

**Summary of Available Data for LOU 20  
Pond C-1 and Associated Piping in Area II**  
Tronox Facility – Henderson, Nevada

- Name of LOU:** LOU 20 – Pond C-1 and Associated Piping in Area II
- Goal of Closure:**
- Closure for future commercial and industrial uses.
- Site Investigation Area:**
- Size: Approximately 175 ft by 275 ft (1.5 acres) [Ref. 4].
    - Approximately 3.1 million gallon capacity [Ref. 4].
  - Location: North of LOU 21 (Pond Mn-1) in the eastern portion of Area II.
  - Current Status/Features: LOU 20 was used as an evaporation pond for non-hazardous industrial wastewater and is no longer active. The liners have been removed and the current feature at the pond site consists of a vacant depression.
- Description:**
- Pond C-1 received non-hazardous industrial wastewater from Unit 4, Unit 5, and the Steam Plant. Pond C-1 was used for evaporation and was not equipped to recycle liquids back to processes [Refs. 4 and 6].
  - Pond C-1 was constructed with a single-layer, 60-mil liner and PVC flooring with reinforced butyl rubber side walls. The lining was removed in 1996 [Refs. 4, 6 and 7].
  - Pond C-1 was in operation from October 1974 through October 1994 [Ref. 4].
  - Process waste streams included metal wastes and various sulfates and phosphates discharged into Pond C-1 [Ref. 4].
  - Process waste streams discharged into Pond C-1 did not contain fuels, solvents, PCBs, pesticides or herbicides [Ref. 6].
- Associated piping system:
- Pond C-1 piping consisted of above-ground plastic piping aligned along 9<sup>th</sup> Street from Units 4 and 5 to the pond [Ref. 6]. The piping was removed in 1994 when Pond C-1 was decommissioned [Ref. 7].
  - Above-ground piping also ran from the Steam Plant across 9<sup>th</sup> Street to Pond C-1 [Ref. 6].
  - The piping system handled low pressure flow with no vents or sample points [Ref. 6].
  - Pipeline outfalls were in the southeast and southwest corners of Pond C-1 [Refs. 5 and 6].
  - Process waste flow was diverted to LOU 21 (Pond Mn-1) when Pond C-1 neared maximum capacity [Refs. 4 and 6].

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<b>Process Waste Streams Associated with LOU 20</b>	<b>Known or Potential Constituents Associated with LOU 20</b>
Sodium chlorate and sodium perchlorate from Units 4 and 5 production	<ul style="list-style-type: none"> <li>• Hexavalent chromium</li> <li>• TPH-DRO/ORO (paraffin)</li> <li>• Chlorate</li> <li>• Perchlorate</li> <li>• Wet chemistry</li> </ul>
Paraffin from Units 4 and 5 processes	<ul style="list-style-type: none"> <li>• TPH-DRO/ORO (paraffin)</li> </ul>
Steam Plant boiler blow-down – 2.8 to 8.9 gpm [Refs. 4 and 6]	<ul style="list-style-type: none"> <li>• Salts</li> <li>• Phosphates</li> <li>• Sulfates</li> </ul>
Boiler Plant wash-down – episodic [Refs. 4 and 6]	<ul style="list-style-type: none"> <li>• Salts</li> <li>• Phosphates</li> <li>• Sulfates</li> </ul>
Manganese dioxide cathode wash – 1.2 to 8.1 gpm [Refs. 4 and 6]	<ul style="list-style-type: none"> <li>• Manganese</li> <li>• Phosphates</li> <li>• Calcium</li> <li>• Magnesium</li> </ul>
Main Cooling Tower blow-down and filter wash – 15,000 gpd [Refs. 4 and 6]	<ul style="list-style-type: none"> <li>• Salts</li> <li>• Phosphates</li> <li>• Sulfates</li> <li>• Metals (hexavalent chromium)</li> </ul>
Boron neutralization solutions – 0.9 to 1.9 gpm [Refs. 4 and 6]	<ul style="list-style-type: none"> <li>• Boron</li> <li>• Sulfates</li> <li>• Carbonates</li> <li>• Borates</li> </ul>
Halide wall solid and screen filter wastes [Ref. 6]	<ul style="list-style-type: none"> <li>• Boron trichloride</li> <li>• Boron tribromide</li> </ul>

**Adjacent or Overlapping LOUs:** The following LOUs overlap or are adjacent to LOU 20:

Overlapping LOUs

- None

Adjacent LOUs

- LOU 5 (Beta Ditch) – Located north (downgradient) of LOU 20.
- LOU 21 (Pond Mn-1 and Associated Piping) – Located south (upgradient) of LOU 20.

LOU 5 is downgradient of LOU 20; therefore, it is not considered to affect LOU 20. As a result, the addition of other chemical classes related to LOU 5 to the proposed Phase B Analytical Plan for LOU 20 is not required.

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

**Other LOUs Potentially Affecting Soils in LOU 20:**

- LOU 21: Pond Mn-1 is a surface impoundment located upstream of LOU 20 which is used for evaporating non-hazardous wastewater from manganese dioxide processes. Pond Mn-1 also occasionally receives waste water from the Steam Plant. Pond Mn-1 is double-lined and any releases (none documented) from this pond could potentially affect LOU 20 (downgradient).

Known or potential chemical classes associated with LOU 21 are consistent with those listed for LOU 20; therefore, the addition of other chemical classes related to LOU 21 to the proposed Phase B Analytical Plan for LOU 20 is not required.

**Known or Potential Chemical Classes:**

- Metals
- Hexavalent chromium
- Perchlorate
- Wet chemistry analytes
- TPH-DRO/ORO (paraffin)

**Known or Potential Release Mechanisms:**

- No known releases documented for this LOU.
- Possible impacts to surrounding soils from surface releases [Ref. 4].
- Potential liner leaks [Ref. 4].
- Potential infiltration to subsurface soils and groundwater.
- Monitoring wells installed to evaluate potential releases and changes in water chemistry. Kleinfelder (1993) cited increasing conductivity trend in M-22 as indication of impacts, but stated “source location difficult to evaluate based on spatially limited data and the existence of several possible sources upgradient of this monitoring well.” Kleinfelder also noted that salt concentrations in groundwater beneath this area increased in the early 1990s [Ref. 4].

**Results of Historical Sampling:**

Soil

- One historical boring (BDB-05) was drilled approximately 150 feet west of Pond C-1. However, this boring was located to evaluate the eastern drainage ditch for LOU 5 (Beta-Ditch) and not Pond C-1 [Ref. 1]; therefore, it is not considered to be representative of conditions at LOU 20.

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Groundwater

- One upgradient monitoring well (M-35) and five downgradient monitoring wells (M-19, M-2A, M34, M-35, and M-39) are routinely tested for hexavalent chromium, manganese, sodium chloride, and perchlorate as part of a routine groundwater monitoring program [Ref. 3]. Analytical results are summarized on LOU 20 Tables 1 and 2 (see attached).
- General chemistry testing of waste streams for the NPDES Permit included pH, sodium TDS, calcium, magnesium, manganese and potassium in the late 1980's and early 1990's. The NPDES testing was intended to see if Pond C-1 was leaking [Ref. 4].

**Did Historical Samples Address Potential Release?**

- No

**Summary of Phase A SAI:**

Soil

- None specifically conducted for LOU 20 in Area II. The closest boring (SA17) is approximately 55 feet north (downgradient) and located within Beta Ditch (LOU 5) and was not specifically sampled to evaluate this LOU [Ref. 2]. As a result, this boring is not considered to be representative of soil conditions at LOU 20.

Groundwater:

- None specifically conducted for LOU in Area II. The closest well sampled (M-19) is approximately 50 feet to the east (downgradient) and was not specifically sampled to evaluate this LOU [Ref. 2]. As a result, this well is not considered to be representative of groundwater conditions at LOU 20.

**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 of LOU 20 consists of collecting soil samples from 10 locations:
  - Three (3) soil borings will be placed within the boundaries of LOU 20.
  - Two (2) soil borings will be drilled south (upgradient) of LOU 20 and the associated conveyance lines.
  - One (1) soil boring will be drilled north (downgradient) of LOU 20.

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- One (1) soil boring will be drilled west (cross-gradient) of LOU 20.
- Two (2) soil borings will be drilled along the pipeline route associated with LOU 20.
- One (1) soil boring will be drilled east (cross-gradient) of Pond C-1.
- All 10 borings along with the analytical program to evaluate soil samples from LOU 20 are listed on **Table A – Soil Sampling and Analytical Plan for LOU 20.**
- 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 LOU 20, based on the known process waste streams.
  - Eight (8) of the 10 sample locations are judgmental locations and include soil borings SA71, SA144, SA145, SA92, SA62, SA158, SA61, and SA151.
- Random sample locations:
  - Designed to assess whether unknown constituents associated with LOU 20 are present.
  - Two (2) of the 10 sample locations are randomly-placed locations and include soil borings RSAM8 and RSAN7.

**Proposed Chemical Classes for Phase B Investigation 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
- TPH-DRO/ORO

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

- VOCs
- Organochlorine pesticides
- Radionuclides
- Dioxins/furans
- Asbestos

Random sample locations will be analyzed for the following full list of Phase A site related chemicals for area-wide coverage purposes:

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- 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 20 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.
  - One (1) existing well south (upgradient) of LOU 20 (M-35) will be sampled.
  - Two (2) existing wells north (downgradient; M-39) and west (cross-gradient; M-19) of LOU 20 will be sampled.
  - Two (2) existing wells (M-34 and M-2A) located along the conveyance piping route of LOU 20 will be sampled.
  - The sampling wells and the analytical program to evaluate groundwater samples associated with LOU 20 are listed on **Table B – Groundwater Sampling and Analytical Plan for LOU 20.**

**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 will be collected to evaluate area conditions for the presence of vapor-phase VOCs in the vadose zone.

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**References:**

1. ENSR Corporation (ENSR), 1997, Phase II Environmental Conditions Assessment located at Kerr-McGee Chemical Corporation, Henderson, Nevada, August 7, 1997.
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)
5. Region IX, 1980, Aerial Reconnaissance of Hazardous Waste Sources BMI Industrial Complex, Henderson, 1943-1979.
6. Tronox, Susan Crowley, verbal communication, January 14, 2008.
7. Tronox, Susan Crowley, verbal communication, February 5, 2008.

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**LOU Figure**



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**Sampling and Analytical Plans for LOU 20:**

- Table A – Soil Sampling and Analytical Plan for LOU 20
- Table B – Groundwater Sampling and Analytical Plan for LOU 20

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 (EPA 8015B)	VOCs <sup>2</sup> (EPA 8260B)	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>8</sup> EPA/540/R-97/028	Geo-technical Tests <sup>10</sup>	Rationale	
<b>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).</b>																				
M-7	20	SA92	SA92-0.0	0.0																Boring located to evaluate LOU 20 (Pond C-1 and Associated Piping) and LOU 5 (Beta Ditch). Located in bottom of Eastern Diversion Ditch to evaluate upstream tributary releases and potential overflow releases from LOU 20.
M-7	20		SA92-0.5	0.5	X	X	X	X		X	X		X	X	X	X				
M-7	20		SA92-10	10	X	X	X	X		X	X		Hold	X	X					
M-7	20		SA92-20	20	X	X	X	X		X	X		Hold	X	X					
M-7	20		SA92-30	30	X	X	X	X		X	X		X	X	X					
M-8	20	SA62	SA62-0.0	0.0																Boring located to evaluate LOU 20 (Pond C-1 and Associated Piping). Located in a low spot in the bottom and near an inflow piping outlet to evaluate worst case conditions.
M-8	20		SA62-0.5	0.5	X	X	X	X		X	X		X		X	X				
M-8	20		SA62-10	10	X	X	X	X		X	X		Hold	X	X					
M-8	20		SA62-20	20	X	X	X	X		X	X		Hold	X	X					
M-8	20		SA62-22	22	X	X	X	X		X	X		X		X					
M-8	5, 20	SA71	SA71-0.0	0.0																Boring located to evaluate LOU 5 (Beta Ditch) and LOU 20 (Pond C-1 and Associated Piping). Located to evaluate possible overflow releases from historical LOU 5 Beta Ditch and overflows from LOU 20; both LOUs are upslope of SA71.
M-8	5, 20		SA71-0.5	0.5	X	X	X			X	X		X		X	X				
M-8	5, 20		SA71-10	10	X	X	X			X	X		Hold	X	X					
M-8	5, 20		SA71-20	20	X	X	X			X	X		Hold	X	X					
M-8	5, 20		SA71-22	22	X	X	X			X	X		X		X					
M-8	5, 20	SA144	SA144-0.0	0.0																Boring located to evaluate LOU 5 (Beta Ditch) and LOU 20 (Pond C-1 and Associated Piping). Located to evaluate possible overflow releases from historical LOU 5 (before LOU 20 was constructed) and a low spot in bottom of LOU 20 for worst case conditions.
M-8	5, 20		SA144-0.5	0.5	X	X	X	X		X	X		X		X	X				
M-8	5, 20		SA144-10	10	X	X	X	X		X	X		Hold	X	X					
M-8	5, 20		SA144-20	20	X	X	X	X		X	X		Hold	X	X					
M-8	5, 20		SA144-22	22	X	X	X	X		X	X		X		X					
M-8	20	SA145	SA145-0.0	0.0																Boring located to evaluate LOU 20 (Pond C-1 and Associated Piping). Located in a lowspot at the bottom and near an inlet pipe for worst case conditions in LOU 20.
M-8	20		SA145-0.5	0.5	X	X	X	X		X	X		X		X	X				
M-8	20		SA145-10	10	X	X	X	X		X	X		Hold	X	X					
M-8	20		SA145-20	20	X	X	X	X		X	X		Hold	X	X					
M-8	20		SA145-22	22	X	X	X	X		X	X		X		X					
M-8	20	RSAM8	RSAM8-0.0	0.0																Boring located to evaluate LOU 20 (Pond C-1 and Associated Piping). Randomly located to evaluate possible overflow releases from LOU 20 and for site wide coverage.
M-8	20		RSAM8-0.5	0.5	X	X	X	X		X	X		X	X	X	X				
M-8	20		RSAM8-10	10	X	X	X	X		X	X		Hold	X	X					
M-8	20		RSAM8-20	20	X	X	X	X		X	X		Hold	X	X					
M-8	20		RSAM8-30	30	X	X	X	X		X	X		Hold	X	X					
M-8	20		RSAM8-35	35	X	X	X	X		X	X		X	X	X					
N-6	20	SA151	SA151-0.0	0.0																Boring located to evaluate LOU 20 (Pond C-1 and Associated Piping). Located along LOU 20 piping to evaluate potential releases.
N-6	20		SA151-0.5	0.5	X	X	X	X		X	X		X	X	X	X				
N-6	20		SA151-10	10	X	X	X	X		X	X		X	X	X					
N-7	5, 20, 22, 23	RSAN7	RSAN7-0.0	0.0																Boring located to evaluate LOU 5 (Beta Ditch), LOU 20 (Pond C-1 and Associated Piping), LOU 22 (Pond WC-West Associated Piping), and LOU 23 (Pond WC-East Associated Piping). Randomly located in a low spot of the Eastern Diversion Ditch of LOU 5 to evaluate possible releases and overflow runoff from LOU 20. Also to evaluate potential releases from LOUs 22 and 23 piping.
N-7	5, 20, 22, 23		RSAN7-0.5	0.5	X	X	X	X		X	X		X	X	X	X				
N-7	5, 20, 22, 23		RSAN7-10	10	X	X	X	X		X	X		Hold	X	X					
N-7	5, 20, 22, 23		RSAN7-20	20	X	X	X	X		X	X		Hold	X	X					
N-7	5, 20, 22, 23		RSAN7-30	30	X	X	X	X		X	X		Hold	X	X					
N-7	5, 20, 22, 23		RSAN7-35	35	X	X	X	X		X	X		X	X	X					
N-8	20	SA61	SA61-0.0	0.0																Boring located to evaluate LOU 20 (Pond C-1 and Associated Piping). Located adjacent to a sharp bend in LOU 20 inflow piping to evaluate possible pipeline releases at this high risk location and upslope of LOU 20 to evaluate overflow releases.
N-8	20		SA61-0.5	0.5	X	X	X	X		X	X		X		X	X				
N-8	20		SA61-10	10	X	X	X	X		X	X		Hold	X	X					
N-8	20		SA61-20	20	X	X	X	X		X	X		Hold	X	X					
N-8	20		SA61-30	30	X	X	X	X		X	X		X		X					
N-8	5, 20	SA158	SA158-0.0	0.0																Boring located to evaluate LOU 20 (Pond C-1 and Associated Piping). Located adjacent to a sharp bend in LOU 20 inflow piping to evaluate possible pipeline releases at this high risk location and upslope of LOU 20 to evaluate overflow releases.
N-8	5, 20		SA158-0.5	0.5	X	X	X	X		X	X		X		X	X				
N-8	5, 20		SA158-10	10	X	X	X	X		X	X		Hold	X	X					
N-8	5, 20		SA158-20	20	X	X	X	X		X	X		Hold	X	X					
N-8	5, 20		SA158-30	30	X	X	X	X		X	X		X		X					
<b>Number of Samples:</b>					<b>40</b>	<b>40</b>	<b>40</b>	<b>36</b>	<b>0</b>	<b>40</b>	<b>40</b>	<b>0</b>	<b>20</b>	<b>16</b>	<b>40</b>	<b>10</b>	<b>10</b>	<b>0</b>		

**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.

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)	Radionuclides <sup>5</sup>	Rationale
<b>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).</b>														
M8	IIN	M-39	24.9 - 39.9	Qal/MCf <sub>g1</sub>	yes	X	X	X	X	X	X	X	X	Located as a downgradient stepout for LOUs 5, 20, 22 (pipelines in Area II) and LOU 23 (pipelines in Area II); and for general Site coverage.
M8	II	M-19	14.5 - 34.5	Qal/MCf <sub>g1</sub>	no	X	X	X	X	X	X	X	X	Located to serve as an upgradient stepout for LOUs 5 and 20; to evaluate LOUs 22 and 23 and potential offsite sources to the east; and as general Site coverage.
N6	II	M-2A*	nr	nr	yes	X	X	X	X	X	X	X	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.
N7	II	M-34	25 - 40	Qal/MCf <sub>g1</sub>	no	X	X	X	X	X	X	X	X	Located to evaluate the outfall of the culvert that empties into the Eastern Diversion segment of LOU 5; as a downgradient stepout for LOUs 13 and 14 as an upgradient step out for LOUs 20, 22, and 23; and for general Site coverage.
N7	IIS	M-35	25 - 40	Qal/MCf <sub>g1</sub>	no	X	X	X	X	X	X	X	X	Located to evaluate LOUs 5, 20, 22, and 23; and for general Site coverage.
<b>Number of Field Samples:</b>						<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	
<b>Notes:</b>														
* 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).														
IIN/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														
MCf <sub>g1</sub> Muddy Creek Formation - first fine-grained facies														
MCc <sub>g1</sub> Muddy Creek Formation - first coarse-grained facies														

**Summary of Available Data for LOU 20  
Pond C-1 and Associated Piping in Area II**  
Tronox Facility – Henderson, Nevada

**Soil and Groundwater Characterization Data**

**Summary of Available Data for LOU 20  
Pond C-1 and Associated Piping in Area II**  
Tronox Facility – Henderson, Nevada

LOU-specific analytes identified include:

- Wet chemistry analytes
- Metals (Phase A list)
- Hexavalent chromium
- Perchlorate
- TPH-DRO/ORO (paraffin)

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

**LOU 20 Table 1 - Groundwater Characterization Data - Routine Monitoring**

**LOU 20 Table 2 - Groundwater Characterization Data - Routine Monitoring**

Notes for All Phase A Data Tables are Presented at the End of the Tables

**LOU 20 Table 1**  
**Groundwater Characterization Data - Routine Monitoring<sup>1</sup>**

C-1 Pond and Associated Piping  
Tronox Facility - Henderson, Nevada

Well ID	Date	Depth to water (ft)	Perchlorate mg/L	Qual	MCL <sup>2</sup> mg/L	Total Chromium mg/L	Qual	MCL <sup>2</sup> mg/L	TDS mg/L	Qual	MCL <sup>2</sup> mg/L	Nitrate (as N) mg/L	Qual	MCL <sup>2</sup> mg/L	Chlorate mg/L	Qual	MCL <sup>2</sup> mg/L
M-19	2/2/2006	31.67	1	d	1.80E-02 a,m	0.2	d	1.00E-01			5.00E+02 j			1.00E+01			--
M-19	5/3/2006	33.14	0.96	d	1.80E-02 a,m	0.19	d	1.00E-01	2950		5.00E+02 j			1.00E+01			--
M-19	8/2/2006	34.11	0.91	d	1.80E-02 a,m	0.22	d	1.00E-01	2650		5.00E+02 j			1.00E+01			--
M-19	11/1/2006	35.72	1.83	d	1.80E-02 a,m	0.32	d	1.00E-01	3670		5.00E+02 j			1.00E+01			--
M-19	1/31/2007	34.92	1.9		1.80E-02 a,m	0.29		1.00E-01	3740		5.00E+02 j			1.00E+01			--
M-19	5/2/2007	34.51	1.91		1.80E-02 a,m	0.34		1.00E-01	3720		5.00E+02 j			1.00E+01			--
M-19	8/1/2007	34.93	2.49		1.80E-02 a,m	0.38		1.00E-01	4820		5.00E+02 j			1.00E+01			--
M-2A	5/5/2006	---	430	d	1.80E-02 a,m	18	d	1.00E-01	12100		5.00E+02 j			1.00E+01			--
M-2A	5/4/2007	---	362		1.80E-02 a,m	17		1.00E-01	10200		5.00E+02 j			1.00E+01			--
M-31A	2/2/2006	46.07	1800	d	1.80E-02 a,m	13	d	1.00E-01			5.00E+02 j			1.00E+01			--
M-31A	5/3/2006	46.41	1700	d	1.80E-02 a,m	13	d	1.00E-01	8030		5.00E+02 j			1.00E+01			--
M-31A	8/2/2006	46.56	1410	d	1.80E-02 a,m	12	d	1.00E-01	6300		5.00E+02 j			1.00E+01			--
M-31A	11/1/2006	47.03	1750	d	1.80E-02 a,m	13	d	1.00E-01	9780		5.00E+02 j			1.00E+01			--
M-31A	1/31/2007	46.43	1490		1.80E-02 a,m	13		1.00E-01	9710		5.00E+02 j			1.00E+01			--
M-31A	5/2/2007	46.05	1400		1.80E-02 a,m	13		1.00E-01	8750		5.00E+02 j			1.00E+01			--
M-31A	8/1/2007	46.84	1710		1.80E-02 a,m	11		1.00E-01	9330		5.00E+02 j			1.00E+01			--
M-34	2/2/2006	---	1800	d	1.80E-02 a,m	17	d	1.00E-01			5.00E+02 j			1.00E+01			--
M-34	5/3/2006	---	1700	d	1.80E-02 a,m	18	d	1.00E-01	8960		5.00E+02 j			1.00E+01			--
M-34	5/7/2006	40.86	1950	d	1.80E-02 a,m			1.00E-01	14500		5.00E+02 j			1.00E+01			--
M-34	8/2/2006	---	1550	d	1.80E-02 a,m	18	d	1.00E-01	7430		5.00E+02 j			1.00E+01			--
M-34	11/1/2006	---	1910	d	1.80E-02 a,m	18	d	1.00E-01	10900		5.00E+02 j			1.00E+01			--
M-34	1/31/2007	---	1860		1.80E-02 a,m	17		1.00E-01	12000		5.00E+02 j			1.00E+01			--
M-34	5/2/2007	37.52	1670		1.80E-02 a,m	17		1.00E-01	9850		5.00E+02 j			1.00E+01			--
M-34	8/1/2007	---	2130		1.80E-02 a,m	16		1.00E-01	11900		5.00E+02 j			1.00E+01			--
M-35	2/2/2006	34.73	810	d	1.80E-02 a,m	9.4	d	1.00E-01			5.00E+02 j			1.00E+01			--
M-35	5/3/2006	35.02	550	d	1.80E-02 a,m	9.8	d	1.00E-01	6090		5.00E+02 j			1.00E+01			--
M-35	5/7/2006	38.68	945	d	1.80E-02 a,m			1.00E-01	9610		5.00E+02 j			1.00E+01			--
M-35	5/7/2006	38.68	777	d	1.80E-02 a,m			1.00E-01	9670		5.00E+02 j			1.00E+01			--
M-35	8/2/2006	35.54	694	d	1.80E-02 a,m	11	d	1.00E-01	6240		5.00E+02 j			1.00E+01			--
M-35	11/1/2006	35.67	785	d	1.80E-02 a,m	12	d	1.00E-01	9070		5.00E+02 j			1.00E+01			--
M-35	1/31/2007	35.74	650		1.80E-02 a,m	12		1.00E-01	9530		5.00E+02 j			1.00E+01			--
M-35	5/2/2007	35.52	408		1.80E-02 a,m	6.2		1.00E-01	6090		5.00E+02 j			1.00E+01			--
M-35	8/1/2007	35.97	407		1.80E-02 a,m	9.4		1.00E-01	7280		5.00E+02 j			1.00E+01			--
M-39	2/2/2006	30.42	380	d	1.80E-02 a,m	4	d	1.00E-01			5.00E+02 j			1.00E+01			--
M-39	5/3/2006	30.36	320	d	1.80E-02 a,m	3.7	d	1.00E-01	4300		5.00E+02 j	2.6	d	1.00E+01	1100	d	--

**LOU 20 Table 1 (continued)**  
**Groundwater Characterization Data - Routine Monitoring**<sup>1</sup>

C-1 Pond and Associated Piping  
Tronox Facility - Henderson, Nevada

Well ID	Date	Depth to water (ft)	Perchlorate mg/L	Qual	MCL <sup>2</sup> mg/L	Total Chromium mg/L	Qual	MCL <sup>2</sup> mg/L	TDS mg/L	Qual	MCL <sup>2</sup> mg/L	Nitrate (as N) mg/L	Qual	MCL <sup>2</sup> mg/L	Chlorate mg/L	Qual	MCL <sup>2</sup> mg/L
M-39	8/2/2006	31.20	320	d	1.80E-02 a,m	4.3	d	1.00E-01	4560		5.00E+02 j	3.5	d	1.00E+01	1220	d	--
M-39	11/1/2006	31.53	400	d	1.80E-02 a,m	4.5	d	1.00E-01	6310		5.00E+02 j	10.8	d	1.00E+01	1370	d	--
M-39	1/31/2007	31.78	390		1.80E-02 a,m	4.5		1.00E-01	6730		5.00E+02 j			1.00E+01			--
M-39	5/2/2007	31.67	403		1.80E-02 a,m	4.7		1.00E-01	6990		5.00E+02 j	10.3		1.00E+01	1380		--
M-39	8/1/2007	32.10	489		1.80E-02 a,m	4.6		1.00E-01	7280		5.00E+02 j			1.00E+01			--

**Notes**

1. ENSR, 2007, Quarterly Performance Report for Remediation Systems, Tronox LLC, 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](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 diluted and was not detected above the sample reporting limit

**LOU 20 Table 2**  
**Groundwater Characterization Data - Routine Monitoring<sup>1</sup>**

C-1 Pond and Associated Piping  
Tronox Facility - Henderson, Nevada

Well ID	Sample Date	Total Depth (ft bgs)	Depth to Water (ft TOC)	pH (Lab)	EC (Lab, $\mu\text{mho/cm}$ )	Cr-total (ppm)	Mn (ppm)	$\text{ClO}_4$ (ppm)
M-19	5/6/99	39.54	33.03	7.14	12000	0.62	0.70	13.0
M-19	5/5/00	39.54	34.50	7.62	11300	0.71	0.34	7.360
M-19	5/4/01	39.54	35.06	7.38	10700	0.88	0.08	0.056
M-19	4/29/02	39.54	34.02	7.3	8360	0.45	0.17	6.8
M-35	5/6/99	42.80	34.27	7.13	9720	4.30	0.85	1000
M-35	5/5/00	42.80	35.22	7.31	8970	3.40	1.20	820
M-35	5/4/01	42.80	25.40	7.28	9970	4.60	2.40	1000
M-35	3/11/02	42.80	--	--	--	--	0.07	--
M-35	4/29/02	42.80	34.27	7.2	9370	6.8	0.14	990
M-35	9/9/02	42.80	--	--	--	--	0.22	--
M-35	12/9/02	42.80	35.40	7.2	9280	6.8	0.061	590
M-35	4/29/03	42.80	--	--	--	--	ND<0.15	--
M-39	5/6/99	42.12	30.59	7.45	8080	2.40	0.44	140
M-39	5/5/00	42.12	31.70	7.54	7680	2.80	1.60	190
M-39	5/2/01	42.12	32.10	7.34	7620	3.30	1.80	280
M-39	3/11/02	42.12	--	--	--	--	0.06	--
M-39	4/29/02	42.12	20.60	7.3	7700	13	ND <0.15	450
M-39	9/9/02	42.12	--	--	--	--	ND <0.15	--
M-39	12/10/02	42.12	--	--	--	--	ND <0.15	--
M-39	5/7/03	42.12	--	--	--	--	ND<0.15	--

**Notes:**

1. ENSR, 2005, Conceptual Site Model, Kerr-McGee Facility, Henderson, Nevada, ENSR, Camarillo, California, 04020-023-130, February 2005 and August 2005.

ft bgs = feet below ground surface

ppm = parts per million

$\mu\text{mho/cm}$  = micromhos per centimeter

ft TOC = feet from Top of Casing

ND<0.15 = Not determined, not detected above the designated detection limit.

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

EC = Electrical Conductivity

Cr-total: Total Chromium

Mn = Manganese

$\text{ClO}_4$ : Perchlorate

**LOU 20 Table 3**  
**Notes for Phase A Data Tables**

C-1 Pond and Associated Piping  
Tronox Facility - Henderson, Nevada

Blank	Not analyzed.
<b>Bold</b>	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.
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	Soluble metals
T	Total Metals.
U	The analyte was analyzed for, but was not detected above the laboratory sample quantitation limit.
UU	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