

Prepared for:  
**Tronox LLC**  
**Henderson, Nevada**

**Phase B Source Area Investigation**  
**Soil Gas Survey Work Plan**  
**Tronox LLC Facility Henderson, Nevada**

ENSR Corporation  
March 2007  
Document No.: 04020-023-430-SG



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March 20, 2008

Ms. Shannon Harbour, P.E.  
Nevada Division of Environmental Protection  
2030 East Flamingo Road, Suite 230  
Las Vegas, Nevada 89119-0818

**Subject: Phase B Source Area Investigation - Soil Gas Survey Workplan  
Tronox LLC, Henderson, Nevada**

Dear Ms. Harbour:

Tronox LLC (Tronox) has undertaken an Environmental Conditions Assessment (ECA) as directed by the Nevada Division of Environmental Protection (NDEP). Towards this work, Tronox has prepared the attached *Phase B Source Area Investigation - Soil Gas Survey Workplan, Tronox LLC, Henderson Nevada*. This is one of six work plans which will provide information to be used in assessing soil, soil gas and groundwater impacts at the Tronox Henderson facility.

Please contact me at (702) 651-2234 if you have any comments or questions concerning this correspondence.

Sincerely,

Susan M. Crowley  
Staff Environmental Specialist

Overnight Mail

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Sundberg	Paul	Montrose		X	
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**Phase B Source Area Investigation  
Soil Gas Survey Work Plan  
Tronox LLC Facility  
Henderson, Nevada**

Phase B Source Area Investigation Soil Gas Survey Work Plan  
Tronox LLC - Henderson, Nevada

**Responsible CEM for this project**

*I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.*

*I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and, to the best of my knowledge, comply with all applicable federal, state and local statutes, regulations and ordinances.*

 3-19-08

Susan M. Crowley, CEM 1428 exp. date 3/8/09  
Staff Environmental Specialist  
Tronox LLC

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**ABBREVIATIONS AND ACRONYMS**

bgs	Below Ground Surface
BMI	Black Mountain Industrial
BRC	Basic Remediation Company
CAS	Columbia Analytical Services
CD	Compact Disc
CEM	Certified Environmental Manager
DOT	Department of Transportation
HASP	Health and Safety Plan
JE	Johnson and Ettinger Model
LOU	Letter of Understanding
NDEP	Nevada Division of Environmental Protection
PDF	Portable Document File
PRG	Preliminary Remediation Goal
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RL	Reporting Limit
SOPs	Standard Operating Procedures
SRCs	Site-related Chemicals
TCE	Trichloroethene
Tronox	Tronox LLC
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds



## 1.0 Purpose and Background

This Soil Gas Survey Work Plan (Work Plan) is being submitted as part of the Environmental Conditions Assessment for the Tronox LLC (Tronox) site in Henderson, Nevada (Site) (**Figure 1**). The Site is owned and operated by Tronox headquartered in Oklahoma City, Oklahoma. Tronox was formerly known as Kerr-McGee Chemical LLC.

The work is being conducted under oversight of the Nevada Division of Environmental Protection (NDEP) and is part of the Phase B Source Area Investigation. The Phase B activities follow on the recently completed Phase A Source Area Investigation (ENSR 2007b) and are intended to further characterize site-related chemicals (SRCs) in soil and groundwater at the identified source areas within the roughly 450-acre Site. Potential source areas were identified by NDEP in their August 15, 1994 Letter of Understanding (LOU). Seventy (70) potential source areas have been identified on the Site, of which 69 areas have been designated as LOUs (LOU 1 through LOU 69). A 70<sup>th</sup> location (former U.S. Vanadium site) has not been designated an LOU by the State, but is considered a potential source area. The LOUs that have been identified at the Site are shown on **Figure 2**.

### 1.1 Site Background

In September 2007, the *Phase A Source Area Investigation Results* (ENSR 2007b) report was submitted to the NDEP. This document presented the findings of the investigations described in the *Phase A Source Area Investigation Work Plan – Tronox LLC Facility, Henderson, Nevada* (ENSR 2006c) and the *Addendum to the Phase A Source Area Work Plan* (ENSR 2007a). Included in the Phase A report were recommendations for additional Phase B work (see Appendix I of the Phase A report) to close data gaps identified and to support preparation of a human health risk assessment for the Site. An important component of the proposed Phase B investigation is the collection of soil gas samples to address the potential vapor intrusion risk pathway at the Site.

In discussions following review of the Phase A report (ENSR 2007b), NDEP suggested separation of the various Phase B Site characterization efforts to smaller, more manageable parts or “Areas.” Tronox is submitting this Work Plan as one of six work plan submissions associated with the Phase B Source Area Investigation. Following this Work Plan, Tronox will submit four “Area” work plans that will cover soil and groundwater sampling at the Site, and a sixth work plan for obtaining background groundwater data. The Area subdivisions are shown on **Figure 2**.

### 1.2 Purpose and Objectives

This Work Plan addresses the collection of soil gas data for volatile organic compounds (VOCs) and is a site-wide investigation. The sample locations proposed herein are based on a review of Phase A data, historic soil and groundwater data collected from prior investigations, and from groundwater studies that have been performed since the Phase A investigation (Hargis + Associates, 2008).

Additionally, the scope of work for the soil gas investigation was designed from a review of the operational history for each LOU that was derived from a number of historical sources including the *Environmental Conditions Assessment report* (Kleinfelder, 1993), *Response to Letter of Understanding, Henderson, Nevada Facility* (Kerr-McGee, 1996a, 1996b), *Phase II Environmental Conditions Assessment, Kerr-McGee Chemical*

LLC, Henderson, Nevada (ENSR, 1997), *Conceptual Site Model, Kerr-McGee Facility, Henderson, Nevada* (ENSR, 2005) and the *Phase A Source Area Investigation Results Report, Tronox LLC Facility, Henderson, Nevada* (ENSR 2007b). The findings from the review of operational and historic data are being compiled for each LOU into "LOU data packages". As noted above, these data packages and the scope of work for soil and groundwater investigation for each LOU will be presented in the four Area work plans that will follow this submission.

The proposed locations of the soil gas borings are designed to provide data that are representative of VOC concentrations in the unsaturated zone at the Site. The objectives of the soil gas survey are to:

- Gather sufficient soil gas data to assess the potential risk to human health via the indoor air vapor intrusion pathway for potential future commercial/industrial development and currently occupied buildings;
- Evaluate the nature and extent of VOCs in soil gas in areas where VOCs were reported in soil and groundwater samples from the Phase A investigation; and,
- Evaluate LOUs where VOCs may have been used in past operations.

### 1.3 Previous Investigations

To date, soil gas samples have not been collected at the Site. The proposed work is based on the findings presented in the Phase A report for VOC concentrations in soil and groundwater, recent groundwater sampling data (Hargis + Associates, 2008) and from the assessment of individual LOUs.

The Phase A Source Area investigation focused on soil and groundwater conditions associated with the SRCs and their suspected source areas. One-hundred and twenty soil and 27 groundwater samples were collected from 27 suspected source area locations as part of the Phase A program (ENSR 2007b). From these data, an evaluation of VOCs reported in soil and groundwater was performed following United States Environmental Protection Agency (USEPA) guidance (USEPA, 2002) to assess the potential risk for migration of VOCs to indoor air (ENSR, 2007b). From this analysis, comparison levels were developed to assess risk and address potential exposure of SRCs from groundwater to indoor air. The Phase A investigation identified several VOCs where the maximum concentration reported in groundwater samples exceeded their respective vapor intrusion comparison level. These VOCs include the following:

- |                        |                          |
|------------------------|--------------------------|
| • 1,2-Dichlorobenzene  | • Chloroform             |
| • 1,4-Dichlorobenzene  | • Chloromethane          |
| • Benzene              | • Dibromochloromethane   |
| • Bromodichloromethane | • Tetrachloroethene      |
| • Bromoform            | • Trichloroethene (TCE)  |
| • Carbon tetrachloride | • Trichlorofluoromethane |
| • Chlorobenzene        |                          |

VOCs were not reported frequently in the Phase A soil samples (ENSR 2007b). Chloroform was the most frequently detected VOC (50% of the soil samples) and generally at depths below 15 to 20 feet bgs (**Figure 3**).

These soil results are generally consistent with the presence and distribution of chloroform in groundwater. The Phase A investigation samples revealed a plume of chloroform, and to a lesser extent TCE in groundwater located in central portion of the Site that may be emanating from the Unit 3 and Unit 4 buildings (**Figure 3 and 4**). In addition to this plume, the Phase A groundwater data suggest that another plume of VOCs, principally chloroform and to a lesser extent benzene is located along the western Site boundary possibly from an off-site source to the west.

From a review of historic information and Phase A investigation results the following LOUs were identified as potential sources for VOCs (**Figure 2**):

- LOU 4 – Former Hardesty Chemical Company site
- LOU 5 – Onsite portion of the Beta Ditch, including small diversion ditch
- LOU 7 – Old P-2 Pond and associated conveyance piping
- LOU 8 – Old P-3 Pond and associated conveyance piping
- LOU 9 – New P-2 Pond and associated piping
- LOU 13 – Pond S-1
- LOU 14 – Pond P-1
- LOU 16 & 17 – Ponds AP-1, AP-2 and AP-3 and associated transfer lines
- LOU 18 – Pond AP
- LOU 19 – Pond AP-5
- LOU 35 – Former Truck Emptying/Dumping site
- LOU 39 – Satellite Accumulation Point/AP Maintenance Shop
- LOU 43 – Unit 4 and Unit 5 basements
- LOU 45 – Diesel Storage Tank
- LOU 54 – AP Plant Area Change House/Laboratory Septic Tank
- LOU 60 – Acid Drain System
- LOU 62 – Former State Industries including impoundments and catch basin
- LOU 68 – Southern Nevada Auto Parts site (Pick-a-Part)

## 1.4 Project Organization

The Tronox project manager is Susan Crowley. Ms. Crowley is a Nevada-Certified Environmental Manager (CEM #1428, expiring March 8, 2009) and is the person who serves as the point of contact for regulatory and environmental issues pertinent to the Site. She is located at the Tronox Henderson Facility. Her telephone number is (702) 651-2234. Ms. Crowley manages the consultants and subcontractors that will be performing the tasks described in this Work Plan. Ms. Crowley will be supported by Tronox hydrogeologist Mr. Tom Reed.

ENSR Corporation is Tronox's environmental consultant. Mr. Michael Flack (Senior Program Manager and Hydrogeologist), Dr. Keith Bailey (Engineer), Dr. Lisa Bradley (Senior Toxicologist), Brian Ho, CEM (Phase B Investigation Team Lead and Field Manager), Elizabeth Perry (Geostatistician), and Robert Kennedy (Senior Chemist and Data Quality Assurance/Quality Control [QA/QC] Officer), and ENSR Staff Geologists will be assisting with this project as needed. Ms. Elizabeth Martinez will be responsible for QA/QC of documents.

CoreProbe™ International has been selected as the drilling contractor to advance the soil gas borings and conduct the soil gas sampling.

The analytical laboratory that will be used for the soil gas program is Columbia Analytical Laboratory (CAS) of Simi Valley, California (NELAP Certificate #02115CA). CAS will provide Tronox with laboratory data for the TO-15 analytical suite in hard copy format as well as Tronox-specific EQUiS™ electronic data deliverable format. The laboratory will provide sample receipt notification upon receipt of samples at the laboratory.

## 1.5 Documents of Record

Previously prepared planning documents for the BMI Common Areas in general and the Tronox site in particular, have been reviewed and approved by the NDEP. These documents are considered documents of record and referenced as is appropriate herein to streamline the preparation of the Phase B Soil Gas Investigation Work Plan and include the following:

- *Conceptual Site Model, Kerr-McGee Facility, Henderson, Nevada* (ENSR 2005);
- *Up-gradient Investigation Work Plan* for the Tronox Site (ENSR, 2006a);
- *Up-gradient Investigation Work Plan Addendum* (ENSR, 2006b);
- *Phase A Source Area Investigation Work Plan* (ENSR, 2006c);
- *Up-gradient Investigation Results* (ENSR, 2006e);
- *Basic Remediation Company (BRC) Field Sampling and Standard Operating Procedures Manual for the BMI Common Areas* (ERM and MWH, 2007);
- *Addendum to the Phase A Source Area Investigation Work Plan* (ENSR, 2007a);
- *Phase A Source Area Investigation Results* (ENSR 2007b); and,
- Revisions to the Up-gradient Investigation Results (ENSR 2007c).

Background information including the site description, site location, physical setting, regional and local geology, etc., are described in detail in the *Conceptual Site Model Report* (ENSR, 2005) and the *Phase A Source Area Investigation Work Plan and Report* (ENSR, 2006c, 2007b).

## 2.0 Project Scope

To meet the soil gas investigation objectives, a total of 95 soil gas locations are proposed (**Figure 2**). The majority of the soil gas sample locations are within the four Areas of the Site. However, soil gas samples will also be collected from locations within Parcels A through D, F, G, and H, which are for sale and are being investigated by the Basic Remediation Company (BRC) independent of Tronox's Source Area Investigation. **Figures 3 and 4** show the chloroform and TCE groundwater plumes from the Phase A Source Area Investigation report (ENSR 2007b) and the soil gas locations that are proposed to further investigate VOCs in groundwater and to investigate areas where Phase A soil samples contained VOC concentrations above comparison levels. **Table 1** presents the sampling plan and rationale for each proposed location to collect and analyze soil gas samples to evaluate the vapor intrusion pathway and address the project objectives.

The majority of the soil gas locations have been collocated either with soil borings that will be drilled as part of the Phase B scope of work or with wells that will be sampled as part of the Phase B scope of work. (All of the wells that were sampled as part of the Phase A investigation will be sampled as part of Phase B investigation.) The purpose of co-locating soil gas borings with Phase B borings and/or groundwater monitoring wells is to facilitate comparison of the data in the different environmental media. In places where soil gas sample locations are not collocated with a Phase B soil boring or well, the soil gas location is adjacent to an occupied building to evaluate the potential for vapor intrusion.

Data acquisition requirements and quality assurance and control procedures are provided in the ENSR Quality Assurance Project Plan (QAPP) (ENSR 2006d), which is in the process of being amended and will be provided to NDEP prior to the work being performed. The field procedures will follow those described in the BRC *Field Sampling and Standard Operating Procedures* (ERM and MWH, 2007). Pre-field activities including underground utility clearance by a geophysical surveyor as well as notification of Underground Services Alert will be performed following the same procedures described in the *Phase A Source Area Investigation Work Plan* (ENSR, 2006c).

In accordance with applicable federal regulation (29 CFR 1910.10) all field activities will be performed in accordance with the ENSR Health and Safety Plan (HASP) prepared for the site as an element of the *Phase A Source Area Investigation Work Plan* (ENSR, 2006a).

### 2.1 Soil Gas Sampling

The soil gas sample locations are designed to provide Site-wide coverage based upon the occurrence of VOCs identified in the *Phase A Source Area Investigation Results Report* (ENSR 2007b) and subsequent groundwater samples and to aid in identifying other potential sources of VOCs. In addition, soil gas probes will be placed adjacent to occupied buildings on the Site and within or adjacent to LOUs that are potential sources of VOCs to soil or groundwater. As shown on **Table 1**, most of the soil gas samples will be collected from 10 feet bgs. In the vicinity of Unit 3, where the basement is occupied by Tronox staff on a daily basis and the closest soil gas sample (SG41-20) will be collected at a depth of approximately 20 feet bgs. Several soil gas monitoring points are located along the western perimeter of the Site to evaluate potential influx of VOCs from the adjoining properties to the west.

Soil gas samples will be collected using direct push technology. A track-mounted Geoprobe™ drill rig will be used for most sample locations using the methods described in *BRC Standard Operating Procedure*

(SOP) 37- *Active Soil Gas Investigation* (ERM and MWH, 2007). If the sample location is in an area not accessible to the track-mounted Geoprobe™, a limited access probe rig will be utilized to advance the boring. Should subsurface conditions prevent the soil gas probe advancement using the direct push method, alternative drilling methods such as sonic drilling technology or hollow-stem auger drilling using a soil gas sampling probe modified for these drilling methods will be used to collect the soil gas sample.

Soil gas samples will be collected into Summa™ canisters. The filled Summa™ canisters will be sent to an off-site laboratory, under chain-of-custody procedures for analysis of VOCs using USEPA Method TO-15.

Once the soil gas samples are collected, the sample tubing will be removed from the ground and the borehole will be abandoned as described in BRC *SOP-19- Borehole Abandonment* (ERM and MWH, 2007).

All soil gas sample locations will be surveyed as described in BRC *SOP-10 – Surveying* (ERM and MWH, 2007). In general, locations will be surveyed to an accuracy of 0.01-foot vertical and 0.1-foot horizontal relative to Nevada Coordinate System Datum (North American Vertical Datum 1983 and North American Datum 1983, Nevada East Plane) by a licensed land surveyor.

## 2.2 Management of Investigation-Derived Wastes

By using the direct push method, production of soil cuttings will be avoided. In the event that a sonic or hollow-stem auger rig is needed, soil cuttings will be collected in Department of Transportation (DOT) approved drums. Liquid wastes including decontamination fluids, will be collected in DOT-approved drums. Each container will be marked with water-proof labels and water-proof markers. Each container will receive a unique identification number and will be cataloged for waste containment documentation purposes. Following characterization, each drum of material will be disposed of as appropriate per federal, state and local requirements.

## 2.3 Analytical Testing Program

The Phase B soil gas samples will be analyzed using the EPA Method TO-15, for the individual analytes shown in **Table 2**. **Table 2** also presents the reporting limit (RL) for each analyte and compares the RL to the soil gas comparison level. The soil gas comparison level is equal to the USEPA Region 9 Preliminary Remediation Goal for Ambient Air (USEPA, 2004d) with USEPA's default attenuation factor of 0.1 applied (USEPA, 2002). This level was further adjusted by dividing the level by a factor of 10, as requested by NDEP.

## 3.0 Schedule and Reporting

### 3.1 Soil Gas Sampling Schedule

The soil gas sampling activities of the Phase B Source Area Investigation will commence within 30 days following NDEP approval of this Work Plan. Actual start dates will be dependant on the availability of drilling contractors at the time of approval. General milestones and durations are provided below:

- Field Activities – three to four weeks, inclusive of utility clearance activities at the Site;
- Laboratory Analyses – four to six weeks; and
- Data Validation and Analysis – four weeks.

### 3.2 Reporting

Upon receipt of all field and analytical data for the Phase B Soil Gas Investigation, a single report will be prepared that includes the following elements:

- A description of the field methods employed, analytical methods, analytical results, data evaluation methods and data validation results;
- Laboratory analysis results presented in tabulated form;
- A scale map(s) containing the locations of the soil gas borings
- A scale map(s) presenting the concentrations of contaminants of concern at each investigative location;
- Completed boring logs and well completion diagrams;
- Laboratory-certified analytical reports provided in Adobe Acrobat (.PDF) electronic form on a compact disc (CD) in an appendix;
- A human health risk assessment of the vapor intrusion pathway, including evaluation of the soil gas data using the USEPA version of the Johnson and Ettinger vapor intrusion model (USEPA, 2004a and b); and,
- Jurat provided by a Nevada-Certified Environmental Manager on the report.

It is anticipated that this report will be provided as an appendix to the summary Phase B Source Area Investigation report, which will consist of a compilation of all four Area investigations (for soil and groundwater) and the background groundwater quality investigation.



## 4.0 References

- ENSR, 1997, Phase II Environmental Conditions Assessment located at Kerr-McGee Chemical Corporation, Henderson, Nevada, August, 1997.
- ENSR, 2005, Conceptual Site Model, Kerr-McGee Facility, Henderson, Nevada, February, 2005.
- ENSR, 2006a, Upgradient Investigation Work Plan, Tronox LLC Facility, Henderson, Nevada, February, 2006.
- ENSR, 2006b, Upgradient Investigation Work Plan Addendum, February, 2006.
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- ENSR, 2006d, Quality Assurance Project Plan, September, 2006.
- ENSR, 2006e, Upgradient Investigation Results, October, 2006.
- ENSR, 2007a, Addendum to the Phase A Source Area Work Plan, April, 2007.
- ENSR, 2007b, Phase A Source Area Investigation Results, September, 2007.
- ENSR, 2007c, Revisions to the Upgradient Investigation Results, September, 2007.
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- USEPA, 2002, OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), EPA 530-D-02-004. November, 2002.
- USEPA, 2004a, USEPA Version of the Johnson and Ettinger Model. SG-ADV, Version 3.1. February, 2004.
- USEPA, 2004b, User's Guide Evaluating Subsurface Vapor Intrusion into Buildings, Office of Emergency and Remedial Response, Toxics Integration Branch, U.S. Environmental Protection Agency, Washington, D.C., March, 2003.
- USEPA, 2004c, Region 9 Preliminary Remediation Goals, October, 2004.



## **TABLES**

**Table 1**  
**Sampling Plan to Evaluate Soil Gas**  
Phase B Source Area Investigation Work Plan  
Tronox Facility - Henderson, Nevada

Grid Location <sup>1</sup>	Soil Gas Sample ID Number - Depth (feet bgs) <sup>2</sup>	Soil Gas Location Reference		Investigation Objectives					Comments
		Area <sup>3</sup>	LOU <sup>4</sup>	Evaluate LOU as Potential Source <sup>5</sup>	Evaluate Potential Offsite Sources <sup>6</sup>	Assess Vapor Intrusion - Existing Building <sup>7</sup>	Assess Phase A Groundwater Results <sup>8</sup>	Evaluate Site-wide Vapor Intrusion <sup>9</sup>	
A4	SG01-10	--	67	--	--	--	X	X	Evaluate VOCs from a groundwater source; assess VOCS in the area of Phase A Well PC40 (4J ug/L Chloroform/4.5J ug/L TCE).
A4	SG02-10	--	67	--	--	--	X	X	Evaluate VOCs from a groundwater source; west stepout from Well PC40 (4J ug/L Chloroform/4.5J ug/L TCE).
B4	SG03-10	--	67	--	--	--	X	X	Evaluate VOCs from a groundwater source; south Stepout from Well PC40 (4J ug/L Chloroform/4.5J ug/L TCE).
C2	SG04-10	--	--	--	X	--	--	X	Evaluate VOCs from a groundwater source; soil gas location colocated near Well H-49A which will be sampled in Phase B.
D3	SG05-10	--	--	--	X	--	--	X	Evaluate VOCs from a groundwater source in this area of the Site. Provide areal coverage for the sitewide investigation.
F4	SG06-10	--	--	--	--	--	--	X	Evaluate VOCs from a groundwater source. Soil gas location colocated near Well PC-37 which will be sampled in Phase B.
E6	SG07-10	--	68	X	--	--	X	X	Investigate Southern Nevada Auto Parts as a potential VOC source. Evaluate VOCs from a groundwater source; assess VOCS in the area of Phase A Well M95 (350J+ ug/L Chloroform/5U ug/L TCE).
E6	SG08-10	--	68	X	--	--	X	X	Investigate Southern Nevada Auto Parts as a potential VOC source. Evaluate VOCs from a groundwater source; assess VOCS in the area of Phase A Well M95 (350J+ ug/L Chloroform/5U ug/L TCE).
E7	SG09-10	--	68	X	--	--	X	X	Investigate Southern Nevada Auto Parts as a potential VOC source. Provide areal coverage for the sitewide investigation. Southeast stepout from Phase A Well M95 (350J+ ug/L Chloroform/5U ug/L TCE)
F5	SG10-10	--	68	X	--	--	X	X	Investigate Southern Nevada Auto Parts as a potential VOC source. Provide coverage midway between M95 and M98 (810J ug/L Chloroform/5U ug/L TCE).
G6	SG11-10	--	68	X	--	--	X	X	Investigate Southern Nevada Auto Parts as a potential VOC source. Provide coverage midway between M95 and M98 (810J ug/L Chloroform/5U ug/L TCE).
G6	SG12-10	--	68	X	--	--	--	X	Investigate Southern Nevada Auto Parts as a potential VOC source. Provide areal coverage for the sitewide investigation and assessment of VOCs from a groundwater source.
H7	SG13-10	--	69	--	--	--	X	X	Evaluate VOCs from a groundwater source as indicated by Phase A Well M48 (99J ug/L Chloroform/5U ug/L TCE).
H8	SG14-10	--	69	--	--	--	X	X	Evaluate VOCs from a groundwater source as indicated by Phase A Well M48 (99J ug/L Chloroform/5U ug/L TCE).
I8	SG15-10	--	69	--	--	--	X	X	Assess VOCs in the unsaturated zone as indicated by Phase A SA24.
E1	SG16-10	--	--	--	X	--	--	X	Provide areal coverage for the sitewide investigation of VOCs from a groundwater source.
G2	SG17-10	--	--	--	X	--	--	X	Provide areal coverage in the sitewide investigation of VOCs from a groundwater source. Companion to Phase B Well MC-97
H6	SG18-10	--	--	--	X	--	--	X	Provide areal coverage in the sitewide evaluation vapor intrusion and VOCs from a groundwater source. Companion Well M-23.
H2	SG19-10	I	--	--	X	--	X	X	Evaluate VOCs from a groundwater source as indicated by Phase A Well M7B (2.3J ug/L Chloroform/5U ug/L TCE).
K2	SG20-10	I	2	--	X	--	X	X	Evaluate VOCs from a groundwater source as indicated by Phase A Well M5A (5U ug/L Chloroform/5U ug/L TCE).
L5	SG21-10	I	58	--	--	--	X	X	Assess indoor air risk to Perchlorate Treatment Building.
M8	SG22-10	I	5	X	--	--	X	X	Investigate the Beta Ditch as a potential VOC source. Evaluate VOCs from elevated concentrations reported in Phase A Well M39 (820J+ ug/L Chloroform/5U ug/L TCE).
L6	SG23-10	I	55	--	--	--	X	X	Evaluate VOCs from a groundwater source as indicated by Phase A Well M55 (690 ug/L Chloroform/12+ ug/L TCE).
I4	SG24-10	I	1	--	--	--	--	X	Evaluate VOCs from a groundwater source. Also to provide areal coverage for the sitewide investigation. Companion for Phase B Well M99.
J2	SG51-10	I	1	--	X	--	--	X	Provide areal coverage in the sitewide investigation of VOCs from a groundwater source and assess possible offsite sources from the west.
K3	SG52-10	I	Feb-60	--	X	--	--	X	Evaluate VOCs from a groundwater source. Also to provide areal coverage for the sitewide investigation and assess the acid drain system as a potential source. Companion for Phase B Well MW-16.
K2	SG53-10	I	2	--	X	--	--	X	Provide areal coverage in the sitewide investigation of VOCs from a groundwater source and assess possible offsite sources from the west.
L3	SG54-10	I	2	--	X	--	--	X	Evaluate VOCs from a groundwater source. Companion for Phase B Well M-126
L5	SG25-10	II	--	--	--	--	X	X	Evaluate VOCs from a groundwater source as indicated by concentrations reported in Phase A Well IAR (21J ug/L Chloroform/5U ug/L TCE).
M6	SG26-10	II	5	X	--	--	X	X	Investigate the Beta Ditch as a potential VOC source. Evaluate VOCs from a groundwater source as indicated from concentrations reported in Phase A Well M89 (1700J+ ug/L Chloroform/12 ug/L TCE).
N5	SG27-10	II	--	--	--	--	X	X	Evaluate VOCs from a groundwater source as indicated by concentrations reported in Phase A Well M76 (290J+ ug/L Chloroform/5U ug/L TCE).
N6	SG28-10	II	--	--	--	X	X	X	Stepout from Well M2A (1300J+ ug/L Chloroform/25 ug/L TCE); adjacent to Steam Plant Building.
N3	SG29-10	I	38	--	X	X	--	X	Investigate AP Lab Building a vapor intrusion pathway.
N4	SG30-10	I	39	X	--	X	--	X	Investigate satellite accumulator and AP maintenance shop as a potential VOC source. Investigate Maintenance Shop Building and vapor intrusion risk. Upgradient of Phase A SA14 (19,000 ug/L Chloroform/500U ug/L TCE).
M4	SG55-10	I	--	--	--	--	--	X	Provide areal coverage in the sitewide investigation of VOCs from a groundwater source and assess possible offsite sources from the west. Eastward stepout for SG31 and SG56.
M3	SG31-10	I	5	X	X	--	X	X	Investigate the Beta Ditch as a potential VOC source. Assess VOCs from a groundwater source as indicated by the concentrations reported in Phase A Sample SA14 (19,000 ug/L Chloroform/500U ug/L TCE).
N2	SG32-10	I	35	X	X	--	--	X	Investigate the former truck emptying/dumping area as a potential source. Assess VOCs from a groundwater source as indicated by the concentrations reported in Phase A Sample SA9 (20,000 ug/L Chloroform/500U ug/L TCE) located within the LOU.
O4	SG33-10	I	64	--	--	--	X	X	Assess area of the former Asphalt Batch Plant and the VOCs from a groundwater source as indicated by Phase A Well SA10 (300 ug/L Chloroform/2.1J ug/L TCE)
P2	SG34-10	--	--	--	X	--	X	X	Assess VOCs from a groundwater source as indicated by Phase A Well M92 (30 ug/L Chloroform/3.8J ug/L TCE)
P7	SG35-10	III	--	--	--	--	X	X	Evaluate VOCs from a groundwater source as indicated by Phase A Well M31A (930J ug/L Chloroform/5U ug/L TCE)
Q7	SG36-20	III	60	--	--	X	X	X	Investigate acid drain system and evaluate VOCs from a groundwater source as indicated by Phase A Well M11 (130 ug/L Chloroform/5U ug/L TCE) and nearby Unit 5 Building.
Q8	SG37-20	III	60	X	--	X	--	X	Investigate the acid drain system as a potential VOC source. Assess the vapor risk to nearby Unit 6 Building.
R8	SG38-20	III	--	--	--	X	--	X	Provide areal coverage of VOCs from a groundwater source and assess vapor intrusion for nearby Unit 6 Building.
Q5	SG39-10	II	60	X	--	--	X	X	Investigate the acid drain system as a potential VOC source. Evaluate VOCs from a groundwater source as indicated by Phase A Well M13 (40 ug/L Chloroform/33 ug/L TCE).
Q6	SG40-10	II	60	X	--	--	X	X	Investigate the acid drain system as a potential VOC source. Evaluate VOCs from a groundwater source as indicated by Phase A Well M12A (1600 ug/L Chloroform/5U ug/L TCE).
R4	SG64-10	IV	--	--	--	--	--	X	Evaluate VOCs from a groundwater or soil source down-gradient of the WAPA Facility.
R5	SG41-20	II	42	--	--	X	--	X	Assess the vapor risk to nearby Unit 3 Building.
S6	SG42-10	II	--	--	--	X	--	X	Assess the vapor risk to nearby Admin/Security Building.
R6	SG43-10	II	29	--	--	X	--	X	Assess the vapor risk to nearby Locker Room/First Aid Bldg.
R3	SG44-10	IV	60	--	X	X	--	X	Investigate acid drain system and provide areal coverage in the sitewide investigation and assess VOCs in the area of the WAPA Facility.
S2	SG45-10	--	60	X	X	--	--	X	Investigate the acid drain system as a potential VOC source. Provide areal coverage in the sitewide investigation.
S4	SG46-10	IV	--	--	--	--	--	X	Provide areal coverage in the sitewide investigation and assess VOCs in the area of the WAPA Facility.
S5	SG65-10	IV	--	--	--	--	--	X	Provide areal coverage in the sitewide investigation and assess VOCs in the area of the WAPA Facility.
U4	SG47-10	IV	62	X	--	--	--	X	Investigate State Industries as a potential VOC source. Evaluate VOCs from a groundwater source as indicated by Phase A Well SA02 (54 ug/L Chloroform/8.6 ug/L TCE).
U4	SG66-10	IV	62	X	--	--	--	X	Investigate State Industries as a potential VOC source. Evaluate VOCs from a groundwater source as indicated by Phase A Well SA02 (54 ug/L Chloroform/8.6 ug/L TCE).
U4	SG67-10	IV	62	X	--	--	--	X	Investigate State Industries as a potential VOC source. Evaluate VOCs from a groundwater source as indicated by Phase A Well SA02 (54 ug/L Chloroform/8.6 ug/L TCE).
T5	SG68-10	IV	--	--	--	--	--	X	Provide areal coverage in the sitewide investigation.
T6	SG48-10	IV	--	--	--	X	--	X	Assess the vapor risk to nearby Safety/Training Building.

**Table 1**  
**Sampling Plan to Evaluate Soil Gas**  
Phase B Source Area Investigation Work Plan  
Tronox Facility - Henderson, Nevada

Grid Location <sup>1</sup>	Soil Gas Sample ID Number - Depth (feet bgs) <sup>2</sup>	Soil Gas Location Reference		Investigation Objectives					Comments
		Area <sup>3</sup>	LOU <sup>4</sup>	Evaluate LOU as Potential Source <sup>5</sup>	Evaluate Potential Offsite Sources <sup>6</sup>	Assess Vapor Intrusion - Existing Building <sup>7</sup>	Assess Phase A Groundwater Results <sup>8</sup>	Evaluate Site-wide Vapor Intrusion <sup>9</sup>	
W4	SG49-10	--	--	--	--	--	--	X	Up-gradient assessment of VOCs in the unsaturated zone.
V7	SG50-10	--	--	--	--	--	--	X	Up-gradient assessment of VOCs in the unsaturated zone.
M3	SG56-10	I	2	--	X	--	X	X	Evaluate VOCs from a groundwater source and serve as an eastward step out for borings located on the west property boundary located to assess offsite sources of VOCs.
M2	SG57-10	I	--	--	X	--	--	X	Evaluate offsite sources of VOCs in groundwater along the west property boundary.
M2	SG58-10	I	5	X	X	--	--	X	Investigate the Beta Ditch as a potential VOC source. Evaluate offsite sources of VOCs in groundwater along the west property boundary.
N3	SG59-10	I	54	X	X	--	X	X	Investigate the Septic/Leach Bed as a source of VOCs in groundwater. Upgradient of Phase A SA14 (19,000 ug/L Chloroform/500U ug/L TCE).
N2	SG60-10	I	--	--	X	--	--	X	Evaluate offsite sources of VOCs in groundwater along the west property boundary.
O2	SG61-10	I	35	X	X	--	--	X	Investigate the former truck emptying/dumping area as a potential source. Assess VOCs from a groundwater source as indicated by the concentrations reported in Phase A Sample SA9 (20,000 ug/L Chloroform/500U ug/L TCE) located within the LOU.
O3	SG62-10	I	60/64	X	--	--	--	X	Investigate the acid drain system as a potential VOC source. Eastward stepout for borings located along the west property boundary.
O3	SG63-10	I	35	X	--	--	X	X	Investigate the former truck emptying and dumping area as a potential VOC source. Evaluate VOCs from a groundwater source as indicated by Phase A Sample SA9 (20000 ug/L Chloroform/500U ug/L TCE).
R6	SG69-10	II	43/61	X	--	X	X	X	Investigate Unit 4 and Unit 5 as potential sources. Evaluate VOCs from a groundwater source as indicated by Phase A Well M13 (40 ug/L Chloroform/33 ug/L TCE)
R6	SG70-10	II	43	X	--	X	X	X	Investigate Unit 4 and Unit 5 as potential sources. Evaluate LOU and VOCs from a groundwater source as indicated by Phase A Well M13 (40 ug/L Chloroform/33 ug/L TCE) and M12A (1600 ug/L Chloroform/5U ug/L TCE).
R6	SG71-10	II	12	--	--	X	X	X	Evaluate VOCs from a groundwater source as indicated by Phase A Well Phase A Well M13 (40 ug/L Chloroform/33 ug/L TCE) and M12A (1600 ug/L Chloroform/5U ug/L TCE).
Q4	SG72-10	IV	4	X	--	--	--	X	Investigate Hardesty Chemical as a potential source of VOCs (Benzene AST) to the unsaturated zone/groundwater. Up-gradient of Well M12A (1600 ug/L Chloroform/5U ug/L TCE).
Q4	SG73-10	IV	4	X	--	--	--	X	Investigate Hardesty Chemical as a potential source of VOCs (Benzene AST) to the unsaturated zone/groundwater. Up-gradient of Well M12A (1600 ug/L Chloroform/5U ug/L TCE).
Q4	SG74-10	IV	4/60	X	--	--	--	X	Investigate Hardesty Chemical as a potential source of VOCs (Benzene AST) to the unsaturated zone/groundwater. Up-gradient of Well M12A (1600 ug/L Chloroform/5U ug/L TCE). Also assess acid drain as potential source.
O6	SG75-10	II	14/60	X	--	--	X	X	Investigate Pond P-1 and diesel storage tank as a potential source. Evaluate LOU and VOCs from a groundwater source as indicated by Phase A Well M2A (1300J+ ug/L Chloroform/25 ug/L TCE). Investigate acid drain system.
O6	SG76-10	II	13	X	--	--	X	X	Investigate Pond P-1 and diesel storage tank as a potential source. Evaluate LOU and VOCs from a groundwater source as indicated by Phase A Well M2A (1300J+ ug/L Chloroform/25 ug/L TCE).
O5	SG77-10	II	7/60	X	--	--	X	X	Investigate Old P-2 Pond, diesel storage tank and acid drain system as potential source. Evaluate VOCs from a groundwater source as indicated by Phase A Well M76 (290J+ ug/L Chloroform/5U ug/L TCE).
O6	SG78-10	II	9	X	--	--	X	X	Investigate Pond P-1 and diesel storage tank as a potential source. Evaluate LOU and VOCs from a groundwater source as indicated by Phase A Well M76 (290J+ ug/L Chloroform/5U ug/L TCE).
M6	SG79-10	II	16/17/60	X	--	--	X	X	Investigate AP Ponds 1, 2 and 3 and acid drain system as potential sources. Evaluate LVOCs from a groundwater source as indicated by Phase A Well M89 (1700J+ ug/L Chloroform/12 ug/L TCE).
M7	SG80-10	II	18	X	--	--	X	X	Investigate AP Pond 4 as a potential source and VOCs from a groundwater source as indicated by Phase A Well M89 (1700J+ ug/L Chloroform/12 ug/L TCE).
M6	SG81-10	II	16/17	X	--	--	X	X	Evaluate AP Ponds 1, 2 and 3 as potential sources and VOCs from a groundwater source as indicated by Phase A Well M89 (1700J+ ug/L Chloroform/12 ug/L TCE).
M6	SG82-10	II	16/17	X	--	--	X	X	Evaluate AP Ponds 1, 2 and 3 as potential sources and VOCs from a groundwater source as indicated by Phase A Well M89 (1700J+ ug/L Chloroform/12 ug/L TCE).
O2	SG83-10	I	35	X	X	--	X	X	Investigate the former truck emptying and dumping area as a potential VOC source. Evaluate LOU and VOCs from a groundwater source as indicated by Phase A Sample SA09 (20000 ug/L Chloroform/500u TCE).
P7	SG84-10	III	60	X	--	--	--	X	Investigate the acid drain system as a potential VOC source.
O8	SG85-10	111	24/60	X	--	--	--	X	Investigate the acid drain system as a potential VOC source.
N6	SG86-10	III	60	X	--	--	--	X	Investigate the acid drain system as a potential VOC source.
L5	SG87-10	I	60	X	--	--	--	X	Investigate the acid drain system as a potential VOC source.
Q3	SG88-10	IV	60	X	--	--	--	X	Investigate the acid drain system as a potential VOC source.
O5	SG89-10	II	8	X	--	--	--	X	Investigate Old Pond P-3 as a potential VOC source. Upgradient from Phase A Well M2A (1300J+ ug/L Chloroform/25 ug/L TCE).
I4	SG90-10	I	1	--	--	--	--	X	Evaluate VOCs from a groundwater source. Also to provide areal coverage for the sitewide investigation.
I6	SG91-10	I	1	--	--	--	--	X	Evaluate VOCs from a groundwater source. Also to provide areal coverage for the sitewide investigation.
J5	SG92-10	I	1	--	--	--	--	X	Evaluate VOCs from a groundwater source. Also to provide areal coverage for the sitewide investigation.
K8	SG93-10	I	1	--	--	--	--	X	Evaluate VOCs from a groundwater source. Also to provide areal coverage for the sitewide investigation.
O6	SG94-10	II	45	X	--	--	--	X	Investigate the Diesel Storage Tank Area as a potential source.
O5	SG95-10	II	45	X	--	--	--	X	Investigate the above-ground storage tanks west of the Diesel Storage Tanks (LOU #45).
<b>Number of Field Samples: 95</b>									
<b>QA/QC Samples:</b>									
Field Duplicates (10%) 10									
Field Blanks 0									
Equipment Rinsate Blanks 0									
Trip Blank Samples (2/day) 0									
Matrix Spike (5%) 0									
Matrix Spike Duplicate (5%) 0									
<b>Total Number of Samples: 10</b>									
<b>Notes:</b>									
1 Soil gas sample locations are shown on Figure 2, Figure 3 and Figure 4									
2 All soil gas samples will be analyzed by TO-15 for the analyte suite shown on Table 2									
3 Areas are shown on Figure 2									
4 LOUs are shown on Figure 2									
5 LOUS that have been identified as potential sources and targeted for the soil gas program									
6 Phase A groundwater data indicated possible VOCs from offsite sources to the west of the Site									
7 Soil gas sample locations associated with the occupied buildings are showing on Figure 2									
8 Phase A data for chloroform and TCE are shown on Figures 3 and 4									
9 The principal objective of the soil gas sampling program is to evaluate the soil vapor risk to indoor air									

**Table 2**  
**Soils Gas Sample Analyte List**  
Phase B Source Area Investigation Work Plan  
Tronox Facility - Henderson, Nevada

USEPA TO-15 Compound	Lab RL (ug/m <sup>3</sup> )	CL* (ug/m <sup>3</sup> )
1,1,1-Trichloroethane	1.00E-01	2.3E+03
1,1,2,2-Tetrachloroethane	1.00E-01	3.3E-02
1,1,2-Trichloroethane	1.00E-01	1.2E-01
1,1-Dichloroethane	1.00E-01	5.2E+02
1,1-Dichloroethene	1.00E-01	2.1E+02
1,2,4-Trichlorobenzene	1.00E-01	3.7E+00
1,2,4-Trimethylbenzene	5.00E-01	6.2E+00
1,2-Dibromo-3-chloropropane	5.00E-01	2.1E-01
1,2-Dibromoethane	1.00E-01	3.4E-03
1,2-Dichlorobenzene	1.00E-01	2.1E+02
1,2-Dichloroethane	1.00E-01	7.4E-02
1,2-Dichloropropane	1.00E-01	9.9E-02
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114) <sup>6</sup>	5.00E-01	3.1E+04
1,3,5-Trimethylbenzene	5.00E-01	6.2E+00
1,3-Dichlorobenzene	1.00E-01	1.1E+02
1,4-Dichlorobenzene	1.00E-01	3.1E-01
1,4-Dioxane	5.00E-01	6.1E-01
2-Butanone (MEK)	5.00E-01	5.1E+03
2-Hexanone <sup>5</sup>	5.00E-01	3.1E+03
4-Ethyltoluene <sup>7</sup>	5.00E-01	1.1E+02
4-Methyl-2-pentanone	5.00E-01	3.1E+03
Acetone	5.00E+00	3.3E+03
Acrylonitrile	5.00E-01	2.8E-02
alpha-Methylstyrene	5.00E-01	2.6E+02
Allyl chloride	1.00E-01	1.0E+00
Benzene	1.00E-01	2.5E-01
Benzyl chloride	1.00E-01	4.0E-02
Bromodichloromethane	1.00E-01	1.1E-01
Bromoform	5.00E-01	1.7E+00
Bromomethane	1.00E-01	5.2E+00
Carbon disulfide	5.00E-01	7.3E+02
Carbon Tetrachloride	1.00E-01	1.3E-01
Chlorobenzene	1.00E-01	6.2E+01
Chloroethane	1.00E-01	2.3E+00
Chloroform	1.00E-01	8.3E-02
Chloromethane	1.00E-01	9.5E+01
cis-1,2-Dichloroethene	1.00E-01	3.7E+01
cis-1,3-Dichloropropene	5.00E-01	4.8E-01
Dibromochloromethane	1.00E-01	8.0E-02
Dichlorodifluoromethane (CFC 12)	5.00E-01	2.1E+02
Diisopropyl ether (DIPE)	5.00E-01	4.0E+02
Ethanol	5.00E+00	--
Ethylbenzene	5.00E-01	1.1E+03
Ethyl-tert-butyl ether (ETBE) <sup>3</sup>	5.00E-01	7.4E+00

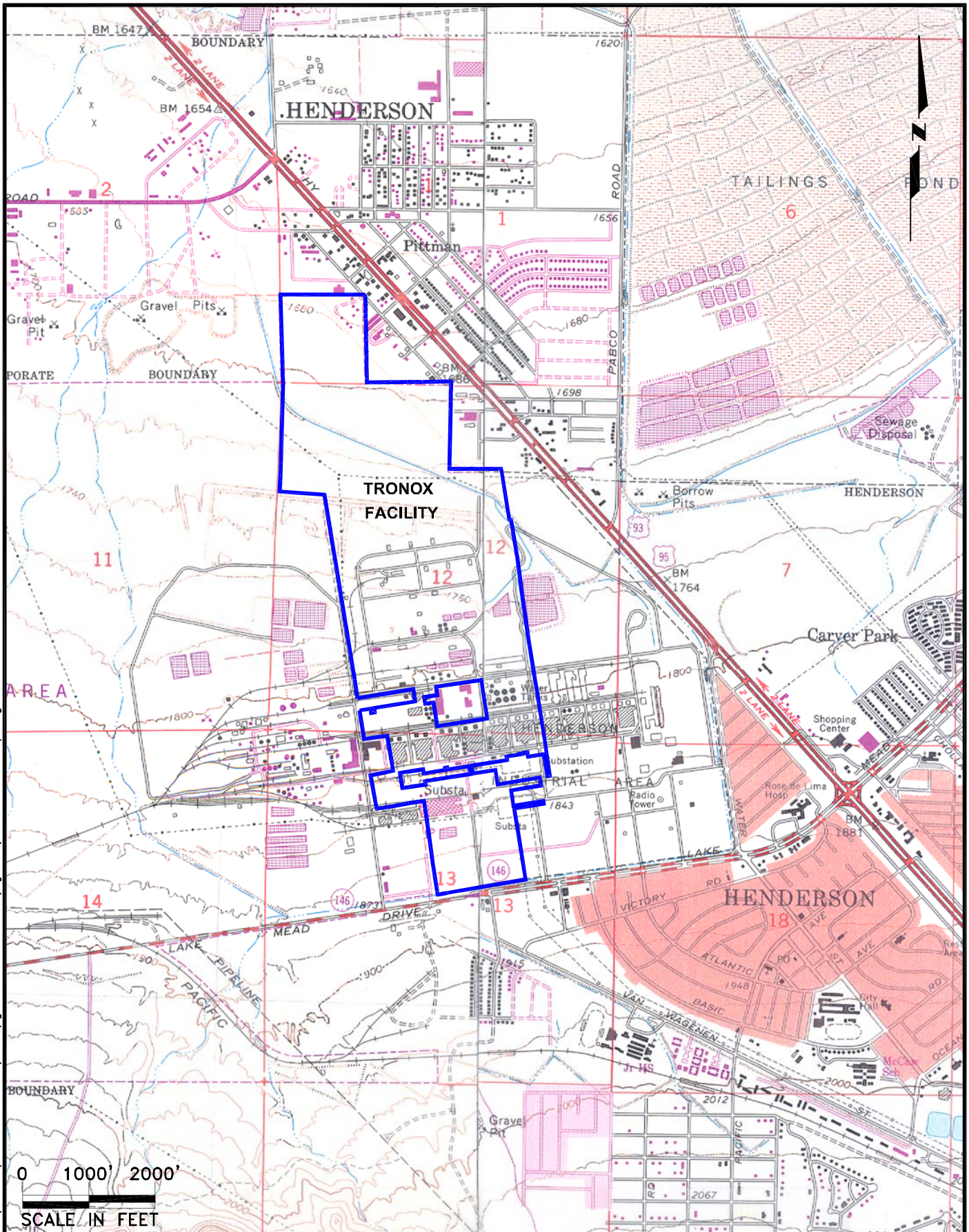
**Table 2**  
**Soils Gas Sample Analyte List**  
Phase B Source Area Investigation Work Plan  
Tronox Facility - Henderson, Nevada

USEPA TO-15 Compound	Lab RL (ug/m <sup>3</sup> )	CL* (ug/m <sup>3</sup> )
Hexachlorobutadiene	1.00E-01	8.6E-02
Isopropyl benzene (Cumene)	5.00E-01	4.0E+02
Methyl tert-Butyl Ether	1.00E-01	7.4E+00
Methylene Chloride	5.00E-01	4.1E+00
Methyl methacrylate	5.00E-01	7.3E+02
Naphthalene	2.00E-01	3.1E+00
n-Butylbenzene	5.00E-01	1.5E+02
n-Heptane	5.00E-01	--
n-Propylbenzene	5.00E-01	1.5E+02
n-Octane	5.00E-01	--
p-Isopropyltoluene <sup>4</sup>	5.00E-01	4.0E+02
sec-Butylbenzene	5.00E-01	1.5E+02
Styrene	5.00E-01	1.1E+03
tert-Amyl-methyl ether (TAME)	5.00E-01	--
tert-Butyl alcohol (TBA)	5.00E-01	--
tert-Butylbenzene	5.00E-01	1.5E+02
Tetrachloroethene	1.00E-01	3.2E-01
Toluene	5.00E-01	4.0E+02
trans-1,2-Dichloroethene	1.00E-01	7.3E+01
trans-1,3-Dichloropropene <sup>1</sup>	5.00E-01	4.8E-01
Trichloroethene	1.00E-01	1.7E-02
Trichlorofluoromethane	1.00E-01	7.3E+02
Trichlorotrifluoroethane (CFC 113)	1.00E-01	3.1E+04
Vinyl acetate	5.00E+00	2.1E+02
Vinyl Chloride	1.00E-01	1.1E-01
m,p-Xylenes <sup>2</sup>	5.00E-01	1.1E+02
o-Xylene <sup>2</sup>	5.00E-01	1.1E+02
<b>Definitions</b>		
CL - Comparison Level. CLs are equal to the PRGs with USEPA's default attenuation factor of 0.1 applied. This level was further adjusted by dividing the level by a factor of 10, as requested by NDEP.		
RL - Reporting Limit		
PRG = U.S. Environmental Protection Agency Preliminary Remediation Goal for Ambient Air,		
-- = No CL value available		
<b>Notes</b>		
1 = CL for 1,3-Dichloropropene		
2 = CL for undifferentiated Xylenes		
3 = CL for Methyl tert-Butyl Ether		
4 = CL for Isopropyl benzene (Cumene)		
5 = CL for 4-Methyl-2-pentanone		
6 = CL for Trichlorotrifluoroethane (CFC 113)		
7 = CL for undifferentiated Xylenes		

## FIGURES



FILENAME: j:\2006 Projects\04020\023--Henderson\151 Upgrad Invest Results\Figures\site location map.dwg



SOURCE: USGS 7.5 Minute Topographic Quadrangle, Las Vegas SE, Nevada, 1967, Photorevised 1984 Henderson, Nevada, 1970, Photorevised 1983



QUADRANGLE LOCATION



**SITE LOCATION MAP**

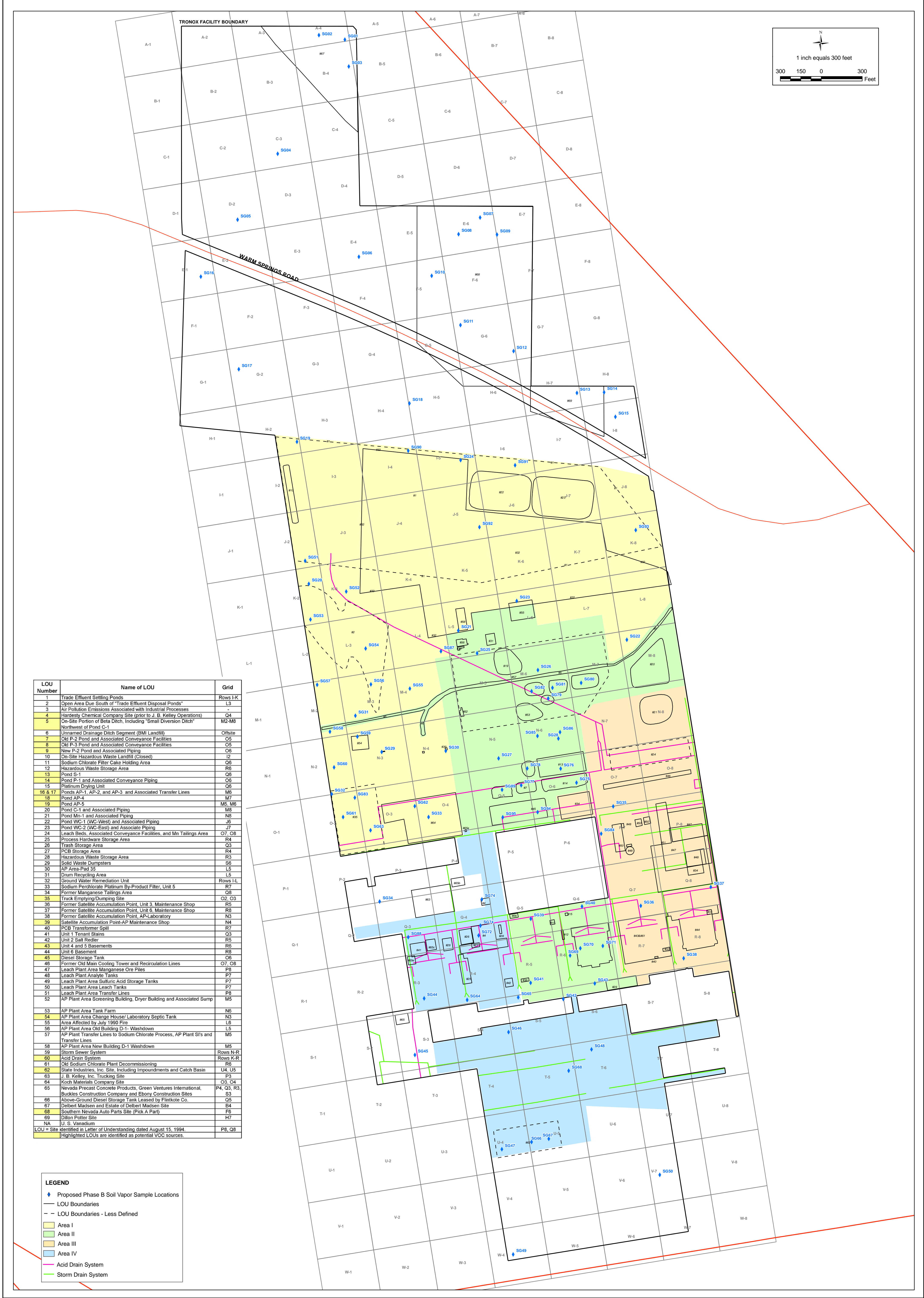
Phase B Source Area Investigation  
Tronox Facility  
Henderson, Nevada

FIGURE NUMBER:

**1**

DRAWN BY: M. Scop	DATE: 3/20/2008	PROJECT NUMBER: 04020-023-151	SHEET NUMBER:
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LOU Number	Name of LOU	Grid
1	Trade Effluent Settling Ponds	Rows I-K
2	Open Area Due South of Trade Effluent Disposal Ponds	L3
3	Air Pollution Emissions Associated with Industrial Processes	-
4	Harshey Chemical Company Site (prior to J. B. Kelley Operations)	Q4
5	On-Site Portion of Beta Ditch, Including "Small Diversion Ditch" Northwest of Pond C-1	M2-M8
6	Unnamed Drainage Ditch Segment (BML Landfill)	Offsite
7	Old P-2 Pond and Associated Conveyance Facilities	O5
8	Old P-3 Pond and Associated Conveyance Facilities	O5
9	New P-2 Pond and Associated Piping	O6
10	On-Site Hazardous Waste Landfill (Closed)	I2
11	Sodium Chlorate Filter Cake Holding Area	O6
12	Hazardous Waste Storage Area	R6
13	Pond S-1	Q6
14	Pond P-1 and Associated Conveyance Piping	O6
15	Platinum Drying Unit	O6
16 & 17	Ponds AP-1, AP-2, and AP-3 and Associated Transfer Lines	M6
18	Pond AP-4	M7
19	Pond AP-5	M5, M6
20	Pond C-1 and Associated Piping	M6
21	Pond M-1 and Associated Piping	N8
22	Pond WC-1 (WC-West) and Associated Piping	J6
23	Pond WC-2 (WC-East) and Associated Piping	J7
24	Leach Beds, Associated Conveyance Facilities, and Mn Tailings Area	O7, O8
25	Process Hardware Storage Area	R4
26	Trash Storage Area	Q3
27	PCB Storage Area	R4
28	Hazardous Waste Storage Area	R3
29	Solid Waste Dumpsters	S6
30	AP Area-Pad 35	L5
31	Drum Recycling Area	L5
32	Ground Water Remediation Unit	Rows I-L
33	Sodium Perchlorate Platinum By-Product Filter, Unit 5	R7
34	Former Manganese Tailings Area	O8
35	Truck Emptying/Dumping Site	O2, O3
36	Former Satellite Accumulation Point, Unit 3, Maintenance Shop	R5
37	Former Satellite Accumulation Point, Unit 5, Maintenance Shop	R6
38	Former Satellite Accumulation Point, AP-Laboratory	N3
39	Satellite Accumulation Point-AP Maintenance Shop	N4
40	PCB Transformer Spill	R7
41	Unit 1 Tenant Slams	Q3
42	Unit 2 Salt Bedder	R5
43	Unit 4 and 5 Basements	R6
44	Unit 6 Basement	R8
45	Diesel Storage Tank	O6
46	Former Old Main Cooling Tower and Recirculation Lines	O7, O8
47	Leach Plant Area Manganese Ore Piles	P8
48	Leach Plant Analyte Tanks	P7
49	Leach Plant Area Sulfuric Acid Storage Tanks	P7
50	Leach Plant Area Leach Tanks	P7
51	Leach Plant Area Transfer Lines	P8
52	AP Plant Area Screening Building, Dryer Building and Associated Sump	M5
53	AP Plant Area Tank Farm	N6
54	AP Plant Area Change House/Laboratory Septic Tank	N3
55	Area Affected by July 1990 Fire	L6
56	AP Plant Area Old Building D-1 - Washdown	L5
57	AP Plant Transfer Lines to Sodium Chlorate Process, AP Plant S1's and Transfer Lines	M5
58	AP Plant Area New Building D-1 Washdown	M5
59	Storm Sewer System	Rows N-R
60	Acid Drain System	Rows K-R
61	Old Sodium Chlorate Plant Decommissioning	R6
62	Slate Industries, Inc. Site, Including Impoundments and Catch Basin	U4, U5
63	J. B. Kelley, Inc. Trucking Site	P3
64	Koch Materials Company Site	O3, O4
65	Nevada Precast Concrete Products, Green Ventures International, Buckles Construction Company and Ebony Construction Sites	P4, O3, R3, S3
66	Above-Ground Diesel Storage Tank Leased by Flintkote Co.	Q5
67	Delbert MacIsen and Estate of Delbert MacIsen Site	B4
68	Southern Nevada Auto Parts Site (Pick A Part)	F6
69	Dillon Potter Site	H7
NA	U. S. Vanadium	-
LOU # Site identified in Letter of Understanding dated August 15, 1994.		P8, Q8

**LEGEND**

- ◆ Proposed Phase B Soil Vapor Sample Locations
- LOU Boundaries
- - LOU Boundaries - Less Defined
- Area I
- Area II
- Area III
- Area IV
- Acid Drain System
- Storm Drain System

SHEET NUMBER: X  
FIGURE NUMBER: 2

**PROPOSED PHASE B SOIL GAS LOCATIONS**  
**PHASE B SOURCE AREA INVESTIGATION**  
**TRONOX FACILITY**  
**HENDERSON, NEVADA**

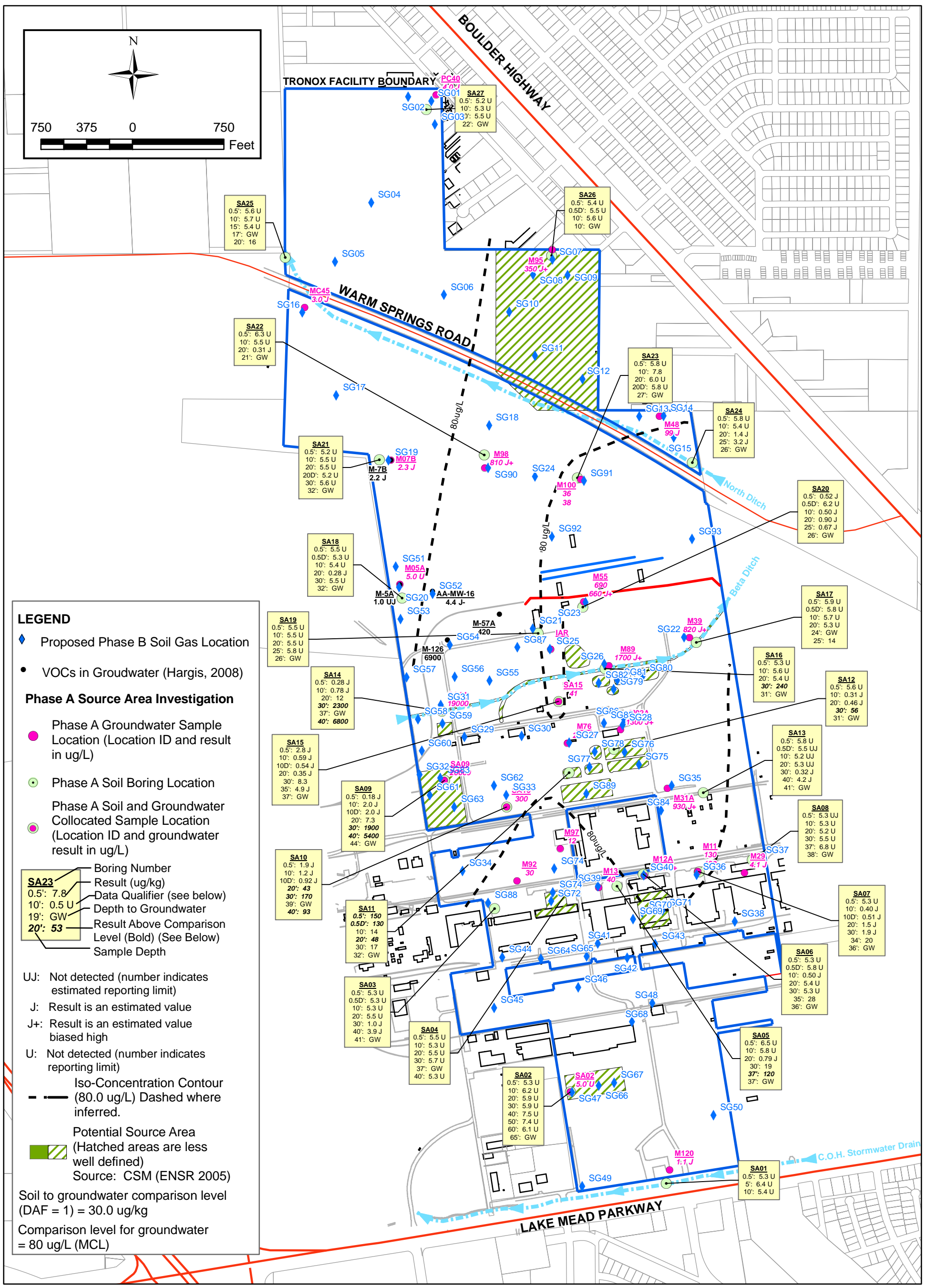
SCALE: AS SHOWN      DATE: 3/20/08      PROJECT NUMBER: 04020-023-430

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T.M.				
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B.H.				
APPROVED BY:				
M.F.				





**LEGEND**

- ◆ Proposed Phase B Soil Gas Location
- VOCs in Groundwater (Hargis, 2008)

**Phase A Source Area Investigation**

- Phase A Groundwater Sample Location (Location ID and result in ug/L)
- Phase A Soil Boring Location
- Phase A Soil and Groundwater Collocated Sample Location (Location ID and groundwater result in ug/L)

Boring Number  
**SA23**  
 0.5': 7.8  
 10': 0.5 U  
 19': GW  
 20': 53  
 Result (ug/kg)  
 Data Qualifier (see below)  
 Depth to Groundwater  
 Result Above Comparison Level (Bold) (See Below)  
 Sample Depth

UJ: Not detected (number indicates estimated reporting limit)  
 J: Result is an estimated value  
 J+: Result is an estimated value biased high  
 U: Not detected (number indicates reporting limit)

Iso-Concentration Contour (80.0 ug/L) Dashed where inferred.

Potential Source Area (Hatched areas are less well defined)  
 Source: CSM (ENSR 2005)

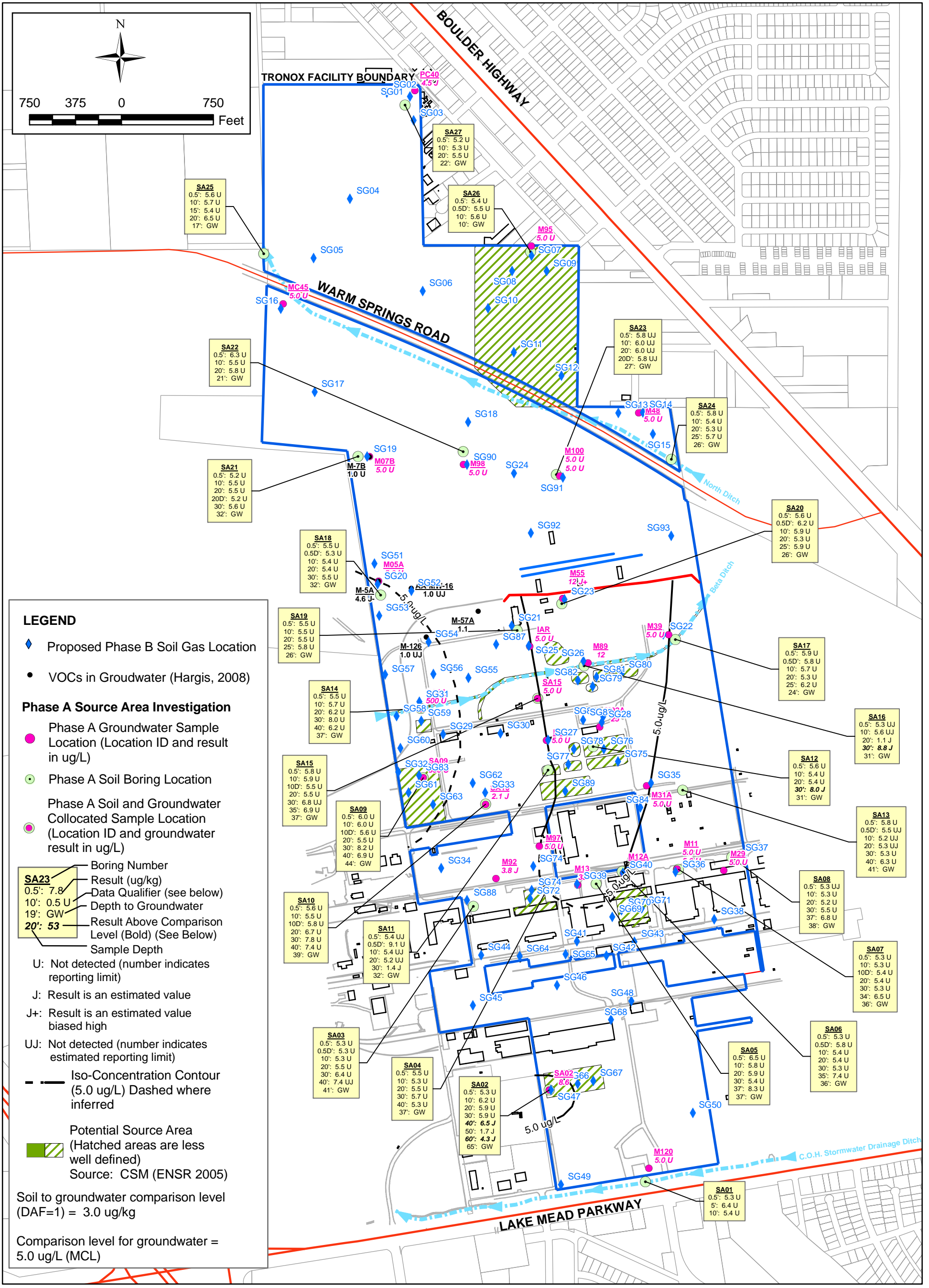
Soil to groundwater comparison level (DAF = 1) = 30.0 ug/kg  
 Comparison level for groundwater = 80 ug/L (MCL)

SHEET NUMBER:	3	FIGURE NUMBER:

PHASE A INVESTIGATION SOIL AND GROUND-WATER RESULTS FOR CHLOROFORM		
PHASE B SOURCE AREA INVESTIGATION		
TRONOX FACILITY		
HENDERSON, NEVADA		
SCALE:	DATE:	PROJECT NUMBER:
1:9,000	3/20/08	04020-023-430

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**LEGEND**

- ◆ Proposed Phase B Soil Gas Location
  - VOCs in Groudwater (Hargis, 2008)
  - Phase A Source Area Investigation**
  - Phase A Groundwater Sample Location (Location ID and result in ug/L)
  - Phase A Soil Boring Location
  - Phase A Soil and Groundwater Collocated Sample Location (Location ID and groundwater result in ug/L)
- SA23**  
 0.5': 7.8  
 10': 0.5 U  
 19': GW  
**20': 53**  
 Sample Depth
- Boring Number  
 Result (ug/kg)  
 Data Qualifier (see below)  
 Depth to Groundwater  
 Result Above Comparison Level (Bold) (See Below)  
 Sample Depth
- U: Not detected (number indicates reporting limit)  
 J: Result is an estimated value  
 J+: Result is an estimated value biased high  
 UJ: Not detected (number indicates estimated reporting limit)
- - - Iso-Concentration Contour (5.0 ug/L) Dashed where inferred
- Potential Source Area (Hatched areas are less well defined)  
 Source: CSM (ENSR 2005)
- Soil to groundwater comparison level (DAF=1) = 3.0 ug/kg  
 Comparison level for groundwater = 5.0 ug/L (MCL)

SHEET NUMBER:	4	FIGURE NUMBER:

PHASE A INVESTIGATION SOIL AND GROUND-WATER RESULTS FOR TCE		
PHASE B SOURCE AREA INVESTIGATION		
TRONOX FACILITY		
HENDERSON, NEVADA		
SCALE:	DATE:	PROJECT NUMBER:
1:9,000	3/20/08	04020-023-430

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