

# Tronox LLC Henderson Facility Fact Sheet

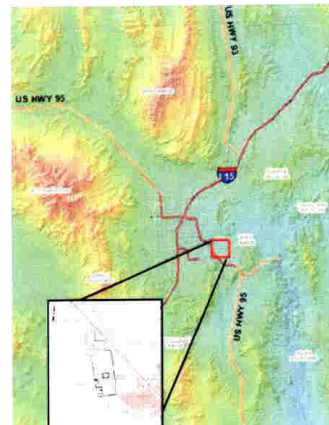
The Tronox LLC (Tronox), formerly Kerr-McGee Chemical LLC, Henderson facility is located within the Black Mountain Industrial (BMI) complex. The facility is approximately 450 acres in size and is located 13 miles southeast of Las Vegas in an unincorporated section of Clark County, Nevada. It is completely surrounded by the incorporated area comprising the City of Henderson (COH).

## Site History

The BMI complex has been the site of industrial operations since 1942 and was originally sited and operated by the U.S. government as a magnesium production plant in support of the World War II effort. Following the war, a portion of the complex was leased by Western Electrochemical Company (WECCO). By August 1952, WECCO had purchased several portions of the complex, including six of the large unit buildings, and produced manganese dioxide, sodium chlorate and various perchlorates. In addition, in the early 1950s, pursuant to a contract with the U.S. Navy, WECCO constructed and operated a plant to produce ammonium perchlorate on land purchased by the Navy. In 1956, WECCO merged with American Potash and Chemical Company (AP&CC) and continued to operate the processes, with the Navy's



Air Photo of Tronox LLC Site



Site Location

continued involvement in the ammonium perchlorate process. In 1962, AP&CC purchased the ammonium perchlorate plant from the Navy, but continued to supply the Navy, and its contractors, material from the operating process. AP&CC merged with Kerr-McGee Corporation (Kerr-McGee) in 1967. This merger included boron production processes in California, which were moved to Henderson and began operation in the early 1970s. These included elemental boron, boron trichloride and boron tribromide. In 1994, the boron tribromide process was shut down and dismantled. In 1997, the sodium chlorate process was shut down and in 1998, production of commercial ammonium perchlorate ended as well. The ammonium perchlorate production equipment was used to reclaim perchlorate from on-site materials until early 2002, when the equipment was permanently shut down. In 2005, Kerr-McGee Chemical LLC's name was changed to Tronox LLC. Processes currently operated by Tronox at the Henderson facility are for production of manganese dioxide, boron trichloride and elemental boron.

## Site Investigation and Remediation

A groundwater investigation was initiated by Tronox in July 1981 to comply with the federal Resource Conservation and Recovery Act (RCRA) standards for monitoring the existing on-site impoundments. In December 1983, the Nevada Division of Environmental Protection (NDEP) requested that Tronox investigate the extent of chromium impact in the groundwater beneath the facility.

A Consent Order between Tronox and NDEP, prepared in September 1986, stipulated additional groundwater characterization and the implementation of remedial activities to address chromium in the groundwater. As a result of the 1986 Consent Order, monitor wells, groundwater interceptor wells, a

groundwater treatment system for chromium reduction and two treated-groundwater injection trenches were installed and the treatment of groundwater began in mid-1987. This treatment is on-going today.

In April 1991, Tronox was one of six companies entering into a Consent Agreement with the NDEP to conduct environmental studies to assess site-specific environmental conditions, which are the result of past and present industrial operations and waste disposal practices. The six companies that entered into the Consent Agreement included those past or present entities that conducted business within the BMI complex. The Consent Agreement specified that, among other things, the companies identify, document or address soil, surface water, groundwater or air impacts and document measures that have been taken to address environmental impacts from their respective sites.

In April 1993, in compliance with the 1991 Consent Agreement, Tronox submitted the Phase I Environmental Conditions Assessment (ECA) to NDEP. The purpose of the report was to identify and document site-specific environmental impacts resulting from past or present industrial activities. The Phase I ECA included an assessment of the geologic and hydrologic setting, as well as historical manufacturing activities. In 1994, the NDEP issued a letter of understanding (LOU) that identified 69 data gap areas which needed additional information, either in the form of additional document research or field sampling of site conditions.

During the mid to late 1990s, Tronox collected additional data to fill the LOU identified data gaps. This was done by investigating past operator records as well as through field sampling. Results of this work are described in the Phase II Written Response to the LOU, the Phase II ECA and the Supplemental Phase II ECA, the later two of which were reports describing the results of field sampling of groundwater and soils. Through this effort, potential environmental impacts associated with the 69 LOU areas were evaluated.

In 1997, perchlorate was discovered in the Las Vegas Wash vicinity and this aspect of the ECA was placed on a remedial fast-track. Impact characterization and treatment methodology evaluation was on-going in the late 1990s with installation of a water collection system and temporary ion exchange (IX) process for perchlorate removal. This remedial process began operation in November 1999. Tronox and NDEP entered into a 1999 Consent Agreement, which defined remedial requirements and looked forward to a more permanent treatment process that would replace the temporary IX. After considerable research and process development, a permanent treatment technology was developed. Tronox and NDEP entered into an October 2001 Administrative Order on Consent (AOC) defining the more permanent remedial requirements, which were installed and are operating today. To date, perchlorate remediation efforts have included the design, installation and operation of groundwater extraction as well as surface water collection systems, along with development, design, installation and operation of a permanent treatment process. These activities include:

- 1) The on-site groundwater barrier wall together with an upgradient collection well field,
- 2) The Athens Road groundwater collection well field,
- 3) The seep area collection well field as well as a sump for collection of water in the area where groundwater surfaced, and
- 4) A treatment process that removes chromium and perchlorate from the collected groundwater then discharges the water in accordance with the limits set forth in the existing National Pollutant Discharge Elimination System (NPDES) permit.



**Biological Treatment Plant for Groundwater**

The groundwater remediation systems will continue to operate under the direction of NDEP.

In 2004, a list of site-related chemicals was developed based upon investigations associated with operations at the site. This list included raw materials, process chemicals, intermediates, as well as products of all current and previous manufacturers at the site. In 2005, a Conceptual Site Model (CSM) was prepared for the site which consolidated information gathered about environmental impact, both known and potential. Concentrations of the site-related chemicals in both soil and groundwater upgradient of the Tronox site were investigated in 2006. On-site investigation of the site-related chemicals in soil and groundwater continued in 2006 and 2007 with the Phase A Site Investigation. The purpose of the Phase A work was first, to gather extensive data from 27 locations on the site; and second, to determine which of the site-related chemicals were adequately characterized for a future risk assessment and which would require additional characterization. To complete that additional characterization and prepare for a site-wide human health risk assessment, a subsequent Phase B Site Investigation Work Plan was submitted to NDEP in 2008 and is close to finalization.

## **Future Activities**

While much has been learned about site-related chemicals, Tronox, under the supervision of NDEP, will continue to define the nature and extent of impacts to soil and groundwater from its operations. The proposed Phase B Site Investigation, designed to fill data gaps identified in the CSM and the Phase A studies, will be followed by a site-wide human health risk assessment. The risk assessment, planned for 2009, will establish site-specific risk-based action levels and identify additional remedial requirements if any.

December 12, 2008

## Shannon Harbour

---

**From:** Crowley, Susan [Contractor] [Susan.Crowley@tronox.com]  
**Sent:** Friday, December 12, 2008 1:08 PM  
**To:** Shannon Harbour  
**Cc:** Brian Rakvica; Keith Bailey; Flack, Mike; Caceres-Schnell, Carmen; Budin-Caloroso, Jessica  
**Subject:** Tronox Henderson Fact Sheet  
**Attachments:** Tronox Fact Sheet - Rev 8 - 12-12-08.pdf

Shannon,

Attached please find a revised Fact Sheet for the Tronox Henderson site. I've included an Adobe file but a live Word file is available. The Word file is about 8 MB due to the graphics – but if you need this file ENSR can forward it by Leapfile. Please let me know if you have any questions or comments. Thanks.

### TRONOX LLC

Susan Crowley (Contractor)  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

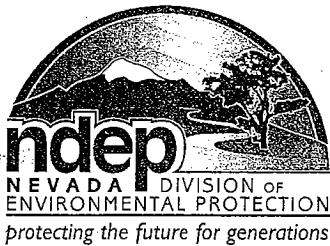
*It's the set of our sails, not the force of the gales, that determines the way we go.*

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# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

December 28, 2008

Susan Crowley (Contractor)  
C/O Tronox LLC  
PO Box 55  
Henderson, NV 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Appendix E -Data Validation Summary Report (DVSR) Annual Remedial Performance Report for Chromium and Perchlorate*  
Dated December 18, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's report identified above and provides comments below:

1. Per the NDEP's letter dated October 6, 2008, comment 9.a stated "General comment, TRX should provide only the records applicable to a DVSR in the database that is included with each DVSR. This practice would not only facilitate review of the DVSR but also provide a more cost-effective means of incorporating new data into the regional database maintained by NDEP." TRX's response did not provide a revised database. Please provide a revised database by **January 16, 2009**.

Please contact the undersigned with any questions at [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov) or (702) 486-2850 extension 247.

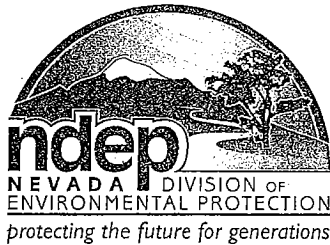
Sincerely,

Brian Rakvica, P.E.  
Supervisor  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

BAR:s



CC: Jim Najima, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Mike Skromyda, Tronox LLC, PO Box 55, Henderson, NV 89009  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544



# STATE OF NEVADA

Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

December 22, 2008

Susan Crowley (Contractor)  
C/O Tronox LLC  
PO Box 55  
Henderson, NV 89009

Re: **Tronox LLC (TRX)**

**NDEP Facility ID #H-000539**

Nevada Division of Environmental Protection (NDEP) Response to:

*Technical Memorandum – Screening Level Indoor Air Health Risk Assessment for the  
2008 Tronox Parcels A/B Soil Gas Investigation*

Dated November 13, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's report identified above and provides comments in Attachment A. The revised report should include a fully annotated response-to-comments (RTC), a red-line strike-out version of the report, and a revised report.

Please contact the undersigned with any questions at [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov) or (702) 486-2850 extension 247.

Sincerely,

Brian Rakvica, P.E.  
Supervisor  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

BAR:s



CC: Jim Najima, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Mike Skromyda, Tronox LLC, PO Box 55, Henderson, NV 89009  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
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Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
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Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Paul Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215  
Kelly Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215



## Attachment A

1. General comments, the NDEP has the following general comments regarding the subject document:
  - a. The subject document in general and the CSM in particular make no reference to the Phase 2 Investigation on Parcels A and B.
  - b. Shallow soil samples have been collected at other locations at the BMI Industrial Complex and analyzed for physical properties. BRC should explore how the default Johnson and Ettinger (J&E) model values compare to the data collected either on Parcels A & B or in the general area. For the soil gas calculations particular attention should be paid to the soil moisture content.
  - c. The subject document does not adequately describe the modeling work that was performed.
  - d. The NDEP's review of the subject document would be aided by the addition of Section numbers.
  - e. It appears that the data used in this assessment may have been reported with non-detects shown at their reporting limits rather than their detection limits. For example, for 1,1,2-TCA there are eight non-detects reported between 0.15 ug/m<sup>3</sup> and 0.17 ug/m<sup>3</sup>. There is one detected value reported with a J flag at 0.12 ug/m<sup>3</sup>. Looking through the remainder of the dataset (beyond the nine samples used in these analyses), it appears that detects are quite often reported below the non-detect levels. This is usually an indication that the non-detects are being reported at a reporting limit rather than a method or instrument detection limit. That practice causes substantial overestimation of concentrations when the frequency of detection is low.
2. Introduction, page 1, the data validation summary report (DVSR) for the soil gas should be appropriately referenced. In addition, all referenced reports should denote their approval status.
3. Selection of Chemicals of Potential Concern, page 3, all chemicals that were not detected in soil gas at the site were eliminated from further consideration. This is an acceptable approach when it is accompanied by some consideration of whether reasonable detection limits were achieved for such chemicals. Without that information it is impossible to know if it is acceptable to eliminate those chemicals. This information may be in the DVSR that is referenced in the Introduction, if so, that is adequate, however, so additional explanation would be helpful. Please clarify.
4. Determination of Exposure Point Concentrations, pages 3 through 5
  - a. Please note that the United States Environmental Protection Agency (USEPA) actually encourages that both a central tendency estimate (CTE) and a reasonable maximum estimate (RME) be used to help account for the uncertainties associated with determining risk. It is fine in this case for TRX to use only an RME, but the wording of this paragraph is a bit confusing.
  - b. Indoor Air, page 4, TRX states "Maximum detected VOCs concentrations in soil gas were used as representative exposure concentrations for the indoor air exposure pathway." The J&E spreadsheet calculations used the 95 percent UCL values not the maximum. This inconsistency needs to be rectified.

- a. Page 4, 1<sup>st</sup> paragraph, in the final sentence, “non-detect” isn’t quite the right term to use. NDEP suggests that TRX use the term “minimum” in place of “non-detect”.
5. Uncertainty Analysis, page 5, the NDEP has the following comments:
  - a. TRX states “The environmental sampling at the property is one source of uncertainty in the evaluation. However, the number of sampling locations and events is large and widespread...” Please note that nine samples within Parcels A and B would not be considered “large”, however, this may be “adequate”.
  - b. The uncertainty analysis should discuss the fact the screening level indoor risk assessment used default values for a residential scenario while the assessment was intended for a commercial use scenario.
6. Screening-Level Indoor Air Health Risk Assessment Results and Summary, page 7, the results of the previous screening-level health risk assessment for Parcels A and B should be mentioned in this summary. The soil gas assessment for indoor air was intended to fill a gap in that assessment. These results on their own, without combining the potentially additive risks, do not provide an adequate assessment of the potential risks to a commercial worker on this site.
7. Table 1, TRX needs to review this table for issues with significant figures.
  - a. Upon close inspection, the main issue seems only to occur with trailing zeros. For example, the data are presented with two significant digits, but 8.0 is shown as 8, and .50 is shown as .5.
  - b. NDEP also notes that three significant figures were reported for some medians (e.g., 1,4-Dioxane) although the reported value in the data files contains only two significant figures (0.39 in the data file and 0.385 in Table 1).
  - c. Finally, another case where three significant figures were used was for the Chloroform UCL, which should clearly only have two significant figures since it is calculated from data that contain only two significant figures.
8. Table 2, the NDEP has the following comments:
  - a. Please note that average soil temperature is not intended to be a default value.
    - i. The average soil temperature of 10°C appears low for Las Vegas which has a mean annual temperature of approximately 20°C.
  - b. Was the soil type used (sand) based on site-specific data? There are no text references in this regard.
    - i. The NDEP is accepts the default soil physical properties provided the soil type is site-specific.
  - c. Exposure duration, exposure frequency, and averaging time for non-carcinogens values employed are not J&E Model default values.
9. Table 4, several of the chemical names were truncated.
10. J&E Model Spreadsheets
  - a. Chemical Properties Lookup Table, Vlookup Tab. References were not provided for updated information and for the chemicals added to the table.
  - b. DataEnter sheets were provided even when the chemical was non-detect (ND) in all nine samples. Chemical Group 1, for example, includes input sheets 1,1,1-TCA and 1,2-DCB but the chemicals were not detected.
  - c. J&E model calculations were checked for one chemical from each of the four chemical groups as follows:

- i. Group 1 – 1,4-DCB
  - ii. Group 2 – benzene
  - iii. Group 3 – chloroform
  - iv. Group 4 – PCE
  - v. NDEP comments are provided below for each of these compounds.
- d. Group 1
- i. DataEnter 1,4-Dioxane – the CAS number appears correct but the chemical reported at I12 (spreadsheet location) is Crotonaldehyde (2-butenal)? The problem is that TRX added chemicals to the *Chemical Properties Lookup Table*; but did not sort the table (lowest to highest CAS number). Hence the VLOOKUP formula in cell I12 does not work properly in the files provided. This problem can be solved in one of two ways:
    - 1. Simply sort the VLOOKUP table in ascending order after adding new chemicals to the list, or
    - 2. Modify the formula in cell I12 as follows by adding argument FALSE (highlighted yellow):  
IF(ISERROR(MATCH(E12,CAS\_No,0)),"CAS No. not found",VLOOKUP(E12,Chemical\_Data,2,FALSE))
      - a. By adding this argument the table need not be in ascending order.
  - ii. The NDEP sorted the VLOOKUP table and the formula worked properly.
    - 1. This operation was performed for the VLOOKUP table for each of the four chemical groups
  - iii. Various factors (*e.g.*, RfC and URF) were updated but no references for this information were provided.
- e. Groups 2 through 4
- i. This set of spreadsheets contains the same error as noted above.
  - ii. Various factors (*e.g.*, RfC and URF) were updated but no references for this information were provided.

## Shannon Harbour

---

**From:** Shannon Harbour  
**Sent:** Monday, December 08, 2008 11:38 AM  
**To:** 'Crowley, Susan [Contractor]'  
**Cc:** Brian Rakvica; Keith Bailey; Ho, Brian; Flack, Mike  
**Subject:** RE: SA-191 Relocation - SA-214 Use to Evaluate LOU 28

Susan,

My understanding was that SA214 was added for the characterization of LOU60 as requested by NDEP. Also, I'm not sure that SA214 is close enough to LOU 28 to be considered representative. However, if it is not feasible to sample LOU 28 at this time, then characterization will have to occur after the ASTs have been removed. LOU 28 should probably be considered an active area like the LOUs present in the Mn production area in Area III. If this is the case, then NDEP is fine with leaving SA191 in the original location in the Unit 2 area.

Sincerely,  
 Shannon

*Shannon Harbour, P.E.  
 Special Projects Branch  
 Bureau of Corrective Actions  
 NDEP-Las Vegas Office  
 2030 E Flamingo Rd Suite 230  
 Las Vegas, NV 89119  
 702-486-2850 x 240 (work)  
 702-486-5733 (fax)*

---

**From:** Crowley, Susan [Contractor] [mailto:Susan.Crowley@tronox.com]  
**Sent:** Monday, December 08, 2008 11:11 AM  
**To:** Shannon Harbour  
**Cc:** Brian Rakvica; Keith Bailey; Ho, Brian; Flack, Mike  
**Subject:** SA-191 Relocation - SA-214 Use to Evaluate LOU 28

Shannon,

NDEP comment 22.g.iv.3, in a response letter dated June 18, 2008, stated:

"SA191 may be moved into LOU 28; otherwise, TRX should place an additional boring in LOU 28 either between the two ASTs or just north of the northernmost AST in the northwest corner of LOU 28."

Tronox has suggested leaving boring SA-191 at the location originally proposed, since it provides coverage for the center of the Unit 2 area. Regarding the NDEP request to locate an additional boring either between the ASTs which now stand over the LOU-28 area, or possibly in the northwest corner of LOU-28, Tronox has previously expressed concern about drilling through the HDPE lined secondary containment for the two ASTs. Boring SA04 in the Phase A Site Investigation was placed north of LOU-28, while avoiding utilities buried in the plant roads. Newly proposed boring SA-214 was added northeast of LOU 28 following receipt of the NDEP comments. As another alternative, Tronox also considered angle drilling to reach LOU-28 from outside the containment area, but the combination of shallow groundwater (45 feet below ground surface at SA-214) and limited clearances make the

12/8/2008

option unworkable. Drilling locations north and south of LOU 28 are too narrow to allow the needed rig access for angle drilling. On the west side, the containment extends about 70 feet west of LOU28 ... angle drilling would therefore not reach under LOU 28 before extending below the water table. On the east side, the roadway contains utilities which would interfere with angled drilling to the west.

Considering all, Tronox believes that the addition of boring SA-214 is the most practical solution to the NDEP comment. Is this acceptable to NDEP?

**TRONOX LLC**

Susan Crowley (Contractor)

PO Box 55

Henderson, NV 89009

office 702.651.2234

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Thank you.

Nov

## Shannon Harbour

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**From:** Susan Crowley [smcrowley@cox.net]  
**Sent:** Friday, November 14, 2008 9:01 AM  
**To:** Shannon Harbour  
**Subject:** RE: Submittal updates

Shannon,  
Keith will respond in a moment with a more complete message – I suspect he'll call – but although I'm out of the office today, I wanted to express our thanks for your quick turn-around with comments. We have the groundwater tables ready for you and what Keith and you may need to talk about is a way to highlight the changes you make, a small thing considering how far we've come. Again ... thanks. We're anxious to get moving as well.

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, NV 89009  
Phone: 702-651-2234  
Fax: 405-302-4607  
cell: 702-592-7727

---

**From:** Shannon Harbour [mailto:sharbour@ndep.nv.gov]  
**Sent:** Thursday, November 13, 2008 4:51 PM  
**To:** Crowley, Susan [Contractor]; Susan Crowley; Keith Bailey  
**Subject:** Submittal updates

Susan/Keith,

I have reviewed my deadlines file and have the following outstanding items from TRX:

Mixing Zone Calculations: 10/10/08: TRX was to provide a schedule addressing this issue  
Revised Annual Report DVSR: 11/7/08  
Revised Parcels C, D, F, G, and H DVSR: 11/10/08: TRX to provide a schedule for submittal

Please provide an update on these three items.

Thanks,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230  
Las Vegas, NV 89119  
702-486-2850 x 240 (work)  
702-486-5733 (fax)*

11/14/2008

**Shannon Harbour**

---

**From:** Crowley, Susan [Contractor] [Susan.Crowley@tronox.com]  
**Sent:** Friday, November 07, 2008 2:47 PM  
**To:** Shannon Harbour  
**Cc:** Keith Bailey; Flack, Mike; Caceres-Schnell, Carmen; Budin-Caloroso, Jessica; bho@ensr.aecom.com  
**Subject:** Assistance With Phase B Document Revision  
**Attachments:** Table 1 - Total PCB Calcs 11-6-08 to Shannon Harbour.xls; NDEP Area I -IV Revision 11-7-08 to Shannon Harbour.doc; C\_DOCUME~1zsmc1LOCALS~1TempTrx to NDEP 11-7-08 - re Review of Phase B Drafts.pdf

Shannon,

Attached please find a cover letter which describes the (also attached) MS Word and Excel files. ENSR will be providing Figures 1 to 4 and Plate A directly from their office. These latter docs will be drawing size for readability and so ... we thought a hard copy would be best for now. Please let me know if an electronic copy would be helpful. We expressed our appreciation for your offered assistance, but once again ... thanks.

**TRONOX LLC**

Susan Crowley (Contractor)  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

*It's the set of our sails, not the force of the gales, that determines the way we go.*

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Thank you.



Table 1. Sample-By-Sample Summary of Total Congener PCB Results in Soil  
**PRELIMINARY UNVALIDATED DATA**  
 Tronox Facility - Henderson, Nevada

Grid Location	Boring ID	Sample ID	Sample Depth	PCBs TEQ Zero Detection Limit (a) (ug/kg)	PCBs TEQ Full Detection Limit (a) (ug/kg)	Total PCBs Zero Detection Limit (a) (mg/kg)	Total PCBs Full Detection Limit (a) (mg/kg)
N-2	RSAN2	RSAN2-0.5B	0.5	4.35E-07	1.80E-04	1.54E-03	1.89E-03
		RSAN2-10B	10	9.37E-07	9.23E-05	3.09E-03	3.35E-03
		RSAN2-20B	20	9.86E-07	5.73E-05	2.17E-03	2.26E-03
		RSAN2-30B	30	1.28E-06	1.93E-04	2.35E-03	3.04E-03
		RSAN2-30BD	30	9.44E-07	3.22E-04	2.54E-03	3.38E-03
		RSAN2-35B	35	9.90E-07	2.03E-04	2.00E-03	2.54E-03
O-2	RSAO2	RSAO2-0.5B	0.5	7.78E-06	2.85E-04	3.42E-03	3.93E-03
		RSAO2-10B	10	1.00E-06	1.08E-04	1.59E-03	2.15E-03
		RSAO2-20B	20	8.08E-07	2.61E-04	1.58E-03	2.03E-03
		RSAO2-20BD	20	9.09E-07	1.50E-04	1.60E-03	2.07E-03
		RSAO2-30B	30	5.64E-07	4.75E-04	1.77E-03	3.15E-03
		RSAO2-33B	33	2.09E-06	3.43E-04	5.33E-03	6.23E-03
O-4	RSAO4	RSAO4-0.5B	0.5	6.15E-06	4.75E-04	1.68E-02	1.70E-02
		RSAO4-10B	10	4.34E-06	2.02E-04	1.45E-02	1.49E-02
		RSAO4-20B	20	5.16E-07	2.77E-04	1.88E-03	2.86E-03
		RSAO4-30B	30	1.34E-06	4.03E-04	2.30E-03	3.32E-03
		RSAO4-36B	36	1.57E-06	3.01E-04	2.51E-03	2.82E-03
O-3	SA180	SA180-0.5B	0.5	2.22E-02	2.22E-02	5.73E-02	5.75E-02
		SA180-10B	10	1.08E-06	1.67E-04	1.84E-03	2.25E-03
		SA180-20B	20	1.13E-03	1.13E-03	1.79E-03	1.90E-03
		SA180-30B	30	1.92E-02	1.92E-02	3.47E-03	4.61E-03
O-3	SA48	SA48-0.5B	0.5	1.75E-02	1.75E-02	2.36E-01	2.36E-01
		SA48-10B	10	1.27E-05	2.13E-04	3.08E-03	4.15E-03
		SA48-20B	20	7.61E-03	7.61E-03	4.65E-02	5.01E-02
		SA48-30B	30	2.61E-06	3.98E-04	1.23E-03	2.00E-03
		SA48-35B	35	6.56E-06	2.38E-04	2.28E-03	2.57E-03
O-3	SA57	SA57-0.5B	0.5	7.75E-03	7.75E-03	5.25E-02	5.32E-02
		SA57-10B	10	7.98E-07	8.10E-05	1.42E-03	1.55E-03
		SA57-20B	20	5.45E-04	5.45E-04	8.60E-04	1.60E-03
		SA57-30B	30	2.34E-03	2.34E-03	1.74E-03	3.11E-03
		Comparison Levels		1 (b)	1 (b)	1.00E+00 TSCA (residential; 1/10 industrial.) (c)	
						2.90E-01 1/10th Region 6 MSSSL (d)	

Notes:

MSSL - USEPA Region 6 Medium-Specific Screening Level. March 7, 2008.

PCB - Polychlorinated biphenyl.

TEQ - Toxic Equivalent. Calculated by first multiplying the congener concentration by the Toxic Equivalency Factor (TEF) (Van den Berg et al., 2006) and then summing the resulting values.

TSCA - Toxic Substances Control Act.

Van den Berg, et al. 2006. The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. Toxicological Sciences 93(2): 223-241.

(a) Total PCB and PCB TEQs were calculated using two different methods for handling non-detected results:

- Results for congeners not detected above the laboratory detection limit were set equal to zero.
- Results for congeners not detected above the laboratory detection limit were set equal to the laboratory detection limit.

(b) USEPA, 1998. Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites. OSWER Directive 9200.4-26. April, 1998. Value for residential soils.

(c) TSCA. 40 CFR Part 761; 63 FR 35383-35474, June 29, 1998.

(d) MSSSL. [http://www.epa.gov/earth1r6/6pd/rcra\\_c/pd-n/screen.htm](http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

# TRONOX

Susan Crowley

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November 7, 2008

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

Dear Ms. Harbour:

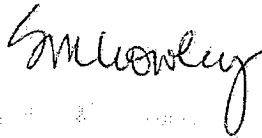
**Subject: Tronox LLC Draft Phase B Work Plan Documents**

We are most grateful for your offer to review and comment on and/or edit the draft documents associated with Tronox's response to NDEP comments for the four Phase B Area Work Plans. Towards that, you will find enclosed the draft discussion we have prepared describing the approach we've used to revise all four of the Area Work Plans, I through IV. This is what we term our "rule" guide and is the basis for revision of Table 2 and Table 3 in each of the Work Plan documents. Also enclosed is a Table I which presents PCB analyses from samples collected in Area I in the June / July 2008 timeframe. This information supports the discussion. Both the discussion and Table I are provided as live documents, in MS Word and Excel, respectively.

Under separate cover, ENSR will forward Figures 1 to 4 and Plate A, which also support the discussion. They are drawing sized documents and as such – hard copies have been printed and these are being overnight mailed to you. They should be delivered Monday morning. The electronic versions can be provided if needed, but we'll need to mail a CD, the file size is too large for e-mail transmittal. Please let me know if you'd like the electronic copy.

Again, we are appreciative of the help you are providing. This draft review process will continue as we forward the tables associated with the Phase B groundwater sampling (Table IIIs) to be followed by the tables associated with the Phase B soil sampling (Table IIs). Feel free to call me at (702) 651-2234, if you have any questions or need anything for your review. Thank you.

Sincerely



Susan M. Crowley, CEM 1428, exp 3-8-09

E-Mail Transmitted

**Tronox. Adding value beyond the product.**

8000 West Lake Mead Parkway, Henderson, Nevada 89015 • P.O. Box 55, Henderson, Nevada 89009

**PHASE B SOURCE AREA INVESTIGATION  
REVISIONS TO AREA I THROUGH IV WORK PLANS  
DRAFT TEXT/Drawing SUBMITTAL – NOVEMBER 10, 2008**

**I. INTRODUCTION**

Tronox LLC (Tronox) has submitted four Area Sampling and Analysis Plans (SAPs) to the Nevada Division of Environmental Protection (NDEP) as part of the ongoing Phase B Site Investigation for the Tronox Henderson facility. This Environmental Conditions Assessment (ECA) work is being performed under terms of a 1996 Consent Agreement between NDEP and Tronox (then Kerr-McGee Chemical Corporation, Reference). NDEP has responded with comments on each Area SAP. After receiving conditional approval of the Area I SAP, Tronox initiated sampling in Area I in June 2008, but suspended work in July 2008 due to a combination of financial issues and a desire to ensure that changes being requested by NDEP in all four of the Area SAPs could be incorporated. Several conference calls have subsequently been held between NDEP and Tronox in an effort to identify the most efficient way to proceed with the Phase B work. This revised SAP submission incorporates our understanding of the combined comments and discussions for all four Area SAPs. We hope to receive timely approval of the modified SAPs presented here, to be followed by initiation of the proposed field work.

This response document is organized into five major parts. The first includes a review of the rationale for modifying the Phase B SAPs. A brief summary history of all NDEP correspondence related to the SAPs and copies of all NDEP comment letters and teleconference meeting minutes are attached in Appendix A (the comments are not separated by Areas since many of the teleconference discussions covered multiple Area plans). Parts two through five of this submission are tabbed sections for each Phase B Site Investigation Area, including revised soil and groundwater SAP Tables (Tables 2 and 3 for each Area). Two versions of each Table are included. The first highlights changes being made by showing additions with a green background and deletions with a brown background, similar to a red-line strikeout format. The second version is a clean black and white copy of each Table showing only the proposed work. The sampling locations for the four Site Areas being investigated are all shown on Plate A. As requested, five copies of Plate A have been included in the volume submitted to Shannon Harbour, while all other copies of the document contain only one copy of Plate A. In addition to showing the division of the Site into the four major sampling Areas, Plate A also shows former and revised locations of individual borings and wells which NDEP has requested be moved.

The goal of the overall Phase B Site Investigation is to identify the nature and extent of chemical constituents from 70 potential source areas on the Tronox Site. Results from conducting the four Area SAPs will be combined with data from Site-wide soil-gas

sampling (completed earlier this year), data from the Phase A Site Investigation, and data from a forthcoming work plan for quantifying background concentrations in quaternary alluvium (Qal) groundwater, to form the basis for development of a Site Human Health Risk Assessment (HHRA). The HHRA is expected to be prepared in the latter half of 2009. As Tronox proposes to modify the HHRA SOP generated by BMI to incorporate commercial/industrial land use and a few other changes, NDEP requested that Tronox provide a red-line/strike out version of Tronox' proposed modifications to the BMI SOP. This SOP is attached as Appendix B.

## II RATIONALE FOR SAP MODIFICATIONS

Tronox is proposing several adjustments to the previously submitted SAPs. The adjustments involve a combination of the following:

- Incorporating NDEP review comments into the SAPs, as modified by subsequent NDEP teleconference discussions;
- Optimizing sample collection methods and vertical sampling frequency to improve efficiency in the field; and
- Limiting sampling in areas of the Site for which regulatory closure is not currently being requested (e.g. active production areas).

### Incorporating NDEP Review Comments

NDEP comments on the initial SAP submissions, as modified by telephone discussions, have been incorporated into the SAPs. As noted in the introduction, where corrections have been made, or wells/borings have been added, the changes are shown on the respective SAP Tables highlighted with a green background. Where deletions have been made from the original Table submissions, those changes are shown with brown backgrounds.

Tronox has taken the NDEP comments for each Area SAP as the starting point for making the proposed revisions and has not gone back to individual LOU packages. In general, the columns titled "Location Description and Characterized Area Rationale for Investigation" or similar titles in the original SAP submissions have not been modified except to add estimated depths to groundwater for each boring/well. Tronox expects that this approach will facilitate the review process deferring extensive discussion of the individual LOUs to the full Phase B Site Investigation report.

### Optimization/Efficiency Changes

The full list of Tronox' proposed sampling plan adjustments is as follows:

1. Use a Geoprobe™ to collect proposed soil samples at depths of 0-0.5 and 10 feet below ground surface (bgs).
2. Reduce the number of soil samples collected between 10 feet bgs and the capillary fringe.
3. Limit the number of soil samples to be analyzed for Organochlorine Pesticides (OCPs) by review of the Conceptual Site Model (CSM).
4. Limit the number of soil and groundwater samples to be analyzed for Organophosphorus Pesticides (OPPs) and Organic Acids (OAs) by review of the CSM.
5. Limit the number of congener and Arochlor PCB analyses by review of the CSM.

6. Limit sampling in the active production areas of Area III, where closure is not being requested.
7. Reduce possible confusion and review time by showing individual borings/wells only on the Table for the Area in which they are physically located.
8. Supplement ENSR data validation (DV) efforts with DV services provided by Laboratory Data Corporation (LDC).

The following subsections describe in more detail the proposed SAP modifications related to each of the eight changes above.

### **1.0 Geoprobe™ Program**

Recent Tronox Geoprobe™ experience in soil-gas sampling demonstrated rapid set-up and penetration of alluvial soils. The soil gas investigation demonstrated that this equipment could reach the depth of five feet below ground surface (bgs) with relative ease and likely can reach at least 10 feet. In order to increase the sampling efficiency in the field, Tronox proposes to utilize Geoprobe™ equipment to collect the soil samples from the 0.5 and 10-foot bgs intervals. As in the original work plans, Sonic drill rigs will be utilized to collect deeper soil samples and in any locations where the Geoprobe™ fails to reach the required sampling depth.

Based on ENSR experience, Tronox anticipates significant increases in sample collection rates using the Geoprobe™ equipment.

A draft Standard Operating Procedure (SOP) for Geoprobe™ work is provided in Appendix C. A copy of the draft SOP has been forwarded by Ranajit Sahu of BMI to NDEP for approval and incorporation into their standard set of SOPs to be utilized in environmental evaluations for the BMI Complex.

### **2.0 Revision of Soil Sample Intervals**

Tronox proposes to collect soil samples at the surface (0-0.5 feet) and 10 feet bgs to evaluate the direct contact risk pathway and determine whether site related chemicals are migrating downward toward groundwater. Soil samples will be collected from the capillary fringe (i.e., 2 feet above the water table) to evaluate whether constituents migrating with groundwater are being sorbed onto soils. However, rather than collecting soil samples at 10-foot intervals between 10 feet bgs and the capillary fringe, Tronox proposes to reduce the sampling frequency.

Tronox proposes to collect soil samples at the following depths:

- 0 feet (Asbestos analysis only collected within the top two inches bgs),
- 0.5 feet bgs,
- 10 feet bgs,
- the capillary fringe,
- If the capillary fringe is 20 feet or more below the 10 foot sample an additional sample will be taken near the midpoint (see below). If the capillary fringe depth minus 10 feet exceeds 40 feet two additional samples will be collected making the maximum depth between each vertical sample no more than 20 feet.

The capillary fringe sampling depths shown on the SAP Tables were determined by using Tronox May 2008 groundwater data and surface elevations to develop site-wide groundwater elevations. These groundwater elevations were used to estimate the depth to the groundwater at proposed boring locations. The capillary fringe sample depth shown on the revised SAP Tables is located two feet above the estimated depth to groundwater. The actual depth to groundwater will be confirmed as soil sampling is performed.

For clarity, an example calculation of sample depths between the 10 foot bgs and capillary fringe depth is as follows:

If the elevation difference between the 10 foot bgs sample and the capillary fringe does not exceed 40 feet, take the difference between the 10 foot sample depth and the capillary fringe sample depth, divide it by two, and add this value to the 10 foot sample depth, then round to the nearest 5-foot interval.

- If the original sampling plan called for samples to be collected at 0.5, 10, 20, 30, 40, and 47 feet bgs,
  - The difference between 10 feet and 42 feet = 32 feet.
  - Divide 32 feet by two:  $32/2 = 16$  feet
  - Add 16 feet to 10 feet:  $16+10 = 26$  feet
  - Round to nearest 5-foot interval: 25 feet bgs is the depth for an additional sample.

- The SAP Table is then revised for this location to indicate that soil samples will be collected at 0.5, 10, 25, and 42 feet. The originally proposed sample depths of 20 and 40 feet are highlighted with a brown background in the color SAP tables to indicate that they have been removed from the SAP. The samples at 25 and 42 feet bgs are shown with a green background indicating that they have been added.

Tronox understands that this approach will reduce the total number of soil samples collected. Data for soils in the 0-10 foot bgs "direct contact" zone of the proposed HHRA will not be impacted by the change. Estimation of potential source quantities for leaching constituents from soils between 10 feet bgs and the capillary fringe will involve fewer samples and will require that Tronox use a "conservative" approach in preparing such estimates.

### **3.0 Rationale for Organochlorine Pesticide Sampling Program**

#### **3.1 Soil Sampling for OCPs**

There are a limited number of locations on Tronox property where Organochlorine pesticides (OCPs) or liquid wastes potentially containing OCPs were produced, stored, conveyed, or potentially disposed. It is proposed that judgmental borings (i.e., boring numbers prefaced with "SA . . .") will be drilled at specific locations and analyzed for OCPs in these areas of the Site. In addition, soils at selected locations along the western boundary of the Tronox Site will be analyzed since OCPs are present in off-Site soil to the west of the Site as a result of historic OCP production by other BMI companies. Judgmental boring locations were selected to provide general areal coverage in the western portion of the Site. At those judgmental boring locations where OCPs (and potential related wastes) were not generated, stored, conveyed, or disposed of, OCP sampling is not proposed. All random grid samples will be analyzed for OCPs.

Other than the former Hardesty Chemical site (LOU 4), which may have produced Dichloro-Diphenyl-Trichloroethane (DDT) and its degradation products on the Tronox



Site, Tronox knows of no other on-Site pesticide production area. Locations at the Site where OCPs could have been released to the environment include:

- LOU 4 (former Hardesty Chemical Co.) located north of Unit 2. OCPs may be present at this location, as DDT may have been produced and stored here in the 1940s. Soil from borings in LOU 4 will be analyzed for OCPs.
- LOU 60 (Acid Drain System). Liquid effluent potentially containing DDT from LOU 4 could have been conveyed along LOU 60 pipelines. Soil from borings along specific segments of LOU 60 pipelines that carried effluent from off-site sources to the west will also be analyzed for OCPs. Borings located along the LOU 60 conveyance route, specifically from Unit 2 to LOU 1 (the former Trade Effluent Ponds) where effluent was discharged, will also be analyzed for OCPs.
- LOU 1 (former Trade Effluent Ponds). In the 1940s, effluent from the Acid Drain System was discharged into the Trade Effluent Ponds. Soil from select judgmental borings within LOU 1 will be analyzed for OCPs.
- LOU 59 (Storm Sewer System). Surface water that potentially contained OCPs could have entered LOU 59 through storm-water run-off. Soil from borings along segments of LOU 59 that carried effluent from off-site sources west of the Site will be analyzed for OCPs. Additional borings located along the LOU 59 conveyance route specifically from Unit 2 to LOU 5 (Beta Ditch), which was (and still is) the receptor for discharges from LOU 59 will also be analyzed for OCPs.
- LOU 5 (Beta Ditch). LOU 5 was the receptor for discharges from LOU 59. Moreover, effluent discharged into the segment of Beta Ditch west of the Site would have flowed eastward (via surface flow) along Beta Ditch and onto the Tronox property.

**Figure 1** shows the locations and proposed sampling depths for OCPs. In the areas where a hydrostatic head could have provided a potential transport mechanism for OCPs into the underlying soil column (marked by blue dots on Figure 1), samples collected from depths of 0.5-foot, 10 feet and the capillary fringe will be analyzed for OCPs. Where there is not a hydrostatic head driver (see red dots on Figure 1), samples from 0.5 foot and the capillary fringe will be analyzed for OCPs to evaluate whether wind-blown soils or OCPs migrating with groundwater are being sorbed onto soils. Samples will also be collected from the remaining boring depths (shown on the SAP

Tables with the notation "Hold"). These samples will be held for later analysis if OCPs are detected in samples from that same boring which are being analyzed. Tronox understands that the hold time (14 days for extraction) for these "Hold" samples may be exceeded if the samples are subsequently analyzed after results from the first samples are reported; therefore, OCP analyses of the "Hold" samples may be coded (J-flagged) to indicate that values are estimated. Since these analyses will likely be utilized for developing a groundwater source term rather than a direct contact pathway, the J-flagged data should be adequate.

As noted above, soils from all proposed random borings (i.e., boring numbers prefaced with "RSA . . .") will be analyzed for OCPs for general site-wide coverage. For the random borings, soil samples collected from 0.5 foot and the capillary fringe will be analyzed for OCPs. Intermediate samples in these borings will be placed on "hold" pending OCP results from the 0.5-foot and capillary fringe samples for those same borings.

### **3.2 Groundwater Sampling for OCPs**

There are no proposed changes to the groundwater sampling program for OCPs that has been previously proposed in the Area work plans submitted to NDEP. All groundwater well samples in the Phase B Site Investigation will be analyzed for OCPs. Table 3 for each Area and **Figure 3** show the proposed Phase B groundwater well locations to be sampled of OCPs.

### **4.0 Rationale for Organophosphorus Pesticides and Organic Acids Sampling Program**

The Tronox Site is not known to have supported production of organophosphorus pesticides (OPPs) or organic acids (OAs). The only pesticides thought to have been produced on Site are associated with the former Hardesty Chemical site (LOU 4), where OCPs (e.g., DDT) may have been produced (though production records are not available for the operation). Possible migration of OPPs and OAs from sources off-site to the west of the Site prompted NDEP, in its July 21, 2008 letter, to request sampling for

OPPs and OAs in soil borings and groundwater samples throughout the Tronox site. Tronox proposes to demonstrate from the CSM, that a reduced number of samples is adequate to characterize migration of OPPs and OAs onto the Site.

#### 4.1 Soil Sampling for OPPs and OAs

Tronox proposes to collect soil samples for OPP and OA analyses from areas along the western portion of the Site (Area I) and from specific locations in Areas II, III, and VI where LOU 5 (Beta Ditch), and segments of LOU 59 (Storm Sewer System) and LOU 60 (Acid Drain System) may have carried OPP and OA constituents onto Tronox property from offsite sources to the west. Two borings are also proposed in the former Hardesty Chemical LOU to confirm the absence of OPPs and OAs. The proposed boring locations are shown on **Figure 2**.

NDEP requested OPP and OA analyses in soil borings and groundwater samples in and downstream of LOU 5 (Beta Ditch), LOU 59 (Storm Drain System), and LOU 60 (Acid Drain System). These LOUs are discussed below:

- LOU 5 (Beta Ditch) – Waste discharges being conveyed to the upper BMI ponds from the various BMI complex companies operating to the west of the Tronox Site flowed across the Site in the Beta Ditch. Some of these flows may have contained OPPs and OAs and therefore some infiltration of these contaminants into soils below the unlined Beta Ditch is possible. Tronox proposes to sample soils along the path of the Beta Ditch for OPPs and OAs.
- LOU 59 (Storm Sewer System) – As shown on **Figure 2**, the gravity flow Storm Drain System picked up water from the area west of the Site and carried it north, then moved east to 6<sup>th</sup> Street and finally north to the Beta Ditch. Since the drain lines slope to the north, it is highly unlikely that effluent would flow in directions opposite the flow arrows shown on the Figure. Accordingly, Storm Drain locations east of 6<sup>th</sup> Street (between Units 1 and 2) are not likely to carry constituents from the west. Tronox proposes to sample soils below the LOU 59 pipeline segments that carried off-site process waste from the west.
- LOU 60 (Acid Drain System) – The same argument presented above for LOU 59 applies to LOU 60 and similar sampling for OPPs and OAs is proposed. Entry of OPPs and OAs from west of the Site into the Acid Drain System would be limited to the line running from the southern end of the Site (Grid T-3) northward along 5<sup>th</sup> Street. That line then joins the other acid drain piping at Unit 1, running

eastward along Avenue G towards 9<sup>th</sup> Street, then north to the conveyance leading to the former Trade Effluent Ponds.

Based on information provided to Tronox by NDEP (Figure 2-2 of Revision 1.0 Conceptual Site Model, Former Montrose and Stauffer Facilities and Downgradient Areas to Las Vegas Wash, Henderson, Clark County, Nevada, Replacement Pages dated July 25, 2008), the only direct connections for the transfer of liquids potentially containing OPPs and OAs from the west are through the segment of LOU 60 that enters the Tronox Site at Grid O-2 and through off-site flow from the west onto the Tronox portion of the Beta Ditch. Accordingly, Tronox proposes to sample for OPPs and OAs in the specified segment of LOU 60.

- LOU 1 (Former Trade Effluent Ponds) – In the 1940s, effluent from the Acid Drain System was discharged into the Trade Effluent Ponds. If OPPs and OAs from sources to the west used the Acid Drain System to dispose of process waste then the possibility exists that LOU 1 may have been impacted. Tronox proposes to sample for OPPs and OAs at select borings within LOU 1.
- Along Western Property Line - Surface and capillary fringe sampling along the western edge of the Site in Areas I and IV will be conducted to assess migration of OPPs and OAs from the west.
- While the Hardesty Chemical operation (LOU 4) is not known to have produced OPPs or OAs, two borings in LOU 4 will be sampled for OPPs and OAs to confirm the CSM information.
- Additional locations outside of the areas discussed above will be analyzed for OPPs and OAs. These locations, shown on **Figure 2**, were selected based on wind rose patterns for the area and will provide general coverage across the Site to evaluate the potential transport of these constituents by wind and groundwater.

At locations marked with red dots on Figure 2, soil samples will be collected from depths of 0.5-foot bgs and the capillary fringe. These samples will be analyzed for OPPs and OAs to assess potential impacts related to wind-blown dust and to evaluate whether constituents migrating with groundwater are being sorbed onto soils. At locations marked with blue dots, soil samples from a depth of 10 feet bgs will also be analyzed for OPPs and OAs because at these locations, a hydrostatic head could have existed that provided a potential transport mechanism for OCPs into the underlying soil column.

## 4.2 Groundwater Sampling for OPPs and OAs

OPPs and OAs produced from the various BMI complex companies operating west of the Tronox Site could potentially be carried beneath the Tronox site via groundwater migration from the west to the north-northeast. Tronox proposes to sample groundwater for OPPs and OAs along the path of groundwater migration from the west and downgradient of the Beta Ditch. Groundwater in the alluvium along the west side of the Site is effectively separated from groundwater on the eastern portion of the Site, by a Muddy Creek "high". Where alluvial wells are not dry, Tronox proposes to sample groundwater in the alluvium along the western edge of the site. Groundwater in the upper portion of the Muddy Creek formation will also be sampled.

Groundwater samples for OPPs and OAs will be collected from monitoring well locations shown on **Figure 3**. The wells were selected to provide general coverage to evaluate potential migration of OPPs and OAs onto Tronox from offsite sources to the west.

## 5.0 Rationale for Polychlorinated Biphenyl Sampling Program

Tronox has and continues to operate electrolytic cells on the Henderson Site. NDEP has questioned whether the Tronox electrolytic cells could generate poly-chlorinated biphenyl (PCB) compounds and has requested that Tronox analyze soil samples for both Aroclor PCBs and congener PCBs using EPA analytical methods 8082 and 1668A, respectively.

Aroclor PCBs are typically associated with electric transformers; these types of transformers have been used at the Site and a spill of PCB-containing transformer oil has been reported. Tronox proposes to utilize EPA method 8082 for analyzing Aroclor PCBs in such areas.

Tronox maintains that the electrolytic cells utilized at the Site do not generate PCB congeners. Tronox proposes that the use of EPA analytical method 1668A be limited to samples from the west side of the Site, where NDEP indicates that PCB congeners generated off-site may be entering Tronox property.

Tronox and its predecessors have operated several types of electrolytic cells on the Site since the 1940's. These include:

- Sodium chlorate cells converting NaCl to NaClO<sub>3</sub>
- Sodium perchlorate cells converting NaClO<sub>3</sub> to NaClO<sub>4</sub>, and
- Manganese cells plating MnO<sub>2</sub> from manganese sulfate solutions.

Currently, the manganese dioxide cells in Units 5 and 6 (LOU 44) are the only electrolytic cells in operation at the Site. They operate using a sulfate based anolyte and thus do not generate chlorine needed to form PCBs.

While both the historic sodium chlorate and sodium perchlorate cells generated free chlorine (a degradation product of sodium hypochlorite, an intermediate compound in the electrolytic operation), neither process utilized organic compounds that could produce benzene ring structures which could then be chlorinated to PCBs. Moreover, PCB congeners typically form at temperatures ranging from 400 to 700 degrees Celsius. Tronox electrolytic production processes (both historic and current) operate at temperatures well below the boiling point of water. Thus, it is highly unlikely that Tronox's manufacturing processes would have yielded PCB congeners as byproducts.

Geosyntec Consultants's conceptual site model (CSM) indicates that the Montrose Chemical Company's closed pond areas (CPAs) have site-related chemicals (SRCs) such as chloroform, chlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene and benzene that have affected both the soil and groundwater beneath and around the CPAs (Geosyntec, Sec 4.2.3). Montrose's SRCs are either organic hydrocarbons or chlorinated hydrocarbons, all of which are possible precursors to PCB byproduct synthesis. In the event that PCBs have been generated off-site through byproduct synthesis and not direct synthesis, EPA method 8082 for commercial mixtures of Aroclor PCBs is unlikely to be effective. EPA method 1668A for PCB congeners will be therefore be utilized at locations along the Tronox western boundary.

## **5.1 Soil Sampling for PCBs**

Based on the discussion above, the following areas will be sampled for PCBs:

- Soil borings along the western property boundary where possible PCB congeners generated off-site may enter Tronox property.
- LOU 5 – Beta Ditch will be tested since off-site wastes flowed across the Tronox Site in the unlined ditch.
- LOU 27 – PCB Storage Area,
- LOU 35 – former Truck Emptying/Dumping Area (PCBs were detected in Phase A samples),
- LOU 40 – PCB Transformer Spill will be sampled for PCBs, and
- Per NDEP's request, soil borings located near the WAPA site.

Figure 4 shows the PCB soil sampling locations. Borings identified with a red dot on Figure 4 will be analyzed by EPA method 8082 for Arochlors. Borings identified with a blue dot will be analyzed using both EPA method 8082 and EPA method 1668A for PCB congeners.

NDEP previously requested specific borings be sampled for PCBs. Some of these borings, however, have already been drilled as part of the Area I Phase B source area investigation and were found to contain negligible PCB concentrations (see Table 1). Other NDEP proposed borings were found to be in areas associated with Tronox electrolytic cells not associated with PCBs (as discussed above). Since no significant concentrations of PCB congeners have been identified over a large area of the Site, Tronox proposes that the following borings requested by NDEP not be sampled for PCB Arochlors or congeners: SA35, SA70, SA175, SA155, SA107, SA158, SA62, SA145, SA61, SA144, SA71, RSAM8, RSAN7, SA151, SA208, SA31, SA122, SA34, SA177, SA68, SA59, and RSAT6.

As with OCP, OPP and OA sampling, Tronox proposes to sample at depths of 0.5 feet bgs and the capillary fringe at locations where a hydrostatic head is not likely to have facilitated downward migration of constituents through the soil column. At locations with a potential for hydraulic head such as the Beta Ditch, an additional sample at 10 feet bgs will be collected.

Soil samples in LOU 64 (former Koch Materials Company Area) and other locations marked with blue diamonds on **Figure 4** were collected as part of the Area I Phase B investigation (June-July 2008). Those samples were analyzed for both Arochlors and PCB congeners (see Table 1).

## **5.2 Groundwater Sampling for PCBs**

Groundwater samples will be analyzed for both Arochlor and congener PCBs at two locations (M-123 and M-125) associated with LOU 35 (former Truck Emptying/Dumping Area). (Arochlor PCBs were detected in soil and groundwater from LOU 35 during Phase A investigation). One location (M-123) has already been sampled as part of the Area I Phase B investigation.

To determine whether PCBs are moving onto the Tronox Site in groundwater from the west, samples from the following wells will be tested using both EPA methods 8082 and 1668A: M-7B, M-5A, M-127, M-125, and M-123.

## **6.0 Modification to Area III Soil Boring Program Where Closure is Not Being Sought (Removal of Justified Boring Locations)**

In the original Phase B Area III SAP submission, Tronox proposed both random (4-acre grid) and judgmental sampling of several LOUs not being proposed for closure due to ongoing plant operations. Tronox now proposes to simplify the Phase B sampling by limiting sampling in areas not proposed for closure to random samples only. In areas of the Site that will remain as active production areas for the foreseeable future (i.e., the Manganese Leach Plant Area, and Units 5 and 6), judgmental boring locations have been removed from the Area III Soil SAP. The randomly-located borings in these areas will be drilled and these borings remain on Table 2 (Soil Sampling and Analytical Plan) for Area III as discussed with NDEP (October 1, 2008).

The borings initially proposed in the Area III Work Plan that will not be drilled include the following: SA140, SA159, SA78, SA38, SA37, SA174, SA36, SA177, SA34, and SA132.

## **7.0 Removal of Duplicate Entries on Area Sampling Tables**

In the original Area SAPs submitted to NDEP, several borings and wells were listed in sampling Tables for more than one Area. This was done because the wells/borings were organized according to their listings in the individual LOU Data Packages. For example, in some cases, a well may be downgradient of an LOU in Area II and the same



well may be upgradient of an LOU in Area I. To simplify review of this submission, Tronox has removed the duplicate entries and shows the borings and groundwater wells only in the Area in which they are physically located. The color coded **Table 2** and **Table 3** for each Area identifies duplicate listings for borings/wells that have been removed by a brown background and an explanation in the Rationale column.

For Phase B investigation wells located outside of Area boundaries or off-site, the wells are shown on Table 3 for the Area work plans indicated below:

- Wells located in the north, west, and east of Area I are listed in Table 3 of Area I.
- Wells located off-site and east of Area III are listed in Table 3 of Area III.
- Wells locate on Tronox Parcels F, G, and H area listed in Table 3 of Area IV.

To assist reviewers, should a question arise on which Area includes a specific well or boring, two tables have been provided. **Table X** and **Table Y** show alphabetical lists of groundwater wells and borings, respectively, along with corresponding Site grid coordinates and the Area SAP in which the well/boring is located.

## **8.0 Data Validation**

To increase efficiencies in the data validation process, Tronox proposes to use Laboratory Data Corporation (LDC) to validate laboratory sample results. ENSR will coordinate the flow of data from the laboratories to LDC and will work with LDC to streamline the Tronox validation process.

## **Appendix A Phase B Source Area Investigation Work Plans – Submittal History and NDEP Response Chronology**

This Appendix provides a short summary of the four Phase B Site Investigation Area Work Plan submittals to NDEP, NDEP comments to those submittals and subsequent teleconferences between NDEP and Tronox. Following the summary, copies of full NDEP comment letters and teleconference minutes are attached.

To investigate the approximately 70 source areas and their potential affect on soil and groundwater conditions, the Tronox facility (Site) has been subdivided into four "Areas" (Area I, II, III, and IV; see Plate A of attached report). Work plans for each of the four Areas were submitted to NDEP between April and June 2008. NDEP reviewed and issued comments for each of the Work Plans, and a series of conference calls were held

between NDEP and Tronox to discuss Tronox responses to the comments. For each of the Area work plans, NDEP provided conditional approval provided that NDEP's concerns were addressed prior to commencement of field activities.

Date	Event	Document	Author
April 3, 2008	Tronox submits Phase B Area I Work Plan to NDEP	Phase B Source Area Investigation Work Plan, Area I (Northern LOUs), Tronox LLC Facility, Henderson, Nevada	Tronox
May 6, 2008	NDEP issues comments on Area I Work Plan to Tronox	Nevada Division of Environmental Protection (NDEP) Response to: <i>Phase B Source Area Investigation Work Plan, Area I (Northern LOUs), Tronox LLC Facility, Henderson, Nevada</i>	NDEP
May 8, 2008	NDEP and Tronox meet via conference call to discuss Tronox responses to NDEP comments on Area I Work Plan.	Meeting Minutes Regarding Future Phase B submittals and NDEP's comments to the <i>Phase B Source Area Investigation Work Plan, Area I (Northern LOUs), Tronox LLC Facility, Henderson, Nevada</i>	NDEP (Meeting minutes are in-lieu of Tronox RTCs.)
May 16, 2008	Tronox submits Phase B Area IV Work Plan to NDEP	Phase B Source Area Investigation Work Plan, Area IV (Western and Southern LOUs), Tronox LLC Facility, Henderson, Nevada	Tronox
May 30, 2008	Tronox submits to NDEP the following components of the Area I Work Plan that have been revised per requests from NDEP (May 8, 2008):  Plate A Table 2 (Soil SAP) Table 3 (GW SAP)	Additional Documents for Phase B Area I Work Plan, Tronox LLC, Henderson, Nevada	Tronox.

Date	Event	Document	Author
June 18, 2008	NDEP issues comments on Area IV Work Plan to Tronox.	Nevada Division of Environmental Protection (NDEP) Response to: <i>Phase B Source Area Investigation Work Plan, Area IV (Western and Southern LOUs), Tronox LLC Facility, Henderson, Nevada</i>	NDEP
June 23, 2008	NDEP and Tronox meet via conference call to discuss future Phase B submittals and Tronox responses to NDEP comments on Area IV Work Plan.	Meeting Minutes Regarding Future Phase B submittals and NDEP's comments to the <i>Phase B Source Area Investigation Work Plan, Area IV (Western and Southern LOUs), Tronox LLC Facility, Henderson, Nevada</i>	NDEP (Meeting minutes are in-lieu of Tronox RTCs.)
July 11, 2008	Tronox submits to NDEP the following components of the Area IV Work Plan that have been revised per requests from NDEP (June 23, 2008):  Plate A Table 2 (Soil SAP) Table 3 (GW SAP)	Revised Documents for Phase B Area IV Work Plan, Tronox LLC, Henderson, Nevada	Tronox
June 27, 2008	Tronox submits Phase B Area II Work Plan to NDEP	Phase B Source Area Investigation Work Plan, Area II (Central LOUs), Tronox LLC Facility, Henderson, Nevada	Tronox
June 27, 2008	Tronox submits Phase B Area III Work Plan to NDEP	Phase B Source Area Investigation Work Plan, Area III (Eastern LOUs), Tronox LLC Facility, Henderson, Nevada	Tronox

Date	Event	Document	Author
July 21, 2008	<p>NDEP issues comments on Area II Work Plan to Tronox.</p> <p>NDEP requests the following:</p> <ul style="list-style-type: none"> <li>• SVOCs, PCBs, TPH-ORO/DRO/GRO, OPPs, and cyanide be added to the sampling plan for select borings,</li> <li>• select boring locations be moved,</li> <li>• select boreholes should be converted to groundwater wells,</li> <li>• new soil borings should be added to select locations.</li> </ul>	<p>Nevada Division of Environmental Protection (NDEP) Response to: <i>Phase B Source Area Investigation Work Plan Area II (Central LOUs). Tronox LLC Facility, Henderson, Nevada, Dated June 27, 2008</i></p>	NDEP
July 21, 2008	<p>NDEP issues comments on Area III Work Plan to Tronox.</p> <p>NDEP requests the following:</p> <ul style="list-style-type: none"> <li>• SVOCs, PCBs, TPH-ORO/DRO/GRO, OPPs, and cyanide be added to the sampling plan for select borings,</li> <li>• select boring locations be moved,</li> <li>• select boreholes should be converted to groundwater wells,</li> <li>• new soil borings should be added to select locations</li> </ul>	<p>Nevada Division of Environmental Protection (NDEP) Response to: <i>Phase B Source Area Investigation Work Plan Area III (Eastern LOUs). Tronox LLC Facility, Henderson, Nevada, Dated June 27, 2008</i></p>	NDEP

Date	Event	Document	Author
July 21, 2008	<p>NDEP issues general comments that apply to the Work Plans for Areas I, II, III, and IV to Tronox.</p> <p>NDEP requests that PCBs, TPH-ORO/DRO, OPPs, and cyanide be added to the sampling plan for select borings.</p>	<p>Nevada Division of Environmental Protection (NDEP) Response to:</p> <ul style="list-style-type: none"> <li>- <i>Phase B Source Area Investigation Work Plan, Area I (Northern LOUs), Tronox LLC Facility, Henderson, Nevada, Dated April 3, 2008</i></li> <li>- <i>Phase B Source Area Investigation Work Plan Area IV (Western and Southern LOUs). Tronox LLC Facility, Henderson, Nevada, Dated May 16, 2008</i></li> <li>- <i>Phase B Source Area Investigation Work Plan Area II (Central LOUs). Tronox LLC Facility, Henderson, Nevada, Dated June 27, 2008</i></li> <li>- <i>Phase B Source Area Investigation Work Plan Area III (Eastern LOUs). Tronox LLC Facility, Henderson, Nevada, Dated June 27, 2008</i></li> </ul>	NDEP
August 11, 2008	NDEP and Tronox meet via conference call to discuss Tronox responses to NDEP comments issued on July 21, 2008.	Meeting Minutes of TRX's response to comments to three NDEP letters dated July 21, 2008: 1) Re: Phase B SAPs Areas I through IV general soil sampling comments; 2) Re: Phase B Source Area Investigation Work Plan (SAP) Area II, and 3) Re: Phase B SAP Area III.	NDEP (Meeting minutes are in-lieu of Tronox RTCs.)

Date	Event	Document	Author
September 8, 2008	<p>NDEP and Tronox meet via conference call to discuss changes to Tronox responses to NDEP comments.</p> <p>Topics discussed:</p> <ul style="list-style-type: none"> <li>• reducing the number of PCB congener analysis and organic acid analysis,</li> <li>• use of Geoprobe™ for drilling,</li> <li>• increasing the interval between sample depths within each soil boring,</li> <li>• reducing the number of proposed borings in the active production areas in Area III, and</li> <li>• data validation.</li> </ul>	Meeting Minutes on discussion of changes to Tronox's Response to Comments for the Phase B sampling.	NDEP
October 1, 2008	NDEP and Tronox meet via conference call to discuss Tronox's proposed justification for sampling design optimization	Meeting Minutes on discussion of Tronox's proposed justification for sampling design optimization for the Phase B Site Investigation for Areas I, II, III, and IV.	NDEP

**Copies of NDEP Area Work Plan Comments and Teleconference Minutes**

**APPENDIX B**

**Redline Revision of BMI SOP for Human Health Risk Assessment**

**(To be submitted on or before December 19, 2008)**



APPENDIX C

DRAFT Geoprobe™ SOP

(Submitted by BMI to NDEP for inclusion in their SOP package.)

## Shannon Harbour

---

**From:** Crowley, Susan [Contractor] [Susan.Crowley@tronox.com]  
**Sent:** Thursday, November 06, 2008 12:54 PM  
**To:** Shannon Harbour; Brian Rakvica  
**Cc:** Keith Bailey; Flack, Mike  
**Subject:** Contact Information for Susan Crowley

Shannon and Brian,  
I recently forwarded updated contact information to you, and apologize that this has caused a bit of confusion re the Tronox contact. Please accept one more update and I promise this will be good for the foreseeable future.

I remain the Tronox contact for the perchlorate, ECA and parcel sales work. My Tronox contact information stays the same as it was for many years:

Mailing:  
Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, NV 89009  
Phone: 702-651-2234  
Cell: 702-592-7727  
Fax: 405-302-4607  
e-mail: [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com) and [smcrowley@cox.net](mailto:smcrowley@cox.net)

Street address: (for Fed Ex and UPS)  
Susan Crowley  
Tronox LLC  
8000 West Lake Mead Pkwy  
Henderson, NV 89015

I am hopeful that correspondence can be also CC'd to both:

Mike Skromyda  
Tronox LLC  
PO Box 55  
Henderson, NV 89009

Crowley Environmental LLC  
366 Esquina Dr  
Henderson, NV 89014

Please call if you have any questions at all.

**TRONOX LLC**  
Susan Crowley (Contractor)  
PO Box 55  
Henderson, NV 89009

11/6/2008

office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

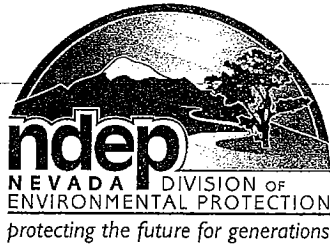
*It's the set of our sails, not the force of the gales, that determines the way we go.*

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Thank you.



# STATE OF NEVADA

Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

November 4, 2008

Mike Skromyda  
Tronox LLC  
PO Box 55  
Henderson, NV 89009

Re: **Tronox LLC (TRX)**

**NDEP Facility ID #H-000539**

Nevada Division of Environmental Protection (NDEP) Response to:  
*Data Validation Summary Report (DVSR), Tronox Parcels C, D, F, G, and H  
Supplemental Investigations – June-July 2008, BMI Industrial Complex, Clark County,  
Nevada*

Dated October 24, 2008

Dear Mr. Skromyda,

The NDEP has received and reviewed TRX's above-identified DVSR and provides comments in Attachment A. A revised DVSR should be submitted based on the comments found in Attachment A. Please advise the NDEP **by November 10, 2008** regarding the schedule for this resubmittal. TRX should additionally provide an annotated response-to-comments letter as part of the revised submittal

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Susan Crowley, Crowley Environmental LLC, 366 Esquina Dr, Henderson NV 89014  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
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Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Paul Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544

**Attachment A**

1. Mercury Censoring, Table 2-4 and Section 2.1.3.3: Table 2-4 contains two records where the mercury concentration was qualified due to laboratory blank contamination resulting in censoring of the detected values. The records are for samples TSB-CJ-09-10 (F8F130140008, also identified as KPWW1 in the laboratory reports) and TSB-GJ-08-10 (F8F120167001, also identified at KPRW1 in the laboratory report). Sample TSB-CJ-09-10 was analyzed with a mercury concentration of 21.2 µg/kg (instrument concentration 0.116) and sample TSB-GJ-08-10 with a mercury concentration of 19.1 µg /kg (instrument concentration 0.107); both values are less than the QL but above the MDL. Table 2-4 also indicates the blank concentration associated with the samples was 0.1 µg /L. Review of the method blanks associated with this batch shows they had instrument concentrations at 0.005, 0.08, 0.017, and 0.009. However, the two CCBs that bracket sample TSB-CJ-09-10 were less than one-fifth the value of the sample, 0.017 versus 0.116. Even when instrument concentrations (before adjustment due to sample matrix and amount extracted) are compared, this sample contains mercury at a concentration greater than five times the blanks. It is unclear why these records were qualified based on the method blank contamination. These results should be re-evaluated and revised as appropriate.
2. Radium-226 Qualification due to Blank Contamination: in SDG 210228 several records for Ra-226 were qualified with reason code 3, due to laboratory blank contamination. However, review of the laboratory results indicates the contamination was in the rinsate (field blank) indicating the reason code should be 13. The final qualifiers appear to be correct but the reason codes used should be investigated and the database revised accordingly.
3. Table 1-4: this table should include Reason Code 0 (zero).

**Shannon Harbour**

---

**From:** Crowley, Susan [Contractor] [Susan.Crowley@tronox.com]**Sent:** Tuesday, November 04, 2008 3:48 PM**To:** Shannon Harbour**Subject:** RE: Parcels Supplemental Work DVSR

Shannon,

Thanks for the attached. While we do want Mike Skromyda to have a copy (he's located in the office next to mine) – he's not the actual addressee, I should be. ENSR miss-stepped when they stated that Mike was the Tronox contact, if they've indicated this. I'm still the project lead for the sales work as well as the ECA and perchlorate projects. We do want Mike to have a copy to keep in Henderson files (in case I use mine away from the office), but he's not associated with the projects. No need to re-issue any past docs – he's just next door for me to retrieve the original – just a heads up.

If it would be easier to make this the case – you can use my original address (Tronox's - below) as the address you send my documents to, rather than the 366 Esquina Dr address. I'll get them at either location. Call if you have any question at all?

**TRONOX LLC**

Susan Crowley (Contractor)

PO Box 55

Henderson, NV 89009

office 702.651.2234

cell 702.592.7727 or 701.339.8620

efax 405.302.4607

email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com) or [smcrowley@cox.net](mailto:smcrowley@cox.net)

*It's the set of our sails, not the force of the gales, that determines the way we go.*

---

**From:** Shannon Harbour [mailto:sharbour@ndep.nv.gov]**Sent:** Tuesday, November 04, 2008 3:20 PM**To:** Crowley, Susan [Contractor]; Susan Crowley; Keith Bailey**Cc:** Skromyda, Michael; Brian Rakvica; Brian Giroux**Subject:** Parcels Supplemental Work DVSR

Susan and Keith,

Attached is NDEP's response to the DVSR for the Supplemental Sampling at Parcels C, D, F, G, and H. Hard copies will follow via US Mail.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230*

11/5/2008

*Las Vegas, NV 89119*  
*702-486-2850 x 240 (work)*  
*702-486-5733 (fax)*

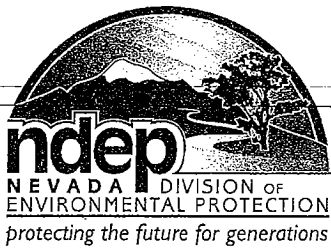
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STATE OF NEVADA  
Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Kenny C. Guinn, Governor  
Allen-Biaggi, Director  
Leo M. Drozdoff, P.E., Administrator

November 4, 2008

Mike Skromyda  
Tronox LLC  
PO Box 55  
Henderson, NV 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Response to NDEP Comments Vertical Delineation of Contaminant Plumes and  
Hydraulic Gradients*  
Dated September 2008 (received September 26, 2008)

Dear Mr. Skromyda,

The NDEP has received and reviewed TRX's report identified above and provides comments in Attachment A. No response is necessary, however, these comments should be considered in the development of future Deliverables. Please advise the NDEP as soon as possible regarding the schedule for the implementation of the proposed scope of work.

Please contact the undersigned with any questions at [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov) or (702) 486-2850 extension 247.

Sincerely,

Brian A. Rakvica, P.E.  
Supervisor  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

BAR:sh:s



CC: Jim Najima, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Susan Crowley, Crowley Environmental LLC, 366 Esquina Dr, Henderson NV 89014  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509

### Attachment A

1. General comment, groundwater density appears to be calculated by various methods by the various BMI Companies (BMI, Tronox, TIMET and the Pioneer-Olin-Stauffer-Syngenta-Montrose group). In performing these spot checks the NDEP used the online calculator found at <http://www.csgnetwork.com/h2odenscalc.html>. For example, TIMET used an online calculator found at <http://www.earthwardconsulting.com/density>. To facilitate comparability of results the NDEP recommends that all the BMI Companies standardize upon a single method, namely the method used at the online calculator found at <http://www.earthwardconsulting.com/density>. That website lists a reference for its implementation (in the spreadsheet linked at the bottom of the page) as *Handbook of Hydrology, 1993, David R. Maidment*.
2. General comment, there appears to be some disparity in groundwater temperature measurement that may or may not be related to sampling methodology by the BMI Companies. TRX did not present water temperatures and this issue needs clarification. Also, please clarify the sampling methods used.
3. Table 1, it is noted that the NDEP spot check for wells M-74, M-133, and M-132 for Spring 2008 provided comparable results.
4. Table 2, the NDEP has the following comments:
  - a. The Spring 2008 data set was evaluated for all TR-Series wells; the data appear acceptable for the Standard Methods quality checks.
  - b. Note regarding the Comments column; the NDEP does not approve the use of either anion or cation data from an earlier or later sample to compute the cation-anion balance.
5. Figure 1, NDEP notes that the spacing between wells TR-12 and H-58A is not appropriate for vertical gradient calculations. Based upon data reviewed in the region, it is expected that wells should generally be no further than 50' apart.
6. Plate 1, due to the large distances between the projected wells and the wells used to develop this cross-section, it is noted that the geologic interpretation is not likely to be meaningful. It is requested that the cross-section be redrawn once the new wells are installed.

#### **References Cited**

American Public Health Association, American Water Works Association, and Water Environment, 1995. Standard Methods for the Examination of Water and Wastewater, Section 1030 E for Correctness of Analyses. 19<sup>th</sup> Edition.

Oct

## Shannon Harbour

---

**From:** Shannon Harbour  
**Sent:** Thursday, October 23, 2008 10:06 AM  
**To:** 'Keith Bailey'; smcrowley@cox.net  
**Cc:** 'Stater, Rick'; 'Flack, Mike'; 'Skromyda, Michael'; Brian Rakvica; 'Paul S. Hackenberry, Jr.'; Jim Najima  
**Subject:** RE: Tronox contact information and meeting minutes comments  
**Attachments:** 081020\_NDEP-TRX\_conf\_call\_gw\_capture\_rtc\_email.doc

Keith and Susan,

Attached is the final version of the NDEP-TRX October 20, 2008 conference call.

Also in reference to our discussions on October 20th, please note that the NDEP is also looking for a three-point gradient solution at each end of the barrier wall which will indicate the direction of flow at these two points and using hydraulic conductivity data the estimated flow. The NDEP has indicated this in previous reviews and we need to not lose sight of this.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
NDEP BCA-Las Vegas Office*

---

**From:** Keith Bailey [mailto:okbailey@flash.net]  
**Sent:** Wednesday, October 22, 2008 12:34 PM  
**To:** Shannon Harbour; 'Flack, Mike'; smcrowley@cox.net; 'Skromyda, Michael'  
**Cc:** 'Stater, Rick'  
**Subject:** Tronox contact information and meeting minutes comments

Shannon,

Attached is a red-line comment version of your draft meeting minutes from our Capture Plan conference call last Monday. Please give me a call at (405) 216-9213 if you have any questions regarding the comments.

I spoke with Rick Stater, the Tronox Henderson plant manager. With the retirement of Susan Crowley, Michael (Mike) Skromyda ("Skro-me-da") will become the emergency contact for the Tronox facility. His phone number is (702) 651-2228. His mailing address is the same as the one you have been using for Susan Crowley. Please add Mike Skromyda to your distribution list for the same documents as have been sent to Susan.

Susan Crowley and I will continue to handle the Tronox perchlorate, chromium and ECA issues as contractors. Mike will handle issues related to the ongoing plant operations. Susan's contact information is as follows:

Susan Crowley  
Crowley Environmental LLC  
366 Esquina Dr.  
Henderson, NV 89014

10/23/2008

Phone: 702443547479

Cell: 70233968620

Please continue to include her on the same distribution lists that she has been receiving, but using the new address.

Thanks for your help.

Keith

10/23/2008

## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 1:30 PM, Monday, October 20, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Hackenberry Assoc. – Paul Hackenberry (for NDEP)  
Environmental Answers – Keith Bailey (for TRX)  
ENSR – Mike Flack (for TRX)

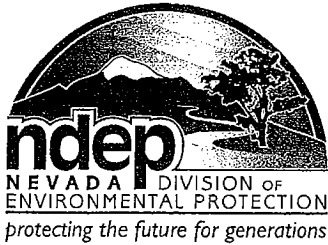
CC: Jim Najima

1. The meeting was held to discuss TRX response-to-comments (RTC) e-mail dated October 14, 2008 in response to NDEP's October 6, 2008 Annual Remedial Performance Report response letter.
  2. NDEP's October 6, 2008 letter requested TRX's response to specific comment by October 13, 2008. A complete annotated RTC letter will be included in the next Annual Remedial Performance Report.
  3. Keith Bailey for TRX announced that Susan Crowley has been retired from TRX. Susan is expected to be contracted in a similar fashion as Keith for this project. To date, Susan has not been contracted and was therefore not on this call.
  4. Keith will determine who the point of contact (POC) for TRX will be and notify NDEP.
- ACTION ITEM.**
5. For this call, Keith and Mike Flack represented TRX.
  6. TRX stated that TRX has a new AIG technical liaison, Julie Diebenow (pronounced as "D-ben-oh").
  7. NDEP and TRX discussed the following comments from TRX's October 14, 2008 e-mail response.
    - a. TRX RTC: "In response to these NDEP requests (and for submittal of a revised Groundwater Capture Evaluation as a stand-alone document), Tronox will provide the revised document by **February 27, 2009.**"
      - i. TRX should note that NDEP is approving the submittal date of February 27, 2009 with the understanding that no extensions will be granted.
      - ii. TRX acknowledged NDEP's statement.
    - b. TRX RTC: "Regarding demonstration of barrier integrity (page 2-2, Data Gap No.1) - pumping of wells M-70, M-71, and M-72 was proposed. Tronox is currently working on a power source such that pumping could be performed in these wells. It is anticipated that the power source can be secured and pumping will begin by the end of December 2008."
      - i. NDEP requested clarification/explanation for the delay in **obtaining** electrical power. NDEP also noted that failure to obtain power will **not be considered** as justification for not addressing this data gap in the revised document. This work should be completed in time to include the data in the Revised Groundwater Capture Evaluation by the February 27, 2009 deadline.
      - ii. TRX stated that the current electrical panel located at the groundwater treatment system does not have additional capacity for the operation of the pumps for M-70,

- M-71, and M-72. TRX is looking at options to supply power to these pumps including solar panels since pumping rates are expected to be low.
- c. TRX RTC: “Regarding flow around the western end of the barrier (page 2-4, Data Gap No. 3) - This data gap will be addressed through the installation of two additional borings (M-147 and M-148). The borings will be installed in late November or early December 2008.”
- i. NDEP requested clarification/explanation for the delay in the advancement of these borings especially since the delay results in trying to schedule field work during holiday season. NDEP also noted that failure to schedule and complete this work will not be accepted as justification for not addressing this data gap in the revised document. This work should be completed in order to include the data in the Revised Groundwater Capture Evaluation by the February 27, 2009 deadline.
  - ii. TRX stated that the schedule for advancement of these borings and the completion of the groundwater wells was being delayed to coordinate with the installation of the seep area wells. The seep wells are in turn being delayed by access agreement issues with BRC. TRX is in the process of reviewing and editing the latest version of the access agreement with BRC. TRX stated that BRC version of the access agreement had items concerning the development of the lower pond area including possible relocation of wells as needed for development.
- d. TRX RTC: “Regarding overlapping cones of depression (page 2-4, Data Gap. No 4) - At the present time, Tronox does not intend to shutdown any of the interceptor well field to accommodate additional distance-drawdown testing. Tronox would like to discuss this matter further with NDEP.”
- i. TRX stated that the investigation of overlap in the interceptor wells (south of the barrier) is a somewhat lower priority than the other data gaps and the Phase B Source Area Investigation since the barrier wall serves to block downgradient flow.
  - ii. NDEP stated that a detailed groundwater elevation map would be preferable to a drawdown investigation. NDEP mentioned that a program such as Surfer could be used to draw vectors for groundwater direction analysis.
  - iii. TRX stated that the extraction wells are not operated in steady state but are intermittent and shut off when water levels drop. Any groundwater elevation map will only be a “snapshot in time”. TRX will provide a draft map to the NDEP for comment prior to the inclusion in the final revised groundwater capture document.
- e. TRX RTC: “Regarding demonstration of inward flow (section 2.2.3, page 2-11), reconfiguration of the pumping wells, bringing well ART-6 back online was proposed. The engineering to accomplish this has begun and Tronox anticipates that both ART-6 and ART-9 wells will be online in the later part of December or early January 2008. Significant additional work is required to bring this well back online given the breadth of development that has taken place in the past few years.”
- i. NDEP requested clarification/explanation of this comment.
  - ii. TRX stated that ART-6 has been operated as a “buddy well” to ART-9. This means that only one well is operated as an extraction well at a time, using single power source and flow line back to Lift Station #3 TRX is investigating rewiring or re-designing the power system to the pumps. Additionally, TRX has been delayed by the need to raise the grade of the well completions due to COH construction.



- iii. NDEP stated that failure to complete this work will not be accepted as justification for not addressing this data gap in the revised document. This work should be completed in order to include the data in the Revised Groundwater Capture Evaluation by February 27, 2008.
- f. TRX RTC: “Installation of three wells (PC-138, PC-139 and PC-140) near recovery wells PC-117, PC-118 and PC-133 in the area of the Seep to support the understanding of drawdown in these wells and the delineation of the capture zone. Tronox continues to work to secure an access agreement from BRC for the installation of these wells. The goal is to install these wells within the 4th quarter 2008, pending negotiation of access agreement language.”
  - i. NDEP responded that the installation of these three wells is acceptable.
  - ii. Scheduling delays due to access negotiations were discussed above.
- g. TRX RTC: “In consideration of additional wells as noted in NDEP Comment 8 (l), Section 2.1.2, page 2-5, flow budget, it is suggested that TRX install wells within the Muddy Creek formation to address potential underflow issues and to refine the flow budget. Tronox proposed additional nested "deep" wells in the response to the Vertical Delineation of Contaminant Plumes and Hydraulic Gradients (September 2008). Tronox believes that the installation of these wells should be done before consideration of additional wells in the area of the interceptor well field and barrier.”
  - i. NDEP stated that the well locations proposed in the Vertical Delineation document area are acceptable to advance and install prior to considering additional wells to address this data gap. NDEP also stated that this work should be completed in time to be included in the Revised Groundwater Capture Evaluation by February 27, 2008.
  - ii. NDEP stated that comments to the Vertical Delineation document should be issued by the end of the week.
  - iii. NDEP stated that there has been no resolution to the nomenclature issue.
  - iv. TRX stated concern with using existing nomenclature that may not be acceptable later.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

October 20, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Revised Data Validation Summary Report (DVSR), Phase B Source Area Investigation*  
*Soil Gas Survey – Tronox LLC Facility, Henderson, Nevada*  
Dated October 13, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified DVSR and finds that the document is acceptable.

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

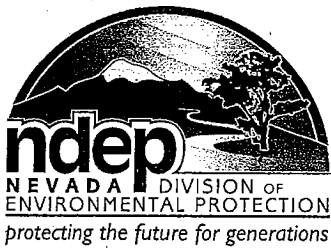
Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

October 15, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Tronox LLC ECA Quarterly Activity Report – Third Quarter 2008*  
Dated October 15, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Report identified above and provides comment in Attachment A. A revised Report should be submitted based on the comment found in Attachment A by **October 22, 2008**.

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

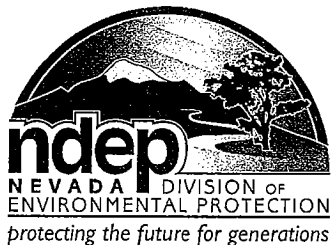
SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
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George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
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Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110

**Attachment A**

1. Page 1, Upgradient Investigation Results, TRX should include the date of the new submittal deadline (November 10, 2008) for the Background Water Quality Work Plan Outline.
2. Page 2, Evaluation of Effective Groundwater Capture, Appendix B (Groundwater Capture Evaluation) of the *Annual Remedial Performance Report Chromium and Perchlorate July 2007 to June 2008* (dated August 27, 2008) should be listed in this section.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

October 6, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Annual Remedial Performance Report for Chromium and Perchlorate, Tronox LLC,*  
*Henderson, Nevada, July 2007 – June 2008*  
Dated August 25, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Annual Report identified above and provides comments in Attachment A. TRX should provide an annotated response-to-comments (RTC) letter as part of the next Annual Report submittal with the following exceptions:

- Appendix B – Groundwater (GW) Capture Evaluation, TRX should respond to the comments in Attachment A for this appendix in a separate RTC that should be included in a Revised GW Capture Evaluation submitted as a stand-alone document. Please advise the NDEP **by October 13, 2008** regarding the schedule for this resubmittal.
- Appendix E – Data Validation Summary Report (DVSR), TRX should resubmit the DVSR for this Annual Report **by November 7, 2008** that addresses the comments provided in Attachment A. This may also be addressed as a stand-alone submittal.

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shamon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh



CG\* Jim Najima, NDEP, BCA, Carson City  
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Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544



**Attachment A**

1. Section 2.0, page 2-1, TRX stated that “January/February 2008” data from TIMET was used to base the potentiometric surface in Plate 2; however, Appendix A includes May 2008 data from the TIMET wells. Please clarify whether January/February 2008 data was used and if it was, please justify its use over the May 2008 data.
2. Section 2.1, page 2-1, last paragraph, NDEP has the following comments:
  - a. TRX stated that eight pumping wells were “turned off until static water levels were reached.” Please list which wells were turned off.
  - b. TRX used the term “section” in the paragraph when referring to Figure 2: East-West Hydrogeologic Cross Section. Please use the term “cross-section” in future reporting.
  - c. TRX stated that “Recent installation of new wells on both ends of the barrier wall has affirmed the presence of inter-channel Muddy Creek ridges at both ends of the barrier wall. The tops of these bounding ridges are shown in the section to be above the adjacent potentiometric surface – separating the saturated alluvium at TIMET well CLD2-R from Interceptor well I-K on the east.” Please discuss the implications of this statement as it relates to contaminant fate and transport.
  - d. TRX uses the term “subparallel” to describe narrow alluvial channels separated by Muddy Creek ridges. Please define this term and provide discussion on the significance of these channels.
3. Section 2.2, page 2-3, 1<sup>st</sup> paragraph, TRX states that the Athens Road Well Field wells with the most subsidence are identified. Please clarify where these wells are identified.
4. Section 3.3, page 3-4, 2<sup>nd</sup> paragraph, the text in this paragraph is not consistent with Figure 10. Please revise either the text or the figure as appropriate for consistency.
5. Figures, NDEP has the following comments:
  - a. Figure 2, NDEP has the following comments:
    - i. TRX should include perchlorate and chromium concentration data for all wells sampled on the referenced date on this figure. Please address this comment in future submittals.
    - ii. TRX should submit a separate figure of this cross-section that indicated which wells were shut-down between June 2 – 4, 2008, as stated in the last paragraph on page 2-1, with the resulting groundwater elevations measured as a result of this test for comparison.
  - b. Figure 3, TRX should include perchlorate and chromium concentration data for all wells sampled on the referenced date on this figure. Please address this comment in future submittals.
  - c. Figure 6, the current scale of this figure renders the data useless. Please revise the scale of the figure to improve readability in future submittals.
  - d. Figure 10, text in 2<sup>nd</sup> paragraph on page 3-4 is not consistent with this figure. Please revise either the text or the figure as appropriate for consistency.
  - e. Figure 11, the timeframe referenced in this figure should correspond with timeframe referenced on the report (i.e. July 2007 – June 2008). Please revise in future submittals.
  - f. Figure 21, this figure referenced a Figure 21a that is not included in this report. Please correct this in future submittals.
6. Plates, NDEP has the following comments:

- a. General comment, Plates should include data collected from the AMPAC and BRC wells shown on the Plates. Please include in future submittals.
  - b. General comment, Plates should at a minimum include all of the wells shown in the cross-sections (Figures 2 – 4). (e.g. Wells L639 and L641 are included in Figure 3 but are not shown on the Plates.)
  - c. Plate 2, NDEP has the following comments:
    - i. General comment, this plate is not consistent with the Appendix A table. Please address this comment in future submittals.
    - ii. Contours, TRX should note that dashed lines should be used only when there is not enough data presented due to well spacing, etc. Otherwise, if there is sufficient well data, the contour lines should be presented as a solid line. TRX should review the contour lines presented in this plate especially on the southern portion of the facility.
    - iii. Inset B, it appears that 5-foot intervals were used in this Inset for the potentiometric surface contour lines. NDEP noted that there were several instances where additional contour lines should have been included using a 5-foot interval. Please add contour lines as appropriate to address this comment in future submittals.
7. Appendix A, TRX should provide the data for all wells posted on the figures and plates in this appendix. (e.g. Most of the TIMET wells posted on Plates 1 - 5 do not have data listed in this table.)
8. Appendix B, NDEP has the following comments:
- a. General comment, all Annual Performance Report (July 2007 – June 2008) data and figures referenced in the Appendix B GW Capture Evaluation should be included in revised stand-alone submittal. (Any comments made on these figures in this letter should be addressed in the Revised GW Capture Evaluation.)
  - b. Section 1.2, page 1-2, 3<sup>rd</sup> bullet, the NDEP does not support the use of well pairs; please provide 3-point gradient solutions.
  - c. Section 2.0, general comment, TRX should provide a schedule **by October 13, 2008** for all additional work proposed in this section to address the identified data gaps.
  - d. Section 2.1.1, page 2-2, 1<sup>st</sup> Data Gap, Results, NDEP has the following comments:
    - i. TRX should additionally include potential leakage under the barrier wall to this data gap.
    - ii. 1<sup>st</sup> paragraph, please clarify whether there a reference figure or analysis to demonstrate that the mound dissipated. If none is provided, then please provide a figure or analysis to demonstrate that the mound dissipated.
    - iii. 2<sup>nd</sup> paragraph, please provide a map or data to support the conclusion that “the barrier wall has negligible leakage.”
    - iv. This section and all similar sections need to consider and discuss the density of the water relative to vertical gradients. This comment will not be repeated for the remaining sections.
    - v. Section 2.1.1, page 2-3, 2<sup>nd</sup> Data Gap, Results, 3<sup>rd</sup> paragraph, please clarify whether groundwater density is a factor in regards to groundwater head in the calculations for vertical groundwater gradient. TRX should discuss this point and support discussion with data in the Revised GW Capture Evaluation. (Please note that this comment should be applied to other areas of this document as appropriate.)

- e. Section 2.1.1, page 2-4, 3<sup>rd</sup> Data Gap, 1<sup>st</sup> paragraph, TRX states that the “theoretical pumping rates for most of the wells were improved”. Please discuss whether actual observed pumping rates improved in these wells.
- f. Section 2.1.1, page 2-4, 4<sup>th</sup> Data Gap, Results, NDEP has the following comments,
  - i. 2<sup>nd</sup> paragraph, TRX stated that, “The results from well I-T provided adequate drawdown data in adjacent observation wells to estimate the pumping well efficiency, which was estimated to be about 84 percent.” Based on the calculation provided in Attachment B, the pumping well efficiency is about 20 percent. Please review the data and calculations for resubmittal in the Revised GW Capture Evaluation.
  - ii. 2<sup>nd</sup> paragraph, TRX states that, “The absence of drawdown beyond 20 to 25 feet is likely a function (of) well spacing...” Drawdown during an aquifer test is not a function of well spacing. Please remove the text in future submittals.
  - iii. 3<sup>rd</sup> paragraph, NDEP does not concur that this data gap has been addressed based on the results presented in Attachment E to the GW Capture Evaluation. One of the four tests presented was successful and the one successful test was incorrectly analyzed. Please review the data and calculations for resubmittal in the Revised GW Capture Evaluation.
  - iv. 3<sup>rd</sup> paragraph, TRX states “In the future, additional distance drawdown testing will be considered...” It is not clear what is precluding TRX from completing this work; please provide a schedule for implementation.
  - v. 3<sup>rd</sup> paragraph, last sentence, TRX states that “Well efficiency data derived from the testing of well I-T will be used to contour pumping data from this well.” TRX should note that the well efficiency for well I-T was calculated incorrectly. Please review the data and calculations for resubmittal in the Revised GW Capture Evaluation.
- g. Section 2.1.2, page 2-5, Capture Zone, TRX states, “...the barrier wall and Interceptor well field is stopping the downgradient flow of perchlorate above 35 mg/L on the east end and 120 mg/L on the west end.” The data on Plate 4, Inset B do not support this conclusion for the west end. Please review the Plate and associated data to address this comment.
- h. Section 2.1.2, page 2-5, Capture Zone, TRX states that “Considering this average concentration up gradient of the barrier wall...” As commented in previous document responses, NDEP does not concur with this analysis based on concentration. Calculations must be made on a mass basis. Please revise the Revised GW Capture Evaluation accordingly.
- i. Section 2.1.2, page 2-5, flow budget, it is suggested that TRX install wells within the Muddy Creek formation to address potential underflow issues and to refine the flow budget.
- j. Section 2.1.2, page 2-7, Downgradient Concentration Declines over Time, one of the reasons that NDEP requested wells at the east and west ends of the barrier wall was so that flow at both ends of the barrier could be calculated; and thus, calculations could be made on a mass basis. Furthermore, concentration versus time series graphs are requested to present and discuss concentration declines over time.
- k. Section 2.1.2, page 2-7, Overlapping Cones of Depression, please provide a map at the scale of Plate 1 for groundwater elevation and contour.
- l. Section 2.1.4, page 2-8, Data Gaps, TRX should be include an additional data gap that discusses the upper most water bearing zone (water table) flow around the eastern and

- western ends of the barrier wall using data from the new wells. If there is insufficient data for this, then TRX should propose additional wells for this purpose.
- m. Section 2.2, page 2-8, last paragraph, 2nd bullet, TRX should note that McGinley recommended five new wells be installed. Please revise the text accordingly.
  - n. Section 2.2.1, page 2-9, 1st Data Gap, Results, TRX should discuss groundwater density as an influencing factor in regards to groundwater head. Please revise the text accordingly and support the discussion with data.
  - o. Section 2.2.1, page 2-10, 1st paragraph, the referenced Plate 2 (in the GW Capture Evaluation) shows the net drawdown. Please provide a groundwater elevation map at the same scale as the GW Capture Evaluation Plate 2.
  - p. Section 2.2.2, page 2-10, Capture Zone, NDEP does not concur with this analysis based on concentration. Calculations must be made on a mass basis. Please revise the Revised GW Capture Evaluation accordingly.
  - q. Section 2.2.2, page 2-10, Flow Budget, the analysis and discussion herein do not meet the EPA (2005) capture zone evaluation requirement. The EPA referenced document indicates that groundwater flow be calculated via Darcy's law and the results are compared to actual flow rate. Please revise the text and calculations accordingly.
  - r. Section 2.2.2, page 2-10, Overlapping Cones of Depression, TRX should note that there is very limited control for constructing the drawdown contours as drawn on Plate 2. Please discuss this in the Revised GW Capture Evaluation.
  - s. Section 2.2.2, page 2-11, Downgradient Concentration Declines over Time, both PC-98R and MW-K5 appear asymptotic (Figures 24 and 24A, Annual Remedial Performance Report). Please review and evaluate the long term trends and revise the text accordingly in the Revised GW Capture Evaluation.
  - t. Section 2.2.3, page 2-11, Data Gaps and Proposed Additional Evaluation, this section is incomplete. Please review the above-comments to assist in identifying additional data gaps. The text of the Revised GW Capture Evaluation should be revised accordingly.
  - u. Section 2.3, page 2-11, last paragraph, please note that NDEP does not concur with this analysis based on concentration. Calculations must be made on a mass basis. Please revise the Revised GW Capture Evaluation accordingly.
  - v. Section 2.3.1, page 2-12, Overlapping Cones of Depression, please provide a map at the scale of Plate 1 for groundwater elevation and contour.
  - w. Section 2.3.1, page 2-12, Downgradient Concentration Declines over Time, NDEP has the following comments:
    - i. 1<sup>st</sup> sentence, please note that NDEP does not concur with this analysis based on concentration. Calculations must be made on a mass basis. Please revise the Revised GW Capture Evaluation accordingly.
    - ii. 2nd sentence, TRX should note that this section references concentration declines over time; mass is related to concentration but also includes flow. Please revise the Revised GW Capture Evaluation as necessary to clarify the difference in these two concepts.
  - x. Section 3.0, page 3-1, please update this section based on the comments contained in this letter.
  - y. Figure 3, please discuss how the represented vertical gradients relate to density driven flow. This comment also applies to Figures 5 and 7.
  - z. Tables, NDEP has the following comments:

- i. Table 1, NDEP has the following comments:
    1. TRX should note that NDEP has recommended ASTM methods for all physical property analysis.
    2. In the following columns where two or more methods are listed, please clarify which method was used and whether the two methods are the same.
      - a. Moisture Content – ASTM D2216 and API RP 40
      - b. Effective permeability – ASTM D5084, API RP 40, and USEPA 9100 (Please note that TRX response (dated Nov. 28, 2007) to NDEP Comment #6 indicates that the ASTM method would be employed for the analysis.)
      - c. Hydraulic conductivity ASTM D5084, API RP 40, and USEPA 9100
  - ii. Table 3, TRX should provide the TDS concentrations for these wells and determine whether there are density effects that may influence the calculated vertical gradients. Please revise the Revised GW Capture Evaluation accordingly.
  - iii. Table 4, the NDEP has the following comments:
    1. NDEP did not observe that mass flux calculations were completed in this table. Please include these calculations in the Revised GW Capture Evaluation.
    2. TRX should additionally include data east of I-Z.
- aa. Attachment A, NDEP and TRX Correspondence, NDEP has the following comments:
- i. TRX should note that NDEP's Response (dated December 12, 2007) to TRX's *Response to Nevada Division of Environmental Protection (NDEP) Comments to the Revised Work Plan to Evaluate Effective Groundwater Capture at Tronox LLC, Henderson, Nevada* (dated November 28, 2007) was not included in this attachment. Please include this letter in the Revised GW Capture Evaluation.
  - ii. TRX's November, 20, 2007 response-to-comments (RTC), RTC 8, TRX should note that NDEP has previously indicated that overlapping cones of depression need to include the text as indicated in the NDEP Comment #8. The difficulty with utilizing drawdown to indicate capture zone is that drawdown does not include the prevailing hydraulic gradient in its calculation. Drawdown and capture only coincide when the prevailing hydraulic gradient is zero. In the case of the Athens Road Well Field an argument could be made, if the gradient is sufficiently flat, that the paleochannel geometry, extraction well locations, and overlapping cones of depression combine to form one line of evidence.
- bb. Attachment D, please provide the survey data for wells M-129 and M-130 in the Revised GW Capture Evaluation.
- cc. Attachment E, Distance Drawdown Data and Graphs – Interceptor Well Field and Barrier Wall, TRX should recalculate the well efficiencies in the Revised GW Capture Evaluation based on NDEP's following comments:
- i. General comment, please note that NDEP used the following reference for the comments below: Roscoe Moss Company, 1990. Handbook of Ground Water Development. John Wiley & Sons, NY, pages 308 and 493.
  - ii. General comment, the formula provided by TRX for well efficiency is incorrect. The correct formula is  $\text{Aquifer Loss} / \text{Total Drawdown} * 100\%$ . Aquifer Loss at an extraction well is determined by first using linear regression on the groundwater elevation (GWE) at  $T = X$ . Using the regression line equation, a  $T = 0$  GWE can be calculated for the extraction well. The difference between the observed  $T = 0$  GWE and the calculated  $T=0$  GWE is the Aquifer Loss.

- iii. Pumping well I-K, NDEP has the following comments:
  - 1. NDEP noted that the GWE at T=0 data points are nearly equal to T=200 data points. This could possibly mean that insufficient time elapsed for complete water level recovery and/or that other factors have a greater influence on the data points.
  - 2. TRX should note that at a flow rate of 0.40 gpm in I-K and with the closest observation well was 66.2 ft; extraction at well I-K would likely have had little if any effect on the observation wells.
- iv. Pumping well I-N, NDEP has the following comments:
  - 1. If a linear regression is run for the GWE data for each well versus distance from pumping well at T = 150 minutes the R<sup>2</sup> value (0.3222) indicates that GWE has low relationship to distance from extraction well (i.e. other factors are likely to have greater influence); as opposed TRX's statement that there is "insufficient data to estimate well efficiency." This is at least partially due to the relatively large distance from the extraction well to the observation wells and comparatively low flow rate.
  - 2. NDEP also noted that at T=0 GWE data points are nearly equal to T=150 data points at the observation wells. This could possibly mean that insufficient time elapsed for complete water level recovery and/or that other factors have a greater influence on the data points.
- v. Pumping well I-T, based on the well efficiency formula presented above, the well efficiency calculated by TRX is incorrect.
- dd. Pumping well I-R, while the NDEP concur that two data points are really not sufficient for analysis, the data suggest that the extraction well may quite inefficient based on the formula presented above.
- 9. Appendix E, NDEP has the following comments:
  - a. General comment, TRX should provide only the records applicable to a DVSR in the database that is included with each DVSR. This practice would not only facilitate review of the DVSR but also provide a more cost-effective means of incorporating new data into the regional database maintained by NDEP.
  - b. Section 2.0, TRX indicates that 10% of the data packages were subject to full validation. Based on Table 4, there were 140 unique SDGs and only samples from two SDGs (239631, and 230066) were bolded indicating full validation. This equals 29 samples out of 790. To clarify, a minimum of 10% of the samples should undergo full Level IV data validation. If this full data validation indicates anomalous quality assurance problems, the number of samples validated should be expanded. TRX should resubmit the DVSR after a minimum of 10% of the samples have completed full Level IV data validation.
  - c. Section 3.1, paragraph 2, TRX should correct the text to reflect EPA Method is 218.6 (incorrectly typed as 281.6).

**Shannon Harbour**

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**From:** Shannon Harbour  
**Sent:** Thursday, October 02, 2008 11:14 AM  
**To:** 'Crowley, Susan'  
**Cc:** Brian Rakvica; Keith Bailey; Flack, Mike  
**Subject:** RE: Phase B Soil Gas Survey Report

Susan,

Thank you for your response. The NDEP will note that the Phase B Soil Gas Report will be submitted with the Phase B Source Area Investigation Report.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
NDEP BCA-Las Vegas Office*

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**From:** Crowley, Susan [mailto:Susan.Crowley@tronox.com]  
**Sent:** Tuesday, September 30, 2008 1:57 PM  
**To:** Shannon Harbour  
**Cc:** Brian Rakvica; Keith Bailey; Flack, Mike  
**Subject:** FW: Phase B Soil Gas Survey Report

Shannon,

This e-mail is in response to your question about the Tronox soil gas report - you mentioned this report was due Sept 22<sup>nd</sup>. Please see the excerpt from the work plan below – which describes our expectation for getting the soil gas report to you. The soil gas report was never to be a stand alone document....from the work plan (see in RED)

.....

.....  
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.

.....  
Please let me know if you have any questions. Thanks.

**TRONOX LLC**

Susan Crowley  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

*It's the set of our sails, not the force of the gales, that determines the way we go.*

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**From:** Shannon Harbour [mailto:[sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov)]  
**Sent:** Monday, September 29, 2008 4:20 PM  
**To:** Crowley, Susan  
**Cc:** Keith Bailey; Brian Rakvica  
**Subject:** Phase B Soil Gas Survey Report

Susan,

Could you give me an update on the status of this report? I thought the Soil Gas Survey Report was to be submitted by September 22, 2008. To date, I have not received this submittal.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230  
Las Vegas, NV 89119  
702-486-2850 x 240 (work)  
702-486-5733 (fax)*

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Thank you.

10/2/2008



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Please let me know immediately by return e-mail if you have received this message by mistake, then delete the e-mail message.

Thank you.

Thanks,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
NDEP BCA-Las Vegas Office*

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**From:** Shannon Harbour  
**Sent:** Thursday, October 02, 2008 1:00 PM  
**To:** Brenda.Pohlmann@cityofhenderson.com  
**Cc:** Dennis Campbell; Barry Conaty; 'David.Towell@CH2M.com'  
**Subject:** City of Henderson Landfill Deliverables

Hi Brenda,

I was updating the NDEP quarterly report and realized that I haven't heard anything about the landfill in a while. Could you please let me know the status of the Post-Response Site Control Plan and the Post-Closure Groundwater Monitoring Plan?

Thanks,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230  
Las Vegas, NV 89119  
702-486-2850 x 240 (work)  
702-486-5733 (fax)*

10/28/2008

## Shannon Harbour

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**From:** Shannon Harbour  
**Sent:** Thursday, October 02, 2008 9:07 AM  
**To:** 'Crowley, Susan'  
**Cc:** Keith Bailey; Flack, Mike; Carmen Schell; Ho, Brian  
**Subject:** POSSM Site Map  
**Attachments:** Figure 2-2.pdf

Susan,

Attached is the site map of the POSSM site illustrating the plant locations and piping. The figure is from *Revision 1.0 Conceptual Site Model, Former Montrose and Stauffer Facilities and Downgradient Areas to Las Vegas Wash, Henderson, Clark County, Nevada, Replacement Pages* dated July 25, 2008.

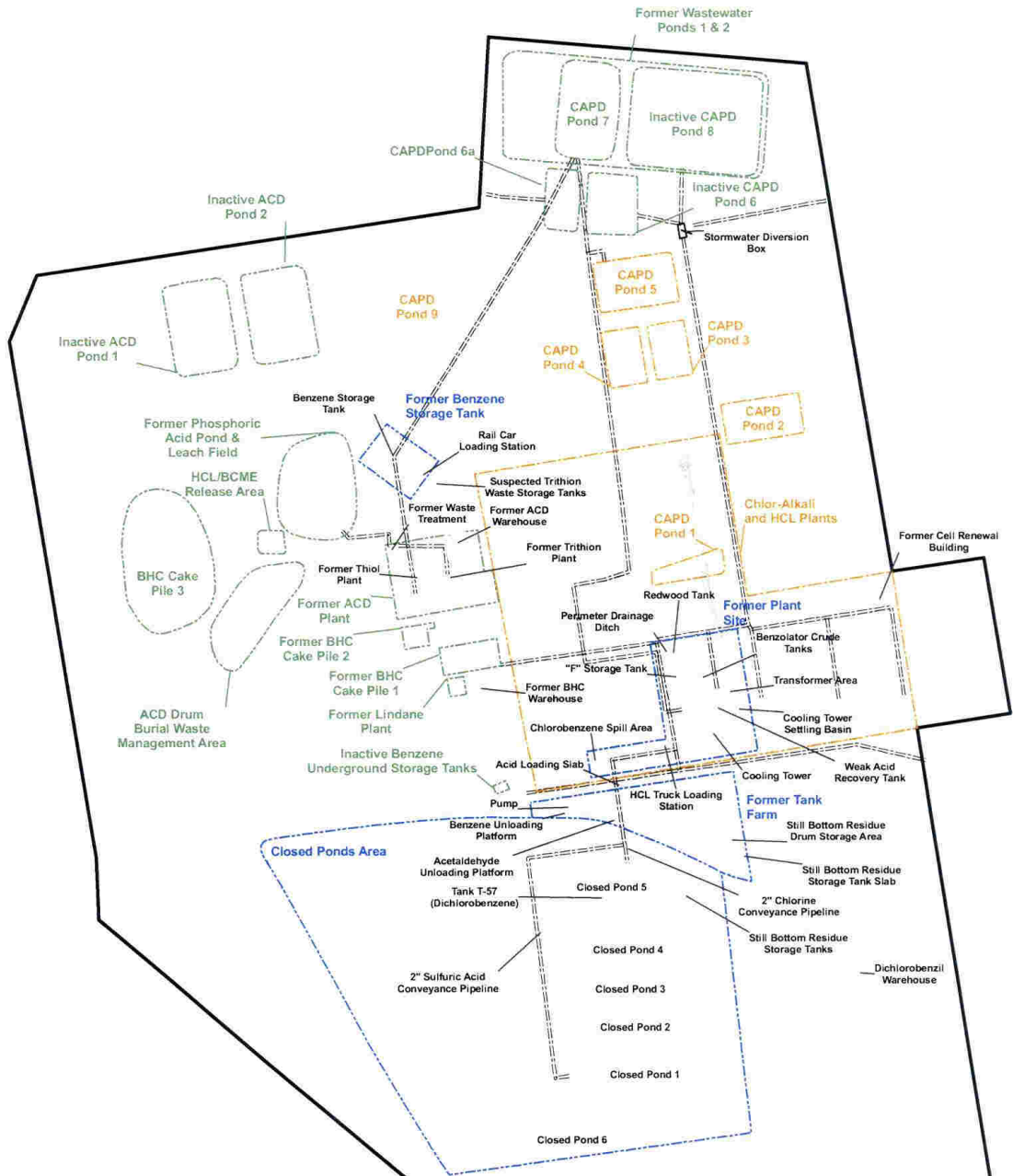
Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230  
Las Vegas, NV 89119  
702-486-2850 x 240 (work)  
702-486-5733 (fax)*

Fig 2-2 CS M

7/25/08

Rev 1.0 CS M

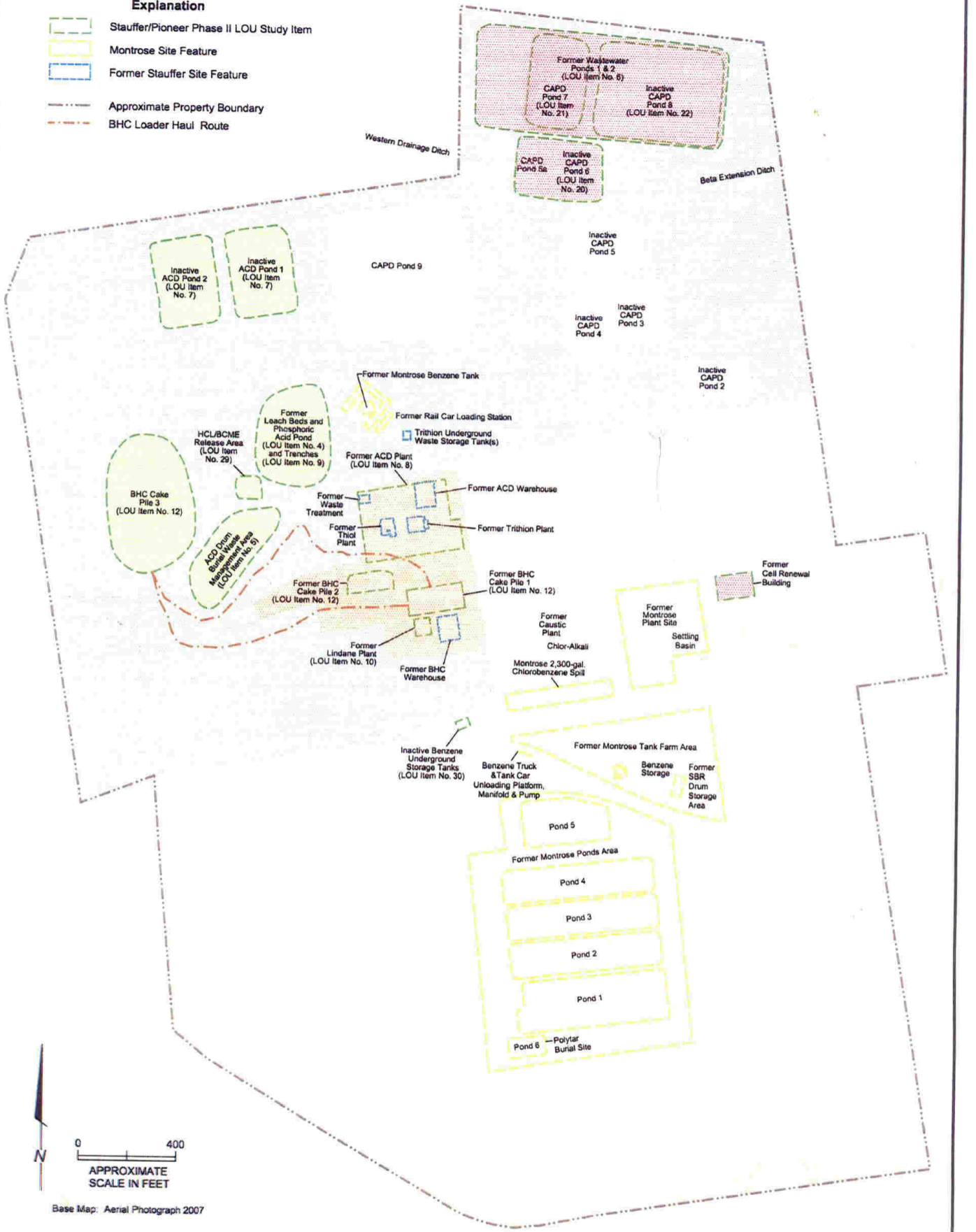


SITE ASSESSMENT AREAS/LETTER OF UNDERSTANDING STUDY ITEMS FOR THE FORMER MONTROSE FACILITY		
Site Assessment Area	LOU Study Item No.	Description
Former Plant Site	1	Process Sewer System
	2	Former Organic Chemical Manufacturing Plant Site
	4	Hydrochloric Acid Truck Loading Station
	5	Release from "F" Storage Tank (1982)
	13	Plant Perimeter Drain Ditch
	14	Stormwater Sewer System
	20	Redwood Tank
	22	Settling Basin
	23	Chlorobenzene Spill (March 1984)
Closed Ponds	6	Spill of Still Bottom Residues (1981) and Still Bottom Residue Storage Tank Area
	15	Ponds 1, 3, and 4 and associated 2-inch Waste Line
	16	Ponds 2 and 5 (RCRA closed ponds)
	17	Pond 6
Former Tank Farm	18	Still Bottom Residue Drum Storage Area
	19	Tank Farm
Former Benzene Storage Tank	3	Railcar Loading Area near Benzene Storage Tank
	21	Benzene Storage Tank on Parcel C
Site-Wide Groundwater	Site-Wide	Site-Wide

LETTER OF UNDERSTANDING STUDY ITEMS FOR THE FORMER STAUFFER FACILITY	
LOU Study Item No.	Description
4 & 9	Former Leach Field and Phosphoric Acid Pond and Trenches
5	Agricultural Chemicals Division (ACD) Drum Burial Waste Management Area
6	Former Wastewater Ponds 1 and 2
7	Inactive ACD Ponds 1 and 2
8	Former ACD Plant
10	Former Lindane Plant
11	Former Cell Renewal Building Area and Associated Conveyance Facilities
12	Former Benzene Hexachloride (BHC) Cake Piles 1 and 2, Former BHC Loader Haul Route, and BHC Cake Pile 3
20	Inactive CAPD Pond 6
21	CAPD Pond 7
22	Inactive CAPD Pond 8
29	Former HCL/bis(chloromethyl)ether Release Area
30	Inactive Benzene Underground Storage Tanks

**Explanation**

- Stauffer/Pioneer Phase II LOU Study Item
- Montrose Site Feature
- Former Stauffer Site Feature
- Approximate Property Boundary
- BHC Loader Haul Route



Document Reference Numbers

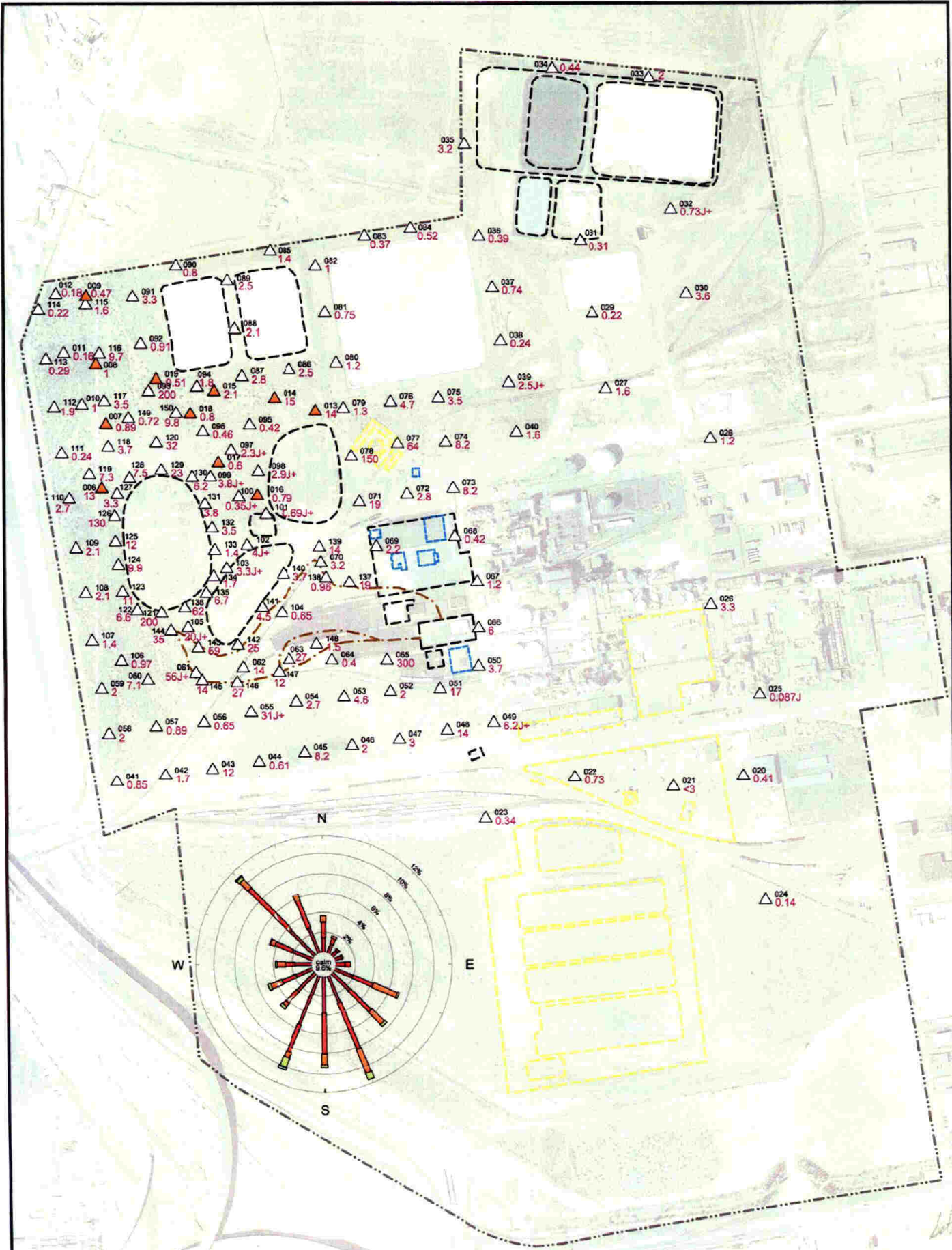
- ① Work Plan for Remedial Alternatives Study, BHC Cake Pile 3, ACD Drum Burial Waste Management Area, and Former Leach Beds and Phosphoric Acid Pond, and Trenches, Former Stauffer Chemical Company Facility, Henderson, Nevada, January 30, 2008.
- ② Work Plan for Remedial Alternatives Study: Former ACD Plant, Former Lindane Plant, Former BHC Cake Piles 1 and 2 and BHC Loader Haul Route, and Surface Soils, Former Stauffer Chemical Company Facility, Henderson, Nevada, April 11, 2008.
- ③ Work Plan for Remedial Alternatives Study: Former Wastewater Ponds 1 and 2, Former Cell Renewal Building Area and Associated Conveyance Facilities, inactive CAPD Pond 6, inactive CAPD Pond 7, inactive CAPD Pond 8, Former Stauffer Chemical Company Facility, Henderson, Nevada, May 15, 2008.
- ④ Area-Specific Conceptual Site Models: BHC Cake Pile 3 (Component Of LOU No. 12); ACD Drum Burial Waste Management Area (LOU No. 5); Former Leach Beds and Phosphoric Acid Pond (LOU No. 4) and Trenches (LOU No. 9); inactive ACD Ponds 1 & 2 (LOU No. 7); and former HCL/BCME Release Area (LOU No. 29), Former Stauffer Chemical Company Facility Henderson, Nevada, April 11, 2008.
- ⑤ Area-Specific Conceptual Site Models: Former ACD Plant (LOU No. 8); Former Lindane Plant (LOU No. 10); and Former BHC Cake Piles 1 & 2 and Former BHC Loader Haul Route (LOU No. 12), Former Stauffer Chemical Company Facility, Henderson, Nevada, June 12, 2008.
- ⑥ Area-Specific Conceptual Site Model for Shallow Soil Former Stauffer Chemical Company Facility, Henderson, Nevada, July 1, 2008.
- ⑦ Draft Area-Specific Conceptual Site Models: Former Wastewater Ponds 1 and 2, Former Cell Renewal Building Area and Associated Conveyance Facilities, inactive CAPD Pond 6, inactive CAPD Pond 7, inactive CAPD Pond 8, Former Stauffer Chemical Company Facility, Henderson, Nevada, (Submittal date pending resolution of NDEP 6/24/08 comments).

Area Color	Reference Nos.	
	RAS	CSM
	①	④
	②	⑤
	③	⑥
		⑦

*email submittal*

1/7/07

Data Trans. & PC Env Inc



Explanation

△ 051 Surface Soil Sample Location

BAC  
1/7/07

## Shannon Harbour

---

**From:** Brian Rakvica  
**Sent:** Wednesday, October 01, 2008 4:28 PM  
**To:** Shannon Harbour; Kelly Black (kblack@neptuneinc.org); pblack@neptuneinc.org; hackenberry@sbcglobal.net; terilcopeland@aol.com; Susan Crowley (susan.crowley@tronox.com); mflack@ensr.aecom.com; Ho, Brian; Keith Bailey (okbailey@flash.net)  
**Subject:** TRX PCB discussion

TRX and ENSR (I apologize for those that I missed),

As discussed in our meeting, regarding the PCB justification, TRX should provide better support.

One issue is to discuss the explicit conditions which are required to form PCBs. One issue with the current argument is that technically you don't need biphenyl to make PCBs. Also, there are temperature issues to be considered. Other issues to discuss: are there any catalysts, or potential catalysts (even iron oxide) present? Since these reactions are near ambient I am not sure that this will be an issue, however, I am confident that your chemists can address this.

In general the discussion should be set up as follows: reactants + conditions = PCBs or no PCBs. Please note that reactants are chlorine plus aromatic hydrocarbons, including already chlorinated aromatic hydrocarbons. Conditions can vary greatly depending upon whether there is some type of catalyst that lowers the temperature needed for some by-product reaction to PCBs.

It should also be noted that the manganese reaction is in the absence of chlorine, hence, no PCBs.

Contact us with any questions.

Thanks,

Brian

## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 1:30 PM, Wednesday, October 01, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Neptune – Kelly Black (for NDEP)  
Hackenberry Assoc. – Paul Hackenberry (for NDEP)  
Teri Copeland (for NDEP)  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)  
ENSR – Brian Ho, Carmen Schnell, Mike Flack (for TRX)

CC: Jim Najima

1. The meeting was held to discuss TRX's proposed justification for sampling design optimization for the Phase B Site Investigation including Areas I, II, III, and IV.
2. TRX submitted the following for use on this call (TRX stated that updated versions of these items will be included in the Revised Approach to Phase B Site Investigation (Revised Approach):
  - a. Draft Table 2, Soil Sampling and Analytical Plan for Area I
  - b. Figure 1, Soil Boring Locations Sampled for OCPs, OPPs, and Organic Acids (proposed)
  - c. Figure 2, Soil Boring Locations Sampled for PCBs (proposed)
  - d. Figure 3, Proposed Groundwater Sample Locations for OPPs, OCPs and Organic Acids
  - e. Justification section of the Revised Approach document.
3. NDEP stated that the submitted figures and tables contained inconsistencies. TRX should review the final document for consistency prior to submittal.
4. NDEP stated that the objective of the justification should emphasize optimization of the sampling design for the systematic sampling plan. Financial objectives should be not be emphasized or even mentioned in the justification section in the Revised Approach document.
5. Geoprobe™ sampling, the following points were discussed for this issue:
  - a. TRX stated that the use of Geoprobe™ for boring advancement during the Soil Gas Investigation was successful to 5 feet below ground surface (fbgs).
  - b. TRX believes that Geoprobe™ advancement for the collection of the 0-0.5 fbgs and the 10 fbgs samples could be achieved more rapidly than by sonic drilling.
  - c. TRX will submit a Standard Operating Procedure (SOP) for Geoprobe™ advancement and sample collection with the Phase B SAP Errata for NDEP approval.
  - d. TRX stated that sonic drilling will be used for deeper sample collection and for any locations where the Geoprobe™ is not able to accomplish the required sampling.
  - e. TRX stated that Geoprobe™ advancement might be conducted in conjunction with asbestos or other sampling to minimize mobilization.
6. Data Validation, TRX will use LDC and ENSR for data validation for future submittals.
7. Organic Acids, the following points were discussed for this issue:
  - a. TRX stated that the modifications requested for analysis of the organic acids are based on source location and transport mechanisms.
  - b. TRX stated that organic acids are not a site-related chemical for TRX.



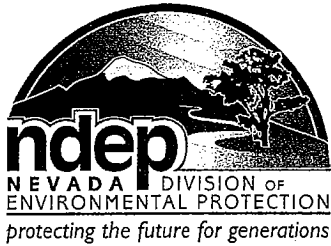
- c. TRX proposed to limit the analysis for organic acids to the western portion of the TRX facility and along the Beta Ditch based on the source.
  - d. NDEP stated that TRX should include discussion on the source(s) of the organic acids in the justification section in the Revised Approach document.
8. PCBs and Attachment A, the following points were discussed for this issue:
- a. TRX proposed to perform Arochlor analyses (method 8082) for all soil samples shown on the draft figure submitted for NDEP discussion and referred to NDEP comments that off-site sources of PCBs are from the southwest of the TRX facility as a potential source of PCB congeners. TRX suggested that congener analysis should be limited accordingly.
  - b. NDEP stated that TRX should discuss these sources in the justification section of the Revised Approach document. The discussion should include whether Arochlor and/or congener analysis should be conducted including justification.
  - c. NDEP had previously asked if PCBs are generated in TRX electrolytic processes. TRX responded that it knows of no mechanism for PCB formation in the TRX electrolytic processes. NDEP stated that TRX should use process knowledge, such as temperature, of the chlorate and perchlorate electrolytic process to explain how or if PCB formation is possible.
  - d. NDEP stated that the description of the MnO<sub>2</sub> generation process should be revised so that it is clear that there is no chlorine present for the paraffin wax to come in contact with to enable PCB production.
  - e. NDEP will provide additional guidance on PCB formation to TRX. **ACTION ITEM.**
  - f. NDEP stated that TRX should discuss PCB source areas in the justification.
  - g. TRX stated that boring SA67 (where the Beta Ditch enters the TRX site), has already been advanced and sampled for both Arochlor and congener analyses.
  - h. TRX inquired whether WAPA was analyzing for both Arochlors and congeners.
  - i. NDEP stated that WAPA was only analyzing for Arochlors; however, TPH is the driver for remediation in that even if the Arochlor concentrations are low, TPH is still greater than the 100 ppm action level.
  - j. TRX stated that the rationale for only analyzing three of ten sample points in the Beta Ditch for both Arochlors and congeners is that TRX is looking to measure the PCBs entering the TRX facility from the west via the Beta Ditch, from the stormwater entering the Beta Ditch from the TRX facility, and leaving the TRX facility via the Beta Ditch.
  - k. NDEP suggested that TRX investigate the hold times for the congener analysis and if feasible, collect samples for the congener analysis. These samples could be held pending the results of the Arochlor analysis. The congener analysis could then be run based on examination of the Arochlor results.
9. Pesticides and Attachment B, the following points were discussed for this issue:
- a. NDEP indicated that the Phase B Source Area Work Plans stated that random samples were to be sampled for broad suite analysis for site-wide comparison, including OCPs. This contradicts TRX's proposal to eliminate analyses in many of the random samples.
  - b. TRX stated that all random samples will be sampled for the broad suite analyses listed in the LOU packages.
  - c. TRX stated that it will revise the pesticide sampling figure and generate one figure for proposed OCP sampling locations and a second figure for OPPs and Organic Acids sampling locations.

- d. NDEP inquired on the status of the analytical for the borings that were completed and sampled as indicated on the submitted table.
  - e. TRX stated that the analytical results had been received.
  - f. NDEP suggested that TRX review the data for additional support for the elimination of sampling locations for pesticides.
10. Reduction of number of samples collected between 10 fbg and the capillary fringe, the following points were discussed for this issue:
- a. NDEP stated that if the number of sampling depths is limited, TRX should be prepared to make conservative interpolation and assumptions for the leaching model.
  - b. NDEP also stated that if additional information is needed in areas of elevated concentrations, TRX may need to resample the area at other depths. TRX stated that this was understood.
11. Limit sampling in Area III production areas, the following points were discussed for this issue:
- a. TRX stated that the random samples proposed in the Area III production areas will still be collected.
  - b. TRX stated that the Revised Approach document will request that the judgmental samples be removed from the Area III production areas where closure is not currently being requested. TRX stated that these potential source areas will be addressed after production has ceased.
12. Conclusion, the NDEP advised that TRX focus on the objective of optimization of the sampling design.
13. Attachment B, NDEP stated that TRX should investigate the location of the Acid Drain System relative the Montrose and Stauffer plants in order to support the statements about the Acid Drain location in relation to the former plant locations. NDEP will provide a figure of the locations of these plants and associated piping to TRX. **ACTION ITEM.**
14. Revised Approach Submittal, the following comments were discussed for this topic:
- a. TRX stated that the Revised Approach document will be submitted to the NDEP on October 13, 2008.
  - b. TRX stated that the Revised Approach document will contain the justification section and a section for each of the four areas proposing modifications to the approved Phase B Source Area Work Plans, which will include the following:
    - i. Color Table with modifications to the sampling plan highlighted.
    - ii. Final Table – for field use, will include the requested modifications but will not be annotated.
    - iii. Annotated maps detailing the modifications requested. A map will be generated for the following analytes: PCB, OCP, and OPP/OA.
    - iv. Final maps – for field use, will include requested modifications but will not be annotated.
    - v. Justification section
    - vi. Any other requested errata pages.
  - c. NDEP requested that TRX add the justification for any changes to each boring to the Rationale column of the color annotated table. TRX agreed.
  - d. NDEP requested that the annotated maps also designate which wells TRX has requested to have the represented analysis eliminated

## FINAL

15. TRX indicated that drilling has not yet been scheduled pending approval of the work plan revisions.
16. NDEP indicated that review of the Revised Approach document may take about a month. A response could be issued by mid-November. NDEP additionally stated that the length of the review would be based upon the quality of the submitted document.

Sep



# STATE OF NEVADA

Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

September 30, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**

**NDEP Facility ID #H-000539**

Nevada Division of Environmental Protection (NDEP) Response to:  
*Response to NDEP September 18, 2008 Comments, Data Validation Summary Report (DVSR), Phase B Source Area Investigation, Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada, Dated August 25, 2008*  
Dated September 29, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified Response-to-Comments (RTC) letter and provides additional comments in Attachment A. TRX should provide an annotated response-to-comments letter and revised DVSR **by October 14, 2008** addressing these comments. If TRX would find it helpful, a brief conference call with NDEP could be held to discuss these issues. Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544

**Attachment A**

1. RTC 1, NDEP has the following comments:
  - a. The NDEP finds TRX's description and method acceptable.
  - b. TRX should document the calibration and other QA/QC checks used during the helium analysis method and keep them for the record to document that helium results are based on quality procedures.
  - c. TRX should also cite the ITRC source that discusses using helium tracer and the New York State Department of Environmental Conservation document that allows tracer concentrations up to 10% before the sample is considered compromised.
  - d. TRX should note that all the sampling parameters and QC checks (e.g. dead volume) performed during the field work should be documented. This documentation does not have to be included in the DVSR but should be available if questions on the sampling arise.

## Shannon Harbour

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**From:** Flack, Mike [MFlack@ensr.aecom.com]  
**Sent:** Monday, September 29, 2008 4:43 PM  
**To:** Shannon Harbour; Brian Rakvica; TeriLCopeland; Paul S. Hackenberry, Jr.; Kelly Black  
**Cc:** Keith Bailey; Crowley, Susan; Caceres-Schnell, Carmen; Ho, Brian; Budin-Caloroso, Jessica  
**Subject:** NDEP-TRX Conference Call - Phase B SAPs Revisions  
**Attachments:** DRAFT Table 2 Area I (10-01-08).pdf; Rationale for Scope Reduction (9-29).pdf

At the request of Tronox, in preparation for the October 1, 2008 conference call regarding scoping revisions to the proposed Phase B program attached are:

- 1.) The narrative describing the scoping revisions, including CSM discussion and approach for PCBs, OCPs, OPPs and Organic Acids
- 2.) A "draft" Table 2 for soil sampling in Area I. This table is provided to illustrate the changes to the proposed sampling program. We are very interested if it communicates the changes easily and clearly.

The following figures will be provided tomorrow (9-29) via internet link (ENSR LeapFile)....and will also be sent via FEDEX for Wednesday AM delivery.

- 1.) A map showing the proposed sample locations for OCPs, OPPs and Organic Acids in groundwater
- 2.) A map showing the proposed sample locations for OCPs, OPPs and Organic Acids in soil
- 3.) A map showing the proposed sample locations for PCBs in soil

If there are any questions, please contact me at your earliest convenience.

THANK YOU

Michael Flack  
ENSR  
1220 Avenida Acaso  
Camarillo, CA 93012-8738  
805.388.3775  
805.388.3577 (fax)



Grid Location	LOU Number	Boring No.	Sample ID Number	Sample Depth <sup>1</sup> (ft-bgs)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 602)	TPH-GRO (EPA 8015B)	VOCs <sup>3</sup> (EPA 826B)	Hex Cr <sup>4</sup> (EPA 7199)	Wet Chem <sup>5</sup>	OCFs <sup>6</sup> (8081A)	Formaldehyde (EPA 8315A)	TPH-DRO/CRO (EPA 8015B)	Total Cyanide (EPA 9012A)	SVOCs <sup>7</sup> (EPA 8270C)	PCBs <sup>8</sup> (EPA 8082)	Radiionuclides <sup>9</sup>	Dioxins/Furans <sup>10</sup>	PCBs <sup>11</sup> (EPA 1668)	OPPs <sup>12</sup>	Organic Acids <sup>13</sup>	Asbestos <sup>14</sup> EPA 8460R-9702B	Geotech Tests <sup>15</sup>	Location Description and Characterized Area Rationale
Borings are organized by grid location as shown on Plate A - Starting point is on the northwestern most grid in Area 1 (O-4).																								
H-3	1, 10	RSAH9	RSAB3-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and as an eastward step-out to LOU 10 (Former Onsite Hazardous Waste Landfill). GW anticipated at ~34 feet bgs
H-3	1, 10		RSAB3-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
H-3	1, 10		BRSA13-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
H-3	1, 10		BRSA13-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
H-3	1, 10		BRSA13-32B	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-2	1, 10	RSAI2	RSAB2-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and as an eastward step-out to LOU 10 (Former Onsite Hazardous Waste Landfill). GW anticipated at ~33 feet bgs
I-2	1, 10		RSAB2-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-2	1, 10		RSAB2-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-2	1, 10		RSAB2-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-2	1, 10		RSAB2-31B	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1	RSAI3	RSAB3-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~34 feet bgs
I-3	1		RSAB3-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1		RSAB3-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1		RSAB3-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1		RSAB3-32B	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1, 32	SA201	SA201-0.0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located on the north berm of the GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~30 feet bgs
I-3	1, 32		SA201-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1, 32		SA201-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1, 32		SA201-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-3	1, 32		SA201-28B	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-4	1, 32	RSAI4	RSAB4-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located on the north berm of the GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~34 feet bgs
I-4	1, 32		RSAB4-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-4	1, 32		RSAB4-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-4	1, 32		RSAB4-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-4	1, 32		RSAB4-32B	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-5	1, 32	RSAI5	RSAB5-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located on the north berm of the GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~30 feet bgs
I-5	1, 32		RSAB5-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-5	1, 32		RSAB5-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-5	1, 32		RSAB5-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-5	1, 32		RSAB5-28B	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-7	1, 22, 23, 32	RSAI7	RSAB7-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds), LOUs 22 & 23 (Ponds WC-West & WC-East), and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit).
I-7	1, 22, 23, 32		RSAB7-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-7	1, 22, 23, 32		RSAB7-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-7	1, 22, 23, 32		RSAB7-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
I-7	1, 22, 23, 32		RSAB7-30B	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10	RSAI2	RSAB2-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~31 feet bgs
J-2	1, 10		RSAB2-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10		RSAB2-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10		RSAB2-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10		RSAB2-33B	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1	RSAI3	RSAB3-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~31 feet bgs
J-3	1		RSAB3-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1		RSAB3-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1		RSAB3-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1		RSAB3-29B	29	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 32	SA202	SA202-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds), LOUs 22 & 23 (Ponds WC-West & WC-East), and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit).
J-3	1, 32		SA202-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 32		SA202-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 32		SA202-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 32		SA202-28B	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60	SA206	SA206-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and LOU 60 (former Acid Drain System), and for general site coverage. GW anticipated at ~39 feet bgs
J-3	1, 60		SA206-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60		SA206-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60		SA206-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60		SA206-24B	24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60		SA206-37B	37	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32	RSAI5	RSAB5-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located east of GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds), as an upgrade boring to evaluate LOU 22 (Pond WC-West and Associated Piping), and for general site coverage. GW anticipated at ~21 feet bgs.
J-5	1, 22, 32		RSAB5-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32		RSAB5-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32		RSAB5-19B	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32		RSAB5-25	25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-6	1, 22, 32	RSAI6	RSAB6-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located east of GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds), as an upgrade boring to evaluate LOU 22 (Pond WC-West and Associated Piping), and for general site coverage. GW anticipated at ~21 feet bgs.
J-6	1, 22, 32		RSAB6-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-6	1, 22, 32		RSAB6-10B	10	X	X	X																	

**Table 2**  
**Soil Sampling and Analytical Plan for Area I**  
 Phase B Source Area Investigation Work Plan  
 Tronox Facility - Henderson, Nevada  
 Page 2 of 6

Grid Location	LOU Number	Boring No.	Date Sampled	Sample ID Number	Sample Depth <sup>1</sup> (ft-bgs)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 620)	TPH-GRO (EPA 80155)	VOCs <sup>3</sup> (EPA 826B)	Hex Cr <sup>6</sup> (EPA 7199)	Wet Chem <sup>5</sup>	OCFs <sup>6</sup> (8081A)	Formaldehyde (EPA 8315A)	TPH-DRO/ORO (EPA 8015A)	Total Cyanide (EPA 8012A)	SVOCs <sup>7</sup> (EPA 8270C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>10</sup> (EPA 168)	OPP <sup>11</sup>	Organic Acids <sup>14</sup>	Asbestos <sup>11</sup> EPA 8460/97028	Geotech Tests <sup>12</sup>	Location Description and Characterized Area Rationale
J-8	1, 2, 23, 32	RSAJ8		RSAJ8-0.0	0.0	X	X		X	X	X	X		X		X		X						Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds), LOUs 22 & 23 (Ponds WC-West & WC-East), and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit), and for general site coverage.	
J-8	1, 2, 23, 32			RSAJ8-0.5B	0.5	X	X		X	X	X	hold		X		X		X							
J-8	1, 2, 23, 32			RSAJ8-10B	10	X	X		X	X	X	hold		X		X		X							
J-8	1, 2, 23, 32			RSAJ8-20B	20	X	X		X	X	X	hold		X		X		X							
J-8	1, 2, 23, 32			RSAJ8-30B	30	X	X		X	X	X	hold		X		X		X							
J-8	1, 2, 23, 32			RSAJ8-33B	33	X	X		X	X	X	hold		X		X		X							
K-2	2	SA152		SA152-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds) as a step-out boring to SA18 as requested by NDEP in comments to the Phase A report. GW anticipated at ~35 feet bgs; MC/g ~31'
K-2	2			SA152-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-2	2			SA152-10B	10	X	X		X	X	X	removed		X		X		X							
K-2	2			SA152-22B	22	X	X		X	X	X	removed		X		X		X							
K-2	2			SA152-34B	34	X	X		X	X	X	removed		X		X		X							
K-2	2	RSAK2		RSAK2-0.0	0.0	X	X		X	X	X	X		X		X		X							Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds) and to evaluate potential offsite VOC source to the west.
K-2	2			RSAK2-0.5B	0.5	X	X		X	X	X	hold		X		X		X							
K-2	2			RSAK2-10B	10	X	X		X	X	X	hold		X		X		X							
K-2	2			RSAK2-22B	20	X	X		X	X	X	hold		X		X		X							
K-2	2			RSAK2-22B	30	X	X		X	X	X	hold		X		X		X							
K-2	2			RSAK2-22B	35	X	X		X	X	X	hold		X		X		X							
K-3	1, 2, 32	SA88		SA88-0.0	0.0	X	X		X	X	X	removed		X		X		X							
K-3	1, 2, 32			SA88-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-3	1, 2, 32			SA88-10B	10	X	X		X	X	X	removed		X		X		X							
K-3	1, 2, 32			SA88-21B	21	X	X		X	X	X	removed		X		X		X							
K-3	1, 2, 32			SA88-32B	32	X	X		X	X	X	removed		X		X		X							
K-3	1, 32	RSAK3		RSAK3-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located on the northern berm GW-11 Pond to evaluate LOU 1 (former Trade Effluent Ponds) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~33 feet bgs
K-3	1, 32			RSAK3-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-3	1, 32			RSAK3-10B	10	X	X		X	X	X	removed		X		X		X							
K-3	1, 32			RSAK3-20B	20	X	X		X	X	X	removed		X		X		X							
K-3	1, 32			RSAK3-31B	31	X	X		X	X	X	removed		X		X		X							
K-3	2, 32, 60	SA134		SA134-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds), LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit), and LOU 60 (former Acid Drain System). GW anticipated at ~33 feet bgs
K-3	2, 32, 60			SA134-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-3	2, 32, 60			SA134-10B	10	X	X		X	X	X	removed		X		X		X							
K-3	2, 32, 60			SA134-20B	20	X	X		X	X	X	removed		X		X		X							
K-3	2, 32, 60			SA134-31B	31	X	X		X	X	X	removed		X		X		X							
K-4	1, 2, 32	RSAK4		RSAK4-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and as an upgrade boring to LOU 1 (former Trade Effluent Settling Ponds) and LOU 2 (Open Area South of Trade Effluent Settling Ponds). GW anticipated at ~33 feet bgs
K-4	1, 2, 32			RSAK4-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-4	1, 2, 32			RSAK4-10B	10	X	X		X	X	X	removed		X		X		X							
K-4	1, 2, 32			RSAK4-20B	20	X	X		X	X	X	removed		X		X		X							
K-4	1, 2, 32			RSAK4-31B	31	X	X		X	X	X	removed		X		X		X							
K-5	1, 32	RSAK5		RSAK5-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~24 feet bgs
K-5	1, 32			RSAK5-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-5	1, 32			RSAK5-10B	10	X	X		X	X	X	removed		X		X		X							
K-5	1, 32			RSAK5-22B	22	X	X		X	X	X	removed		X		X		X							
K-5	1, 32			RSAK5-30B	30	X	X		X	X	X	removed		X		X		X							
K-6	1, 32	SA76		SA76-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located north of groundwater recharge trenches to evaluate LOU 1 (former Trade Effluent Settling Ponds) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~22 feet bgs
K-6	1, 32			SA76-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-6	1, 32			SA76-10B	10	X	X		X	X	X	removed		X		X		X							
K-6	1, 32			SA76-20B	20	X	X		X	X	X	removed		X		X		X							
K-6	1, 32			SA76-25B	25	X	X		X	X	X	removed		X		X		X							
K-6	1, 32	RSAK6		RSAK6-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located south of groundwater recharge trenches to evaluate LOU 1 (former Trade Effluent Settling Ponds) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~26 feet bgs
K-6	1, 32			RSAK6-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-6	1, 32			RSAK6-10B	10	X	X		X	X	X	removed		X		X		X							
K-6	1, 32			RSAK6-24B	24	X	X		X	X	X	removed		X		X		X							
K-6	1, 32			RSAK6-30B	30	X	X		X	X	X	removed		X		X		X							
K-7	1, 22, 23, 32	RSAK7		RSAK7-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds), LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit), and pipelines associated with LOUs 22 and 23 (Ponds WC-West & WC-East).
K-7	1, 22, 23, 32			RSAK7-0.5B	0.5	X	X		X	X	X	hold		X		X		X							
K-7	1, 22, 23, 32			RSAK7-10B	10	X	X		X	X	X	hold		X		X		X							
K-7	1, 22, 23, 32			RSAK7-20B	20	X	X		X	X	X	hold		X		X		X							
K-7	1, 22, 23, 32			RSAK7-27B	27	X	X		X	X	X	hold		X		X		X							
K-8	1, 32	RSAK8		RSAK8-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and as upgrade location to LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~28 feet bgs
K-8	1, 32			RSAK8-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
K-8	1, 32			RSAK8-10B	10	X	X		X	X	X	removed		X		X		X							
K-8	1, 32			RSAK8-20B	20	X	X		X	X	X	removed		X		X		X							
K-8	1, 32			RSAK8-26B	26	X	X		X	X	X	removed		X		X		X							
L-2	2	RSAL2		RSAL2-0.0	0.0	X	X		X	X	X	hold		X		X		X							Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds).
L-2	2			RSAL2-0.5B	0.5	X	X		X	X	X	hold		X		X		X							
L-2	2			RSAL2-10B	10	X	X		X	X	X	hold		X		X		X							
L-2	2			RSAL2-20B	20	X	X		X	X	X</														

**Table 2**  
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Grid Location	LOU Number	Boring No.	Sample Depth (ft. bgs)	Sample ID Number	Sample Depth (ft. bgs)	Perchlorate (EPA 3140)	Metals <sup>2</sup> (EPA 6020)	TPH-GRO (EPA 8165)	VOCs <sup>1</sup> (EPA 1288B)	Hex Cr <sup>6</sup> (EPA 7199)	Wet Chem <sup>5</sup>	OCFs <sup>4</sup> (891A)	Formaldehyde (EPA 8315A)	TPH-DRO/ORO (EPA 6015B)	Total Cyanide (EPA 8012A)	SVOCS <sup>7</sup> (EPA 8270C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>15</sup> (EPA 1668)	OPPs <sup>12</sup>	Organic Acids <sup>4</sup>	Asbestos <sup>11</sup> EPA 8461R-971028	Geotech Tests <sup>14</sup>	Location Description and Characterized Area Rationale		
L-3	2	RSAL3	0.0	RSAL3-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X						Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds).		
L-3	2	RSAL3	0.5	RSAL3-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X						GW anticipated at ~32 feet bgs		
L-3	2	RSAL3	10	RSAL3-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-3	2	RSAL3	20	RSAL3-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-3	2	RSAL3	30	RSAL3-30B	30	X	X	X	X	X	X	removed		X		X		X	X								
L-4	32, 60	SA189	0.0	SA189-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X							Boring located to evaluate LOU 60 (Acid Drain System) pipeline/flume route and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit).	
L-4	32, 60	SA189	10	SA189-10B	10	X	X	X	X	X	X	removed		X		X		X	X							GW anticipated at ~31 feet bgs	
L-4	32, 60	SA189	20	SA189-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-4	32, 60	SA189	29	SA189-29B	29	X	X	X	X	X	X	removed		X		X		X	X								
L-4	2, 32, 60	RSAL4	0.0	RSAL4-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X							Boring located to evaluate LOU 60 (Acid Drain System) pipeline/flume route and as a step-out to LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 2 (Open Area South of Trade Effluent Settling Ponds).	
L-4	2, 32, 60	RSAL4	0.5	RSAL4-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
L-4	2, 32, 60	RSAL4	10	RSAL4-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-4	2, 32, 60	RSAL4	20	RSAL4-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-4	2, 32, 60	RSAL4	29	RSAL4-29B	29	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	SA74	0.0	SA74-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located adjacent to new D-1 building to evaluate LOU 88 (AP Plant Area New Building D-1 Washdown) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit).
L-5	32, 59	SA74	0.5	SA74-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								GW anticipated at ~31 feet bgs
L-5	32, 59	SA74	10	SA74-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	SA74	20	SA74-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	SA74	29	SA74-29B	29	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	RSAL5	0.0	RSAL5-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located to evaluate LOU 88 (AP Plant Area New Building D-1 Washdown) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit).
L-5	32, 59	RSAL5	0.5	RSAL5-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	RSAL5	10	RSAL5-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	RSAL5	20	RSAL5-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	RSAL5	30	RSAL5-30B	30	X	X	X	X	X	X	removed		X		X		X	X								
L-5	32, 59	RSAL5	32, 59	RSAL5-32, 59	32, 59	X	X	X	X	X	X	removed		X		X		X	X								
L-7	22, 23	RSAL7	0.0	RSAL7-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located to evaluate pipeline associated with LOUs 22 and 23 (Ponds WC-West & WC-East), and for general Site coverage.
L-7	22, 23	RSAL7	0.5	RSAL7-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
L-7	22, 23	RSAL7	10	RSAL7-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-7	22, 23	RSAL7	27	RSAL7-27B	27	X	X	X	X	X	X	removed		X		X		X	X								
L-7	22, 23	RSAL7	30	RSAL7-30B	30	X	X	X	X	X	X	removed		X		X		X	X								
L-7	32	SA75	0.0	SA75-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit).
L-7	32	SA75	0.5	SA75-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
L-7	32	SA75	10	SA75-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-7	32	SA75	20	SA75-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-7	32	SA75	28	SA75-28B	28	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAL8	0.0	RSAL8-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located north of LOU 5 (Beta Ditch) along Timet boundary as a downgradient boring to LOU 5 (Beta Ditch) and for general Site coverage.
L-8	5	RSAL8	0.5	RSAL8-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAL8	10	RSAL8-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAL8	20	RSAL8-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAL8	28	RSAL8-28B	28	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAM2	0.0	RSAM2-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located north of LOU 5 (Beta Ditch) along Olin (Pioneer) boundary to evaluate potential VOC sources from the west, as a step-out boring for LOU 2 (Open Area South of Trade Effluent Settling Ponds), and for general Site coverage.
L-8	5	RSAM2	0.5	RSAM2-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAM2	10	RSAM2-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAM2	22	RSAM2-22B	22	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	RSAM2	35	RSAM2-35B	35	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	SA67	0.0	SA67-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located south of LOU 5 (Beta Ditch) and to evaluate potential VOC sources from the west.
L-8	5	SA67	0.5	SA67-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	SA67	10	SA67-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	SA67	20	SA67-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	SA67	30	SA67-30B	30	X	X	X	X	X	X	removed		X		X		X	X								
L-8	5	SA67	35	SA67-35B	35	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	SA100	0.0	SA100-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds) and to evaluate potential VOC sources from the west.
M-3	2	SA100	0.5	SA100-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	SA100	10	SA100-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	SA100	20	SA100-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	SA100	30	SA100-30B	30	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	RSAM3	0.0	RSAM3-0.0	0.0	X	X	X	X	X	X	removed		X		X		X	X								Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds).
M-3	2	RSAM3	0.5	RSAM3-0.5B	0.5	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	RSAM3	10	RSAM3-10B	10	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	RSAM3	20	RSAM3-20B	20	X	X	X	X	X	X	removed		X		X		X	X								
M-3	2	RSAM3	30	RSAM3-30B	30	X	X	X	X	X	X	removed		X		X		X	X								
M-4	2	SA69	0.0	SA69-0.0	0.0																						

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Grid Location	LOU Number	Boring No.	Sample Date	Sample ID Number	Sample Depth <sup>1</sup> (ft. bgs)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 602)	TPH-GRO (EPA 8015B)	VOCs <sup>3</sup> (EPA 826B)	Hex Cr <sup>4</sup> (EPA 715)	Wet Chem <sup>5</sup>	OCPS <sup>6</sup> (801A)	Formaldehyde (EPA 815A)	TPH-DRO/ORO (EPA 8015B)	Total Cyanide (EPA 9072A)	SVOCS <sup>7</sup> (EPA 870C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>16</sup> (EPA 168)	OPPs <sup>13</sup>	Organic Acids <sup>14</sup>	Asbestos <sup>11</sup> EPA/49 CFR 87/038	Geotech Tests <sup>12</sup>	Location Description and Characterized Area Rationale
N-2	35	SA56		SA56-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located along western Site boundary to evaluate LOU 35 (former Truck Emptying/Dumping Site) and potential offsite VOC sources from the west. PCBs and TPH-G were detected in Phase A SA09. GW anticipated at ~39 feet bgs
N-2	35			SA56-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-2	35			SA56-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-2	35			SA56-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-2	35			SA56-2.3B	2.3	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-2	35			SA56-3.0B	3.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-2	35			SA56-3.7B	3.7	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-2	n/a	RSAN2	Jul-08	RSAN2-0.0	0.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					Boring located along western Site boundary north of LOU 35 (Truck Emptying/Dumping Site) to evaluate potential offsite VOC sources from the west, and for general Site coverage. GW anticipated at ~37 feet bgs
N-2	n/a			RSAN2-0.5B	0.5	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-2	n/a			RSAN2-1.0B	1.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-2	n/a			RSAN2-2.0B	2.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-2	n/a			RSAN2-3.0B	3.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-2	n/a			RSAN2-3.5B	3.5	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-3	54	SA85		SA85-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located northwest of AP Lab building to evaluate LOU 54 (AP Plant Area Change House/Laboratory Septic Tank). Dilute formaldehyde titrant was used in LOU 38 (Former Satellite Accumulation Point, AP Laboratory) and possibly discharged to LOU 54. GW anticipated at ~35 feet bgs
N-3	54			SA85-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	54			SA85-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	54			SA85-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	54			SA85-3.0B	3.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	54			SA85-3.5B	3.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	38	RSAN3		RSAN3-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located to evaluate LOU 38 (Former Satellite Accumulation Point, AP Laboratory). Dilute formaldehyde titrant was used in the AP Laboratory. GW anticipated at ~34 feet bgs
N-3	38			RSAN3-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	38			RSAN3-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	38			RSAN3-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	38			RSAN3-3.2B	3.2	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-3	38			RSAN3-4.0B	4.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	39	SA87	Jul-08	SA87-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located at the southeast corner of the AP Maintenance Shop building to evaluate LOU 39 (Satellite Accumulation Point, AP Maintenance Shop).
N-4	39			SA87-0.5B	0.5	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-4	39			SA87-1.0B	1.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-4	39			SA87-2.0B	2.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-4	39			SA87-2.5B	2.5	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-4	39			SA87-3.0B	3.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
N-4	5	SA165		SA165-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located in LOU 5 (Beta Ditch) to evaluate the Beta Ditch and for general Site coverage. GW anticipated at ~30 feet bgs
N-4	5			SA165-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	5			SA165-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	5			SA165-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	5			SA165-3.0B	3.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	39	RSAN4		RSAN4-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located to evaluate former drum storage area in LOU 39 (Satellite Accumulation Point, AP Maintenance Shop) and for general Site coverage. GW anticipated at ~33 feet bgs
N-4	39			RSAN4-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	39			RSAN4-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	39			RSAN4-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	39			RSAN4-3.1B	3.1	X	X	X	X	X	X	removed		X		X	X	X	X	X					
N-4	39			RSAN4-4.0B	4.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	35	RSAC2	Jul-08	RSAC2-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located along western boundary of Site to evaluate LOU 35 (Truck Emptying/Dumping Site) and potential offsite VOC sources from the west. PCBs and TPH-GRO were detected in Phase A soil boring SA09.
O-2	35			RSAC2-0.5B	0.5	X	X	X	X	X	X	hold		X		X	X	X	X	X					
O-2	35			RSAC2-1.0B	1.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
O-2	35			RSAC2-2.0B	2.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
O-2	35			RSAC2-3.0B	3.0	X	X	X	X	X	X	hold		X		X	X	X	X	X					
O-2	35			RSAC2-3.3B	3.3	X	X	X	X	X	X	hold		X		X	X	X	X	X					
O-2	n/a	SA35		SA35-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located along western Site boundary to evaluate potential offsite VOC sources from the west. PCBs and TPH-GRO were detected in Phase A soil boring SA09.
O-2	n/a			SA35-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	n/a			SA35-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	n/a			SA35-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	n/a			SA35-3.2B	3.2	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	n/a			SA35-4.0B	4.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	35, 60	SA166		SA166-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located along western Site boundary to evaluate LOU 35 (Truck Emptying/Dumping Site), LOU 60 (Acid Drain System), and potential offsite VOC sources from the west. GW anticipated at ~33 feet bgs
O-2	35, 60			SA166-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	35, 60			SA166-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	35, 60			SA166-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-2	35, 60			SA166-3.1B	3.1	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-3	35	SA48	Jul-08	SA48-0.0	0.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					Boring located along western Site boundary to evaluate LOU 35 (Truck Emptying/Dumping Site) and potential offsite VOC sources from the west. PCBs and TPH-GRO were detected in Phase A soil boring SA09.
O-3	35			SA48-0.5B	0.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-3	35			SA48-1.0B	1.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-3	35			SA48-2.0B	2.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-3	35			SA48-3.0B	3.0	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-3	35			SA48-3.5B	3.5	X	X	X	X	X	X	removed		X		X	X	X	X	X					
O-3	35	SA57	Jul-08	SA57-0.0	0.0	X	X	X	X	X	X	hold		X	</										

**Table 2**  
**Soil Sampling and Analytical Plan for Area I**  
 Phase B Source Area Investigation Work Plan  
 Tronox Facility - Henderson, Nevada  
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Grid Location	LOU Number	Boring No.	Sample ID Number	Sample Depth <sup>1</sup> (ft)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 8020)	TPH-GRO (EPA 8015B)	VOCs <sup>3</sup> (EPA 8260B)	Hex Cr <sup>6</sup> (EPA 7199)	Wet Chem <sup>4</sup>	OCFs <sup>4</sup> (8081A)	Formaldehyde (EPA 8315A)	TPH-DRO/ORO (EPA 8015B)	Total Cyanide (EPA 9072A)	SVOCS <sup>7</sup> (EPA 8270C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>11</sup> (EPA 1658)	OPPs <sup>12</sup>	Organic Acids <sup>4</sup>	Asbestos <sup>11</sup> EPA 8460-87028	Geotech Tests <sup>12</sup>	Location Description and Characterized Area Rationale
O-3	64	RSAC3	RSAC3-0.0	0.0																				Boring located to evaluate soil stain in northern portion of LOU 64 (Koch Materials Company Site).
O-3	64		RSAC3-0.5B	0.5	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		Materials Company Site). GW anticipated at ~33 feet bgs
O-3	64		RSAC3-1.0B	1.0	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-3	64		RSAC3-2.0B	2.0	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-3	64		RSAC3-3.1B	3.1	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-3	64		RSAC3-3.7B	3.7	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed		
O-3	60, 64	SA176	SA176-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Boring located to evaluate LOU 60 (Acid Drain System) pipelines and LOU 64 (Koch Materials Company Site). GW anticipated at ~39 feet bgs
O-3	60, 64		SA176-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
O-3	60, 64		SA176-1.0B	1.0	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-3	60, 64		SA176-2.0B	2.0	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed		
O-3	60, 64		SA176-2.3B	2.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
O-3	60, 64		SA176-3.0B	3.0	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed		
O-3	60, 64		SA176-3.7B	3.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
O-3	n/a	SA207	SA207-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Boring located to evaluate area between LOU 35 (Truck Emptying/Dumping Site) and LOU 64 (Koch Materials Company Site).
O-3	n/a		SA207-0.5B	0.5	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-3	n/a		SA207-1.0B	1.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-3	n/a		SA207-2.0B	2.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-3	n/a		SA207-3.0B	3.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-3	n/a		SA207-4.0B	4.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64	SA46	SA46-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Boring located to evaluate LOU 64 (Koch Materials Company Site) OCFs added to SA46 at the request of NDEP in comments to the Phase A report.
O-4	64		SA46-0.5B	0.5	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA46-1.0B	1.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA46-2.0B	2.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA46-3.0B	3.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64	SA47	SA47-0.0	0.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		Boring located to evaluate LOU 64 (Koch Materials Company Site).
O-4	64		SA47-0.5B	0.5	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA47-1.0B	1.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA47-2.0B	2.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA47-3.0B	3.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA47-3.5B	3.5	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64	SA65	SA65-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Located as a downgradient boring to LOU 64 (Koch Materials Company Site) as a step-out to LOU 35 (Truck Emptying/Dumping Site) to investigate for VOCs from potential onsite sources to the west, and for general site coverage. GW anticipated at ~37 feet bgs
O-4	64		SA65-0.5B	0.5	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA65-1.0B	1.0	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA65-2.2B	2.2	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA65-3.0B	3.0	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed		
O-4	64		SA65-3.5B	3.5	X	X	X	X	X	X	removed	X	X	X	X	X	X	X	X	X	X	X		
O-4	64	RSA04	RSA04-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Boring located to evaluate LOU 64 (Koch Materials Company Site).
O-4	64		RSA04-0.5B	0.5	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		RSA04-1.0B	1.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		RSA04-2.0B	2.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		RSA04-3.0B	3.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		RSA04-3.6B	3.6	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	60, 64	SA182	SA182-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Boring located to evaluate soil stain in northern portion of LOU 64 (Koch Materials Company Site) and LOU 60 (Acid Drain System). GW anticipated at ~40 feet bgs
O-4	60, 64		SA182-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
O-4	60, 64		SA182-1.0B	1.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
O-4	60, 64		SA182-2.0B	2.0	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed		
O-4	60, 64		SA182-2.4B	2.4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
O-4	60, 64		SA182-3.0B	3.0	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed		
O-4	60, 64		SA182-3.6B	3.6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
O-4	64	SA183	SA183-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Boring located to evaluate soil stain in northern portion of LOU 64 (Koch Materials Company Site).
O-4	64		SA183-0.5B	0.5	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA183-1.0B	1.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA183-2.0B	2.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA183-3.0B	3.0	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
O-4	64		SA183-3.3B	3.3	X	X	X	X	X	X	hold	X	X	X	X	X	X	X	X	X	X	X		
<b>Total #:</b>		<b>68</b>			<b>264</b>	<b>263</b>	<b>85</b>	<b>253</b>	<b>263</b>	<b>263</b>	<b>124</b>	<b>8</b>	<b>251</b>	<b>246</b>	<b>42</b>	<b>263</b>	<b>68</b>	<b>33</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>68</b>	<b>0</b>	

Grid Location	LOU Number	Boring No.	Sample ID Number	Sample Depth <sup>1</sup> (ft-bgs)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 6020)	TPH-GRO (EPA 80155)	VOCs <sup>3</sup> (EPA 8260B)	Hex Cr <sup>6</sup> (EPA 7199)	Wet Chem <sup>5</sup>	OCPs <sup>6</sup> (8081A)	Formaldehyde (EPA 8315A)	TPH-DRO/ORO (EPA 8015B)	Total Cyanide (EPA 8012A)	SVOCs <sup>7</sup> (EPA 8270C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>10</sup> (EPA 1668)	OPP <sup>11</sup>	Organic Acids <sup>14</sup>	Asbestos <sup>11</sup> EPA/ASIR-97/028	Geotech Tests <sup>11</sup>	Location Description and Characterized Area Rationale
<b>Synthetic Precipitate Leaching Procedure (SPL) Samples<sup>1</sup>:</b>																								
J-3	1, 32	RSAJ3	RSAJ3-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from the outlet of LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes from Alluvium (Qal) soils. Expected soil type: Sand.
J-3	1, 32	RSAJ3	DD* = depth (ft)	DD* = depth (ft)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Optional sample - only to be collected if soil type is different than at 10 ft bgs; no sample will be collected within the capillary fringe. Contact between Qal & MC1g1 is approximately 38 feet bgs. Groundwater is expected to occur at approximately 33.
I-7	22, 23	RSAT7	RSAT7-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from the northern portion of LOU 1 (former Trade Effluent Settling Ponds), LOUs 22 & 23 (Ponds WC-West & WC-East), and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) to evaluate leaching potential of Site-related analytes.
I-7	22, 23	RSAT7	DD* = depth (ft)	DD* = depth (ft)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Optional sample - only to be collected if soil type is different than at 10 ft bgs; no sample will be collected within the capillary fringe. Contact between Qal & MC1g1 is approximately 27 feet bgs. Groundwater is expected to occur at approximately 25.
M-3	2	RSAM3	RSAM3-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected below LOU 2 (Open Area South of Trade Effluent Settling Ponds) to evaluate leaching potential of Site-related analytes. Expected soil type: Sand.
M-3	2	RSAM3	RSAM3-30B	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from below the northern part of LOU 2 (Open Area South of Trade Effluent Settling Ponds) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (MC1g1) soils. Contact between Qal & MC1g1 is approximately 27 feet bgs. Groundwater is expected to occur at approximately 25.
N-2	35	SA56	SA56-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from the northwest portion of LOU 35 (Truck Emptying/Dumping Site) to evaluate leaching potential of Site-related analytes. Expected soil type: Gravelly Sand.
N-2	35	SA56	SA56-30B	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from below beneath the northwest portion of LOU 35 (Truck Emptying/Dumping Site) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (MC1g1) soils. Contact between Qal and M.
O-2	35, 60	SA166	SA166-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from beneath the northwest portion of LOU 35 (Truck Emptying/Dumping Site) and LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes. Expected soil type: Sandy Gravel.
O-2	35, 60	SA166	SA166-35B	35	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from below beneath the northwest portion of LOU 35 (Truck Emptying/Dumping Site) and LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (MC1g1) so.
O-4	64	SA182	SA182-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from below beneath the northeast portion of LOU 64 (Koch Materials Company Site) and LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes. Expected soil type: Gravelly Sand.
O-4	64	SA182	SA182-30B	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Soil sample collected from below beneath the northeast portion of LOU 64 (Koch Materials Company Site) and LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (MC1g1) so.
<b>Number of Samples:</b>																								
SPLC Samples: 276																								
Field Duplicates (10%): 28																								
Field Blanks: 1																								
Equipment Rinse Blanks: 1																								
Trip Blank Samples: 0																								
Matrix Spike (5%): 14																								
Matrix Spike Duplicate (5%): 14																								
Total Sample Count: 332																								
Not applicable - boring is not associated with a specific LOU but is located to evaluate soil for general area-wide coverage.																								
n/a																								
X																								
Sample will be collected and analyzed.																								
No sample collected under Phase B sampling program.																								
Sample depth to be determined in the field where DID = sample depth (ft).																								
Total petroleum hydrocarbons - Gasoline-Range Organics.																								
Total petroleum hydrocarbons - Diesel-Range Organics/Oil-Range Organics.																								
SPLC samples will be analyzed by EPA method 1312 using two preparation methods: 1) with extraction fluid #2 (reagent water at pH 5.00±0.05), and 2) with extraction method #3 (reagent water), per NDEP.																								
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. Alternatively, if an unpaved area is within a reasonable distance, the sample will be moved to the unpaved area.																								
Metals analyses includes Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Tin, Titanium, Thallium, Tungsten, Uranium, Vanadium, Zinc.																								
Hexavalent Chromium																								
Wet chemistry parameters include: alkalinity (total), CO <sub>3</sub> , HCO <sub>3</sub> <sup>-</sup> , ammonia, bromide, chloride, conductivity, cyanide (total), nitrate, nitrite, perchlorate, pH, phosphate (total), sulfate, surfactants (MBAs), TDS, Total Organic Carbon, and TSS.																								
Organochlorine Pesticides (includes analysis for hexachlorobenzene).																								
Semi-volatile Organic Compounds																								
Radionuclides consists of alpha spectrometry for isotopic uranium and isotopic thorium, and Radium-226, plus Radium-228 by beta counting (per NDEP).																								
Dioxins/furans will be analyzed by EPA Method 8290 for all samples. Screening reports will be provided for 90% of the samples and full data packages for 10% of the samples.																								
Polychlorinated biphenyls - Sample locations will be analyzed by USEPA methods 8082 and 1668A. Concrete surfaces at these locations will also include chip and/or wipe samples per EPA Region 1 SOP for Sampling Concrete in the Field (1997).																								
Soil samples for asbestos analyses will be collected from a depth of 0 to 2-inches bgs.																								
Geotechnical Tests consist of: moisture content (ASTM D-2216), grain size analysis (ASTM D-422 and C-117-04), Soil Dry Bulk Density (ASTM D-2937), Grain Density (ASTM D-854, Soil-Water Filled Porosity (ASTM D-2216), Vertical Hydraulic Conductivity (ASTM D-5094/USEPA 9100).																								
Organophosphorous Pesticides																								
Organic Acid analysis includes the following analytes: 4-Chlorobenzene sulfonic acid; Benzenesulfonic acid; O,O-Diethylphosphorothioic acid; O,O-Dimethylphosphorothioic acid; and Phthalic acid.																								
Green-shading indicates new addition to this table as soil sample will be analyzed for the specific analyte class: NDEP (July 21, 2008)																								
Text in blue is recently added																								
Duplicate Sample																								

**Tronox Revised Approach to Phase B Site Investigation**

Comments received from the Nevada Division of Environmental Protection (NDEP) on the four draft Phase B Site Investigation Area Work Plans have significantly increased both the number of samples to be collected and chemical analytes to be tested. The estimated cost for the increased scope is about \$1.3 million. Tronox has reserved \$6.2 million to perform the Phase B work and faces difficult financial issues which preclude increasing the budget.

To stay within approved financial reserves, Tronox is proposing several adjustments to the work plans. The adjustments range from employing less costly methods for collecting some of the soil samples to limiting sampling in areas of the site not being proposed for closure. Each proposal is discussed in more detail below. The full list of proposed sample plan adjustments includes:

1. Use a Geoprobe™ to collect proposed soil samples at depths of 0-0.5 and 10 feet below ground surface (bgs).
2. Supplement ENSR data validation with services provided by LDC.
3. Limit samples to be analyzed for Organic Acids by Conceptual Site Model (CSM) review.
4. Limit the number of PCB congener analyses by CSM review.
5. Reduce the number of samples for Organophosphorus Pesticides (OPPs) and Organochlorine Pesticides (OCPs) by CSM review.
6. Reduce the number of soil samples collected between 10 feet bgs and the capillary fringe.
7. Limit sampling in Area III production areas, where closure is not being requested.

**1 - Geoprobe™ Sampling**

Recent Geoprobe™ experience with soil-gas sampling demonstrated rapid set-up and penetration of alluvial soils. Tronox proposes to utilize Geoprobe™ equipment to collect 0.5 and 10 foot bgs soil samples. The soil gas investigation demonstrated that it is very possible that this equipment could reach the target depth of 10 feet bgs. As in the original work plans, Sonic rigs will be utilized to collect deeper soil samples and in any locations where the Geoprobe™ fails to reach the desired depth. A standard operating procedure for this work will be developed and provided in the final submittal to NDEP.

## 2 – Supplement Data Validation

Tronox proposes to utilize Laboratory Data Corporation (LDC) in validating sample results. ENSR will coordinate the work and will work with LDC to streamline the Tronox validation process.

## 3 – Limit samples to be analyzed for Organic Acids (OAs) by CSM review

While OAs are not on the Tronox list of Site Related Chemicals. NDEP has requested OA analysis in many samples to determine whether OAs are migrating onto the Tronox site from the west. As shown on **Figure 1** (attached) Tronox proposes to limit expensive OA soil analyses largely to Areas I and IV, along with the Beta Ditch. Soil sampling in Areas II and III will be limited to areas where acid and storm drain systems may possibly have carried OA constituents onto the site from offsite sources. **Figure 3** shows the well locations where OAs will be analyzed in the groundwater samples collected during the Phase B investigation.

## 4- Limit the number of PCB Congener Analyses by CSM review

In work plan comments, NDEP has expressed concerns that PCBs may have been generated in the electrolytic processes employed on the Tronox site. NDEP has requested use of PCB method 1668 (\$970 per sample) for congener analysis in addition to PCB method 8082 (\$75 per sample) for Arochlor analyses. Tronox has reviewed the electrolytic processes employed at the site (**see Attachment A**) and finds no mechanism by which benzene ring compounds needed for PCB formation would be present in the electrolytic cells. Accordingly, Tronox proposes to limit the number of samples analyzed by method 1668 to those shown on **Figure 2**.

## 5 – Limit the number of Organophosphorous and Organochlorine Pesticide Analyses by CSM Review

Other than Hardesty Chemical, which may have produced DDT and its degradation products on the Tronox site, Tronox knows of no other pesticide production. Accordingly, as shown on **Figure 1**, proposed sampling for OPPs and OCPs has been scaled back from the extensive sampling NDEP requested. **Attachment B** includes the rationale for proposed sampling. **Figure 3** shows the well locations where OCPs and OPPs will be analyzed in the groundwater samples collected during the Phase B investigation.

## 6 – Reduce the number of soil samples collected between 10 feet bgs and the capillary fringe.

Tronox proposes to collect soil samples at the surface (0-0.5 feet) and 10 feet bgs to evaluate the direct contact risk pathway and determine whether site related chemicals



are migrating downward toward groundwater. Soil sampling at the capillary fringe (two feet above the water table) will determine whether constituents migrating with groundwater are being sorbed onto soils. However, rather than sampling every 10 feet between 10 feet bgs and the capillary fringe, Tronox proposes to reduce the sampling frequency. Collection of samples at 10, 25, and 40 feet is proposed. Where the distance between the 10 foot sample and the capillary fringe are less than 20 feet, it is proposed that no intermediate sample be collected.

#### 7- Limit Sampling in Area III production areas, where closure is not requested.

In the draft Area III work plan submitted to NDEP, Tronox proposed judgemental sampling in production areas (South of F Street) while suggesting that future closure sampling could be limited to those analytes associated with the production processes. NDEP responded that it "did not necessarily concur" with the approach and would review the issue at the time of closure. To avoid duplication of sampling costs, Tronox suggests that since closure is not now being requested for the production areas, judgemental sampling be can be delayed until closure is required. Random grid samples in the production area will be collected and analyzed.

#### Conclusion

Adoption of the seven approaches suggested above will offset costs associated with expanding scope required by NDEP for the Phase B investigation.

## **Attachment A - Tronox Electrolytic Cells Did Not Produce PCBs**

Tronox has operated and continues to operate electrolytic cells on the Henderson Site (Site). The Nevada Division of Environmental Protection (NDEP) has questioned whether the Tronox electrolytic cells could generate Polychlorinated Biphenyl compounds (PCBs) and has requested that Tronox sample for PCB congeners using analytical method 1668A along with using method 8082A for Arochlor PCBs. Tronox maintains that the electrolytic cells utilized at the Site do not generate PCB congeners (please see the additional information below). Tronox proposes that use of PCB analytical method 1668A should be limited to samples from the west side of the Site, where NDEP believes that PCB congeners generated off-site are entering Tronox property. Arochlor PCBs associated with electric transformers have been used at the Site and a spill of PCB transformer oil has been reported. Tronox therefore proposes to utilize method 8082A for Arochlor PCBs for Phase B Site Investigation samples.

Tronox and its predecessors have operated several types of electrolytic cells on the Site since the 1940's. These include:

- Sodium chlorate cells converting  $\text{NaCl}$  to  $\text{NaClO}_3$
- Sodium perchlorate cells converting  $\text{NaClO}_3$  to  $\text{NaClO}_4$ , and
- Manganese cells plating  $\text{MnO}_2$  from manganese sulfate solutions.

The manganese dioxide cells in Units 5 and 6 (LOU 44) are the only electrolytic cells currently in operation at the Site. Associated conveyance lines from the processes in Units 5 and 6 to Mn-1 Pond (LOU 20) are also currently in operation.

PCB congeners are formed by reaction of chlorine with biphenyl (a molecule containing two joined benzene rings). While both the sodium chlorate and sodium perchlorate cells generated free chlorine (a degradation product of sodium hypochlorite, an intermediate compound in the electrolytic operation), neither process utilized organic compounds that could produce benzene ring structures which could then be chlorinated to PCBs. Graphite electrodes were used in early chlorate and perchlorate cells, but they are not associated with benzene ring structures. Similarly, urea ( $(\text{NH}_2)_2\text{CO}$ ) was used to decompose hypochlorite in the chlorate and perchlorate processes, but the carbon atom in urea would not generate benzene ring structures associated with PCB formation. Currently, the manganese dioxide electrolytic cells operate on a sulfate solution and do not generate free chlorine. While the manganese cells are covered with a layer of paraffin wax to minimize evaporation, the organic wax does not come into contact with chlorine to generate PCB congeners; therefore, PCB analysis in borings associated with Units 5 and 6 and Mn-1 Pond are not required.

## **Tronox Rationale for Proposed PCB Sampling**

Based on the discussion above, suspected PCB impacted locations, and NDEP requests, the following locations of the Tronox Facility will be sampled for PCBs.

- Soil borings along the western property boundary will be sampled for PCBs where NDEP believes that PCB congeners generated off-site are entering Tronox property. LOU 5 – Beta Ditch will also be tested for PCBs since off-site wastes entered the Tronox facility via this pathway.
- Soil borings associated with LOU 27 – PCB Storage Area, LOU 40 – PCB Transformer Spill will be sampled for PCBs.
- Per NDEP’s request, soil borings located near the WAPA site will be sampled for PCBs.

NDEP has requested a specific list of borings to be sampled for PCBs, however, some of these borings have already been drilled as part of the Area I Phase B source area investigation, were found to be in areas not associated with PCBs (as discussed above), or were a bit excessive. Figure 2 shows the soil borings proposed by Tronox to be analyzed for PCBs.

The following borings requested by NDEP have already been drilled: RSAN2, RSAO2, SA57, SA48, SA180, and RSAO4.

Tronox is proposing that the following borings requested by NDEP not be sampled for PCBs: SA35, SA70, SA175, SA155, SA107, SA158, SA62, SA145, SA61, SA144, SA71, RSAM8, RSAN7, SA151, SA208, SA31, SA122, SA34, SA177, SA68, SA59, and RSAT6.

### **Sampling Program Rationale**

Two sampling programs for PCBs are proposed and are based on locations with the potential for head and locations where surface and/or groundwater impacts may be present.

#### Locations with Surface (0.5 feet bgs), Mid-Point, and Capillary Fringe Sampling Depths

Locations with potential head are considered to be areas where percolating fluids have had the potential to facilitate downward migration of constituents in the soil column.

Locations with the potential for head include:

- LOU 5 – Beta Ditch,
- LOU 35 – Truck Dumping Area,
- LOU 59 – Storm Sewer System, and
- LOU 60 – Acid Drain System.

These locations are associated with potential off-site sources. Select soil borings associated with these locations will be sampled at surface (0.5 feet below ground surface), mid-point, and capillary fringe depths. Select soil borings along the western property boundary will also be sampled at surface, mid-point, and capillary fringe depths. The red dots on Figure 2 show the proposed PCB boring locations with the above mentioned sampling depths.

#### Surface (0.5 feet bgs) and Capillary Fringe Sampling Depths

At locations where surface and/or groundwater impacts may be present, due to wind blown sediments and/or groundwater migration, samples will be collected at surface (0.5 feet bgs) and capillary fringe depths. Figure 2 shows the proposed PCB boring locations.

#### PCB Arochlor and Congener Analysis

All sample locations will be tested for Arochlor PCBs by EPA Method 8082. Tronox proposes limited analysis of samples for Arochlor and Congener PCBs by EPA Methods 8082 and 1668A, respectively. Proposes sample locations for PCBs are shown on Figure 2 (Attached). Locations proposed for 1668A analysis include:

- two locations within the Beta Ditch (LOU 5),
- one location in the former Truck Dumping Area (LOU 35) along the western property boundary,
- one location within the PCB Storage Area (LOU 27), and
- two locations at the PCB Transformer Spill (LOU 40).

## **Attachment B - Rationale for Proposed Tronox OPP, OCC and Organic Acid Sampling**

The Tronox Site is not known to have supported production of organophosphorus pesticides (OPPs) or Organic Acids (OAs). Pesticides thought to have been produced on the Site are associated with the Hardesty Chemical lease (LOU 4), where DDT may have been produced (though production records are not available for the operation). Possible migration of OPPs and OAs from sources off-site to the west prompted NDEP in its July 21, 2008 letter, to request sampling for OPPs and organic acids in over sixty borings and numerous groundwater samples. Costs for these combined analyses exceed \$220,000. Tronox proposes to demonstrate from the Conceptual Site Model, that a much reduced number of samples is adequate to characterize OPPs and OAs at the Site.

NDEP requested OPP and OA analyses in soil borings and groundwater samples in and downstream of Beta Ditch (LOU 5), the Storm Drain System (LOU 59), and the Acid Drain System (LOU 60). Each of these LOUs will be considered below:

- LOU 5 Beta Ditch – Waste discharges from the various BMI complex companies operating to the west of the Tronox Site flowed across the Site in the Beta Ditch. Some of these flows may have contained OPPs and OAs and therefore some infiltration of these contaminants into soils below the Beta Ditch is possible. Similarly, groundwater moving north-northeast from the area west of the Site may have carried contaminants onto the Site. Tronox proposes to sample soils and groundwater along the path of the Beta Ditch for OPPs and OAs. As any seepage from the Beta Ditch would pass downward toward groundwater, soil samples will be collected from the elevation at the bottom of the Beta Ditch to the groundwater capillary fringe. Soil borings north of the Beta Ditch will be sampled at the capillary fringe for OPPs and OAs. Groundwater in the alluvium along the west side of the Site is effectively separated from groundwater on the eastern portion of the Site, by a Muddy Creek “high”. Tronox proposes to sample groundwater wells screened in the alluvium along the western edge of the site. Groundwater in the upper portion of the Muddy Creek formation will also be sampled at wells.
- LOU 59 Storm Drain System – As shown on Figure 1 (Attached) the gravity flow Storm Drain System picked up water from the area west of the Site and carried it north, moving east to 6<sup>th</sup> Street, and then north to the Beta Ditch. Since the drain lines slope to the north, it is highly unlikely that water would flow in directions opposite the flow arrows shown on the Figure. Accordingly, Storm Drain

locations east of 6<sup>th</sup> Street (between Units 1 and 2) are not likely to carry constituents from the west. Also, the depth to groundwater in the area of the Unit buildings is about 40 feet, much lower than the elevation of the storm drain piping. Movement of water from groundwater to the piping is therefore not possible. Accordingly, Tronox proposes to sample groundwater wells west of 6<sup>th</sup> Street for OPPs and OAs. In the area south of Beta Ditch and east of 6<sup>th</sup> Street, groundwater sampling for OPPs and OAs is not proposed.

- LOU 60 Acid Drain System – The same argument presented above for LOU 59 applies to LOU 60 and similar sampling for OPPs and OAs is proposed. Since the Acid Drain System is located significantly above the current and past water tables, entry of OPPs and OAs from west of the Site into the Acid Drain System would be limited to the line running from the southern end of the site northward along 5<sup>th</sup> Street. That line then runs parallel to the acid drain piping north of Unit 1, draining eastward to 9<sup>th</sup> Street then north to the conveyance leading to the former Trade Effluent Ponds (LOU 1). Since the source of OPPs and OAs from companies to the west of the Tronox Site was located in the northwest portion of the Olin Site, it is unlikely that OPPs and OAs were piped south (up hill) to an Acid Drain System inlet. Accordingly, Tronox proposes to sample for OPPs and OAs along the western edge of the Site in Area I and IV.

**Shannon Harbour**

---

**From:** Brian Rakvica  
**Sent:** Monday, September 29, 2008 5:34 PM  
**To:** Crowley, Susan; Flack, Mike; Shannon Harbour; TeriLCopeland; Paul S. Hackenberry, Jr.; Kelly Black  
**Cc:** Keith Bailey; Caceres-Schnell, Carmen; Ho, Brian; Budin-Caloroso, Jessica  
**Subject:** RE: NDEP-TRX Conference Call - Phase B SAPs Revisions  
**Importance:** High

Susan,

Thank you for the clarification on what TRX's objectives are for Wednesday's call. TRX should understand that NDEP and its consultants will do the best review possible of the submitted information; however, the review will be preliminary at best. NDEP can discuss these preliminary comments with you but TRX should understand that when the final documents are submitted and a thorough review is conducted, NDEP may have additional comments or a better understanding of the entire site that may change the direction of the preliminary comments given by the NDEP. If TRX is looking for more definite comments from NDEP, additional review time will be necessary (and additional information may be necessary also). If TRX is interested in postponing the call for this additional review, please let me know and I will discuss the review schedule with Brian and our consultants and reschedule the call. Please understand that NDEP currently has a large review work load that will delay the thorough review of TRX's submitted information.

Sincerely,  
 Shannon

*Shannon Harbour, P.E.  
 Special Projects Branch  
 NDEP BCA-Las Vegas Office*

---

**From:** Crowley, Susan [mailto:Susan.Crowley@tronox.com]  
**Sent:** Mon 9/29/2008 5:00 PM  
**To:** Flack, Mike; Shannon Harbour; Brian Rakvica; TeriLCopeland; Paul S. Hackenberry, Jr.; Kelly Black  
**Cc:** Keith Bailey; Caceres-Schnell, Carmen; Ho, Brian; Budin-Caloroso, Jessica  
**Subject:** RE: NDEP-TRX Conference Call - Phase B SAPs Revisions

Shannon,  
 Please see Mike's message below. I wanted to reinforce that what we hope to accomplish in our Wednesday teleconference is a consensus on the direction that Tronox is heading to address NDEP's comments for the four Phase B area work plans. This includes agreeing that the rational description for the work plan changes is sound, even if it is modified from what Mike Flack has provided here. This will allow us to produce revised work plans that meet NDEP's expectations. We are providing the revised Table 2, as well as the maps mentioned, so that we can get your take on their clarity in supporting the rational. We don't need a thorough review of their content at this point. Thanks.

**TRONOX LLC**  
 Susan Crowley  
 PO Box 55

9/30/2008

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*It's the set of our sails, not the force of the gales, that determines the way we go.*

---

**From:** Flack, Mike [mailto:MFlack@ensr.aecom.com]  
**Sent:** Monday, September 29, 2008 4:43 PM  
**To:** Shannon Harbour; Brian Rakvica; TeriLCopeland; Paul S. Hackenberry, Jr.; Kelly Black  
**Cc:** Keith Bailey; Crowley, Susan; Caceres-Schnell, Carmen; Ho, Brian; Budin-Caloroso, Jessica  
**Subject:** NDEP-TRX Conference Call - Phase B SAPs Revisions

At the request of Tronox, in preparation for the October 1, 2008 conference call regarding scoping revisions to the proposed Phase B program attached are:

- 1.) The narrative describing the scoping revisions, including CSM discussion and approach for PCBs, OCPs, OPPs and Organic Acids
- 2.) A "draft" Table 2 for soil sampling in Area I. This table is provided to illustrate the changes to the proposed sampling program. We are very interested if it communicates the changes easily and clearly.

The following figures will be provided tomorrow (9-29) via internet link (ENSR LeapFile)....and will also be sent via FEDEX for Wednesday AM delivery.

- 1.) A map showing the proposed sample locations for OCPs, OPPs and Organic Acids in groundwater
- 2.) A map showing the proposed sample locations for OCPs, OPPs and Organic Acids in soil
- 3.) A map showing the proposed sample locations for PCBs in soil

If there are any questions, please contact me at your earliest convenience.

THANK YOU

Michael Flack  
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1220 Avenida Acaso  
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805.388.3775  
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Thank you.



**Tronox Revised Approach to Phase B Site Investigation**

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2. Supplement ENSR data validation with services provided by LDC.
3. Limit samples to be analyzed for Organic Acids by Conceptual Site Model (CSM) review.
4. Limit the number of PCB congener analyses by CSM review.
5. Reduce the number of samples for Organophosphorus Pesticides (OPPs) and Organochlorine Pesticides (OCPs) by CSM review.
6. Reduce the number of soil samples collected between 10 feet bgs and the capillary fringe.
7. Limit sampling in Area III production areas, where closure is not being requested.

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## 2 – Supplement Data Validation

Tronox proposes to utilize Laboratory Data Corporation (LDC) in validating sample results. ENSR will coordinate the work and will work with LDC to streamline the Tronox validation process.

## 3 – Limit samples to be analyzed for Organic Acids (OAs) by CSM review

While OAs are not on the Tronox list of Site Related Chemicals. NDEP has requested OA analysis in many samples to determine whether OAs are migrating onto the Tronox site from the west. As shown on **Figure 1** (attached) Tronox proposes to limit expensive OA soil analyses largely to Areas I and IV, along with the Beta Ditch. Soil sampling in Areas II and III will be limited to areas where acid and storm drain systems may possibly have carried OA constituents onto the site from offsite sources. **Figure 3** shows the well locations where OAs will be analyzed in the groundwater samples collected during the Phase B investigation.

## 4- Limit the number of PCB Congener Analyses by CSM review

In work plan comments, NDEP has expressed concerns that PCBs may have been generated in the electrolytic processes employed on the Tronox site. NDEP has requested use of PCB method 1668 (\$970 per sample) for congener analysis in addition to PCB method 8082 (\$75 per sample) for Arochlor analyses. Tronox has reviewed the electrolytic processes employed at the site (**see Attachment A**) and finds no mechanism by which benzene ring compounds needed for PCB formation would be present in the electrolytic cells. Accordingly, Tronox proposes to limit the number of samples analyzed by method 1668 to those shown on **Figure 2**.

## 5 – Limit the number of Organophosphorous and Organochlorine Pesticide Analyses by CSM Review

Other than Hardesty Chemical, which may have produced DDT and its degradation products on the Tronox site, Tronox knows of no other pesticide production. Accordingly, as shown on **Figure 1**, proposed sampling for OPPs and OCPs has been scaled back from the extensive sampling NDEP requested. **Attachment B** includes the rationale for proposed sampling. **Figure 3** shows the well locations where OCPs and OPPs will be analyzed in the groundwater samples collected during the Phase B investigation.

## 6 – Reduce the number of soil samples collected between 10 feet bgs and the capillary fringe.

Tronox proposes to collect soil samples at the surface (0-0.5 feet) and 10 feet bgs to evaluate the direct contact risk pathway and determine whether site related chemicals

are migrating downward toward groundwater. Soil sampling at the capillary fringe (two feet above the water table) will determine whether constituents migrating with groundwater are being sorbed onto soils. However, rather than sampling every 10 feet between 10 feet bgs and the capillary fringe, Tronox proposes to reduce the sampling frequency. Collection of samples at 10, 25, and 40 feet is proposed. Where the distance between the 10 foot sample and the capillary fringe are less than 20 feet, it is proposed that no intermediate sample be collected.

#### 7- Limit Sampling in Area III production areas, where closure is not requested.

In the draft Area III work plan submitted to NDEP, Tronox proposed judgemental sampling in production areas (South of F Street) while suggesting that future closure sampling could be limited to those analytes associated with the production processes. NDEP responded that it "did not necessarily concur" with the approach and would review the issue at the time of closure. To avoid duplication of sampling costs, Tronox suggests that since closure is not now being requested for the production areas, judgemental sampling be can be delayed until closure is required. Random grid samples in the production area will be collected and analyzed.

#### Conclusion

Adoption of the seven approaches suggested above will offset costs associated with expanding scope required by NDEP for the Phase B investigation.

## **Attachment A - Tronox Electrolytic Cells Did Not Produce PCBs**

Tronox has operated and continues to operate electrolytic cells on the Henderson Site (Site). The Nevada Division of Environmental Protection (NDEP) has questioned whether the Tronox electrolytic cells could generate Polychlorinated Biphenyl compounds (PCBs) and has requested that Tronox sample for PCB congeners using analytical method 1668A along with using method 8082A for Arochlor PCBs. Tronox maintains that the electrolytic cells utilized at the Site do not generate PCB congeners (please see the additional information below). Tronox proposes that use of PCB analytical method 1668A should be limited to samples from the west side of the Site, where NDEP believes that PCB congeners generated off-site are entering Tronox property. Arochlor PCBs associated with electric transformers have been used at the Site and a spill of PCB transformer oil has been reported. Tronox therefore proposes to utilize method 8082A for Arochlor PCBs for Phase B Site Investigation samples.

Tronox and its predecessors have operated several types of electrolytic cells on the Site since the 1940's. These include:

- Sodium chlorate cells converting  $\text{NaCl}$  to  $\text{NaClO}_3$
- Sodium perchlorate cells converting  $\text{NaClO}_3$  to  $\text{NaClO}_4$ , and
- Manganese cells plating  $\text{MnO}_2$  from manganese sulfate solutions.

The manganese dioxide cells in Units 5 and 6 (LOU 44) are the only electrolytic cells currently in operation at the Site. Associated conveyance lines from the processes in Units 5 and 6 to Mn-1 Pond (LOU 20) are also currently in operation.

PCB congeners are formed by reaction of chlorine with biphenyl (a molecule containing two joined benzene rings). While both the sodium chlorate and sodium perchlorate cells generated free chlorine (a degradation product of sodium hypochlorite, an intermediate compound in the electrolytic operation), neither process utilized organic compounds that could produce benzene ring structures which could then be chlorinated to PCBs. Graphite electrodes were used in early chlorate and perchlorate cells, but they are not associated with benzene ring structures. Similarly, urea ( $(\text{NH}_2)_2\text{CO}$ ) was used to decompose hypochlorite in the chlorate and perchlorate processes, but the carbon atom in urea would not generate benzene ring structures associated with PCB formation. Currently, the manganese dioxide electrolytic cells operate on a sulfate solution and do not generate free chlorine. While the manganese cells are covered with a layer of paraffin wax to minimize evaporation, the organic wax does not come into contact with chlorine to generate PCB congeners; therefore, PCB analysis in borings associated with Units 5 and 6 and Mn-1 Pond are not required.

### **Tronox Rationale for Proposed PCB Sampling**

Based on the discussion above, suspected PCB impacted locations, and NDEP requests, the following locations of the Tronox Facility will be sampled for PCBs.

- Soil borings along the western property boundary will be sampled for PCBs where NDEP believes that PCB congeners generated off-site are entering Tronox property. LOU 5 – Beta Ditch will also be tested for PCBs since off-site wastes entered the Tronox facility via this pathway.
- Soil borings associated with LOU 27 – PCB Storage Area, LOU 40 – PCB Transformer Spill will be sampled for PCBs.
- Per NDEP’s request, soil borings located near the WAPA site will be sampled for PCBs.

NDEP has requested a specific list of borings to be sampled for PCBs, however, some of these borings have already been drilled as part of the Area I Phase B source area investigation, were found to be in areas not associated with PCBs (as discussed above), or were a bit excessive. Figure 2 shows the soil borings proposed by Tronox to be analyzed for PCBs.

The following borings requested by NDEP have already been drilled: RSAN2, RSAO2, SA57, SA48, SA180, and RSAO4.

Tronox is proposing that the following borings requested by NDEP not be sampled for PCBs: SA35, SA70, SA175, SA155, SA107, SA158, SA62, SA145, SA61, SA144, SA71, RSAM8, RSAN7, SA151, SA208, SA31, SA122, SA34, SA177, SA68, SA59, and RSAT6.

### **Sampling Program Rationale**

Two sampling programs for PCBs are proposed and are based on locations with the potential for head and locations where surface and/or groundwater impacts may be present.

#### Locations with Surface (0.5 feet bgs), Mid-Point, and Capillary Fringe Sampling Depths

Locations with potential head are considered to be areas where percolating fluids have had the potential to facilitate downward migration of constituents in the soil column.

Locations with the potential for head include:

- LOU 5 – Beta Ditch,
- LOU 35 – Truck Dumping Area,
- LOU 59 – Storm Sewer System, and
- LOU 60 – Acid Drain System.

These locations are associated with potential off-site sources. Select soil borings associated with these locations will be sampled at surface (0.5 feet below ground surface), mid-point, and capillary fringe depths. Select soil borings along the western property boundary will also be sampled at surface, mid-point, and capillary fringe depths. The red dots on Figure 2 show the proposed PCB boring locations with the above mentioned sampling depths.

#### Surface (0.5 feet bgs) and Capillary Fringe Sampling Depths

At locations where surface and/or groundwater impacts may be present, due to wind blown sediments and/or groundwater migration, samples will be collected at surface (0.5 feet bgs) and capillary fringe depths. Figure 2 shows the proposed PCB boring locations.

#### PCB Arochlor and Congener Analysis

All sample locations will be tested for Arochlor PCBs by EPA Method 8082. Tronox proposes limited analysis of samples for Arochlor and Congener PCBs by EPA Methods 8082 and 1668A, respectively. Proposes sample locations for PCBs are shown on Figure 2 (Attached). Locations proposed for 1668A analysis include:

- two locations within the Beta Ditch (LOU 5),
- one location in the former Truck Dumping Area (LOU 35) along the western property boundary,
- one location within the PCB Storage Area (LOU 27), and
- two locations at the PCB Transformer Spill (LOU 40).

## **Attachment B - Rationale for Proposed Tronox OPP, OCC and Organic Acid Sampling**

The Tronox Site is not known to have supported production of organophosphorus pesticides (OPPs) or Organic Acids (OAs). Pesticides thought to have been produced on the Site are associated with the Hardesty Chemical lease (LOU 4), where DDT may have been produced (though production records are not available for the operation). Possible migration of OPPs and OAs from sources off-site to the west prompted NDEP in its July 21, 2008 letter, to request sampling for OPPs and organic acids in over sixty borings and numerous groundwater samples. Costs for these combined analyses exceed \$220,000. Tronox proposes to demonstrate from the Conceptual Site Model, that a much reduced number of samples is adequate to characterize OPPs and OAs at the Site.

NDEP requested OPP and OA analyses in soil borings and groundwater samples in and downstream of Beta Ditch (LOU 5), the Storm Drain System (LOU 59), and the Acid Drain System (LOU 60). Each of these LOUs will be considered below:

- LOU 5 Beta Ditch – Waste discharges from the various BMI complex companies operating to the west of the Tronox Site flowed across the Site in the Beta Ditch. Some of these flows may have contained OPPs and OAs and therefore some infiltration of these contaminants into soils below the Beta Ditch is possible. Similarly, groundwater moving north-northeast from the area west of the Site may have carried contaminants onto the Site. Tronox proposes to sample soils and groundwater along the path of the Beta Ditch for OPPs and OAs. As any seepage from the Beta Ditch would pass downward toward groundwater, soil samples will be collected from the elevation at the bottom of the Beta Ditch to the groundwater capillary fringe. Soil borings north of the Beta Ditch will be sampled at the capillary fringe for OPPs and OAs. Groundwater in the alluvium along the west side of the Site is effectively separated from groundwater on the eastern portion of the Site, by a Muddy Creek “high”. Tronox proposes to sample groundwater wells screened in the alluvium along the western edge of the site. Groundwater in the upper portion of the Muddy Creek formation will also be sampled at wells.
- LOU 59 Storm Drain System – As shown on Figure 1 (Attached) the gravity flow Storm Drain System picked up water from the area west of the Site and carried it north, moving east to 6<sup>th</sup> Street, and then north to the Beta Ditch. Since the drain lines slope to the north, it is highly unlikely that water would flow in directions opposite the flow arrows shown on the Figure. Accordingly, Storm Drain

locations east of 6<sup>th</sup> Street (between Units 1 and 2) are not likely to carry constituents from the west. Also, the depth to groundwater in the area of the Unit buildings is about 40 feet, much lower than the elevation of the storm drain piping. Movement of water from groundwater to the piping is therefore not possible. Accordingly, Tronox proposes to sample groundwater wells west of 6<sup>th</sup> Street for OPPs and OAs. In the area south of Beta Ditch and east of 6<sup>th</sup> Street, groundwater sampling for OPPs and OAs is not proposed.

- LOU 60 Acid Drain System – The same argument presented above for LOU 59 applies to LOU 60 and similar sampling for OPPs and OAs is proposed. Since the Acid Drain System is located significantly above the current and past water tables, entry of OPPs and OAs from west of the Site into the Acid Drain System would be limited to the line running from the southern end of the site northward along 5<sup>th</sup> Street. That line then runs parallel to the acid drain piping north of Unit 1, draining eastward to 9<sup>th</sup> Street then north to the conveyance leading to the former Trade Effluent Ponds (LOU 1). Since the source of OPPs and OAs from companies to the west of the Tronox Site was located in the northwest portion of the Olin Site, it is unlikely that OPPs and OAs were piped south (up hill) to an Acid Drain System inlet. Accordingly, Tronox proposes to sample for OPPs and OAs along the western edge of the Site in Area I and IV.



**Table 2**  
Phase B Source Area Investigation Work Plan  
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Grid Location	LOU Number	Boring No.	Sample ID Number	Sample Depth (ft-bgs)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 8020)	TPH-GRO (EPA 8016B)	VOCs <sup>3</sup> (EPA 8260B)	Hex Cr <sup>6</sup> (EPA 7199)	Wet Chem <sup>5</sup>	OCFs <sup>4</sup> (8081A)	Formaldehyde (EPA 8315A)	TPH-DRO/GRO (EPA 8016B)	Total Cyanide (EPA 8012A)	SVOCS <sup>7</sup> (EPA 8270C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>10</sup> (EPA 168)	OPPs <sup>12</sup>	Organic Acids <sup>14</sup>	Asbestos <sup>11</sup> EPA 8461R-97028	Geotech Tests <sup>13</sup>	Location Description and Characterized Area Rationale
Borings are organized by grid location as shown on Plate A - Starting point is on the northwestern most grid in Area 1 (H-3) and ending with the southeastern most grid in Area 1 (O-4).																								
H-3	1, 10	RSAH3	RSAH3-0.0	0.0																				Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and as an eastward step-out to LOU 10 (Former Onsite Hazardous Waste Landfill). GW anticipated at ~34 feet bgs
H-3	1, 10		RSAH3-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
H-3	1, 10		BRSAH3-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
H-3	1, 10		BRSAH3-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
H-3	1, 10		BRSAH3-32B	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-2	1, 10	RSAI2	RSAI2-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and as an eastward step-out to LOU 10 (Former Onsite Hazardous Waste Landfill). GW anticipated at ~33 feet bgs
L-2	1, 10		RSAI2-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-2	1, 10		RSAI2-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-2	1, 10		RSAI2-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-2	1, 10		RSAI2-31B	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-3	1	RSAL3	RSAL3-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage GW anticipated at ~34 feet bgs
L-3	1		RSAL3-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-3	1		RSAL3-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-3	1		RSAL3-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-3	1		RSAL3-32B	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-3	1, 32	SAZ01	SAZ01-0.0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located on the north berm of the GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~30 feet bgs
L-3	1, 32		SAZ01-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-3	1, 32		SAZ01-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-3	1, 32		SAZ01-20B	20	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	
L-3	1, 32		SAZ01-28B	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-4	1, 32	RSAL4	RSAL4-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located on the north berm of the GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage GW anticipated at ~34 feet bgs
L-4	1, 32		RSAL4-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-4	1, 32		RSAL4-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-4	1, 32		RSAL4-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-4	1, 32		RSAL4-32B	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-5	1, 32	RSAL5	RSAL5-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located on the north berm of the GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage GW anticipated at ~34 feet bgs
L-5	1, 32		RSAL5-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-5	1, 32		RSAL5-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-5	1, 32		RSAL5-20B	20	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	
L-5	1, 32		RSAL5-26B	26	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-5	1, 32		RSAL5-30B	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-7	1, 23, 32	RSAL7	RSAL7-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds), LOU 22 & 23 (Ponds WC-West & WC-East), and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~30 feet bgs
L-7	1, 23, 32		RSAL7-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-7	1, 23, 32		RSAL7-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-7	1, 23, 32		RSAL7-20B	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
L-7	1, 23, 32		RSAL7-30B	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10	RSAL2	RSAL2-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds), LOU 10 (Former Onsite Hazardous Landfill) and to investigate potential of site VOC sources. GW anticipated at ~35 feet bgs
J-2	1, 10		RSAL2-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10		RSAL2-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10		RSAL2-21B	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-2	1, 10		RSAL2-33B	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1	RSAL3	RSAL3-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and for general site coverage. GW anticipated at ~31 feet bgs
J-3	1		RSAL3-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1		RSAL3-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1		RSAL3-20B	20	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	
J-3	1		RSAL3-29B	29	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 32	SAZ02	SAZ02-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds), LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit), and for general site coverage. GW anticipated at ~30 feet bgs
J-3	1, 32		SAZ02-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 32		SAZ02-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 32		SAZ02-20B	20	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	
J-3	1, 32		SAZ02-28B	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60	SAZ06	SAZ06-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and LOU 60 (former Acid Drain System), and for general site coverage. GW anticipated at ~39 feet bgs
J-3	1, 60		SAZ06-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60		SAZ06-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60		SAZ06-20B	20	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	
J-3	1, 60		SAZ06-24B	24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-3	1, 60		SAZ06-37B	37	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32	RSAL5	RSAL5-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located to evaluate LOU 1 (former Trade Effluent Settling Ponds) and LOU 60 (former Acid Drain System), and for general site coverage. GW anticipated at ~21 feet bgs
J-5	1, 22, 32		RSAL5-0.5B	0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32		RSAL5-10B	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32		RSAL5-19B	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
J-5	1, 22, 32		RSAL5-25	25	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	removed	
J-6	1, 22, 32	RSAL6	RSAL6-0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Boring located east of GW-11 Pond to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 1 (former Trade Effluent Settling Ponds), as an upgradient boring to evaluate LOU 22 (Pond WC-West and Associated Piping), and for general site coverage. GW anticipated at ~21 feet bgs
J-6	1, 22, 32</																							



Grid Location	LOU Number	Boring No.	Sample ID Number	Sample Depths (ft. bgs)	Per-chlorate (EPA 314.0)	Metals <sup>3</sup> (EPA 6020)	TPH-GRO (EPA 8015B)	VOCs <sup>1</sup> (EPA 1260B)	Hex Cr <sup>4</sup> (EPA 7169)	Wet Chem <sup>5</sup>	OCPs <sup>6</sup> (891A)	Formaldehyde (EPA 8315A)	TPH-DRO/ORO (EPA 8015B)	Total Cyanide (EPA 9012A)	SVOCs <sup>7</sup> (EPA 8270C)	PCBs <sup>10</sup> (EPA 8052)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>16</sup> (EPA 1686)	OPPs <sup>12</sup>	Organic Acids <sup>14</sup>	Asbestos <sup>11</sup> EPA/ASMR-97028	Geotech Tests <sup>13</sup>	Location Description and Characterized Area Rationale		
L-3	2	RSAL3	RSAL3-0.0	0.0																				Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds). GW anticipated at ~32 feet bgs		
L-3	2		RSAL3-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
L-3	2		RSAL3-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-3	2		RSAL3-2.0B	2.0	X	X	X	X	X	X	removed		X				X									
L-3	2		RSAL3-3.0B	3.0	X	X	X	X	X	X	removed		X				X									
L-4	32, 60	SA189	SA189-0.0	0.0	X	X	X	X	X	X	removed		X				X								Boring located to evaluate LOU 60 (Acid Drain System) pipeline/fluore route and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~31 feet bgs	
L-4	32, 60		SA189-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
L-4	32, 60		SA189-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-4	32, 60		SA189-2.0B	2.0	X	X	X	X	X	X	removed		X				X									
L-4	32, 60		SA189-2.9B	2.9	X	X	X	X	X	X	removed		X				X									
L-4	2, 32, 60	RSAL4	RSAL4-0.0	0.0	X	X	X	X	X	X	removed		X				X								Boring located to evaluate LOU 60 (Acid Drain System) pipeline/fluore route and as a step-out to LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) and LOU 2 (Open Area South of Trade Effluent Settling Ponds). GW anticipated at ~30 feet bgs	
L-4	2, 32, 60		RSAL4-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
L-4	2, 32, 60		RSAL4-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-4	2, 32, 60		RSAL4-2.0B	2.0	removed	removed	removed	removed	removed	removed	removed		removed				removed									
L-4	2, 32, 60		RSAL4-2.8B	2.8	X	X	X	X	X	X	removed		X				X									
L-5	32, 58	SA174	SA174-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located adjacent to new D-1 building to evaluate LOU 58 (AP Plant Area New Building D-1 Washdown) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~31 feet bgs
L-5	32, 58		SA174-0.9B	0.9	X	X	X	X	X	X	removed		X				X									
L-5	32, 58		SA174-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-5	32, 58		SA174-2.0B	2.0	removed	removed	removed	removed	removed	removed	removed		removed				removed									
L-5	32, 58		SA174-2.9B	2.9	X	X	X	X	X	X	removed		X				X									
L-5	32, 58	RSAL5	RSAL5-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located to evaluate LOU 58 (AP Plant Area New Building D-1 Washdown) and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~32 feet bgs
L-5	32, 58		RSAL5-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
L-5	32, 58		RSAL5-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-5	32, 58		RSAL5-2.0B	2.0	X	X	X	X	X	X	removed		X				X									
L-5	32, 58		RSAL5-3.0B	3.0	X	X	X	X	X	X	removed		X				X									
L-7	22, 23	RSAL7	RSAL7-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located to evaluate pipeline associated with LOUs 22 and 23 (Ponds WC-West & WC-East), and for general Site coverage. GW anticipated at ~29 feet bgs
L-7	22, 23		RSAL7-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
L-7	22, 23		RSAL7-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-7	22, 23		RSAL7-2.7B	2.7	X	X	X	X	X	X	removed		X				X									
L-7	22, 23		RSAL7-3.0B	3.0	removed	removed	removed	removed	removed	removed	removed		removed				removed									
L-7	32	SA175	SA175-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located to evaluate LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit). GW anticipated at ~30 feet bgs
L-7	32		SA175-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
L-7	32		SA175-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-7	32		SA175-2.0B	2.0	removed	removed	removed	removed	removed	removed	removed		removed				removed									
L-7	32		SA175-2.8B	2.8	X	X	X	X	X	X	removed		X				X									
L-8	5	RSAL8	RSAL8-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located north of LOU 5 (Beta Ditch) along Tinned boundary as a downgradient boring to LOU 5 (Beta Ditch) and for general Site coverage. GW anticipated at ~30 feet bgs
L-8	5		RSAL8-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
L-8	5		RSAL8-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
L-8	5		RSAL8-2.0B	2.0	removed	removed	removed	removed	removed	removed	removed		removed				removed									
L-8	5		RSAL8-2.8B	2.8	X	X	X	X	X	X	removed		X				X									
M-2	2	RSAM2	RSAM2-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located north of LOU 5 (Beta Ditch) along Clin (Pioneer) boundary to evaluate potential VOC sources from the west, as a step-out boring for LOU 2 (Open Area South of Trade Effluent Settling Ponds), and for general Site coverage. GW anticipated at ~37 feet bgs
M-2	2		RSAM2-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
M-2	2		RSAM2-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
M-2	2		RSAM2-2.2B	2.2	X	X	X	X	X	X	removed		X				X									
M-2	2		RSAM2-3.5B	3.5	X	X	X	X	X	X	removed		X				X									
M-2	5	SA67	SA67-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located south of LOU 5 (Beta Ditch) and to evaluate potential VOC sources from the west.
M-2	5		SA67-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
M-2	5		SA67-1.0B	1.0	X	X	X	X	X	X	hold		X				X									
M-2	5		SA67-2.0B	2.0	X	X	X	X	X	X	hold		X				X									
M-2	5		SA67-3.0B	3.0	X	X	X	X	X	X	hold		X				X									
M-2	5		SA67-3.5B	3.5	X	X	X	X	X	X	removed		X				X									
M-3	2	SA100	SA100-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds) and to evaluate potential VOC sources from the west. GW anticipated at ~32 feet bgs
M-3	2		SA100-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
M-3	2		SA100-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
M-3	2		SA100-2.0B	2.0	X	X	X	X	X	X	removed		X				X									
M-3	2		SA100-3.0B	3.0	X	X	X	X	X	X	removed		X				X									
M-3	2	RSAM3	RSAM3-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located to evaluate LOU 2 (Open Area South of Trade Effluent Settling Ponds). GW anticipated at ~32 feet bgs
M-3	2		RSAM3-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
M-3	2		RSAM3-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
M-3	2		RSAM3-2.0B	2.0	X	X	X	X	X	X	removed		X				X									
M-3	2		RSAM3-3.0B	3.0	X	X	X	X	X	X	removed		X				X									
M-4	2	SA69	SA69-0.0	0.0	X	X	X	X	X	X	removed		X				X									Boring located north of LOU 5 (Beta Ditch) as a step-out to LOU 2 (Open Area South of Trade Effluent Settling Ponds) and to investigate for potential offtsite VOC sources from the west. GW anticipated at ~31 feet bgs
M-4	2		SA69-0.5B	0.5	X	X	X	X	X	X	removed		X				X									
M-4	2		SA69-1.0B	1.0	X	X	X	X	X	X	removed		X				X									
M-4	2		SA69-2.0B	2.0	X	X	X	X	X	X	removed		X				X									
M-4	2		SA69-2.9B	2.9	X	X	X	X	X	X	removed		X				X									

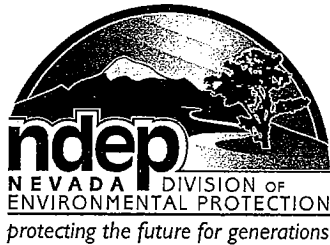
**Table 2**  
Phase B Source Area Investigation Work Plan  
Tronox Facility - Henderson, Nevada  
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Grid Location	LOU Number	Boring No.	Depth (ft)	Sample ID Number	Sample Depth <sup>1</sup> (ft bgs)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 6020)	TPH-GRO (EPA 8015B)	VOCs <sup>3</sup> (EPA 8260)	Hex Cr <sup>6</sup> (EPA 7199)	Wet Chem <sup>5</sup>	OCs <sup>4</sup> (891A)	Formaldehyde (EPA 8215A)	TPH-DRO/DRO (EPA 8015A)	Total Cyanide (EPA 9072A)	SVOCs <sup>7</sup> (EPA 8270C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>10</sup> (EPA 166)	OPPs <sup>13</sup>	Organic Acids <sup>14</sup>	Asbestos <sup>11</sup> EPA/ASIR-97028	Geotech Tests <sup>12</sup>	Location Description and Characterized Area Rationale	
N-2	35	SA56	0.0	SA56-0.0																					Boring located along western Site boundary to evaluate LOU 35 (former Truck Emptying/Dumping Site) and potential offsite VOC sources from the west. PCBs and TPH-G were detected in Phase A SA09. GW anticipated at ~39 feet bgs	
N-2	35	SA56	0.5	SA56-0.5B																						
N-2	35	SA56	10	SA56-10B																						
N-2	35	SA56	20	SA56-20B																						
N-2	35	SA56	23	SA56-23B																						
N-2	35	SA56	30	SA56-30B																						
N-2	35	SA56	37	SA56-37B																						
N-2	n/a	RSAN2	0.0	RSAN2-0.0																						Boring located along western Site boundary north of LOU 35 (Truck Emptying/Dumping Site) to evaluate potential offsite VOC sources from the west, and for general Site coverage. GW anticipated at ~37 feet bgs
N-2	n/a	RSAN2	0.5	RSAN2-0.5B																						
N-2	n/a	RSAN2	10	RSAN2-10B																						
N-2	n/a	RSAN2	20	RSAN2-20B																						
N-2	n/a	RSAN2	30	RSAN2-30B																						
N-2	n/a	RSAN2	36	RSAN2-36B																						
N-3	54	SA65	0.0	SA65-0.0																						Boring located northwest of AP Lab building to evaluate LOU 54 (AP Plant Area Change House/Laboratory Septic Tank). Dilute formaldehyde titrant was used in LOU 38 (Former Satellite Accumulation Point, AP Laboratory) and possibly discharged to LOU 54. GW anticipated at ~35 feet bgs
N-3	54	SA65	0.5	SA65-0.5B																						
N-3	54	SA65	10	SA65-10B																						
N-3	54	SA65	20	SA65-20B																						
N-3	54	SA65	33	SA65-33B																						
N-3	54	SA65	35	SA65-35B																						
N-3	38	RSAN3	0.0	RSAN3-0.0																						Boring located to evaluate LOU 38 (Former Satellite Accumulation Point, AP Laboratory). Dilute formaldehyde titrant was used in the AP Laboratory. GW anticipated at ~34 feet bgs
N-3	38	RSAN3	0.5	RSAN3-0.5B																						
N-3	38	RSAN3	10	RSAN3-10B																						
N-3	38	RSAN3	20	RSAN3-20B																						
N-3	38	RSAN3	32	RSAN3-32B																						
N-3	38	RSAN3	40	RSAN3-40B																						
N-4	39	SA87	0.0	SA87-0.0																						Boring located at the southeast corner of the AP Maintenance Shop building to evaluate LOU 39 (Satellite Accumulation Point, AP Maintenance Shop).
N-4	39	SA87	0.5	SA87-0.5B																						
N-4	39	SA87	10	SA87-10B																						
N-4	39	SA87	20	SA87-20B																						
N-4	39	SA87	25	SA87-25B																						
N-4	39	SA87	30	SA87-30B																						
N-4	39	SA87	30	SA87-30B																						
N-4	5	SA165	0.0	SA165-0.0																						Boring located in LOU 5 (Beta Ditch) to evaluate the Beta Ditch and for general Site coverage. GW anticipated at ~30 feet bgs
N-4	5	SA165	0.5	SA165-0.5B																						
N-4	5	SA165	10	SA165-10B																						
N-4	5	SA165	20	SA165-20B																						
N-4	5	SA165	28	SA165-28B																						
N-4	29	RSAN4	0.0	RSAN4-0.0																						Boring located to evaluate former drum storage area in LOU 39 (Satellite Accumulation Point, AP Maintenance Shop) and for general Site coverage. GW anticipated at ~33 feet bgs
N-4	29	RSAN4	0.5	RSAN4-0.5B																						
N-4	39	RSAN4	10	RSAN4-10B																						
N-4	39	RSAN4	20	RSAN4-20B																						
N-4	39	RSAN4	31	RSAN4-31B																						
N-4	39	RSAN4	40	RSAN4-40B																						
O-2	35	RSAO2	0.0	RSAO2-0.0																						Boring located along western boundary of Site to evaluate LOU 35 (Truck Emptying/Dumping Site) and potential offsite VOC sources from the west. PCBs and TPH-GRO were detected in Phase A soil boring SA09.
O-2	35	RSAO2	0.5	RSAO2-0.5B																						
O-2	35	RSAO2	10	RSAO2-10B																						
O-2	35	RSAO2	20	RSAO2-20B																						
O-2	35	RSAO2	30	RSAO2-30B																						
O-2	35	RSAO2	33	RSAO2-33B																						
O-2	n/a	SA35	0.0	SA35-0.0																						Boring located along western Site boundary to evaluate potential offsite VOC sources from the west. PCBs and TPH-GRO were detected in Phase A soil boring SA09. GW anticipated at ~34 feet bgs
O-2	n/a	SA35	0.5	SA35-0.5B																						
O-2	n/a	SA35	10	SA35-10B																						
O-2	n/a	SA35	21	SA35-21B																						
O-2	n/a	SA35	32	SA35-32B																						
O-2	n/a	SA35	40	SA35-40B																						
O-2	35, 60	SA166	0.0	SA166-0.0																						Boring located along western Site boundary to evaluate LOU 35 (Truck Emptying/Dumping Site), LOU 60 (Acid Drain System), and potential offsite VOC sources from the west. GW anticipated at ~33 feet bgs
O-2	35, 60	SA166	0.5	SA166-0.5B																						
O-2	35, 60	SA166	10	SA166-10B																						
O-2	35, 60	SA166	20	SA166-20B																						
O-2	35, 60	SA166	31	SA166-31B																						
O-2	35, 60	SA166	31	SA166-31B																						
O-3	35	SA48	0.0	SA48-0.0																						Boring located along western Site boundary to evaluate LOU 35 (Truck Emptying/Dumping Site) and potential offsite VOC sources from the west. PCBs and TPH-GRO were detected in Phase A soil boring SA09.
O-3	35	SA48	0.5	SA48-0.5B																						
O-3	35	SA48	10	SA48-10B																						
O-3	35	SA48	20	SA48-20B																						
O-3	35	SA48	30	SA48-30B																						
O-3	35	SA48	35	SA48-35B																						
O-3	35	SA57	0.0	SA57-0.0																						Boring located along western Site boundary to evaluate LOU 35 (Truck Emptying/Dumping Site) and potential offsite VOC sources from the west. PCBs and TPH-GRO were detected in Phase A soil boring SA09.
O-3	35	SA57	0.5	SA57-0.5B																						

**Table 2**  
**Soil Sampling and Analytical Plan for Area I**  
 Phase B Source Area Investigation Work Plan  
 Tronox Facility - Henderson, Nevada  
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Grid Location	LOU Number	Boring No.	Sample #	Sample ID Number	Sample Depth <sup>1</sup> (ft. bgs)	Per-chlorate (EPA 314.0)	Metals <sup>2</sup> (EPA 6020)	TPH-GRO (EPA 60155)	VOCs <sup>3</sup> (EPA 1260B)	Hex Cr <sup>4</sup> (EPA 7199)	Wet Chem <sup>5</sup>	OCPs <sup>6</sup> (8081A)	Formaldehyde (EPA 8315A)	TPH-DRO/ORO (EPA 60158)	Total Cyanide (EPA 9012A)	SVOCs <sup>7</sup> (EPA 1270C)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>9</sup>	PCBs <sup>16</sup> (EPA 1668)	OPPs <sup>13</sup>	Organic Acids <sup>14</sup>	Asbestos <sup>11</sup> EPA/ASACR-97028	Geotech Tests <sup>12</sup>	Location Description and Characterized Area Rationale
C-3	64	RSAC3		RSAC3-0.0	0.0																				Boring located to evaluate soil stain in northern portion of LOU 64 (Koch Materials Company Site).
C-3	64			RSAC3-0.5B	0.5	X	X		X	X	X	removed		X		X		X							Materials Company Site). GW anticipated at ~33 feet bgs
C-3	64			RSAC3-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-3	64			RSAC3-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-3	64			RSAC3-3.1B	3.1	X	X		X	X	X	removed		X		X		X							
C-3	64			RSAC3-3.7B	3.7	removed	removed		removed	removed	removed	removed		removed		removed		removed							
C-3	60, 64	SA176		SA176-0.0	0.0	X	X		X	X	X	removed		X		X		X							Boring located to evaluate LOU 60 (Acid Drain System) pipelines and LOU 64 (Koch Materials Company Site). GW anticipated at ~39 feet bgs
C-3	60, 64			SA176-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-3	60, 64			SA176-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-3	60, 64			SA176-2.0B	2.0	removed	removed		removed	removed	removed	removed		removed		removed		removed							
C-3	60, 64			SA176-2.3B	2.3	X	X		X	X	X	removed		X		X		X							
C-3	60, 64			SA176-3.0B	3.0	removed	removed		removed	removed	removed	removed		removed		removed		removed							
C-3	60, 64			SA176-3.7B	3.7	X	X		X	X	X	removed		X		X		X							
C-3	n/a	SA207		SA207-0.0	0.0	X	X		X	X	X	removed		X		X		X							
C-3	n/a			SA207-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-3	n/a			SA207-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-3	n/a			SA207-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-3	n/a			SA207-3.0B	3.0	X	X		X	X	X	removed		X		X		X							
C-3	n/a			SA207-4.0B	4.0	X	X		X	X	X	removed		X		X		X							
C-4	64	SA46		SA46-0.0	0.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA46-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-4	64			SA46-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA46-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA46-3.0B	3.0	X	X		X	X	X	removed		X		X		X							
C-4	64	SA47		SA47-0.0	0.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA47-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-4	64			SA47-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA47-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA47-3.0B	3.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA47-3.5B	3.5	X	X		X	X	X	removed		X		X		X							
C-4	64	SA55		SA55-0.0	0.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA55-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-4	64			SA55-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA55-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA55-3.0B	3.0	removed	removed		removed	removed	removed	removed		removed		removed		removed							
C-4	64			SA55-3.5B	3.5	X	X		X	X	X	removed		X		X		X							
C-4	64	RSAC4		RSAC4-0.0	0.0	X	X		X	X	X	removed		X		X		X							
C-4	64			RSAC4-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-4	64			RSAC4-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-4	64			RSAC4-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-4	64			RSAC4-3.0B	3.0	X	X		X	X	X	removed		X		X		X							
C-4	64			RSAC4-3.6B	3.6	X	X		X	X	X	removed		X		X		X							
C-4	60, 64	SA182		SA182-0.0	0.0	X	X		X	X	X	removed		X		X		X							
C-4	60, 64			SA182-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-4	60, 64			SA182-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-4	60, 64			SA182-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-4	60, 64			SA182-2.4B	2.4	X	X		X	X	X	removed		X		X		X							
C-4	60, 64			SA182-3.0B	3.0	removed	removed		removed	removed	removed	removed		removed		removed		removed							
C-4	60, 64			SA182-3.6B	3.6	X	X		X	X	X	removed		X		X		X							
C-4	64	SA183		SA183-0.0	0.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA183-0.5B	0.5	X	X		X	X	X	removed		X		X		X							
C-4	64			SA183-1.0B	1.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA183-2.0B	2.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA183-3.0B	3.0	X	X		X	X	X	removed		X		X		X							
C-4	64			SA183-3.3B	3.3	X	X		X	X	X	removed		X		X		X							
<b>Total #:</b>						264	263	85	263	263	263	124	8	251		246	42	263	68	33	36	36	68	0	

Grid Location	LOU Number	Boring No.	Sample ID Number	Sample Depth <sup>1</sup> (ft-bgs)	Per-chlorate (EPA 3140)	Metals <sup>2</sup> (EPA 8020)	TPH-GRO (EPA 8018)	VOCs <sup>3</sup> (EPA 8260)	Hex. Cr <sup>6</sup> (EPA 7199)	Wet Chem <sup>4</sup>	OCFs <sup>4</sup> (8081A)	Formaldehyde (EPA 8215A)	TPH-DRO/ORO (EPA 8015B)	Total Cyanide (EPA 9012A)	SVOCs <sup>7</sup> (EPA 8270)	PCBs <sup>10</sup> (EPA 8082)	Radionuclides <sup>8</sup>	Dioxins/Furans <sup>4</sup>	PCBs <sup>10</sup> (EPA 168)	OPPs <sup>12</sup>	Organic Acids <sup>4</sup>	Asbestos <sup>11</sup> EPA/ASIR-97/028	Geotech Tests <sup>14</sup>	Location Description and Characterized Area Rationale
<b>Synthetic Precipitate Leaching Procedure (SPL) Samples<sup>1</sup>:</b>																								
J-3	1, 32	RSAJ3	RSAJ3-10B	10	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from the outlet of LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes from Aluminum (Al) soils. Expected soil type: Sand.
J-3	1, 32	RSAJ3	RSAJ3-DBB	DD* = depth (ft)	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Optional sample - only to be collected if soil type is different than at 10 ft bgs; no sample will be collected within the capillary fringe. Contact between Qal & MC1g <sup>1</sup> is approximately 38 feet bgs. Groundwater is expected to occur at approximately 33.
I-7	22, 23	RSAT7	RSAT7-10B	10	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from the northern portion of LOU 1 (former Trade Effluent Settling Ponds), LOUs 22 & 23 (Ponds WC-West & WC-East), and LOU 32 (Chromium and Perchlorate Groundwater Remediation Unit) to evaluate leaching potential of Site-related analytes.
I-7	22, 23	RSAT7	RSAT7-DBB	DD* = depth (ft)	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Optional sample - only to be collected if soil type is different than at 10 ft bgs; no sample will be collected within the capillary fringe. Contact between Qal & MC1g <sup>1</sup> is approximately 27 feet bgs. Groundwater is expected to occur at approximately 25.
M-3	2	RSAM3	RSAM3-10B	10	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected below LOU 2 (Open Area South of Trade Effluent Settling Ponds) to evaluate leaching potential of Site-related analytes. Expected soil type: Sand.
M-3	2	RSAM3	RSAM3-30B	30	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from below the northern part of LOU 2 (Open Area South of Trade Effluent Settling Ponds) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (SG1) soils. Contact between Qal & MC1g <sup>1</sup> is approximately 27 feet bgs. Groundwater is expected to occur at approximately 25.
N-2	35	SA56	SA56-10B	10	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from the northwest portion of LOU 35 (Truck Emptying/Dumping Site) to evaluate leaching potential of Site-related analytes. Expected soil type: Gravelly Sand.
N-2	35	SA56	SA56-30B	30	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from below beneath the northwest portion of LOU 35 (Truck Emptying/Dumping Site) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (MC1g1) soils. Contact between Qal and M.
O-2	35, 60	SA166	SA166-10B	10	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from beneath the northwest portion of LOU 35 (Truck Emptying/Dumping Site) and LOU 60 (former Acid Drain System) to evaluate leaching potential of Site-related analytes. Expected soil type: Sandy Gravel.
O-2	35, 60	SA166	SA166-35B	35	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from below beneath the northwest portion of LOU 35 (Truck Emptying/Dumping Site) and LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (MC1g1) so.
O-4	64	SA182	SA182-10B	10	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from below beneath the northeast portion of LOU 64 (Koch Materials Company Site) and LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes. Expected soil type: Gravelly Sand.
O-4	64	SA182	SA182-30B	30	X	X	X	X	X	X	X	X			X	X	X		X	X	X		X	Soil sample collected from below beneath the northeast portion of LOU 64 (Koch Materials Company Site) and LOU 60 (Acid Drain System) to evaluate leaching potential of Site-related analytes from Muddy Creek Formation - First Fine-Grained Facies (MC1g1) so.
<b>Number of Samples:</b>																								
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.																							
DD*	No sample collected under Phase B sampling program.																							
TPH-GRO	Sample depth to be determined in the field where DD = sample depth (ft).																							
PH-DRO/ORO	Total petroleum hydrocarbons - Gasoline-Range Organics.																							
SPLP	Total petroleum hydrocarbons - Diesel-Range Organics/Oil-Range Organics.																							
1.	SPLP samples will be analyzed by EPA method 1312 using two preparation methods: 1) with extraction fluid #2 (reagent water at pH 5.00±0.05), and 2) with extraction method #3 (reagent water), per NDEP.																							
2.	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.																							
3.	Metals analyses includes Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Tin, Titanium, Thallium, Tungsten, Uranium, Vanadium, Zinc																							
4.	Samples for VOC analysis will be preserved in the field using sodium bisulfate (or DI water) and methanol preservatives per EPA Method 8035.																							
5.	Hexavalent Chromium.																							
6.	Wet chemistry parameters include: alkalinity (total), CO <sub>2</sub> , HCO <sub>3</sub> , ammonia, bromide, chloride, conductivity, cyanide (total), nitrate, nitrite, perchlorate, pH, phosphate (total), sulfate, surfactants (MBAs), TDS, Total Organic Carbon, and TSS.																							
7.	Organochlorine Pesticides (includes analysis for hexachlorobenzene).																							
8.	Semi-volatile Organic Compounds																							
9.	Radionuclides consists of alpha spec reporting for isotopic thorium and isotopic uranium, and Radium-226, plus Radium-228 by beta counting (per NDEP).																							
10.	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.																							
11.	Polychlorinated biphenyls - Sample locations will be analyzed by USEPA methods 8082 and 1668A. Concrete surfaces at these locations will also include chip and/or wipe samples per EPA Region 1 SOP for Sampling Concrete in the Field (1997).																							
12.	Soil samples for asbestos analyses will be collected from a depth of 0 to 2-inches bgs.																							
13.	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).																							
14.	Organophosphorous Pesticides																							
X	Organic Acid analysis includes the following analytes: 4-Chlorobenzene sulfonic acid; Benzenesulfonic acid; O,O-Diethylphosphorodithioic acid; O,O-Dimethylphosphorodithioic acid; and Phthalic acid.																							
removed	Green-shading indicates new addition to this table as soil sample will be analyzed for the specific analyte class. NDEP (July 21, 2008)																							
abcd	*Removed* indicates that soil sample will not be analyzed for specific analyte class, per communication with NDEP (September 8, 2008)																							
D	Text in blue is recently added																							
	Duplicate Sample																							



# STATE OF NEVADA

Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

September 25, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Request for an Updated Factsheet

Dear Ms. Crowley,

The NDEP has noted that the Factsheet for the TRX facility was last updated in December 2007. As such, please submit an updated Factsheet by **November 10, 2008**.

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

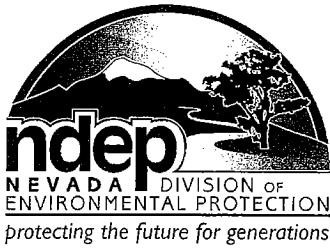
Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
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Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110





# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biggi, Director

Leo M. Drozdoff, P.E., Administrator

September 19, 2008

ENVIRONMENTAL PROTECTION  
LAS VEGAS OFFICE  
2008 SEP 23 P 10:10

Ms. Susan Crowley  
Tronox, LLC  
P.O. Box 55  
Henderson, NV89009

**RE: Underground Injection Control Permit #UNEV94218  
Tronox Henderson Facility, 8000 West Lake Mead Drive, Henderson, Nevada 89009**

Dear Ms. Crowley:

The Nevada Division of Environmental Protection, Bureau of Water Pollution Control has completed the renewal of Underground Injection Control permit # UNEV94218, **Tronox Henderson Facility, 8000 West Lake Mead Drive, Henderson, Nevada 89009**. No significant comments were received during the public notice period; therefore, the permit is active as of September 19, 2008.

Please review the permit carefully. The annual permit fee is due July 1 of each year, and the permit will expire September 19, 2013. The renewal application and fee are due 180 days before expiration of the permit. If you do not wish to renew the application, please request that the permit be cancelled and follow UIC Permit cancellation guidelines.

If you have any questions regarding the permit, please contact me at (775) 687-9428 or via email [rland@ndep.nv.gov](mailto:rland@ndep.nv.gov).

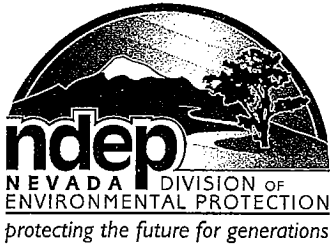
Sincerely,

Russ Land  
Bureau of Water Pollution Control

Enclosure: UIC UNEV94218 permit

cc: Brian Rakvica, Bureau of Corrective Actions, NDEP Las Vegas  
GWP Reader File  
UNEV94218





# STATE OF NEVADA

Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

September 18, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Revised Response to:  
*Data Validation Summary Report (DVSR), Phase B Source Area Investigation Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada*  
Dated August 25, 2008

Dear Ms. Crowley,

Please accept this revised response letter that replaces NDEP's September 17, 2008 letter regarding the above-identified DVSR.

The NDEP has received and reviewed TRX's above-identified DVSR and provides comments in Attachment A. TRX should provide an annotated response-to-comments letter **by September 30, 2008** addressing these comments.

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

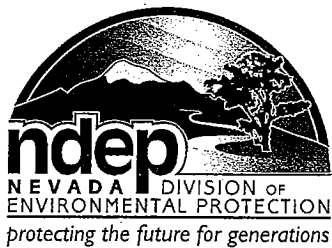
SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
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Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544

**Attachment A**

1. **Helium Analysis:** Review of the laboratory reports from Columbia Analytical Services shows that helium analysis, using a modified method 3C, was performed on the Summa canister samples. It is unclear why helium analysis was required and why the soil gas samples would be exposed to helium. The DVSR should provide details on why helium analysis was performed along with a discussion of what impact helium detection in a sample has on the TO-15 results. For example, does helium indicate a soil gas sample was influenced from a purge gas? If helium detection in a sample does impact the VOC results the DVSR should also provide a validation of the helium analysis along with a discussion of the impact of helium results on the VOC data. Please respond **by September 30, 2008** with the rationale for the helium analysis and the potential effects the presence of helium would have on the analytical results.
2. **Recommendation for Future Reports:** It would benefit the readability of the report if future reports included the following information in the Introduction section of the DVSR:
  - a. The number of SDGs included in this DVSR
  - b. The SDG IDs
  - c. The total number of samples taken
  - d. The number of samples taken within each SDG
  - e. An analyte list for each SDG.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

September 17, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Data Validation Summary Report (DVSR), Phase B Source Area Investigation Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada*  
Dated August 25, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified DVSR and finds that the document is acceptable with the following exceptions noted for the administrative record:

- Helium Analysis:** Review of the laboratory reports from Columbia Analytical Services shows that helium analysis, using a modified method 3C, was performed on the Summa canister samples. It is unclear why helium analysis was required and why the soil gas samples would be exposed to helium. The DVSR should provide details on why helium analysis was performed along with a discussion of what impact helium detection in a sample has on the TO-15 results. For example, does helium indicate a soil gas sample was influenced from a purge gas? If helium detection in a sample does impact the VOC results the DVSR should also provide a validation of the helium analysis along with a discussion of the impact of helium results on the VOC data. Please respond **by September 30, 2008** with the rationale for the helium analysis and the potential effects the presence of helium would have on the analytical results.
- Recommendation for Future Reports:** It would benefit the readability of the report if future reports included the following information in the Introduction section of the DVSR:
  - The number of SDGs included in this DVSR
  - The SDG IDs
  - The total number of samples taken
  - The number of samples taken within each SDG
  - An analyte list for each SDG.

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.



Sincerely,



Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh

CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
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WA 98110  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544

## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 11:00 AM, Monday, September 08, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Tronox –Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)  
ENSR –Brian Ho, Mike Flack (for TRX)

CC: Jim Najima, Paul Hackenberry, Teri Copeland, Kelly Black

1. The meeting was held to discuss changes to TRX's Response to Comments for the Phase B sampling. TRX stated that the current financial situation of TRX did not allow for the additional sampling requested by NDEP and agreed to by TRX. TRX wanted to discuss options to reduce costs of the Phase B Investigation to the previously budgeted \$6.2 million.
2. The following were the topics TRX brought up as potential cost savings and the subsequent discussions.
  - a. PCB Analysis (Congener – Method 1668)
    - i. TRX stated that the cost for the PCB congener analysis is approximately \$970 per sample.
    - ii. TRX stated that the Phase A Source Area Investigation (Phase A Investigation) did not detect PCBs.
    - iii. NDEP stated that the Phase A Investigation only analyzed for Aroclor and not congeners. NDEP stated that these two methods do not exhibit comparable results.
    - iv. NDEP stated that TRX should base any justification for sample elimination on the CSM.
      - 1) For example, PCB sampling on the west side of the facility was driven by the presence of a PCB source to the west; thereby, potentially providing justification for the elimination of PCB analysis to the east.
      - 2) Additionally, TRX could explain how their electrolytic process does not generate PCBs; thereby, potentially justifying the elimination of PCB analysis for the samples associated with that process.
    - v. TRX suggested that only 10% of all of the PCB analyses to the western portion of the facility by Method 1668 (Congener) and that 100% would be Method 8082 (Aroclor).
    - vi. TRX also suggested just sampling the capillary fringe based on a transport justification.
    - vii. NDEP stated that TRX needed to provide justification using a CSM perspective (process knowledge, pathway (capillary fringe, Beta Ditch, etc.)).
  - b. Organic Acid Analysis
    - i. TRX stated that the cost for the organic analysis was approximately \$400 to \$450 per sample.
    - ii. TRX stated that organic acids were not on the SRC list for the TRX facility.
    - iii. NDEP stated that the elimination of organic acids could be handled similarly as the elimination of the PCB congener analysis.
  - c. Organochlorine Pesticides (OCPs) / Organophosphorus Pesticides (OPP)

- i. TRX stated that they will use the same logic as the PCBs on the western portion of the TRX facility to potentially eliminate these analyses.
  - ii. TRX stated that they understand that the Hardesty issue (what chemicals were produced at this site) will need to be addressed.
  - iii. TRX would like to eliminate OCP and OPP analyses from Areas II and III.
  - iv. NDEP suggested limiting depth based on pathway (surface for wind-blown deposition and capillary fringe for groundwater).
- d. Geoprobe
- i. TRX stated that they could realize significant savings if Geoprobe technology was used to collect the 0 and 10 foot samples.
  - ii. TRX will check into whether there is an existing Standard Operating Procedure (SOP) for Geoprobe sampling; otherwise, TRX will develop and submit a SOP. NDEP stated that BRC and TIMET do not have a Geoprobe SOP.
- e. Data Validation Summary Reports (DVSRs)
- i. TRX stated as an FYI to NDEP that ENSR will no longer conduct the entire data validation.
  - ii. TRX will switch to LDC for data validation, with ENSR reviewing the information.
  - iii. NDEP noted that the other BMI facilities are using LDC for data validation.
  - iv. TRX will make sure that the EDDs from Colombia Laboratories are compatible with LDC's database.
- f. Reduction of number of samples collected per borehole
- i. TRX noted that the Phase B SAPs have all proposed sampling from the surface to the capillary fringe in 10 foot increments.
  - ii. TRX suggested that instead of 10 foot increments that sampling at the following depths below ground surface be considered: 0 (surface), 10', 25', 40' or capillary fringe.
  - iii. TRX stated that this would eliminate about 20% of the soil samples.
  - iv. NDEP stated that TRX has the potential risk of additional sampling if elevated concentrations of contaminants are found.
  - v. TRX acknowledged this and stated that they would conduct additional sampling as necessary for risk assessment.
- g. Area III Manganese Production Area Sampling
- i. TRX stated that in the Phase B SAP for Area III, they stated that if sampling was conducted in the active Mn Production Area that TRX would not have to conduct additional sampling for analytes not associated with the process after production ceased.
  - ii. NDEP stated in their response letter to the Phase B SAP for Area III that additional sampling may be necessary in the future.
  - iii. TRX stated that if re-sampling may be necessary in the future, it may be better to minimize the sampling to be conducted now.
  - iv. TRX suggested that the random samples still be collected but that the judgmental samples should be eliminated.
  - v. TRX stated that surface sampling for asbestos and dioxin would be conducted for assessment of worker safety.
  - vi. TRX stated that all proposed and requested monitoring wells in this area would still be installed to allow site-wide groundwater assessment.



FINAL

- vii. NDEP stated that quantification of source to groundwater pathway for this area would not be achieved.
  - viii. NDEP stated that elimination of samples in this area was a possibility with proper justification since TRX is not currently requesting closure for the active production areas.
3. TRX stated that a request for an extension of the submittal date of September 15, 2008 for the Phase B revised text, tables, and plates and response to comments will be submitted to the NDEP. **ACTION ITEM.**

Aug

## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 9:00 AM Monday, August 11, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)  
ENSR – Brian Ho, Carmen Schnell, Mike Flack (for TRX)

CC: Jim Najima

1. The meeting was held to discuss TRX's response to comments (RTCs) to three NDEP letters dated July 21, 2008 1) Re: Phase B SAPs Areas I through IV general soil sampling comments 2) Re: Phase B Source Area Investigation Work Plan (SAP) Area II, and 3) Re: Phase B SAP Area III.
2. The following are TRX's RTC to NDEP's July 21, 2008 letter Re: Phase B SAPs Areas I through IV general soil sampling comments:
  - a. RTC 1<sup>st</sup> bullet, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAPs submittal accordingly.
  - b. RTC 2<sup>nd</sup> bullet, TRX and NDEP had the following discussion:
    - i. TRX noted that borings SA183 and SA67 in Area I have already been drilled and sampled prior to the receipt of NDEP's comments for additional analyses (for OPPs and organic acids). NDEP acknowledged this and stated that TRX did not have to re-drill and re-sample these borings for the requested analytes.
    - ii. TRX inquired whether the four organic acids (4-Chlorobenzene sulfonic acid; Benzenesulfonic acid; O,O-Diethylphosphorodithioic acid; and O,O-Dimethylphosphorodithioic acid) that are listed in BRC's QAPP were sufficient for the TRX site. NDEP indicated that TRX should also test for phthalic acid in addition to the four analytes. TRX stated concern over the costs of the additionally requested analytes (OPP and organic acid analyses).
    - iii. NDEP inquired as to how this data gap could be addressed if sampling is not conducted.
    - iv. NDEP stated that the organic acids have been detected in the groundwater near TRX's western property boundary.
    - v. NDEP stated that these chemicals are relatively non-toxic based on toxicological data; however, the concentrations observed to the west of TRX were of concern.
    - vi. NDEP stated that TRX could present an argument against sampling for these compounds based on the relative toxicological criteria, expected concentration based on Stauffer/Montrose data and Conceptual Site Model.
    - vii. TRX stated that will look into this topic and may propose alternative sampling, such as sampling for an indicator compound, etc., with the Revised Phase B SAP submittal.
3. The following are TRX's RTC to NDEP's July 21, 2008 letter Re: Phase B SAP Area II:
  - a. RTC 1, TRX acknowledges this comment.
  - b. RTC 2, TRX acknowledges this comment.
  - c. RTC 3.a-f, TRX acknowledges these comments and will address in the Phase B Report.

- d. RTC 4, TRX stated that this comment was addressed in the text of the Phase B SAP Area II. NDEP acknowledged.
- e. RTC 5, TRX stated that this comment was addressed in the text of the Phase B SAP Area II. NDEP acknowledged.
- f. RTC 6, TRX acknowledges this comment.
- g. RTC 7, TRX acknowledges this comment.
- h. RTC 8, TRX acknowledges this comment and will address in the Phase B Report.
- i. RTC 9, a-c, TRX acknowledges these comments and will modify the SAP as requested in subsequent NDEP comments.
- j. RTC 10, TRX acknowledges this comment.
- k. RTC 11, TRX stated that geotechnical samples of the Muddy Creek formation will be collected.
- l. RTC 12.a.i-iii, TRX acknowledges these comments and will address in the Phase B Report.
- m. RTC 12.b.i, TRX acknowledges this comment.
- n. RTC 12.b.ii-iii, TRX acknowledges these comments and will address in the Revised Phase B SAP submittal.
- o. RTC 12.b.iv, TRX acknowledges this comment.
- p. RTC 12.b.v.1, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- q. RTC 12.b.v.2.a-b, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- r. RTC 12.b.v.3-7, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- s. RTC 12.c.i, TRX acknowledges this comment.
- t. RTC 12.c.ii, TRX stated that 1,4-dioxane is included in the SVOC analyses.
- u. RTC 12.c.iii, TRX stated that they will continue to look for the well log for M-2A. If the well log cannot be found, TRX stated that they would likely extrapolate geologic formation data from nearby M-2 and use down-well camera technology to determine well completion information.
- v. RTC 12.d-e, TRX acknowledges this comment.
- w. RTC 13, TRX stated that the groundwater elevation map (Figure 4) was provided for general elevation and gradient purposes. TRX will be providing a comprehensive groundwater elevation map in the Annual Monitoring Report that is scheduled to be submitted to the NDEP on August 28, 2008 that should address this comment.
- x. RTC 14, TRX acknowledges this comment.
- y. RTC 15.a.i, TRX stated that they will include text of the Phase B Report that discusses the depth of the beta ditch. Also, TRX stated that the ground surface elevation for each boring will be provided in the Phase B Report.
- z. RTC 15.a.ii, TRX acknowledges this comment and will address in the Revised Phase B SAP submittal.
- aa. RTC 15.a.iii, TRX acknowledges this comment and clarified that both Aroclor and congener analyses were to be used.
- bb. RTC 15.a.iv-vi, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- cc. RTC 15.a.vii, SA165 will be moved closer to the LOU 59 outfall.

- dd. RTC 15.a.viii, TRX will not add an additional boring as requested, but will accomplish the goal of the comment (see comment 3.cc above); also SA128 will be moved to the confluence of the Western Diversion Ditch and the main Beta Ditch channel.
- ee. RTC 15.b.i, TRX acknowledges this comment and will address in the Phase B Report.
- ff. RTC 15.b.ii-iii, TRX acknowledges these comments.
- gg. RTC 15.b.iv-v, TRX acknowledges these comments and will address in the Revised Phase B SAP submittal.
- hh. RTC 15.c.i, TRX acknowledges this comment and stated that Pond AP-5 is tentatively scheduled for decommissioning in spring 2009. TRX is considering converting AP-6 to an active pond. TRX will be contacting NDEP-BWPC about AP-6, if pond needed.
- ii. RTC 15.c.ii, TRX acknowledges this comment and will address in the Phase B Report.
- jj. RTC 15.c.iii, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- kk. RTC 15.d.i, TRX stated that the manganese dioxide production process utilizes sulfuric acid rather than chloride and should not generate PCBs. TRX will address this comment more fully in the Revised Phase B SAP submittal.
- ll. RTC 15.d.ii, TRX indicated that the cathodes are constructed of copper.
- mm. RTC 15.d.iii, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- nn. RTC 15.e.i, TRX will relocate SA122 to the gravel section between the concrete pads.
- oo. RTC 15.e.ii, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- pp. RTC 15.f.i-ii, NDEP concurred with TRX's rationale to not move SA173 and SA179 (as requested in NDEP's comments) because the concrete pad for this LOU (LOU 56 – Old D-1 Washdown Building) is still in place. TRX indicated that these borings are located in likely drainage areas from the concrete pad.
- qq. RTC 15.f.iii, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- rr. RTC 15.g, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly. TRX indicated that there are numerous above-ground pipelines in the vicinity of this area (Pond AP-5) and that they would try to accommodate NDEP by moving the boring location without damaging the pipelines, but that options are limited.
- ss. RTC 15.h, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly. TRX noted that 1,4-dioxane is included in the SVOC analysis.
- tt. RTC 15.i.i, TRX acknowledges this comment and will address in the Phase B Report.
- uu. RTC 15.i.ii-iii, TRX acknowledges these comments and will address in the Revised Phase B SAP submittal. As with comment kk above, the electrolytic process involves sulfate chemistry and should not generate PCBs.
- vv. RTC 15.i.iv, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- ww. RTC 15.i.v, TRX will not move SA124 as this boring is currently proposed to be located in the drainage for the concrete pad of LOU 11.
- xx. RTC 15.i.vi, TRX will not move SA125 as it is not feasible because of overhead power transmission lines.

- yy. RTC 15.j-k, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
  - zz. RTC 15.l.i, TRX acknowledges this comment.
  - aaa. RTC 15.l.ii-iii, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
  - bbb. RTC 15.l.iv-v, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly. TRX indicated that the additional borings requested by NDEP along Avenue F (north of ChemStar) to evaluate segments of the storm sewer and acid drain systems may not be on TRX property – this area along Avenue F may belong to ChemStar. TRX will search property records and county assessor parcel maps to ascertain ownership of this land.
  - ccc. RTC 15.l.vi, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
  - ddd. RTC 15.m.i-ii, TRX acknowledges these comments.
4. The following are TRX's RTC to NDEP's July 21, 2008 letter Re: Phase B SAP Area III:
- a. RTC 1, TRX acknowledges this comment.
  - b. RTC 2, TRX acknowledges this comment.
  - c. RTC 3.a-f, TRX acknowledges these comments and will address in the Phase B Report.
  - d. RTC 4, TRX stated that this comment was addressed in the text of the Phase B SAP Area II. NDEP acknowledged.
  - e. RTC 5, TRX stated that this comment was addressed in the text of the Phase B SAP Area II. NDEP acknowledged.
  - f. RTC 6, TRX acknowledges this comment.
  - g. RTC 7, TRX acknowledges this comment.
  - h. RTC 8, TRX acknowledges this comment and will address in the Phase B Report.
  - i. RTC 9, TRX acknowledges this comment and will address in the Revised Phase B SAP submittal.
  - j. RTC 10.a.i, TRX acknowledges this comment.
  - k. RTC 10.a.ii-iii, TRX acknowledges these comments and will address in the Revised Phase B SAP submittal.
  - l. RTC 10.a.iv.1, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
  - m. RTC 10.a.iv.2.a-b, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
  - n. RTC 10.a.iv.3-6, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
  - o. RTC 10.b.i, TRX acknowledges this comment.
  - p. RTC 10.b.ii, TRX stated that 1,4-dioxane is included in the SVOC analyses.
  - q. RTC 10.b.iii, TRX stated that they will continue to look for the well logs. If the well logs cannot be found, TRX stated that they would likely extrapolate geologic formation data from nearby wells and use down-well camera technology to determine well completion information.
  - r. RTC 10.c, TRX acknowledges this comment and will address in the Revised Phase B SAP submittal.
  - s. RTC 10.d-e, TRX acknowledges these comments.

- t. RTC 11, TRX stated that the groundwater elevation map (Figure 4) was provided for general elevation and gradient purposes. TRX will be providing a comprehensive groundwater elevation map in the Annual Monitoring Report that is scheduled to be submitted to the NDEP on August 28, 2008 that should address this comment.
- u. RTC 12, TRX acknowledges this comment.
- v. RTC 13a.i-ii, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- w. RTC 13.a.iii, TRX acknowledges this comment.
- x. RTC 13.a.iv-vii, NDEP did not label RTC 13.a.v-vii properly as they are sub-comments to RTC 13.a.iv. However, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- y. RTC 13.b.i, TRX acknowledges this comment.
- z. RTC 13.b.ii, TRX acknowledges that there may be fines in the ore introduced during transportation, etc. but that the percent fines has not been measured.
- aa. RTC 13.b.iii, TRX acknowledges this comment and will revise Table 3 and Plate A in the Revised Phase B SAP submittal accordingly.
- bb. RTC 13.b.iv, NDEP indicated that the rationale for adding a soil boring at this location was to gather data for airborne emissions (wind-blown dust). NDEP concurred with TRX to collect a surface soil sample at the NDEP-requested location instead of drilling a soil boring. TRX will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- cc. RTC 13.c.i, TRX acknowledges this comment but will not characterize this area at this time because of potential risk to underground utilities and current operations.
- dd. RTC 13.c.ii, TRX indicated that the cathode wash utilizes a hexametaphosphate-based cleaning agent. TRX acknowledges they will provide additional information including description of the waste material (e.g., sludge), how the material is characterized for waste disposal, and where the waste material is disposed.
- ee. RTC 13.c.iii TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly. TRX noted that 1,4-dioxane is included in analyte list for SVOCs.
- ff. RTC 13.c.iv, TRX had the following responses to the NDEP request to collect soil samples during the boring advancement for the following proposed wells:
  - i. Well M-122: TRX will not collect soil samples during the advancement of M-122 since the monitoring well will be located adjacent to Phase A soil boring SA08, from which soil samples have already been collected and analyzed.
  - ii. Wells M-145 and M-139: TRX agreed to collect soil samples during the advancement of M-145 and M-139. TRX will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- gg. RTC 13.d.i-ii, TRX acknowledges these comments.
- hh. RTC 13.d.iii, TRX acknowledges this comment and will address in the Revised Phase B SAP submittal.
- ii. RTC 13.d.iv-v, TRX acknowledges these comments and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- jj. RTC 13.d.vi-vii, TRX acknowledges these comments and will address in the Revised Phase B SAP submittal.
- kk. RTC 13.e.i-ii, TRX acknowledges these comments.

FINAL

- ll. RTC 13.e.iii-iv, TRX acknowledges these comments and will address in the Revised Phase B SAP submittal.
- mm. RTC 13.e.v, TRX acknowledges this comment and will revise Table 2 and Plate A in the Revised Phase B SAP submittal accordingly.
- 5. TRX stated that the LOU packages will be revised as necessary and will be appended to the Phase B Report in an electronic format.
- 6. TRX stated that the Revised Phase B SAP errata pages will be submitted by September 15, 2008.
- 7. TRX stated that drilling will continue to be suspended until after NDEP approval of the errata. TRX noted that upon receipt of NDEP's approval that drilling would be scheduled, which may result in further delay depending upon the drillers schedule.



## Meeting Minutes

**Project:** Nevada Pic-A-Part Parcel (former Tronox Parcel I)  
**Location:** Conference Call / NDEP – Las Vegas Office  
**Time and Date:** 9:30 AM, Thursday, August 07, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Nevada Pic-A-Part – David Christensen  
Claiborne Thornton (for NV Pic-A-Part)  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for Tronox)

CC: Jim Najima

1. The meeting was held to discuss the current status of Parcel I. (Please note that all parties agreed to refer to the parcel under discussion as Nevada Pic-A-Part (NPAP) Parcel in this and all future discussions.)
2. TRX stated the following:
  - a. Mr. Christensen purchased the NPAP parcel from Tronox (TRX) on an “as is” basis.
  - b. TRX retains responsibility for groundwater and vadose zone soils greater than 10 feet below ground surface underlying Parcel I.
  - c. Construction is restricted to the top ten feet of the NPAP parcel.
  - d. Development of the NPAP parcel is limited to commercial/industrial use.
  - e. TRX has conducted soil gas sampling on the NPAP parcel.
3. NPAP stated that their lease with TRX (formerly Kerr-McGee) commenced in 1998.
4. TRX stated that the NPAP parcel has been occupied by a pick-a-part yard since the 1980s.
5. TRX stated that NDEP had agreed that the sampling conducted for TRX parcels A and B would be used as baseline conditions. Based on this assumption, TRX stated that the analyte list for future soil characterization could be reduced by eliminating non-detected chemicals from the Phase A and Parcels A and B sampling results.
6. NDEP stated that its understanding of using the Parcels A and B data as representative of baseline conditions on the NPAP parcel would be used between TRX and NPAP to delineate between historic TRX impacts from the more recent NPAP impacts.
7. NDEP agreed to the submittal of a document from NPAP requesting to be able to use the Parcels A and B data to eliminate chemicals from the analyte list for future soil sampling on the NPAP parcel. This document should contain justification for the request based upon a Conceptual Site Model approach. NDEP additionally requested that this document contain a work plan for soil sampling.
8. TRX suggested and NDEP acknowledged that NPAP could use the *Technical Memorandum – Data Review for 2007 Tronox Parcels A/B Investigation, BMI Industrial Complex, Clark County, Nevada, Revision 1* dated February 11, 2008 as a reference for a sampling work plan and for what information is necessary in order to proceed toward a No Further Action Determination.
9. NDEP stated that David Christensen, as the new property owner, is now the Responsible Party for the NPAP parcel.
10. NDEP acknowledged that TRX is still the responsible party for groundwater impacts under the NPAP parcel.

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11. NDEP and TRX stated that a specific sampling protocol and analytical method for the sampling and analysis of asbestos will need to be used. Standard Operating Procedures (SOPs) are available on the NDEP's website.
12. TRX stated that NPAP should note that all laboratory analyses must be conducted by a Nevada certified laboratory in order to be accepted by the NDEP. Information on Nevada certified laboratories can be obtained on the NDEP website.
13. NPAP stated that scraping of several areas of the NPAP parcel have occurred. Impacted soil was sent to US Ecology in Beatty, NV for disposal. The crumb asphalt was sent to another facility for use.
14. NPAP is currently constructing a block wall to enclose the NPAP parcel and has constructed a modular office on the NPAP parcel
15. NPAP will contact NDEP by close of business on August 15, 2008 with a timeline for document submittal and property development/business operation.
16. NPAP indicated that a portion or the entire NPAP parcel may be paved for future operation.

## Shannon Harbour

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**From:** Brian Rakvica  
**Sent:** Tuesday, August 05, 2008 2:28 PM  
**To:** Ranajit Sahu; Crowley, Susan  
**Cc:** Keith Bailey; Shannon Harbour  
**Subject:** RE: Disposition of Soil Removed from Parcels C / D / H

All,

That would be acceptable to the NDEP.

Thanks,

Brian

---

**From:** Ranajit Sahu [mailto:sahuron@earthlink.net]  
**Sent:** Tue 8/5/2008 1:04 PM  
**To:** Crowley, Susan  
**Cc:** Keith Bailey; Brian Rakvica  
**Subject:** Re: Disposition of Soil Removed from Parcels C / D / H

Susan:

Given the levels of asbestos and dioxin that have been detected in the Tronox samples from Parcels C/D and H, we do not see any impediment to disposal of these impacted soils in the CAMU, should Tronox want to go that route. I have briefly discussed this with Brian Rakvica at the NDEP and he agreed with this assessment. However, I have cc:ed him on this e-mail, in case he has a different opinion.

Regards

Ron

-----Original Message-----

From: "Crowley, Susan"  
Sent: Aug 5, 2008 12:36 PM  
To: "Ranajit (Ron) Sahu"  
Cc: Keith Bailey  
Subject: Disposition of Soil Removed from Parcels C / D / H

Ron,

As we decide on the disposition of the soil to be removed from Parcels C, D and H – we need to know if the CAMU (if there is room available) is an acceptable home for this material. Can the CAMU receive the soil scrapped to remediate for asbestos and dioxin? Your thoughts?

**TRONOX LLC**  
Susan Crowley  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607

8/6/2008

email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

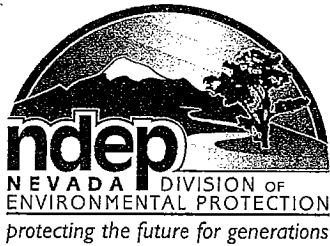
*It's the set of our sails, not the force of the gales, that determines the way we go.*

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STATE OF NEVADA  
Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

August 4, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Vertical Delineation of Contaminant Plumes and Hydraulic Gradients*  
Dated June 27, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's report identified above and provides comments in Attachment A. A revised report (and annotated response-to-comments letter) should be submitted based on the comments found in Attachment A. Please resubmit the report **by September 12, 2008**.

Please contact the undersigned with any questions at [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov) or (702) 486-2850 extension 247.

Sincerely,

Brian A. Rakvica, P.E.  
Supervisor  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

BAR:s



CC: Jim Najima, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W., Suite 900, Washington, D.C. 20004  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranajit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509  
Brian Giroux, McGinley and Associates, 425 Maestro Drive, Suite 202, Reno, NV 89511

**Attachment A**

1. General comment, it is not clear that any of the gradient evaluations considered the density of the groundwater. This can be significant and must be considered. NDEP can provide guidance on performing these calculations if TRX has any questions.
2. General comment, TRX has not discussed the validation status of the data presented. Please clarify this in the revised submittal.
3. General comment, TRX has not discussed if a cation-anion balance has been conducted on the data sets presented. The status of these data sets and the results of the cation-anion balance needs discussion in the revised report.
4. General comment, in the revised report, please provide a schematic drawing which presents the various hydrogeologic units and the nomenclature that is being ascribed to these units by TRX.
5. General comment, most of the well clusters do not address the five hydrogeologic formations described by TRX. TRX should review this matter and propose to install additional wells to address the vertical delineation issues at the Site.
6. Page 2, TRX notes that the construction information from wells MC-9 and H-58A are unclear. Please note that these wells should not be used in any way until the construction information is verified. Alternately, these wells can be replaced. Please advise the NDEP how the well clusters at location TR-11 and TR-12 will be addressed (i.e.: well construction will be determined or wells will be replaced).
7. Figure 1, please revise the Figure to indicate the hydrogeologic formation addressed by each well location. Please note that the format of the Figure submitted by Hargis on June 25, 2008 for the Companies associated with the Olin Site is very helpful.

July



TRX MIXED ZONE /  
NPDES Permit

7/29/08

① B+V presentation by Willard Pale  
2/22/07  
@ NWRA Conference in Sparks, NV

NDEP: Brian Rakvia, Shannon Harbour  
Alan Tinney

CWC: Lynn Orphan

→ explained what it was and what we want  
-- it is an Excel Spreadsheet

→ broke LRVW into separate units (22)  
for each erosion control structure

→ if questions --- to understand the assumptions  
contact Willard / Lynne

→ Lynn will check permissions

**Shannon Harbour**

---

**From:** Crowley, Susan [Susan.Crowley@tronox.com]  
**Sent:** Monday, July 28, 2008 2:42 PM  
**To:** Brian Rakvica  
**Cc:** Shannon Harbour; Keith Bailey  
**Subject:** RE: TRX Area II and III SAPs - NDEP Responses

Brian,

Please see below? As we've reviewed the comments re the Area II and Area III WP's we recognize that these affect the Area I and Area IV Work Plans. We're now evaluating what this means to the samples already drawn in Area I as well as those proposed for Area IV. Our first task as we review the comments is to get a real handle on this. I thought it wise to pause drilling until we have the comments addressed with errata pages - so that we don't take borings which may need samples not taken during the drilling. I expect that early within the 6 to 8 week period for developing the errata pages we'll address any additions needed (errata pages) for the earlier WP's. For timing .... I'd expect we could generate errata pages for the Area I and Area IV WP's within a week or so of our (NDEP / Trx) teleconference re the comments (which is August 11<sup>th</sup>). This would place Area I and IV errata pages to you by August 18<sup>th</sup>. The errata process for Area II and Area III will follow this. Thanks.

**TRONOX LLC**

Susan Crowley  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

*It's the set of our sails, not the force of the gales, that determines the way we go.*

---

**From:** Brian Rakvica [mailto:[brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov)]  
**Sent:** Monday, July 28, 2008 8:20 AM  
**To:** Brian Rakvica; Crowley, Susan  
**Cc:** Shannon Harbour; Keith Bailey  
**Subject:** RE: TRX Area II and III SAPs - NDEP Responses

Susan or Keith,

Any update on this or the driller situation?

Thanks,

Brian

---

**From:** Brian Rakvica  
**Sent:** Monday, July 21, 2008 4:29 PM  
**To:** Crowley, Susan  
**Cc:** Shannon Harbour; Keith Bailey  
**Subject:** RE: TRX Area II and III SAPs - NDEP Responses

7/28/2008

**Importance:** High

Susan,

In that case, we will not review the Area IV Errata we received today. Please advise when the new errata can be expected.

Thanks,

Brian

---

**From:** Crowley, Susan [mailto:Susan.Crowley@tronox.com]  
**Sent:** Mon 7/21/2008 2:50 PM  
**To:** Brian Rakvica  
**Cc:** Shannon Harbour; Keith Bailey  
**Subject:** RE: TRX Area II and III SAPs - NDEP Responses

Brian,

Please excuse the delay in getting back to you re scheduling for the errata pages for Area II and Area III. We gone through the NDEP comments the first time and recognize there are comments that will stretch back into the previous WP's to be implemented, so we want to ensure we've got the NDEP comments addressed before we complete the drilling for Areas I and IV. We're expecting that within 6 to 8 weeks we'll have the Area II and Area III errata pages prepared, as well as have looked at the previous Area I and Area IV work plans to revised them as needed. We're expecting that certainly by the end of September (we'll try to better this) we'll have the II and III errata pages to you, as well as any other errata pages needed to document the changes in the I and IV work plans.

Will this work?

**TRONOX LLC**

Susan Crowley  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

*It's the set of our sails, not the force of the gales, that determines the way we go.*

---

**From:** Brian Rakvica [mailto:brakvica@ndep.nv.gov]  
**Sent:** Monday, July 21, 2008 8:41 AM  
**To:** Crowley, Susan; Keith Bailey  
**Cc:** Shannon Harbour; TeriLCopeland; Paul Black; Kelly Black; hackenberry@sbcglobal.net; dgerry@ensr.aecom.com; sbilodeau@ensr.aecom.com; mflack@ensr.aecom.com; Bradley, Lisa  
**Subject:** RE: TRX Area II and III SAPs - NDEP Responses

Susan,

Due to the delays with drilling, what is the forecast for implementation of these? Meaning, how much time do we have to get through the errata process?

7/28/2008

Thanks,

Brian

---

**From:** Crowley, Susan [mailto:Susan.Crowley@tronox.com]  
**Sent:** Monday, July 21, 2008 8:39 AM  
**To:** Brian Rakvica; Keith Bailey  
**Cc:** Shannon Harbour; TeriLCopeland; Paul Black; Kelly Black; hackenberry@sbcglobal.net; dgerry@ensr.aecom.com; sbilodeau@ensr.aecom.com; mflack@ensr.aecom.com; Bradley, Lisa  
**Subject:** RE: TRX Area II and III SAPs - NDEP Responses

Brian,

Thanks. We'll read through these and see what changes we need to make.

**TRONOX LLC**

Susan Crowley  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

*It's the set of our sails, not the force of the gales, that determines the way we go.*

---

**From:** Brian Rakvica [mailto:brakvica@ndep.nv.gov]  
**Sent:** Monday, July 21, 2008 7:39 AM  
**To:** Crowley, Susan; Keith Bailey  
**Cc:** Shannon Harbour; Brian Rakvica; TeriLCopeland; Paul Black; Kelly Black; hackenberry@sbcglobal.net; dgerry@ensr.aecom.com; sbilodeau@ensr.aecom.com; mflack@ensr.aecom.com; Bradley, Lisa  
**Subject:** TRX Area II and III SAPs - NDEP Responses

All,

See attached, hard copy to follow by mail.

Keith and Susan – FYI Shannon is out until 8/4/08. If we need to discuss these letters, please contact me directly.

Thanks,

Brian

Brian A. Rakvica, P.E.  
Supervisor, Special Projects Branch  
Bureau of Corrective Actions  
Nevada Division of Environmental Protection  
2030 East Flamingo Road, Suite 230  
Las Vegas, Nevada 89119  
tel: 702-486-2850 x 247  
e: [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov)

7/28/2008

fax: 702-486-5733 (please note the new fax number)

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Please let me know immediately by return e-mail if you have received this message by mistake, then delete the e-mail message.

Thank you.

## Brian Rakvica

---

**From:** Ranajit Sahu [sahuron@earthlink.net]  
**Sent:** Thursday, July 24, 2008 4:38 PM  
**To:** Brian Rakvica  
**Cc:** Brian Rakvica; Shannon Harbour; pblack@neptuneinc.org  
**Subject:** RE: Tronox Parcels C, D, and H

Brian:

Thanks. We will connect the strip.

Ranajit

-----Original Message-----

>From: Brian Rakvica <brakvica@ndep.nv.gov>  
>Sent: Jul 24, 2008 4:20 PM  
>To: Ranajit Sahu <sahuron@earthlink.net>  
>Cc: Brian Rakvica <brakvica@ndep.nv.gov>, Shannon Harbour  
><sharbour@ndep.nv.gov>, pblack@neptuneinc.org  
>Subject: RE: Tronox Parcels C, D, and H  
>  
>Ranajit,  
>  
>These look fine from a purely mathematical perspective but to leave that little strip  
>between the two polygons on the west side of C-D doesnt make any logical sense.  
>  
>Please connect those two.  
>  
>With that change you can proceed.  
>  
>Thanks,  
>  
>Brian  
>  
>  
>  
>-----  
>From: Ranajit Sahu [mailto:sahuron@earthlink.net]  
>Sent: Thu 7/24/2008 4:17 PM  
>To: Brian Rakvica  
>Subject: Fw: Tronox Parcels C, D, and H  
>  
>  
>  
>Brian:  
>  
>Please let me know if the Tronox attachments came through...  
>  
>Thanks  
>  
>Ranajit  
>  
>  
>  
>

**Brian Rakvica**

---

**From:** Ranajit Sahu [sahuron@earthlink.net]  
**Sent:** Thursday, July 24, 2008 4:18 PM  
**To:** Brian Rakvica  
**Subject:** Fw: Tronox Parcels C, D, and H  
**Attachments:** Tronox\_Parcels-C-D ScrapePts.pdf; Parcels C-D-H Scrape Pts.xls; Tronox\_Parcel-H ScrapePts.pdf

Brian:

Please let me know if the Tronox attachments came through...

Thanks

Ranajit

7/25/2008



Removal Action Workplan for Soil  
Tronox Parcels "C", "D", "F", "G" and "H"

**FIGURE**

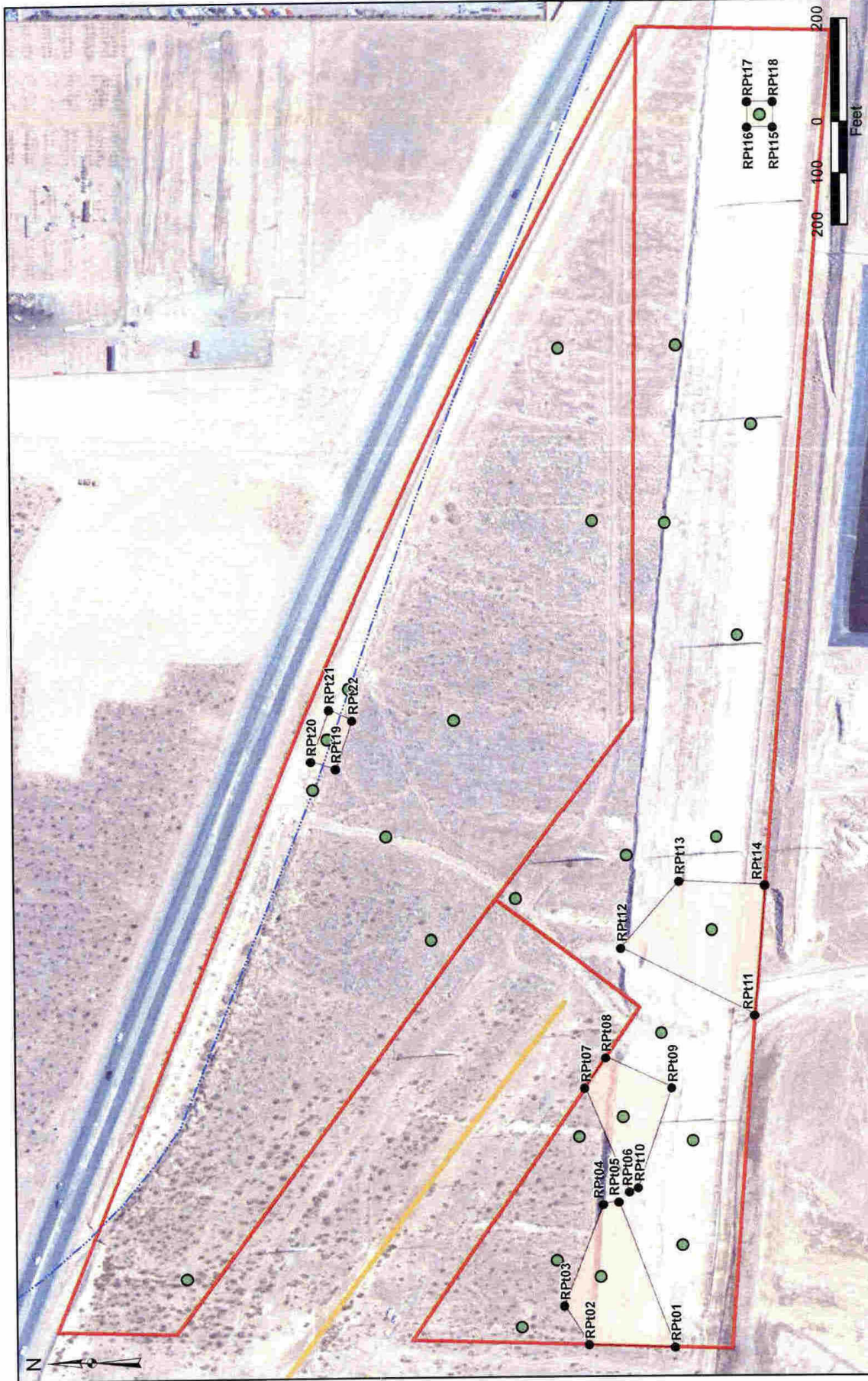
**PARCEL "H"  
SCRAPE AREA  
CONTROL POINTS**

Basic Environmental  
CORPORATION

Prepared by: MKJ Date: 07/22/08  
JOB No. 0098073  
FILE: GIS/REC/TRONOX/FIGURE\_5.MXD

- Parcel H Boundary
  - Proposed Scrape Area (0.55 Acres)
  - Scrape Area Control Points
- January 2008 Aerial from AeroTech Mapping.



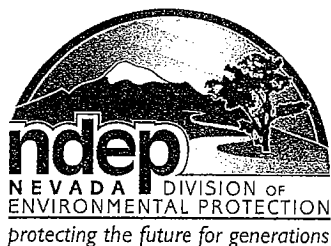


Parcel Boundaries  
 Pioneer/Montrose GW Treatment System  
 Historical Northwestern Ditch  
● Sampling Location  
 Proposed Scrape Areas (2.6 Acres)  
● Scrape Area Control Points

Removal Action Workplan for Soil  
 Tronox Parcels "C", "D", "F", "G" and "H"  
**FIGURE**  
**PARCELS "C" AND "D"**  
**SCRAPE AREA**  
**CONTROL POINTS**

Prepared by: MKJ  
 Date: 07/20/08  
 Job #: 0689073  
 FILE: GIS/ELECTRONIX/FIGURE.MXD  
 Basic Environmental  
 CONSULTANTS

January 2008 Aerial from AeroTech Mapping.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

July 21, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:

*Phase B Source Area Investigation Work Plan, Area I (Northern LOUs), Tronox LLC Facility, Henderson, Nevada*  
Dated April 3, 2008

*Phase B Source Area Investigation Work Plan Area IV (Western and Southern LOUs). Tronox LLC Facility, Henderson, Nevada*  
Dated May 16, 2008

*Phase B Source Area Investigation Work Plan Area II (Central LOUs). Tronox LLC Facility, Henderson, Nevada*  
Dated June 27, 2008

*Phase B Source Area Investigation Work Plan Area III (Eastern LOUs). Tronox LLC Facility, Henderson, Nevada*

Dated June 27, 2008

Dear Ms. Crowley,

The NDEP has completed review of four of four Phase B Source Area Sampling Analysis Plans (SAPs). The following are general comments regarding the soil sampling analyses.

- NDEP has added PCBs and TPH DRO/ORO analysis to any borings located in the vicinity of Western Area Power Administration (WAPA) property. For the Phase B SAPs these borings include: SA177, RSAR8, SA34, RSAS8, SA208, RSAS5, SA31, RSAS3, RSAS4, RSAS5, RSAS6, RSAS7, RSAT6, RSAT7, and RSAT8. Please note that PCBs will be sampled at other locations as indicated in the SAPs and the subsequent NDEP response letters to each of the SAPs.
- NDEP has added organophosphorus pesticides (OPP) and organic acid analyses to all borings associated with the sections of LOU 5, LOU 59, and LOU 60 downstream of the western property boundary. For the Phase B SAPs these borings include: SASA131, SA66, SA67,



SA128, SA70, SA104, SA129, SA175, SA86, SA92, SA155, SA71, SA165, SA49, SA154, SA107, RSAN7, SA158, RSAN4, SA55, SA182, SA183, SA176, SA50, SA198, SA64, SA189, RSAL4, SA82, SA134, RSAJ3, SA 192SA126, RSAQ6, RSAP7, SA178, all additional borings for LOU 60 in Area III, all additional borings on LOU 60 for Area VI .

- NDEP has added cyanide to the all of the borings north of Row V and west of Column 6 (not inclusive) of Plate A. Please note that other locations will be sampled for cyanide as indicated in the SAPs and the subsequent NDEP response letters.

TRX should additionally submit four copies of a revised Plate A that addresses the NDEP's comments from the Area I, II, III, and IV response letters. These revised plates will be placed in each of the Phase B Source Area SAPs. Please contact the undersigned with any questions at sharbour@ndep.nv.gov or (702) 486-2850 extension 240.

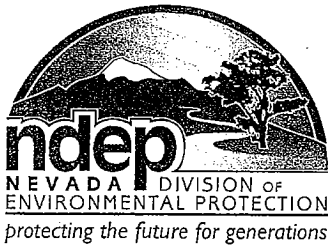
Sincerely,



Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh

CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W.,  
Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Teri Copeland, 5737 Kanan Road #182, Agoura Hills CA 91301  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509  
Kelly Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

July 21, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Phase B Source Area Investigation Work Plan Area III (Eastern LOUs). Tronox LLC  
Facility, Henderson, Nevada*  
Dated June 27, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Phase B Area III Sampling Analysis Plan (SAP) identified above and finds the document acceptable with the conditions and comments provided in Attachment A.

Errata sheets should be submitted based on the comments found in Appendix A as noted. TRX should additionally provide an annotated response-to-comments (RTC) letter as part of the errata submittal. Alternately, in place of an RTC letter, TRX can discuss these comments with the NDEP in a meeting or via phone. Please advise the NDEP regarding the schedule for this submittal. Please note that it is NDEP's intent that TRX should be able to proceed with implementation of this SAP upon submittal of the errata and RTC letter (or completion of meeting with NDEP in lieu of the RTC letter).

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W.,  
Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Teri Copeland, 5737 Kanan Road #182, Agoura Hills CA 91301  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509  
Kelly Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215

**Attachment A**

1. General comment, NDEP has noted numerous typographic errors and cross-referencing errors in the text, tables, and figures of this document but will not list these in this response letter. TRX should review documents in greater detail and revise as necessary prior to submittal.
2. General comment, some site-wide changes to the sampling plan have been requested under separate cover. Please refer to separate letter dated July 21, 2008.
3. General comment, NDEP noted numerous errors in the Medium Specific Screening Levels (MSSLs), Maximum Contaminant Levels (MCLs), etc. listed in the tables of the main text and Appendix A LOU packages and notes the following (TRX should note that the following is not an exhaustive list):
  - a. TRX should review these values in greater detail and revise as necessary prior to the submittal of future documents.
  - b. The non-cancer endpoint MSSL for arsenic is used instead of the cancer endpoint MSSL.
  - c. TRX did not include the MSSL for titanium.
  - d. TRX did not include the MSSL for thallium.
  - e. TRX should use the values listed for the outdoor worker as these are more stringent. Indoor workers will be addressed using the indoor air pathway.
  - f. TRX should list the more stringent of the cancer vs. non-cancer endpoint MSSLs for each contaminant.
4. Section 1.0, page 1-2, it is the NDEP's expectation that TRX will meet with the NDEP to discuss the format of the final Phase B Source Area Investigation Report prior to submittal.
5. Section 1.1, page 1-3, 3<sup>rd</sup> paragraph, it is the NDEP's expectation that TRX will meet with the NDEP to discuss data usability prior to the submittal of the final Phase B Source Area Investigation Report.
6. Section 1.2, page 1-5, TRX lists the Phase A Investigation Results Report as a document of record. TRX should note that the NDEP accepted the submittal of the Phase B SAPs in lieu of TRX submitting a revised Phase A Report. Additionally, while the validated data presented in the Phase A Report was approved by the NDEP, the procedures/methodologies, recommendations, and conclusions in the Phase A Report were neither approved nor rejected by the NDEP.
7. Section 2.2.1, page 2-3, 2<sup>nd</sup> paragraph, TRX states that "If current operations do not exacerbate contamination, future closure may not require sampling for the full SRC list (i.e., if a chemical is not detected in the Phase B Source Area Investigation and is not a part of the process associated with the LOU, it may not be analyzed for at the time of closure)." The NDEP does not necessarily concur with this statement at this time and will review this issue at the time of closure.
8. Section 2.2.1, page 2-4, 4<sup>th</sup> paragraph, TRX should include discussion on groundwater as a source of continuing soil contamination.
9. Section 2.3.2, page 2-6, 1<sup>st</sup> bullet, NDEP has added PCBs and TPH DRO/ORO analysis to any borings located in the vicinity of Western Area Power Administration (WAPA) property. Please see comments below.
10. Tables, the NDEP has the following comments:
  - a. Table 2, the NDEP has the following comments

- i. TRX should submit errata pages for Table 2 that addresses the following comments for Table 2 and the comments for Appendix A as appropriate.
  - ii. The analysis indicated for PCBs on the column header is incorrect. This should include Aroclor and congener analysis.
  - iii. TRX should indicate in a footnote that platinum will be added to the analyses for boring SA132 and SA34.
  - iv. The following borings should include the corresponding analyses:
    1. SVOCs: SA141, SA142, SA171, SA140, SA36, SA174, SA132, SA112, and SA34
    2. Cyanide:
      - a. TRX should note that NDEP requested that “all borings located in Area 4 west of column 6 (not inclusive) and all borings associated with LOU 60 downstream of the LOU 63 conveyance piping junction” in the June 18, 2008 response letter to the Phase B Area IV SAP.
      - b. NDEP acknowledges that TRX will analyze all samples collected in Area I for total cyanide.
    3. PCBs: SA177, RSAR8, SA34 and RSAS8
    4. TPH DRO/ORO: SA157, SA178, SA141, SA142, SA171, SA140, SA36, SA174, and SA177
    5. TPH GRO: SA36
    6. 1,4-dioxane: SA177, RSAR8, SA34
  - b. Table 3, the NDEP has the following comments:
    - i. General comment, TRX should note that the NDEP does not necessarily agree that the selected wells are representative of the up-gradient, down-gradient and/or cross-gradient conditions as stated in the Appendix A LOU packets. The NDEP does note that the overall coverage of the groundwater sampling plan appears adequate.
    - ii. TRX should add analysis for 1,4-dioxane for all wells associated with this area.
    - iii. As noted previously, for wells with unknown lithology TRX should note that the use of this data will be limited. NDEP requests that TRX either determine the lithology (e.g.: through a down-hole camera) or re-drill the wells.
  - c. Table 4, LOU 20 Appendix A package and Table 4 are not consistent in regards to Goal of Closure.
  - d. Table 6, TRX should note that this table was not reviewed in detail by the NDEP as it is NDEP’s assumption that this table is consistent with the approved QAPP.
  - e. Table 7, TRX should note that this table was not reviewed in detail by the NDEP as it is NDEP’s assumption that this table is consistent with the approved QAPP.
11. Figure 4, NDEP noted that the wells used in this figure are not the same as those listed for the Phase B site-wide groundwater investigation. TRX should at a minimum use these wells in the creation of this figure.
12. Plate A, update this plate to include the following comments to the Appendix A LOU packets that affect boring placement.
13. Appendix A, the NDEP has the following comments:
  - a. LOU 20 (Pond C-1 and Associated Piping in Area III), the NDEP has the following comments (please see the corresponding attached figure as necessary):
    - i. RSAP7 should be moved north adjacent to LOU 59 just past where LOU 59 crosses LOU 60.

- ii. SA36 should be moved north adjacent to LOU 20 piping and over LOU 60.
- iii. Significant inconsistencies have been noted between Table A, the text of the area-specific CSM, and the main body of the report. For example, based upon the text, all judgmental samples should include TPH analysis. Table A does not show this, please note that this analysis should be added. Table A includes dioxin/furan analysis, however, this is not described in the text. No change to the table is necessary. SVOC analysis proposed on the Table is also not consistent with the text. SVOC analysis should be added to location SA36. These comments are compiled into the NDEP's comments listed above for Table 2, however, they are included herein as an example.
- iv. LOU 24 and 46 (Mn Tailings Area and Old Main Cooling Tower), the NDEP has the following comments (please see the corresponding attached figure as necessary):
  - v. TRX should clarify if the starting point (i.e. surface) for sample collection located over the Mn tailings pile is at the soil-tailings interface.
  - vi. SA139 should be moved to a point just north of the Mn tailings pile approximately halfway between wells M-35 and CLD4-R. Additionally, a groundwater monitoring well should be installed at this location.
  - vii. An additional boring should be located within the surface flow area indicated on Figure A of the LOU.
- b. LOU 34E, 47, 48, 49, 50, 51, and Area 70 (Operational Manganese Leach Plant and Former US Vanadium Site)
  - i. General comment, TRX should note that the tailings status as non-hazardous waste is not pertinent to Site characterization. This is a comment that applies to other statements within the subject document and will not be repeated for each instance.
  - ii. TRX notes that the ore is ½" to 1" in diameter. It is likely that there is a percentage of "fines" within the ore and this should be acknowledged.
  - iii. RSAO8 should be converted to an additional groundwater monitoring well.
  - iv. An additional boring should be located in the northern portion of LOU 47 (Historical) over LOU 60.
- c. LOU 44 and 37 (Unit 6 Basement and Former Satellite Accumulation Point, Unit 6 Maintenance Shop)
  - i. TRX should note that characterization under the Unit buildings is not precluded due to continued operations. Angled or directional borings may be used to characterize under the active portions of the buildings.
  - ii. TRX should provide additional information of the cathode wash and storage areas adjacent to LOU 44.
  - iii. TRX should add the following analyses to the borings associated with this LOU: PCBs and 1,4-dioxane.
  - iv. M-122, M-145, and M-139: samples should be collected during boring advancement.
- d. LOU 59 (Storm Drain System Segment), the NDEP has the following comments (please see the corresponding attached figure as necessary):
  - i. General comment, the borings associated with this LOU should be located immediately adjacent to the storm drain system whenever possible.
  - ii. The table in this Section of the Appendix does not address any of the off-Site sources that were disposed of in the Beta Ditch. This is a global comment which applies to all of the applicable area-specific CSMs that are in Appendix A. NDEP considered this



- issue during the review of the document and requested additional sampling, as appropriate.
- iii. TRX should add the following analyses to the borings associated with this LOU because of the potential Stauffer discharges into this LOU: organophosphate pesticides (OPP) and organic acids. TRX should note that this should apply to all samples within this LOU (including in other Areas, if possible).
  - iv. TRX should add PCB analysis to any boring located near the WAPA property.
  - v. An additional boring should be located on the slim portion of the Site near the junction with the southernmost leg of LOU 59 from TIMIET.
  - vi. An additional boring should be located adjacent to LOU 47 to the east near the junction with the LOU leg within the operation Mn leach plant.
  - vii. An additional boring should be located adjacent to LOU 59 just north of ChemStar property and south of LOU 34W.
- e. LOU 60 (Former Acid Drain System), the NDEP has the following comments (please see the corresponding attached figure as necessary):
- i. General comment, the borings associated with this LOU should be located directly above the former Acid Drain system whenever possible.
  - ii. General comment, for borings located above LOU 60, TRX should log the condition of the pipe, if possible, and collect a sample directly underneath the pipe. This sample may be substituted for the next proposed 10 foot interval in the Phase B SAPs, Table 2 (e.g. if the bottom of the Former Acid Drain System pipe was located at 8 fbg, then the sample should be collected directly underneath the pipe and not at 10 fbg). Please note that this comment additionally applies to the Phase B Area I and IV SAPs.
  - iii. TRX should add the following analyses to the borings associated with this LOU because of the potential Stauffer discharges into this LOU: OPP and organic acids. TRX should note that this should apply to all samples, all areas (if possible) for this LOU.
  - iv. SA141 should be moved west to the area where two legs of LOU 60 run parallel north of the East Diversion Ditch (west of the Mn tailings pile).
  - v. SA34 should be moved north adjacent to LOU 59 and over LOU 60.

• move BSA P7 adjacent to LOU 59 and near intersection with LOU 60.  
 • move SA36 north to be over LOU 60.



**LEGEND**

- LOU of Interest
- LOU #59 Storm Sewer System with manholes and sumps with flow direction
- LOU #60 Acid Drain System with manholes and sumps with flow direction
- Other LOU Boundary
- Other LOU Associated Pipelines
- Proposed Phase B Explorations for LOU
  - Groundwater Monitoring Well Location
  - Boring Location
  - Soil Gas Location
- Other Explorations
  - Phase A Boring Location (Sep. 2007)
  - Phase II BRC Sample Location (Oct. 2007)
  - Historic Groundwater Monitoring Well Location (Dry)
  - Historic Sample Location (pre 2006)
  - Existing Well Location (No Proposed Sampling)
  - Proposed Phase B Groundwater Location (Other LOU)
  - Proposed Phase B Soil Boring Location (Other LOU)
  - Proposed Phase B Soil Gas Location (Other LOU)
- Tronox Facility Boundary
- Area Boundary
- Parcel Boundary
- Four Acre Grid Line (Cell reference displayed as row-column, i.e. M-8)

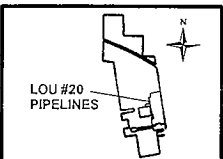
Base Aerial Photo from PBS&J, October 2006

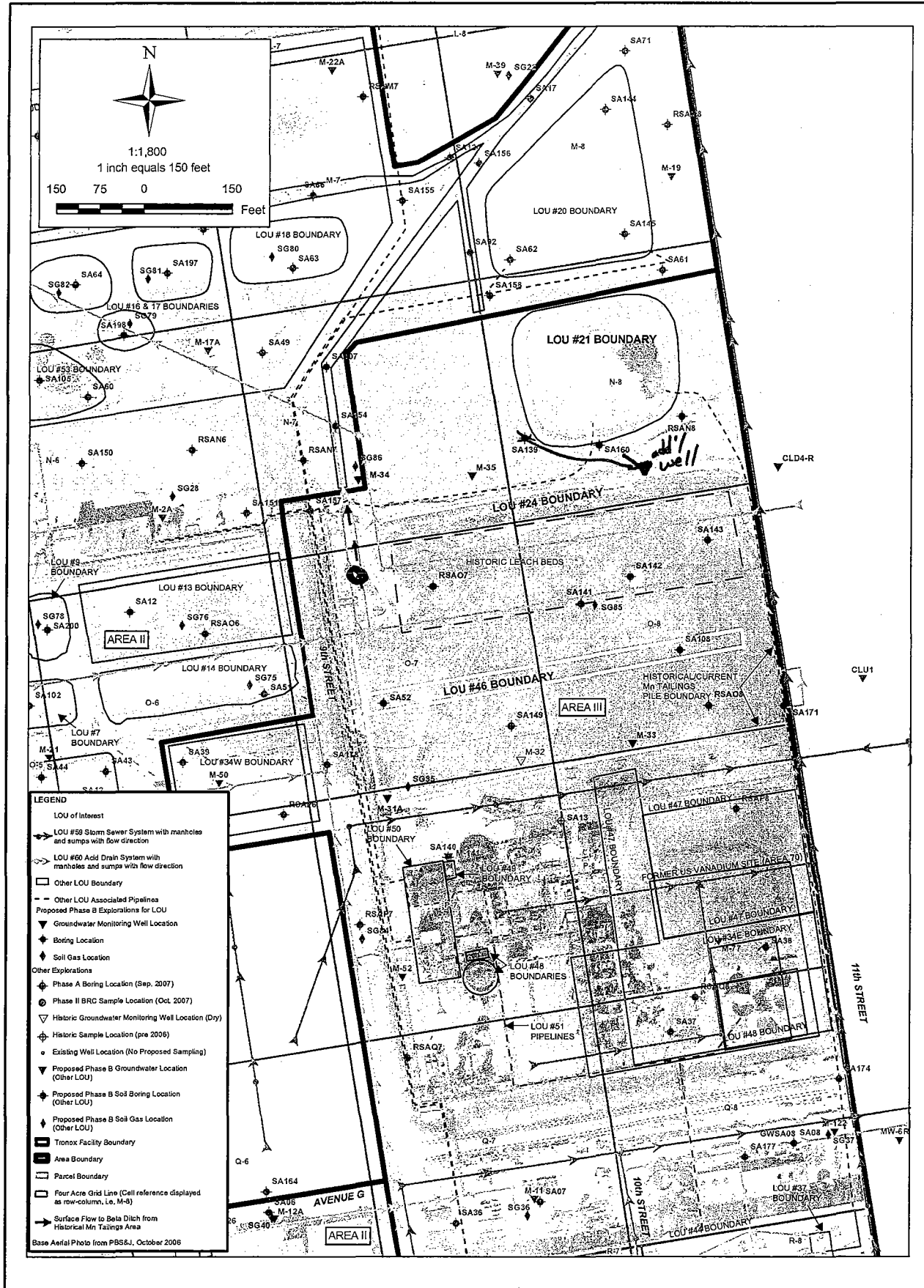
SHEET NUMBER:	1
FIGURE NUMBER:	

SAMPLE LOCATIONS FOR LOU #20, POND C-1 AND ASSOCIATED PIPING IN AREA III		
Phase B Area III Source Area Investigation		
Tronox Facility		
Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/4/2008	04020-023-430

ENSR CORPORATION  
 1220 AVENIDA ACASO  
 CAMARILLO, CALIFORNIA 93012  
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 WEB: HTTP://WWW.ENSR.AECOM.COM

DESIGNED BY:	B. Ho
DRAWN BY:	M. Scop
CHECKED BY:	C. Schnell
APPROVED BY:	B. Ho





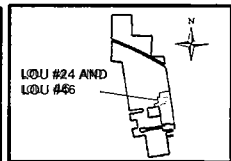
additional boring located in surface flow from MN TAILINGS Area  
 near SA139 to just north of LOU 24 & convert to monitoring well.

SHEET NUMBER:	1
FIGURE NUMBER:	

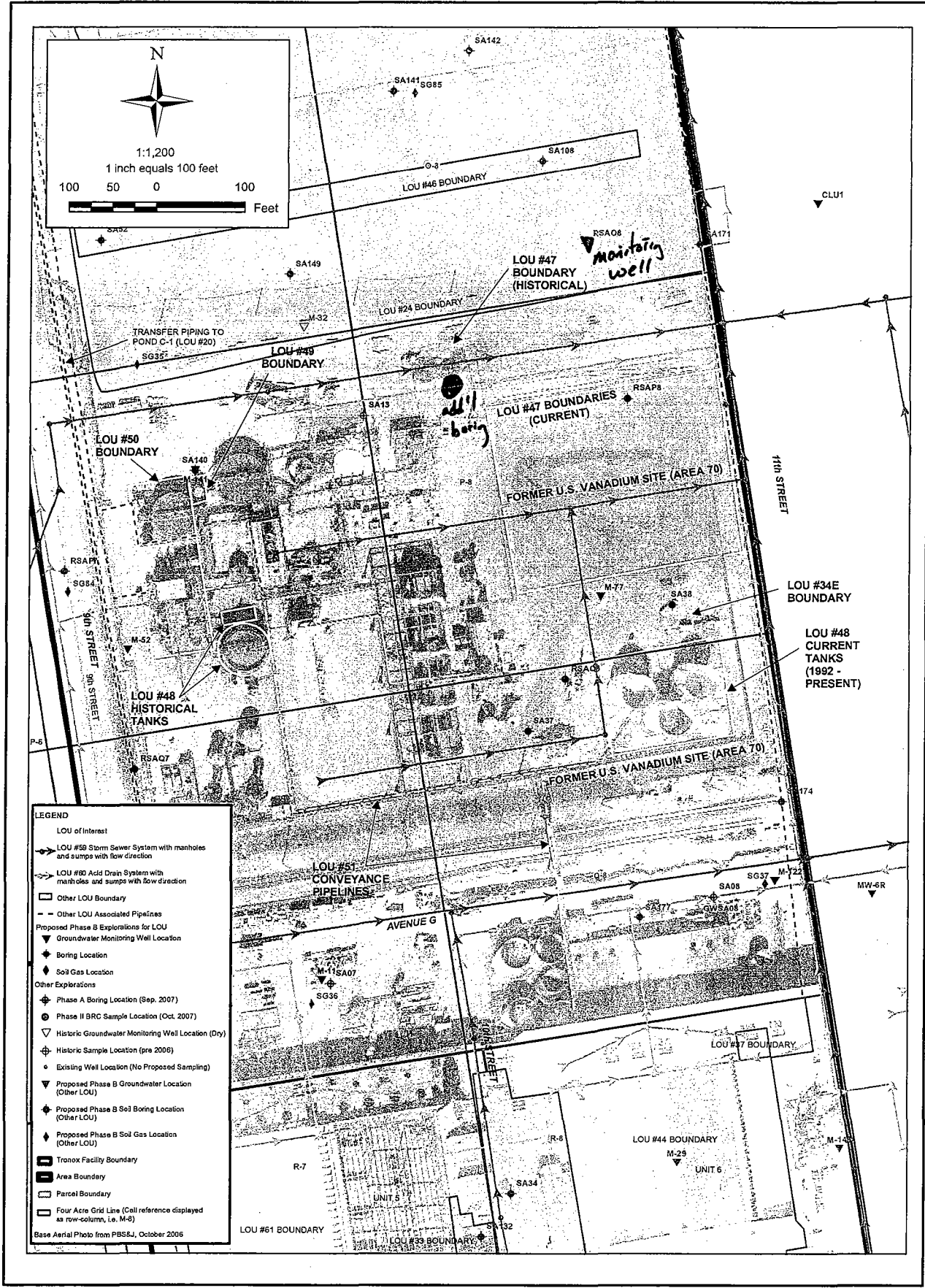
SAMPLE LOCATIONS FOR LOU #24 AND #46 MN TAILINGS AREA AND OLD MAIN COOLING TOWER Phase B Area III Source Area Investigation Tronox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/9/2008	04020-023-430

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APPROVED BY:	B. Ho



Additional boring on LOU 60 in northern portion of historical LOU 47.  
 Convert RSA08 to monitoring well.



**LEGEND**

- LOU of Interest
- LOU #59 Storm Sewer System with manholes and sumps with flow direction
- LOU #60 Acid Drain System with manholes and sumps with flow direction
- Other LOU Boundary
- Other LOU Associated Pipelines
- Proposed Phase B Explorations for LOU
- Groundwater Monitoring Well Location
- Boring Location
- Soil Gas Location
- Other Explorations
- Phase A Boring Location (Sep. 2007)
- Phase II BRC Sample Location (Oct. 2007)
- Historic Groundwater Monitoring Well Location (Dry)
- Historic Sample Location (pre 2006)
- Existing Well Location (No Proposed Sampling)
- Proposed Phase B Groundwater Location (Other LOU)
- Proposed Phase B Soil Boring Location (Other LOU)
- Proposed Phase B Soil Gas Location (Other LOU)
- Tronox Facility Boundary
- Area Boundary
- Parcel Boundary
- Four Acre Grid Line (Cell reference displayed as row-column, i.e. M-8)

Base Aerial Photo from PBSSJ, October 2006

SHEET NUMBER	1
FIGURE NUMBER	1

**SAMPLE LOCATIONS FOR LOUs #34E, #47, #48, #49, #50, #51 AND AREA 70 (FORMER U.S. VANADIUM SITE)**

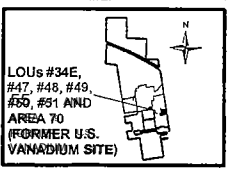
Phase B Area III Source Area Investigation  
Tronox Facility  
Henderson, Nevada

SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/9/2008	04020-023-430

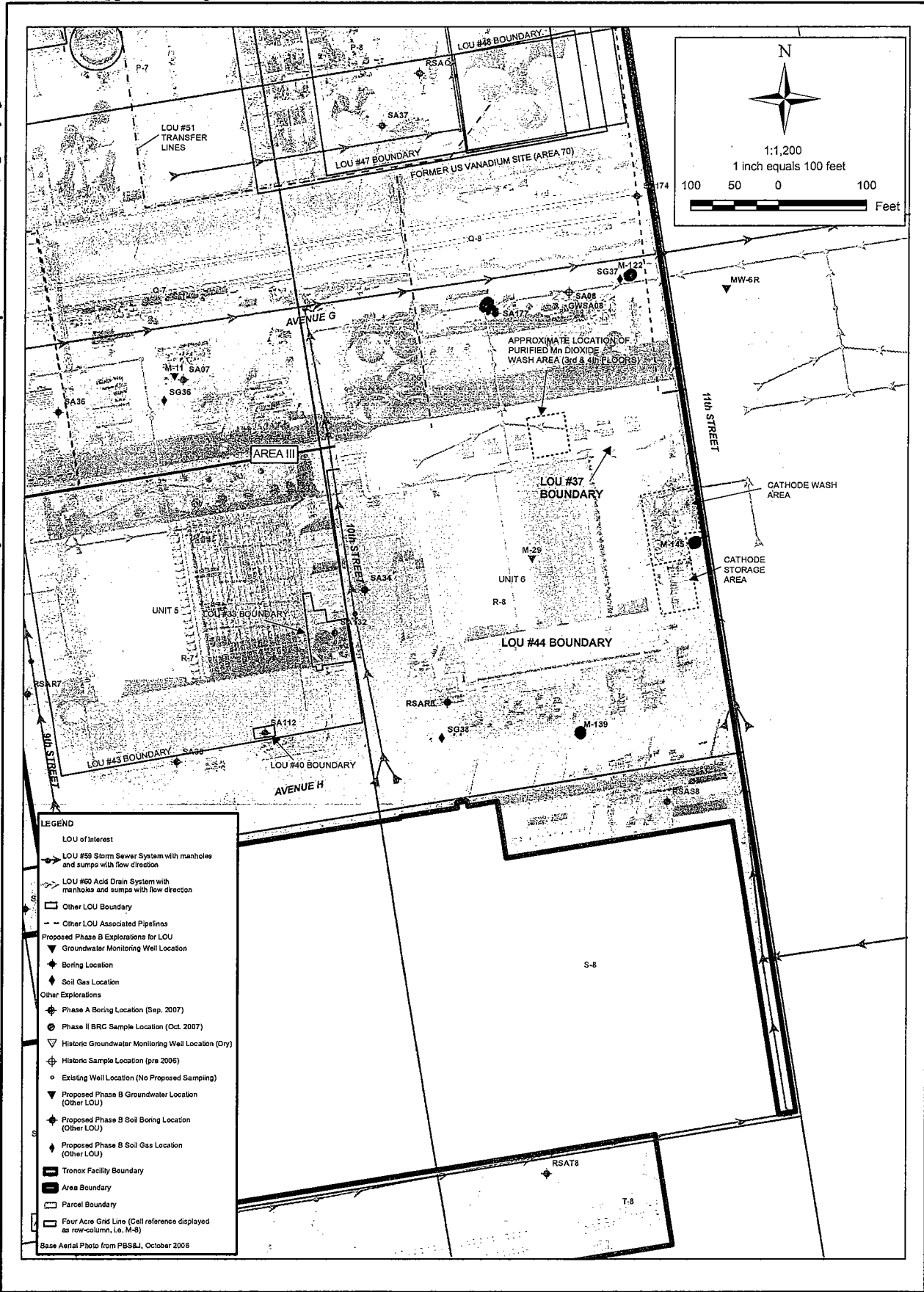
ENSR

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B. Ho  
DRAWN BY:  
M. Scop  
CHECKED BY:  
C. Schnell  
APPROVED BY:  
B. Ho



SA177 move to intersection/junction LOU 60.  
 Add borings (collect samples) for M-122, M-145 & M-139



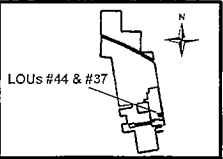
SHEET NUMBER:	X
FIGURE NUMBER:	1

**SAMPLE LOCATIONS FOR LOUs #44 & #37  
 UNIT 6 BASEMENT & FORMER SATELLITE  
 ACCUMULATION POINT  
 - UNIT 6 MAINTENANCE SHOP  
 Phase B Area III Source Area Investigation  
 Tronox Facility, Henderson, Nevada**

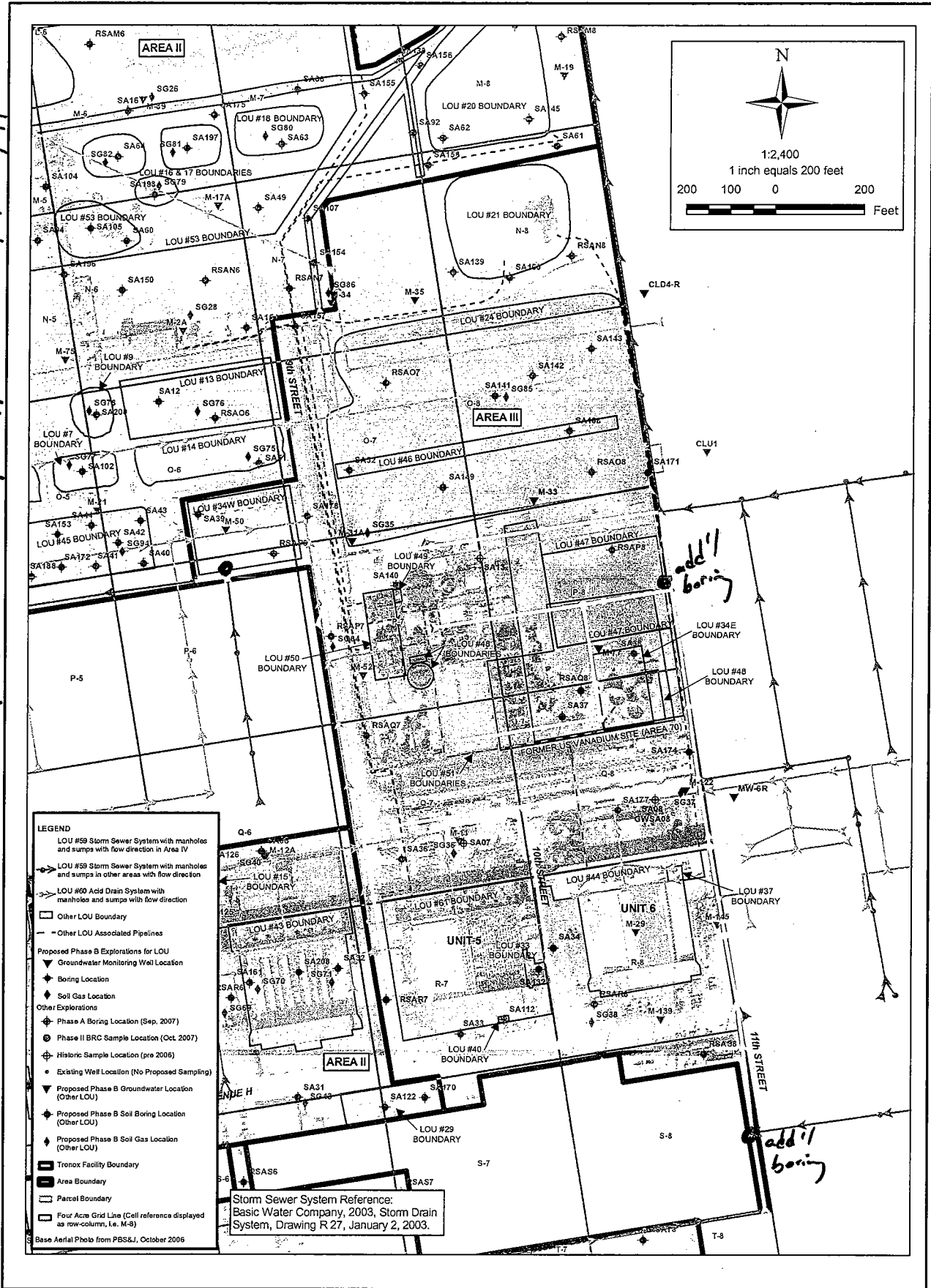
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/4/2008	04020-023-430

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CHECKED BY:	G. Helt
APPROVED BY:	B. Ho



additional boring southeast portion of LOU  
 additional boring at junction on east side of LOU #7.  
 11.1.11  
 add 11 boring

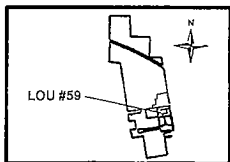


SHEET NUMBER: X	FIGURE NUMBER: 1
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SAMPLE LOCATIONS FOR LOU #59 IN AREA III STORM DRAIN SYSTEM SEGMENT		
Phase B Area III Source Area Investigation Tronox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/3/2008	04020-023-430

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DESIGNED BY: B. Ho
DRAWN BY: M. Scop
CHECKED BY: C. Schnell
APPROVED BY: B. Ho



move SA34 west to the two legs of LOU 60.



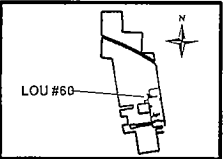
SHEET NUMBER:	1
FIGURE NUMBER:	

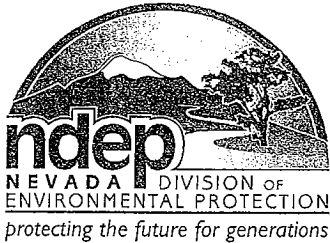
SAMPLE LOCATIONS FOR LOU #60 IN AREA III FORMER ACID DRAIN SYSTEM SEGMENT		
Phase B Area III Source Area Investigation Trenox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/3/2008	04020-023-430

ENSR AECOM

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DESIGNED BY:	B. Ho
DRAWN BY:	M. Scop
CHECKED BY:	C. Schnell
APPROVED BY:	B. Ho





# STATE OF NEVADA

Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

July 21, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Phase B Source Area Investigation Work Plan Area II (Central LOUs). Tronox LLC*  
*Facility, Henderson, Nevada*  
Dated June 27, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Phase B, Area III Sampling Analysis Plan (SAP) identified above and finds the document acceptable with the conditions and comments provided in Attachment A.

Errata sheets should be submitted based on the comments found in Appendix A. TRX should additionally provide an annotated response-to-comments (RTC) letter as part of the errata submittal. Alternately, in place of an RTC letter, TRX can discuss these comments with the NDEP in a meeting or via phone. Please advise the NDEP regarding the schedule for this submittal. Please note that it is NDEP's intent that TRX should be able to proceed with implementation of this SAP upon submittal of the errata and RTC letter (or completion of meeting with NDEP in lieu of the RTC letter).

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh





CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W.,  
Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranjit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Teri Copeland, 5737 Kanan Road #182, Agoura Hills CA 91301  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509  
Paul Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215

### Attachment A

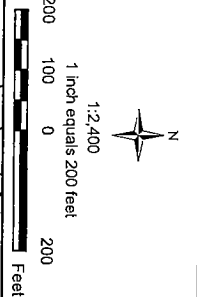
1. General comment, NDEP has noted numerous typographic errors and cross-referencing errors in the text, tables, and figures of this document but will not list these in this response letter. TRX should review documents in greater detail and revise as necessary prior to submittal.
2. general comment, some site-wide changes to the sampling plan have been requested under separate cover. Please refer to separate letter dated July 21, 2008.
3. General comment, NDEP noted numerous errors in the Medium Specific Screening Levels (MSSLs), Maximum Contaminant Levels (MCLs), etc. listed in the tables of the main text and Appendix A LOU packages and notes the following (TRX should note that the following is not an exhaustive list):
  - a. TRX should review these values in greater detail and revise as necessary prior to the submittal of future documents.
  - b. The non-cancer endpoint MSSL for arsenic is used instead of the cancer endpoint MSSL.
  - c. TRX did not include the MSSL for titanium.
  - d. TRX did not include the MSSL for thallium.
  - e. TRX should use the values listed for the outdoor worker as these are more stringent. Indoor workers will be addressed using the indoor air pathway.
  - f. TRX should list the more stringent of the cancer versus non-cancer endpoint MSSLs for each contaminant.
4. Section 1.0, page 1-2, as noted previously, it is the NDEP's expectation that TRX will meet with the NDEP to discuss the format of the final Phase B Source Area Investigation Report prior to submittal.
5. Section 1.1, page 1-3, 4<sup>th</sup> paragraph, as noted previously, it is the NDEP's expectation that TRX will meet with the NDEP to discuss data usability prior to the submittal of the final Phase B Source Area Investigation Report.
6. Section 1.2, page 1-5, TRX lists the Phase A Investigation Results Report as a document of record. The NDEP did not approve this document but accepted the submittal of the Phase B SAPs in lieu of TRX submitting a revised Phase A Report. TRX should note that while the validated data presented in the Phase A Report was approved by the NDEP, the procedures/methodologies, recommendations, and conclusions in the Phase A Report were neither approved nor rejected by the NDEP.
7. Section 2.2.1, page 2-3, 2<sup>nd</sup> paragraph, TRX states that "If current operations do not exacerbate contamination, future closure may not require sampling for the full SRC list (i.e., if a chemical is not detected in the Phase B Investigation and is not a part of the process associated with the LOU, it may not be analyzed for at the time of closure)." The NDEP does not necessarily concur with this statement at this time and will review this issue at the time of closure.
8. Section 2.2.1, page 2-4, 3<sup>rd</sup> paragraph, TRX should include discussion on groundwater as a source of continuing soil contamination.
9. Section 2.3.2, page 2-6, 1<sup>st</sup> bullet, the NDEP has the following comments:
  - a. TRX should note that sampling for PCBs is necessary in several locations in Area II.
  - b. TRX should note that PCB analyses should include Aroclor and congener analyses.

- c. NDEP has added PCBs and TPH DRO/ORO analysis to any borings located in the vicinity of Western Area Power Administration (WAPA) property. Please see Table 2 comments.
10. Section 2.3.2, page 2-6, last bullet, TRX should note that cyanide sampling should be conducted at all sampling locations located west of column 6 of Plate A, not inclusive, per NDEP's comment in a June 18, 2008 response letter and TRX subsequent response to comments (RTCs) dated June 23, 2008.
  11. Section 2.3.4.1, page 2-7, 1<sup>st</sup> paragraph, based on a review of Table 2, the Muddy Creek formation (MCf) does not seem to be represented in the proposed geotechnical sampling.
  12. Tables, the NDEP has the following comments:
    - a. General comment, the List of Tables on page iii of the Contents and the actual Tables located in the Tables section are not consistent as follows:
      - i. Table 8 is not a List of Soil Screening Levels... but is the Summary of Well Completion Data.
      - ii. No Table 9 was located.
      - iii. All references in the text of the report to these two tables are erroneous.
    - b. Table 2, the NDEP has the following comments
      - i. TRX should submit errata pages for Table 2 that addresses the following comments for Table 2 and the comments for Appendix A as appropriate.
      - ii. TRX should add a column for PCB analysis.
      - iii. TRX should indicate in a footnote that platinum will be added to the analyses for boring SA126.
      - iv. The following borings should be advanced to the water table to be consistent with other borings. (If this depth is not feasible or practical, TRX should supply justification/rationale for the difference in boring depth.): SA122, SA151, SA155, SA167, SA170, SA173, SA179, and SA196.
      - v. The following borings should include the corresponding analyses:
        1. SVOCs: SA62, SA71, SA144, SA145, SA61, SA158, SA133, SA208, RSAS5, and SA31
        2. Cyanide, please see the following comments:
          - a. TRX should note that NDEP requested that "all borings located in Area 4 west of column 6 (not inclusive) and all borings associated with LOU 60 downstream of the LOU 63 conveyance piping junction" in the June 18, 2008 response letter to the Phase B Area IV SAP.
          - b. The following borings should include analysis for total cyanide: SA72, SA123, SA73, SA66, SA67, SA65, SA70, SA104, RSAM5, SA64, SA175, RSAM6, SA197, SA198, SA63, SA92, SA155, RSAM7, SA71, SA144, RSAM8, SA58, SA94, SA113, SA196, SA60, SA105, SA49, SA154, SA107, RSAN7, SA158, SA41, SA45, SA50, SA102, SA172, SA187, SA188, SA40, SA42, SA126, RSAQ6, SA30, SA32, SA125, SA161, and RSAR6
        3. PCBs: SA92, SA62, SA71, SA144, SA145, RSAM8, SA151, RSAN7, SA61, SA158, SA122, SA170, SA133, SA208, RSAS5, and SA31
        4. TPH DRO/ORO: SA70, SA104, SA64, SA175, SA198, SA155, SA71, SA49, SA107, SA122, SA170, and SA102

5. TPH GRO: SA131, SA128, SA70, SA104, SA129, RSAM5, SA175, SA86, SA92, SA155, RSAM7, SA71, SA144, RSAM8, SA49, SA154, SA107, RSAN7, SA158, SA50, SA53, SA102, SA51, RSAO6, and SA200
  6. 1,4 dioxane: SA133
  7. Organophosphorus Pesticides (OPPs): SASA131, SA66, SA67, SA128, SA70, SA104, SA129, SA175, SA86, SA92, SA155, SA71, SA165, SA49, SA154, SA107, RSAN7, SA158
- c. Table 3, the NDEP has the following comments:
- i. General comment, TRX should note that the NDEP does not necessarily agree that the selected wells are representative of the up-gradient, down-gradient and/or cross-gradient conditions as stated in the Appendix A LOU packets. The NDEP does note that the overall coverage of the groundwater sampling plan appears adequate.
  - ii. TRX should add analysis for 1,4-dioxane for all wells associated with this area.
  - iii. TRX has noted that well information for well M-2A has not been located. TRX should note that any data collected from this well without the well information may not be usable.
- d. Table 6, TRX should note that this table was not reviewed in detail by the NDEP as it is NDEP's assumption that this table is consistent with the approved QAPP.
- e. Table 7, TRX should note that this table was not reviewed in detail by the NDEP as it is NDEP's assumption that this table is consistent with the approved QAPP.
13. Figure 4, NDEP noted that the wells used in this figure are not the same as those listed for the Phase B site-wide groundwater investigation. TRX should at a minimum use these wells in the creation of this figure.
14. Plate A, update this plate to include the following comments to the Appendix A LOU packets that affect boring placement. TRX should additionally submit four copies of a revised map that includes NDEP's requested revisions for Areas I, II, III, and IV. These copies will be placed in each of the Phase B SAPs.
15. Appendix A, the NDEP has the following comments:
- a. LOU 5 (Beta Ditch), the NDEP has the following comments (please see the corresponding attached figure as necessary):
    - i. TRX should note the depth of this LOU and whether this will affect the comparison of the data collected within the Beta Ditch with the data collected for the rest of the Site (elevation difference in compared samples).
    - ii. The table in this Section of the Appendix does not address any of the off-Site sources that were disposed of in the Beta Ditch. This is a global comment which applies to all of the applicable area-specific CSMs that are in Appendix A. NDEP considered this issue during the review of the document and requested additional sampling, as appropriate.
    - iii. PCBs analysis should be added to all samples collected for LOU 5. (Please see above comment for Table 2 for specific borings.)
    - iv. SA129 should be moved to a location just downstream of where LOU 60 (Acid Drain System) crossed over LOU 5.
    - v. SA67 should be moved north to the bottom of LOU 5.
    - vi. SA69 (Area I) should include all analytical suites for consistency with LOU 5.

- vii. SA165 should be moved in the downstream direction to provide separation from the additional boring requested below. Please note that the sample should still be located well above the confluence of the Western Diversion Ditch and the main channel.
  - viii. One additional boring should be located at the outfall of LOU 59 (Storm Drain System). The analyses for this boring should include, perchlorate, metals (Phase A List), Hexavalent Chromium, TPH ORO/DRO, TPH GRO, VOCs, Wet Chemistry, Total Cyanide, OCPs, OPPs, SVOCs, Radionuclides, Dioxins/Furans, PCBs, and Asbestos
- b. LOU 7, 8, 9, 13, and 14 (Old Ponds P-2 and P-3, New Pond P-3, Ponds S-1, P-1 and associated conveyance piping), the NDEP has the following comments (please see the corresponding attached figure as necessary):
- i. TRX should check volume values reported. Volume calculation seems to be in error based on the small reported change in dimensions and the corresponding large increase in volume. If the volume is correct, please provide additional details (e.g.: was a large berm constructed?).
  - ii. SA53 should be moved to the soil stained area west of LOU 9.
  - iii. An additional boring should be located in LOU 8 near SB2-8.
  - iv. An additional boring should be located in LOU 7 in the vicinity of the observed wall stains.
  - v. An additional boring should be located in LOU 7 in the vicinity of the observed “white encrustments”.
- c. LOU 16, 17, 18, 19, 52, and 57 (AP Plant Area), the NDEP has the following comments (please see the corresponding attached figure as necessary):
- i. General comment, NDEP assumes that characterization of LOU 19, (AP-5 and AP-6) will occur after AP-5 has been decommissioned. NDEP will reserve commenting on these ponds until that time.
  - ii. LOU 57 piping (historic and current) should be indicated on this LOU figure. Please revise this figure for inclusion in the Phase B Investigation Report.
  - iii. SA65 should move to the area of depression observed off of the northeast corner of LOU 52.
- d. LOU 20 (Pond C-1 and Associated Piping in Area II):
- i. TRX reports that electrolytic wastes are associated with this LOU. Please add the following analyses to the borings associated with this LOU: PCB and SVOCs.
  - ii. Please provide the materials of construction of the cathodes.
  - iii. SA154 should be located as close as possible to the associated piping for this LOU.
- e. LOU 29 (Solid Waste Dumpsters)
- i. Please clarify whether SA122 is located on the concrete pad or in the gravel section between the pads.
  - ii. Due to the proximity of WAPA property, TRX should add the following analyses to the borings associated with this LOU: PCBs and TPH ORO/DRO.
- f. LOU 30 and 56 (AP Area – Pad 35 and Old Building D-1 Washdown), the NDEP has the following comments (please see the corresponding attached figure as necessary):
- i. SA173 should be moved east to be located within LOU 56.
  - ii. SA179 should be moved west to be located within LOU 56.
  - iii. SA123 should be moved to the north side of LOU 30.

- g. LOU 31 (Drum Recycling Area), SA72 should be moved to a location in the former drum storage area. (Please see the corresponding attached figure as necessary.)
- h. LOU 36 (Former Satellite Accumulation Point, Unit 3, Maintenance Shop), TRX should add the following analyses to the borings associated with this LOU: PCBs, SVOCs, and 1,4 dioxane.
- i. LOU 43, 11, 12, and 15 (Unit 4 Basement and Old Chlorate Plant Decommissioning, Sodium Chlorate Filter Cake Holding Area, Hazardous Waste Storage Area and Platinum Drying Unit), the NDEP has the following comments (please see the corresponding attached figure as necessary):
  - i. TRX should include the data for boring SA05 instead of SA07 in the historic data tables.
  - ii. TRX reports that electrolytic wastes are associated with this LOU. Please add the following analyses to the borings associated with this LOU: PCB and SVOCs.
  - iii. TRX should indicate in a footnote that platinum will be added to the analyses for boring SA126.
  - iv. SA126 should be moved to the west of LOU 15.
  - v. SA124 should be moved into LOU 11. If this is not feasible, please explain.
  - vi. SA 125 should be moved into LOU 12. If this is not feasible, please explain.
- j. LOU 45 (Diesel Storage Tanks), SA188 should be moved north to a location above LOU 60. (Please see the corresponding attached figure as necessary.)
- k. LOU 55 (Area Affected by July 1990 Fire), RSAL6 should be moved to the soil adjacent to the pad in the direction of drainage.
- l. LOU 59 (Storm Drain System Segment), the NDEP has the following comments (please see the corresponding attached figure as necessary):
  - i. General comment, the borings associated with this LOU should be located immediately adjacent to the storm drain system whenever possible.
  - ii. RSAQ5 should be moved north adjacent to LOU 59 in the vicinity of the southwest corner of ChemStar property.
  - iii. RSAR6 should be moved north adjacent to LOU 59 and over LOU 60.
  - iv. An additional boring should be located adjacent to LOU 59 at the 90 degree turn just south of ChemStar property.
  - v. An additional boring should be located adjacent to LOU 59 just north of ChemStar property, south of LOU 45 and over LOU 60.
  - vi. An additional boring should be located adjacent to LOU 59 just south of LOU 34 at the 90 degree turn just north of ChemStar property.
- m. LOU 60 (Former Acid Drain System), the NDEP has the following comments (please see the corresponding attached figure as necessary):
  - i. General comment, the borings associated with this LOU should be located directly above the former acid drain system whenever possible.
  - ii. General comment, for borings located above LOU 60, TRX should log the condition of the pipe, if possible, and collect a sample directly underneath the pipe. This sample may be substituted for the next proposed 10 foot interval in the Phase B SAPs, Table 2 (e.g. if the bottom of the Former Acid Drain System pipe was located at 8 fbg, then the sample should be collected directly underneath the pipe and not at 10 fbg). Please note that this comment additionally applies to the Phase B Area I and IV SAPs.



• Move SA67 N into Beta Ditch  
 • move SA129 down stream of Lou #6  
 • additional monitoring at north end of Lou #9 (instead down stream)

**LEGEND**

- LOU of Interest
- LOU #59 Storm Sewer System with manholes and sumps with flow direction
- LOU #60 Acid Drips, Sumps, with manholes and sumps with flow direction
- Other LOU Boundary
- Other LOU Associated Pipelines
- Proposed Phase B Expansions for LOU
- Groundwater Monitoring Well Location
- Boring Location
- Soil Gas Location
- Other Locations
- Phase A Boring Location (Sep. 2007)
- Phase A BIC Sample Location (Oct. 2007)
- Historic Sample Location (pre 2009)
- Existing Well Location (Pre-Proposed Sampling) (Other LOU)
- Proposed Phase B Groundwater Location (Other LOU)
- Proposed Phase B Soil Boring Location (Other LOU)
- Proposed Phase B Soil Gas Location (Other LOU)
- Tronox Facility Boundary
- Area Boundary
- Parcel Boundary
- Four Ace Old Lim (Cell reference displayed as rework-cell, i.e. M-9)
- Base Aerial Photo from PDS-1, October 2006

**SHEET NUMBER:**  
X

**FIGURE NUMBER:**  
1

**SAMPLE LOCATIONS FOR LOU #5 BETA DITCH**

Phase B Area II Source Area Investigation  
 Tronox Facility  
 Henderson, Nevada

SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/11/2008	04020-023-430

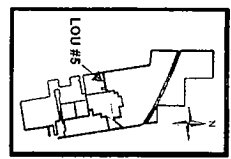
ENSR CORPORATION  
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 CAMARILLO, CALIFORNIA 93012  
 PHONE: (805) 388-3775  
 FAX: (805) 388-3577  
 WEB: HTTP://WWW.ENSR.AECOM.COM

**DESIGNED BY:**  
B Wilson

**DRAWN BY:**  
M Scop

**CHECKED BY:**  
C Schnell

**APPROVED BY:**  
B Ho





move SAS 3 to white stained soil west of LOU 9  
 additional borings near SB2-8 (LOU 8)  
 additional borings in LOU 7 where spill stains are noted

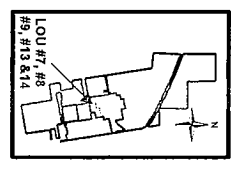
LEGEND	
[Symbol]	LOU of Interest
[Symbol]	LOU #28 Storm Sewer System with manholes and sumps with flow direction
[Symbol]	LOU #80 Acid Drain System with manholes and sumps with flow direction
[Symbol]	Other LOU Boundary
[Symbol]	Other LOU Associate Pipelines
[Symbol]	Proposed Phase B Expectations for LOU
[Symbol]	Groundwater Monitoring Well Location
[Symbol]	Boring Location
[Symbol]	Soil Gas Location
[Symbol]	Other Expectations
[Symbol]	Phase A Boring Location (Sep. 2007)
[Symbol]	Phase II BRIC Sample Location (Oct. 2007)
[Symbol]	Historic Groundwater Monitoring Well Location (Dry)
[Symbol]	Existing Well Location (No Proposed Sampling) (Other LOU)
[Symbol]	Proposed Phase B Soil Gas Location (Other LOU)
[Symbol]	Proposed Phase B Soil Gas Location (Other LOU)
[Symbol]	Proposed Phase B Soil Gas Location (Other LOU)
[Symbol]	Tensor Facility Boundary
[Symbol]	Area Boundary
[Symbol]	Parcel Boundary
[Symbol]	Four Area Grid Line (Cell reference displayed)
[Symbol]	Base Aerial Photo from PG&A, October 2006

SHEET NUMBER	1
FIGURE NUMBER	X

SAMPLE LOCATIONS FOR LOU #7, #8, #9, #13 AND #14 OLD PONDS P-2 AND P-3, NEW POND P-3, POND S-1, P-1 AND ASSOCIATED CONVEYANCE PIPING		
Phase B Area II Source Area Investigation		
Tronox Facility, Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/13/2008	04020-023-430

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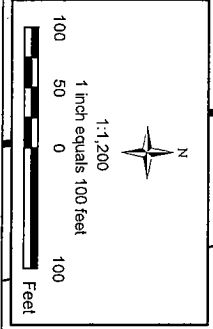
DESIGNED BY:	G Hols
DRAWN BY:	M Scop
CHECKED BY:	C Schnell
APPROVED BY:	B Ho







move SA65 to area of depression off of NE of LOU #52



**LEGEND**

- LOU #16 #17
- LOU #18
- LOU #19
- LOU #52
- LOU #53
- LOU #57
- LOU #58
- LOU #59
- Other LOU Associated Pipelines
- Proposed Phase B Explorations for LOU
- Groundwater Monitoring Well Location
- Being Location
- Soil Gas Location
- Other Explorations
- Phase A Being Location (Sep. 2007)
- Phase II BRG Sample Location (Oct. 2007)
- Historic Groundwater Monitoring Well Location (DW)
- Historic Sample Location (pre 2006)
- Existing Well Location (No Proposed Sampling) (Other LOU)
- Proposed Phase B Groundwater Location (Other LOU)
- Proposed Phase B Soil Being Location (Other LOU)
- Proposed Phase B Soil Gas Location (Other LOU)
- Tronox Facility Boundary
- Area Boundary
- Four Area Grid Line Callouts displayed as to location, in 100' by 100' Base Aerial Photo from PMS 14, October 2005

SHEET NUMBER:	1
FIGURE NUMBER:	X

**SAMPLE LOCATIONS FOR LOU #57, #16, #17, #18, #19, #52 & #53**

**AP PLANT AREA**

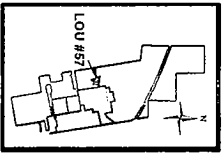
Phase B Area II Source Area Investigation  
Tronox Facility  
Henderson, Nevada

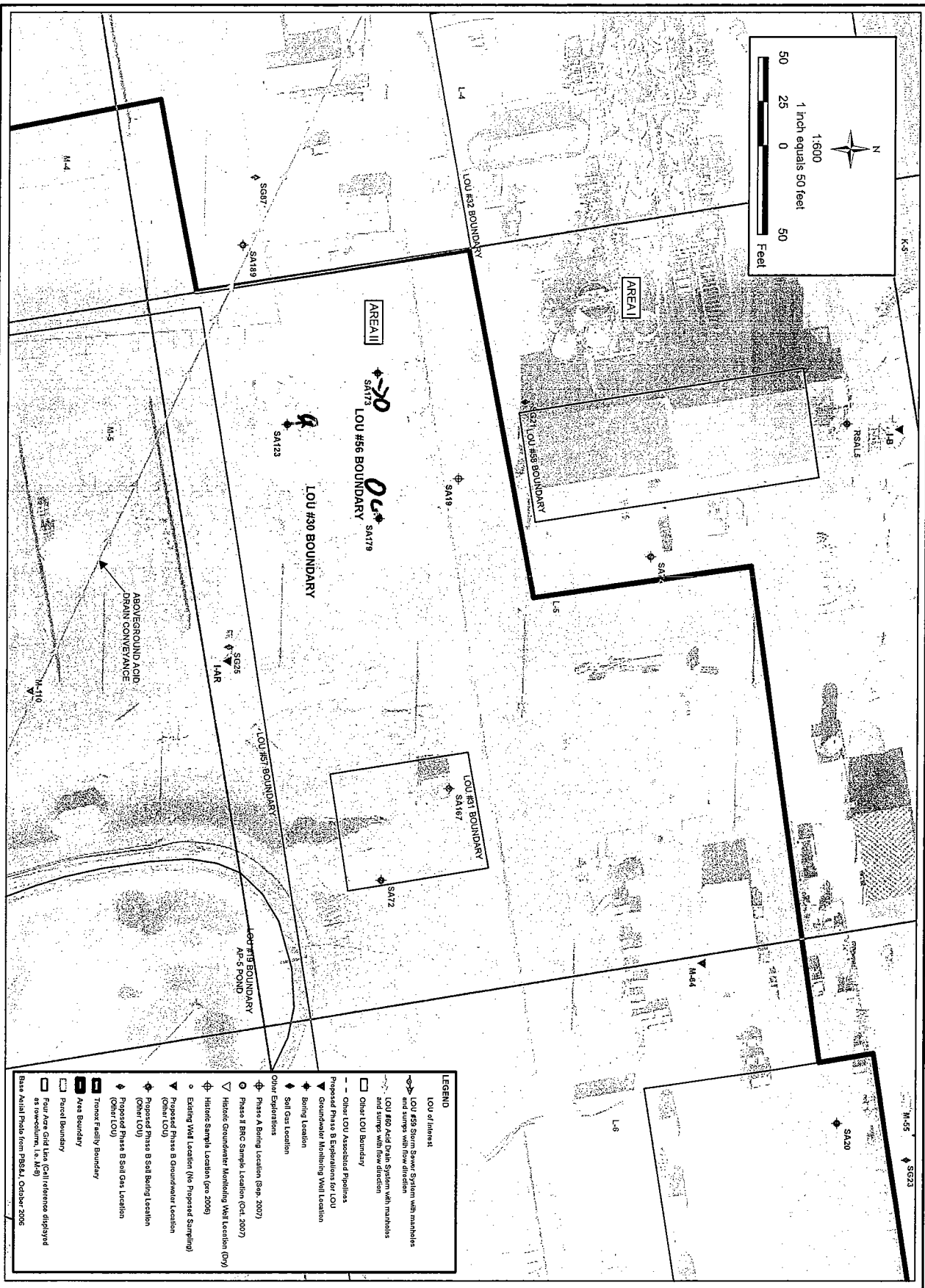
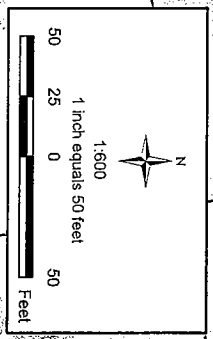
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/11/2008	04020-023-430

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DRAWN BY:	M Scop
CHECKED BY:	G Heis
APPROVED BY:	B Ho





• Move all bearings w/in LOUs

**LEGEND**

- LOU of Interest
- LOU #56 Storm Sewer System with manholes and sumps with flow direction
- LOU #60 Acid Drain System with manholes and sumps with flow direction
- Other LOU Boundary
- Other LOU Associated Pipelines
- Proposed Phase B Explorations for LOU
- Groundwater Monitoring Well Location
- Boring Location
- Soil Gas Location
- Other Explorations
- Phase A Boring Location (Sep. 2007)
- Phase A BRC Sample Location (Oct. 2007)
- Historic Groundwater Monitoring Well Location (Dry)
- Historic Sample Location (pre 2006)
- Existing Well Location (No Proposed Sampling)
- Proposed Phase B Groundwater Location (Other LOU)
- Proposed Phase B Soil Boring Location (Other LOU)
- Proposed Phase B Soil Gas Location (Other LOU)
- Tronox Facility Boundary
- Area Boundary
- Parcel Boundary
- Four Area Grid Line (Cell reference displayed as row,column, i.e. A16)

Base Aerial Photo from PB844, October 2006

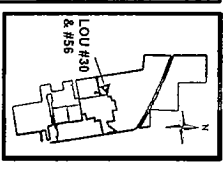
SHEET NUMBER:	1
FIGURE NUMBER:	X

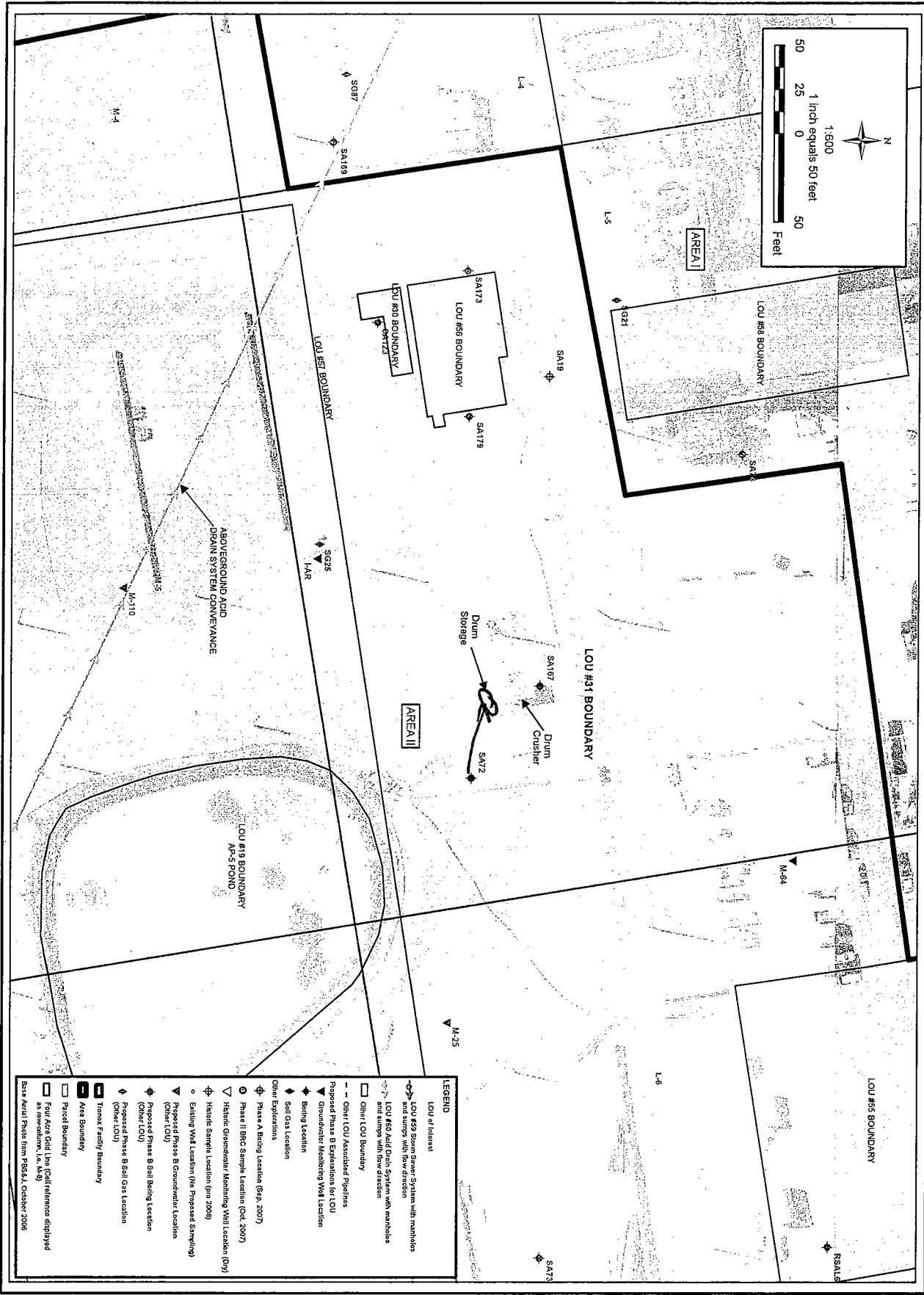
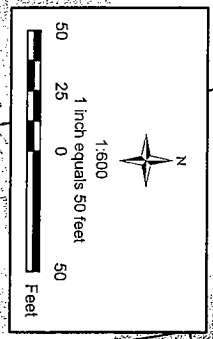
<b>SAMPLE LOCATIONS FOR LOU #30 &amp; #56</b> <b>AP AREA - PAD 35 AND OLD BUILDING</b> <b>D-1 WASHDOWN</b> Phase B Area II Source Area Investigation Tronox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/16/2008	04020-023-430

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DRAWN BY:	M Scop
CHECKED BY:	G Hols
APPROVED BY:	B Ho





• MOVE SAT22 to Drum Storage Area

**LEGEND**

- LOU of Interest
- LOU #99 Storm Sewer System with manholes and sumps with flow direction
- LOU #60 Acid Drain System with manholes and sumps with flow direction
- Other LOU Boundary
- Other LOU Associated Pipelines
- Proposed Phase B Epi-liners for LOU
- Proposed Phase B Monitoring Well Location
- Boiling Location
- Soil Gas Location
- Soil Gas Location
- Other Expenditures
- Phase A Boiling Location (Sep. 2007)
- Phase II BRIC Sample Location (Oct. 2007)
- Historic Groundwater Monitoring Well Location (Dry)
- Historic Sample Location (Jan. 2008)
- Existing Well Location (No Proposed Sampling)
- Proposed Phase B Groundwater Location (Other LOU)
- Proposed Phase B Soil Boiling Location (Other LOU)
- Proposed Phase B Soil Gas Location (Other LOU)
- Tronox Facility Boundary
- Ayco Boundary
- Pitco Boundary
- Four/Ace Grid Line (Cell reference displayed as coordinate, i.e. M-9)

Base Aerial Photo from PPS&I, October 2006

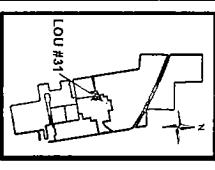
FIGURE NUMBER:	1
SHEET NUMBER:	X

SAMPLE LOCATIONS FOR LOU #31 DRUM RECYCLING AREA		
Phase B Area II Source Area Investigation Tronox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/11/2008	04020-023-430

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DESIGNED BY:	B Wilson
DRAWN BY:	M Scop
CHECKED BY:	C Schnell
APPROVED BY:	B Ho



move SA124 into LOU11  
 move SA126 adjacent to LOU15 to the west.



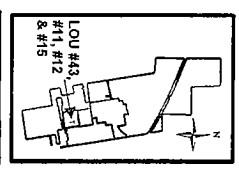
FIGURE NUMBER:	1
SHEET NUMBER:	X

SAMPLE LOCATIONS FOR LOU #43, #11, #12 & #15 UNIT 4 BASEMENT AND OLD CHLORATE PLANT DECOMMISSIONING, SODIUM CHLORATE FILTER CAKE HOLDING AREA, HAZARDOUS WASTE STORAGE AREA & PLATINUM DRYING UNIT Phase B Area II Source Area Investigation, Tronox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/13/2008	04020-023-430

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DESIGNED BY:	G. Hols
DRAWN BY:	M. Scop
CHECKED BY:	C. Schnell
APPROVED BY:	B. Ho





Move SA188 north over LOU 60.

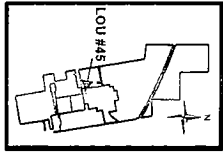
FIGURE NUMBER:	1
SHEET NUMBER:	X

SAMPLE LOCATIONS FOR LOU #45 DIESEL STORAGE TANKS		
Phase B Area II Source Area Investigation		
Tronox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/16/2008	04020-023-430

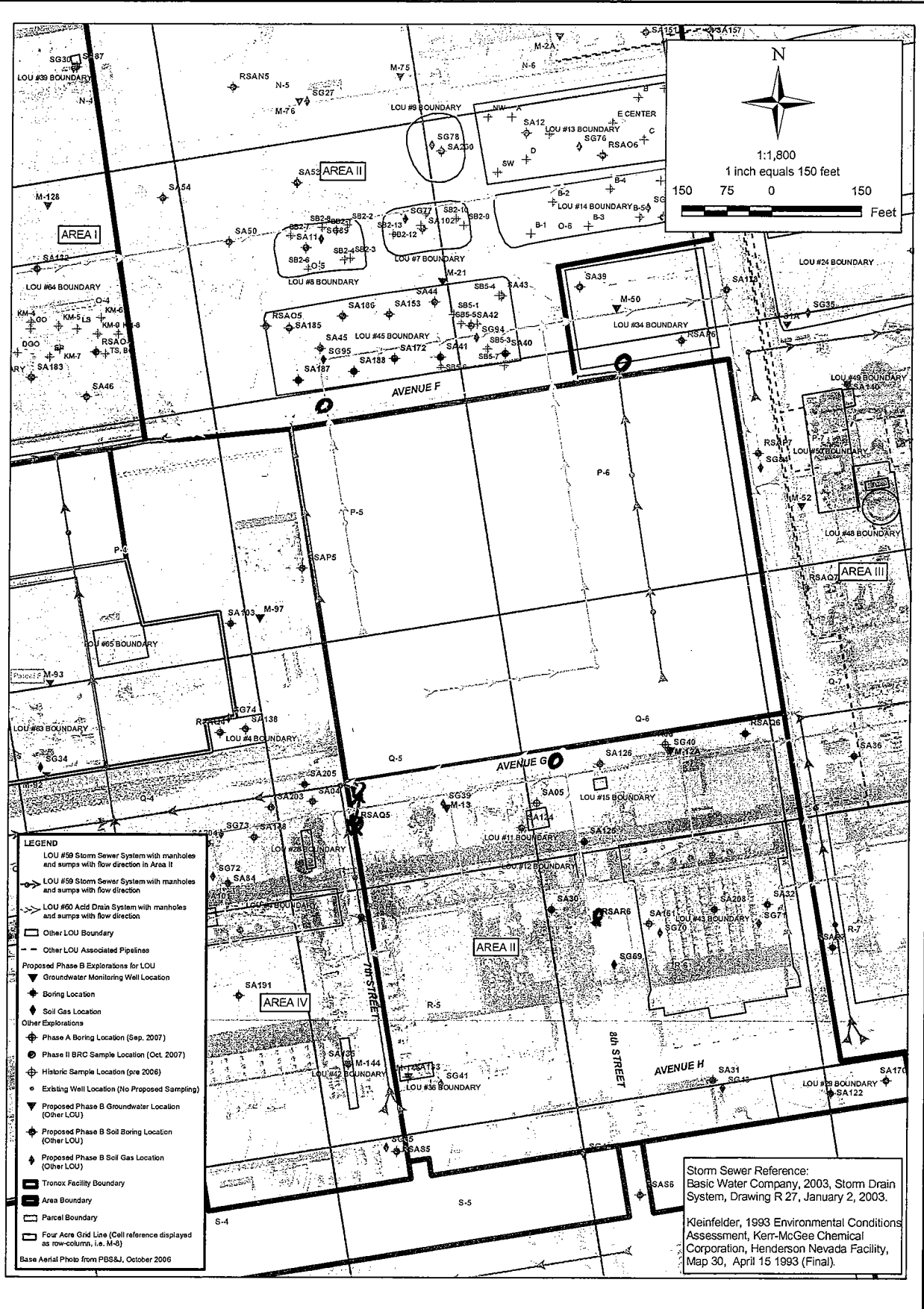
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DESIGNED BY:	B Wilson
DRAWN BY:	M Scop
CHECKED BY:	C Schnell
APPROVED BY:	B Ho



additional boring  
 additional boring  
 additional boring  
 North of ChemStar, south of Lou 45, over Lou 60  
 North of ChemStar, south of Lou 39, at 90° turn  
 South of ChemStar, at 90° turn  
 adjacent to Lou 59  
 move R5 & B6 over Lou 60

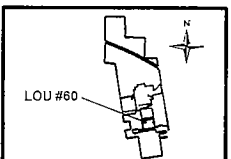


SHEET NUMBER	1
FIGURE NUMBER	1

SAMPLE LOCATIONS FOR LOU #59 STORM SEWER SYSTEM SEGMENT IN AREA II		
Phase B Area II Source Area Investigation Tronox Facility Henderson, Nevada		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	6/16/2008	04020-023-430

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DESIGNED BY:	B. Ho
DRAWN BY:	M. Scop
CHECKED BY:	C. Schnell
APPROVED BY:	B. Ho



**Brian Rakvica**

---

**From:** Brian Rakvica  
**Sent:** Wednesday, July 16, 2008 10:14 AM  
**To:** Brian Rakvica; 'Keith Bailey'; Shannon Harbour; 'Crowley, Susan'; 'lbradley@ensr.aecom.com'; 'Flack, Mike'  
**Cc:** 'TeriLCopeland'; 'Kelly Black'  
**Subject:** RE: NDEP Tronox HHRA Call Minutes - follow up to action items

Sorry, one more thing...regarding Figure 5-1 from the Phase A Report...

NDEP had provided TRX some draft comments as follows:

Figure 5-1, the primary sources, their locations, and release mechanisms are not adequately characterized.

Section 5.1.2, page 5-3, 3rd and 4th paragraphs, wind blown dust is identified as a potential pathway and Figure 5-1 identifies off-Site residents as potential receptors. Section 5.1.3, page 5-4, 2<sup>nd</sup> paragraph identifies off-site receptors. Yet there is no discussion of predominant wind direction at the Site and there are no off-Site soil samples. This issue requires additional consideration.

Please note that the NDEP may have additional comments that will be provided as a function of the review of the HRA Work Plan.

Thanks,

Brian

---

**From:** Brian Rakvica  
**Sent:** Wednesday, July 16, 2008 10:11 AM  
**To:** 'Keith Bailey'; Shannon Harbour; 'Crowley, Susan'; lbradley@ensr.aecom.com; 'Flack, Mike'  
**Cc:** 'TeriLCopeland'; Kelly Black; Brian Rakvica  
**Subject:** RE: NDEP Tronox HHRA Call Minutes - follow up to action items

All,

As a follow up to some of the action items...

1. Regarding background comparisons, the following is noted:
  - a. Background comparisons should probably proceed on a site-wide basis as a LOU-basis will likely result in failure based on statistical power issues.
  - b. Comparisons should not be solely based upon the statistical tests. Exploratory data analysis (EDA) must also be used as a converging line of evidence to support assertions that areas are within the range of background.
  - c. EDA can be discussed with the NDEP prior to completion to insure that expectations are met. Perhaps review of some draft EDA would be productive.
  - d. Background comparisons should likely be completed using only the McCullough portion of the background data sets and depth-specific issues should also be considered.
  - e. Definition of exposure areas (after background comparisons) should also include spatial plots to substantiate the definition of the exposure areas.
2. Regarding PCBs, the following is noted:

7/16/2008

- a. PCB concentrations (if all Aroclor-based) should be compared to the USEPA Region VI MSSL (0.83 mg/kg for industrial soils which is very similar to the 1 ppm TSCA value) - - clean up may not be necessary, however, this value should be used for comparison purposes.
- b. PCB concentrations (if all congener based) should be converted to dioxin/furan TEQs and compared to the ATSDR comparison levels.

Please advise if you have any questions or if additional discussion is needed.

Thanks,

Brian

---

**From:** Keith Bailey [mailto:okbailey@flash.net]

**Sent:** Wednesday, July 16, 2008 8:53 AM

**To:** Shannon Harbour; Brian Rakvica; 'Crowley, Susan'; lbradley@ensr.aecom.com; 'Flack, Mike'

**Subject:** FW: NDEP Tronox HHRA Call Minutes

Shannon,

Attached are a few Tronox red-line comments on your draft minutes from the risk assessment call. Susan is tied up in a meeting this morning and asked me to forward them to you.

If you have questions, please call Susan or me.

Keith



## Shannon Harbour

---

**From:** Shannon Harbour  
**Sent:** Friday, July 11, 2008 11:11 AM  
**To:** 'Ranajit Sahu'  
**Cc:** 'Crowley, Susan'; Brian Rakvica; 'L. Keith Bailey'  
**Subject:** RE: FW: Dioxin/Furan removal proposed in RAW for Parcels C, D, F, G, and H

Ron,

The approach outlined below is acceptable to the NDEP. No updated figure is necessary at this time. Please keep me updated as needed.

Thanks,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
NDEP BCA-Las Vegas Office*

---

**From:** Ranajit Sahu [mailto:sahuron@earthlink.net]  
**Sent:** Thursday, July 10, 2008 9:38 AM  
**To:** Shannon Harbour  
**Cc:** Brian Rakvica; okbailey@flash.net; Susan Crowley  
**Subject:** Re: FW: Dioxin/Furan removal proposed in RAW for Parcels C, D, F, G, and H

Shannon:

Based on my conversations with you and Brian this morning, I suggest a somewhat different approach (than in your e-mail below) to address your concerns regarding confirmation that the dioxin hit at TRB-CR-07 has been properly addressed.

First, the dioxin hit was, given its magnitude, due to a "hot-spot" related to an activity involving a localized fire (for cooking or heating purposes). There is no CSM mechanism to suggest that dioxin levels of this magnitude (or even a lot smaller magnitude) are or can be widespread, such as by wind-borne dispersion, stormwater carry-out etc. Thus, using the polygon approach to defining the potential removal area may not be the best.

I propose that we remove a 50x50 foot area (or greater, if warranted by field observations prior to remediation); however, following that we will take not one (at the center of the square, as proposed) but 5 confirmation samples (center + 4 corners) to confirm that the dioxin impacted area was properly removed.

Of course, if we have unacceptable levels detected in the confirmation samples, we will have to address that via potential additional remediation.

I hope that this approach addresses your concerns. Please let me know.

Regards

Ron

7/11/2008

-----Original Message-----

From: Shannon Harbour  
Sent: Jul 10, 2008 8:48 AM  
To: "Ranajit (Ron) Sahu"  
Subject: FW: Dioxin/Furan removal proposed in RAW for Parcels C, D, F, G, and H

Ron,

Here is a copy of the email I sent yesterday so that any response will be part of the thread.

Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
NDEP BCA-Las Vegas Office*

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**From:** Shannon Harbour  
**Sent:** Wednesday, July 09, 2008 9:44 AM  
**To:** 'Crowley, Susan'  
**Cc:** Ranajit (Ron) Sahu; L. Keith Bailey; Brian Rakvica  
**Subject:** Dioxin/Furan removal proposed in RAW for Parcels C, D, F, G, and H

Susan,

NDEP erroneously approved the proposed removal actions for the soils centered on sample TRB-CR-07 in a July 2, 2008 NDEP approval letter for the Removal Action Workplan (RAW) for Parcel C, D, F, G, and H (dated July 1, 2008). The RAW proposed a 50 ft square removal area centered on TSB-CR-07 based on dioxins/furans exceedance. TRX should construct a Veronoi polygon for this area following the same procedure for the construction of the removal polygons for the asbestos exceedances. TRX may choose to conduct additional sampling for dioxins/furans to potentially reduce the size of the polygon. Please submit an updated Figure 2 for the RAW that includes the Veronoi polygon centered on TSB-CR-07 and any proposed additional sampling prior to any removal action on these Sites.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230  
Las Vegas, NV 89119  
702-486-2850 x 240 (work)  
702-486-5733 (fax)*

7/11/2008

## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 9:00 AM PDT, Thursday, July 10, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Neptune – Kelly Black (for NDEP)  
Teri Copeland (for NDEP)  
Kurt Fehling (for NDEP)  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)  
ENSR – Lisa Bradley, Julie Kabel (for TRX)

CC: Jim Najima

1. The meeting was held to discuss the Human Health Risk Assessment (HHRA) work plan (WP).
2. Discussed ecological risk, NDEP noted that an ecological risk assessment would not be needed on-Site and that off-Site issues could be dealt with at a later time. NDEP noted that NDEP promulgated guidance in 2006 regarding how ecological risk assessments should be conducted (SLERA/GAE guidance)
3. ENSR provided 2 handouts (example tables) via email for use on the call: Table 1, Comparison of USEPA Region 6 Medium-Specific Screening Levels (MSSLs) and USEPA Screening Levels for Chemicals on the Tronox Comparison Tables and Table 2, Surface Soil, Selection of COI for the Outdoor On-Site Worker.
4. ENSR noted that they expect to follow the CSM presented as Figure 5-1 in the Phase A report. It was noted that NDEP did not comment on that figure. ENSR also confirmed that groundwater would be evaluated on a site-wide basis and that, consistent with the BRC Closure Plan, there would be a deed restriction for no potable use of groundwater on-site. NDEP clarified that the deed restriction would not apply outside of the property boundary and that demonstration of capture would be very important.
5. NDEP clarified that the Region VI MSSLs as the appropriate screening levels and contain both residential and industrial MSSLs. NDEP will provide updates as needed but no less frequently than annually, as stated in NDEP's July 8, 2008 guidance letter. NDEP is currently working on updates that include the screening values for organic acids.
6. ENSR referenced Figure 5-1 of the Phase A Report as containing TRX's basis for receptor designation.
7. Cumulative risk/hazard discussions were held regarding how to accommodate cumulative risk/hazard as follows:
  - a. ENSR walked the group through Table 2 of the ENSR agenda package.
  - b. TRX noted that Parcels A and B Technical Memorandum (Tech Memo) used 100% of the PRGs for comparison. NDEP noted that Table 1 of the Tech Memo calculated risk for each chemical using the maximum concentration detected regardless of the concentration relative to the PRG.
  - c. After discussion, NDEP and TRX agreed that using one-tenth of the MSSL to determine whether a chemical is carried into the risk assessment would result in less work for similar results and would eliminate having to revisit chemicals eliminated based on the

- Table 2 approach when the risk characterization results are close to an unacceptable risk or hazard level.
- d. NDEP requested and TRX agreed that both the straight MSSL and one-tenth of the MSSL will be presented on the COPC selection tables.
  - e. NDEP stated that TRX should present/submit clear decision logic and the use of standard terminology (e.g. COPCs instead of COIs)
8. COPC Selection: discussions on the method for COPC section were as follows:
- a. TRX stated and NDEP agreed that if all detected chemicals within an LOU or exposure area are less than one-tenth of the MSSL, then no COPCs would be identified and a quantitative risk characterization would not be warranted for that LOU or exposure area.
  - b. NDEP stated that, in addition to an exposure/toxicity screen (e.g., comparison to one-tenth of the MSSL); other COPC selection criteria should be addressed where appropriate. The BRC Closure Plan (Section 9.4) and RAGS Part A present applicable COPC selection criteria.
  - c. NDEP noted that carcinogenic PAHs should be converted to the benzo(a)pyrene (BaP) equivalents. TRX should not screen out individual congeners if there is a detection of any congeners. All should be carried forward into risk calculations using one half of the detection limit for any non-detects.
  - d. NDEP noted that screening values for non-carcinogenic PAHs (toxicological surrogates have been identified by NDEP for these chemicals) are available on the NDEP website. TRX can reference this document and will not have to provide additional rationale.
9. Decision Logic for COPC selection: NDEP and TRX had the following discussions:
- a. NDEP suggested that TRX review section 9.4 of the BRC Closure Plan and incorporate as needed.
  - b. TRX noted that ECAO (identified in the toxicity criteria hierarchy in the Closure Plan) may not currently exist. NDEP referenced the 12/5/03 Cook memo from USEPA as the basis for the hierarchy of toxicity criteria sources identified in the Closure Plan. The COPC selection criteria in the BRC Closure Plan should be reviewed by TRX and any updates should be communicated to NDEP. **ACTION ITEM.**
  - c. NDEP and TRX will contact Mark Jones to follow-up on the method for obtaining PPRTVs from EPA. **ACTION ITEM.**
10. Background comparisons: TRX stated that a discussion on background comparisons should be postponed to another conference call but did ask the following:
- a. Should the background comparison be conducted on a LOU basis or a Site-wide basis?
  - b. TRX stated that their preference is to compare the site-wide data sets to the background datasets and only carry forward the specific samples that exceed background.
  - c. NDEP will discuss internally and be prepared to discuss with TRX after the Phase B data has been received and validated. **ACTION ITEM.**
11. Exposure Areas: NDEP and TRX had the following discussions on the determination of exposure areas for risk assessment:
- a. TRX asked for direction on the determination of exposure areas.
  - b. NDEP noted that the data distributions in each LOU should be reviewed to decide if data can be grouped to produce as large of a passing area as possible and defensible.
  - c. TRX suggested site-wide comparisons first followed up by reviewing any hot spots.
  - d. NDEP defined risk based hot spot as a statistically different distribution in one area.

- e. NDEP and TRX agreed that exposure areas will be identified prior to estimating exposure point concentrations.
  - f. ENSR stated that they are looking at future land use as the primary basis for identifying exposure areas. NDEP noted the importance of the role of evaluating data distributions in identifying exposure areas.
  - g. NDEP noted that data distributions/plotting (which could be bubble plots or intensity plots) should focus on the drivers and also incorporate process information that identifies chemicals for which different distributions may be possible. The data distribution plots should address depth-specific chemicals of interest (e.g., perchlorate may indicate one population for shallower soil and multiple populations for deeper soil) and “risk driver” chemicals.
  - h. NDEP and TRX agreed to meet to further discuss optimal plotting methods once the Phase B data are validated and assimilated.
  - i. NDEP referenced the BRC/Newfields “statistics document” dated 8/16/06 (with decision rules updated 6/25/08 in the Mohawk Sub-Area SAP) was discussed (this is available on the BRC website).
  - j. NDEP stated that while geo-statistics may be used as a tool to assist in identifying exposure areas, the utility of this approach depends on what the data show. If the data are relatively clean, and sampling has not been interrupted by the presence of buildings or other current operations, then geo-statistics methods such as block kriging may be useful. The ultimate goal is to have unbiased representation of chemicals in the particular environmental medium.
12. Cyanide: TRX will analyze samples for total cyanide and assume it is all in the free form (or as HCN, if applicable). If needed, secondary analyses for free cyanide (or as HCN, if applicable) will be conducted.
13. Bioavailability: NDEP indicated that if necessary, bioavailability studies for metals can be conducted. NDEP will send ENSR the EPA OSWER guidance for bioavailability of arsenic in soil. **ACTION ITEM.**
14. Site Specific Cleanup Goals: NDEP and TRX agreed that it is premature to identify specific methods (e.g., calculations) to use for cleanup goals. These goals would depend on the outcome of the baseline HHRA(s). For now, general remedial action objectives are the target goals of  $1 \times 10^{-6}$  cancer risk for carcinogens, 1.0 hazard index for non-carcinogens, and predetermined concentrations for lead and dioxin/furan TEQs, as identified in the BRC Closure Plan.
15. PCB Cleanup Goals: NDEP and TRX had the following discussions:
- a. NDEP stated that the TSCA cleanup goals are based on non-standard assumptions and include soil ingestion only and did not account for cumulative risk.
  - b. NDEP stated that calculations are dependent upon whether the PCBs are an Aroclor mixture or congeners.
  - c. NDEP stated that while TSCA states a 10 ppm cleanup goal for industrial sites, NDEP does not have authority over this program and any remediation completed to the 10 ppm value will have to be submitted to the USEPA Region IX for review.
  - d. NDEP will discuss internally whether review of remediation to under the 1 ppm TSCA cleanup goal is appropriate. **ACTION ITEM**

DRAFT

16. Dioxins/Furans: TRX stated that they will use a 1 ppb cleanup goal for dioxin/furan TEQs per ATSDR Guidance. NDEP noted that values greater than 50 ppt are also looked at but would not likely require clean-up.
17. NDEP requested that TRX submit a HHRA Work Plan and requested that TRX review Section 9 of the BRC Closure Plan for guidance. TRX was also requested to submit a redline/strikeout version to the NDEP for review using Section 9 of the BRC Closure Plan as the base document. **ACTION ITEM**
18. NDEP and their consultants confirmed the receipt of the Phase B Area II and Area II SAPs.

**Shannon Harbour**

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**From:** Bradley, Lisa [lbradley@ensr.aecom.com]  
**Sent:** Thursday, July 10, 2008 7:37 AM  
**To:** Brian Rakvica; TeriLCopeland; Paul Black  
**Cc:** Shannon Harbour; Keith Bailey; Crowley, Susan; Flack, Mike; Kabel, Julie ✓  
**Subject:** RE: Tronox Henderson Risk Assessment Methods Call

Brian – Sorry for the misunderstanding! We did not intend to have these materials reviewed prior to the call – think of this as a webex without the technology! My assumption has been that you have communicated with Teri and Brian the reason for the call, and the agenda is just confirming that. We plan to walk through these issues and attachments with you in detail so that we can provide the proper introduction and context, and then if there is more consideration that is needed on your part, that can be done after the call. I'd actually prefer it if you didn't look at these in detail ahead of time!

Thanks! :) LASI

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**From:** Brian Rakvica [mailto:brakvica@ndep.nv.gov]  
**Sent:** Thursday, July 10, 2008 10:23 AM  
**To:** Bradley, Lisa; TeriLCopeland; Paul Black  
**Cc:** Shannon Harbour; Keith Bailey; Crowley, Susan; Flack, Mike; Kabel, Julie  
**Subject:** RE: Tronox Henderson Risk Assessment Methods Call

All,

The late delivery of this agenda will limit the utility of this call, but lets see what we can get through.

Thanks,

Brian

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**From:** Bradley, Lisa [mailto:lbradley@ensr.aecom.com]  
**Sent:** Thursday, July 10, 2008 7:13 AM  
**To:** TeriLCopeland; Paul Black  
**Cc:** Shannon Harbour; Brian Rakvica; Keith Bailey; Crowley, Susan; Flack, Mike; Kabel, Julie  
**Subject:** Tronox Henderson Risk Assessment Methods Call

Greetings!

I am sending out the call info again. We have put together a short agenda, but would like to keep this as informal as possible.

**Thursday July 10, 2008**

**12 PM Eastern, 10 AM Mountain, 9 AM Pacific**

**Call-in #: 866-703-9405**

**Part: 315 966**

Agenda:

7/10/2008

NDEP, in comments on the various Phase B Work Plans, wanted to know if Tronox would be following the BRC Closure Plan risk assessment methods (Section 9, May 2007), or if we would be preparing a new work plan. Tronox noted that we would plan to follow the BRC Closure Plan, but there are some clarifications and issues to discuss for those methods to be applicable to the Tronox site. An overview of the issues we would like to discuss is below. Our objective is that by the end of the call we will have discussed these issues, and either have reached consensus, or have identified issues that need more consideration or discussion.

MSSLs v. SLs

See attached comparison for the SRC list

LOU by LOU Data Evaluations

Sample by sample comparison to MSSLs/SLs

COPC Selection

Consideration of cumulative risk screening *-> Table 2*

(See attached example)

- Consistency with background *will be handled on later call*

Exposure Point Concentrations

Definition of/process to define exposure areas

Variograms/block kriging

Dose Response

Exposure Assessment

Remedial Action Objectives

<<MSSL to SL Comparison.pdf>> <<Example of ENSR cumulative screen.pdf>>

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Lisa JN Bradley, Ph.D., DABT

Senior Toxicologist

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7/10/2008



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**TABLE 1  
COMPARISON OF USEPA REGION 6 MEDIUM-SPECIFIC SCREENING LEVELS AND USEPA SCREENING LEVELS  
FOR CHEMICALS ON THE TRONOX COMPARISON TABLES**

Chemical	Industrial Soil (mg/kg)				
	MSSL (w/o derm)	MSSL (w/ derm)	SL	MSSL (w/derm)/ SL	Source With Lowest Value
<b>Metals</b>					
Aluminum	1.0E+05	1.0E+05	9.9E+05	0.10	MSSL
Antimony	8.2E+02	4.5E+02	4.1E+02	1.10	SL
Arsenic	6.1E+02	2.8E+02	1.6E+00	175.00	SL
Barium	1.0E+05	1.0E+05	1.9E+05	0.53	MSSL
Beryllium	2.2E+03	2.2E+03	2.0E+03	1.10	MSSL
Boron	1.0E+05	1.0E+05	2.0E+05	0.50	MSSL
Cadmium	1.0E+03	5.6E+02	--	--	MSSL
Calcium	--	--	--	--	--
Chromium (hexavalent)	6.4E+01	7.1E+01	NA	--	MSSL
Chromium (total)	4.5E+02	5.0E+02	--	--	MSSL
Cobalt	1.9E+03	2.1E+03	--	--	MSSL
Copper	7.6E+04	4.2E+04	4.1E+04	1.02	SL
Iron	1.0E+05	1.0E+05	7.2E+05	0.14	MSSL
Lead	8.0E+02	8.0E+02	NA	--	MSSL
Magnesium	--	--	--	--	--
Manganese	4.7E+04	3.5E+04	NA	--	MSSL
Mercury	--	--	2.8E+01	--	SL
Molybdenum	1.0E+04	5.7E+03	5.1E+03	1.12	SL
Nickel	4.1E+04	2.3E+04	2.0E+04	1.15	SL
Platinum	--	--	--	--	--
Potassium	--	--	--	--	--
Selenium	1.0E+04	5.7E+03	5.1E+03	1.12	SL
Silver	1.0E+04	5.7E+03	5.1E+03	1.12	SL
Sodium	--	--	--	--	--
Strontium	1.0E+05	1.0E+05	6.1E+05	0.16	MSSL
Thallium	--	--	6.6E+01	--	SL
Tin	--	--	6.1E+05	--	SL
Titanium	--	--	--	--	--
Tungsten	--	--	--	--	--
Uranium	--	--	--	--	--
Vanadium	1.0E+04	5.7E+03	7.2E+03	0.79	MSSL
Zinc	1.0E+05	1.0E+05	3.1E+05	0.32	MSSL
<b>Wet Chemistry</b>					
Alkalinity (total, CO3--, HCO3-)	--	--	--	--	--
Ammonia	--	--	6.0E+08	--	SL
Asbestos	--	--	--	--	--
Bromide	--	--	--	--	--
Chlorate	--	--	--	--	--
Chloride	--	--	--	--	--
Conductivity	--	--	--	--	--
Cyanide (total)	4.1E+04	1.4E+04	2.0E+04	0.70	MSSL
Nitrate	NA	NA	--	--	--
Nitrite	NA	NA	1.0E+05	--	SL
Perchlorate	1.4E+03	7.9E+02	--	--	MSSL
pH	--	--	--	--	--
Phosphate (ortho)	--	--	--	--	--
Sulfate	--	--	--	--	--
Surfactants (MBAS)	--	--	--	--	--
Total Dissolved Solids (TDS)	--	--	--	--	--
Total Organic Carbon (TOC)	--	--	--	--	--
Total Suspended Solids (TSS)	--	--	--	--	--
<b>Total Petroleum Hydrocarbons (TPH) and Fuel Alcohols</b>					
GRO (C6 -C10)	--	--	--	--	--
DRO (C10 -C28)	--	--	--	--	--
ORO (C28 -C38)	--	--	--	--	--
Methanol	1.0E+05	1.0E+05	3.1E+05	0.32	MSSL
Ethanol	--	--	--	--	--
Ethylene glycol	1.0E+05	1.0E+05	1.2E+06	0.08	MSSL

COMPARISON OF USEPA REGION 6 MEDIUM-SPECIFIC SCREENING LEVELS AND USEPA SCREENING LEVELS FOR CHEMICALS ON THE TRONOX COMPARISON TABLES

Chemical	Industrial Soil (mg/kg)				
	MSSL (w/o derm)	MSSL (w/ derm)	SL	MSSL (w/derm)/ SL	Source With Lowest Value
<b>Organochlorine Pesticides (OCPs)</b>					
4,4'-DDD	2.4E+01	1.1E+01	7.2E+00	1.53	SL
4,4'-DDE	1.7E+01	7.8E+00	5.1E+00	1.53	SL
4,4'-DDT	1.7E+01	7.8E+00	7.0E+00	1.11	SL
Aldrin	3.4E-01	1.1E-01	1.0E-01	1.10	SL
alpha-BHC	9.1E-01	4.0E-01	2.7E-01	1.48	SL
alpha-Chlordane	--	--	--	--	--
beta-BHC	3.2E+00	1.4E+00	9.6E-01	1.46	SL
Chlordane, technical	--	--	--	--	--
delta-BHC	--	--	--	--	--
Dieldrin	3.6E-01	1.2E-01	1.1E-01	1.09	SL
Endosulfan I	--	--	--	--	--
Endosulfan II	--	--	--	--	--
Endosulfan sulfate	--	--	--	--	--
Endrin	6.1E+02	2.1E+02	1.8E+02	1.17	SL
Endrin aldehyde	--	--	--	--	--
Endrin Ketone	--	--	--	--	--
gamma-BHC (Lindane)	4.4E+00	1.9E+00	2.1E+00	0.90	MSSL
gamma-Chlordane	--	--	--	--	--
Heptachlor	1.3E+00	4.3E-01	3.8E-01	1.13	SL
Heptachlor epoxide	6.3E-01	2.1E-01	1.9E-01	1.11	SL
Methoxychlor	1.0E+04	3.4E+03	3.1E+03	1.10	SL
Toxaphene	5.2E+00	1.7E+00	1.6E+00	1.06	SL
<b>Polychlorinated Biphenyl (PCB) Compounds</b>					
Aroclor 1016	8.2E+01	2.4E+01	2.1E+01	1.14	SL
Aroclor 1221	2.9E+00	8.3E-01	6.2E-01	1.34	SL
Aroclor 1232	2.9E+00	8.3E-01	6.2E-01	1.34	SL
Aroclor 1242	2.9E+00	8.3E-01	7.4E-01	1.12	SL
Aroclor 1248	2.9E+00	8.3E-01	7.4E-01	1.12	SL
Aroclor 1254	2.9E+00	8.3E-01	7.4E-01	1.12	SL
Aroclor 1260	2.9E+00	8.3E-01	7.4E-01	1.12	SL
<b>Dioxins and Furans</b>					
PCDD/PCDFs total TEQ as 2,3,7,8-TCDD	--	--	--	--	--
1,2,3,4,6,7,8,9-OCatchlorodibenzofuran	--	--	--	--	--
1,2,3,4,6,7,8,9-OCatchlorodibenzo-p-dioxin	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	--	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzof-p-dioxin	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran	--	--	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran	--	--	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzofuran	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzo-p-dioxin	3.8E-05	1.8E-05	1.8E-05	1.00	MSSL
<b>Radionuclides</b>					
Radium 226 + 228	--	--	--	--	--
Radium 226	--	--	--	--	--
Radium 228	--	--	--	--	--
Thorium 228	--	--	--	--	--
Thorium 230	--	--	--	--	--
Thorium 232	--	--	--	--	--
Uranium 234	--	--	--	--	--
Uranium 235	--	--	--	--	--
Uranium 238	--	--	--	--	--

COMPARISON OF USEPA REGION 6 MEDIUM-SPECIFIC SCREENING LEVELS AND USEPA SCREENING LEVELS FOR CHEMICALS ON THE TRONOX COMPARISON TABLES

Chemical	Industrial Soil (mg/kg)				
	MSSL (w/o derm)	MSSL (w/ derm)	SL	MSSL (w/derm)/ SL	Source With Lowest Value
<b>Organophosphorous Pesticides (OPPs)</b>					
Azinphos-methyl	--	--	--	--	--
Bolstar	--	--	--	--	--
Chlorpyrifos	6.1E+03	2.1E+03	1.8E+03	1.17	SL
Coumaphos	--	--	--	--	--
Demeton-O	--	--	--	--	--
Demeton-S	--	--	--	--	--
Diazinon	1.8E+03	6.2E+02	5.5E+02	1.13	SL
Dichlorvos	2.0E+01	6.6E+00	5.9E+00	1.12	SL
Dimethoate	--	--	1.2E+02	--	SL
Disulfoton	8.2E+01	2.7E+01	2.5E+01	1.08	SL
EPN (Ethyl p-nitrophenyl phenylphosphorothioate)	--	--	6.2E+00	--	SL
Ethoprop	--	--	--	--	--
Famphur	--	--	--	--	--
Fensulfothion	--	--	--	--	--
Fenthion	--	--	--	--	--
Malathion	4.1E+04	1.4E+04	1.2E+04	1.17	SL
Merphos	--	--	1.8E+01	--	SL
Mevinphos	--	--	--	--	--
Naled	4.1E+03	1.4E+03	1.2E+03	1.17	SL
Parathion-ethyl (Ethyl Parathion)	1.2E+04	4.1E+03	3.7E+03	1.11	SL
Parathion-methyl (Methyl Parathion)	5.1E+02	1.7E+02	1.5E+02	1.13	SL
Phorate	--	--	1.2E+02	--	SL
Ronnel	1.0E+05	3.4E+04	3.1E+04	1.10	SL
Stirphos	--	--	--	--	--
Sulfotepp (Tetraethylthiopyrophosphate)	--	--	3.1E+02	--	SL
Thionazin	--	--	--	--	--
Tokuthion	--	--	--	--	--
Trichloronate	--	--	--	--	--
<b>Organochlorine Herbicides</b>					
Silvex (2-(2,4,5-trichlorophenoxy) propionic acid)	1.6E+04	5.5E+03	4.9E+03	1.12	SL
<b>Volatile Organic Compounds</b>					
1,1,1,2-Tetrachloroethane	7.1E+00	7.6E+00	9.8E+00	0.78	MSSL
1,1,1-Trichloroethane	1.4E+03	1.4E+03	3.9E+04	0.04	MSSL
1,1,2,2-Tetrachloroethane	9.0E-01	9.7E-01	2.9E+00	0.33	MSSL
1,1,2-Trichloroethane	1.9E+00	2.1E+00	5.5E+00	0.38	MSSL
1,1-Dichloroethane	2.3E+03	2.3E+03	1.7E+01	135.29	MSSL
1,1-Dichloroethene	4.3E+02	4.7E+02	1.1E+03	0.43	MSSL
1,1-Dichloropropene	--	--	--	--	--
1,2,3-Trichlorobenzene	--	--	--	--	--
1,2,3-Trichloropropane	2.9E+00	1.6E+00	4.1E-01	3.90	SL
1,2,4-Trichlorobenzene	2.4E+02	2.6E+02	7.9E+02	0.33	MSSL
1,2,4-Trimethylbenzene	2.0E+02	2.2E+02	2.8E+02	0.79	MSSL
1,2-Dibromo-3-chloropropane	1.8E-02	2.0E-02	7.3E-02	0.27	MSSL
1,2-Dibromoethane (Ethylene Dibromide)	6.5E-02	7.0E-02	1.7E-01	0.41	MSSL
1,2-Dichlorobenzene	3.7E+02	3.7E+02	1.0E+04	0.04	MSSL
1,2-Dichloroethane	7.7E-01	8.4E-01	2.2E+00	0.38	MSSL
1,2-Dichloropropane	7.7E-01	8.5E-01	4.7E+00	0.18	MSSL
1,3,5-Trimethylbenzene	7.0E+01	7.8E+01	2.8E+02	0.28	MSSL
1,3-Dichlorobenzene	1.3E+02	1.4E+02	--	--	MSSL
1,3-Dichloropropane	3.7E+02	4.1E+02	2.0E+04	0.02	MSSL
1,4-Dichlorobenzene	7.5E+00	8.1E+00	1.3E+01	0.62	MSSL
2,2-Dichloropropane	--	--	--	--	--
2-Butanone	3.4E+04	3.4E+04	1.9E+05	0.18	MSSL
2-Chlorotoluene	5.1E+02	5.1E+02	2.0E+04	0.03	MSSL
2-Hexanone	--	--	--	--	--
4-Chlorotoluene	--	--	7.2E+04	--	SL
4-Methyl-2-pentanone	1.7E+04	1.7E+04	5.2E+04	0.33	MSSL
Acetone	5.6E+04	6.0E+04	6.1E+05	0.10	MSSL
Benzene	1.5E+00	1.6E+00	5.6E+00	0.29	MSSL
Bromobenzene	1.1E+02	1.2E+02	--	--	MSSL
Bromochloromethane	--	--	--	--	--
Bromodichloromethane	2.4E+00	2.6E+00	4.6E+01	0.06	MSSL
Bromoform	7.2E+02	2.4E+02	2.2E+02	1.09	SL
Bromomethane	1.3E+01	1.5E+01	3.5E+01	0.43	MSSL
Carbon Tetrachloride	5.3E-01	5.8E-01	1.3E+00	0.45	MSSL
Chlorobenzene	4.6E+02	5.0E+02	1.5E+03	0.33	MSSL
Chloroethane	6.5E+00	7.2E+00	6.2E+04	0.0001	MSSL
Chloroform	5.2E-01	5.8E-01	1.5E+00	0.39	MSSL
Chloromethane	1.6E+02	1.7E+02	8.4E+00	20.24	SL
cis-1,2-Dichloroethene	1.5E+02	1.6E+02	1.0E+04	0.02	MSSL
cis-1,3-Dichloropropene	--	--	--	--	--

COMPARISON OF USEPA REGION 6 MEDIUM-SPECIFIC SCREENING LEVELS AND USEPA SCREENING LEVELS FOR CHEMICALS ON THE TRONOX COMPARISON TABLES

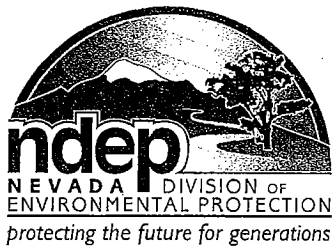
Chemical	Industrial Soil (mg/kg)				Source With Lowest Value
	MSSL (w/o derm)	MSSL (w/ derm)	SL	MSSL (w/derm)/SL	
<b>Volatile Organic Compounds Continued</b>					
Dibromochloromethane	2.4E+00	2.6E+00	2.1E+01	0.12	MSSL
Dibromomethane	5.5E+02	5.9E+02	1.0E+04	0.06	MSSL
Dichlorodifluoromethane	3.1E+02	3.4E+02	7.8E+02	0.44	MSSL
Diisopropyl ether (DIPE)	--	--	--	--	--
Ethylbenzene	2.3E+02	2.3E+02	2.9E+01	7.93	MSSL
Ethyl-tert-butyl ether (ETBE)	--	--	--	--	--
Hexachlorobutadiene	7.3E+01	2.5E+01	2.2E+01	1.14	SL
Isopropyl Benzene (Cumene)	5.2E+02	5.8E+02	1.1E+04	0.05	MSSL
Methylene Chloride	2.1E+01	2.2E+01	5.4E+01	0.41	MSSL
Methyl-tert-butyl ether (MTBE)	7.2E+01	7.9E+01	1.9E+02	0.42	MSSL
Naphthalene	1.9E+02	2.1E+02	6.7E+02	0.31	MSSL
n-Butylbenzene	2.4E+02	2.4E+02	--	--	MSSL
n-Propylbenzene	2.4E+02	2.4E+02	--	--	MSSL
p-Isopropyltoluene	--	--	--	--	--
sec-Butylbenzene	2.2E+02	2.2E+02	--	--	MSSL
Styrene	1.7E+03	1.7E+03	3.8E+04	0.04	MSSL
tert-Amyl-methyl ether (TAME)	--	--	--	--	--
tert-Butyl alcohol (TBA)	--	--	--	--	--
tert-Butylbenzene	3.9E+02	3.9E+02	--	--	MSSL
Tetrachloroethene	1.8E+00	1.7E+00	2.7E+00	0.63	MSSL
Toluene	5.2E+02	5.2E+02	4.6E+04	0.01	MSSL
trans-1,2-Dichloroethene	1.8E+02	2.0E+02	5.0E+02	0.40	MSSL
trans-1,3-Dichloropropene	--	--	--	--	--
Trichloroethene	9.2E-02	1.0E-01	1.4E+01	0.01	MSSL
Trichlorofluoromethane	1.3E+03	1.4E+03	3.4E+03	0.41	MSSL
Vinyl Chloride	8.6E-01	8.6E-01	1.7E+00	0.51	MSSL
Xylenes (total)	2.1E+02	2.1E+02	2.6E+03	0.08	MSSL
<b>Semi-Volatile Organic Compounds (SVOCs)</b>					
1,4-Dioxane	5.2E+02	1.7E+02	1.6E+02	1.06	SL
2-Methylnaphthalene	--	--	4.1E+03	--	SL
Acenaphthene	3.8E+04	3.3E+04	3.3E+04	1.00	MSSL
Acenaphthylene	--	--	--	--	--
Anthracene	1.0E+05	1.0E+05	1.7E+05	0.59	MSSL
Benzo(a)anthracene	7.8E+00	2.3E+00	2.1E+00	1.10	SL
Benzo(a)pyrene	7.8E-01	2.3E-01	2.1E-01	1.10	SL
Benzo(b)fluoranthene	7.8E+00	2.3E+00	2.1E+00	1.10	SL
Benzo(g,h,i)perylene	--	--	--	--	--
Benzo(k)fluoranthene	7.8E+01	2.3E+01	2.1E+01	1.10	SL
Bis(2-ethylhexyl)phthalate	4.1E+02	1.4E+02	1.2E+02	1.17	SL
Butylbenzylphthalate	2.4E+02	2.4E+02	1.2E+05	0.0020	MSSL
Chrysene	7.8E+02	2.3E+02	2.1E+02	1.10	SL
Dibenzo(a,h)anthracene	7.8E-01	2.3E-01	2.1E-01	1.10	SL
Diethylphthalate	1.0E+05	1.0E+05	4.9E+05	0.20	MSSL
Dimethylphthalate	1.0E+05	1.0E+05	--	--	MSSL
Di-n-butylphthalate	1.0E+05	6.8E+04	6.2E+04	1.10	SL
Di-n-octylphthalate	NA	NA	--	--	--
Fluoranthene	8.2E+04	2.4E+04	2.2E+04	1.09	SL
Fluorene	3.3E+04	2.6E+04	2.2E+04	1.18	SL
Hexachlorobenzene	3.6E+00	1.2E+00	1.1E+00	1.09	SL
Indeno(1,2,3-cd)pyrene	7.8E+00	2.3E+00	2.1E+00	1.10	SL
Naphthalene	1.9E+02	2.1E+02	6.7E+02	0.31	MSSL
Nitrobenzene	1.1E+02	1.1E+02	2.8E+02	0.39	MSSL
Octachlorostyrene	--	--	--	--	--
Phenanthrene	--	--	--	--	--
Pyrene	5.4E+04	3.2E+04	1.7E+04	1.88	SL
Pyridine	2.0E+03	6.8E+02	1.0E+03	0.68	MSSL
Notes:	Number of times MSSL is lower value:				78
(a) "--" indicates that the chemical was not included in that source's table.	Number of times SL is lower value:				66
(b) NA indicates that the chemical was included in the source's table but had no available value.					
CAS - Chemical Abstracts Service.					
MSSL - USEPA Region 6 Human Health Medium - Specific Screening Levels, March 2008.					
SL - USEPA Screening Level, May, 2008.					
derm - Dermal exposure route.					
Green shading indicates MSSL is approximately 10-fold or more lower than the SL.					
Yellow shading indicates MSSL is approximately 10-fold or more higher than the SL.					

TABLE 2  
 SURFACE SOIL  
 SELECTION OF COI FOR THE OUTDOOR ON-SITE WORKER  
 EXAMPLE - 7/10/08

*for cumulative*

Constituent	Frequency of Detection (a)	Maximum Concentration (mg/kg)	Commerical/ Industrial Standard (mg/kg)	Ratio of Maximum Concentration: Standard (c)	COI? (d)
<b>Potential Carcinogens (e)</b>					
BENZO(A)ANTHRACENE	2 : 2	56.3	63	8.94E-07	YES
BENZO(A)PYRENE	2 : 2	53	6.3	8.41E-06	YES
BENZO(B)FLUORANTHENE	2 : 2	43.3	63	6.87E-07	YES
BENZO(K)FLUORANTHENE	2 : 2	468	630	7.43E-07	YES
INDENO(1,2,3-CD)PYRENE	2 : 2	48	67	7.16E-07	YES
ARSENIC	1 : 2	6.2	80	7.75E-08	NO
CHROMIUM	2 : 2	20	28000	7.14E-10	NO
CHRYSENE	2 : 2	69.4	6700	1.04E-08	NO
DIBENZO(A,H)ANTHRACENE	1 : 2	3.1	6.7	4.63E-07	NO
<b>Sum of Ratio for NCOI:</b>				<b>5.51E-07</b>	
<b>Sum of Ration for COI and NCOI:</b>				<b>1.20E-05</b>	
<b>Noncarcinogens (e)</b>					
ACENAPHTHENE	2 : 2	10.6	180000	5.89E-05	NO
ACENAPHTHYLENE	2 : 2	16.2	180000	9.00E-05	NO
ANTHRACENE	2 : 2	33.3	880000	3.78E-05	NO
ARSENIC	1 : 2	6.2	590	1.05E-02	NO
BARIUM	2 : 2	120	200000	6.00E-04	NO
BENZO(GHI)PERYLENE	2 : 2	31.8	25000	1.27E-03	NO
CHROMIUM	2 : 2	20	8900	2.25E-03	NO
CYANIDE	2 : 2	3.2	60000	5.33E-05	NO
FLUORANTHENE	2 : 2	151	33000	4.58E-03	NO
FLUORENE	2 : 2	23.3	120000	1.94E-04	NO
MERCURY	1 : 2	0.662	300	2.21E-03	NO
NAPHTHALENE	2 : 2	20	530	3.77E-02	NO
PHENANTHRENE	2 : 2	156	880000	1.77E-04	NO
PYRENE	2 : 2	145	25000	5.80E-03	NO
<b>Sum of Ratio for NCOI:</b>				<b>6.56E-02</b>	

Notes:  
 NCOI - Not a Constituent of Interest.  
 (a) - Frequency of Detection. Number of detects:total number of samples.  
 (c) - Ratio of maximum detected concentration to the Standard. For potential carcinogens, the ratio has been multiplied by the target risk level for the Standards of  $1 \times 10^{-6}$ .  
 (d) - COI - Constituent of Interest. COI identified such that the summed ratios of the NCOI do not exceed  $1 \times 10^{-6}$  for potential carcinogens or 1.0 for noncarcinogens.  
 (e) - Constituents that have standards for potentially carcinogenic and noncarcinogenic effects are evaluated for both.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

July 2, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Removal Action Workplan for Soil, Tronox Parcels "C", "D", "F", "G", and "H" Stes,*  
*Henderson, Nevada*  
Dated July 1, 2008

Dear Ms. Crowley,

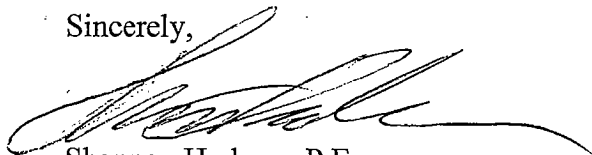
The NDEP has received and reviewed TRX's above-identified Removal Action Workplan (Work Plan) and finds that the document is acceptable with the following exceptions noted for the administrative record:

- TRX states that a report will be completed after the final data are received and validated. The NDEP assumes the "report" will be similar to the Technical Memorandum submitted for Parcels A and B and will contain a human health risk assessment (HHRA). If this assumption is not correct, please contact the NDEP to clarify.
- Please note that if any confirmation samples exhibit elevated concentrations and additional remedial actions are necessary, TRX should contact the NDEP and modify this Work Plan per the USEPA Triad methodology.
- Based on the proposed additional sampling prior to the commencement of remedial action, the NDEP understands that the submittal of the completion report/technical memorandum will be delayed approximately 6 to 8 weeks. Please note that TRX should give further consideration to the collection and analysis of additional samples, if the acquisition of a No Further Action Determination is time sensitive.

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.



Sincerely,



Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh

CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W.,  
Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranajit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Paul Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215



**Shannon Harbour**

---

**From:** Shannon Harbour  
**Sent:** Wednesday, July 02, 2008 1:36 PM  
**To:** 'Crowley, Susan'  
**Cc:** Ranajit (Ron) Sahu; Keith Bailey; Brian Rakvica; Mark Jones  
**Subject:** RE: NDEP Response to Parcels C, D, F, G, & H

Susan,

Thank you for the quick response to my comments. As far as the third bullet goes, your interpretation is correct; however, please additionally note that if TRX does proceed with the additional sampling and there is a time critical nature to the Parcels, the NDEP cannot guarantee a response on the Technical Memo by any specified date. Review time would be based on the current workload at the time of submittal.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230  
Las Vegas, NV 89119  
702-486-2850 x 240 (work)  
702-486-5733 (fax)*

---

**From:** Crowley, Susan [mailto:Susan.Crowley@tronox.com]  
**Sent:** Wednesday, July 02, 2008 11:38 AM  
**To:** Shannon Harbour  
**Cc:** Ranajit (Ron) Sahu; Keith Bailey; Brian Rakvica; Mark Jones  
**Subject:** RE: NDEP Response to Parcels C, D, F, G, & H

Shannon,

Thanks so much for responding quickly to our RAW for Parcels C, D, F, G and H. Re the exceptions ... I thought I'd provide additional information to clarify:

- The report for each Parcel will follow the same format as the final Technical Memo prepared for Parcel A/B, and will contain a HHRA.
- If the confirmatory sampling indicates additional remediation is needed – we will contact NDEP and modify the Work Plan as directed.
- I believe what you're indicating is that additional samples to define the remedial area may not be economic of effort or dollars. The uncertainty of additional samples being able to reduce the remedial area is high. If I've interpreted the exception correctly, we'll move forward with the area defined by the current analyses and not take the additional samples. Please let me know?

Again ... thanks very much for your quick response.

7/2/2008

**TRONOX LLC**

Susan Crowley  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607  
email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

*It's the set of our sails, not the force of the gales, that determines the way we go.*



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**From:** Shannon Harbour [mailto:[sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov)]  
**Sent:** Wednesday, July 02, 2008 11:06 AM  
**To:** Crowley, Susan  
**Cc:** Ranajit (Ron) Sahu; Keith Bailey; Brian Rakvica  
**Subject:** NDEP Response to Parcels C, D, F, G, & H

Susan,

Attached is an electronic version of NDEP's response letter to TRX's Removal Action Workplan for Parcels C, D, F, G, and H. Hard copies will follow via US Mail.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office  
2030 E Flamingo Rd Suite 230  
Las Vegas, NV 89119  
702-486-2850 x 240 (work)  
702-486-5733 (fax)*

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Please let me know immediately by return e-mail if you have received this message by mistake, then delete the e-mail message.

Thank you.

June

## Shannon Harbour

---

**From:** Keith Bailey [okbailey@flash.net]  
**Sent:** Thursday, June 26, 2008 1:57 PM  
**To:** Shannon Harbour; 'Crowley, Susan'  
**Cc:** Brian Rakvica; 'Flack, Mike'; 'Bilodeau, Sally'; 'Caceres-Schnell, Carmen'  
**Subject:** RE: 080623\_NDEP-TRX\_Conf\_Call\_Phase\_B-A4DRAFT.doc

Shannon,

That will be fine.

Keith

---

**From:** Shannon Harbour [mailto:sharbour@ndep.nv.gov]  
**Sent:** Thursday, June 26, 2008 3:44 PM  
**To:** Crowley, Susan  
**Cc:** Brian Rakvica; Keith Bailey; Flack, Mike; Bilodeau, Sally  
**Subject:** RE: 080623\_NDEP-TRX\_Conf\_Call\_Phase\_B-A4DRAFT.doc

Susan,

There seems to be a bit of confusion over my word choice for NDEP comment 22.i.ii, which states "SA116 should be relocated southwest to the western southernmost segment of LOU 59". I should have included the marked up figures like last time for clarification. Please see the attached figure for clarification of this comment. Please respond as to whether TRX accepts this revision.

Thanks,  
Shannon

*Shannon Harbour, P.E.  
Special Projects Branch  
NDEP BCA-Las Vegas Office*

---

**From:** Crowley, Susan [mailto:Susan.Crowley@tronox.com]  
**Sent:** Thursday, June 26, 2008 1:02 PM  
**To:** Shannon Harbour  
**Cc:** Brian Rakvica; Keith Bailey; Flack, Mike; Bilodeau, Sally  
**Subject:** 080623\_NDEP-TRX\_Conf\_Call\_Phase\_B-A4DRAFT.doc

Shannon,  
As always ... thank you for putting the minutes together. Attached are Tronox's comments. Thanks.

**TRONOX LLC**  
Susan Crowley  
PO Box 55  
Henderson, NV 89009  
office 702.651.2234  
cell 702.592.7727  
efax 405.302.4607

6/26/2008

email [susan.crowley@tronox.com](mailto:susan.crowley@tronox.com)

*It's the set of our sails, not the force of the gales, that determines the way we go.*



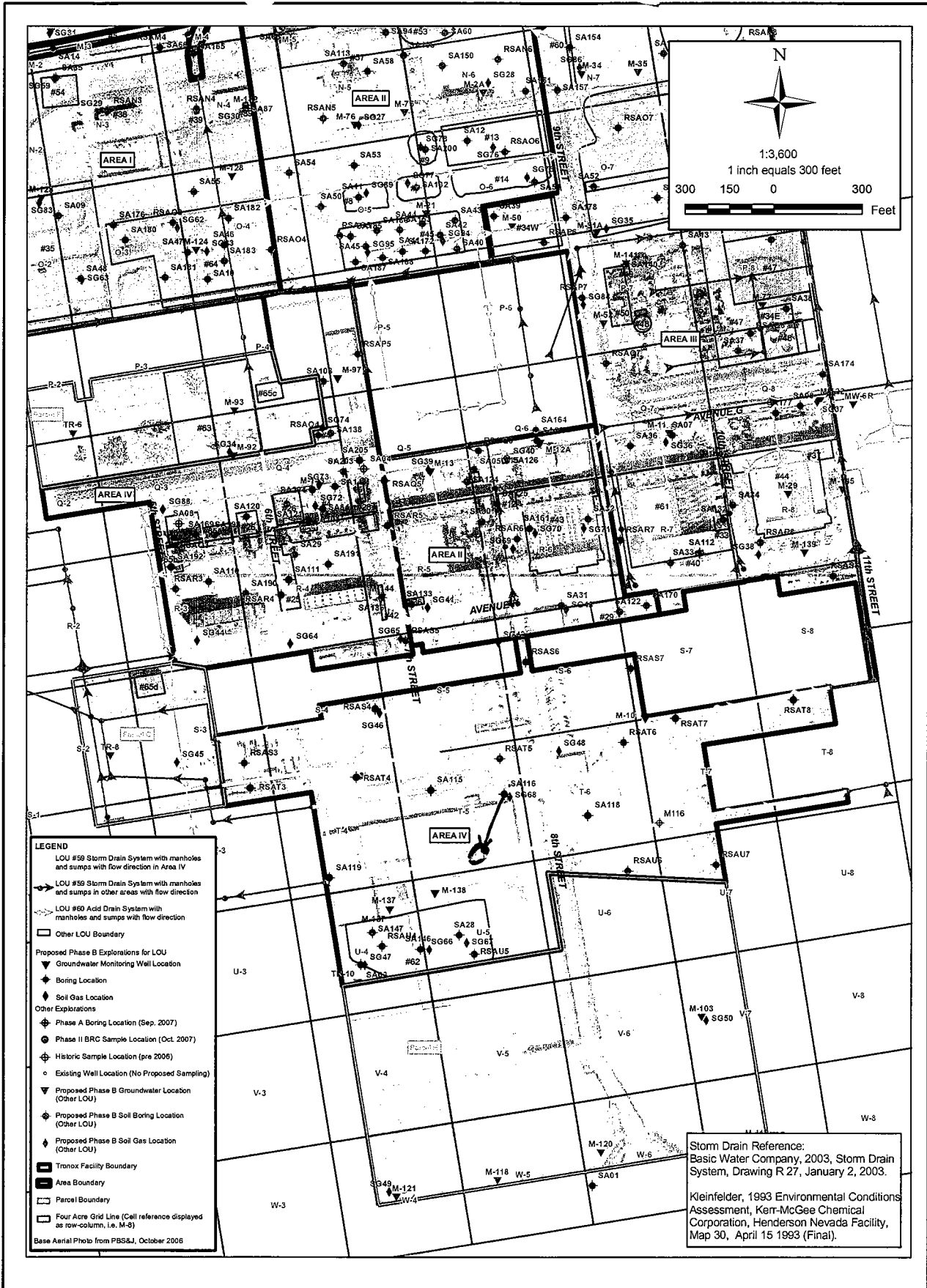
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Thank you.



**LEGEND**

- LOU #59 Storm Drain System with manholes and sumps with flow direction in Area IV
- LOU #59 Storm Drain System with manholes and sumps in other areas with flow direction
- LOU #60 Add Drain System with manholes and sumps with flow direction
- Other LOU Boundary
- Proposed Phase B Explorations for LOU
- Groundwater Monitoring Well Location
- Boring Location
- Soil Gas Location
- Other Explorations
- Phase A Boring Location (Sep. 2007)
- Phase II BRC Sample Location (Oct. 2007)
- Historic Sample Location (pre 2006)
- Existing Well Location (No Proposed Sampling)
- Proposed Phase B Groundwater Location (Other LOU)
- Proposed Phase B Soil Boring Location (Other LOU)
- Proposed Phase B Soil Gas Location (Other LOU)
- Tronox Facility Boundary
- Area Boundary
- Parcel Boundary
- Four Acre Grid Line (Cell reference displayed as row-column, i.e. M-8)

Base Aerial Photo from PBS&J, October 2006

Storm Drain Reference:  
Basic Water Company, 2003, Storm Drain System, Drawing R.27, January 2, 2003.

Kleinfelder, 1993 Environmental Conditions Assessment, Kern-McGee Chemical Corporation, Henderson Nevada Facility, Map 30, April 15 1993 (Final).

SHEET NUMBER: 1  
FIGURE NUMBER: X

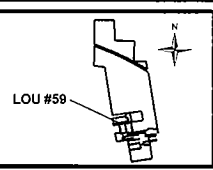
**SAMPLE LOCATIONS FOR LOU #59 IN AREA IV STORM DRAIN SYSTEM SEGMENT**  
Phase B Area IV Source Area Investigation  
Tronox Facility  
Henderson, Nevada

SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	5/14/2008	04020-023-430

ENSR AECOM

ENSR CORPORATION  
1220 AVENIDA ACASO  
CAMARILLO, CALIFORNIA 93012  
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B. Ho  
DRAWN BY:  
M. Scop  
CHECKED BY:  
C. Schnell  
APPROVED BY:  
B. Ho



## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 1:00 PM, Monday, June 23, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)  
ENSR – Carmen Schnell, Mike Flack (for TRX)

CC: Jim Najima, Paul Black, Kelly Black, Teri Copeland, Paul Hackenberry

1. The meeting was held to discuss NDEP's June 18, 2008 comment letter Re: Phase B Source Area Investigation Work Plan Area IV (Western and Southern LOUs), Tronox LLC, Henderson, Nevada – dated May 16, 2008 (Phase B Area IV SAP).
2. The following are TRX's response to comments (RTCs) regarding NDEP's May 6, 2008 Response to the Phase B Area IV SAP.
  - a. RTC 1, TRX will revise Table 2 of the Phase B SAPs for Areas I and IV accordingly to address this comment.
  - b. RTC 2, TRX will attempt to locate the general location of the Former Acid Drain System (LOU 60) using the drop boxes (manholes) as a guide. If LOU 60 is encountered, then TRX will sample from immediately below the Drain as identified in the core as specified in NDEP's comment. It was also noted that the material of construction for the pipe is "acid-resistant vitrified clay tile".
  - c. RTC 3, TRX acknowledges this comment and will address in future Phase B SAP submittals.
  - d. RTC 4, TRX acknowledges this comment and will address in future Phase B SAP submittals.
  - e. RTC 5, TRX acknowledges that this is a variation on the BRC SOP and will use soil gas to investigate the vapor intrusion pathway for a human health risk assessment (HHRA).
  - f. RTC 6, TRX is currently developing the HHRA work plan. Lisa Bradley of ENSR will continue to try and contact NDEP's consultants, Paul Black and Teri Copeland, to discuss HHRA development.
  - g. RTC 7, TRX acknowledges this comment and will address in future Phase B SAP submittals.
  - h. RTC 8, TRX acknowledges this comment.
  - i. RTC 9, TRX acknowledges this comment and will address in the Phase B Report and in the HHRA Work Plan.
  - j. RTC 10, TRX acknowledges this comment and will address in future Phase B SAP submittals.
  - k. RTC 11, please see RTC 1.
  - l. RTC 12, TRX acknowledges this comment and will address in future Phase B SAP submittals.
  - m. RTC 13.a, TRX acknowledges this comment and will address in future Phase B SAP submittals. TRX will assume that total cyanide concentration is equal to the free

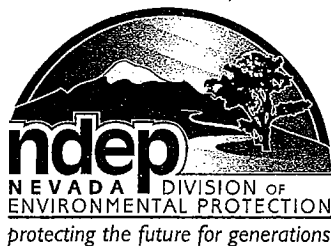
cyanide concentration in the HHRA initially. If the cyanide concentrations indicate an unacceptable health risk, TRX may pursue alternate sampling and analysis.

- n. RTC 13.b, TRX will conduct both Aroclor and congener sampling for PCBs. TRX acknowledges that Area I sampling for PCBs will be sampled for both Aroclor and congeners.
- o. RTC 13.c, TRX acknowledges that they will not be using gamma spectroscopy for the Phase B sampling.
- p. RTC 14, TRX acknowledges this comment and will address in future Phase B SAP submittals.
- q. RTC 15, TRX will send an erratum for page 2-8.
- r. RTC 16, TRX acknowledges this comment and will address in future Phase B SAP submittals by using the wording “variable conditions”.
- s. RTC 17, TRX acknowledges this comment and will address in future Phase B SAP submittals by stating that TRX will follow the USEPA Soils Screening Guidance and acknowledged that modeling will likely be completed. It was noted that VLEACH is not an ideal model for non-VOCs.
- t. RTC 18, TRX has currently proposed to collect total organic carbon, which TRX will use to calculate the fraction of organic carbon as necessary.
- u. RTC 19.a, TRX will complete this table and submit to NDEP in the Phase B Area II SAP.
- v. RTC 19.b, TRX will add the latest SRC List approval date of June 3, 2008.
- w. RTC 19.c.i, TRX will attempt to add details to the rationale for boring selection as time allows. It was noted that this issue needs to be brought to closure before the HHRA but not necessarily before the SAP implementation. NDEP is assuming that TRX has used site history to determine that the sample locations are ‘worst case’.
- x. RTC 19.c.ii, see RTC 19.c.i. NDEP noted that this comment should be addressed before the submittal of the HHRA.
- y. RTC 19.c.iii, TRX will revise Table 2 by checking the appropriate boxes in the Geotechnical Tests column.
- z. RTC 19.c.iv, see RTC 19.c.i.
- aa. RTC 19.c.v.1, TRX acknowledges this comment and will revise Table 2 accordingly.
- bb. RTC 19.c.v.2, TRX acknowledges this comment and will revise Table 2 accordingly. TRX noted that Table 2 for Area I will not need to be revised for this comment as the analyses listed for Wet Chemistry contain cyanide analysis.
- cc. RTC 19.c.v.3, TRX acknowledges this comment and will revise Table 2 accordingly.
- dd. RTC 19.d.i, TRX acknowledges this comment.
- ee. RTC 19.d.ii, TRX stated that Soil Type column in Table 3 provides the requested information and that all of the wells to be sampled will be in the first water bearing zone. NDEP noted that this is not obvious as wells screened in certain lithologies (e.g. UMCf-fg1 are not necessarily “first water” across the Site).
- ff. RTC 19.d.iii, TRX acknowledges that the wells indicated as “upgradient” are not a part of the Water Table Aquifer Background SAP, which will be submitted under separate cover.
- gg. RTC 19.e, TRX acknowledges this comment.
- hh. RTC 19.f, TRX acknowledges this comment.



- ii. RTC 20.a, TRX indicated that all of the wells shown are within the first water bearing zone.
  - jj. RTC 20.b, TRX will include additional wells.
  - kk. RTC 20.c, TRX will include a general groundwater direction arrow.
  - ll. RTC 21.a, b, and c, TRX will investigate the location of LOU 66 and provide a figure to NDEP. NDEP noted that the ownership of the tank as well as the location is important.
  - mm. RTC 22.a, TRX acknowledges this comment and will address in future Phase B SAP submittals.
  - nn. RTC 22.b, TRX acknowledges this comment and will address in the Phase B Report.
  - oo. RTC 22.c, TRX will reference the 1 ppb ATSDR value for dioxin.
  - pp. RTC 22.d, TRX will revise the LOU table for consistent units in future Phase B SAP submittals. TRX noted that the units were included in the LOU packages as reported in the original reports. TRX did not want to modify the data as originally reported.
  - qq. RTC 22.e, TRX will revise the LOU tables on future SAPs to include only EPA Region VI MSSLS.
  - rr. RTC 22.f, TRX acknowledges this comment and will address in future Phase B SAP submittals.
  - ss. RTC 22.g.i, TRX acknowledges this comment and will address prior to the submittal of the HHRA.
  - tt. RTC 22.g.ii, TRX acknowledges this comment and will collect wipe and chip samples for LOU 27. The wipe samples will be collected using the BRC SOP. The chip samples will be collected using EPA Region I, Draft SOP for Sampling Concrete in the Field dated December 30, 1997. NDEP to provide a copy of this SOP to TRX.
- ACTION ITEM.**
- uu. RTC 22.g.iii, TRX acknowledges this comment.
  - vv. RTC 22.g.iv.1-3, TRX acknowledges this comment and will revise Table 2 and Plate A accordingly.
  - ww. RTC 22.h, TRX acknowledges this comment and will revise Table 2 and Plate A accordingly.
  - xx. RTC 22.i.i, TRX acknowledges this comment and will attempt to locate the borings associated with LOU 59 adjacent to the storm drain.
  - yy. RTC 22.i.ii-v, TRX acknowledges this comment and will revise Table 2 and Plate A accordingly.
  - zz. RTC 22.j.i, TRX acknowledges this comment and will attempt to locate borings over the acid drain lines.
  - aaa. RTC 22.j.ii, TRX identified the construction material as 6-inch diameter, vitrified clay tile (5 – 6 foot long segments) and will include this information in future SAP submittals.
  - bbb. RTC 22.j.iii, TRX acknowledges this comment and will revise Table 2 and Plate A accordingly.
  - ccc. RTC 22.j.iv, TRX acknowledges this comment and will revise Table 2 and Plate A accordingly.
  - ddd. RTC 22.k.i, TRX noted that Building T-5 is an active area. TRX will submit a figure showing the location of Buildings T-4, T-5, and T-8.
  - eee. RTC 22.k.ii.1, see RTC 22.k.i

- fff. RTC 22.k.ii.2-4, TRX stated that the location of the conveyance piping to/from the former LOU 62 ponds, the conveyance piping to the Former Acid Drain System from LOU 62, and the sanitary sewer from LOU 62 are unknown at this time. TRX will investigate and will submit a figure showing the locations or approximate locations of these items if the information is available.
  - ggg. RTC 22.k.iii, TRX acknowledges this comment.
  - hhh. RTC 22.l, TRX will submit a figure that shows the location of LOU 66. TRX stated that if this LOU is not on TRX property then TRX is not responsible for this LOU. NDEP clarified that the ownership of the tank is also an issue, per above.
3. TRX will submit the following errata for the Phase B Area IV Report **by July 11, 2008**:
    - a. Page 2-8
    - b. Table 2
    - c. Table 3
    - d. Plate A
    - e. State Industries (LOU 62) Figure
    - f. Flintkote Company (LOU 66) Figure
  4. TRX stated that all revisions will be reflected in Phase B Area II and Area III SAPs.
  5. TRX stated that the Phase B Area II and Area III SAPs will be submitted to the NDEP **by June 30, 2008**. NDEP will endeavor to have comments on the Phase B Areas II and III SAPs by August 1, 2008 to allow field work to continue on an uninterrupted basis.
  6. TRX stated that the following revisions that affect Phase B Area I SAP will be made immediately and that a revised Table 2 for Phase B Area I SAP will be submitted to the NDEP.
    - a. TRX will change the surface sampling depth for all analyses except asbestos to 0 – 0.5 fbs.
    - b. TRX will note that PCBs will be sampled for both Aroclor and congener analysis.
    - c. TRX will note that the SPLP samples will be analyzed using both the reagent water and pH 5.0 reagent water prep methods.
  7. TRX stated that the field work for the soil gas survey has been completed with no reported problems with the direct push sampling.
  8. TRX stated that the asbestos sampling for Area I has been completed, the Area I groundwater sampling has commenced, and the Area I soil sampling is scheduled to commence on June 24, 2008.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

June 18, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Phase B Source Area Investigation Work Plan Area IV (Western and Southern LOUs).*  
*Tronox LLC Facility, Henderson, Nevada*  
Dated May 16, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Phase B, Area IV Sampling Analysis Plan (SAP) identified above and finds the document acceptable with the conditions and comments provided in Attachment A.

Errata sheets should be submitted based on the comments found in Appendix A. TRX should additionally provide an annotated response-to-comments (RTC) letter as part of the errata submittal. Alternately, in place of an RTC letter, TRX can discuss these comments with the NDEP in a meeting or via phone. Please advise the NDEP regarding the schedule for this submittal. Please note that it is NDEP's intent that TRX should be able to proceed with implementation of this SAP upon submittal of the erratum and RTC letter (or completion of meeting with NDEP in lieu of the RTC letter).

Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W.,  
Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranajit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Teri Copeland, 5737 Kanan Road #182, Agoura Hills CA 91301  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509  
Paul Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215

**Attachment A**

1. General comment, as stated in NDEP's comments to the Phase B Area I SAP, TRX should revise Table 2 to note that all samples within the 0 – 1 fbg interval will be collected from 0 – 0.5 fbg unless the area is paved. If the area is paved it is expected that the sample will be collected from a representative depth beneath the pavement. Alternately, if an unpaved area is within a reasonable distance the sample could simply be moved to the unpaved area. Table 2 should be revised accordingly. These changes should be reflected in the Table 2 errata pages for the Phase B Area IV SAP and any future Sampling Analysis Plans (SAPs) submitted to the NDEP.
2. General comment, for borings located above LOU 60, TRX should log the condition of the pipe, if possible, and collect a sample directly underneath the pipe. This sample may be substituted for the next proposed 10 foot interval in the Phase B SAPs, Table 2. (e.g. if the bottom of the Former Acid Drain System pipe was located at 8 fbg, then the sample should be collected directly underneath the pipe and not at 10 fbg). Please note that this comment additionally applies to the Phase B Area I SAP. Please add text and footnotes to future Phase B SAPs that contain sampling for LOU 60 to reflect this change.
3. Section 1.0, page 1-2, 2<sup>nd</sup> paragraph, "Acid Drawn System" should be "Acid Drain System". Please revise text accordingly.
4. Section 1.1, page 1-3, 3<sup>rd</sup> paragraph, final sentence, the term "statistical sample population" is not correct and should be revised to "a statistical sample of the population" or "a statistical sample". However, because these collections of samples include both random and judgmental samples, the term "statistical sample" is also not necessarily strictly accurate. Using the term "sample of the population" or just "sample" is probably best under the circumstances of these data.
5. Section 1.1, page 1-4, 3<sup>rd</sup> bullet, NDEP is unclear how "pathways not applicable in the HHRA" relates to "the evaluation of flux chamber measurements". Please clarify this statement.
6. Section 1.1, page 1-4, 1<sup>st</sup> paragraph, NDEP could not located description of human health risk assessment (HHRA) work plan in Section 3.0 as stated in this paragraph. TRX should acknowledge this statement for the Phase B Area IV SAP and provide the description in any future Phase B SAPs submitted to the NDEP. In addition, it is noted that the HHRA work plan should be developed as soon as possible.
7. Section 2.1, page 2-1, 3<sup>rd</sup> bullet, TRX should add the groundwater direction to this statement.
8. Section 2.2.1, page 2-3, 2<sup>nd</sup> paragraph, TRX states that "if current operations do not exacerbate contamination, future closure for the would not require sampling for the full SRC list (i.e. if a chemical is not detected in the Phase B Investigation and is not a part of the process associated with the LOU, it would not be analyzed for at the time of closure)." The NDEP does not necessarily concur with this statement at this time and will review this issue at the time of closure.
9. Section 2.2.1, page 2-4, 4<sup>th</sup> paragraph, TRX should include discussion on groundwater as a source of continuing soil contamination.
10. Section 2.3, page 2-5, 1<sup>st</sup> paragraph, TRX should note that groundwater samples will be collected from 18 wells under the Phase B Area IV SAP not 1 as is stated in the text.
11. Section 2.3, general comment, TRX should additionally discuss surface sampling for dioxin. Please see above general comment about sampling depths.

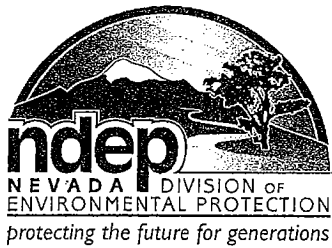
12. Section 2.3.1, page 2-5, 3<sup>rd</sup> paragraph the term "statistical sample population" is not correct as discussed above, please correct this issue throughout the document.
13. Section 2.3.2, page 2-6, the NDEP has the following comments:
  - a. General comment, TRX does not discuss cyanide analysis. Please add cyanide analysis to this section. Additionally, TRX should note that there is only toxicity data available for free cyanide. If only total cyanide analysis is conducted, then TRX will need to assume that the total cyanide concentration is equal to the free cyanide concentration in the HHRA.
  - b. 1<sup>st</sup> bullet, please note that PCB analyses should include Aroclor and congener analyses.
  - c. 5<sup>th</sup> bullet, it is the NDEP's understanding that TRX will not use gamma spectroscopy for any of the Phase B radionuclides analyses.
14. Section 2.3.3.1, page 2-7, the information presented herein does not need a separate section (Section 2.3.3) and should be incorporated into the preceding section.
15. Section 2.3.4.1, page 2-7, the third bullet (concerning TRX using the reagent water leaching method in addition to "extraction fluid #2") on the original page 2-7 has appears to have been removed. It may have been moved to page 2-8 but no errata page for 2-8 was submitted. TRX should acknowledge this omission for the Phase B Area IV SAP and include the omitted text in any SAPs submitted in the future.
16. Section 2.3.4.1, page 2-8, 1<sup>st</sup> paragraph, TRX states that "The leachate data derived from the reagent water and that from the pH 5.0 water will be compared to reflect variable wetting conditions at the site." This text should be revised to state that the leachate data will "...reflect variable pH conditions..."
17. Section 2.3.4.2, general comment, NDEP advises TRX to consider how the SPLP data will be used for risk assessment. Additionally, it is expected that TRX will determine whether any modeling will be conducted. Based on these considerations, TRX should evaluate the geotechnical / physical and chemical properties that are being collected to determine if the number of parameters and samples will provide sufficient data.
18. Section 2.3.4.2, page 2-8, TRX should collect the fraction of organic carbon ( $f_{oc}$ ) in addition to the listed parameters. TRX should acknowledge this omission for the Phase B Area IV SAP and include should this parameter in any future Phase B SAP submitted to the NDEP.
19. Tables, the NDEP has the following comments:
  - a. General comment, the NDEP requests that TRX prepare and present a table and corresponding figure that includes well construction details (e.g. casing diameter, age, materials of construction, screened interval, etc.) versus geology. This table may be submitted as an addendum/insert for the Phase B Areas II and III reports and is not necessary for the implementation of the Area IV SAP. This table should include all wells proposed for sampling in the Phase B Area SAPs.
  - b. Table 1, TRX should include a footnote referencing the approval date of the SRC list used for this table.
  - c. Table 2, the NDEP has the following comments (Please note that the following comments for Table 2 should be addressed by the submittal of errata pages for the Phase B Area IV SAP and incorporated in future Phase B SAPs submittals.):
    - i. General comment, the rationale for judgmental samples included in Table 2 of the Phase B Area IV and future Phase B SAPs should be more focused on how the boring will represent the LOU(s) indicated.

- ii. General comment, in the HHRA and/or future SAPs, TRX should identify whether judgmental borings should be indicative of worst case scenario conditions for a given LOU by using historic information/data, historic aerial photography, etc.
  - iii. General comment, Geotechnical Tests column, the boring-depth sample numbers should be removed from Table 2, page 5 of 5. TRX should alternately indicate the depth of geotechnical sample collection at these borings in the main part of the table. Rational for the geotechnical samples can be included in the Location Description and Characterized Area Rationale column. Please note that the mark indicating a geotechnical sample should be footnoted if the sample is proposed as optional.
  - iv. General comment, Rationale column, TRX should provide additional explanation on the choice of location for each boring in respect to each LOU (i.e. whether the boring represents worst case scenario for a LOU and how this was determined, etc.).
  - v. The following borings should include the corresponding analyses:
    - 1. SVOCs: SA191
    - 2. Cyanide: all borings located in Area 4 west of column 6 (not inclusive) and all borings associated with LOU 60 downstream of the LOU 63 conveyance piping junction. Please additionally revise and resubmit Phase B Area I SAP, Table 2, as necessary.
    - 3. Radionuclides: SA115-20, SA115-30, and SA115-40
  - d. Table 3, the NDEP has the following comments (Please note that the following comments for Table 3 should be addressed by the submittal of errata pages for the Phase B Area IV SAP and incorporated in future Phase B SAPs submittals.):
    - i. General comment, TRX should note that the NDEP does not necessarily agree that the selected wells are representative of the up-gradient, down-gradient and/or cross-gradient conditions as stated in the Appendix A LOU packets. The NDEP does note that the overall coverage of the groundwater sampling plan appears adequate.
    - ii. General comment, TRX should note the water bearing zone of each of the proposed wells in this table.
    - iii. General comment, please clarify whether the wells designated as “upgradient” are to be included in the Alluvial Aquifer Background SAP. If TRX is intending that these wells be a part of the Alluvial Aquifer Background SAP, then TRX should remove these wells from the Phase B Area IV SAP.
  - e. Table 6, TRX should note that this table was not reviewed in detail by the NDEP as it is NDEP’s assumption that this table is consistent with the approved QAPP.
  - f. Table 7, TRX should note that this table was not reviewed in detail by the NDEP as it is NDEP’s assumption that this table is consistent with the approved QAPP.
20. Figure 4, the NDEP has the following comments (Please note that the following comments for Figure 4 should be addressed by the submittal of errata pages for the Phase B Area IV SAP and incorporated in future Phase B SAPs submittals.):
- a. TRX should clarify which water bearing zone is being represented and review the well construction details to determine that all wells used for this figure are in the targeted water bearing zone.
  - b. TRX should use groundwater elevation data from additional wells across the site to more accurately and precisely determine the groundwater direction and gradient. If additional wells are used for this figure, then TRX should include them on the map.
  - c. TRX should illustrate the groundwater direction on this figure.

21. Plate A (Please note that the following comments for Plate A should be addressed by the submittal of errata pages for the Phase B Area IV SAP and incorporated in future Phase B SAPs submittals.):
  - a. Add the location of LOU 66.
  - b. Update this plate to include the following comments to the Appendix A LOU packets that affect boring placement.
  - c. Indicate visually which borings will additionally include geotechnical sample collection.
22. Appendix A, the NDEP has the following comments:
  - a. General comment: TRX should indicate in future LOU packages as to whether any proposed or historic borings/samples represent the worst case scenario conditions for the given LOU and how the location(s) for the worst case scenario conditions was/were determined.
  - b. General comment, TRX should include discussion on the background radionuclide data in the LOU packages, as appropriate.
  - c. General comment, TRX should reference the appropriate ASTDR value for dioxin/furans.
  - d. General comment, the NDEP has noted many examples of non-consistent units within the LOU package data tables. TRX should review and revise all data table for the LOU packages for consistent units within each table for future Phase B SAPs submittals.
  - e. General comment, the NDEP has noted several examples of TRX referencing EPA Region VI MSSLS and Region IX PRGs in the LOU data packages. TRX should review and revise all LOU data tables to contain only EPA Region VI MSSLS until otherwise directed by the NDEP.
  - f. General comment, the NDEP has noted that TRX has not included the DAF 1 and DAF 20 values in the LOU data packages as necessary. TRX should review and revise as necessary for future submittals.
  - g. LOU 4 (Hardesty Chemical Company Site), LOU 26 (Trash Storage Area), LOU 27 (PCB Storage Area), and LOU 28 (Hazardous Waste Storage Area), the NDEP has the following comments:
    - i. LOU 26, TRX should check using old aerial photography, etc. that the location for SA120 represents the worst case scenario for this LOU. Additional rationale as to the confidence that the location of SA120 represents the worst case scenario sampling should be included in the errata for Table 2.
    - ii. LOU 27, wipe and chip samples should be additionally collected in LOU 27 and analyzed for PCBs. TRX should provide a SOP and Work Plan for the collection of the wipe and chip samples. The SOP and Work Plan may be included as errata to the Phase B Area VI SAP or submitted under separate cover. These additions should be indicated in the errata for Plate A and Table 2.
    - iii. Table A: See above comments for Table 2 as applicable
    - iv. Figure 1, the NDEP has the following comments (The following changes should be included in the revised Plate A.):
      1. SA84 should be relocated over the LOU 60 (Acid Drain System).
      2. SA138 should be relocated to the approximate location of the termination of the above ground pipeline.
      3. SA191 may be moved into LOU 28; otherwise, TRX should place an additional boring in LOU 28 either between the two ASTs or just north of the northernmost AST in the northwest corner of LOU 28.



- h. LOU 41, LOU 65a, LOU 65b, LOU 65c, and LOU 65d, SA169 should be relocated to the east directly above the Lou 60 (Acid Drain System).
- i. LOU 59 (Storm Drain System Segment), the NDEP has the following comments:
  - i. General comment, the borings associated with this LOU should be located immediately adjacent to the storm drain system whenever possible.
  - ii. SA116 should be relocated southwest to the western southernmost segment of LOU 59.
  - iii. SA118 should be relocated southeast to the approximate location of historic sample location M116 on the eastern southernmost segment of LOU 59.
  - iv. An additional boring should be located adjacent to TRX's eastern property boundary on the eastern southernmost segment of LOU 59.
  - v. An additional boring should be located adjacent to LOU 59 where it re-enters TRX property across the western property boundary (near SG44).
- j. LOU 60 (Former Acid Drain System), the NDEP has the following comments:
  - i. General comment, the borings associated with this LOU should be located directly above the former acid drain system whenever possible.
  - ii. General comment, TRX should identify the construction material of this LOU.
  - iii. An additional boring should be located over LOU 60 where the acid drain system re-enters TRX property across the western property boundary (near SG88).
  - iv. Three additional borings should be located one at each junction on the northernmost segment of LOU 60 in Area IV (north of Unit Buildings 1 and 2).
- k. LOU 62 (State Industries, Inc. Site), the NDEP has the following comments:
  - i. Description, 5<sup>th</sup> bullet, 2<sup>nd</sup> sub-bullet, TRX should identify the location of Building T-5. Please submit an errata sheet for this revision.
  - ii. Figure A, please submit a revised figure that indicates the location of the following:
    - 1. Buildings T-4, T-5, and T-8,
    - 2. Conveyance piping to/from the former ponds
    - 3. Conveyance piping to the Former Acid Drain System
    - 4. Sanitary sewer that received the LOU 62 discharge overflow from the Former Acid Drain System
  - iii. Please note that additional sampling may be necessary based on the submittal of the above information.
- l. LOU 66 (Flintkote Company Lease, Former Aboveground Diesel Tank), please provide additional discussion on the rationale that TRX does not have to sample this LOU. NDEP does not concur at this time.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

June 5, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Sampling and Analysis Plan to Conduct Supplemental Soil Characterization, Tronox  
Parcels "C", "D", "F", "G", and "H", Henderson, Nevada*  
Dated May 28, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Sampling and Analysis Plan (SAP) identified above and finds that the document is acceptable. Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

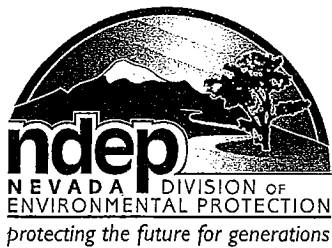
Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:bar:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W.,  
Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranajit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011  
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite 100, Novato, CA 94947  
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209  
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110  
Teri Copeland, 5737 Kanan Road #182, Agoura Hills CA 91301  
Paul Hackenberry, Hackenberry Associates, LLC, 550 W. Plumb Lane B425, Reno, NV 89509  
Paul Black, Neptune and Company, Inc., 8550 West 14<sup>th</sup> Street, Suite 100, Lakewood, CO 80215  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

June 3, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Updated Site Related Chemical List, Tronox LLC, Henderson, Nevada*  
Dated May 29, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's site related chemical (SRC) list identified above and finds that the document is acceptable. Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

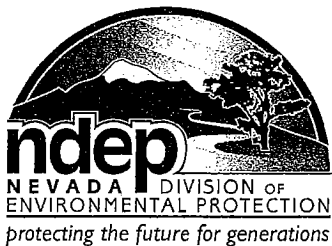
Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

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Washington, D.C. 20036  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
San Francisco, CA 94105-3901  
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# STATE OF NEVADA

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DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

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Leo M. Drozdoff, P.E., Administrator

June 3, 2008

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection (NDEP) Response to:  
*Revised Community Involvement Plan, Tronox LLC, Henderson, Nevada*  
Dated May 30, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified Revised Community Involvement Plan and finds that the document is acceptable. Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

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