of LOU 36 along Seventh Street.

LOUs 42 and 59 are cross-gradient to LOU 36; therefore, they are not considered to affect LOU 36; therefore, the addition of other chemical classes to the proposed Phase B Analytical Plan for LOU 36 is not required.

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

Other LOUs Potentially Affecting Soils in LOU 36:

- None identified for LOU 36.

Known or Potential Chemical Classes:

- Metals
- Wet chemistry analytes
- VOCs
- TPH-DRO/ORO

Known or Potential Release Mechanisms:

- No known releases have been documented [Ref. 2].
- Potential leakage from drums and runoff from pavement to adjacent soil or possible infiltration through pavement cracks to underlying soil and groundwater [Ref. 2].
- Potential runoff of releases to Storm Sewer System inlet in Seventh Street [Ref. 2].
- Stains noted on the pavement [Ref. 2].

Results of Historical Sampling:

- No known historical soil sampling was identified in the documents reviewed.
- Downgradient monitoring wells M-12A and M-13 are routinely sampled for perchlorate, total chromium, TDS, nitrate, and chlorate. Analytical results are summarized on LOU 36 Table 1 (see attached) [Ref. 2].

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 (SA05) is approximately 460 feet northeast (downgradient) of LOU 36 and was not specifically sampled to evaluate this LOU [Ref. 3]. This boring is not considered representative of conditions at LOU 36.

Groundwater

- None specifically conducted for this LOU. The closest well sampled (M-13) is approximately 440 feet to the north (downgradient) of LOU 36 and was not specifically designed to evaluate this LOU [Ref. 3]. This well is not considered representative of conditions at LOU 36.

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 this LOU will consist of collecting soil samples from one judgmental sample location. This boring is SA133.

- The one boring along with the analytical program to evaluate soil samples from LOU 36 is listed on **Table A – Soil Sampling and Analytical Plan for LOU 36.**
- The soil boring for the Phase B investigation of LOU 36 is a judgmental sample location. The closest random grid sample location is approximately 250 feet north of LOU 36.
- Judgmental sample locations:
  - Are designed to evaluate soil for known or potential chemical classes associated with LOU 36, based on the known process waste streams.
  - Soil boring SA133 is a judgmental boring located within the LOU, at a visually stained/cracked location to evaluate local soil conditions due to potential releases.

Summary of Available Data for LOU 36
Former Satellite Accumulation Point, Unit 3, Maintenance Shop
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Proposed Phase B Constituents List for Soils:

The judgmental sample location will be analyzed for LOU-specific constituents consisting of the following:

- Metals (Phase A list)
- Wet chemistry analytes
- VOCs
- TPH-DRO/ORO

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

- Hexavalent chromium
- Perchlorate
- Radionuclides
- Dioxins/furans
- Asbestos

Proposed Phase B Groundwater Investigation/Rationale:

The Phase B groundwater investigation of LOU 36 consists of collecting groundwater samples from three (3) locations to evaluate local groundwater conditions and as part of the site-wide evaluation of constituent trends in groundwater.

- Well M-13 and M12A are located north (downgradient) of LOU 36 and will be used to evaluate local and area-wide groundwater conditions.
- Well M-146 will be located within the LOU 36 boundary to evaluate local and area-wide groundwater conditions.
- The three wells along with the analytical program to evaluate groundwater samples associated with LOU 36 are listed in **Table B – Groundwater Sampling and Analytical Plan for LOU 36**.

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

Summary of Available Data for LOU 36
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Proposed phase B Soil Gas Investigation/Rationale:

The following points will be sampled for soil gases as part of the focused Phase B Investigation for this LOU:

- Point SG41 is located 15 feet southeast of LOU 36 to evaluate area conditions for vapor-phase VOCs from soil and/or groundwater in the LOU and the occupied Unit 3 maintenance shop.

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. Kleinfelder, 1993, Environmental Conditions Assessment, Kerr-McGee Chemical Corporation, Henderson, Nevada Facility, April 15, 1993 (Final).
3. ENSR, 2007a, Phase A Source Area Investigation Results, Tronox Facility, Henderson, Nevada, September 2007.
4. ENSR, 2008, Site Visit by Sally Bilodeau, April 16, 2008.

Summary of Available Data for LOU 36
Former Satellite Accumulation Point, Unit 3, Maintenance Shop
Tronox Facility – Henderson, Nevada

LOU Figure

J:\TronoxGIS\mxd\Phase_B_WorkPlan\LOUs\lou-36.mxd

FIGURE NUMBER:	SHEET NUMBER:
1	X

SAMPLE LOCATIONS FOR LOU #36
FORMER SATELLITE ACCUMULATION POINT, UNIT 3, MAINTENANCE SHOP

Phase B Source Area Investigation
Tronox Facility
Henderson, Nevada

SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/16/2008	04020-023-430

ENSR | AECOM

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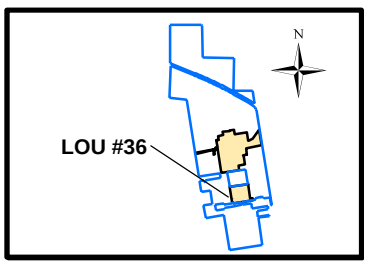

Summary of Available Data for LOU 36
Former Satellite Accumulation Point, Unit 3, Maintenance Shop

Tronox Facility – Henderson, Nevada

Sampling and Analytical Plans for LOU 36

Table A – Soil Sampling and Analytical Plan for LOU 36
Table B – Groundwater Sampling and Analytical Plan for LOU 36

Table A
Soil Sampling and Analytical Plan for LOU 36 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).																			
R-5	36	SA133	SA133-0.0	0.0													X		Boring located to evaluate LOU 36 (Former Satellite Accumulation Point, Unit 3, Maintenance Shop). Located in
R-5	36		SA133-0.5	0.5	X	X	X	X		X	X		X		X	X			damaged pavement area within LOU 36 to evaluate worst case location of surface releases.
R-5	36		SA133-10	10	X	X	X	X		X	X		Hold		X				
R-5	36		SA133-20	20	X	X	X	X		X	X		Hold		X				
R-5	36		SA133-30	30	X	X	X	X		X	X		Hold		X				
R-5	36		SA133-35	35	X	X	X	X		X	X		X		X				
Number of Samples:					**5**	**5**	**5**	**5**	**0**	**5**	**5**	**0**	**2**	**0**	**5**	**1**	**1**	**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 36 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).														
R5	II	M-146	TBD	TBD	no	X	X	X	X	X	X	X	X	Located to evaluate LOU 36; and for general Site coverage.
				Number of Field Samples:		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	

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 36
Former Satellite Accumulation Point, Unit 3, Maintenance Shop
Tronox Facility – Henderson, Nevada

Soil and Groundwater Characterization Data

Summary of Available Data for LOU 36
Former Satellite Accumulation Point, Unit 3, Maintenance Shop
Tronox Facility – Henderson, Nevada

LOU-specific analytes identified include:

- Metals (Phase A list)
- Hexavalent chromium
- VOCs
- SVOCs
- TPH-DRO
- PCBs

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

LOU 36 Table 1 – Groundwater Characterization Data – Routine Monitoring

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

LOU 36 Table 1
Groundwater Characterization Data - Routine Monitoring[1]

Former Satellite Accumulation Point, Unit 3 Maintenance Shop
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
M-12A	2/2/2006	---	360	d	1.80E-02 a,m	13	d	1.00E-01	10230		5.00E+02 j			1.00E+01			--
M-12A	5/4/2006	---	340	d	1.80E-02 a,m	12	d	1.00E-01	8760		5.00E+02 j	<0.1	ud	1.00E+01	2600	d	--
M-12A	8/2/2006	---	312	d	1.80E-02 a,m	12	d	1.00E-01	5640		5.00E+02 j	13	d	1.00E+01	1260	d	--
M-12A	11/1/2006	---	288	d	1.80E-02 a,m	12	d	1.00E-01	7270		5.00E+02 j	14.1	d	1.00E+01	2540	d	--
M-12A	2/1/2007	---	291		1.80E-02 a,m	12		1.00E-01	7820		5.00E+02 j			1.00E+01			--
M-12A	5/3/2007	---	283	J	1.80E-02 a,m	12		1.00E-01	7910	J	5.00E+02 j	18.2	d	1.00E+01	1980	d	--
M-12A	8/1/2007	---	320		1.80E-02 a,m	13		1.00E-01	7890		5.00E+02 j			1.00E+01			--
M-13	5/3/2006	---	27	d	1.80E-02 a,m	1.8	d	1.00E-01	2680		5.00E+02 j	<0.1	ud	1.00E+01	390	d	--
M-13	5/3/2007	---	18.6	J	1.80E-02 a,m	0.8		1.00E-01	3310	J	5.00E+02 j	5.64	d	1.00E+01	255	d	--
M-13	5/3/2006	---	27	d	1.80E-02 a,m	1.8	d	1.00E-01	2680		5.00E+02 j	<0.1	ud	1.00E+01	390	d	--
M-13	5/3/2007	---	18.6	J	1.80E-02 a,m	0.8		1.00E-01	3310	J	5.00E+02 j	5.64	d	1.00E+01	255	d	--

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.
(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

Validation Qualifiers:
J = the result is an estimated quantity

LOU 36
Notes for Phase A Data Tables

Former Satellite Accumulation Point, Unit 3 Maintenance Shop
Tronox Facility - Henderson, Nevada

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