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Memorandum

Date: October 2006

To: Nevada Department of Environmental Protection

From: Tronox LLC

Subject: **APPENDIX I – Evaluation of Micro-Purge Data Compared with Historical Sampling Methods**

Historical Groundwater Sampling

The evaluation of historical sampling methods vs. low-flow sampling methods was done to evaluate which method yielded the most representative samples from the site. As part of the Upgradient Investigation, groundwater samples were collected on March 13, 14, and 20, 2006 from a subset of five wells (TR-7, TR-8, TR-9, TR-10, and M-103) using groundwater sampling methods that have been used during previous groundwater sampling events at the Tronox facility. Specifically, the wells were not purged prior to sample collection, and the sample bottles were collected using a PVC bailer that was lowered to the screened interval of each well. Following collection of the bailer samples, the wells were redundantly sampled using micro-purge sampling techniques.

As the first step in collecting water samples using the historical methods, the depth-to-water was measured from the top of the casing reference point to the nearest 0.01-foot using an electric water-level meter. The casing reference point is marked by a small notch in the top of the PVC casing. The groundwater elevation at each monitoring well was calculated by subtracting the measured depth-to-water from the surveyed elevation of the top of the well casing.

Once the groundwater elevation was measured, a decontaminated PVC bailer, attached to nylon rope, was lowered to the bottom of each well. The bailer was retrieved from the well and groundwater was slowly poured from the bailer into laboratory-supplied sample bottles. Samples collected with the bailer without prior well purging were assigned a sample identification number with an “A” designator. Hence, samples TR-7A, TR-8A, TR-9A, TR-10A, and M-103A were all collected using the bailer/no purge sampling technique.

Low Flow Purge and Sampling

Following collection of the bailer samples, dedicated micro-purge bladder pump systems (pump and tubing) were installed into the five monitoring wells (TR-7, TR-8, TR-9, TR-10, and M-103) selected to be part of this comparison evaluation. Micro-purge groundwater samples were collected March 20 – 24, 2006.

To collect groundwater samples from the wells using the micro-purge techniques, the following procedures were used.

The depth-to-water in each well was first measured using an electric water-level meter. The micro-purge bladder pump was then placed approximately midway along the screened interval in the well. The pumps were lowered slowly into the each well to minimize disturbance or aeration of the groundwater and the water level in each well was allowed to equilibrate prior to purging and sampling. Groundwater was purged at flow rates ranging between 100- to 500-ml per minute. During pumping, the water level was continually monitored using the water level meter to ensure that the water level was relatively stable (i.e., drawdown did not vary more than 0.3 feet).

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During purging, water quality parameters were monitored using a Horiba U-22 water quality meter fitted with a flow-through cell. Parameters such as temperature, pH, electrical conductivity, turbidity, and dissolved oxygen were periodically measured until the parameters stabilized, at which time sample bottles could be filled. Stabilization of water quality parameters was indicated when the following criteria were met in the final three consecutive readings: the pH did not vary more than 0.1 unit, temperature ranged less than one degree Celsius, electrical conductivity did not vary more than 3 percent and the range of dissolved oxygen and turbidity did not vary more than 5 percent. If field parameters did not stabilize within 30 minutes, the deviation was noted on the field sampling field sheet and a sample was collected. The field data were recorded onto data sheets that are included in Appendix D.

No Purge Bailer Sampling Versus Low-Flow (Micro-Purge) Sampling Results

Precision of the bailer method versus the micro-purge method was measured through the calculation of relative percent difference (RPD).
Precision is a measure of the degree to which two or more measurements are in agreement. The objectives for field precision RPDs for this study are 30% or less for aqueous samples. An RPD greater than 30 represents a statistically significant difference in duplicate water samples. The RPD value was calculated using the following formula:

$$RPD = \frac{(Amount\ in\ Sample\ 1 - Amount\ in\ Sample\ 2)}{0.5\,(Amount\ in\ Sample\ 1 + Amount\ in\ Sample\ 2)}\, x\, 100$$

Below is a comparison of the analytical laboratory results and RPDs between the groundwater samples collected with the bailer versus the micro-purge methods. A summary of the data is presented in **Table I-1**.

- Five of the nine groundwater wells (TR-7A, TR-8A, TR-9A, TR-10A, and M-103A) were used for the comparison study. In addition, a duplicate sample (TR-8D) was also used for comparison purposes within a single well. Perchlorate was detected in four of the wells where RPD could be calculated. These samples met the precision objective of 30 RPD or lower (**Table I-1**).
- TPH was not detected above the laboratory quantitation limits for the groundwater samples collected from the 5 wells included in the comparison study (**Table I-1**); therefore, RPD could not be calculated and a comparison of TPH values for the two sampling techniques was not conducted.
- Fuel alcohols (methanol, ethanol, and ethylene glycol) were not detected above the laboratory quantitation limits for any of the groundwater samples collected from the 5 wells included in the comparison study (**Table I-1**); therefore, RPD was not calculated and a comparison of the fuel alcohol values for the two sampling techniques was not conducted.
- VOCs were not detected in the groundwater samples during this sampling event (**Table I-1**), therefore, RPD was not calculated and a comparison of the VOC concentrations for the two sampling techniques was not conducted.
- Of the metals analyzed, 19 were detected in two or more samples where RPD could be calculated. Of the 19 metals where RPD was calculated, 14 exhibited a RPD greater than 30. These data are presented in **Table I-1 and Table I-2**.
- RPD was calculated for hexavalent chromium for four of the five wells included in this comparison study. These data met the precision objective of 30 RPD or lower (**Table I-1 and Table I-2**).
- Of the radionuclides analyzed, 10 were detected in two or more samples where RPD could be calculated. Of the 10 radionuclides where RPD was calculated, five met the RPD precision objective of 30 and five exhibited a RPD greater than 30 (**Table I-1**).

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- Of the wet chemistry parameters analyzed, nine were detected in two or more samples where RPD could be calculated. Of the of the nine wet chemistry parameters where RPD was calculated, eight met the precision objective of 30 RPD or lower and one exhibited a RPD greater than 30 (**Table I-1**).

In Well Cluster 1 (TR-7 and TR-8), higher analytical values were generally observed in the wells sampled using the micro-purge method. The opposite was observed in the analytical values for wells in Well Cluster 2 (TR-9A and TR-10A) and M-103A, with higher analytical values detected in the wells sampled using the bailer method. The greatest difference between the two methods was observed in M-103A and M-103 where the most significant number of values with a RPD of greater than 150 percent was calculated.

Conclusion

Perchlorate, hexavalent chromium, boron, molybdenum, potassium, sodium, 5 radionuclides, and 8 wet chemistry parameters demonstrated acceptable precision through meeting a RPD of 30 or lower. Based on the comparison study it appears that the bailer vs. micro-purge sampling method does not affect the analytical results for these parameters.

Aluminum, arsenic, barium, calcium, total chromium, copper, iron, lead, magnesium, mangansese, titanium, uranium, vanadium, zinc, 5 radionuclides, and one wet chemistry parameter did not meet acceptable precision objective of RPD 30 or lower.

Based on the comparison study it appears that either the bailer vs. micro-purge sampling method affects the analytical results for these parameters or there is another variable that was not identified. In general, the less soluble constituents appear to be affected more than the highly soluble constituents. The following conclusions were drawn regarding the two compared sampling methods:

- Based on the data, it appears that the bailer vs. micro-purge sampling method **does not** affect the analytical results for perchlorate, hexavalent chromium, boron, molybdenum, potassium, sodium, five radionuclides, and eight wet chemistry parameters.

Based on the data, it appears that the bailer vs. micro-purge sampling method **does** affect the analytical results for aluminum, arsenic, barium, calcium, total chromium, copper, iron, lead, magnesium, manganese, titanium, uranium, vanadium, zinc, five radionuclides, and one wet chemistry parameter.

Table I-1
Bailer Versus Low Flow (Micro-Purge)
Upgradient Investigation Report, Tronox Facility - Henderson, Nevada

Analyte	Well Cluster 1									Well Cluster 2								
	TR-7A	**TR-7**	**RPD**	**TR-8A**	**TR-8**	**RPD**	**TR-8**	**TR-8D**	**RPD**	**TR-9A**	**TR-9**	**RPD**	**TR-10A**	**TR-10**	**RPD**	**M-103A**	**M-103**	**RPD**
Sample Depth:	270 ft			75 ft						238 ft			90 ft			75 ft		
Metals	ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L	
Aluminum	630	640	-1.6	1800	2800	-43.5	2800	1500	60.5	13000	185	194.4	2000	115	178.3	15000	1600	161.4
Antimony	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Arsenic	**44**	**50**	-12.8	**73**	**75**	-2.7	**75**	**74**	1.3	**65**	**39**	50.0	**63**	**63**	0.0	**125**	**115**	8.3
Barium	51	38	29.2	75	85	-12.5	85	58	37.8	195	29	148.2	75	53	34.4	265	50	136.5
Beryllium	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Boron	470	470	0.0	**1200**	**1200**	0.0	**1200**	**1200**	0.0	560	540	3.6	**1400**	**1400**	0.0	**1200**	**1200**	0.0
Cadmium	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Calcium	61000	59000	3.3	92000	99000	-7.3	99000	89000	10.6	120000	59000	68.2	140000	140000	0.0	140000	120000	15.4
Chromium (total)	11	31	-95.2	16	17	-6.1	17	15	12.5	44	11	120.0	51	41	21.7	29	16	57.8
Chromium (hexavalent)	8.8	--	--	14.6	14.8	-1.4	14.8	14.9	-0.7	13	12.7	2.3	**57**	**--**	--	15.2	16.9	-10.6
Cobalt	nd	nd	--	nd	nd	--	nd	nd	--	7.0	nd	--	nd	nd	--	4.6	nd	--
Copper	7.4	2.1	111.6	9.8	4.3	78.0	4.3	2.5	52.9	37	nd	--	4.9	2.0	84.1	50	7.0	150.9
Iron	780	1200	-42.4	1900	3000	-44.9	3000	1200	85.7	14000	180	194.9	2800	140	181.0	12000	1600	152.9
Lead	3.3	1.2	93.3	2.4	2.3	4.3	2.3	1.2	62.9	**39**	0.67	193.2	**2300**	nd	--	**22**	2.1	165.1
Magnesium	26000	26000	0.0	47000	51000	-8.2	51000	46000	10.3	59000	23000	87.8	54000	53000	1.9	82000	69000	17.2
Manganese	145	25	141.2	56	53	5.5	53	26	68.4	530	10	192.6	61	4.6	172.0	470	56	157.4
Mercury	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Molybdenum	5.3	5.2	1.9	13	13	0.0	13	13	0.0	4.4	5.2	-16.7	19	21	-10.0	42	49	-15.4
Nickel	nd	nd	--	nd	5.1	--	5.1	nd	--	35	nd	--	6.1	nd	--	14	nd	--
Platinum	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	--	nd	--	nd	nd	--
Potassium	9500	9200	3.2	11000	11000	0.0	11000	10000	9.5	12000	9000	28.6	15000	15000	0.0	14000	11000	24.0
Selenium	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Silicon	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Sodium	160000	160000	0.0	230000	230000	0.0	230000	220000	4.4	170000	170000	0.0	300000	310000	-3.3	320000	330000	-3.1
Strontium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	39	26	40.0	110	160	-37.0	160	64	85.7	550	nd	--	170	nd	--	390	74	136.2
Thallium	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Tungsten	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	--	nd	--	nd	nd	--
Uranium	2.4	2.4	0.0	4.7	4.8	-2.1	4.8	4.7	2.1	8.8	2.1	122.9	4.8	4	18.2	7.3	3	83.5
Vanadium	28	28	0.0	33	33	0.0	33	30	9.5	**70**	25	94.7	35	27	25.8	**38**	26	37.5
Zinc	58	43	29.7	58	75	-25.6	75	41	58.6	4000	52	194.9	39	5.0	154.5	77	11	150.0
Methyl mecury	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wet Chemistry	ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L	
Alkalinity (total,CO_3^{--},HCO_3^-)	85000	82000	3.6	73000	78000	-6.6	78000	83000	-6.2	86000	70000	20.5	77000	65000	16.9	69000	82000	-17.2

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Analyte	Well Cluster 1									Well Cluster 2								
	TR-7A	TR-7	RPD	TR-8A	TR-8	RPD	TR-8	TR-8D	RPD	TR-9A	TR-9	RPD	TR-10A	TR-10	RPD	M-103A	M-103	RPD
Ammonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	199000	198000	0.5	153000	150000	2.0	150000	150000	0.0	189000	190000	-0.5	120000	122000	-1.7	126000	127000	-0.8
Chlorate	nd	nd	--	2910	2310	23.0	2310	2100	9.5	nd	nd	--	9200	8950	2.8	1130	808	33.2
Cyanide (total)	nd	nd	--	nd	7	--	7	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Conductivity (umho/cm)	1290	1310	-1.5	1680	1680	0.0	1680	1690	-0.6	1330	1300	2.3	2240	2210	1.3	2340	2320	0.9
Fluoride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate	930	1100	-16.7	2200	2200	0.0	2200	2300	-4.4	1270	1200	5.7	730	770	-5.3	2800	2500	11.3
Nitrite	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Phosphate (ortho)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphate (total)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perchlorate	nd	nd	--	**65**	**64**	1.6	**64**	**65**	-1.6	nd	nd	--	**860**	**970**	-12.0	**310**	**230**	29.6
Sulfate	255000	255000	0.0	**573000**	**594000**	-3.6	**594000**	**587000**	1.2	266000	269000	-1.1	pend	**971000**	--	**1019000**	**1027000**	-0.8
Sulfide	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TDS	802000	760000	5.4	1186000	1210000	-2.0	1210000	1174000	3.0	772000	750000	2.9	1630000	1380000	16.6	1740000	1560000	10.9
TSS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Surfactants (MBAS)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	8.0	7.9	1.3	8.0	8.0	0.0	8.0	7.9	1.3	8.0	8.0	0.0	8.3	7.9	4.9	7.9	6.7	16.4
Bromide	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorine (residual)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flashpoint	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Asbestos	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TPH and fuel alcohols	mg/L	mg/L		mg/L	mg/L		mg/L	mg/L		mg/L	mg/L		mg/L	mg/L		mg/L	ug/L	
GRO(C6-C10)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
DRO(C10-C28)	nd	nd	--	0.00016J	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
ORO (C28-C38)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Methanol	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Ethanol	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Ethylene glycol	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Radionuclides	pCi/L	pCi/L		pCi/L	pCi/L		pCi/L	pCi/L		pCi/L	pCi/L		pCi/L	pCi/L		pCi/L	pCi/L	
Actinium 228	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth 212	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross alpha (adjusted) (3)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead 210	nd	nd	--	4.97	nd	--	nd	nd	--	nd	nd	--	11.4	1.04	166.6	1.07	nd	--
Lead 212	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Polonium 210	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Proactinium 231	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium 226	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	0.848	--	0.969	nd	--

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Analyte	Well Cluster 1									Well Cluster 2								
	TR-7A	**TR-7**	**RPD**	**TR-8A**	**TR-8**	**RPD**	**TR-8**	**TR-8D**	**RPD**	**TR-9A**	**TR-9**	**RPD**	**TR-10A**	**TR-10**	**RPD**	**M-103A**	**M-103**	**RPD**
Radium 228	nd	0.276	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	1.03	--	1.62	nd	--
Radon 222	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium 228	0.139	nd	--	0.502	0.181	94.0	0.181	0.232	-24.7	nd	nd	--	nd	nd	--	2.39	nd	--
Thorium 230	nd	nd	--	0.299	0.192	43.6	0.192	0.109	55.1	nd	nd	--	nd	nd	--	2.30	nd	--
Thorium 232	nd	nd	--	0.299	nd	--	nd	0.0814	--	0.224	nd	--	nd	nd	--	2.27	nd	--
Uranium 234	1.28	1.46	-13.1	3.09	3.06	1.0	3.06	3.93	-24.9	1.14	1.07	6.3	3.75	2.94	24.2	3.36	1.44	80.0
Uranium 235	nd	nd	--	nd	0.132	--	0.132	0.524	-119.5	nd	nd	--	0.218	nd	--	0.309	nd	--
Uranium 238	0.745	0.725	2.7	1.35	1.58	-15.7	1.58	1.83	-14.7	1.14	1.13	0.9	1.54	1.77	-13.9	2.44	0.680	112.8
Uranium (total)	2.72	2.65	2.6	7.03	5.29	28.2	5.29	5.25	0.8	2.54	2.35	7.8	4.39	4.26	3.0	12.70	3.41	115.3
Volatile Organic Compounds	ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L		ug/L	ug/L	
1,1,1,2-Tetrachloroethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,1,1-Trichloroethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,1,2,2-Tetrachloroethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,1,2-Trichloroethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,1-Dichloroethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,1-Dichloroethene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,1-Dichloropropene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2,3-Trichlorobenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2,3-Trichloropropane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2,4-Trichlorobenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2,4-Trimethylbenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2-Dibromo-3-chloropropane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2-Dibromoethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2-Dichlorobenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2-Dichloroethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,2-Dichloropropane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,3,5-Trimethylbenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,3-Dichlorobenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,3-Dichloropropane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1,4-Dichlorobenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
1-Chlorohexane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
2,2-Dichloropropane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
2-Butanone	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
2-Chlorotoluene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
2-Hexanone	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
4-Chlorotoluene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
4-Methyl-2-pentanone	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Acetone	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Benzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Bromobenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--

-- = Not Analyzed, nd = not detected

Table I-1
Bailer Versus Low Flow (Micro-Purge)
Upgradient Investigation Report, Tronox Facility - Henderson, Nevada

Analyte	**Well Cluster 1**									**Well Cluster 2**								
	TR-7A	**TR-7**	**RPD**	**TR-8A**	**TR-8**	**RPD**	**TR-8**	**TR-8D**	**RPD**	**TR-9A**	**TR-9**	**RPD**	**TR-10A**	**TR-10**	**RPD**	**M-103A**	**M-103**	**RPD**
Bromochloromethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Bromodichloromethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Bromoform	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Bromomethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Carbon Tetrachloride	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Chlorobenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Chloroethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Chloroform	nd	nd	--	9.4	14	-39.3	14	13	7.4	nd	nd	--	nd	1.6J	--	nd	nd	--
Chloromethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
cis-1,2-Dichloroethene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
cis-1,3-Dichloropropene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Dibromochloromethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Dibromomethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Dichlorodifluoromethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Diisopropyl ether (DIPE)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Ethylbenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Ethyl-tert-butyl ether (ETBE)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Hexachlorobutadiene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Isopropyl Benzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Xylenes (total)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Methylene Chloride	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Methyl-tert-butyl ether (MTBE)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Naphthalene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
n-Butylbenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
n-Propylbenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
p-Isopropyltoluene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
sec-Butylbenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Styrene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
tert-Amyl-methyl ether (TAME)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
tert-Butyl alcohol (TBA)	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
tert-Butylbenzene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Tetrachloroethene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Toluene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
trans-1,2-Dichloroethene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
trans-1,3-Dichloropropene	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Trichloroethene	nd	nd	--	nd	1.3J	--	1.3J	1.1J	--	nd	nd	--	nd	nd	--	nd	nd	--
Trichlorofluoromethane	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--
Vinyl Chloride	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--	nd	nd	--

Notes:

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Table I-1
Bailer Versus Low Flow (Micro-Purge)
Upgradient Investigation Report, Tronox Facility - Henderson, Nevada

Analyte	Well Cluster 1									Well Cluster 2								
	TR-7A	TR-7	RPD	TR-8A	TR-8	RPD	TR-8	TR-8D	RPD	TR-9A	TR-9	RPD	TR-10A	TR-10	RPD	M-103A	M-103	RPD

TR-7A - Wells designated with an "A" were not purged prior to sampling with a bailer.
TR-7 - Well purged and sampled with a dedicated micro-purge bladder pump.
RPD - Relative percent difference
ug/L - micrograms per liter
mg/L - milligrams per liter
pCi/L - pico Curries per liter
nd - Not detected above the laboratory quantitation limit.
J - Estimated value; concentration was less than the quantitation limit
Bold - value exceeded established data quality level (EPA Region IX, 2004 PRGs and MCLs)

-- = Not Analyzed, nd = not detected

Table I-2
Summary of Relative Percent Difference for
Bailer vrs. Micropurge Analytical Results for Metals
Tronox Facility - Henderson, Nevada

Constituent	7-7A	8-8A	8-8D	9-9A	10-10A	103-103A
Aluminum	-1.6	-43.5	60.5	194.4	178.3	161.4
Antimony	--	--	--	--	--	--
Arsenic	-12.8	-2.7	1.3	50.0	0.0	8.3
Barium	29.2	-12.5	37.8	148.2	34.4	136.5
Beryllium	--	--	--	--	--	--
Boron	0.0	0.0	0.0	3.6	0.0	0.0
Cadmium	--	--	--	--	--	--
Calcium	3.3	-7.3	10.6	68.2	0.0	15.4
Chromium (total)	-95.2	-6.1	12.5	120.0	21.7	57.8
Chromium (hexavalent)	--	-1.4	-0.7	2.3	--	-10.6
Cobalt	--	--	--	--	--	--
Copper	111.6	78.0	52.9	--	84.1	150.9
Iron	-42.4	-44.9	85.7	194.9	181.0	152.9
Lead	93.3	4.3	62.9	193.2	--	165.1
Magnesium	0.0	-8.2	10.3	87.8	1.9	17.2
Manganese	141.2	5.5	68.4	192.6	172.0	157.4
Mercury	--	--	--	--	--	--
Molybdenum	1.9	0.0	0.0	-16.7	-10.0	-15.4
Nickel	--	--	--	--	--	--
Platinum	--	--	--	--	--	--
Potassium	3.2	0.0	9.5	28.6	0.0	24.0
Selenium	--	--	--	--	--	--
Silver	--	--	--	--	--	--
Sodium	0.0	0.0	4.4	0.0	-3.3	-3.1
Titanium	40.0	-37.0	85.7	--	--	136.2
Thallium	--	--	--	--	--	--
Tungsten	--	--	--	--	--	--
Uranium	0.0	-2.1	2.1	122.9	18.2	83.5
Vanadium	0.0	0.0	9.5	94.7	25.8	37.5
Zinc	29.7	-25.6	58.6	194.9	154.5	150.0

RPD = Relative Percent Difference
Yellow highlight means RPD is greater than 30
Blue highlight is for duplicate groundwater comparison
Of the 30 metals analyzed, 19 were detected in two or more samples where RPD could be calculated.
Of the 19 metals where RPD was calculated 14 exhibited a RPD greater than 30.
An RPD greater than 30 represents a statistically significant difference in water samples.
-- There were not two values therefore an RPD was not calculated.