

**Brian Rakvica**

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**From:** Brian Rakvica  
**Sent:** Tuesday, April 08, 2008 6:37 AM  
**To:** Keith Bailey; 'Crowley, Susan'  
**Cc:** 'Ranjit (Ron) Sahu'; 'Mark Jones'; 'Paul Black'; 'Kelly Black'; Shannon Harbour; Jim Najima; Bill Frey (bfrey@ag.nv.gov); Brian Rakvica  
**Subject:** TRX Parcels A and B NFA  
**Importance:** High  
**Attachments:** 080408 TRX Parcels A B NFA.doc

Susan and Keith,

Attached is the cleaned up NFA. Hard copy to follow.

Please note that there are issues that should be dealt with in future Deliverables, however, it is believed that these issues would not materially change the NFA status.

These issues are annotated below for your information. A response is not necessary or desired.

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

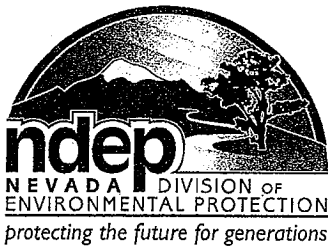
**General Comments**

1) A few of the previous General Comments have aspects that are much broader in application than just for these parcels. Some of the issues that, although addressed adequately for the purposes of this report, should be discussed further with NDEP prior to future deliverables include:

- A continued desire to have site data and decisions tied back to the Conceptual Site Model in all Deliverables so that full understanding of the rationale for decisions can be achieved.
- The inclusion/exclusion of lead from the HI calculations for risk assessments. It is uncommon practice to include lead in the HI calculations.
- Appropriate cleanup goals given that USEPA is no longer updating their Region 9 Preliminary Remediation Goals.
- The use of gamma method EPA 901.1 for Radium-226 and Radium-228 is generally not considered compatible with alpha method EPA 903.1 and beta method EPA 904.0, and should not be presented as compatible in future Deliverables.

## Specific Comments

- 1) Attachment E: In the Uranium Isotope Data Review for 2007 Tronox Parcels A/B Investigation memo, it is stated that the thorium and radium analyses for site and background are “considered comparable”. NDEP has stated several times that the gamma method (EPA 901.1) is not considered comparable with the alpha (EPA 903.1) and beta (EPA 904.0) methods. In fact, the boxplots and probability plots in Attachment F show noticeably different distributions for the background and site data for these radionuclides. This is an indication that the methods do indeed differ, and that it may not be appropriate to dismiss radium as being within background levels, at least not without presenting an argument for that conclusion.
- 2) Attachment E – Final paragraph: This Attachment pertains only to radionuclides, and we note that uranium is identified as potentially above background, so the final paragraph is an overstatement of the situation. Consequently, the first sentence is incorrect and should be changed (there is evidence of uranium contamination, and this Attachment deals only with radionuclides, but the sentence implicates all chemicals).
- 3) Page 9, second paragraph: This paragraph oversimplifies the radium issue. Rather than just saying that some site radionuclides appear to be slightly lower than background, an explanation needs to be provided. The explanation is likely to be related to the different methods that were used for radium analysis in the site and background data.
- 4) Previous comment #17: Niobium does have detections in background according to Table 2. However, according to Table 3, it is brought through as greater than background on the basis of “Non-Detect in Background”. Please clean up the tables for this chemical.
- 5) Previous comment #23 and related text, and Table 4: The previous comment asked for sample size calculations for asbestos. It is not clear that the calculations are appropriate. The formula used for the other chemicals is probably not the correct formula to use for asbestos because of the nature of the data. NDEP and TRONOX should consider the most appropriate approach to use to assess data adequacy for asbestos.
- 6) A better justification and/or spatial model will be considered to assist in determining remediation boundaries in the future.
- 7) There are some inconsistencies in the text...e.g.: there are no soil vapor data however soil data vapor validation is discussed in the report.



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

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

April 8, 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 Response to:  
*Technical Memorandum – Data Review for 2007 Tronox Parcels A/B Investigation*  
Dated February 11, 2008

Dear Ms. Crowley,

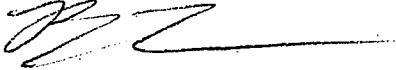
The NDEP has received and reviewed TRX's above-identified report and finds that No Further Action (NFA) is required at this time with the following conditions:

1. TRX retains the responsibility to address any environmental impacts to groundwater beneath the property referred to as Parcels A and B. As such, additional investigation may be necessary on this property as it relates to TRX's responsibilities. TRX must be granted access to the site for activities such as well or soil boring installations or other investigative or remedial efforts.
2. The materials presented to the NDEP do not evaluate the possibility of a vapor intrusion concern from contamination in groundwater. It is anticipated that this issue will be addressed as part of the investigation of groundwater issues in the region.
3. The site soils beneath 10' below ground surface have not been evaluated to date. The property owner should note that these soils should not be disturbed without additional investigation or evaluation.
4. To limit liability, the property owner should ensure that activities at the property do not exacerbate existing, sub-surface, environmental conditions.
5. The site use is suitable for purposes of commercial or industrial use only.



Please contact the undersigned with any questions at brakvica@ndep.nv.gov or (702) 486-2850 x 247.

Sincerely,



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

BAR:s

CC: Jim Najima, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, BCA, Las Vegas  
William J. Frey, AG's Office, Carson City  
Keith Bailey, Environmental Answers, 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, Clark County Comprehensive Planning, 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  
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WA 98110

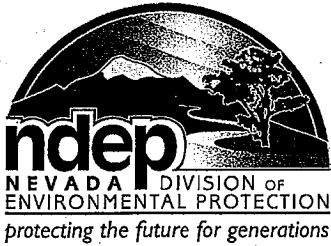


## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 10:00 AM, Friday April 4, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Tronox –Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)

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

1. The meeting was held to discuss various topics including deep soil sampling at the TRX facility.
2. TRX stated that the Phase B, Area 1 Sampling Analysis Plan (SAP) will include soil sampling for Area 1 and groundwater sampling for Area 1 plus Parcels A, B, C, and D.
  - a. LOU area maps will include groundwater wells that will be sampled for the Phase B SAP.
  - b. A separate groundwater sampling map will be generated for the Area because of readability issues.
3. TRX stated that the Area 4 SAP will include groundwater sampling for Parcels F, G, and H.
4. TRX is on schedule to submit the area SAPs every other week until all are submitted.
5. TRX stated that the SAPs for each of the areas will contain approximately the same front text and organization, as such; TRX requested that NDEP send any preliminary comments to TRX informally so that subsequent Phase B SAPs can be revised if needed before submittal. The NDEP will attempt to accommodate this request. **ACTION ITEM.**
6. TRX will submit the Revised QAPP likely by Monday April 7, 2008. The QAPP will contain SOPs from Colombia, Test America, and GEL laboratories.
7. TRX reported that the analytical results for radionuclides at Parcel H have been received and that they appear to fall within the range of background.
8. NDEP stated that they will not be scheduling an Annual Meeting between SNWA, EPA, TRX and NDEP this year.
9. NDEP will check the status of the review for the Parcel A and B Technical Memorandum, Revision 1. **ACTION ITEM.**
10. Deep soil investigation of Parcels.
  - a. TRX stated that they will be extending the limits of Parcel G to the north and will propose to install two additional borings on either side of the existing building. TRX will propose to extend these borings down to groundwater and additionally sample at 20, 30 (if groundwater has not been encountered) and the capillary fringe.
  - b. TRX stated that they will propose a boring in the triangular area east of Parcel C (0-10feet);
  - c. TRX will propose three additional borings in Parcel F, extending existing boring locations to the groundwater capillary fringe as described above.
  - d. These borings will be submitted as an addendum to the corresponding SAPs.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

April 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:

*Data Validation Summary Report (DVSR) for the Tronox Parcels C, D, F, and G  
Investigation - November 2007, BMI Industrial Complex, Clark County, Nevada*

(Revised)

Dated March 28, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified DVSR revision 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

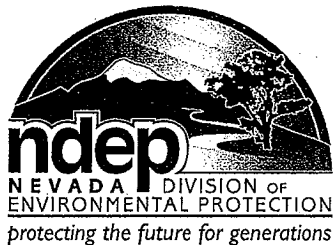
Special Projects Branch

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  
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Washington, D.C. 20036  
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San Francisco, CA 94105-3901  
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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



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

April 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:  
*Quarterly Performance Report for Remediation Systems, Tronox LLC, Henderson, Nevada, Appendix C – Data Validation Summary Report (DVSR)*  
Dated February 27, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's DVSR identified above and provides comments in Attachment A. TRX should note that this DVSR was reviewed for completeness, rationality, accuracy of the text with the tables and a random crosscheck with laboratory reports. This review did not encompass 100% of the report but was a sampling of the laboratory reports and database against the tables provided in the report. Errata pages should be submitted based on the comments found in Appendix A. Please advise the NDEP regarding the schedule for this submittal. TRX should additionally provide an annotated response-to-comments letter as part of the 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:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
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WA 98110  
Dave Gratson, Neptune and Company, 1505 15<sup>th</sup> Street, Suite B, Los Alamos, NM 87544

**Attachment A**

1. Hexavalent Chromium, Sample M-11, Report number 221809, the laboratory report for Sample M-11 in SDG 221809 indicates this sample was analyzed past the holding time; however, this sample is not included in Table D-3 nor is the result under that SDG qualified. These results should be reviewed and this potential discrepancy clarified
2. DVSR, Memorandum dated January 29, 2008, the Memorandum refers to Report number 22057R; the correct report name is 220257R.
3. Sample M-10\_11/07/07, this sample was analyzed under two different SDGs, 221802 and 221809, with the analysis for TDS under both. The DVSR should clarify that these analyses were split between two SDGs and discuss how the TDS results were used since they were reported in both SDGs.

**Brian Rakvica**

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**From:** Brian Rakvica  
**Sent:** Wednesday, April 02, 2008 9:27 AM  
**To:** Shannon Harbour; 'Crowley, Susan'  
**Cc:** 'Keith Bailey'; 'Paul S. Hackenberry, Jr.'; 'Paul Black'; 'terilcopeland@aol.com'; Brian Rakvica  
**Subject:** RE: NDEP-TRX March 27, 2008 Conference Call - Final Minutes

All,

Regarding comment 5 in the minutes, as follows:

1. TRX stated that they are not anticipating or proposing any deeper soil characterization on the sale Parcels.
  - a. TRX has conducted and proposed characterization to address specific pathways for risk assessment: 0 to 10 feet below ground surface (fbgs) to address the direct contact pathway and soil gas survey for indoor air pathway. Groundwater sampling will be performed on a site-wide basis including sales parcels.
  - b. TRX stated that if 0 to 10 fbgs is not impacted then there shouldn't be any deeper contamination other than that associated with groundwater.
  - c. NDEP responded that for contaminants (such as organics), concentrations could actually increase with depth given the conditions at the site.
  - d. TRX believes that there would also be a corresponding increase in the groundwater concentration if there was deeper soil contamination.
  - e. NDEP stated that there could be a difference between Parcels A, B, C, and D and Parcels F, and G because the latter may contain source areas.
  - f. TRX concurred that Parcels F and G may have deeper impacts and will check groundwater to determine any impact. If groundwater is not being increasingly impacted across Parcels F & G, deep soil samples may not be needed.

We would like to offer some additional thoughts which may be worthwhile to discuss. As follows:

Regarding 5(b), if groundwater is contaminated but shallow soil is not...deeper samples should be considered.

Regarding 5(d) this argument would depend upon several factors, one factor being that the upgradient contamination was less than the leachate/groundwater mix at the point of concern. This argument greatly simplifies contaminant fate and transport in the subsurface soils.

Argument 5(f) this argument depends on the assumptions associated with Argument 5(d).

We just want to be certain that we do not simplify things to the point of where we may miss an opportunity to grab a sample when it is opportune.

Please advise if we need to discuss.

Thanks,

Brian

4/2/2008

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**From:** Shannon Harbour  
**Sent:** Friday, March 28, 2008 10:54 AM  
**To:** 'Crowley, Susan'  
**Cc:** Keith Bailey; Brian Rakvica; 'Paul S. Hackenberry, Jr.'; Paul Black; 'terilcopeland@aol.com'; Jim Najima  
**Subject:** NDEP-TRX March 27, 2008 Conference Call - Final Minutes

Susan,

Attached is the electronic version of final minutes from yesterday's NDEP-TRX conference call. As a follow-up comment to the conference, the NDEP would like to note that comments provided for the set of five LOU areas did not "recommend not establishing source area bounds" but stated that the source areas should be characterized first and that since the focus of the Phase B work plans is to investigate the source areas, TRX should provide rationale for boring not located within the vicinity of the source areas. NDEP did not mean to imply that TRX could not move forward with step-out sampling, rather that if there is a choice between a source area sample and a step-out sample, the source area sample should have priority over the step-out sample if the source area has not been characterized.

Please contact me if you have any questions or additional comments.

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)*



## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 8:00 AM, Thursday March 27, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)

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

1. The meeting was held to discuss various issues including the Phase B Work Plan (WP) submittals and sale parcels A, B, C, D, F, G, and H (Parcels).
2. TRX stated that the submittal schedule submitted last week should be modified. The Phase B WPs will be submitted one week later than proposed. The submittal schedule will now be as follows:
  - a. Phase B, Area 1 – April 4, 2008
  - b. Phase B, Area 4 – April 18, 2008
  - c. Phase B, Area 3 – May 2, 2008
  - d. Phase B, Area 2 – May 16, 2008
  - e. Alluvial Groundwater Background Sampling – May 30, 2008  
Groundwater sampling for the entire site, including the proposed sales parcels, will be included in the four area work plans. Background alluvial groundwater sampling is needed, but since alluvial water does not extend upgradient of the site, cross-gradient sampling will be needed.
3. TRX has received NDEP's approval of the Soil Gas Survey WP and will begin implementation as soon as possible.
4. TRX stated that the objective of the Phase B WPs is to both sample worst case source area locations and to bound the limits of the source areas identified on-site. TRX is concerned about consistency of review by the NDEP and its consultants, for example: comments last year requested bounding sources, while more recent comments on a set of five LOUs recommended not establishing source area bounds in the Phase B work plan.
5. TRX stated that they are not anticipating or proposing any deeper soil characterization on the sale Parcels.
  - a. TRX has conducted and proposed characterization to address specific pathways for risk assessment: 0 to 10 feet below ground surface (fbgs) to address the direct contact pathway and soil gas survey for indoor air pathway. Groundwater sampling will be performed on a site-wide basis including sales parcels.
  - b. TRX stated that if 0 to 10 fbgs is not impacted then there shouldn't be any deeper contamination other than that associated with groundwater.
  - c. NDEP responded that for contaminants (such as organics), concentrations could actually increase with depth given the conditions at the site.
  - d. TRX believes that there would also be a corresponding increase in the groundwater concentration if there was deeper soil contamination.
  - e. NDEP stated that there could be a difference between Parcels A, B, C, and D and Parcels F, and G because the latter may contain source areas.

FINAL

- f. TRX concurred that Parcels F and G may have deeper impacts and will check groundwater to determine any impact. If groundwater is not being increasingly impacted across Parcels F & G, deep soil samples may not be needed.
6. NDEP and TRX discussed Parcel I (Nevada Pic-A-Part).
  - a. David Christensen has hired a CEM.
  - b. TRX has the expectation that the site will be restored to “pre-occupation conditions”.
  - c. NDEP and TRX were in agreement that any data collected for the Pic-A-Part cleanup should be supportive of an NFA.
  - d. NDEP will use the data from Parcels A and B to support the CSM for Parcel I.
7. NDEP reported that the Revised Technical Memorandum for Parcels A and B was still in review. NDEP to follow-up on the status of the review. **ACTION ITEM.**
8. TRX reported that there were asbestos detections on Parcels C and D.
9. NDEP will check to see if there are any files on the former Koch Asphalt facility that was located at the TRX site. **ACTION ITEM.**
10. TRX will review the Request for Time Extension of Combination TRX Remedial Project Reports dated February 22, 2007 to see if they have a NDEP-signed modification request. If located, TRX will supply to NDEP for inclusion in the TRX file. If TRX cannot locate this document, they will follow-up with Bill Frey. **ACTION ITEM.**
11. TRX believes the Parcel investigations are considered part of ECA (Phase II AOC) requirements. NDEP stated that prioritization of certain areas have been assigned by TRX but the site was divided into smaller areas at the behest of the NDEP and the same process ECA process (ECA analytical suites, NDEP approval of work, etc.) has been and will be applied to the entire site.

## Shannon Harbour

---

**From:** Shannon Harbour  
**Sent:** Friday, March 28, 2008 10:54 AM  
**To:** 'Crowley, Susan'  
**Cc:** Keith Bailey; Brian Rakvica; 'Paul S. Hackenberry, Jr.'; Paul Black; 'terilcopeland@aol.com'; Jim Najima  
**Subject:** NDEP-TRX March 27, 2008 Conference Call - Final Minutes  
**Attachments:** 080327\_Phase\_B\_Conf\_Call.doc

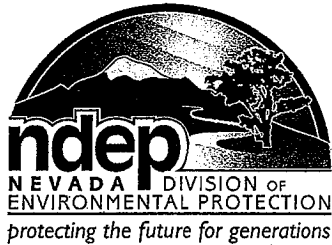
Susan,

Attached is the electronic version of final minutes from yesterday's NDEP-TRX conference call. As a follow-up comment to the conference, the NDEP would like to note that comments provided for the set of five LOU areas did not "recommend not establishing source area bounds" but stated that the source areas should be characterized first and that since the focus of the Phase B work plans is to investigate the source areas, TRX should provide rationale for boring not located within the vicinity of the source areas. NDEP did not mean to imply that TRX could not move forward with step-out sampling, rather that if there is a choice between a source area sample and a step-out sample, the source area sample should have priority over the step-out sample if the source area has not been characterized.

Please contact me if you have any questions or additional comments.

Sincerely,  
Shannon

*Shannon Harbour, P.E.  
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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

March 26, 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:

*Quarterly Performance Report for Remediation Systems, Tronox LLC, Henderson, Nevada, October – December 2007*

Dated February 27, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified performance report and provides comments in Attachment A. These comments should be addressed in future performance report submittals. TRX should additionally provide an annotated response-to-comments letter as part of the next performance report submittal unless otherwise noted.

Additionally, pursuant to Section VI, paragraph 2 of the 2005 Administrative Order on Consent between TRX (formerly Kerr McGee Chemical LLC) and NDEP, the NDEP, at its discretion, may reduce the quarterly performance reporting to semi-annual reporting. Therefore, TRX may begin to report to the NDEP-BCA on a semi-annual schedule. Commencing immediately, TRX is only required to submit a Semi-Annual (July – December) and Annual (January – June) Performance Report. The Semi-Annual and Annual reports should be submitted by February 28th and August 28th of each year, respectively.

TRX should note that this does not change any permit reporting requirements, etc. Additionally, TRX should continue to provide timely notification to NDEP about significant remedial system upsets or shutdowns, well destruction, etc.

It is suggested that the issues in Attachment A be discussed, in person, with the NDEP at the next available date. Please contact the NDEP to arrange this meeting. 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 Pöhlmann, 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, Clark County Comprehensive Planning, PO Box 551741, Las Vegas, NV, 89155-1741  
Ranajit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801  
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Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011  
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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. Section 2.0, page 2-2, second paragraph, please notify the NDEP when the new injection trench has been installed. TRX should additionally report the installation in the corresponding performance report.
2. Section 2.0, page 2-2, fourth paragraph, TRX should remove this discussion until TRX has evidence to present that their assumptions are correct. It is suggested that this discussion (and similar discussions throughout the report) be deferred to the Capture Zone Evaluation.
3. Section 3.0, page 3-2, the NDEP has the following comments:
  - a. TRX states that the anomalously high concentration of chromium in well ART-1 is believed to be due to "chromium leaching from the stainless steel screen". Please explain the chemical conditions in this well that would facilitate this leaching. Also, well ART-1 is not a new well so please explain what has changed in the recent past to facilitate this leaching.
  - b. Last paragraph, TRX states that PC-68 will be abandoned because "it is no longer needed." Please provide rationale for this statement.
4. Section 5.0, page 5-1, TRX notes that approximately 77% of pond AP-5 has been treated. NDEP would like to discuss TRX's plans for the use of the excess treatment capacity once pond AP-5 is remediated.
5. Figure 11, it is requested that the scale on this Figure be adjusted so that more recent data can be presented in a meaningful fashion. NDEP is amenable to addressing this in any number of ways and would like to discuss this matter with TRX. This comment also applies to other Figures.
6. Appendix C, Response To Comments (RTC), the NDEP has the following comments:
  - a. RTC 1.a, as noted above, TRX should notify NDEP when the Interceptor well field rehabilitation is complete and include in the next performance report.
  - b. RTC 1.c, as noted above, TRX should remove this discussion until TRX has evidence to present that their assumptions are correct.
  - c. RTC 5.d, the NDEP has the following comments:
    - i. TRX states that influent and effluent samples are collected annually from the activated carbon system. Please provide the annual sampling analytical results for the activated carbon influent and effluent sampling in the next performance report.
    - ii. Please note that based upon a review of groundwater data from neighboring properties to the west it appears that a plume of high concentration organics is approaching the western edge of the TRX on-Site treatment system. For example, chloroform at concentrations in excess of 6,000 micrograms/liter.
    - iii. It should be noted that the groundwater treatment system operated north of the Olin property is not effective in treating beta-BHC. This system uses two stages of granular activated carbon as well as air stripping. TRX should consider this when examining options to address beta-BHC.
  - d. RTC 5.e, the NDEP discussed having TRX report a minimum of the last 5 quarters of data in the hard copy of the report. The electronic version of the database included with the performance report was to contain all historical and current data. Please include all historical data in the electronic version of the database included with the next performance report.

**Shannon Harbour**

---

**From:** Crowley, Susan [Susan.Crowley@tronox.com]  
**Sent:** Tuesday, March 25, 2008 2:26 PM  
**To:** Shannon Harbour  
**Cc:** Keith Bailey  
**Subject:** FW: Tronox Submission Schedule  
**Attachments:** Phase B Workplan Areas.pdf

Shannon,

Keith indicated on March 14<sup>th</sup> that Tronox would be prepared to forward the first of the area based work plans (based upon the data packages) this Friday – March 28<sup>th</sup>. Please see the message below. This first work plan is not yet of the quality that either Keith or I would expect needed for your review – and so we are requesting that the due date for this first (and subsequent area work plans) be pushed back by one week. Our intent in this request is that we would be capable of supplying NDEP with a document that would not require iterations to be acceptable for moving into the field. This would ultimately save both of us resources. Your thoughts?

Also, Keith and I would like to call tomorrow so that we can discuss the groundwater and deeper soils characterization on the sales parcels. Will you be in the office tomorrow morning – or Thursday morning? Let me know. 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:** Keith Bailey [mailto:okbailey@flash.net]  
**Sent:** Friday, March 14, 2008 12:24 PM  
**To:** 'Shannon Harbour'; 'Brian Rakvica'; Crowley, Susan  
**Cc:** 'Flack, Mike'; 'Bilodeau, Sally'; 'Ho, Brian'; 'Caceres-Schnell, Carmen'  
**Subject:** Tronox Submission Schedule

Shannon,

As we discussed on the phone yesterday, Tronox is planning to submit to NDEP, six separate work plans associated with the Phase B Site Investigation program. The six work plans include:

- 1) Soil Gas Survey – measurement of VOC levels in soils over the entire site (including the sales parcels) to support evaluation of the vapor intrusion risk pathway.
- 2) Area I Source Area Investigation – evaluation of potential sources (about 12 LOUs) in the area of the old Trade Effluent ponds and the west side of the site (see attached pdf map showing proposed site areas).
- 3) Area II Source Area Investigation – evaluation of potential sources in the center of the site,

3/25/2008

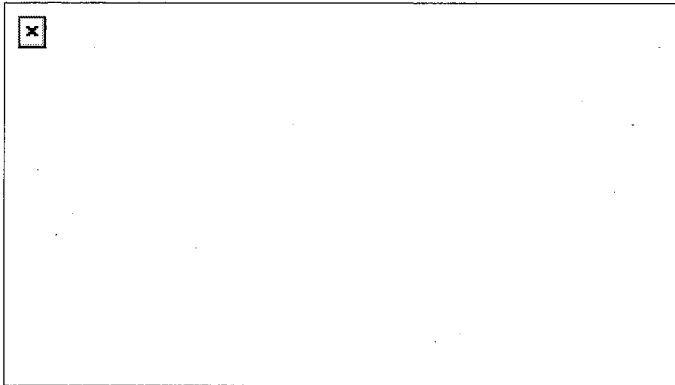
including the old AP, S and P ponds along with the C-1 pond and Unit buildings 3 and 4.

- 4) Area III Source Area Investigation – evaluation of potential sources the eastern portion of the site where current MnO<sub>2</sub> operations are located. Since this area includes active operations, closure is not being requested, but data will be collected to provide an indication of potential sources.
- 5) Area IV Source Area Investigation – evaluation of potential sources south of the Unit buildings.
- 6) Alluvial Groundwater Background Sampling – revision of the groundwater sampling proposal included in the Phase A report Appendix I.

Tronox anticipates submitting the Soil Gas Survey Work Plan to NDEP by March 21, 2008, followed by the Area I Source Area Investigation Work Plan by March 28, 2008. The remaining four work plans will be submitted roughly every other week thereafter.

If you have questions or comments, please call me at (405) 216-9213 or call Susan Crowley at (702) 651-2234 (Susan is out today and tomorrow, but will return Monday).

Keith



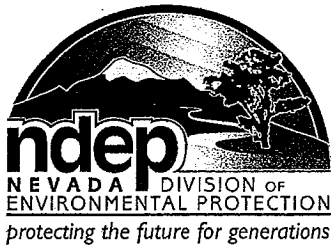
**Tronox Confidentiality Notice!**

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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.





# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

March 24, 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 1-14-08 Request for an Updated Site-Related Chemical (SRC) List,*  
*Tronox LLC, Henderson, Nevada*  
Dated March 12, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Updated SRC List identified above and provides comments in Attachment A. A Revised SRC List should be submitted **by April 24, 2008** based on the comments found in Appendix A. TRX should additionally provide an annotated response-to-comments letter as part of the Revised SRC List 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

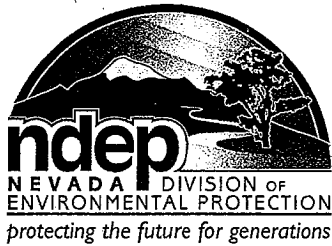
SH:sh



CC: Jim Najima, NDEP, BCA, Carson City  
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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

**Attachment A**

1. Table 1, the following constituents are listed on Table 1 as a site related chemical (SRC) but not on Table 2. Please revise Table 2 for consistency.
  - a. Dibenz(a,h)anthracene
  - b. Methyl tert-butyl ether (MTBE)
2. Table 2, "Applicable SRCs other than analyte" Column, the general listing for "fuel oxygenates" is listed in Table 2 but is not listed in Table 1. Please add Fuel Oxygenates to Table 1.
3. Table 2, the following constituents are listed as a site related chemical in Table 2 but are not specifically listed or have a general listing (as shown in the "Applicable SRCs other than analyte column" in Table 2) in Table 1. Please revise Table 1 for consistency.
  - a. Nitrite
  - b. Metadichlorobenzene (1,3-Dichlorobenzene)



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

March 24, 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 1-14-08 Request for an Updated Site-Related Chemical (SRC) List,*  
*Tronox LLC, Henderson, Nevada*  
Dated March 12, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Updated SRC List identified above and provides comments in Attachment A. A Revised SRC List should be submitted **by April 24, 2008** based on the comments found in Appendix A. TRX should additionally provide an annotated response-to-comments letter as part of the Revised SRC List 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

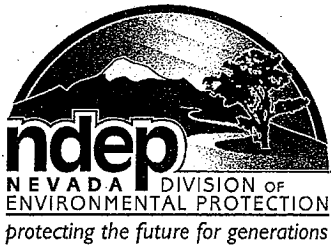
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Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110

**Attachment A**

1. Table 1, the following constituents are listed on Table 1 as a site related chemical (SRC) but not on Table 2. Please revise Table 2 for consistency.
  - a. Dibenz(a,h)anthracene
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2. Table 2, "Applicable SRCs other than analyte" Column, the general listing for "fuel oxygenates" is listed in Table 2 but is not listed in Table 1. Please add Fuel Oxygenates to Table 1.
3. Table 2, the following constituents are listed as a site related chemical in Table 2 but are not specifically listed or have a general listing (as shown in the "Applicable SRCs other than analyte column" in Table 2) in Table 1. Please revise Table 1 for consistency.
  - a. Nitrite
  - b. Metadichlorobenzene (1,3-Dichlorobenzene)



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

March 24, 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), Tronox Parcels C, D, R, and G Investigation,*  
*November 2007, BMI Industrial Complex, Clark County, Nevada*  
Dated February 27, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's DVSR identified above and provides comments in Attachment A. TRX should note that this DVSR was reviewed for completeness, rationality, accuracy of the text with the tables and a random crosscheck with laboratory reports. This review did not encompass 100% of the report but was a sampling of the laboratory reports and database against the tables provided in the report. Errata pages should be submitted based on the comments found in Appendix A. Please advise the NDEP regarding the schedule for this submittal. TRX should additionally provide an annotated response-to-comments letter as part of the 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:sh



CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
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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. Table 2-1, three Analysis Dates for laboratory sample F7K150237005, in Table 2-7, page 17 of 31 appears incorrect.
2. Database, the Analytical Method name "KWSR" is included in the database. This method is not included in Table 1-2. The report should clarify the name KWSR or correct the database.
3. Tables 2-9 and 2-10, a number of the values in the Limit column are incorrect. In some cases they appear to match the QL value, in other instances their origin is unclear. The values in the Limit column should show the maximum RPD, difference, or RER value that is acceptable.

## Shannon Harbour

---

**From:** Crowley, Susan [Susan.Crowley@tronox.com]  
**Sent:** Tuesday, March 04, 2008 4:40 PM  
**To:** Shannon Harbour  
**Cc:** Keith Bailey; bho@ensr.aecom.com; Bilodeau, Sally; Flack, Mike  
**Subject:** Delivery Date for the First of the Phase B Collection of Data Packages (Revised Phase B Work Plans)

Shannon,

To confirm our phone conversation of several moments ago – next Friday (March 14<sup>th</sup>) we will provide you with a delivery date for the first of the revised Phase B Work Plans. There will be at least three additional Phase B Work Plans which will follow this first at later dates. 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)

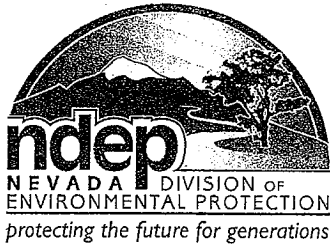
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Thank you.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

March 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:  
*Strategy and Concept for Tronox Mailing List, Tronox LLC, Henderson, Nevada*  
Dated February 27, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified letter response and finds the proposed strategy and concept acceptable. It is requested that Community Involvement Plan (CIP) be revised to address the mailing list changes as outlined in the TRX letter response. The revised CIP should be submitted to the NDEP by **April 4, 2008**, as specified in an NDEP letter dated March 3, 2008 Re: Request for Revised Community Involvement Plans. Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 x 240.

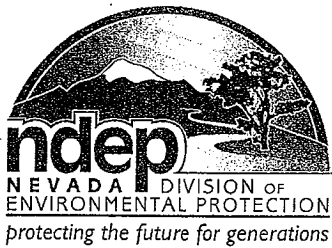
Sincerely,

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

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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

March 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 Response to:  
*Revisions to the Upgradient Investigations Results Report,*  
*Tronox LLC, Henderson, Nevada*  
Dated September 27, 2007

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's letter response identified above and provides comments in Attachment A. A revised submittal is not requested. It is suggested that this data be used for Site characterization purposes. The deeper samples may or may not be consistent with background; however, this will not be known until a deeper background data set is approved. Please contact the undersigned with any questions at (702) 486-2850 x 240 or [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov).

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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Paul Black, Neptune and Company, 8550 West 14th Avenue, Suite 100, Lakewood, CO 80215

### Attachment A

1. Review comments were provided by the NDEP in a letter dated March 23, 2007 on all sections of the report and on several of the appendices. This revised report offers only revisions to the Executive Summary and Chapter 5, and appends a new Appendix J. This is noted clearly in the TRX response to comments (RTC), page 1 of 19. However, the NDEP's comments herein apply to these sections only. All of the comments previously made on other sections of the document still stand and will instead be addressed in the next complete version of this report (if necessary).
2. NDEP still questions the separate comparisons of the "upgradient" data set with the COH and BRC background data sets. These data sets do not completely separate geologies that are reflected in the combined background data set. The separation, if warranted, should be based on geologic differences, as noted in the NDEP's final comments on the shallow background data set. For several metals, the background data can be reasonably combined (no geologic differences). For some, there are both geologic and depth differences, all of which can be considered as background comparisons are performed. The following is taken from the background report: "BRC/TIMET sample locations BRC-BKG-1 through BRC-BKG-9 and sample location BRC-BKG-11, and Environ sample locations BG-01 through BG-03 are downgradient of the McCullough Range. BRC/TIMET sample location BRC-BKG-12 and Environ sample location BG-04 are located in an alluvial fan area containing mixed McCullough Range and River Mountains geologic materials. Environ sample locations BG-05, BG-06, BG-07, and BG-08 are located downgradient from the River Mountains." Please note that Table J-1 would be revised if other subsets of background data were used. Consequently, no comments are made on Table J-1 at this time.
3. A few site related chemicals in the "upgradient" data set appear elevated compared with background. This makes it difficult to support conclusions that these "upgradient" data are fully representative of background soil conditions. Given the richness of the current background dataset, especially with respect to the McCullough Range, it is suggested that TRX instead use the "upgradient" soil data for site characterization.
4. NDEP notes that a comparability issue between Site data and background data was discovered after the submittal of this report. NDEP notes that any discussions regarding radionuclides would need to be revised based upon this discovery.
5. NDEP noted a lot of exact duplication between the Executive Summary and Chapter 5. Perhaps the Executive Summary can be shortened or the two sections in question can be focused differently. Note also that Figures 4-9 are appended to the main text and Appendix J.
6. There are some statistical calculations based on log-data in the Attachments. NDEP does not find as much value in these analyses because log transformations mask high concentrations. This does not seem useful for background comparisons.

### Specific Comments

1. Page ES-1, 1<sup>st</sup> paragraph, please note that the correct date of the NDEP comments is March 23, 2007.
2. Page ES-2, TRX states "the deeper samples (>20 ft), the Muddy Creek formation." NDEP does not concur that the Muddy Creek formation (MCf) begins at 20 feet below

- ground surface (ft bgs). It would be more appropriate to characterize this as deep alluvium.
3. Page ES-2, TRX notes that there are a few compounds that appear to be elevated relative to background. These include: perchlorate, boron and others. It would also be important to note that both perchlorate and boron were produced at the TRX Site.
  4. Page ES-3, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs (and Page 5-2, bullet 4 of 5). These paragraphs overstate the likelihood that the observed values are actually representative of background. A more appropriate wording might state that it is "possible" that the observed values represent background conditions, rather than that it is "likely" that they do. Some of the metals, in particular, exhibit concentrations sufficiently greater than background that even the general statement could be questioned. For example, cadmium concentrations are considerably greater than background. It is not clear that the conclusions as stated are reasonable for all metals.
  5. Page ES-3, Upgradient Groundwater, upgradient groundwater concentrations indicate elevated concentrations of perchlorate and chromium and possibly some other metals. TRX should consider trying to qualitatively match the chemicals that have high concentrations in both soil and groundwater.
  6. Page ES-3, Upgradient Groundwater, the groundwater data appear to be from the Muddy Creek formation. It is not clear what the intended use might be for these data, given the statement in the last paragraph of this section that "even un-impacted wells might not be an appropriate background reference".
  7. Page ES-3, Groundwater Sampling Methods Comparison, an RPD can be calculated if there is one data point from two different datasets. It might not be statistically useful, but it can be calculated. It would also help if some summary statistics were presented.
  8. Table ES-1, the title and label for this table could clarify the subsets of data included. It is not clear that it is useful to include the NA columns in the background data set on page 2 of 2 of this table. The same issue applies to Table J-2.
  9. Page 4 of 19 in response-to-comments (RTC), items 4d and 4f, see General comment #2. The general issue is one of if or how to subset the background data for comparison.
  10. Page 4 of 19 in RTC, items 4m and 4n, NDEP's preference would have been to provide the explanation rather than to delete text. The explanation is reasonable and just needs to be added to the text.
  11. Page 5 of 19 in RTC, item 12, if the northern McCullough Range is the primary source, does this mean that the most appropriate background data subset for comparison is the McCullough Range data? If so, such comparison might be sufficient.
  12. Page 7 of 19 in RTC, item 21a, if the radionuclide data are not going to be used as a background dataset in the future, this should be made clearer in the conclusions and perhaps in the executive summary.
  13. Page 9 of 19 in RTC, item 22, this explanation should be provided in the text.
  14. Page 10 of 19 in RTC, item 26, if comparisons are going to be made, it would be preferable to make them statistically. RPDs can be reported as well, but a paired t-test would allow the two methods to be compared statistically.
  15. Page 11 of 19 in RTC, item 28, this explanation should be provided in the text.
  16. Page 13 of 19 in RTC, item 29o, see general comment #2 above. NDEP does not necessarily concur. The general issue is one of how to subset the background data for



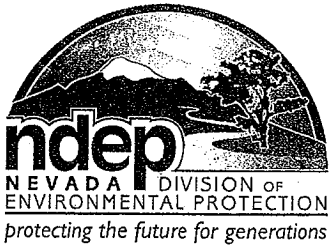
comparison. It seems that other arguments have been made that the McCullough dataset might be most appropriate for comparison here.

17. Page 13 of 19 in RTC, item 30, the conclusion does not quite follow. NDEP is aware of at least one form of potential radioactive contamination that is natural (imported ores that are higher in, at least, uranium content). NDEP also notes that given the recent discussions about analytical methods for radionuclides, some of the radionuclide results seem low compared to background and hence, some further investigation of the analytical methods (prep methods in particular) is warranted. No apparent discussion of this issue could be found in the document.
18. Page 17 of 19 in RTC, item 36a, TRX should note that, in principle, Gehan's ranking scheme could be used for the K-W test and might be more defensible than using a substitution method.
19. Appendix J, the NDEP has the following comments:
  - a. Page J-1. The histograms are described here but statistical presentations in Attachments 2 and 3 are not. The box plots are useful for understanding the differences in concentrations by depth and could be described here and perhaps should be moved in front of Attachment 2 on secular equilibrium. NDEP also notes that the histograms presented here are really bar charts and that the final bars sometimes cover a range of concentrations that is not defined on the upper end (> some value). It would be more helpful when comparing data to show all the data.
  - b. Page J-1, Histograms and Discussion/Interpretation of Statistical, Results, TRX should clarified herein as to how non-detects are handled in both the histograms and statistical analyses. It is important to understand exactly how the non-detects are being incorporated into the analyses especially because low detection frequency is an issue for several of the analytes being studied. TRX should note that there appear to be non-detect issues for boron, cadmium (in background), tungsten, and antimony.
  - c. Page J-1 and elsewhere, Discussion/Interpretation section, the NDEP would find it helpful if more physical evidence was reported for the alluvium/Muddy Creek distinction. (For example, soil boring logs might have information that shows that soil samples are a different material in the transition from 20 ft to 30 ft bgs samples.)
  - d. Pages J-1 and J-2, whenever the TRX data are shown to be significantly less than (statistically or by observation of histograms) either of the background data subsets, further investigation as to the appropriateness of the background data for comparison should be performed. Also, see General Comment 2.
  - e. Page J-2, 2nd paragraphs, based on the histogram, the TRX zinc data do not appear to be significantly lower than the BRC zinc data.
  - f. Page J-3, Lead-212 paragraph, the logic for determining that the upgradient lead-212 data are likely to represent background is not compelling. TRX might find worth in reviewing the analytical methods and results to see if there is any reason to believe that there is a high bias in the data or otherwise exploring other datasets for similar issues for Pb-212.
  - g. Page J-3, 5th paragraph, the first sentence implies that geology is considered when selecting an appropriate background data set for comparison to site data. Although the consideration of similar depth horizons is an important aspect of comparability, no specific consideration of comparable geology is discussed in this report. The background comparisons in this report would benefit greatly to include this

comparison. The selection of background data should be based on similar geologic formations as that of the upgradient data for comparisons.

- h. Page J-3, 5th paragraph, NDEP has noted that Th-228 may also be elevated vs. background. However, this is not the case for some of the other radionuclides in the Th chain (Ra-228 and Th-232). TRX should provide some further explanation especially since these radionuclides also appear to be in secular equilibrium.
- i. Page J-3, final sentence, TRX again overstates the likelihood that the observed values are actually representative of background. A more appropriate wording would state that it is "possible" that the observed values represent background conditions, rather than that it is "likely" that they do.
- j. Page J-4, Discussion of groundwater, TRX should include some discussion of why groundwater data show some contamination but the soil samples often do not. A specific chemical of concern noted by NDEP is chromium.
- k. Page J-4, the secular equilibrium analysis seems reasonable; however, there are a few observations that need to be made considering issues with secular equilibrium evaluation for other Companies' data sets. The ANOVA results presented in this report demonstrate secular equilibrium under the null hypothesis of secular equilibrium. No other data sets that we have looked at from the Companies, including background, pass this test (parametric or non-parametric). NDEP believes that there are 2 technical issues. One is that sample size has a large impact on ANOVA results. For this dataset there appear to be 12 samples included in the ANOVA analysis. In the background dataset there are 120 samples. Classical statistical tests find statistical differences as the sample size increases. The second potential issue with the radionuclide background data is that the different analytical methods naturally produce minor differences even if the radionuclides exist in near-secular equilibrium so that secular equilibrium is difficult to prove using ANOVA methods. The alternative that NDEP is pursuing is to reverse the null and alternative hypotheses and to allow a range of options in each hypothesis. TRX should note that at the moment, it would also be helpful to make clear which analytical methods were used for radionuclide data. For now, the issue is that it is surprising to see the ANOVA methods provide success here, given the lack of success with other Companies' data sets. Further investigation of other data sets will be forthcoming.
- l. Page J-5, 2nd bullet, NDEP recommends that the final sentence be extended to read, "However, it is recognized that there is uncertainty in this approach because the data have not been independently evaluated and because they come from the Tronox site, albeit upgradient of the primary activities on the site."
- m. Page J-5, after the 4th bullet, NDEP recommends adding an additional bullet that says, "This dataset may be used to help characterize the southern portion of the Tronox site."
- n. Table J-1, the NDEP has the following comments:
  - i. The decision logic for this table can be summarized as follows: if the TRX upgradient data was found to be lower than either the City of Henderson or the BRC/TIMET background data sets it was considered consistent with background. This is flawed in that it essentially compares the TRX data to the higher concentrations within each data set. This is not conservative and has no basis.

- ii. As noted elsewhere in this letter, it would have been more appropriate to split the existing shallow background data set by geology, as appropriate.
- iii. Since this table notes that site-related chemicals are elevated relative to background, the Upgradient samples are not consistent with background conditions.
- o. Appendix J, Histograms, the NDEP has the following comments:
  - i. It is not clear how non-detects were handled in the development of these bar charts. It would be helpful to note if half the detection limit was used or if the full detection limit was used.
  - ii. As the NDEP has noted previously, it is not helpful to have the last bar in the chart to be greater than value X. This results in the charts lacking context.
  - iii. It is noted that for antimony (and several other compounds, such as tungsten) that TRX appears to have elevated detection limits. This issue should be addressed with the laboratory in future sampling efforts.
  - iv. As noted previously, boron, which is a site-related chemical, appears elevated relative to background. Also, TRX should note that the use of the term "most" in this chart decreases the meaning of the chart.
  - v. Cadmium appears to be clearly elevated relative to background.
  - vi. Copper appears to be clearly elevated relative to background.
  - vii. Perchlorate appears to be clearly elevated relative to background.
  - viii. There is no histogram for Lead-212 although it is discussed in the text.
  - ix. Although these histograms are very useful visual tools for comparison of the datasets by analyte, presenting them with relative frequency (%) as the vertical axis and the sample size for each data set given in the key would be preferable so that the differences in sample sizes are normalized when viewing the histograms. Sample sizes should be provided on the figures as well.
  - x. The order of the histograms is not quite alphabetical either by full analyte name or by chemical abbreviation (e.g., lead comes between magnesium and manganese). Presenting these in alphabetical order would make it easier to access the information.
- 20. The List of Appendices, shown on page 1-5 of the October 2006 version of the report, needs to be updated to include Appendix J.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

February 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 Response to:  
*Strategy and Concept for Public Repository, Tronox LLC, Henderson, Nevada*  
Dated February 15, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's letter response identified above and finds that the document is acceptable. Please be advised that Stauffer Management Company LLC/Syngenta Crop Protection Inc.; Montrose Chemical Corporation of California; and Olin Corporation (hereinafter referred to as POSSM) has provided a similar response for their strategy and concept for the Information and Document Repository. TRX may wish to coordinate their activities with POSSM to reduce duplication of effort. Please contact the undersigned with any questions at (702) 486-2850 x 240 or [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov).

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  
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Maria Skorska, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
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Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street,  
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Rob Mrowka, Clark County Comprehensive Planning, 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  
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Mike Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
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Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110

**Shannon Harbour**

---

**From:** Keith Bailey [okbailey@flash.net]  
**Sent:** Friday, February 08, 2008 1:21 PM  
**To:** Shannon Harbour; Brian Rakvica; 'Paul Black'; TeriLCopeland@aol.com; 'Paul S. Hackenberry, Jr.'  
**Cc:** susan.crowley@tronox.com; 'Bilodeau, Sally'; 'Perry, Elizabeth'; 'Kennedy, Robert'  
**Subject:** Tronox Response to NDEP letter dated December 7, 2007  
**Attachments:** Rad\_response.pdf; Rad\_response.doc; Table 2\_Rad\_Compare\_1\_alpha-gamma ratios.xls; Table 1\_Henderson\_Gamma\_Rad\_EP\_rev.xls; 2-8-08\_final.pdf

Shannon,

Attached is the Tronox response to the NDEP letter dated December 7, 2007 regarding radionuclide data. The text is provided in both pdf and Word formats. Two Excel tables and a pdf containing histograms and other plots support the analysis. Hard copies are being sent to the regular distribution list for delivery early next week.

As we proposed to NDEP, Tronox has evaluated the inconsistency issues in the Phase A alpha spec radionuclide data by making a comparison with gamma spec data recalculated from the original spectrum recorded by the Test America Richland lab when they analyzed the samples for radium. We believe the data show a good correlation with radionuclide secular equilibrium and help explain the inconsistencies in the Phase A alpha spec data. While the Richland lab maintains that they followed regular acid digestion procedures for uranium chain nuclides and full digestion (HF) for thorium series nuclides, it appears from the gamma data that full dissolution was not accomplished. As you will see from the submission, we believe that the gamma spec data are usable in salvaging the Phase A radionuclide information.

If you have questions or comments, please contact either Susan Crowley at (702) 651-2234 or Keith Bailey at (405) 216-9213.

Keith

**Tronox Response to December 7, 2007 NDEP  
Advisement Regarding Radionuclide Analyses for Uranium**

**NDEP comment**

As noted to the Companies via e-mail, it has been discovered that there are differences in the preparatory (prep) methods used for isotopic uranium analyses. Specifically, the use of hydrofluoric acid (HF) versus not using HF. This difference has significant impacts on the data and represents a comparability problem.

What has been discovered is as follows:

1. The BRC/TIMET background data set was analyzed by STL-Saint Louis (STL-SL) for isotopic uranium. STL-SL uses HF.
2. The TRX upgradient data set was analyzed by GEL for isotopic uranium. GEL uses HF.
3. The TRX Phase A data and several other BRC data sets were completed by STL-Richland. STL-Richland does not use HF. This results in significant low bias relative to the background data set for isotopic uranium.

**Tronox Response**

*Tronox has reviewed and evaluated the Tronox Upgradient and Phase A data sets with regard to the issues raised.*

**NDEP comment**

All QAPPs shall be edited to specifically identify the prep method that uses HF for isotopic uranium analysis. Please address this issue **by January 11, 2008**.

**Tronox Response**

*NDEP granted Tronox an extension to February 8 to deliver this response. The next revision of the Tronox QAPP will specifically include this requirement. This revision will be complete and submitted for NDEP approval before the Phase B Investigation begins.*

**NDEP comment**

1. The Companies need to identify all data sets that are not comparable and report this to the NDEP. This will also be requested in the letter. Please address this issue **by January 11, 2008**.

**Tronox Response**

*The NDEP granted Tronox an extension to February 8, 2008 to deliver this response. The Tronox Phase A Investigation dataset for isotopic uranium is not comparable to the BRC/TIMET background study data because a total dissolution prep with HF was not performed prior to the HASL-300 alpha spec analysis. The former STL-Richland (now TestAmerica (TA)-Richland) laboratory has confirmed that only an acid leach without HF was used to digest these samples. TA-Richland has stated that all the Phase A samples analyzed for isotopic thorium by alpha spec were digested with HF in a total dissolution procedure, however Tronox believes the isotopic thorium results are not comparable to the BRC/TIMET dataset based on both the statistical analyses presented in the Phase A report and a subsequent comparison, presented in the attached Table 2, of the results for thorium derived from gamma spectrometry on the same samples.*

**NDEP comment**

2. All parties need to work to identify what other radionuclide data may be compromised. Each company should respond to this issue in the January 11, 2008 Deliverable. If additional radionuclide data is compromised additional changes to QAPPs will be required.

### **Tronox Response**

*Tronox has not identified any additional radiochemical data, other than the alpha spec isotopic uranium and thorium Phase A results mentioned above, as compromised by prep or analyses so that the data is not comparable in principle to the BRC/TIMET background dataset.*

### **NDEP comment**

3. All parties need to contemplate how we might salvage the data from STL-Richland for isotopic uranium analysis for use in future background comparisons. Some ideas that have been mentioned thus far are as follows:
  - a. Complete a side by side study of the two methods and develop a correction factor that could be applied to data from STL-Richland. It should be noted that enough uranium (metal) data may exist to develop this correction factor currently. This is important if any of the data will be used for risk assessments. This item can be addressed by the NDEP for the Companies or the Companies can complete this exercise.
  - b. Discard the existing data that is affected by this difference and utilize the total uranium data for background comparisons. It is likely that this is a defensible procedure for addressing background comparisons.
  - c. Utilize gamma spectroscopy for future analyses of isotopic uranium (NDEP does not support this).
  - d. These ideas need to be contemplated for what will be defensible. NDEP is open to additional suggestions.
  - e. Each Company should respond to this issue in the January 11, 2008 Deliverable.

### **Tronox Response**

*To salvage the Phase A uranium and thorium data for Phase A Tronox requested that the TA-Richland lab reprocess the raw gamma spec dataset (originally used to measure only the radium) so it included the isotopic uranium and thorium nuclides as well. The exact daughter nuclides and line energies measured were discussed with Dave Gratson at Neptune and are detailed in the attached data validation memo. These gamma spec results are provided in the attached Table 1 and are compared to the original alpha spec results in Table 2.*

*Ratios of the gamma to alpha spec results for each sample, each nuclide, and the aggregate U and Th isotopes are calculated in Table 2. These results confirm the original Phase A alpha spec data for U and Th were biased low. Moreover the ratios for the U-234 and U-238 nuclides are comparable to the "correction factors" derived by BRC in their comparison of the HF dissolution vs. HNO<sub>3</sub> leach prep results for subsamples of the Deep Soil Background and Parcel A/B datasets (see green highlights in Table 2). The similarity of the aggregate U and Th ratios indicates that the alpha spec results for both the U and Th nuclides were biased low even though the lab claims the Th analyses were preceded by total dissolution preparation. Tronox has not been able to determine the exact reason the original Th results also appear biased low.*

*As discussed in our conference call on January 22, 2008, Tronox has compared the gamma spec data from the Phase A soils at depths from 0 to 10 ft to NDEP-approved background activities, and also evaluated secular equilibrium based on the gamma spec results. The attached statistical analyses using the new gamma spec dataset for U and Th from Phase A soils (0-10 ft deep) corroborates that the gamma data is both more consistent with BRC and COH background datasets and internally more consistent with the assumption of secular equilibrium in the nuclide decay chains. Specific observations based on the comparisons include:*

- *The histograms showing both Phase A soils (0-10 ft) and BRC/COH background data show that the Phase A gamma spec results are consistent with background for Ra-226, Ra-228, Th-228, and Th-230. While the medians of Th-232, U-234 and U-238 appear generally greater than background, the highest activity levels in the Phase A samples are similar to the highest activities in the background samples. The box-plots show the same information in a slightly different way.*



- *To evaluate secular equilibrium, histograms and box-plots were prepared for the radionuclides in each decay chain. These show a general normal distribution that is similar for all radionuclides in each decay chain, as would be expected from random variability. Similar histograms and box plots were also prepared for the BRC and COH datasets separately.*
- *In a further evaluation of secular equilibrium, the Phase A data for each decay chain was graphed on a scatterplot. In a world without random errors, all of the points should fall on top of each other, and also on the line representing one-to-one correlation if the samples are in secular equilibrium. Instead, the Phase A data show a clustering of the data points around a central value, as would be expected with random errors. (Note that Th-230 and Ra-226 were measured from the same decay product (Bi-214) and the same emission line, which is reflected in their very high correlation.) Similar scatterplots have been prepared with the BRC and COH datasets.*
- *In addition, similar scatterplots have been prepared that include error bars based on the uncertainties in the analytical results reported by the laboratory. The uncertainties for the U-238 analyses are relatively high, and show that when uncertainty is considered, the U238 and Th230 activities at any given sample overlap. The uncertainties for the remaining radionuclides are lower, but the conclusions are the same – when laboratory uncertainties are considered, activities within each decay chain for any given sample overlap.*

*Please note that the relationship with respect to background for the U-238 gamma spec data is now more consistent with Phase A comparison of the uranium metal results measured by IPC-MS to the background U metal dataset as well. Tronox believes the weight of evidence suggests the new gamma spec data is reliable and more accurate than the original biased alpha spec Phase A data. Tronox therefore proposes to replace the original data with the new gamma spec data for both isotopic U and Th.*

*In regards to NDEP's advisement from January 29, 2008 Tronox agrees in principle to utilize methods consistent with the BRC/TIMET background study methods for future investigations. The use of gamma spectrometric data discussed above is only to salvage the Phase A radiochemistry data in a manner that is internally consistent and appropriate for background comparisons.*

**Table 2. Comparison of Alpha and Gamma Spectrometric Radionuclide Concentrations in Soil**  
Phase A Source Area Investigation  
Tronox Facility, Henderson, Nevada

location	sample ID	Analyte: Analytic Method: Spectroscopy Type: Units: sample date	Th-228		Th-230		Th-232		Th-232		Th-232 ratio gamma alpha	mean Th isotope ratio
			HASL-300 gamma pci/g	HASL-300 alpha pci/g	HASL-300 gamma pci/g	HASL-300 alpha pci/g	HASL-300 gamma pci/g	HASL-300 alpha pci/g				
MN ORE	MN ORE	01/19/2007	0.371	0.517	0.269	0.249 J	0.24	0.514 J	NA	NA	NA	NA
MN TAILINGS	MN TAILINGS	01/19/2007	1.31	1.19	0.982	0.802 J	1.9	0.957 J	NA	NA	NA	NA
SA02	SA2-0.5	11/03/2006	1.56	1.12	1.05	0.798 J	2.22	0.994 J	2.23	2.23	1.65	1.65
SA03	SA3-10	11/13/2006	1.82	0.691 J	1.06	0.594 J	1.83	0.601 J	3.04	3.04	2.53	2.53
SA04	SA4-20	11/14/2006	1.46	0.511 JB	1.22	0.875 J	1.56	0.706 J	2.21	2.21	2.15	2.15
SA05	SA5-30	11/14/2006	1.52	0.481 JB	2.35	2.23	1.65	0.59 J	2.80	2.80	2.34	2.34
SA06	SA6-10	11/14/2006	1.6	0.601 J	1.09	0.619 JB	1.66	0.668 J	2.49	2.49	2.30	2.30
SA07	SA7-20	11/20/2006	1.8	0.488 J	1.34	0.775 J	1.66	0.618 J	2.69	2.69	2.70	2.70
SA11	SA11-10	11/09/2006	2.24	0.663 J	1.79	0.833 J	2.15	0.836 J	2.62	2.62	2.72	2.72
SA13	SA13-40	11/17/2006	1.49	0.659 J	1.85	0.922 J	2.01	0.539 J	2.99	2.99	2.42	2.42
SA15	SA15-10	11/08/2006	1.47 J+	0.868 J	1.23 J+	0.794 J	2.01	0.796 J	2.99	2.99	2.42	2.42
SA15	SA15-10D	11/08/2006	1.63 J+	0.779 J	1.26 J+	0.529 J	2.01	0.544 J	2.99	2.99	2.42	2.42
SA18	SA18-0.5	11/15/2006	1.98	0.763 J	1.23	0.433 J-	2.84	0.676 J	2.71	2.71	2.71	2.71
SA18	SA18-0.5D	11/15/2006	1.88	0.481 J	1.09	0.495 J-	2.20	0.658 J	3.13	3.13	3.08	3.08
SA21	SA21-0.5	11/15/2006	1.9	0.954 J	1.19	0.671 J-	1.77	0.742 J	2.70	2.70	2.15	2.15
SA26	SA26-0.5	11/20/2006	1.71	0.805 J	1.27	0.391 J	3.25	0.759 J	2.75	2.75	2.71	2.71
SA26	SA26-0.5D	11/20/2006	1.95	0.774 J	1.07	0.441 J	2.43	0.729 J	2.72	2.72	2.55	2.55

mean ratio 2.65 2.74 2.46  
%RSD 25.27 10.04

**Data Qualifier Definitions:**

- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity and the result may be biased high.
- J- The result is an estimated quantity and the result may be biased low.
- UJ The analyte was not detected above the sample reporting limit and the reporting limit is approximate.
- U The analyte was analyzed for, but was not detected above the sample reporting limit

**Table 2. Comparison of Alpha and Gamma Spectrometric Radionuclide Concentrations in Soil**  
Phase A Source Area Investigation  
Tronox Facility, Henderson, Nevada

location	sample ID	sample date	Analyte: Analytic Method: Spectroscopy Type:	U-234 HASL-300 gamma pci/g	U-233/234 HASL-300 alpha pci/g	U-234 ratio gamma alpha	U-235 HASL-300 gamma pci/g	U-235/236 HASL-300 alpha pci/g	U-235 ratio gamma alpha	U-238 HASL-300 gamma pci/g	U-238 HASL-300 alpha pci/g	U-238 ratio gamma alpha	mean U isotope ratio
MN ORE	MN ORE	01/19/2007		0.276	0.21 J	NA	0.0588 U	0.0311 J	NA	0.194 U	0.217 J	NA	NA
MN TAILINGS	MN TAILINGS	01/19/2007		1.07	0.882	NA	0.185 U	0.0134 U	NA	0.737 U	0.854	NA	NA
SA02	SA2-0.5	11/03/2006		1.33	0.26 J	5.12	0.0754 U	0.035 J-	NA	1.72 U	0.196 J	NA	5.12
SA03	SA3-10	11/13/2006		1.12	0.427 J-	2.62	0.0726 U	0.0123 UJ	NA	1.3	0.292 J-	4.45	3.54
SA04	SA4-20	11/14/2006		1.23	1.35	0.91	0.179 U	0.0181 J	NA	1.67	0.833	2.00	1.46
SA05	SA5-30	11/14/2006		2.53	1.58	1.60	0.146 U	0.0469 J	NA	2.4	1.37	1.75	1.68
SA06	SA6-10	11/14/2006		1.05	0.787	1.33	0.148 U	0.0165 J	NA	1.17	0.483 J	2.42	1.88
SA07	SA7-20	11/20/2006		1.35	0.652 J+	2.07	0.0452 U	0.0145 U	NA	1.63	0.493 J	3.31	2.69
SA11	SA11-10	11/09/2006		2	0.663	3.02	-0.0866 U	0.004 U	NA	1.52 U	0.37 J	NA	3.02
SA13	SA13-40	11/17/2006		2.1	1.05 J+	2.00	0.172 U	0.0274 U	NA	1.87 U	0.813	NA	2.00
SA15	SA15-10	11/08/2006		1.41 J+	0.518 J	2.00	0.192 U	0.0102 U	NA	2.06	0.376 J	5.48	3.74
SA15	SA15-10D	11/08/2006		1.38 J+	0.404 J	2.00	-0.0311 U	0.00471 U	NA	2.01	0.392 J	5.13	3.56
SA18	SA18-0.5	11/15/2006		1.31	0.547 J	2.39	0.11 U	0.00628 U	NA	2.01 U	0.313 J	NA	2.39
SA18	SA18-0.5D	11/15/2006		1.14	0.322 J	3.54	0.0873 U	0.0114 J+	NA	1.36	0.263 J	5.17	4.36
SA21	SA21-0.5	11/15/2006		1.28	0.314 J	4.08	0.203 U	0.0211 J+	NA	1.23	0.237 J	5.19	4.63
SA26	SA26-0.5	11/20/2006		1.21	0.262 J+	4.62	0.0908 U	0.00551 U	NA	2.24	0.137 J	NA	4.62
SA26	SA26-0.5D	11/20/2006		1.35	0.262 J+	5.15	0.00452 U	0.00397 U	NA	1.02	0.146 J	6.99	6.07

mean ratio  
%RSD

2.83  
48.35

NA  
NA

4.19  
41.36

BRC study\*  
mean ratio

2.7

3.2

**Data Qualifier Definitions:**

- J The result is an estimated quantity.
- J+ The result is an estimated quantity &
- J- The result is an estimated quantity &
- UD The analyte was not detected above
- U The analyte was analyzed for, but w

\*BRC study ratios compared total dissolution prep to the nitric acid leach prep

**Table 1. Radionuclide Concentrations in Soil Determined by Gamma Spectroscopy**  
 Phase A Source Area Investigation  
 Tronox Facility, Henderson, Nevada

Location	Sample ID	Analyte: Method: Spectroscopy: Units:	Th-228 HASL-300 gamma pci/g	Th-230 HASL-300 gamma pci/g	Th-232 HASL-300 gamma pci/g	Th-234 HASL-300 gamma pci/g	U-234 HASL-300 gamma pci/g	U-235 HASL-300 gamma pci/g	U-238 HASL-300 gamma pci/g	Ra-226 HASL-300 gamma pci/g	Ra-228 HASL-300 gamma pci/g
MN ORE	MN ORE	Sample Date 01/19/2007	<b>0.371</b>	<b>0.269</b>	<b>0.24</b>	1.77 U	<b>0.276</b>	0.0588 U	0.194 U	0.271 U	<b>0.55</b>
MN TAILINGS	MN TAILINGS	01/19/2007	<b>1.31</b>	<b>0.982</b>	<b>1.9</b>	2.18 U	<b>1.07</b>	0.185 U	0.737 U	0.968 U	<b>1.54</b>
SA01	SA1-0.5	11/03/2006	<b>1.72</b>	<b>1.03</b>	<b>1.96</b>	3.58 U	<b>1.15</b>	0.165 U	0.609 U	<b>1.01 J</b>	<b>1.6</b>
SA01	SA1-05	11/03/2006	<b>1.43</b>	<b>1.29</b>	<b>1.59</b>	6.16 U	<b>1.4</b>	0.181 U	-0.00812 U	<b>1.25 J</b>	<b>1.69</b>
SA01	SA1-10	11/03/2006	<b>1.83</b>	<b>1.38</b>	<b>1.85</b>	-0.0734 U	<b>1.57</b>	0.0487 U	0.918 U	<b>1.31 J</b>	<b>1.65</b>
SA02	SA2-0.5	11/03/2006	<b>1.56</b>	<b>1.05</b>	<b>2.22</b>	1.99 U	<b>1.33</b>	0.0754 U	1.72 U	<b>1.02 J</b>	<b>1.97</b>
SA02	SA2-10	11/03/2006	<b>1.55</b>	<b>1.2</b>	<b>2.02</b>	-1.2 U	<b>1.51</b>	0.096 U	1.58 U	<b>1.17 J</b>	<b>1.56</b>
SA02	SA2-20	11/03/2006	<b>1.7</b>	<b>1.17</b>	<b>2.01</b>	6.35 U	<b>1.32</b>	0.0702 U	1 U	<b>1.15 J</b>	<b>1.95</b>
SA02	SA2-30	11/06/2006	<b>1.15</b>	<b>3.57</b>	<b>0.999</b>	4.82 U	<b>3.83</b>	0.347 U	<b>4.56</b>	<b>3.39</b>	<b>1.01 U</b>
SA02	SA2-40	11/06/2006	<b>1.59</b>	<b>1.41</b>	<b>1.78</b>	4.86 U	<b>1.71</b>	0.0287 U	<b>1.99</b>	<b>1.34 J</b>	<b>1.72</b>
SA02	SA2-50	11/06/2006	<b>1.31</b>	<b>1.36</b>	<b>1.64</b>	3.88 U	<b>1.19</b>	0.00138 U	0.0547 U	<b>1.3 J</b>	<b>1.39</b>
SA02	SA2-60	11/06/2006	<b>1.56</b>	<b>2.77</b>	<b>1.71</b>	11.9 U	<b>2.98</b>	0.195 U	<b>3.65</b>	<b>2.64</b>	<b>1.54</b>
SA03	SA3-0.5	11/13/2006	<b>1.63</b>	<b>0.989</b>	<b>2.08</b>	7.19 U	<b>1.12</b>	0.213 U	1.23 U	<b>0.997 J</b>	<b>1.81</b>
SA03	SA3-0.5D	11/13/2006	<b>1.79</b>	<b>1.15</b>	<b>2.25</b>	0.636 U	<b>1.27</b>	0.00458 U	1.67 U	<b>1.13 J</b>	2.21 U
SA03	SA3-10	11/13/2006	<b>1.82</b>	<b>1.06</b>	<b>1.83</b>	7.02 U	<b>1.12</b>	0.0726 U	<b>1.3</b>	<b>1.01 J</b>	<b>1.65</b>
SA03	SA3-20	11/13/2006	<b>1.65</b>	<b>1.26</b>	<b>1.48</b>	2.56 U	<b>1.36</b>	0.0778 U	1.09 U	<b>1.19 J</b>	<b>1.66</b>
SA03	SA3-30	11/13/2006	<b>0.394</b>	<b>1.63</b>	<b>0.587</b>	3.58 U	<b>1.64</b>	0.208 U	<b>2.14</b>	<b>1.59 J</b>	0.357 U
SA03	SA3-40	11/13/2006	<b>0.659</b>	<b>2.16</b>	<b>0.983</b>	3.62 U	<b>2.52</b>	0.0874 U	<b>2.77</b>	<b>2.34</b>	0.913 U
SA04	SA4-0.5	11/14/2006	<b>1.72</b>	<b>1.15</b>	<b>1.83</b>	1.68 U	<b>1.17</b>	0.139 U	0.783 U	<b>1.1 J</b>	<b>1.83</b>
SA04	SA4-10	11/14/2006	<b>1.91</b>	<b>1.16</b>	<b>1.71</b>	1.62 U	<b>1.36</b>	0.059 U	2.3 U	<b>1.13 J</b>	<b>1.81</b>
SA04	SA4-20	11/14/2006	<b>1.46</b>	<b>1.22</b>	<b>1.56</b>	-0.266 U	<b>1.23</b>	0.179 U	<b>1.67</b>	<b>1.19 J</b>	<b>1.53</b>
SA04	SA4-30	11/14/2006	<b>2.04</b>	<b>1.52</b>	<b>2.35</b>	5.03 U	<b>1.85</b>	0.113 U	0.871 U	<b>1.45 J</b>	<b>1.91</b>
SA04	SA4-40	11/14/2006	<b>1.98</b>	<b>1.63</b>	<b>2.14</b>	8.01 U	<b>2</b>	0.185 U	0.818 U	<b>1.6 J</b>	<b>1.9</b>
SA05	SA5-0.5	11/14/2006	<b>1.7</b>	<b>1.14</b>	<b>1.56</b>	0.833 U	<b>1.31</b>	0.0168 U	0.338 U	<b>1.12 J</b>	<b>1.92</b>
SA05	SA5-10	11/14/2006	<b>1.69</b>	<b>1.1</b>	<b>1.74</b>	-1.64 U	<b>1.1</b>	0.00665 U	<b>1.08</b>	<b>1.07 J</b>	<b>1.66</b>
SA05	SA5-20	11/14/2006	<b>1.61</b>	<b>1.16</b>	<b>1.66</b>	-2.44 U	<b>1.31</b>	0.0627 U	1.53 U	<b>1.1 J</b>	<b>1.52</b>
SA05	SA5-30	11/14/2006	<b>1.52</b>	<b>2.35</b>	<b>1.65</b>	0.0608 U	<b>2.53</b>	0.146 U	<b>2.4</b>	<b>2.29</b>	<b>1.68</b>
SA05	SA5-37	11/14/2006	<b>0.78</b>	<b>2.53</b>	<b>1.17</b>	4.66 U	<b>2.86</b>	0.267 U	<b>3.27</b>	<b>2.46</b>	<b>0.806 J</b>
SA06	SA6-0.5	11/14/2006	<b>1.82</b>	<b>1.21</b>	<b>1.79</b>	0.854 U	<b>1.37</b>	0.149 U	<b>1.43</b>	<b>1.18 J</b>	<b>1.87</b>
SA06	SA6-0.5D	11/14/2006	<b>1.8</b>	<b>1.35</b>	<b>1.92</b>	6.95 U	<b>1.21</b>	-0.00889 U	0.739 U	<b>1.32 J</b>	<b>1.89</b>
SA06	SA6-10	11/14/2006	<b>1.6</b>	<b>1.09</b>	<b>1.66</b>	3.77 U	<b>1.05</b>	0.148 U	<b>1.17</b>	<b>1.07 J</b>	<b>1.8</b>
SA06	SA6-20	11/14/2006	<b>1.69</b>	<b>1.24</b>	<b>2.07</b>	6.19 U	<b>1.29</b>	0.137 U	<b>1.75</b>	<b>1.21 J</b>	<b>1.63</b>
SA06	SA6-30	11/14/2006	<b>1.78</b>	<b>1.53</b>	<b>2.14</b>	6.91 U	<b>1.49</b>	0.0842 U	1.54	<b>1.49 J</b>	<b>1.94</b>
SA06	SA6-35	11/14/2006	<b>1.2</b>	<b>2.21</b>	<b>1.13</b>	10.5 U	<b>2.62</b>	0.254 U	<b>3.01</b>	<b>2.1</b>	1.1 U
SA07	SA7-0.5	11/20/2006	<b>1.76</b>	<b>1.15</b>	<b>1.9</b>	2.62 U	<b>1.31</b>	0.0774 U	<b>1.27</b>	<b>1.12 J</b>	<b>1.83 J</b>
SA07	SA7-10	11/20/2006	<b>1.82</b>	<b>1.08</b>	<b>2.01</b>	1.51 U	<b>1.16</b>	-0.00061 U	1.55 U	<b>1.02 J</b>	<b>1.9 J</b>
SA07	SA7-10D	11/20/2006	<b>1.79</b>	<b>0.961</b>	<b>2.2</b>	3.03 U	<b>1.02</b>	0.0496 U	1.02 U	<b>0.939 J</b>	<b>1.77 J</b>
SA07	SA7-20	11/20/2006	<b>1.8</b>	<b>1.34</b>	<b>1.66</b>	3.37 U	<b>1.35</b>	0.0452 U	<b>1.63</b>	<b>1.28 J</b>	<b>1.57 J</b>
SA07	SA7-30	11/20/2006	<b>1.47</b>	<b>1.85</b>	<b>1.91</b>	2.38 U	<b>2.24</b>	0.159 U	4.19 U	<b>1.79 J</b>	<b>1.78 J</b>
SA07	SA7-34	11/20/2006	<b>0.799</b>	<b>7.69</b>	<b>1.45</b>	11.3 U	<b>8.01</b>	<b>0.49</b>	<b>9.04</b>	<b>7.49 J</b>	<b>0.805 J</b>
SA08	SA8-0.5	11/17/2006	<b>1.85</b>	<b>1.12</b>	<b>2.21</b>	4.26 U	<b>1.17</b>	-0.0514 U	<b>0.978</b>	<b>1.07 J</b>	<b>1.76 J</b>
SA08	SA8-10	11/17/2006	<b>1.87</b>	<b>1.11</b>	<b>2.19</b>	3.9 U	<b>1.13</b>	0.032 U	<b>1.16</b>	<b>1.08 J</b>	2.05 U

**Table 1. Radionuclide Concentrations in Soil Determined by Gamma Spectroscopy**  
 Phase A Source Area Investigation  
 Tronox Facility, Henderson, Nevada

Location	Sample ID	Analyte: Method: Spectroscopy: Units:	Sample Date	Th-228	Th-230	Th-232	Th-234	U-234	U-235	U-238	Ra-226	Ra-228
				HASL-300 gamma pci/g	HASL-300 gamma pci/g	HASL-300 gamma pci/g	HASL-300 gamma pci/g	HASL-300 gamma pci/g	HASL-300 gamma pci/g	HASL-300 gamma pci/g	HASL-300 gamma pci/g	HASL-300 gamma pci/g
SA08	SA8-20	11/17/2006	1.73	1.06	1.79	-2.07 U	1.45	0.23 U	1.27 U	1 J-	1.88 J-	
SA08	SA8-30	11/17/2006	1.76	1.39	1.65	3.92 U	1.61	0.0932 U	1.63 U	1.34 J-	1.85 J-	
SA08	SA8-37	11/17/2006	0.615	3.32	1.07	6.48 U	3.77	0.387 U	3.3	3.16 J-	0.771 UJ	
SA09	SA9-05	11/06/2006	1.58	1.05	1.72	3.98 U	1.12	-0.0974 U	1.06	1.02 J	1.64	
SA09	SA9-10	11/06/2006	1.57	1.16	1.87	3.26 U	1.12	0.0666 U	1.84 U	1.12 J	1.76	
SA09	SA9-10D	11/06/2006	1.5	1.17	1.74	2.62 U	1.22	0.0808 U	2.07 U	1.14 J	1.61	
SA09	SA9-20	11/07/2006	1.3	1.67	1.33	4.53 U	1.61	0.209 U	2.57 U	1.62 J	1.47	
SA09	SA9-30	11/07/2006	0.953	2.39	1.21	8.75 U	2.67	0.213 U	2.79 U	2.33	0.892 J	
SA09	SA9-40	11/07/2006	1.71	2.21	1.81	6.77 U	2.35	0.183 U	3.04	2.11	1.72	
SA10	SA10-0.5	11/07/2006	1.75	1.15	2.01	2.17 U	1.36	0.0677 U	1.2 U	1.1 J	1.81	
SA10	SA10-10	11/07/2006	1.58	1	1.46	-2.19 U	1.07	0.0416 U	1.27	0.978 J	1.69	
SA10	SA10-10D	11/07/2006	1.48	0.785	1.54	3.42 U	0.987	0.0554 U	1.93 U	0.759 J	1.6	
SA10	SA10-20	11/07/2006	1.1	1.34	1.24	4.22 U	1.6	-0.00023 U	0.808 U	1.31 J	0.812 J	
SA10	SA10-30	11/07/2006	1.06	1.44	1.2	1.45 U	1.43	0.239 U	1.56	1.4 J	1.14	
SA10	SA10-40	11/07/2006	1.12	1.65	1.44	-4.15 U	1.7	0.0791 U	2.01	1.58 J	1.42	
SA11	SA11-0.5	11/09/2006	1.7	0.98	1.77	1.16 U	1.12	0.0572 U	1.08 U	0.947 J+	1.8 J+	
SA11	SA11-0.5D	11/09/2006	1.43	0.929	1.61	0.61 U	0.935	0.115 U	1.19	0.905 J+	1.87 J+	
SA11	SA11-10	11/09/2006	2.24	1.79	2.19	-0.848 U	2	-0.0866 U	1.52 U	1.7 J+	1.95 J+	
SA11	SA11-20	11/09/2006	1.58	1.08	1.83	5.14 U	1.13	0.151 U	1.54 U	1.06 J+	1.68 J+	
SA11	SA11-30	11/09/2006	0.871	2.6	1.06	4.39 U	2.88	0.0981 U	3.7	2.49 J+	1.17 J+	
SA12	SA12-0.5	11/10/2006	1.81	1.21	2.01	0.449 U	1.2	-0.00737 U	0.474 U	1.16 J+	1.79 J+	
SA12	SA12-10	11/10/2006	1.34	1.01	1.51	1.41 U	1.13	0.178 U	0.829	0.98 J+	1.83 J+	
SA12	SA12-20	11/10/2006	1.8	1.93	2.29	4.63 U	2.04	0.0603 U	1.61 U	1.84 J+	2.01 J+	
SA12	SA12-30	11/10/2006	1.03	1.47	1.14	0.0751 U	1.44	0.0981 U	0.883 U	1.44 J+	1.03 J+	
SA13	SA13-0.5	11/17/2006	1.85	1.14	2.1	1.49 U	1.3	0.17 U	1.38 U	1.12 J-	1.68 J-	
SA13	SA13-0.5D	11/17/2006	1.84	1.09	2.05	2.92 U	1.29	0.0849 U	1.24	1.06 J-	1.87 J-	
SA13	SA13-10	11/17/2006	1.94	1.2	2.13	1.37 U	1.31	0.127 U	0.923 U	1.14 J-	2.05 J-	
SA13	SA13-20	11/17/2006	1.59	1.3	1.77	2.42 U	1.23	-0.0027 U	0.901 U	1.27 J-	1.78 J-	
SA13	SA13-30	11/17/2006	1.73	1.82	1.88	-1.07 U	1.87	0.15 U	1.77	1.73 J-	1.88 J-	
SA13	SA13-40	11/17/2006	1.49	1.85	1.61	0.95 U	2.1	0.172 U	1.87 U	1.79 J-	1.61 J-	
SA14	SA14-0.5	11/08/2006								1.07 J+	1.85 J+	
SA14	SA14-10	11/08/2006								1.06 U	1.93 J+	
SA14	SA14-20	11/08/2006								1.35 J+	1.82 J+	
SA14	SA14-30	11/08/2006								1.47 J+	1.38 J+	
SA14	SA14-40	11/08/2006								1.18 J+	0.676 J+	
SA15	SA15-0.5	11/08/2006								1.19 J+	2.11 J+	
SA15	SA15-10	11/08/2006	1.47 J+	1.23 J+	2.02 J+	2.76 U	1.41 J+	0.192 U	1.28 U	1.2 J+	1.91 J+	
SA15	SA15-10D	11/08/2006	1.63 J+	1.26 J+	2.03 J+	3.89 U	1.38 J+	-0.0311 U	2.06 J+	1.21 J+	1.89 J+	
SA15	SA15-20	11/08/2006								1.43 J+	1.84 J+	
SA15	SA15-30	11/08/2006								1.91 J+	0.777 J+	
SA15	SA15-35	11/08/2006								1.54 J+	0.852 J+	
SA16	SA16-0.5	11/09/2006								1.16 J+	1.92 J+	

Table 1. Radionuclide Concentrations in Soil Determined by Gamma Spectroscopy

Phase A Source Area Investigation  
Tronox Facility, Henderson, Nevada

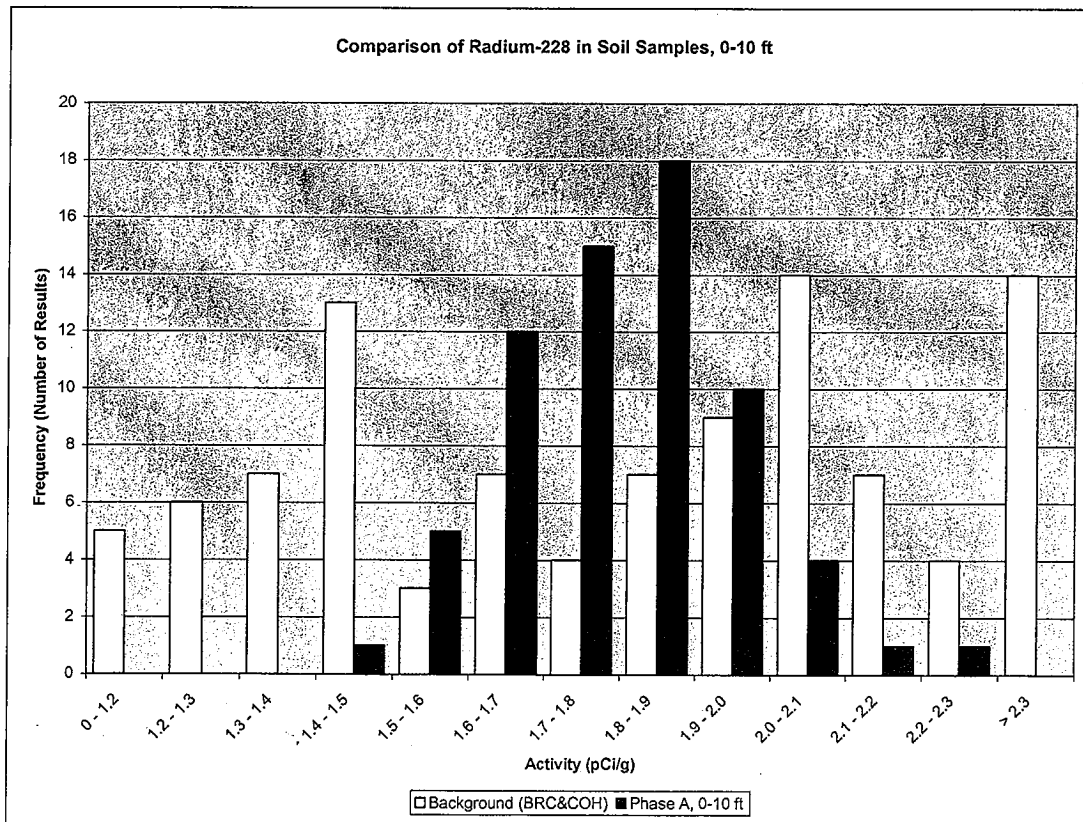
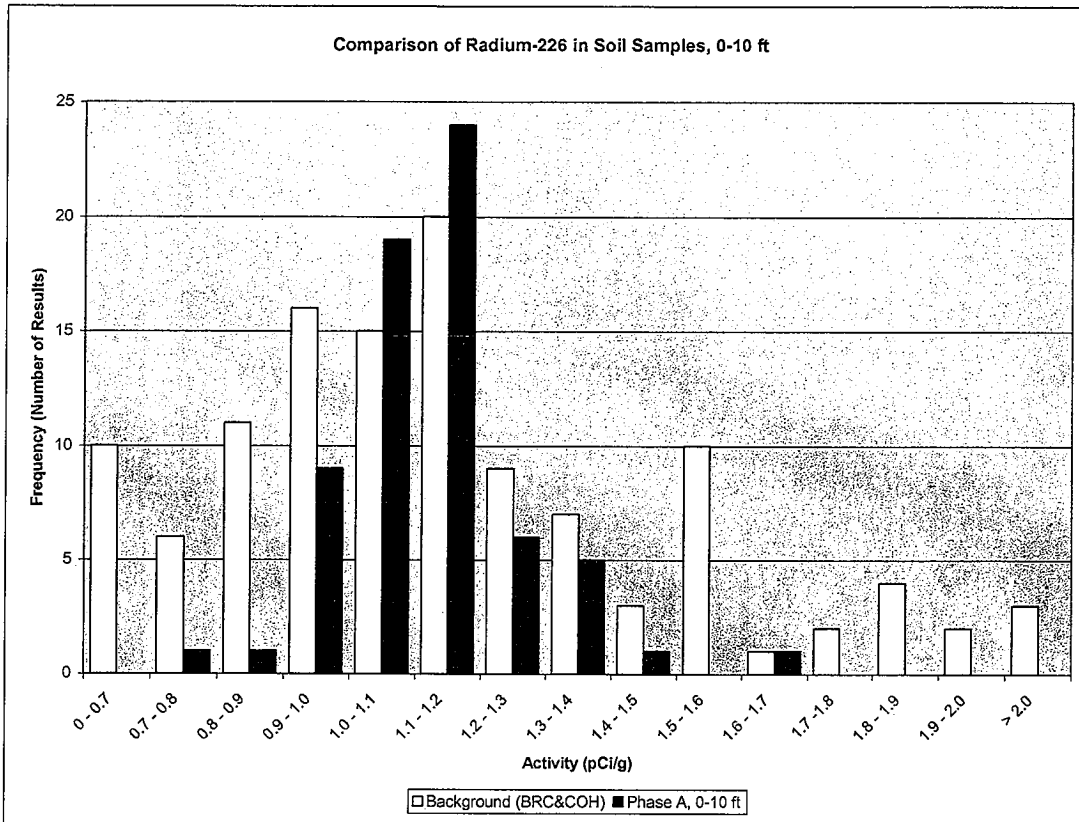
		Analyte: Method: Spectroscopy: Units:	Th-228 HASL-300 gamma pci/g	Th-230 HASL-300 gamma pci/g	Th-232 HASL-300 gamma pci/g	Th-234 HASL-300 gamma pci/g	U-234 HASL-300 gamma pci/g	U-235 HASL-300 gamma pci/g	U-238 HASL-300 gamma pci/g	Ra-226 HASL-300 gamma pci/g	Ra-228 HASL-300 gamma pci/g
Location	Sample ID	Sample Date									
SA16	SA16-10	11/09/2006								1.07 J+	1.5 J+
SA16	SA16-20	11/09/2006								1.85 J+	2.07 J+
SA16	SA16-30	11/09/2006	1.35	1.75	1.26	4.22 U	1.97	0.0173 U	0.97 U	1.71 J+	1.17 J+
SA17	SA17-0.5	11/15/2006	1.61	1.15	1.9	3.42 U	1.24	0.158 U	1.66	1.12 J	1.75
SA17	SA17-0.5D	11/15/2006	1.77	1.15	2.03	-0.487 U	1.15	0.0359 U	1.19 U	1.12 J	1.8
SA17	SA17-10	11/15/2006	1.49	1.24	1.9	0.728 U	1.44	-0.00676 U	-0.244 U	1.2 J	1.55
SA17	SA17-20	11/15/2006	1.85	1.85	2.32	3.67 U	1.86	0.0789 U	1.9	1.8 J	1.99
SA17	SA17-25	11/15/2006	1.12	1.85	1.3	2.52 U	2.09	0.194 U	2.2 U	1.81 J	1.32
SA18	SA18-0.5	11/15/2006	1.98	1.23	1.83	4.82 U	1.31	0.11 U	2.01 U	1.19 J	1.75
SA18	SA18-0.5D	11/15/2006	1.88	1.09	2.06	1.16 U	1.14	0.0873 U	1.36	1.06 J	1.97
SA18	SA18-10	11/15/2006	1.76	1.31	2.02	0.938 U	1.36	0.0485 U	1.35 U	1.25 J	1.78
SA18	SA18-20	11/15/2006	1.77	1.84	1.76	-1.85 U	2.07	0.163 U	2.05 U	1.8 J	1.83
SA18	SA18-30	11/15/2006	1.7	2.56	1.8	3.33 U	2.86	0.161 U	2.64 U	2.47	1.99
SA19	SA19-0.5	11/16/2006	1.9	1.21	1.92	5.25 U	1.25	-0.00974 U	1.18 U	1.16 J-	2 J-
SA19	SA19-10	11/16/2006	1.51	1.46	1.66	6.38 U	1.59	-0.0142 U	1.58	1.43 J-	1.63 J-
SA19	SA19-20	11/16/2006	1.52	1.85	1.72	-0.0207 U	1.99	-0.0103 U	1.81 U	1.76 J-	1.7 J-
SA19	SA19-25	11/16/2006	1.4	1.61	1.37	1.86 U	1.67	0.208 U	1.55 U	1.57 J-	1.38 J-
SA20	SA20-0.5	11/16/2006	1.67	1.05	2.11	4.89 U	1.17	0.0905 U	1.16 U	1 J-	1.87 J-
SA20	SA20-0.5D	11/16/2006	1.7	0.904	1.76	0.797 U	1.1	0.189 U	1.49	0.863 J-	1.56 J-
SA20	SA20-10	11/16/2006	1.52	1.34	1.82	0.771 U	1.46	0.136 U	0.972 U	1.31 J-	1.63 J-
SA20	SA20-20	11/16/2006	1.7	1.51	1.97	5.76 U	1.78	0.125 U	1.14	1.47 J-	1.76 J-
SA20	SA20-25	11/16/2006	1.94	1.55	1.96	-1.78 U	1.69	0.0755 U	1.31 U	1.52 J-	1.82 J-
SA21	SA21-0.5	11/15/2006	1.9	1.19	2	3.93 U	1.28	0.203 U	1.23	1.15 J	1.81
SA21	SA21-10	11/15/2006	1.58	1.28	1.75	0.933 U	1.25	0.0579 U	2.46	1.22 U	2
SA21	SA21-20	11/15/2006	1.84	1.71	1.86	4.65 U	1.64	0.0526 U	1.95	1.67 J	1.87
SA21	SA21-20D	11/15/2006	1.47	2.08	1.57	1.64 U	2.31	0.0697 U	1.52 U	2.01	1.73
SA21	SA21-30	11/15/2006	1.69	1.52	1.89	1.26 U	1.65	0.104 U	1.18	1.48 J	1.87
SA22	SA22-0.5	11/16/2006	1.6	1.03	1.79	2.16 U	1.21	0.0153 U	1.22	1.01 J-	1.78 J-
SA22	SA22-10	11/16/2006	1.86	1.44	1.82	7.4 U	1.42	0.111 U	1.12 U	1.37 J-	1.78 J-
SA22	SA22-20	11/16/2006	1.64	2.34	2.11	0.977 U	3.12	0.0904 U	2.23	2.28 J-	1.99 J-
SA23	SA23-0.5	11/09/2006	1.91	1.24	2.03	5.19 U	1.41	0.0886 U	0.894 U	1.11 J+	2.06 J+
SA23	SA23-10	11/09/2006	1.53	1.21	1.51	-1.32 U	1.21	0.105 U	1.24	1.18 J+	1.66 U
SA23	SA23-20	11/09/2006	1.47	1.82	1.56	6.09 U	1.9	0.176 U		1.73 J+	1.59 J+
SA23	SA23-20D	11/09/2006	1.3	1.76	1.44	3.99 U	2.18	0.182 U	1.16 U	1.72 J+	1.34 J+
SA24	SA24-0.5	11/03/2006	1.66	0.999	2.02	2.07 U	1.21	0.0387 U	0.885 U	0.965 J	1.79
SA24	SA24-10	11/03/2006	1.72	1.13	1.98	3.37 U	1.27	0.0325 U	0.931 U	1.08 J	1.73
SA24	SA24-20	11/03/2006	1.52	1.44	1.53	4.73 U	1.65	0.0711 U	1.55 U	1.4 J	1.65
SA24	SA24-25	11/03/2006	1.68	1.67	1.62	2.51 U	1.8	0.214 U	2.06	1.59 J	1.68
SA25	SA25-0.5	11/03/2006	1.64	1.27	1.89	4.97 U	1.25	0.0116 U	0.983 U	1.21 J	2.03
SA25	SA25-10	11/03/2006	1.53	1.24	1.56	3.23 U	1.56	0.0886 U	1.33	1.19 J	1.61
SA25	SA25-15	11/03/2006	1.57	1.77	1.51	2.22 U	1.9	0.0752 U	0.636 U	1.69 J	1.6
SA25	SA25-20	11/03/2006	1.02	1.67	1.3	0.903 U	1.57	0.185 U	1.01	1.63 J	1.35

**Table 1. Radionuclide Concentrations in Soil Determined by Gamma Spectroscopy**  
 Phase A Source Area Investigation  
 Tronox Facility, Henderson, Nevada

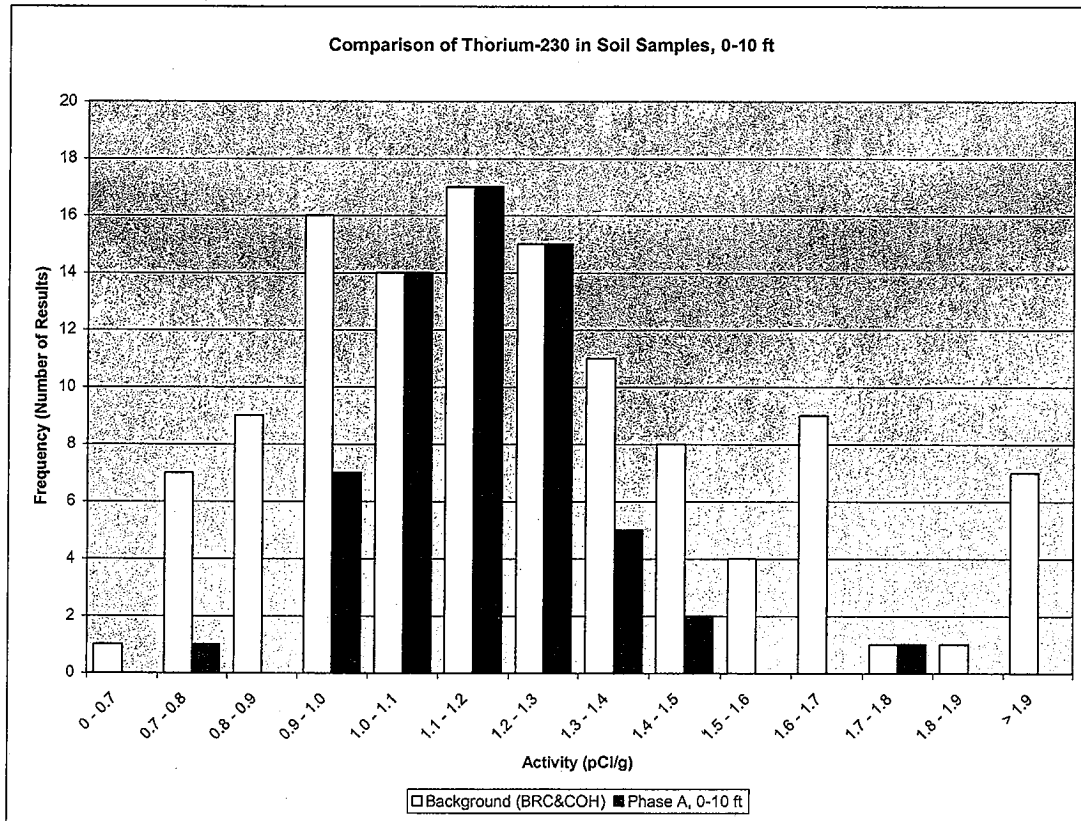
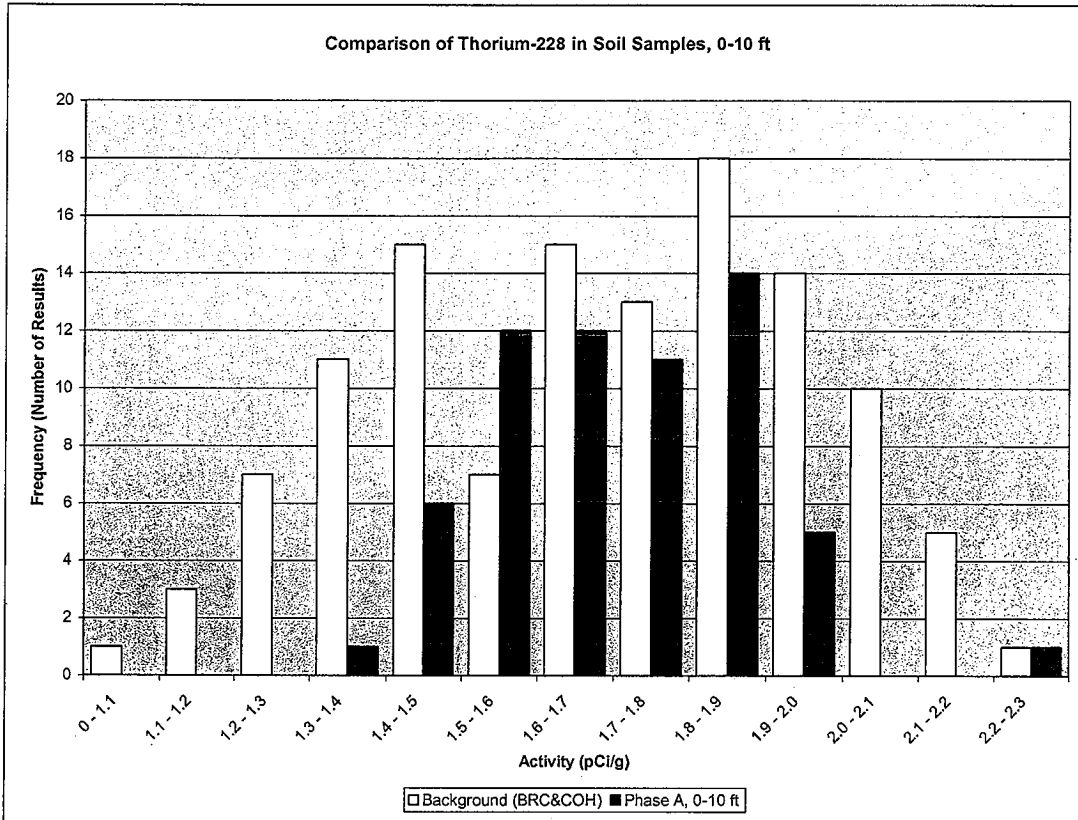
Location	Sample ID	Sample Date	Analyte:		Th-230 HASL-300 gamma pci/g	Th-232 HASL-300 gamma pci/g	Th-234 HASL-300 gamma pci/g	U-234 HASL-300 gamma pci/g	U-235 HASL-300 gamma pci/g	U-238 HASL-300 gamma pci/g	Ra-226 HASL-300 gamma pci/g	Ra-228 HASL-300 gamma pci/g
			Method:	Units:								
SA26	SA26-0.5	11/20/2006	1.71	1.27	0.61 U	1.21	0.0908 U	2.24	1.2 J	1.91 J		
SA26	SA26-0.5D	11/20/2006	1.95	1.07	3.34 U	1.35	0.00452 U	1.02	1.02 J	1.78 J		
SA26	SA26-10	11/20/2006	1.61	1.36	2.87 U	1.33	0.00923 U	1.12	1.33 J	1.82 J		
SA27	SA27-0.5	11/02/2006	1.62	1.02	4.39 U	1.32	-0.0901 U	-0.341 U	0.985 J	1.87		
SA27	SA27-10	11/02/2006	1.85	1.29	6.81 U	1.41	0.141 U	1.4 U	1.23 J	1.84		
SA27	SA27-20	11/02/2006	1.56	1.16	1.39 U	1.16	0.0307 U	0.812 U	1.11 J	1.42		

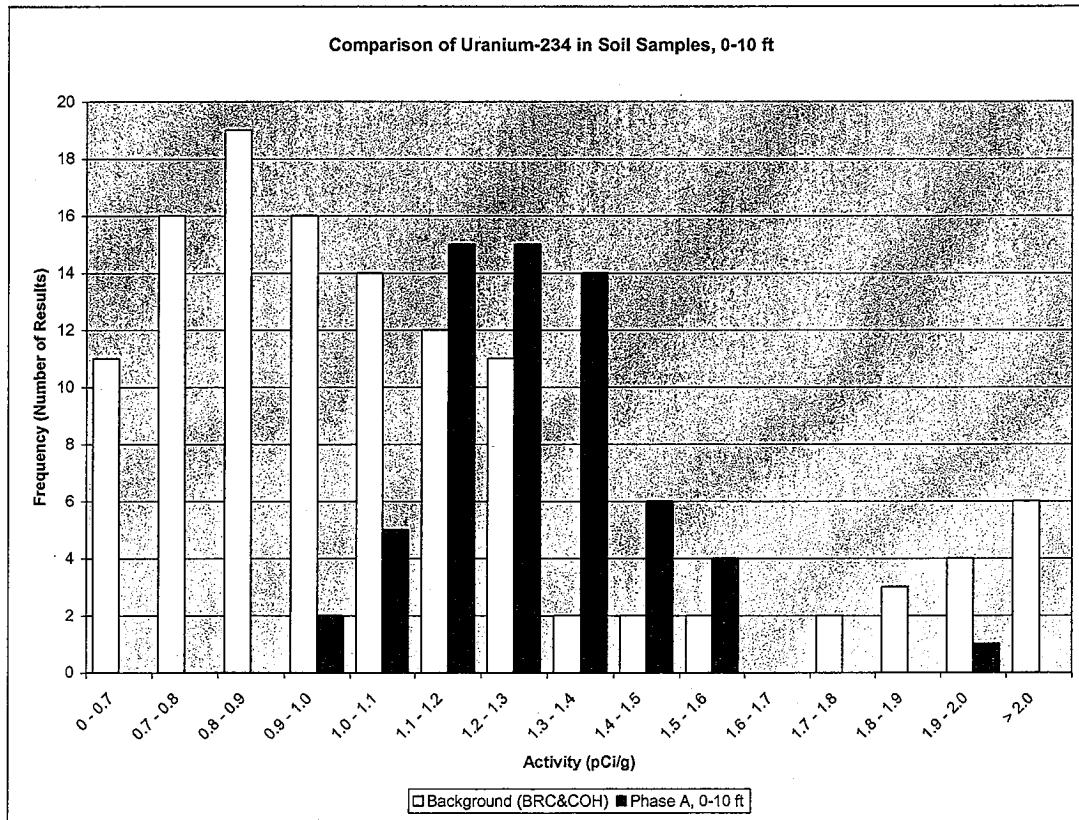
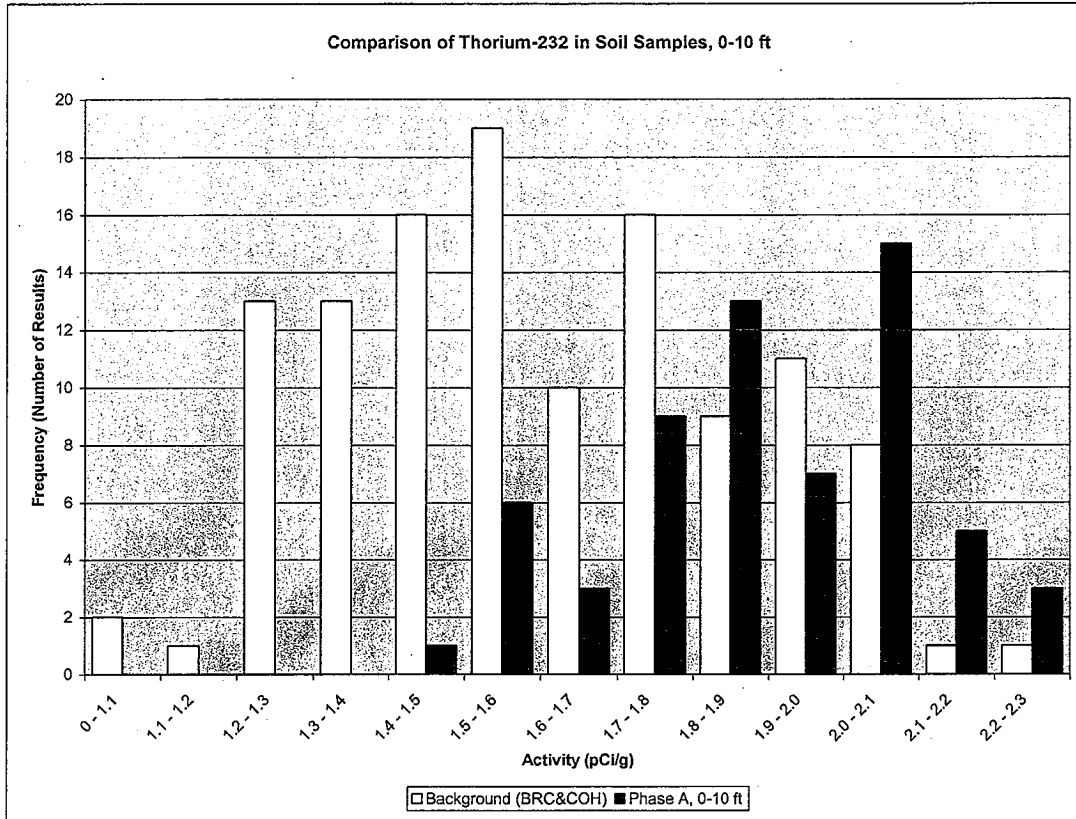
**Data Qualifier Definitions:**

- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity and the result may be biased high.
- J- The result is an estimated quantity and the result may be biased low.
- UJ The analyte was not detected above the sample reporting limit and the reporting limit is approximate.
- U The analyte was analyzed for, but was not detected above the sample reporting limit

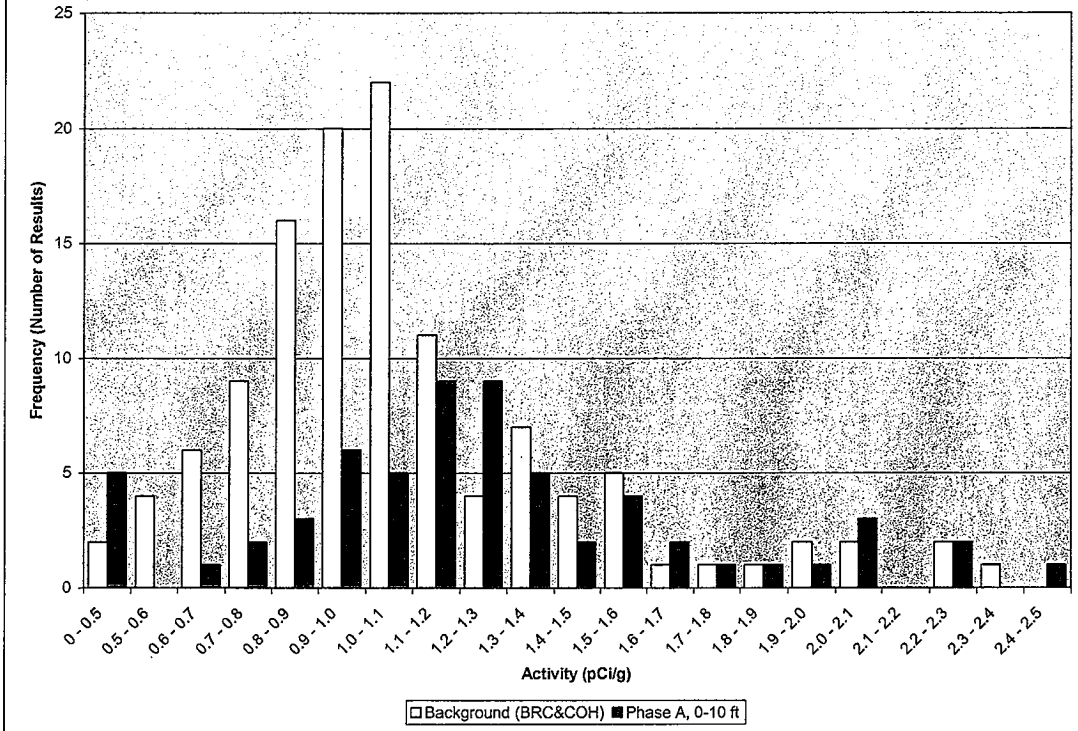


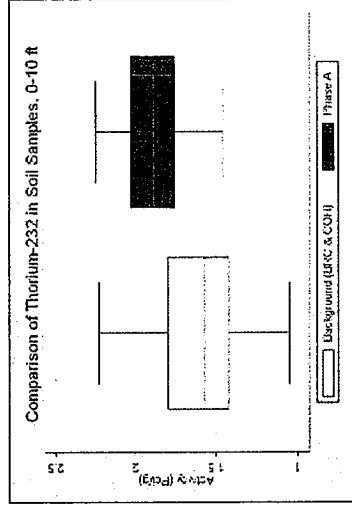
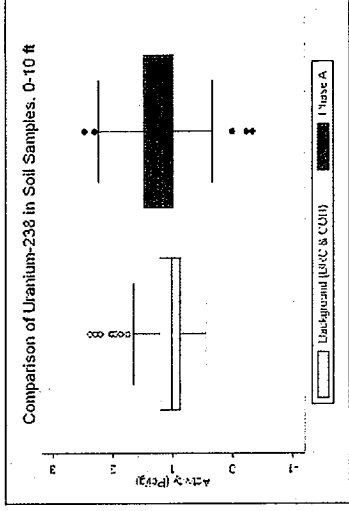
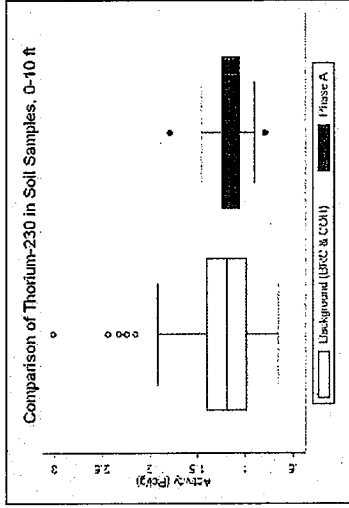
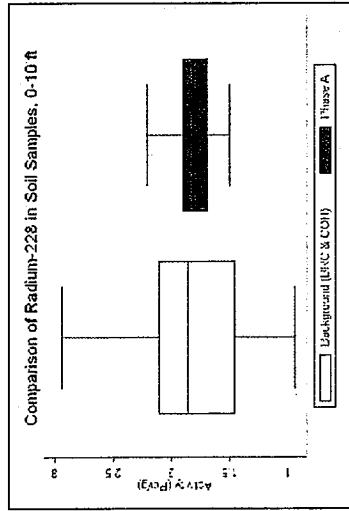
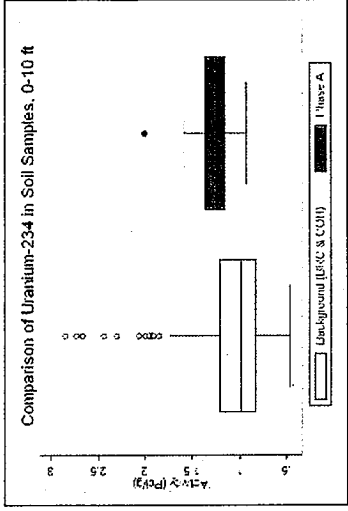
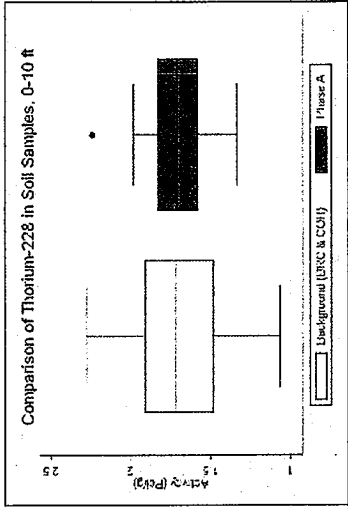
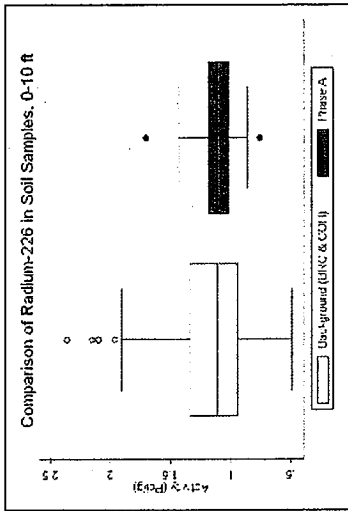


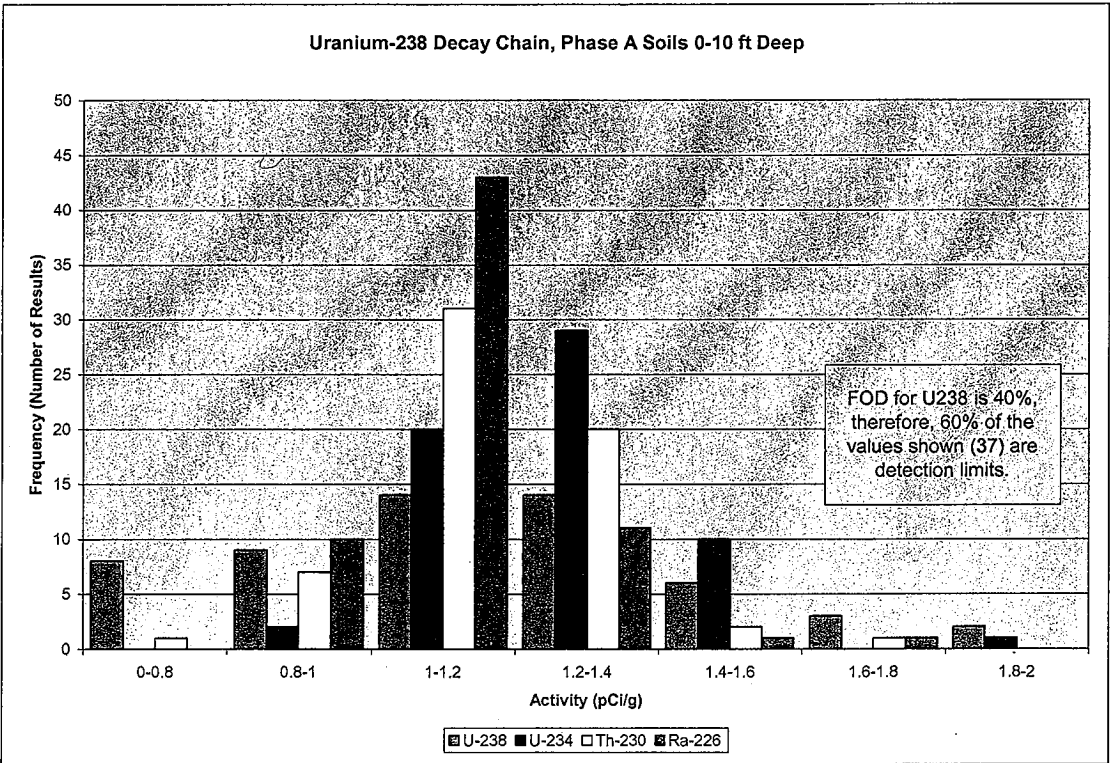
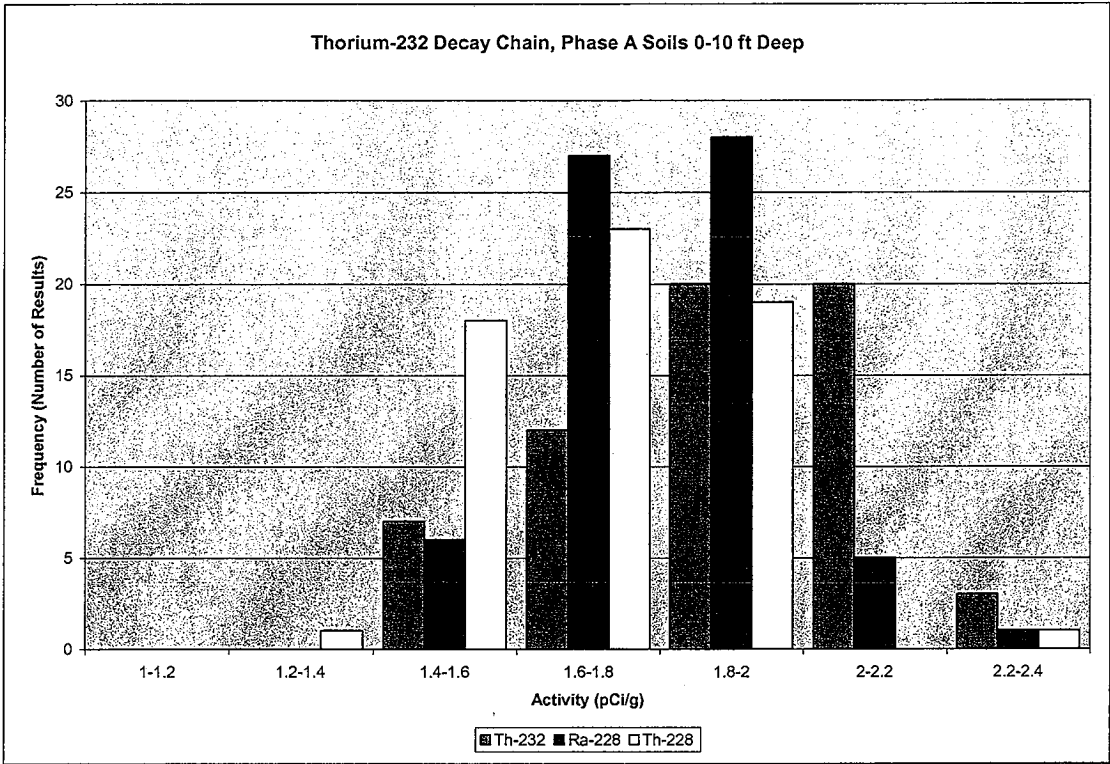


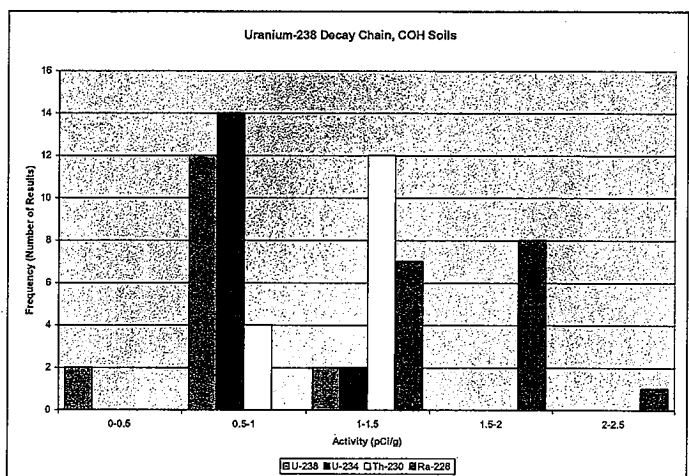
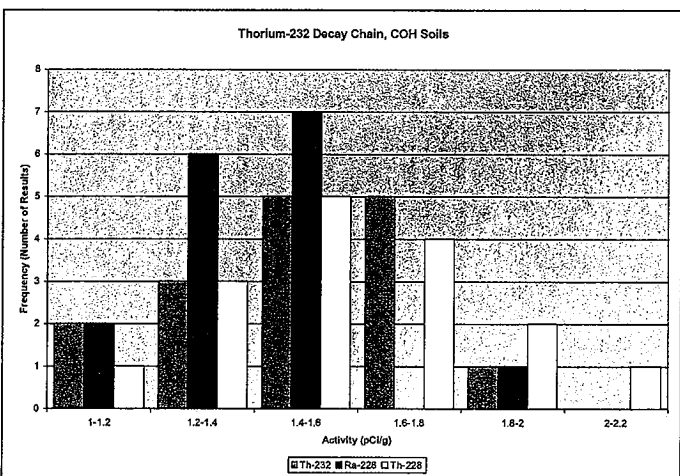
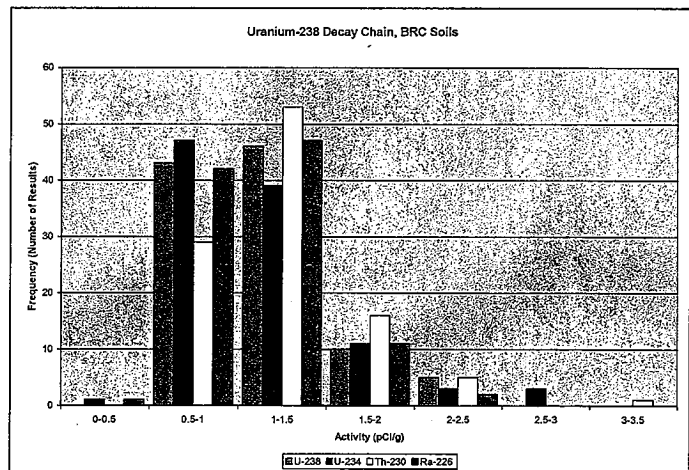
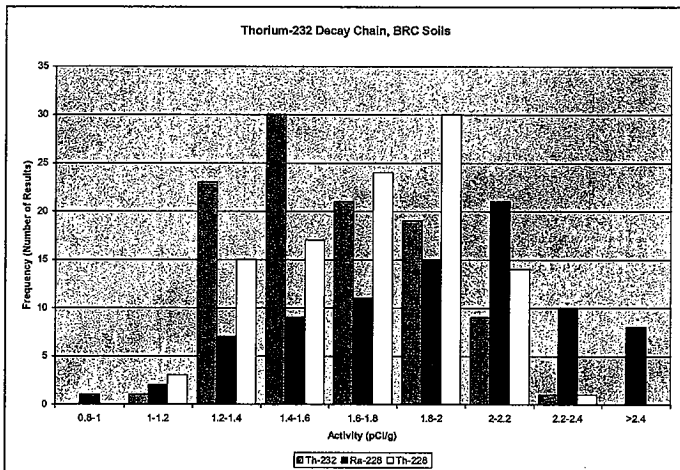
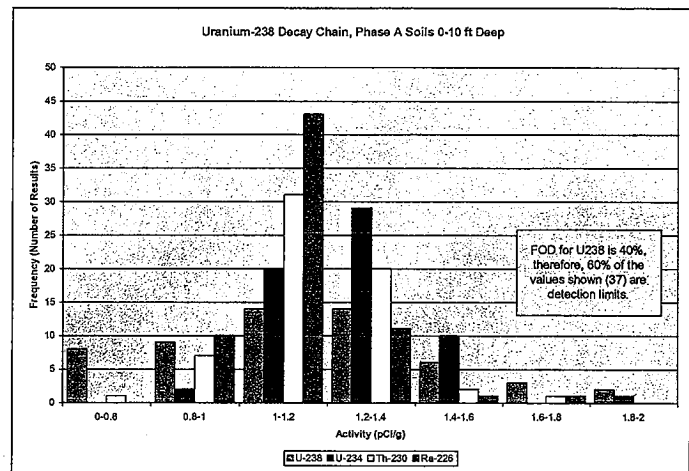
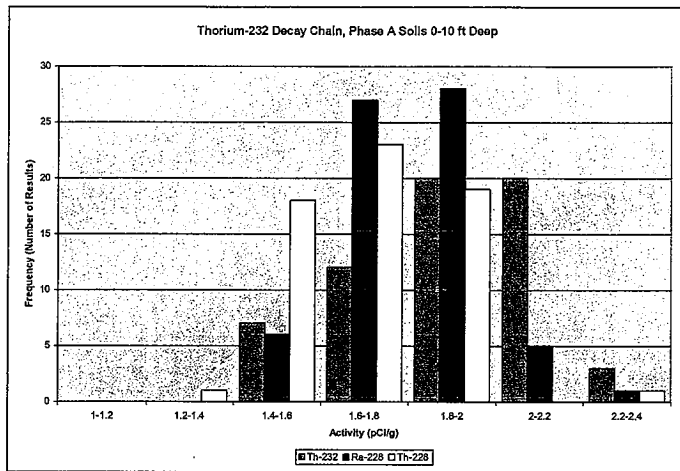


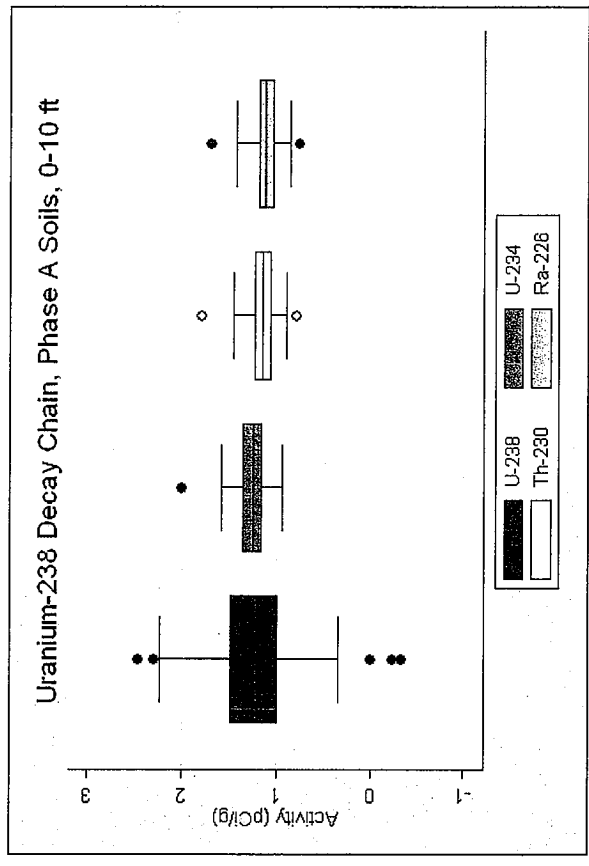
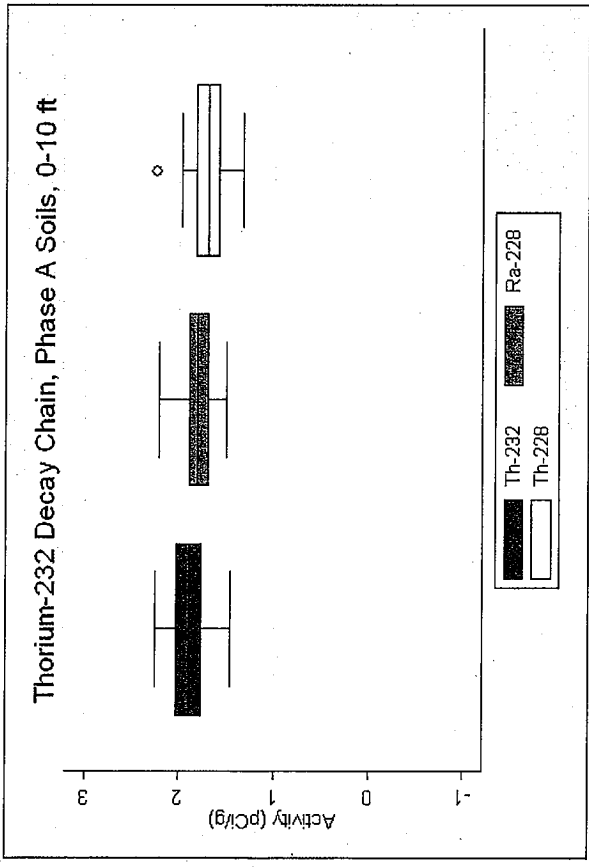
Comparison of Uranium-238 in Soil Samples, 0-10 ft

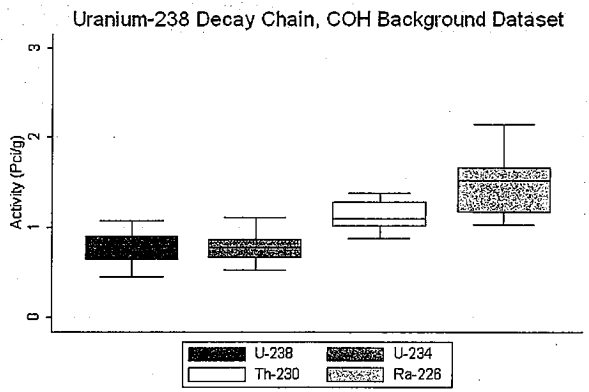
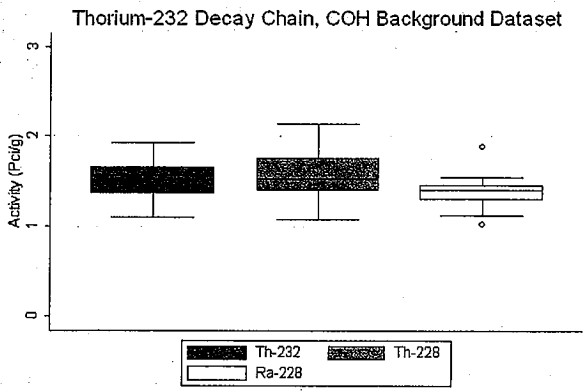
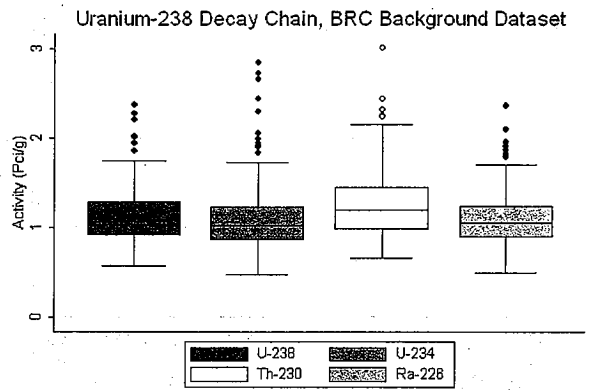
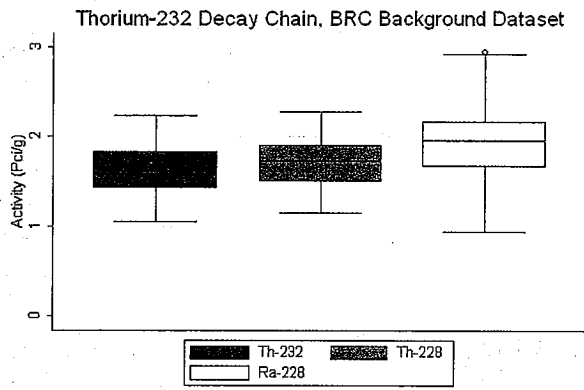
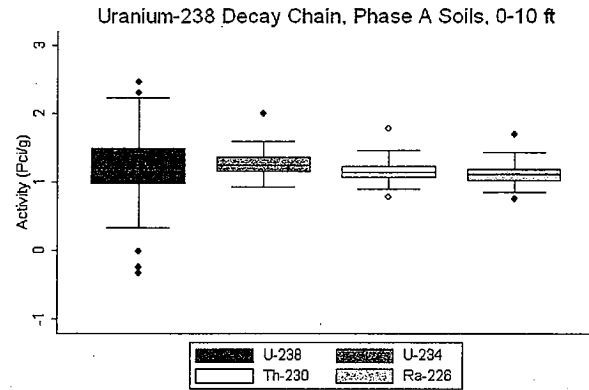
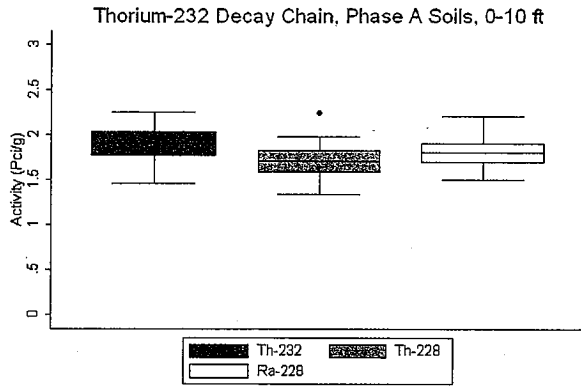




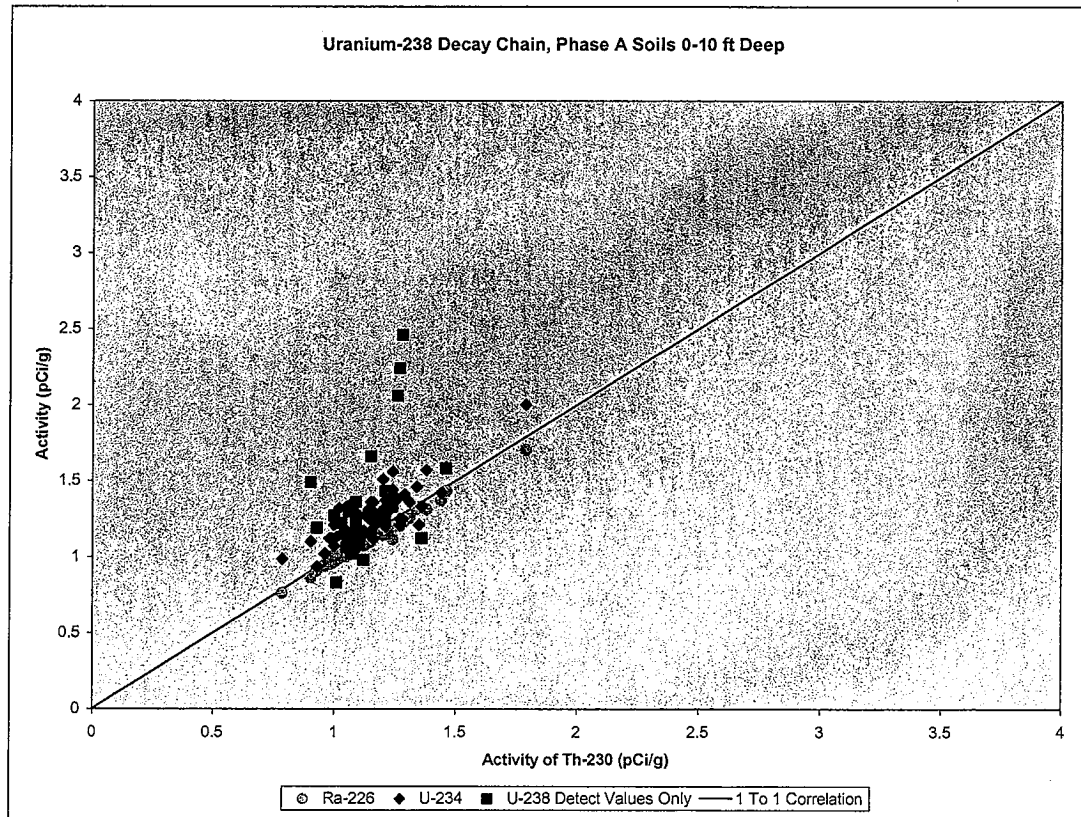
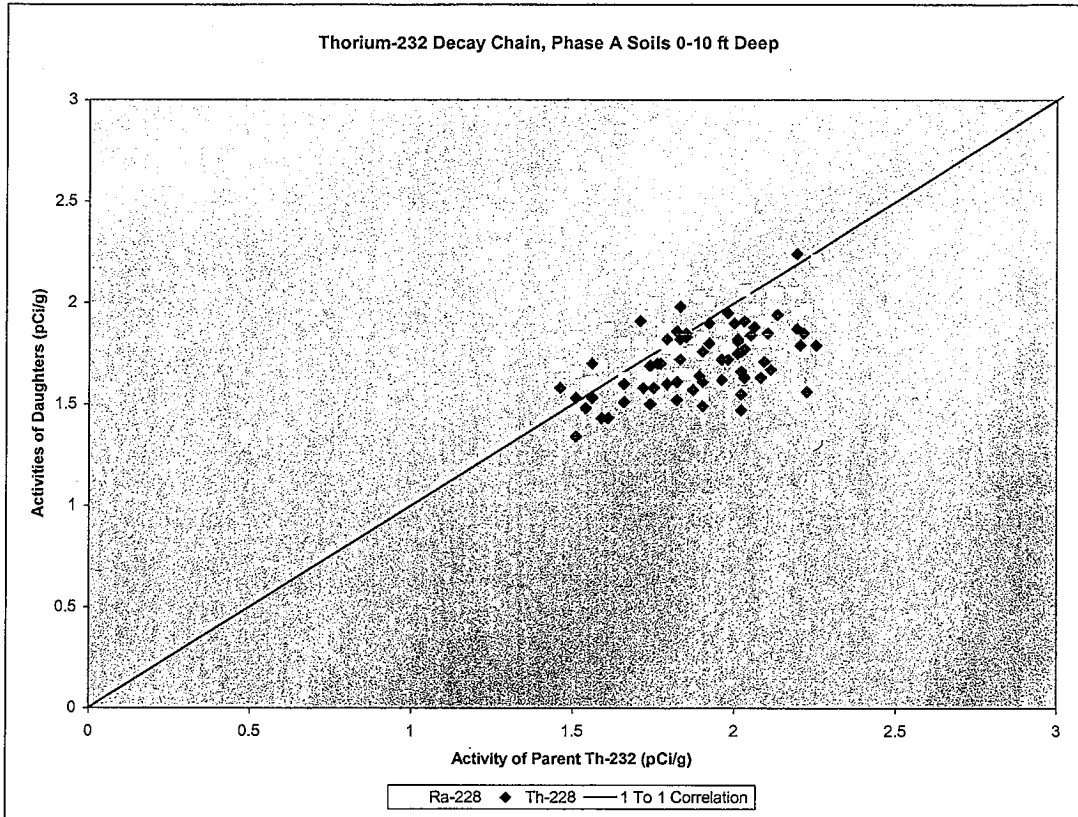


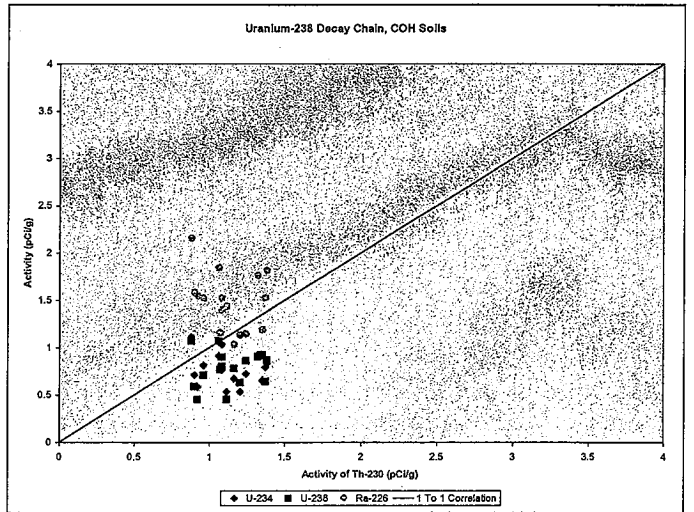
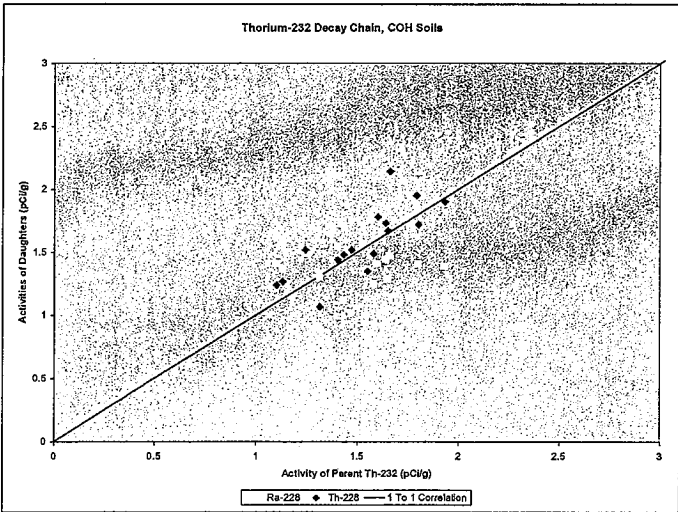
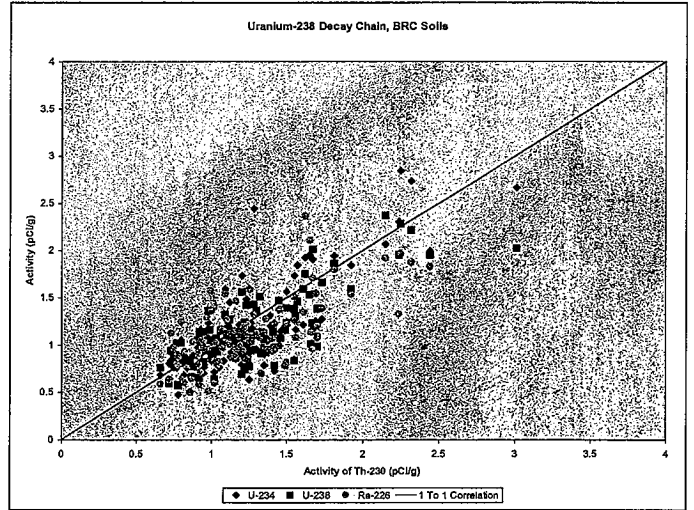
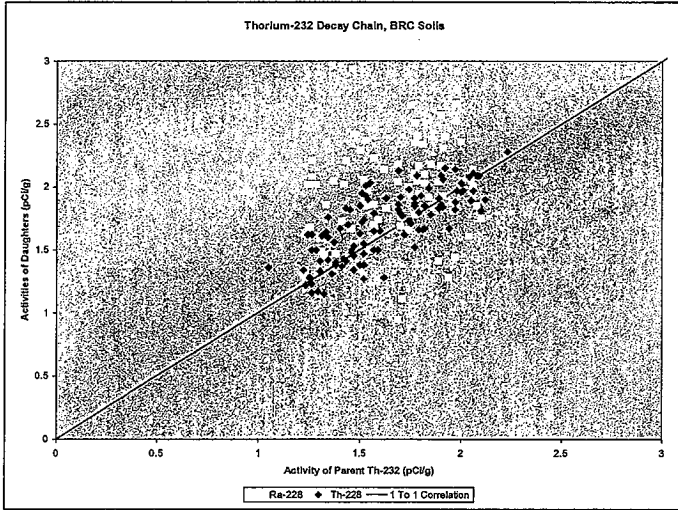
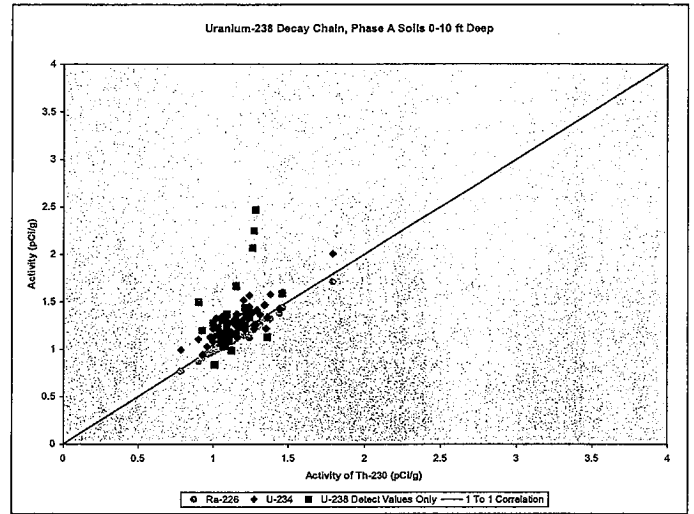
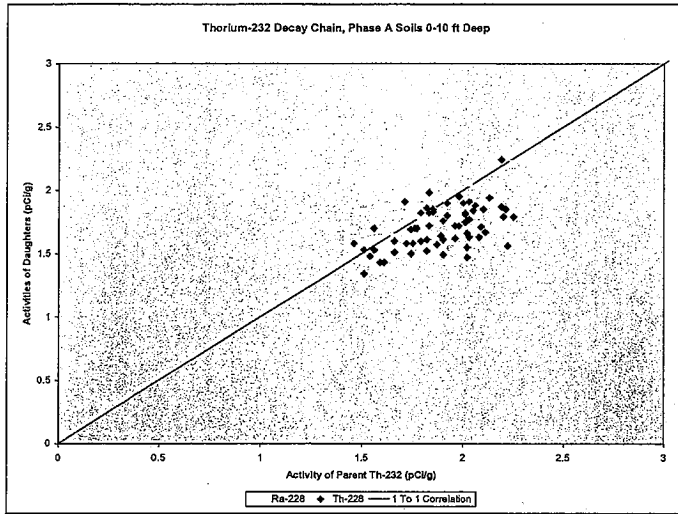




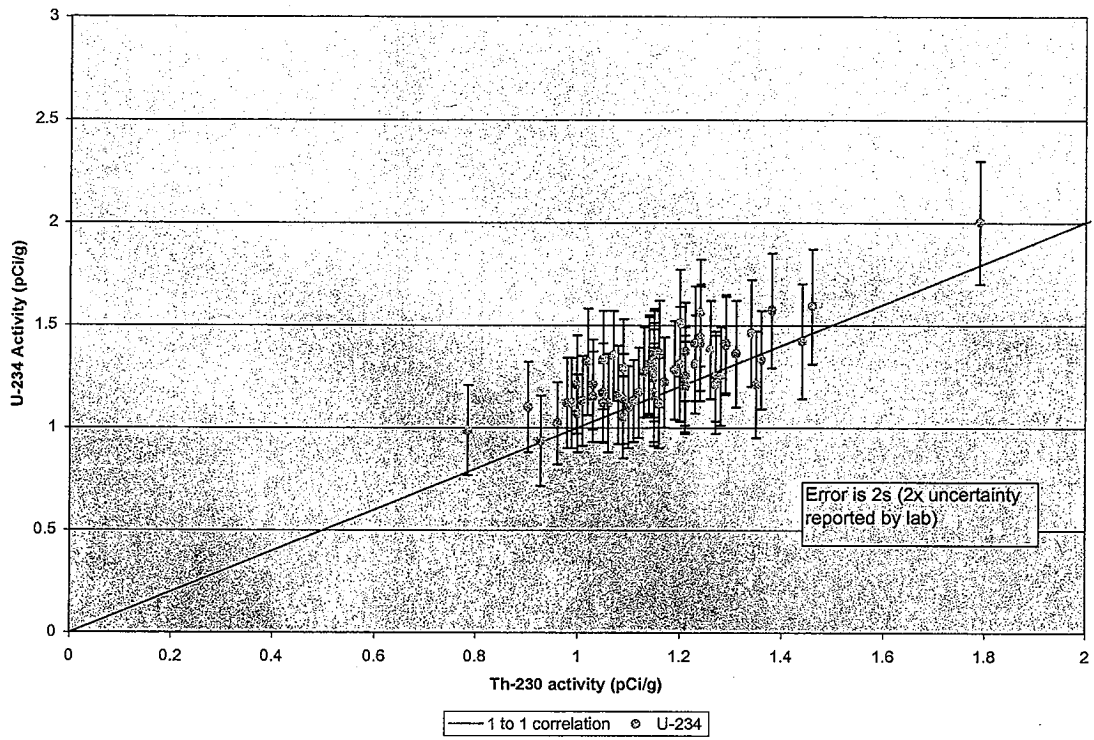




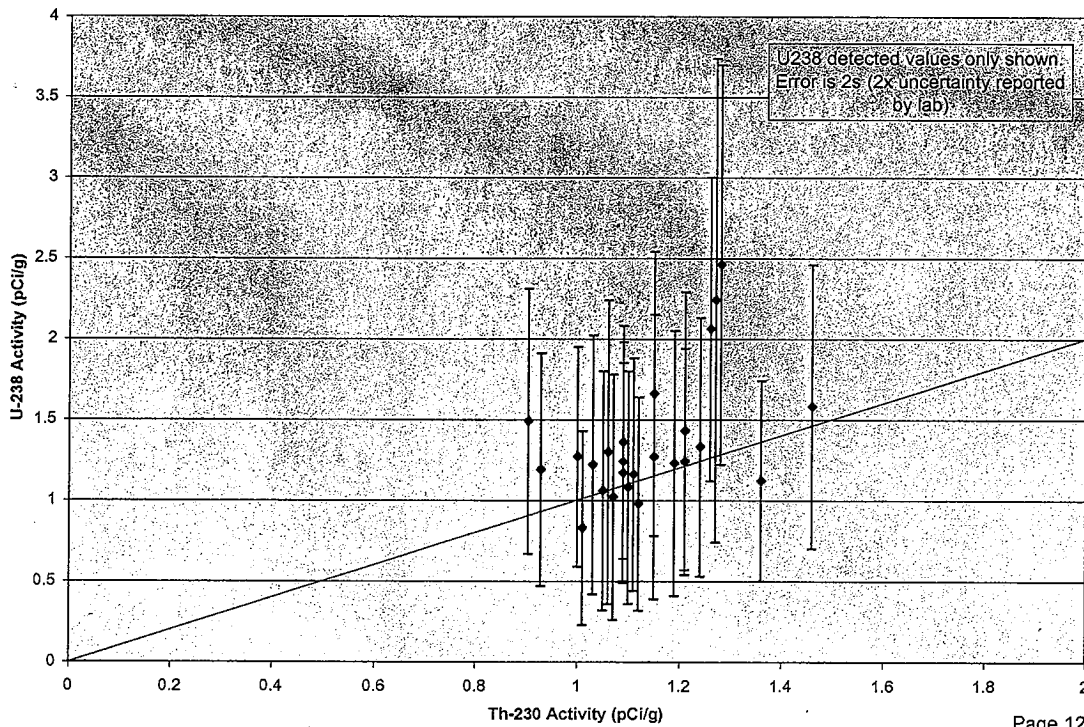




U-234 vs. Th-230 with Uncertainty  
Phase A Soils 0-10 ft, Gamma Method



U-238 vs. Th-230 with Uncertainty  
Phase A Soils 0-10 ft, Gamma method



**Shannon Harbour**

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**From:** Crowley, Susan [Susan.Crowley@tronox.com]  
**Sent:** Tuesday, February 05, 2008 4:07 PM  
**To:** Shannon Harbour  
**Cc:** Keith Bailey; Brian Rakvica; mflack@ensr.aecom.com  
**Subject:** RE: TRX Schedule

Shannon,  
Please see your note below.

**Re the Capture Evaluation WP implementation ... we hope to have the drilling completed (Timet and BMI areas remain) by mid-March.** This is assuming we can mobilize a drill rig in that timeframe. We have ramped up our activities and don't expect this schedule will need revision – but I'll advise you if it does. With the drilling completed, the wells will be **developed by March's end**. They will be sampled and we should have water levels and **analytical in-hand by April's end**. While we'll be advising of our progress (and results determined to date) as we supply the quarterly reports (for remedial performance), the annual report will have a more in-depth explanation of our work and results.

Re the revised Phase B Work Plan, Keith and I will be calling you/Brian tomorrow to discuss timing. Our preference is to get it to you ASAP, however we need to cover our approach on getting your input prior to sending you a very large package for review. We'll call you tomorrow and based upon your thoughts we can commit to a definite delivery date. 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:** Shannon Harbour [mailto:sharbour@ndep.nv.gov]  
**Sent:** Monday, February 04, 2008 11:04 AM  
**To:** Crowley, Susan  
**Cc:** Keith Bailey; Brian Rakvica  
**Subject:** TRX Schedule

Susan,

Could you please send me a quick update on the schedule for the completion of the Groundwater Capture Work Plan implementation? Has the TIMET access agreement been signed? If not, where does this issue stand?

Also, please provide me with a schedule for the submittal of the Phase B Work Plan.

2/7/2008

Please respond to this email by the COB tomorrow (Feb 5).

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)*

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Thank you.

## Shannon Harbour

---

**From:** Shannon Harbour  
**Sent:** Thursday, January 31, 2008 2:04 PM  
**To:** 'Crowley,Susan'  
**Cc:** 'Keith Bailey'; Brian Rakvica; 'Paul Black'; Teri Copeland; Bilodeau, Sally; 'Gerry, Dave'; 'Bradley, Lisa'  
**Subject:** NDEP Response to LOU 20 Information

Susan,

The NDEP has completed its review of the draft LOU 20 summary information submitted by TRX. The following are NDEP's comments by section:

### Summary of Available Data for LOU 20 in EA08

- General comment, the format of this submittal provides the type of background information for a specific site source area that NDEP is looking for.
- General comment – LOU 20, it is not clear how representative the previous soil sample (SA17) is for LOU 20-specific sources. This summary identifies metals, sulfates, phosphates, and paraffin as the known or potential chemical classes that could be associated with the source(s) at LOU 20. Other chemicals were detected in previous sample SA17, which places into question whether SA17 is representative for LOU 20. SA17 could be representative if there is potential for a migration pathway between that sample location and LOU 20. If there is the potential for a migration pathway, then it is appropriate to include the sample as part of the LOU 20 data gap analysis. However, chemicals detected in SA17 should also be analyzed in the proposed Phase B LOU 20 samples. If there is not potential for association of SA17 with LOU 20, then the data should not be included as part of the LOU 20 data gap analysis.

### Description

- Clarify if the pond operated as an unlined pond at any time or if the pond was never in operation when the liner was absent.
- Reference is made to Units 4 & 5 and 9<sup>th</sup> Street. Please notate these items on the figure and provide any additional relevant information regarding these components of LOU 20.

### Known or Potential Chemical Classes

- Paraffin is listed in this section; however, it is not carried into the Process Waste Stream table or the proposed analytical program.
- Specify what types of metal wastes are associated with the Steam plant boiler blow-down.
- Clarify what Analyte is and add to the SRC list and analytical program as needed.

### Known or Potential Release Mechanisms

- Leaks through the liner (or if the pond was in operation without a liner) are not mentioned as a potential release mechanism.
- The mobility of source-related chemicals (including information regarding pH and soil type) should be considered when assessing the significance of the leaching pathway. For sites with existing data at various soil depths, the data distribution with depth should also be considered.

#### Results of Historical Sampling

- Only samples that have some association (i.e., through the CSM) with an LOU should be included in this section. For example, one historical boring, BDB05, is described but is then considered not to be applicable to LOU 20. Additionally, "Too far" is not adequate rationale for sample applicability. CSM considerations, such as migration pathways, should be used to determine the applicability of previous samples.

#### Summary of Phase SAI

- TRX stated that "potential subsurface releases from the C-1 Pond (if any) might be noticeable in SA17 soil results." If this is true, then rationale should be provided as to why chemicals detected in SA17 are not included in the proposed Phase B samples for LOU 20.

#### Proposed Phase B Soil Investigation/Rationale

- The proposed sample locations look reasonable with the exception of the lack of samples along the pipeline south of SA107.
- If there is no potential for contamination in the area between LOU 20 and LOU 21, then drill rig access is not an issue. If there is potential for contamination, then that concern should be addressed in some manner rather than not at all.

#### Proposed Chemical Classes for Phase B Investigation for Soils

- Rationale should be provided for not including chemicals that were detected in SA17.
- Sample depths should be identified and correlated to the CSM (e.g., is the source of perchlorate in LOU 20 soil underlying groundwater?)

#### Proposed Phase B Constituents List for Groundwater

- If VOCs are detected in groundwater that indicate the potential for a vapor intrusion pathway, then soil gas characterization may be in order.

#### **LOU Map**

- The boundaries of LOU 20 should be clearly shown on the figure. It appears that the full extent of the pipeline (which extends to the near the bottom of EA08) is a component of LOU 20; however, this is not necessarily clear nor are there any proposed sampling points along that section of the pipeline.

- Since LOU 21 is referenced and has some association with LOU 20, the boundaries of this LOU, along with any other LOUs within the range of the figure, should be clearly shown on the figure by the notation listed in the legend.
- In addition to a topographical map, some LOUs may require more detailed figures in order to adequately show key components of the source features.

### **land and Groundwater Characterization Data**

- TRX should contemplate using organizing previously collected analytical data on a summary table containing the previous sample IDs, sample depths, and analyses that could be tied into the CSM (in regard to sample locations and waste streams, etc.) in order to document whether data gaps exist in addition to simply including tables of previous analytical data.
- The tables submitted for LOU 20 should be consistent in the presentation of groundwater and soil data. Either all of the tables should combine the soil and groundwater data (e.g. Table 7) or separate the soil and groundwater data (Tables 3 and 4).
- Rather than simply including tables of previous analytical data, it might be more useful (particularly for source areas with more than one previous sample) to include a summary table of previous sample IDs, sample depths, and analyses, and to tie this information to the CSM (i.e., in regard to sample location, waste streams, etc.) in order to document whether or not there are data gaps.
- Note also that the asbestos data in Table 16 needs to include the number of fibers counted in the sample. The analytical sensitivity that is reported is of little use without the fibers counts.

Please contact me with any questions.

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](mailto:Susan.Crowley@tronox.com)]  
**Sent:** Thursday, January 10, 2008 11:38 AM  
**To:** Shannon Harbour  
**Cc:** Brian Rakvica; Keith Bailey; Bilodeau, Sally  
**Subject:** LOU 20 Information

Shannon,  
Please find attached a set of files which give you a picture of LOU 20 – more specifically which provided the structure for how information will be organized in the Phase B Work Plan revision - on an LOU-by-LOU basis.

The Word document (Summary of Available Data) reflects the organization of information with the Adobe map and Adobe tables supporting the Summary. The information provided in the Adobe tables has been drawn from a

1/31/2008



variety of documents and includes both groundwater and soil data. We will continue to refine how the data tables themselves are presented (so that they cleanly support the Summary of Data document) but we were hoping for NDEP's thoughts on the overall presentation of the LOU 20 package. Please provide us your thoughts?

**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)

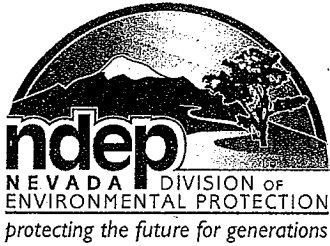
*It's the set of our sails, not the force of the gales, that determines the way we go.*

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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

January 23, 2008

David Christensen  
Nevada Pic-A-Part  
5100 North Lamb Boulevard  
Las Vegas, NV 89115

Re: **Nevada Pic-A-Part (Parcel "I" – Tronox Facility)**  
**110 West Rolly, Henderson, NV**  
**NDEP Facility ID #H-000539**

Nevada Division of Environmental Protection Response to: *Extension request for the submittal of spill response information requested by the NDEP*

Dated: January 28, 2008

Dear Mr. Christensen:

Based on our telephone conversation this morning and on your subsequent e-mail update, the Nevada Division of Environmental Protection (NDEP) approves the extended deadline April 1, 2008 for the submittal of the information requested in a December 13, 2007 letter from the NDEP for the spill reported on December 12, 2007 (NDEP #: 071212-01).

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

Shannon Harbour, P.E.

Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

SH:sh



cc:

Brian Rakvica, Bureau of Corrective Actions, NDEP, Las Vegas, NV  
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New Hampshire Avenue, N.W., Washington, D.C. 20036  
Dennis Campbell, Southern Nevada Health District, PO Box 3902, Las Vegas, NV 89127  
Susan Crowley, Tronox LLC, PO Box 55, Henderson, Nevada 89009  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
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  
Mike Bellotti, 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

## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** Conference Call  
**Time and Date:** 9:00 AM, Tuesday, January 22, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)  
ENSR – Elizabeth Perry, Robert Kennedy (for TRX)

CC: Jim Najima, Paul Black, Paul Duffy, Dave Gratson

1. The meeting was held to discuss TRX's radionuclide issues pertaining to the NDEP All Companies letter dated December 7, 2007.
2. Discrepancy between the Uranium and Thorium decay chains in the analytical results for the Phase A and Parcels A & B investigations:
  - a. STL-Richland used two different preparatory (prep) methods for the Uranium and Thorium radionuclide analyses: Mixed acids (including HF, hence complete dissolution) for the Thorium chain and nitric acid (incomplete dissolution) for the Uranium chain.
  - b. TRX used a factor approach for the Parcel A & B dataset to obtain a NFA but this approach doesn't sufficiently address the radionuclide issue for the Phase A dataset.
3. It is believed that the uranium data (ICP metal analysis) exceeds background in the Phase A dataset.
4. TRX needs to demonstrate secular equilibrium.
  - a. TRX used alpha spectroscopy (spec) for the Uranium and Thorium chains on 10% of the samples collected for the Phase A investigation (15 samples).
  - b. Uranium chain activities were generally less than the Thorium chain activities in the Phase A dataset and this is likely due to the digestion differences discussed above.
5. TRX stated that the Muddy Creek formation (Mcf) samples (deeper samples) should be compared to the deep background dataset that is being generated by BRC/TIMET. (Results are expected in early February from BRC).
6. NDEP will send TRX electronic copies of the TIMET and BMI radionuclide responses to the December 7, 2007 letter. **ACTION ITEM.**
7. TRX stated that they are waiting for STL-Richland to provide calculated results for Uranium series and Thorium series radionuclides using the spectra recorded during gamma spectroscopy measurements for Radium-226 and Radium-228 on the 15 samples from the Phase A dataset that were additionally analyzed with alpha spec. STL-Richland has already provided results for 13 of the 15 samples. Results for the remaining two samples are expected this week. TRX will notify NDEP by Monday, January 28, 2008 whether the results from the remaining two samples were received and will provide a submittal date for this information. **ACTION ITEM.**
8. TRX will compare the gamma spec results to the alpha spec results and present the analysis to NDEP.
9. TRX believes that the radionuclide data should be relied on more heavily than the Uranium metal data for comparison to background determinations.
10. NDEP stated that their consultants have been working on the problem of false negatives (apparent lack of equilibrium) when demonstrating secular equilibrium because of the error associated with the analytical results. NDEP will provide feedback to all of the companies as soon as possible.

## Shannon Harbour

---

**From:** Shannon Harbour  
**Sent:** Thursday, January 24, 2008 11:42 AM  
**To:** 'Crowley,Susan'  
**Cc:** 'Keith Bailey'; Brian Rakvica; 'Kennedy, Robert'; 'Perry, Elizabeth'; 'Gerry, Dave'; 'Paul Black'; paul.duffy@neptuneinc.org; David Gratson  
**Subject:** RE: Jan 23, 2008 Conference Call Draft Minutes  
**Attachments:** 080122\_Rad\_Conf\_Call.doc

All,

Attached are the final minutes from the January 23<sup>rd</sup> conference call for the radionuclide issues.

(Keith, thanks for the updated schedule for submission.)

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:** Keith Bailey [mailto:okbailey@flash.net]  
**Sent:** Thursday, January 24, 2008 11:35 AM  
**To:** Shannon Harbour; 'Crowley,Susan'; Brian Rakvica; 'Kennedy, Robert'; 'Perry, Elizabeth'; 'Gerry, Dave'  
**Subject:** Jan 23, 2008 Conference Call Draft Minutes

Shannon,

We added a few red-line clarifications to your draft minutes (attached).

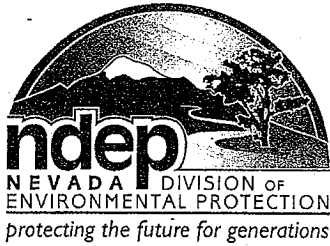
Also, ENSR has received the last two sets of gamma spec data from the Richland lab. We expect to have the statistical work completed and submitted to NDEP by February 8, 2008.

If you have questions or comments, please give me a call at (405) 216-9213 or call Susan Crowley at (702) 651-2234.

Thanks.

Keith

1/24/2008



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

Jim Gibbons, Governor  
Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 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 Response (Part 2) to:  
*Technical Memorandum – Data Review for 2007 Tronox Parcels A/B Investigation*  
Dated December 6, 2007

And

*Asbestos Data Review for 2007 Tronox A/B Investigation,*  
dated December 17, 2007

And

*Uranium Isotope Data Review for 2007 Tronox A/B Investigation,*  
dated December 18, 2007

And

*Asbestos Data Review for 2007 Tronox A/B Investigation,*  
Dated January 9, 2008

And

Supplemental information provided via electronic mail (various dates)

Dear Ms. Crowley,

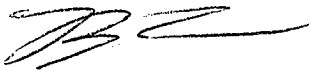
The NDEP has received and reviewed TRX's above-identified report and found that No Further Action (NFA) was required at this time with the conditions, as noted under separate cover.

Attachment A to this letter is intended to: provide additional clarity for the basis of this NFA; provide clarity for the administrative record; and to provide guidance for development of future Deliverables.



Please contact the undersigned with any questions at brakvica@ndep.nv.gov or (702) 486-2850 x 247.

Sincerely,



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

BAR:sh:jn:wf:bar

CC: Jim Najima, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, BCA, Las Vegas  
William J. Frey, AG's Office, Carson City  
Keith Bailey, Environmental Answers, 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  
Rob Mrowka, Clark County Comprehensive Planning, 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, PO Box 248 1186 Lower River Road, Charleston TN 37310-0248  
Curt Richards, Olin Corporation, PO Box 248 1186 Lower River Road, Charleston TN 37310-0248  
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. General comment, examples of information provided by electronic mail which were used to supplement the review and understanding of Parcels A and B include (but are not limited to):
  - a. Probability and box plots (exploratory data analysis);
  - b. Revised data tables presenting USEPA SSLs (DAF1 and DAF 20);
  - c. Legal descriptions of Parcels A and B (expected to be recorded following the issuance of this NFA). These descriptions serve as the basis of understanding for the definition of Parcels A and B).
  - d. In addition, several telephone conferences were held to discuss and clarify technical issues relating to Parcels A and B.
2. General comment, the additional documentation submitted since December 6, 2007 causes some of the very specific conclusions stated in the report to be incorrect. For example, on Page 4, uranium now exceeds the screening level. Some rewording in light of the update information would have been helpful.
3. General comment, the report is lacking transparency in many ways. For example, the CSM is not provided in full, the data are not related back to the CSM fully (for example, consider how the radionuclides are handled), and the risk assessment is minimal. This comment is made in recognition that Parcels A and B appear to have only sporadic and low levels of contamination (now that the asbestos remediation has been performed), in which case a simple risk assessment can be deemed sufficient. However, NDEP expects greater level of detail in other risk assessments performed at TRONOX and elsewhere at the BMI Complex and Common Areas.
4. General comment, a further consideration related to the asbestos remediation is that many of the sample locations have now been remediated or partially remediated. No mention is made of the consequence of this cleanup on the data analysis and risk assessment for all the other chemicals included in the screening risk assessment. The new surface layer could have different concentrations. However, it might be reasonable to assume that the concentration distribution has not changed in any important way for these chemicals. This should be related to the CSM. It might even be reasonable to assume that concentrations are now lower for some chemicals (e.g., dioxins), because of the removal of some soil. Whichever argument is made, it should have been included in the text, and defended in the context of the CSM. A further option is to compare the data across the different depths of data collection. For example, if the concentrations are similar at the different depth intervals of sampling, then it would be reasonable to assume that the old samples are still representative of the current conditions. Consideration of concentrations by depth would also be helpful for understanding the leaching pathway (e.g., to see if concentrations are increasing with depth), and could have resolved some background comparisons for some metals or radionuclides. For example, for several metals and radionuclides the site data are statistically lower than the background data. Without some explanation, this raises issues about the appropriateness of the comparisons.
5. General comment, Although the radionuclide activities appear to be small there are still some outstanding issues that should be addressed in the future. The immediate issues surrounding the radionuclide uranium and thorium analysis appear to have been resolved (methods have been fully identified, and adjustments have been made to the uranium



radionuclide results), and we are comfortable enough with the methods used to predict uranium isotope concentrations for comparison with background and use in the risk assessment. Still of concern is that the uranium metal results fail background comparisons in Parcel A, but none of the other radionuclides fail background comparisons at all. In fact, some of the site radionuclides appear to be slightly lower than background. It might be reasonable to assume that the differences are the result of minor analytical differences, and that all radionuclides are at background concentrations. However, the argument should have been made. The argument includes concerns about the different methods that have been used (gamma-spec for radium, alpha-spec with strong acid digestion for thorium, and alpha-spec with weak acid digestion for uranium as well as uranium as a metal by ICPMS). Since secular equilibrium is expected, the results should be similar for radionuclides within the same chain, but they are not statistically similar. The different methods might provide some explanation.

Our understanding of the Work Plan was that 10% of the samples submitted for gamma-spec analysis for radium would also be submitted for alpha-spec (and beta-spec) analysis for radium. If this had been done, then a better understanding of these inconsistencies might be possible. In our experience, gamma-spec analysis is biased low for some radionuclides. If this is the case here, then this could explain the differences that are seen. Alternatively, a CSM is needed that explains the slightly high uranium concentrations in Parcel A versus Parcel B. Please note that deviations from the Work Plan are not acceptable without NDEP approval.

A further option that could be considered is to perform background comparisons with subsets of the background dataset. We have not looked at the background dataset to see if this would be helpful, however, we recognize that the background dataset shows differences by geology and depth.

The risks are small at this site, but inclusion of uranium in the screening risk assessment raises issues about secular equilibrium and, hence, whether radium should also be included in the risk assessment. Uranium is now driving the cancer endpoint risk assessment, hence the concern. Without uranium the incremental (screening level) risks are, instead,  $1 \times 10^{-6}$ .

It is also not clear yet that it is appropriate to combine cancer risk for radionuclides with those for non-radionuclides. USEPA has for many years not combined risk assessments for these two chemical groups, and this has not been done previously for risk assessments at the BMI Complex and Common Areas. It would help to have a clearer explanation of what is really expected given the data, and the thoughts described above could help provide greater defensibility for the risk assessment. This issue should be discussed between the NDEP and TRX for development of future Deliverables.

6. General comment, we note that use of maximum concentrations across Parcels A and B causes an unusual form of conservatism in the results. That is, if a similar risk assessment had been performed separately for Parcels A and B, then these screening risk assessments would produce lower risks. The maximum concentration must be less in one

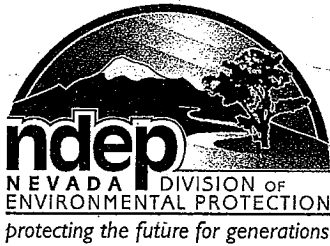
- area than in the other, for each chemical in turn. It would have been worth noting this in the uncertainty analysis.
7. General comment, it is not clear that it is appropriate to include lead in the HI calculation. Risk assessments for lead are often separated from the bulk of the risk assessment because of the source of information about lead risks. This would not affect the conclusions, but would raise beta-BHC and hexachlorobenzene to the level of drivers for the low HI presented. This issue should be discussed between TRX and the NDEP for the development of future Deliverables.
  8. General comment, analytical methods appear to be insufficient (not always providing low enough concentrations) for several analytes, including: antimony, boron, selenium, niobium, and platinum. In the case of antimony this causes failure of the statistical background comparisons tests, and failure of comparison with SSLs. It would be helpful if this issue could be addressed in future sampling events.
  9. General comment, please note that the USEPA no longer supports their Preliminary Remediation Goals. Consequently, some care should be taken to make sure that the most up to date toxicological information is being used in the screening risk assessment.
  10. General comment, the calculations performed to assess risk following the scraping of soils to address asbestos include a "duration of construction" of 130 days. The USEPA default is 250 days/year. It is not appropriate to deviate from default values without justification.
  11. Page 2, we note that the term "robust" has a specific meaning in statistics that is different than intended here. Since the term is used in the context of the data, it is inappropriate. The word "sufficient" could be used instead. Please address this in the development of future Deliverables.
  12. Pages 3 and 4, Data Summary, the NDEP has the following comments:
    - a. NDEP does not concur with the use of a DAF of 20 for this Site based on source area size and depth to groundwater.
    - b. TRX provided a revised evaluation of Site data versus SSLs with a DAF of 1 and it appears that this modification does not materially change the conclusions regarding the Site. At a DAF of 1 the only compounds that were detected and above background were: cadmium and beta-BHC.
    - c. The DAF of 1 for beta-BHC is extremely low and is often exceeded by non-detects as well. This is not a useful metric for the basis of a decision and additional lines of evidence must be examined. There is a known source of beta-BHC in soil and groundwater off-Site and the concentrations of this compound at this Site are considered insignificant relative to upgradient data. If beta-BHC were to leach to groundwater it is unlikely that the contribution from this Site could be detected.
    - d. Based upon a review of available groundwater data in the region, cadmium does not appear to be leaching to groundwater and is not a concern at this time. It is also noted that the cadmium concentrations at the Site do not appear to pose any health risks. It is also noted that there are only three locations above the SSL DAF 1 and these concentrations are only marginally elevated (0.59 mg/kg maximum versus an SSL of 0.4 mg/kg). All cadmium detections are well below the SSL DAF 20 (8 mg/kg). If cadmium were to leach to groundwater it is expected that this

matter could be addressed by the existing groundwater treatment system, as necessary.

- e. It would have been helpful to provide a site-specific model (e.g.: VLEACH to substantiate these concepts). Future Deliverables must address these issues in more detail.
  - f. Based upon the future use of this Site (commercial/industrial) it is expected that Site activities will not exacerbate the conditions in the soil.
13. Page 4. 1<sup>st</sup> full paragraph. This paragraph does not seem quite correct in light of the further information provided for uranium. As things stand, uranium as a radionuclide fails PRG comparisons and background comparisons.
  14. Page 4, last paragraph, first sentence. It is not clear that this is accurate. The depth to groundwater is similar across the site, however, groundwater has been impacted across the BMI complex. The relevant issue here appears to be the low concentrations in the soil, in which case there is very limited source material for contamination in groundwater. The depth then helps support that argument, rather than the other way around. Beta-BHC appears as a potential problem across the site when SSL comparisons are made. This could be noted in the discussion (that the SSL for beta-BHC is very low, and hard to achieve anywhere at this site, and explain that SSLs are known to be very conservative). An alternative is to refine the model of transport to groundwater in this area using, for example, VLEACH.
  15. Page 5, asbestos paragraph. More explanation is appropriate here, since amphibole was collected prior to remediation. Otherwise, what is stated here contradicts what is stated earlier.
  16. Page 7. It appears as if mercury exceeds background as well, and should be carried into the screening risk assessment.
  17. Page 7. Also, niobium should be considered to be less than background for the same reasoning that is used for platinum and selenium. In general the decision logic for the background comparisons should be consistent across metals and radionuclides.
  18. Page 7. As noted in the general comments, more analysis, explanation and discussion is needed regarding uranium and the other radionuclides. It is not reasonable that uranium exceeds background and thorium and radium do not, given the likelihood of secular equilibrium.
  19. Page 7. The meaning of the following sentence is not clear – “Although the comparison statistics indicate that these metals levels at the property are above background, the cumulative probability plots and box-and-whisker plots indicate that for several of these metals, the property and background datasets are most likely representative of a single population”. Some more information needs to be provided to justify a conclusion that background comparisons fail statistically, but the property and background distributions come from the same population. For example, small analytical differences could be mentioned, or small differences might be related to geologic or depth differences as seen in the background dataset. And, the conclusion could be tied back to the CSM (that these chemicals are not expected to be found as contaminants).
  20. Page 10, Review Criterion 3 and 4. It does not appear that the analytical methods are sufficiently sensitive for some of the metals. For example, the antimony data exhibit about 10 high values that exceed background, exceed SSLs, and otherwise create issues for data analysis.

21. Page 10, Review Criterion 3. In addition, issues have been identified associated with the radionuclide analysis, as described in the general comment above. Different methods were used for thorium and uranium, creating differences in activities for radionuclides that are, arguably, in secular equilibrium. In addition, the work plan called for 10% analysis of radium by alpha-spec methods, which have not been performed.
22. Data adequacy section. The formula used is questionable, despite its publication in USEPA documents. The multiplier of 1.16 is based on some simulations that were performed at PNNL to evaluate the difference in power between parametric tests and non-parametric tests. On average in the simulations the difference was a factor of 1.16. This does not mean that this multiplier is appropriate for the characteristics of the data presented here. Because the multiplier is included, some of the statements made are not strictly correct. The test is not based on averages. It is based on the Wilcoxon Rank Sum test, which is a non-parametric test (although the basis of the formula depends on the standard test for normality, the 1.16 multiplier came from simulations of the non-parametric test). The use of z in this formula is also suspect, since its use implies a known standard deviation. The standard deviation is estimated here, in which case t should be used instead of z, and the formula should be based on a t-test instead of a z-test. Finally, results of 0 are not recommended. The raw results are decimal, and are, presumably rounded. It is not appropriate to round any results down, because at least the number on the raw result is needed to prove data adequacy under the assumptions made. That is, the minimum possible integer response should be 1. None of these comments or observations appears to make any substantial difference to the general conclusion that there are enough data, given the assumptions of the model. However, it would be preferable if the statistical analysis and explanation was tightened. These issues must be addressed prior to submittal of future Deliverables.
23. Data adequacy section. Also, since asbestos was a driver for action at this site, some calculations should be presented to verify that sufficient asbestos data have been collected.
24. Page 15 – determination of EPCs. In the middle of the paragraph a statement is made that UCLs were computed. This does not appear to be the case. In addition, it appears initially as if all analytes were evaluated in this way, whereas, asbestos is not. In fact, the approach taken with asbestos to use analytical sensitivity is much more like using a UCL for the other analytes. A clearer distinction could be made.
25. Uncertainty analysis. One more type of uncertainty, or bias, has been introduced in this risk assessment. That is, the use of maximum concentrations across both parcels. Using maxima is clearly conservative, but it is also conservative to apply the maximum to both parcels simultaneously. This could be discussed.
26. Uncertainty analysis. Some discussion of some of the specific uncertainties should be provided in this section.
27. Page 19, 3<sup>rd</sup> paragraph. “The risk estimates are based on reasonable maximum exposure scenarios,” This statement is not strictly true given the use of maximum concentrations in the screening risk assessment. These are not based on a reasonable exposure scenario, instead they are based on a very conservative exposure scenario.
28. Page 19, risk results. The risk results are different if uranium as a radionuclide is included. Some changes to the text are appropriate.

29. Page 20, Summary. "Based on the results of the 2007 investigation, this data review, and the screening-level health risk assessment, there is no evidence to conclude that the Tronox Parcels A and B property is contaminated. In summary, BEC concludes that an NFAD for the property is warranted". This should be reworded. There is evidence of contamination, it is just that the concentrations levels are not at levels of concern for human health risk for the industrial scenario. Some chemicals exhibit concentrations greater than background, and some organic chemicals have been detected. In addition the RME risk for amphibole is  $5 \times 10^{-6}$ , which is based on zero detects of amphibole fibers, and, apparently, insufficient samples to achieve  $1 \times 10^{-6}$  risk.
30. Figure 4. The term "clean" should be clarified. That is, the site was cleaned because of asbestos contamination. As currently used, an implication is that the areas are clean for all chemicals.
31. Table 1. Results for the pre- and post-remediation asbestos data are not presented in this table, although the main text suggests that they are.
32. Table 2 seems like it should be broken out into two separate tables. In addition, mercury appears elevated relative to background, however is not presented in Table 2.
33. Electronic mail (e-mail) containing boxplots, the boxplot for tin appears to contain an error in presentation.
34. *Uranium Isotope Data Review for 2007 Tronox A/B Investigation*, we note also that much of the needed discussion/explanation about radionuclide issues at this site are discussed in the uranium technical memorandum. Perhaps some discussion is needed with NDEP, but it does not seem unreasonable to conclude that the radionuclide activities at this site are similar to background. The only case based on the raw data for which background comparisons fail is uranium as a metal, and, whereas the failure is statistically significant, the difference in activities between site uranium and background uranium activities is small. If uranium is included in the risk assessment, then the risk (radionuclide and non-radionuclide summed, per the risk assessment technical memorandum) is  $4 \times 10^{-6}$ . However, it is  $1 \times 10^{-6}$  if uranium is not included, and it is not clear that it needs to be included. We also note that, whereas, these issues are addressed in the memorandum, the issue concerning gamma-spec analysis for radium is not fully resolved and must be resolved in future investigations.



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

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 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 Response (Part 1) to:  
*Technical Memorandum – Data Review for 2007 Tronox Parcels A/B Investigation*  
Dated December 6, 2007

And

*Asbestos Data Review for 2007 Tronox A/B Investigation,*  
dated December 17, 2007

And

*Uranium Isotope Data Review for 2007 Tronox A/B Investigation,*  
dated December 18, 2007

And

*Asbestos Data Review for 2007 Tronox A/B Investigation,*  
Dated January 9, 2008

And

Supplemental information provided via electronic mail (various dates)

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified report and finds that No Further Action (NFA) is required at this time with the following conditions:

1. TRX retains the responsibility to address any environmental impacts to groundwater beneath the property referred to as Parcels A and B. As such, additional investigation may be necessary on



this property as it relates to TRX's responsibilities. TRX must be granted access to the site for activities such as well or soil boring installations or other investigative or remedial efforts.

2. The materials presented to the NDEP do not evaluate the possibility of a vapor intrusion concern from contamination in groundwater. It is anticipated that this issue will be addressed as part of the investigation of groundwater issues in the region.
3. The site soils beneath 10' below ground surface have not been evaluated to date. The property owner should note that these soils should not be disturbed without additional investigation or evaluation.
4. To limit liability, the property owner should ensure that activities at the property do not exacerbate existing, sub-surface, environmental conditions.
5. The site use is suitable for purposes of commercial or industrial use only.

It should be noted that technical comments are provided under separate cover and are intended to: provide additional clarity for the basis of this NFA; provide clarity for the administrative record; and to provide guidance for development of future Deliverables.

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

Sincerely,



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

BAR:sh:jn:wf:bar

CC: Jim Najima, NDEP, BCA, Carson City  
Shannon Harbour, NDEP, BCA, Las Vegas  
William J. Frey, AG's Office, Carson City  
Keith Bailey, Environmental Answers, 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  
Rob Mrowka, Clark County Comprehensive Planning, 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, PO Box 248 1186 Lower River Road, Charleston TN 37310-0248  
Curt Richards, Olin Corporation, PO Box 248 1186 Lower River Road, Charleston TN 37310-0248  
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



# TRONOX

Susan Crowley  
Staff Environmental Specialist

(702) 651-2234  
fax (405) 302-4607  
susan.crowley@tronox.com

January 15, 2008

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

Dear Mr. Rakvica:

Subject: Tronox LLC ECA Quarterly Report – Fourth Quarter 2007

Pursuant to Section XIII of the Consent Agreement, signed September 5, 1996, between Nevada Division of Environmental Protection (NDEP) and Tronox LLC (Tronox), we submit the following quarterly status report for the Henderson facility's Environmental Conditions Assessment (ECA).

Activities Conducted: 10-01-07 to 12-31-07

**Conceptual Site Model:**

- CSM remains unchanged until additional data justifies revisions.

**Upgradient Investigation Results:**

- September 27 – Tronox transmitted their response to NDEP comments (RTC) regarding the Upgradient Investigation report. This RTC included a revised executive summary, revised conclusions, and revised statistical histograms to NDEP. This revised information was used during preparation of the Phase A report, discussed below.

**Phase A and B - Source Area Investigation**

- November 26 – Teleconference between NDEP and Tronox to discuss the Phase B Work Plan in relation to risk based decision making.
- November 29, 2007 – Tronox and NDEP meet to discuss the Phase A Source Area Investigation Results Report and the scope of work for the Phase B – Source Area Investigation Workplan.
- November 30 – NDEP provides response to Tronox's 9-27-07 Phase A Source Area Investigation Results Report.
- December 17 – NDEP provides approval of Appendix G, DVSR, from Phase A Source Area Investigation Results Report.
- December 19 – Tronox provides draft LOU 20 description to NDEP for comment, with the LOU 20 map and analytical tables to follow.

**QAPP and SOPs:**

- October - December – NDEP-approved BRC SOPs are in use.

**Community Involvement Plan and Fact Sheet**

- December 19 - Tronox provides NDEP a copy of the revised Fact Sheet for the Henderson site.

Tronox LLC

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

Work Plan to Evaluate Effective Groundwater Capture

- October 3 – NDEP provides comments on the Revised Work Plan to Evaluate Effective Groundwater Capture.
- October 31 – Teleconference between NDEP and Tronox to discuss Environmental Conditions Assessment topics, including the Capture Evaluation Work Plan.
- November 14 – Teleconference between NDEP and Tronox to discuss Work Plan to Evaluate Effective Groundwater Capture.
- November 28 – Tronox submits responses to NDEP comments on Work Plan to Evaluate Effective Groundwater Capture.
- December 11 – NDEP provide approval of the Work Plan to Evaluate Effective Capture, with noted exceptions.
- December 2 to 19 – Tronox initiates work to complete well installations and rehabilitations as part of the Work Plan to Evaluate Effective Groundwater Capture. Work will resume in February 2008.

Other

- October 5 – NDEP provides comments to Tronox's Annual Remedial Performance Report dated August 29, 2007.
- October 15 – Tronox issues 3<sup>rd</sup> Quarter - 2007 ECA Status Report to NDEP.
- November 7 – Tronox attends NDEP-sponsored meeting to discuss McGinley report on Athens Road Groundwater modeling.
- November 9 – Tronox provides a revised DVSR to NDEP for the Annual Remedial Performance Report analytical in response to NDEP 9-19-07 comments.
- November 26 – NDEP provides approval of revised DVSR for the Annual Remedial Performance Report.
- December 7 – NDEP provides notice to the BMI companies regarding the disparity between datasets using different extraction methods for isotopic uranium analysis.
- December 10 – Tronox provides estimated perchlorate removed from the environment to NDEP.
- December 10 – Tronox provides Northshore Road perchlorate concentration and mass loading to NDEP.

Feel free to call me at (702) 651-2234, if you have any questions. Thank you.

Sincerely,



Susan M. Crowley  
Staff Environmental Specialist

Overnight Mail

Cc: See attached document distribution list



C:\smc\My  
Documents\Document  
Doc Distribution

# Tronox Document Distribution List

Updated: 28-Aug-07

Document Name: ECA Quarterly Update

Name (Last, First)	Firm	Distribution		Firm	Distribution	
		Hard	e-Copy		Hard	e-Copy
Croft	NDEP	X		Tronox		
King	NDEP	X		Tronox		
Najima	NDEP	X		Tronox		
Rakvica	NDEP	X		Tronox		
Sous	NDEP			Tronox Counsel		
Tinney	NDEP	X		Tronox		
Palm	NDEP	X		Tronox		
Harbour	NDEP	X				
Pohlmann	COH	X		Environ Answers		
Conaty	COH Counsel	X		ENSR		
Durr	DAQEM			ENSR		
Hunsaker	DAQEM			ENSR		
Beckstead	DAQEM					
Jorgenson	DAQEM Counsel					
Mrowka	CCCP	X				
Mulroy	SNWA					
Goff	SNWA					
Liesing	SNWA					
Kaplan	EPA, Reg 9	X				
Compliance Corrdonator	NDEP					
Compliance Coordinator	DAQEM					
Public Repository	Library	X				
Corbett				Tronox	X	
Elmer				Tronox	X	
Hatmaker				Tronox	X	
Reed				Tronox	X	
Hurst				Tronox Counsel	X	
Stater				Tronox	X	
Crowley				Tronox	X	
Bailey				Environ Answers	X	
Krish				ENSR	X	
Bilodeau				ENSR	X	
Gentry				ENSR	X	
Lambeth				Veolia		
McDaniel				Veolia		
Cheung				Veolia		
Guernero				AIG	X	
Giroux				GEI	X	
Stowers				Broadbent		
Sahu				ERM		
Crouse				BMI	X	
Erickson				Syngenta	X	
Kelly				Stauffer	X	
Sundberg				Montrose		
Gibson				Montrose	X	
Sylvia				AmPac		
Wilkinson				Pioneer	X	
Mack				Timet	X	
				Montrose Counsel		

**Shannon Harbour**

---

**From:** Brian Rakvica  
**Sent:** Tuesday, January 15, 2008 6:41 AM  
**To:** 'Crowley, Susan'  
**Cc:** Shannon Harbour  
**Subject:** RE: NDEP's December 7, 2007 letter regarding radionuclides

Susan,

When can we expect to receive the complete answer?

Thanks,

Brian

---

**From:** Crowley, Susan [mailto:Susan.Crowley@tronox.com]  
**Sent:** Monday, January 14, 2008 5:35 PM  
**To:** Brian Rakvica  
**Cc:** Keith Bailey; Gerry, Dave  
**Subject:** RE: NDEP's December 7, 2007 letter regarding radionuclides

Brian,

Please see Tronox's response to your e-mail forwarded earlier today. I had hoped to reach Robert Kennedy, as Keith Bailey is out of the office this week, to give you a more detail re our activities over the last several weeks re the rad extraction issue. Both Keith and Robert have been working to understand how best to address the extraction method discrepancy as it relates to the on-site Phase A sampling. As I'm able to gain more detail from Robert, and Keith when he returns, I'll respond with more detail. 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]  
**Sent:** Monday, January 14, 2008 8:13 AM  
**To:** Crowley, Susan; okbailey@flash.net; Gerry, Dave; lee.erickson@astrazeneca.com; george.crouse@syngenta.com; npogoncheff@pesenv.com; Paul Sundberg; jkelly@montrosechemical.com; cmrichards@olin.com  
**Cc:** Ranajit Sahu, Ph.D.; Wilkinson, Craig; Kirk Stowers; victoria@tysoncontracting.com; Jim Najima; BILL FREY; Maria Skorska; Shannon Harbour; Brian Rakvica  
**Subject:** NDEP's December 7, 2007 letter regarding radionuclides  
**Importance:** High

All,

1/15/2008

The attached letter required a response by January 11, 2008.

To date, TIMET and BRC have responded.

For the remainder of the Companies, please advise me (in writing) regarding your status before the Close of Business (5:00 PM Pacific) Today (January 14, 2008).

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

Tronox Confidentiality Notice!

If you are not the intended recipient of this e-mail message, any use, distribution or copying of the message is prohibited.

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.

# TRONOX

Susan Crowley  
Staff Environmental Specialist

(702) 651-2234  
Fax (405) 302-4607  
susan.crowley@tronox.com

January 14, 2008

Mr. Brian Rakvica, P.E.  
Nevada Division of Environmental Protection  
2030 East Flamingo, Suite 230  
Las Vegas, NV 89119-0818

Subject: NDEP Facility ID H-000539 – Response to NDEP December 7, 2007 Letter Regarding Radionuclide Analysis for Uranium

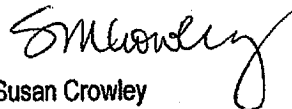
Dear Mr. Rakvica:

Tronox LLC (Tronox) has undertaken an Environmental Conditions Assessment (ECA) as directed by Nevada Division of Environmental Protection (NDEP). Radionuclides are included in the Site Related Chemicals for the site and hence have been analyzed in upgradient / background samples as well as samples collected on-site. As noted in your letter of December 7, 2007 different preparatory methods have been used for isotopic uranium analyses for differing datasets within the complex, presenting a comparability problem from dataset to dataset. Tronox is currently confirming the extraction methods used for the upgradient /background dataset and the Phase A field work dataset, as well evaluating how these extractions have effected the isotopic analyses. This confirmation has not been received from STL.

The two methods indicated in your December 7, 2007 letter, 3a and 3b, are both acceptable to Tronox. Further, it may be necessary to complete both exercises to compare results and ensure past data is usable. Because multiple datasets are effected, our preference is that NDEP complete the exercise in 3a. Tronox will complete the 3b exercise for the Tronox upgradient / background dataset compared to the Tronox Phase A dataset.

Feel free to call either Keith Bailey (405) 216-9213 or me at (702) 651-2234 if you have any questions regarding this correspondence. Thank you.

Sincerely,



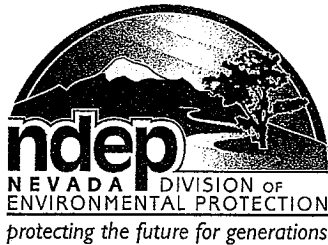
Susan Crowley  
Staff Environmental Specialist, CEM 1428 exp 3-8-09

Cc: LKBailey  
D Gerry

snc/Trx to NDEP - 1-14-08 re Rad Extraction Evaluation.doc

Tronox LLC

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



# STATE OF NEVADA

Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 14, 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 Request for Revised Site-Related  
Chemical (SRC) List

Dear Ms. Crowley,

The NDEP has reviewed the file for the TRX facility and has noted that the SRC list was last submitted by TRX in March 2006 in an electronic format. It is unclear whether the March 2006 SRC list was updated from the October 2004 version or just modified to include laboratory and analysis information. As stated in a NDEP October 27, 2004 approval letter, the SRC list is considered a living document and should be updated periodically. In the March 2006 SRC list, the table labeled "Alphabetical Site Related Chemicals List" has several discrepancies when compared to the tables labeled "SRC" and "SRC by Method". For example, the Alphabetical Site Related Chemicals List contains broad items (e.g. synthetic detergent, various lab wastes, etc.) while the other two tables contain specific chemicals only. The Alphabetical table should be modified to include more detail about the broad items (perhaps as a supplemental table). Additionally, TRX should also revise the SRC lists as necessary based on data collected from Site investigations completed since the last update. The modified and updated SRC lists should be submitted by **March 14, 2008**. Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 x 240.

Sincerely,

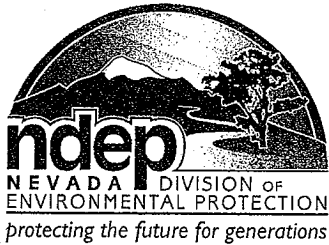
Shannon Harbour, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
Special Projects Branch  
NDEP-Las Vegas Office

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  
Rob Mrowka, Clark County Comprehensive Planning, 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





# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 14, 2008

Ms. Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, NV 89009

Mr. Curt Richards  
Olin Corporation  
3855 North Ocoee Street, Suite 200  
Cleveland, TN 37312

Mr. Joe Kelly  
Montrose Chemical Corp of CA  
600 Ericksen Ave NE, Suite 380  
Bainbridge Island, WA 98110

Mr. Brian Spiller  
Stauffer Management Co LLC  
PO Box 15437  
Wilmington, DE 19850-5437

Mr. Craig Wilkinson  
Titanium Metals Corporation  
PO Box 2128  
Henderson, NV 89009

Re. **BMI Plant Sites and Common Areas Projects, Henderson, Nevada**  
*Request for Revised Community Involvement Plans*

Dear Sirs and Madam:

NDEP received a request from Basic Remediation Company (BRC) on January 11, 2008 to delete the requirement for a physical document repository from their *Community Involvement Plan* (CIP). Due to the alternate methods that BRC has taken to address outreach concerns, the NDEP approved this request via a letter dated January 14, 2008.

For your information, the alternate methods that BRC has employed include the following:

- Annual distribution of a fact sheet to a geographic area agreed to by NDEP and BRC;
- Quarterly Restoration Advisory Committee meetings;
- Development of a website which makes all documents available to the public;
- Construction and maintenance of a public information kiosk;
- Maintenance of a physical copy of all documents at the BRC offices, these copies are available for public review.

NDEP has previously noted that the existing document repository at the City of Henderson Public Library on Water Street is inadequate. It was expected that the remainder of the BMI Companies might participate in the "to be constructed" BRC document repository. Now that this repository will not be constructed, the remainder of the BMI Companies need to develop a plan to address this issue.



NDEP is amenable to a variety of solutions to address this problem. These solutions can be implemented on a company-specific basis or as a group effort. Examples follow (but are not limited to):

- Adoption of an approach consistent with BRC's approach;
- Rectifying the deficiencies at the existing document repository;
- Construction and operation of a new document repository.

It is requested that each Company propose a response to the issues outlined above **by February 15, 2008**. Please contact me with any questions (tel: 702-486-2850 x247; e-mail: [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov)).

Sincerely,



Brian A Rakvica, P.E.  
Supervisor, Special Projects Branch  
Bureau of Corrective Actions

BAR:s

CC: Jim Najima, NDEP, BCA, Carson City  
Dante Pistone, NDEP, Carson City  
Marysia Skorska, NDEP, BCA, Las Vegas  
Shannon Harbour, NDEP, BCA, Las Vegas  
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  
Rob Mrowka, Clark County Comprehensive Planning, 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  
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015  
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409  
Nicholas Pogoncheff, PES Environmental, Inc., 1682 Novato Blvd., Suite 100, Novato, CA  
94947-7021  
Lee Erickson, Stauffer Management Company LLC, P.O. Box 18890 Golden, CO 80402  
Keith Bailey, Environmental Answers, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312  
Jeff Gibson, AMPAC, 3770 Howard Hughes Parkway, Suite 300, Las Vegas, Nevada 89109  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
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  
Jon Erskine, Northgate Environmental Management, Inc., 300 Frank H. Ogawa Plaza, Suite 510,  
Oakland, CA 94612  
Deni Chambers, Northgate Environmental Management, Inc., 300 Frank H. Ogawa Plaza, Suite  
510, Oakland, CA 94612  
Robert Infelise, Cox Castle Nicholson, 555 California Street, 10<sup>th</sup> Floor, San Francisco, CA 94104-1513  
Michael Ford, Bryan Cave, One Renaissance Square, Two North Central Avenue, Suite 2200,  
Phoenix, AZ 85004

**Brian Rakvica**

---

**From:** Crowley, Susan [Susan.Crowley@tronox.com]  
**Sent:** Monday, January 14, 2008 5:35 PM  
**To:** Brian Rakvica  
**Cc:** Keith Bailey; Gerry, Dave  
**Subject:** RE: NDEP's December 7, 2007 letter regarding radionuclides  
**Attachments:** Trx to NDEP 1-14-08 - re Rad Extraction Evaluation.pdf

Brian,

Please see Tronox's response to your e-mail forwarded earlier today. I had hoped to reach Robert Kennedy, as Keith Bailey is out of the office this week, to give you a more detail re our activities over the last several weeks re the rad extraction issue. Both Keith and Robert have been working to understand how best to address the extraction method discrepancy as it relates to the on-site Phase A sampling. As I'm able to gain more detail from Robert, and Keith when he returns, I'll respond with more detail. 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, January 14, 2008 8:13 AM  
**To:** Crowley, Susan; okbailey@flash.net; Gerry, Dave; lee.erickson@astrazeneca.com; george.crouse@syngenta.com; npogoncheff@pesenv.com; Paul Sundberg; jkelly@montrosechemical.com; cmrichards@olin.com  
**Cc:** Ranajit Sahu, Ph.D.; Wilkinson, Craig; Kirk Stowers; victoria@tysoncontracting.com; Jim Najima; BILL FREY; Maria Skorska; Shannon Harbour; Brian Rakvica  
**Subject:** NDEP's December 7, 2007 letter regarding radionuclides  
**Importance:** High

All,

The attached letter required a response by January 11, 2008.

To date, TIMET and BRC have responded.

For the remainder of the Companies, please advise me (in writing) regarding your status before the Close of Business (5:00 PM Pacific) Today (January 14, 2008).

Thanks,

Brian

Brian A. Rakvica, P.E.  
 Supervisor, Special Projects Branch

1/15/2008

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

**Tronox Confidentiality Notice!**

If you are not the intended recipient of this e-mail message, any use, distribution or copying of the message is prohibited.

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.

# TRONOX

Susan Crowley  
Staff Environmental Specialist

(702) 651-2234  
Fax (405) 302-4607  
susan.crowley@tronox.com

January 14, 2008

Mr. Brian Rakvica, P.E.  
Nevada Division of Environmental Protection  
2030 East Flamingo, Suite 230  
Las Vegas, NV 89119-0818

Subject: NDEP Facility ID H-000539 – Response to NDEP December 7, 2007 Letter Regarding Radionuclide Analysis for Uranium

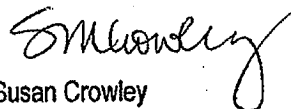
Dear Mr. Rakvica:

Tronox LLC (Tronox) has undertaken an Environmental Conditions Assessment (ECA) as directed by Nevada Division of Environmental Protection (NDEP). Radionuclides are included in the Site Related Chemicals for the site and hence have been analyzed in upgradient / background samples as well as samples collected on-site. As noted in your letter of December 7, 2007 different preparatory methods have been used for isotopic uranium analyses for differing datasets within the complex, presenting a comparability problem from dataset to dataset. Tronox is currently confirming the extraction methods used for the upgradient /background dataset and the Phase A field work dataset, as well evaluating how these extractions have effected the isotopic analyses. This confirmation has not been received from STL.

The two methods indicated in your December 7, 2007 letter, 3a and 3b, are both acceptable to Tronox. Further, it may be necessary to complete both exercises to compare results and ensure past data is usable. Because multiple datasets are effected, our preference is that NDEP complete the exercise in 3a. Tronox will complete the 3b exercise for the Tronox upgradient / background dataset compared to the Tronox Phase A dataset.

Feel free to call either Keith Bailey (405) 216-9213 or me at (702) 651-2234 if you have any questions regarding this correspondence. Thank you.

Sincerely,



Susan Crowley  
Staff Environmental Specialist, CEM 1428 exp 3-8-09

Cc: LKBailey  
D Gerry

snc/Trx to NDEP - 1-14-08 re Rad Extraction Evaluation.doc

Tronox LLC

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

**Shannon Harbour**

---

**From:** Crowley, Susan [Susan.Crowley@tronox.com]  
**Sent:** Thursday, January 10, 2008 11:38 AM  
**To:** Shannon Harbour  
**Cc:** Brian Rakvica; Keith Bailey; Bilodeau, Sally  
**Subject:** LOU 20 Information  
**Attachments:** lou-20 map rev1.pdf; LOU 20 soil\_gw\_tables rev1.pdf; LOU 20 Summary Table 12-17-07.doc

Shannon,

Please find attached a set of files which give you a picture of LOU 20 – more specifically which provided the structure for how information will be organized in the Phase B Work Plan revision - on an LOU-by-LOU basis.

The Word document (Summary of Available Data) reflects the organization of information with the Adobe map and Adobe tables supporting the Summary. The information provided in the Adobe tables has been drawn from a variety of documents and includes both groundwater and soil data. We will continue to refine how the data tables themselves are presented (so that they cleanly support the Summary of Data document) but we were hoping for NDEP's thoughts on the overall presentation of the LOU 20 package. Please provide us your thoughts?

**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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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.

**Summary of Available Data for LOU 20 in EA08**  
Tronox Facility – Henderson, Nevada

**Name of LOU:**

**Pond C-1 and Associated Piping**

**Site Investigation Area:**

- Size: Approximately 175 ft by 275 ft; 1.5 acres
- Location: north end of EA08.

**Description:**

- C-1 Pond period of operation: October 1974 through October 1994.
- Pond received liquid waste products from Unit 4, Unit 5, and Steam Plant.
- Pond floor covered with 60 mil PVC liner and sidewalls lined with butyl rubber. Lining was removed about 1996.
- Minor excavation of soils occurred during the liner removal.
- Process waste streams - metal wastes and various sulfates & phosphates discharged into the C-1 Pond.
- No wastes from production processes that contained fuels, solvents, PCBs, pesticides, were placed into pond.
- Associated piping system: above-ground plastic piping aligned along 9<sup>th</sup> Street from Units 4 & 5 to pond, and above-ground piping running from steam plant across 9<sup>th</sup> Street to pond.
- Pipe system handled low pressure flow with no vents or sample points.
- Pipeline outfalls were in the southeast and southwest corners of Pond C-1.
- Process waste flow was diverted to LOU 21 (Pond Mn-1) if Pond C-1 neared maximum capacity.

**Known or Potential Chemical Classes:**

- Metals
- Sulfates
- Phosphates
- Paraffin

<b>Process Waste Stream</b>	<b>Known or Potential Chemicals Associated with LOU 20</b>
Steam Plant boiler blow-down	metal wastes - <i>more specific?</i>
boiler plant wash-down	phosphates sulfates
manganese dioxide cathode wash	manganese dioxide Anolyte - <i>? on SRC list - detergent?</i>
boron neutralization solutions	boron boron trichloride
hot process water softener solutions - from steam production and boron & manganese dioxide production processes.	calcium sulfates phosphates

**Summary of Available Data for LOU 20 in EA08**  
Tronox Facility – Henderson, Nevada

**Known or Potential Release Mechanisms:**

- Surface releases (Kleinfelder 1993 report: “possible releases from around the edges of the pond could have occurred.” ), it was also noted that salt concentrations in groundwater beneath this area increased in the early 1990s;
- leaching to subsurface – potentially to groundwater (no known releases documented).

**Results of Historical Sampling:**

- One historical boring (BDB05) was drilled approximately 150 feet west of the pond (CSM – ENSR, 2005). However, this boring was located to evaluate the Beta-Ditch (LOU 5) and not the C-1 pond (LOU 20). This boring is considered too far from LOU 20 to be applicable.
- Soil samples were collected following the liner removal to confirm the pond solids were all removed from the area. The location of these results is currently being researched and will be transmitted when found.
- Upgradient, cross-gradient, and downgradient monitoring wells (M35, M19, and M39, respectively) are routinely tested for Cr<sup>+6</sup>, Mn, and perchlorate as part of groundwater monitoring program.

**Did Historical Samples Address Potential Release?** No

**Summary of Phase A SAI:**

Soil: None specifically conducted for this LOU. Closest boring (SA17) is 60 ft to the north (downgradient) within the Beta Ditch (LOU 5) and was not specifically designed to evaluate LOU 20, although potential subsurface releases from the C-1 Pond (if any) might be noticeable in SA17 soil results.

Groundwater: None specifically conducted for this LOU. M39 is the closest well sampled, 250 feet to the north (downgradient).

**Are Phase A Sample Locations in “Worst Case” Areas?** No

**Is Phase B Investigation Recommended?** Yes

**Proposed Phase B Soil Investigation/Rationale:**

- Boring SA62 located in Pond C-1 at low point of Pond Floor to evaluate for potential subsurface impacts from possible liner leaks.
- Boring SA71 located adjacent to the north and downgradient of Pond C-1 to evaluate for impacts from potential over-topping of pond.
- Boring SA61 located near southeast corner of the Pond C-1 near pipeline discharge point to evaluate potential



**Summary of Available Data for LOU 20 in EA08**  
Tronox Facility – Henderson, Nevada

impacts from overfills and surface releases.

- SA140 located near the southwest corner of Pond C-1 pipeline discharge point to evaluate for potential impacts from overfills and surface releases.
- SA107 is located near the associated pipeline to C-1 Pond to evaluate for potential pipeline leaks.
- Note: Drill rig access is limited in the area between LOU 20 and LOU 21. Therefore no borings are proposed in this area.

**Proposed Chemical Classes for Phase B Investigation for soils:**

LOU Specific Analytes:

- Metals (Phase A list);
- Wet Chemistry

Site-wide Analytes:

- Perchlorate
- Ammonia

**Proposed Phase B Groundwater Investigation/Rationale:**

- Well M35 is located upgradient to Pond C-1.
- Well M39 is located downgradient to Pond C-1.
- Well M19 is located cross-gradient and only 50 feet from Pond C-1.
- Wells M31A, M34, and M52 are located close to the alignment of associated piping that runs from the Unit 4/Unit 5 process area to the C-1 Pond.
- Well M02A is located near the alignment of associated piping that runs from the Steam Plant to the C-1 Pond.

**Proposed Phase B Constituents List for Groundwater:**

LOU Specific:

- Metals (Phase A list)
- Wet Chemistry

*what is Analyte*

Site-wide Analyses:

- Perchlorate
- Ammonia
- VOCs
- Radionuclides
- Organochlorine Pesticides

*- need to incorporate phase A results*

**Goal of Closure**

- Unrestricted Closure, for commercial/industrial future use



**Summary of Available Data for LOU 20 in EA08**  
Tronox Facility – Henderson, Nevada

**LOU MAP**

**Summary of Available Data for LOU 20 in EA08**  
Tronox Facility – Henderson, Nevada

**Soil and Groundwater Characterization Data**

LOU 20 Table 1  
Soil and Groundwater Characterization Data - Wet Chemistry  
Tronox Facility - Henderson, Nevada

Soil Characterization Data

C-1 Pond and Associated Piping							
Sampling Program	SI	Ph A	Ph A	Ph A	Ph A	Ph A	
Boring No.	BD-B05	SA17	SA17	SA17	SA17	SA17	
Sample ID	BD-B05	SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25	
Sample Depth (ft)	1	0.5	0.5	10	20	25	
Sample Date	4/12/1996	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006	
Wet Chemistry Parameter							Units
Percent moisture		14.7	13.4	12.1	5.8	19.0	percent
Alkalinity (as CaCO3)		160	109	216	217	389	mg/kg
Bicarbonate		524	499	563	439	1260	mg/kg
Total Alkalinity		685	608	778	656	1640	mg/kg
Ammonia (as N)		5.9 UJ	5.8 UJ	5.7 UJ	5.3 UJ	6.2 UJ	mg/kg
Cyanide		R	R	R	R	R	mg/kg
MBAS		2.4 U	2.4 J	2.2 U	2.1 U	2.6 U	mg/kg
pH (solid)	8.1	9.6	9.6	9.7	9.8	8.5	none
Bromide		2.9 U	2.9 U	2.8 U	2.7 U	1.5 J	mg/kg
Chlorate	0.17 B	5.9 UJ	5.8 U	5.7 U	5.3 U	82.9	mg/kg
Chloride		8.7	8.1	5.2	1.9 J	155	mg/kg
Nitrate (as N)		0.48 J+	0.77 J+	0.96 J+	0.21 U	2.5 J+	mg/kg
Nitrite		0.95	0.25	0.83	0.31	0.37	mg/kg
ortho-Phosphate		10.6 J	4.5 J	5.7 U	5.3 U	6.2 U	mg/kg
Sulfate		28.8	24.9	44.4	152	685	mg/kg
Total Organic Carbon		3900	4900	3500	2000	13100	mg/kg

Groundwater Characterization Data

C-1 Pond and Associated Piping				
Sampling Program	Ph A	Ph A	Ph A	
Well ID	M2A	M31A	M39	
Sample ID	M2A	M31A	M39	
Sample Date	12/04/2006	12/06/2006	12/05/2006	
Wet Chemistry Parameters				Units
Total Dissolved Solids	12700	9720	7270	mg/L
Total Suspended Solids	36.0 J	25.0 J	56.0 J	mg/L
Alkalinity (as CaCO3)	5.0 U	5.0 U	5.0 U	mg/L
Bicarbonate	92.0	108	137	mg/L
Total Alkalinity	92.0	108	137	mg/L
Ammonia (as N)	50.0 U	1270	50.0 U	ug/L
MBAS	0.63	1.8 J	1.2 J	mg/L
Cyanide	R	R	R	ug/L
pH (liquid)	7.2 J	7.1 J	7.1 J	none
Specific Conductance	2450 J+	2630 J+	2360 J+	umhos/cm
Bromide	0.54	25.0 U	2.7	mg/L
Chlorate	4600	3320	1620	mg/L
Chloride	1800	1130	1280	mg/L
Nitrate (as N)	13.6	17.6	12.1	mg/L
Nitrite	22.5	10.0 U	10.0 U	mg/L
ortho-Phosphate	500 U	500 U	5.0 U	mg/L
Sulfate	1250	1480	2720	mg/L
Total Organic Carbon	50.0 U	50.0 U	50.0 U	mg/L

LOU 20 Table 2  
Soil Characterization Data - Dioxins and Dibenzofurans  
Tronox Facility - Henderson, Nevada

Sampling Program	C-1 Pond and Associated Piping		Units
	Ph A	Ph A	
Sample ID	SA17-0.5	SA17-0.5D	
Sample Depth (ft)	0.5	0.5	
Sample Date	11/15/2006	11/15/2006	
<b>Chemical Name</b>			
Dioxin 8290 SCREEN Total TEQ - ENSR Calculated (a) ng/kg	13.64		ng/kg
Dioxin SW 846 8290 Total TEQ - ENSR Calculated (a) ng/kg			ng/kg
Dioxin 8290 SCREEN Total TEQ - ENSR Calculated (b) ng/kg	13.66		ng/kg
Dioxin SW 846 8290 Total TEQ - ENSR Calculated (b) ng/kg			ng/kg
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.752	3.563	ng/kg
1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin	0.279	0.845	ng/kg
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.818	1.760	ng/kg
1,2,3,4,7,8-Hexachlorodibenzofuran	1.703	3.450	ng/kg
1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin	0.062 U	0.099 U	ng/kg
1,2,3,6,7,8-Hexachlorodibenzofuran	0.773	1.330	ng/kg
1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin	0.049 U	0.160	ng/kg
1,2,3,7,8,9-Hexachlorodibenzofuran	0.700	1.218	ng/kg
1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin	0.100	0.163	ng/kg
1,2,3,7,8-Pentachlorodibenzofuran	6.375	11.863	ng/kg
1,2,3,7,8-Pentachlorodibenzo-p-Dioxin	0.042 U	0.220	ng/kg
2,3,4,6,7,8-Hexachlorodibenzofuran	0.440	1.355	ng/kg
2,3,4,7,8-Pentachlorodibenzofuran	3.691	6.606	ng/kg
2,3,7,8-Tetrachlorodibenzofuran	74.100	144.703	ng/kg
2,3,7,8-Tetrachlorodibenzo-p-Dioxin	0.121	0.194	ng/kg
Octachlorodibenzofuran	6.847	14.903	ng/kg
Octachlorodibenzo-p-Dioxin	2.193	5.440	ng/kg
Octachlorodibenzo-p-Dioxin			ng/kg
Tetrachlorinated Dibenzofurans, (Total)			ng/kg
Total HpCDD			ng/kg
Total HpCDF			ng/kg
Total HxCDD			ng/kg
Total HxCDF			ng/kg
Total PeCDD			ng/kg
Total PeCDF			ng/kg
Total TCDD			ng/kg

Notes:

(a) Calculated assuming 0 for non-detected congeners and 2006 toxic equivalency factors (TEFs).

(b) ?

LOU 20 Table 3  
Soil Characterization Data - Metals  
Tronox Facility - Henderson, Nevada

Sampling Program	SI	C-1 Pond and Associated Piping					Units
		Ph A	Ph A	Ph A	Ph A	Ph A	
Sample ID	BD-B05	SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25	
Sample Depth (ft)	1	0.5	0.5	10	20	25	
Sample Date	4/12/1996	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006	
<b>Metals</b>							
Aluminum		13300	14300	8000	4050	5120	mg/kg
Antimony		0.27 J-	0.25 J-	0.21 J-	0.094 J-	0.16 J-	mg/kg
Arsenic	13 B	22.1	37.0	4.2	13.0	13.7	mg/kg
Barium	300 B	142 J	185 J	202 J	136 J	52.7 J	mg/kg
Beryllium		0.93	0.88	0.65	0.30	0.35 J	mg/kg
Boron		8.5 UJ	8.9 UJ	6.9 UJ	6.8 UJ	24.8 UJ	mg/kg
Cadmium		0.089	0.10	0.24	0.091	0.066	mg/kg
Calcium		7470	11600	16700	25900	47300	mg/kg
Chromium (Total)	490	44.6 J-	81.9 J-	23.2 J-	12.5 J-	22.2 J-	mg/kg
Chromium-hexavalent		0.58	1.2	0.16 J	0.39	0.19 J	mg/kg
Cobalt		12.2 J-	11.8 J-	7.1 J-	4.6 J-	2.7 J-	mg/kg
Copper		223 J	175 J	13.6 J	8.3 J	6.7 J	mg/kg
Iron		12600	11500	13300	7190	6130	mg/kg
Lead	240 J	28.6	36.3	8.6	5.1	4.3	mg/kg
Magnesium		11100 J-	10300 J-	7970 J-	5300 J-	36800 J-	mg/kg
Manganese		349	373	325	171	122	mg/kg
Molybdenum		1.1 J	2.4	0.46 J	0.44 J	0.29 J	mg/kg
Nickel		19.3 J-	17.8 J-	15.0 J-	10.7 J-	7.2 J-	mg/kg
Platinum		0.029 J	0.027 J	0.022 J	0.011 U	0.012 U	mg/kg
Potassium		2270	2750	1680	1050	1710	mg/kg
Selenium		0.13 UJ	0.13 UJ	0.12 UJ	0.11 UJ	0.13 UJ	mg/kg
Silver		0.15 J	0.14 J	0.48	0.097 J	0.20 J	mg/kg
Sodium		1420 J-	1860 J-	1090 J-	858 J-	978 J-	mg/kg
Strontium		112 J	165 J	110 J	137 J	220 J	mg/kg
Thallium		0.11 U	0.095 U	0.38 U	0.074 U	0.086 U	mg/kg
Tin		0.52	0.48	0.56	0.32	0.30	mg/kg
Titanium		480	438	638	298	347	mg/kg
Tungsten		9.1 J-	13.9 J-	1.8 J-	2.5 J-	0.64 UJ	mg/kg
Uranium		1.8	2.0	1.6	2.6	3.7	mg/kg
Vanadium	32 J	31.8 J-	30.5 J-	37.9 J-	31.9 J-	26.7 J-	mg/kg
Zinc		206 J-	152 J-	28.9 J-	17.0 J-	26.1 UJ	mg/kg
Mercury	0.53 J	0.0078 UJ	0.0077 UJ	0.0076 UJ	0.0071 UJ	0.0083 UJ	mg/kg

SI  
Ph A  
J  
U  
B

LOU 20 Table 4  
Groundwater Characterization Data - Metals  
Tronox Facility - Henderson, Nevada

C-1 Pond and Associated Piping					
Sampling Program	Ph A	Ph A	Ph A		
Well ID:	M02A	M31A	M39		
Sample ID	M02A-Z	M31A-Z	M39-Z	M39-ZD	
Sample Depth (ft)					
Sample Date	05/09/2007	05/09/2007	05/10/2007	05/10/2007	
Metals					Unit
Aluminum	393 U	760 J	393 U	393 U	ug/L
Antimony	25.0 U	25.0 U	25.0 U	25.0 U	ug/L
Arsenic	100 U	127 J	103 J	100 U	ug/L
Barium	46.5 J	42.5 J	17.0 J	17.6 J	ug/L
Beryllium	4.4 U	4.4 U	4.4 U	4.4 U	ug/L
Boron	3210	6950	10800	10900	ug/L
Cadmium	2.9 U	2.9 U	2.9 U	2.9 U	ug/L
Calcium	713000	617000	620000	633000	ug/L
Chromium (Total)	18100	12300	4580	4700	ug/L
Chromium-hexavalent	18700 J	12900 J	4720 J	4640	ug/L
Cobalt	15.7 U	15.7 U	15.7 U	15.7 U	ug/L
Copper	12.5 U	12.5 U	12.5 U	12.5 U	ug/L
Iron	470 UJ	470 UJ	R	R	ug/L
Lead	24.6 U	24.6 U	24.6 U	24.6 U	ug/L
Magnesium	386000	275000	408000	414000	ug/L
Manganese	17.1 U	127 U	17.1 U	17.1 U	ug/L
Molybdenum	25.0 U	25.0 U	25.0 U	25.0 U	ug/L
Nickel	25.8 U	25.8 U	25.8 U	25.8 U	ug/L
Platinum	5.0 U	5.0 U	5.0 U	5.0 U	ug/L
Potassium	34100	23600	24200	24700	ug/L
Selenium	50.0 U	50.0 U	50.0 U	50.0 U	ug/L
Silver	10.1 U	10.1 U	10.1 U	10.1 U	ug/L
Sodium	1620000	1650000	864000	866000	ug/L
Strontium	18600	14800	14500	14700	ug/L
Thallium	16.0 U	16.0 U	16.0 U	16.0 U	ug/L
Tin	10.0 U	10.0 U	10.0 U	10.0 U	ug/L
Titanium	19.6 U	33.6 J	19.6 U	19.6 U	ug/L
Tungsten	25.0 U	25.0 U	25.0 U	25.0 U	ug/L
Uranium	19.0 J	28.9 J	106	106	ug/L
Vanadium	80.0 U	80.0 U	80.0 UJ	80.0 UJ	ug/L
Zinc	146 J	97.5 J	50.0 U	50.0 U	ug/L
Mercury	0.13 J+	0.11 J+	0.13 U	0.14 U	ug/L

U  
J  
K



**LOU 20 Table 5**  
**Groundwater Characterization Data - Routine Monitoring**  
 Tronox LLC, Henderson, Nevada

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

Source:  
 November 2007 Quarterly Performance Report  
 Remediation Systems

**LOU 20 Table 5**  
**Groundwater Characterization Data - Routine Monitoring**  
 Tronox LLC, Henderson, Nevada

Well ID units	Date	Depth to water feet	Perchlorate mg/l	Qual	Total Chromium mg/l	Qual	TDS mg/l	Qual	Nitrate (as N) mg/l	Qual	Chlorate mg/l	Qual
M-39	2/2/2006	30.42	380	d	4	d						
M-39	5/3/2006	30.36	320	d	3.7	d	4300		2.6	d	1100	d
M-39	8/2/2006	31.20	320	d	4.3	d	4560		3.5	d	1220	d
M-39	11/1/2006	31.53	400	d	4.5	d	6310		10.8	d	1370	d
M-39	1/31/2007	31.78	390		4.5		6730					
M-39	5/2/2007	31.67	403		4.7		6990		10.3		1380	
M-39	8/1/2007	32.10	489		4.6		7280					
M-52	2/2/2006	---	1200	d	10	d						
M-52	5/4/2006	---	1100	d	9.6	d	6760					
M-52	11/2/2006	---	1020	d	9.1	d	7190					
M-52	1/31/2007	---	946		9		8600					
M-52	5/2/2007	---	720		7.9		7450					

**Explanation**  
 < = less than the reporting limit  
 Blank cell or --- = no data and or no qualifier  
 Qual = data qualifiers applied by laboratory or during data validation  
 TDS = Total Dissolved Solids  
 mg/l = milligram per liter

**Laboratory Qualifiers:**  
 d = the sample was diluted  
 u = the analyte was not detected above the sample reporting limit  
 ud = the sample was diluted and was not detected above the sample reporting limit

**Validation Qualifiers:**  
 J = the result is an estimated quantity  
 J- = the result is an estimated quantity and the result may be biased low  
 U = the analyte was analyzed for, but was not detected above the sample reporting limit  
 UJ = the sample was not detected above the sample reporting limit and the reporting limit is approximate

**LOU 20 Table 6**  
**Groundwater Characterization Data**  
 Tronox LLC Facility - Henderson, Nevada

*what do  
 count w/TS*

**Sampling Program: Routine Monitoring**

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

**Notes:**

ft bgs = feet below ground surface  
 ppm = parts per million  
 $\mu\text{mho/cm}$  = micromhos per centimeter  
 ft TOC = feet from Top of Casing

EC = Electrical Conductivity  
 Cr-total: Total Chromium  
 Mn = Manganese  
 $\text{ClO}_4$ : Perchlorate

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

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

LOU 20 Table 7  
 Soil and Groundwater Characterization Data - Organochlorine Pesticides (OCP)  
 Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data

Sampling Program	C-1 Pond & Assoc. Piping			Unit
	SI	Ph A	Ph A	
Boring No.	BD-B05	SA17	SA17	
Sample ID	BD-B05	SA17-0.5	SA17-0.5D	
Sample Depth (ft)	1	0.5	0.5	
Sample Date	4/12/1996	11/15/2006	11/15/2006	
<b>Organochlorine Pesticides</b>				
4,4'-DDD		0.0020 U	0.0020 U	mg/kg
4,4'-DDE	<b>0.16</b>	<b>0.014</b>	<b>0.015</b>	mg/kg
4,4'-DDT	<b>0.53</b>	<b>0.0068</b>	<b>0.0083</b>	mg/kg
Aldrin		0.0020 U	0.0020 U	mg/kg
Alpha-BHC	ND	0.0020 U	0.0020 U	mg/kg
Alpha-chlordane		0.0020 U	0.0020 U	mg/kg
Beta-BHC	ND	0.0020 U	<b>0.0026</b>	mg/kg
Delta-BHC		0.0020 U	0.0020 U	mg/kg
Dieldrin		0.0020 U	0.0020 U	mg/kg
Endosulfan I		0.0020 U	0.0020 U	mg/kg
Endosulfan II		0.0020 U	0.0020 U	mg/kg
Endosulfan Sulfate		0.0020 U	0.0020 U	mg/kg
Endrin		0.0020 U	0.0020 U	mg/kg
Endrin Aldehyde		0.0020 U	0.0020 U	mg/kg
Endrin Ketone		0.0020 U	0.0020 U	mg/kg
Gamma-BHC (Lindane)		0.0020 U	0.0020 U	mg/kg
Gamma-Chlordane		0.0020 U	0.0020 U	mg/kg
Heptachlor		0.0020 U	0.0020 U	mg/kg
Heptachlor Epoxide		0.0020 U	0.0020 U	mg/kg
Methoxychlor		<b>0.045 J</b>	<b>0.055 J</b>	mg/kg
Tech-Chlordane		0.012 U	0.012 U	mg/kg
Toxaphene		0.059 U	0.058 U	mg/kg

LOU 20 Table 7

~~Soil and~~ Groundwater Characterization Data - Organochlorine Pesticides (OCP)  
Tronox LLC Facility - Henderson, Nevada


Groundwater Characterization Data

Sampling Program	C-1 Pond and Associated Piping			Unit
	Ph A	Ph A	Ph A	
Well ID	M2A	M31A	M39	
Sample ID	M2A	M31A	M39	
Sample Date	12/04/2006	12/06/2006	12/05/2006	
<b>Organochlorine Pesticides</b>				
4,4'-DDD	0.050 U	0.050 U	0.050 U	ug/L
4,4'-DDE	0.050 U	0.050 U	0.050 U	ug/L
4,4'-DDT	0.050 U	0.050 U	0.050 U	ug/L
Aldrin	0.050 U	0.050 U	0.050 U	ug/L
Alpha-BHC	0.050 U	0.050 U	0.050 U	ug/L
Alpha-chlordane	0.050 U	0.050 U	0.050 U	ug/L
Beta-BHC	0.050 U	0.050 U	0.050 U	ug/L
Delta-BHC	0.050 U	0.050 U	0.050 U	ug/L
Dieldrin	0.050 U	0.050 U	0.050 U	ug/L
Endosulfan I	0.050 U	0.050 U	0.050 U	ug/L
Endosulfan II	0.050 U	0.050 U	0.050 U	ug/L
Endosulfan Sulfate	0.050 U	0.050 U	0.050 U	ug/L
Endrin	0.050 U	0.050 U	0.050 U	ug/L
Endrin Aldehyde	0.050 U	0.050 U	0.050 U	ug/L
Endrin Ketone	0.050 U	0.050 U	0.050 U	ug/L
Gamma-BHC (Lindane)	0.050 U	0.050 U	0.050 U	ug/L
Gamma-Chlordane	0.050 U	0.050 U	0.050 U	ug/L
Heptachlor	0.050 U	0.050 U	0.050 U	ug/L
Heptachlor Epoxide	0.050 U	0.050 U	0.050 U	ug/L
Methoxychlor	0.10 U	0.10 U	0.10 U	ug/L
Tech-Chlordane	0.50 U	0.50 U	0.50 U	ug/L
Toxaphene	2.0 U	2.0 U	2.0 U	ug/L

LOU 20 Table 8  
**Soil and Groundwater Characterization Data - Organophosphorus Pesticides (OPPs)**  
 Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data

Sampling Program	C-1 Pond and Associated Piping		
	Ph A	Ph A	
Boring No.	SA17	SA17	
Sample ID	SA17-0.5	SA17-0.5D	
Sample Depth (ft)	0.5	0.5	
Sample Date	11/15/2006	11/15/2006	
<b>OPPs</b>			<b>Unit</b>
Azinphos-methyl	0.015 UJ	0.015 UJ	mg/kg
Bolstar	0.015 U	0.015 U	mg/kg
Chlorpyrifos	0.023 UJ	0.023 UJ	mg/kg
Coumaphos	0.015 UJ	0.015 UJ	mg/kg
Demeton-O	0.046 UJ	0.092 J	mg/kg
Demeton-S	0.018 UJ	0.017 UJ	mg/kg
Diazinon	0.026 U	0.025 U	mg/kg
Dichlorvos	0.027 U	0.027 U	mg/kg
Dimethoate	0.026 UJ	0.025 UJ	mg/kg
Disulfoton	0.056 U	0.055 U	mg/kg
EPN	0.015 U	0.015 U	mg/kg
Ethoprop	0.018 U	0.017 U	mg/kg
Ethyl Parathion	0.021 U	0.021 U	mg/kg
Famphur	0.015 UJ	0.015 UJ	mg/kg
Fensulfothion	0.015 U	0.015 U	mg/kg
Fenthion	0.039 U	0.038 U	mg/kg
Malathion	0.018 U	0.017 U	mg/kg
Merphos	0.035 U	0.035 U	mg/kg
Methyl parathion	0.023 U	0.023 U	mg/kg
Mevinphos	0.018 U	0.017 U	mg/kg
Naled	0.039 UJ	0.038 UJ	mg/kg
Phorate	0.023 U	0.023 U	mg/kg
Ronnel	0.021 UJ	0.021 UJ	mg/kg
Stirphos	0.018 UJ	0.017 UJ	mg/kg
Sulfotep	0.023 U	0.023 U	mg/kg
Thionazin	0.021 U	0.021 U	mg/kg
Tokuthion	0.023 U	0.023 U	mg/kg
Trichloronate	0.023 UJ	0.023 UJ	mg/kg

  
**LOU 20 Table 8**  
**Soil and Groundwater Characterization Data - Organophosphorus Pesticides (OPPs)**  
**Troy LLC Facility - Henderson, Nevada**

Groundwater Characterization Data

Sampling Program	C-1 Pond and Associated Piping			Unit
	Ph-A	Ph A	Ph A	
	Well ID	M31A	M39	
	Sample ID	M31A	M39	
Sample Date	12/04/2006	12/06/2006	12/05/2006	
<b>OPPs</b>				
Azinphos-methyl	2.5 U	2.5 U	2.5 U	ug/L
Bolstar	1.0 U	1.0 U	1.0 U	ug/L
Chlorpyrifos	1.0 U	1.0 U	1.0 U	ug/L
Coumaphos	1.0 U	1.0 U	1.0 U	ug/L
Demeton-O	1.0 U	1.0 U	1.0 U	ug/L
Demeton-S	1.0 UJ	1.0 U	1.0 UJ	ug/L
Diazinon	1.0 U	1.0 U	1.0 U	ug/L
Dichlorvos	1.0 U	1.0 U	1.0 U	ug/L
Dimethoate	1.0 U	1.0 U	1.0 U	ug/L
Disulfoton	0.50 U	0.50 U	0.50 U	ug/L
EPN	1.2 U	1.2 U	1.2 U	ug/L
Ethoprop	0.50 U	0.50 U	0.50 U	ug/L
Ethyl Parathion	1.0 U	1.0 U	1.0 U	ug/L
Famphur	1.0 U	1.0 U	1.0 U	ug/L
Fensulfothion	2.5 U	2.5 U	2.5 U	ug/L
Fenthion	2.5 U	2.5 U	2.5 U	ug/L
Malathion	1.2 U	1.2 U	1.2 U	ug/L
Merphos	5.0 U	5.0 U	5.0 U	ug/L
Methyl parathion	4.0 U	4.0 U	4.0 U	ug/L
Mevinphos	6.2 U	6.2 U	6.2 U	ug/L
Naled	1.0 UJ	1.0 U	1.0 UJ	ug/L
Phorate	1.2 U	1.2 U	1.2 UJ	ug/L
Ronnel	10 U	10 U	10 U	ug/L
Stirphos	3.5 U	3.5 U	3.5 U	ug/L
Sulfotep	1.5 U	1.5 U	1.5 U	ug/L
Thionazin	1.0 U	1.0 U	1.0 U	ug/L
Tokuthion	1.6 U	1.6 U	1.6 U	ug/L
Trichloronate	0.50 U	0.50 U	0.50 U	ug/L

LOU 20 Table 9  
 Soil and Groundwater Characterization Data - PCBs  
 Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data  
 C-1 Pond and Associated Piping

	C-1 Pond and Associated Piping					
Sampling Program	Ph A	Ph A	Ph A	Ph A	Ph A	
Boring ID	SA17	SA17	SA17	SA17	SA17	
Sample ID	SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25	
Sample Depth (ft)	0.5	0.5	10	20	25	
Sample Date	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006	
<b>PCBs</b>						<b>Unit</b>
Aroclor-1016	0.039 U	0.038 U	0.038 U	0.035 U	0.041 U	mg/kg
Aroclor-1221	0.039 U	0.038 U	0.038 U	0.035 U	0.041 U	mg/kg
Aroclor-1232	0.039 U	0.038 U	0.038 U	0.035 U	0.041 U	mg/kg
Aroclor-1242	0.039 U	0.038 U	0.038 U	0.035 U	0.041 U	mg/kg
Aroclor-1248	0.039 U	0.038 U	0.038 U	0.035 U	0.041 U	mg/kg
Aroclor-1254	0.039 U	0.038 U	0.038 U	0.035 U	0.041 U	mg/kg
Aroclor-1260	0.039 U	0.038 U	0.038 U	0.035 U	0.041 U	mg/kg

Groundwater Characterization Data  
 C-1 Pond and Associated Piping

	C-1 Pond and Associated Piping			
Sampling Program	Ph A	Ph A	Ph A	
Well ID	M2A	M31A	M39	
Sample ID	M2A	M31A	M39	
Sample Date	12/04/2006	12/06/2006	12/05/2006	
<b>PCBs</b>				<b>Unit</b>
Aroclor-1016	0.10 U	0.10 U	0.10 U	ug/L
Aroclor-1221	0.10 U	0.10 U	0.10 U	ug/L
Aroclor-1232	0.10 U	0.10 U	0.10 U	ug/L
Aroclor-1242	0.10 U	0.10 U	0.10 U	ug/L
Aroclor-1248	0.10 U	0.10 U	0.10 U	ug/L
Aroclor-1254	0.10 U	0.10 U	0.10 U	ug/L
Aroclor-1260	0.10 U	0.10 U	0.10 U	ug/L



LOU 20 Table 10  
 Soil and Groundwater Characterization Data - Perchlorate  
 Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data  
 C-1 Pond and Associated Piping

Boring ID	Sample ID	Sample Depth (ft)	Sample Date	Perchlorate ug/kg	Sampling Program
SA17	SA17-0.5	0.5	11/15/2006	366	Ph A
	SA17-0.5D	0.5	11/15/2006	302	Ph A
	SA17-10	10	11/15/2006	122	Ph A
	SA17-20	20	11/15/2006	792	Ph A
	SA17-25	25	11/15/2006	13500	Ph A

Groundwater Characterization Data  
 C-1 Pond and Associated Piping

Well ID Number	Sample ID	Sample Date	Perchlorate	Units	Sampling Program
M2A	M2A	12/04/2006	465000	ug/L	Ph A
M31A	M31A	12/06/2006	1740000 J+	ug/L	Ph A
M39	M39	12/05/2006	403000 J+	ug/L	Ph A

LOU 20 Table 11  
Soil and Groundwater Characterization Data - Radionuclides  
Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data  
C-1 Pond and Associated Piping

Boring ID Number	Sample ID	Sample Depth (ft)	Date	Ra-226 (gamma) pci/g	Ra-228 (gamma) pci/g	Th-228 (TH MOD) pci/g	Th-230 (TH MOD) pci/g	Th-232 (TH MOD) pci/g	U-233/234 (U MOD) pci/g	U-235/236 (U MOD) pci/g	U-238 (U MOD) pci/g	Sampling Program
SA17	SA17-0.5	0.5	11/15/2006	1.12 J	1.75							Ph A
	SA17-0.5D	0.5	11/15/2006	1.12 J	1.8							Ph A
	SA17-10	10	11/15/2006	1.2 J	1.55							Ph A
	SA17-20	20	11/15/2006	1.8 J	1.99							Ph A
	SA17-25	25	11/15/2006	1.81 J	1.32							Ph A

Groundwater Characterization Data  
C-1 Pond and Associated Piping

Well ID Number	Sample ID	Date	Ra-226 pci/L	Ra-228 pci/L	Th-228 pci/L	Th-230 pci/L	Th-232 pci/L	U-233/234 pci/L	U-235/236 pci/L	U-238 pci/L	Sampling Program
M2A	M2A-Z	05/09/2007	0.0440 U	0.402 UJ	0.0584 U	0.0798 U	0.0285 U	13.7	0.408	8.09	Ph A
M31	M31A-Z	05/09/2007	0.312 J	0.862 UJ	0.0105 U	5.00 J	0.102 J	55.1	1.19	34.9	Ph A
M39	M39-Z	05/10/2007	0.191 J	0.277 U	0.0253 U	0.428 B	0.122 J	53.1	1.43	33.3	Ph A
M39	M39-ZD	05/10/2007	0.185 J	0.106 U	0.0253 U	0.428 B	0.122 J	53.1	1.43	33.3	Ph A

LOU 20 Table 12  
Soil and Groundwater Characterization Data - SVOC  
Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data

C-1 Pond and Associated Piping						
Sampling Program		Ph A	Ph A	Ph A	Ph A	Ph A
Boring No.		SA17	SA17	SA17	SA17	SA17
Sample ID		SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25
Sample Depth (ft)	Analytical	0.5	0.5	10	20	25
Sample Date	Method	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006
SVOC		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
1,4-Dioxane	non-SIM	77 U	380 U	380 U	350 U	410 U
2-Methylnaphthalene	non-SIM	390 U	380 U	380 U	350 U	410 U
2-Methylnaphthalene	SIM	7.7 U				
Acenaphthene	non-SIM	390 U	380 U	380 U	350 U	410 U
Acenaphthene	SIM	7.7 U				
Acenaphthylene	non-SIM	390 U	380 U	380 U	350 U	410 U
Acenaphthylene	SIM	7.7 U				
Anthracene	non-SIM	390 U	380 U	380 U	350 U	410 U
Anthracene	SIM	7.7 U				
Benz(a)anthracene	non-SIM	390 U	380 U	380 U	350 U	410 U
Benz(a)anthracene	SIM	7.7 U				
Benzo(a)pyrene	non-SIM	390 U	380 U	380 U	350 U	410 U
Benzo(a)pyrene	SIM	7.7 U				
Benzo(b)fluoranthene	non-SIM	390 U	380 U	380 U	350 U	410 U
Benzo(b)fluoranthene	SIM	7.7 U				
Benzo(g,h,i)perylene	non-SIM	390 U	380 U	380 U	350 U	410 U
Benzo(g,h,i)perylene	SIM	7.7 U				
Benzo(k)fluoranthene	non-SIM	390 U	380 U	380 U	350 U	410 U
Benzo(k)fluoranthene	SIM	7.7 U				
bis(2-Ethylhexyl)phthalate	non-SIM	390 U	380 U	380 U	350 U	410 U
Butyl benzyl phthalate	non-SIM	390 U	380 U	380 U	350 U	410 U
Chrysene	non-SIM	390 U	380 U	380 U	350 U	410 U
Chrysene	SIM	7.7 U				
Dibenz(a,h)anthracene	non-SIM	390 U	380 U	380 U	350 U	410 U
Dibenz(a,h)anthracene	SIM	7.7 U				
Diethyl phthalate	non-SIM	390 U	380 U	380 U	350 U	410 U
Dimethyl phthalate	non-SIM	390 U	380 U	380 U	350 U	410 U
Di-N-Butyl phthalate	non-SIM	390 U	380 U	380 U	350 U	410 U
Di-N-Octyl phthalate	non-SIM	390 U	380 U	380 U	350 U	410 U
Fluoranthene	non-SIM	390 U	380 U	380 U	350 U	410 U
Fluoranthene	SIM	7.7 U				
Fluorene	non-SIM	390 U	380 U	380 U	350 U	410 U
Fluorene	SIM	7.7 U				
Hexachlorobenzene	non-SIM	61 J	45 J	57 J	350 U	410 U
Hexachlorobenzene	SIM	60				
Indeno(1,2,3-cd)pyrene	non-SIM	390 UJ	380 UJ	380 UJ	350 UJ	410 UJ
Indeno(1,2,3-cd)pyrene	SIM	7.7 U				
Naphthalene	non-SIM	5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Naphthalene	non-SIM	390 U	380 U	380 U	350 U	410 U
Naphthalene	SIM	7.7 U				
Nitrobenzene	non-SIM	390 U	380 U	380 U	350 U	410 U

LOU 20 Table 12  
Soil and Groundwater Characterization Data - SVOC  
Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data

		C-1 Pond and Associated Piping				
Sampling Program		Ph A	Ph A	Ph A	Ph A	Ph A
Boring No.		SA17	SA17	SA17	SA17	SA17
Sample ID		SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25
Sample Depth (ft)	Analytical	0.5	0.5	10	20	25
Sample Date	Method	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006
<b>SVOC</b>		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Octachlorostyrene	non-SIM	390 U	380 U	380 U	350 U	410 U
Phenanthrene	non-SIM	390 U	380 U	380 U	350 U	410 U
Phenanthrene	SIM	7.7 U				
Pyrene	non-SIM	390 U	380 U	380 U	350 U	410 U
Pyrene	SIM	7.7 U				
Pyridine	non-SIM	1900 U	1800 U	1800 U	1700 U	2000 U

		C-1 Pond and Associated Piping		
Sampling Program		Ph A	Ph A	Ph A
Well No.		M2A	M31A	M39
Sample ID	Analytic	M2A	M31A	M39
Sample Date	Method	12/04/2006	12/06/2006	12/05/2006
<b>SVOCs</b>		ug/L	ug/L	ug/L
1,4-Dioxane	non-SIM	10 U	10 U	10 U
2-Methylnaphthalene	non-SIM	10 U	10 U	10 U
2-Methylnaphthalene	SIM		0.20 U	
Acenaphthene	non-SIM	10 UJ	10 UJ	10 U
Acenaphthene	SIM		0.20 U	
Acenaphthylene	non-SIM	R	R	10 U
Acenaphthylene	SIM		0.20 U	
Anthracene	non-SIM	10 UJ	10 U	10 U
Anthracene	SIM		0.20 U	
Benz(a)anthracene	non-SIM	10 U	10 U	10 U
Benz(a)anthracene	SIM		0.20 U	
Benzo(a)pyrene	non-SIM	10 U	10 U	10 U
Benzo(a)pyrene	SIM		0.20 U	
Benzo(b)fluoranthene	non-SIM	10 U	10 U	10 U
Benzo(b)fluoranthene	SIM		0.20 U	
Benzo(g,h,i)perylene	non-SIM	10 U	10 U	10 U
Benzo(g,h,i)perylene	SIM		0.20 U	
Benzo(k)fluoranthene	non-SIM	10 U	10 U	10 U
Benzo(k)fluoranthene	SIM		0.20 U	
bis(2-Ethylhexyl)phthalate	non-SIM	10 U	10 U	10 U
Butyl benzyl phthalate	non-SIM	10 U	10 U	10 U
Chrysene	non-SIM	10 U	10 U	10 U
Chrysene	SIM		0.20 U	
Dibenz(a,h)anthracene	non-SIM	10 U	10 U	10 U
Dibenz(a,h)anthracene	SIM		0.20 U	

LOU 20 Table 12  
Soil and Groundwater Characterization Data - SVOC  
Tronox LLC Facility - Henderson, Nevada

Groundwater Characterization Data				
Sampling Program	Well No.	C-1 Pond and Associated Piping		
		Ph A	Ph A	Ph A
Sample ID	Analytic	M2A	M31A	M39
Sample Date	Method	12/04/2006	12/06/2006	12/05/2006
<b>SVOCs</b>		ug/L	ug/L	ug/L
Diethyl phthalate	non-SIM	10 U	10 U	10 U
Dimethyl phthalate	non-SIM	10 U	10 U	10 U
Di-N-Butyl phthalate	non-SIM	10 U	10 U	10 U
Di-N-Octyl phthalate	non-SIM	10 U	10 U	10 U
Fluoranthene	non-SIM	10 U	10 U	10 U
Fluoranthene	SIM		0.23 U	
Fluorene	non-SIM	10 U	10 U	10 U
Fluorene	SIM		0.20 U	
Hexachlorobenzene	non-SIM	10 U	10 U	10 U
Hexachlorobenzene	SIM		0.20 U	
Indeno(1,2,3-cd)pyrene	non-SIM	10 U	10 UJ	10 U
Indeno(1,2,3-cd)pyrene	SIM		0.20 U	
Naphthalene	non-SIM	5.0 U	5.0 U	5.0 U
Naphthalene	non-SIM	10 U	10 UJ	10 U
Naphthalene	SIM		0.20 U	
Nitrobenzene	non-SIM	10 U	10 U	10 U
Octachlorostyrene	non-SIM	10 U	10 U	10 U
Phenanthrene	non-SIM	10 U	10 U	10 U
Phenanthrene	SIM		0.20 U	
Pyrene	non-SIM	10 U	10 U	10 U
Pyrene	SIM		0.20 U	
Pyridine	non-SIM	20 UJ	20 U	20 U

LOU 20 Table 13  
 Soil Characteristic Data - TPH and Fuel Alcohols  
 Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data			C-1 Pond and Associated Piping						Sampling Program	
Boring No.	Sample ID.	Sample Depth (ft)	Sample Date	Fuel Alcohols			Total Petroleum Hydrocarbons			
				Ethanol mg/kg	Ethylene glycol mg/kg	Methanol mg/kg	TPH - ORO mg/kg	TPH - DRO mg/kg	TPH - GRO mg/kg	
SA17	SA17-0.5	0.5	11/15/2006				29 U	29 U	0.12 U	Ph A
	SA17-0.5D	0.5	11/15/2006				29 U	29 U	0.12 U	Ph A
	SA17-10	10	11/15/2006				28 U	28 U	0.11 U	Ph A
	SA17-20	20	11/15/2006				27 U	27 U	0.11 U	Ph A
	SA17-25	25	11/15/2006				31 U	31 U	0.12 U	Ph A

LOU 20 Table 14  
 Soil and Groundwater Characterization Data - VOCs  
 Tronox LLC Facility - Henderson, Nevada

*where is gas? next table*  
*revised*  
*9/20*  
*from H&S*

*- Tables should be correct if one of the data is all on 11/15/2006*

Soil Characterization Data		C-1 Pond and Associated Piping									
Sampling Program	Boring No.	SI	SI	SI	Ph A	Ph A	Ph A	Ph A	Ph A	Ph A	Ph A
Sample ID	Sample Depth (ft)	BD-B05	BD-B05	BD-B05	SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25	ug/kg	ug/kg
Sample Date	Sample Date	4/12/1996	4/12/1996	4/12/1996	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006	ug/kg	ug/kg
VOCs		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Naphthalene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,1,1,2-Tetrachloroethane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,1,1-Trichloroethane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,1,2,2-Tetrachloroethane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,1,2-Trichloroethane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,1-Dichloroethane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,1-Dichloroethene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,1-Dichloropropene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2,3-Trichlorobenzene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2,3-Trichloropropane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2,4-Trichlorobenzene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2,4-Trimethylbenzene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2-Dibromo-3-chloropropane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2-Dichlorobenzene		ND	ND	ND	5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2-Dichloroethane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,2-Dichloropropane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,3,5-Trimethylbenzene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,3-Dichlorobenzene		ND	ND	ND	5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,3-Dichloropropane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
1,4-Dichlorobenzene		ND	ND	ND	5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
2,2-Dichloropropane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
2-Butanone					12U	12U	11U	11U	12U		12U
2-Chlorotoluene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
2-Hexanone					12UJ	12UJ	11UJ	11UJ	12UJ		12UJ
2-Methoxy-2-methyl-butane					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
4-Chlorotoluene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
4-Isopropyltoluene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
4-Methyl-2-pentanone					12U	12U	11U	11U	12U		12U
Acetone					12UJ	71J	6.9J	11U	12U		12U
Benzene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U
Bromobenzene					5.9U	5.8U	5.7U	5.3U	6.2U		6.2U

LOU 20 Table 14  
Soil and Groundwater Characterization Data - VOCs  
Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data	C-1 Pond and Associated Piping							
Sampling Program	SI	SI	SI	Ph A	Ph A	Ph A	Ph A	Ph A
Boring No.	BD-B05	BD-B05	BD-B05	SA17	SA17	SA17	SA17	SA17
Sample ID	BD-B05	BD-B05	BD-B05	SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25
Sample Depth (ft)	1	2.5	5	0.5	0.5	10	20	25
Sample Date	4/12/1996	4/12/1996	4/12/1996	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006
VOCs	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Bromochloromethane				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Bromodichloromethane				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Bromoform				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Bromomethane				12 U	12 U	11 U	11 U	12 U
Carbon tetrachloride				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Chlorobenzene	NA	ND	ND	5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Chloroethane				5.9 UJ	5.8 UJ	5.7 UJ	5.3 UJ	6.2 UJ
Chloroform				5.9 U	5.8 U	5.7 U	5.3 U	14
Chloromethane				5.9 UJ	5.8 UJ	5.7 UJ	5.3 UJ	6.2 UJ
cis-1,2-Dichloroethene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
cis-1,3-Dichloropropene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Dibromochloromethane				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Dibromomethane				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Dichlorodifluoromethane				5.9 UJ	5.8 UJ	5.7 UJ	5.3 UJ	6.2 UJ
Ethyl t-butyl ether				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Ethylbenzene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Ethylene dibromide				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Hexachlorobutadiene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
isopropyl ether				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Isopropylbenzene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Methyl tert butyl ether				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Methylene chloride				5.9 UJ	23 UJ	5.7 UJ	5.3 UJ	6.2 UJ
N-Butylbenzene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
N-Propylbenzene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
sec-Butylbenzene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Styrene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
t-Butyl alcohol				12 UJ	12 UJ	11 UJ	11 UJ	12 UJ
tert-Butylbenzene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
Tetrachloroethene				5.9 U	5.8 U	5.7 U	5.3 U	1.1 J
Toluene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U
trans-1,2-Dichloroethylene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U



LOU 20 Table 14  
 Soil and Groundwater Characterization Data - VOCs  
 Tronox LLC Facility - Henderson, Nevada

Soil Characterization Data		C-1 Pond and Associated Piping									
Sampling Program	SI	SI	SI	Ph A	Ph A	Ph A	Ph A	Ph A	Ph A	Ph A	Ph A
Boring No.	BD-B05	BD-B05	BD-B05	SA17	SA17	SA17	SA17	SA17	SA17	SA17	SA17
Sample ID	BD-B05	BD-B05	BD-B05	SA17-0.5	SA17-0.5D	SA17-10	SA17-20	SA17-25			
Sample Depth (ft)	1	2.5	5	0.5	0.5	10	20	25			
Sample Date	4/12/1996	4/12/1996	4/12/1996	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006	11/15/2006
VOCs	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
trans-1,3-Dichloropropene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U			
Trichloroethene				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U			
Trichlorofluoromethane				5.9 UJ	5.8 UJ	5.7 UJ	5.3 UJ	6.2 UJ			
Vinylchloride				5.9 U	5.8 U	5.7 U	5.3 U	6.2 U			
Xylene (Total)				12 U	12 U	11 U	11 U	12 U			

LOU 20 Table 15  
Groundwater Characteristic Data - VOCs  
Tronox LLC Facility - Henderson, Nevada

Groundwater Characterization Data

Sampling Program	C-1 Pond and Assoc. Piping		
	Ph A	Ph A	Ph A
Well ID	M2A	M31A	M39
Sample ID	M2A	M31A	M39
Sample Date	12/04/2006	12/06/2006	12/05/2006
VOCs	ug/L	ug/L	ug/L
Naphthalene	5.0 U	5.0 U	5.0 U
1,1,1,2-Tetrachloroethane	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	0.83 J	5.0 U	5.0 U
1,1-Dichloropropene	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	5.0 UJ	5.0 U	5.0 UJ
1,2-Dichlorobenzene	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	5.0 U	5.0 U	5.0 U
2-Butanone	10 U	10 U	10 U
2-Chlorotoluene	5.0 U	5.0 U	5.0 U
2-Hexanone	10 U	10 UJ	10 U
2-Methoxy-2-methyl-butane	5.0 U	5.0 UJ	5.0 U
4-Chlorotoluene	5.0 U	5.0 U	5.0 U
4-Isopropyltoluene	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone	10 UJ	10 UJ	10 UJ
Acetone	10 UJ	10 U	10 U
Benzene	5.0 U	5.0 U	5.0 U
Bromobenzene	5.0 U	5.0 U	5.0 U
Bromochloromethane	5.0 U	5.0 U	5.0 U
Bromodichloromethane	5.0 U	5.0 U	5.0 U
Bromoform	5.0 U	4.8 J	5.0 U
Bromomethane	10 UJ	10 U	10 UJ
Carbon tetrachloride	1.2 J	5.0 U	5.0 U
Chlorobenzene	5.0 U	5.0 U	5.0 U
Chloroethane	5.0 U	5.0 U	5.0 U
Chloroform	1300 J+	930 J+	820 J+
Chloromethane	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5.0 U	5.0 U	5.0 U

LOU 20 Table 15  
Groundwater Characteristic Data - VOCs  
Tronox LLC Facility - Henderson, Nevada

Groundwater Characterization Data

Sampling Program	C-1 Pond and Assoc. Piping		
	Ph A	Ph A	Ph A
Well ID	M2A	M31A	M39
Sample ID	M2A	M31A	M39
Sample Date	12/04/2006	12/06/2006	12/05/2006
VOCs	ug/L	ug/L	ug/L
Dibromochloromethane	5.0 U	5.0 U	5.0 U
Dibromomethane	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	5.0 U	5.0 UJ	5.0 U
Ethyl t-butyl ether	5.0 U	5.0 UJ	5.0 U
Ethylbenzene	5.0 U	5.0 U	5.0 U
Ethylene dibromide	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene	5.0 U	5.0 U	5.0 U
isopropyl ether	5.0 U	5.0 UJ	5.0 U
Isopropylbenzene	5.0 U	5.0 U	5.0 U
Methyl tert butyl ether	0.67 J	5.0 U	5.0 U
Methylene chloride	5.0 U	5.0 UJ	5.0 U
N-Butylbenzene	5.0 U	5.0 U	5.0 U
N-Propylbenzene	5.0 U	5.0 U	5.0 U
sec-Butylbenzene	5.0 U	5.0 U	5.0 U
Styrene	R	5.0 U	5.0 U
t-Butyl alcohol	10 UJ	10 UJ	10 UJ
tert-Butylbenzene	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5.0 U	5.0 U	5.0 U
Toluene	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethylene	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	5.0 U	5.0 U	5.0 U
Trichloroethene	25	5.0 U	5.0 U
Trichlorofluoromethane	5.0 U	5.0 U	5.0 U
Vinylchloride	5.0 U	5.0 U	5.0 U
Xylene (Total)	10 U	10 UJ	10 U

**LOU 20 Table 16**  
**Soil Characterization Data - Long Asbestos Fibers in Respirable Soil Fraction**  
 Tronox LLC Facility - Henderson, Nevada

**Soil Characteristic Data**

			<b>C-1 Pond and Associated Piping</b>		
			Long Amphibole Protocol Structures	Long Chrysotile Protocol Structures	Sampling Program
<b>No.</b>	<b>Sample ID</b>	<b>Sample Date</b>	s/gPM10	s/gPM10	
SA17	SA17	12/07/2006	2995000 U	2995000 U	Ph A



**Basic Environmental**  
C O M P A N Y

RECEIVED  
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LAS VEGAS OFFICE  
2008 JAN -9 P 4:04

Transmittal

**To:** Shannon Harbour

**Date:** 1/9/08

**From:** Ron Sahu  
Director of Environmental Services

**Company:** NDEP  
2030 E. Flamingo Road, Suite 230  
Las Vegas, Nevada 89119-0818

- VIA:**
- Pick up
  - Courier
  - Overnight Courier
  - Hand Delivered
  - US Mail

---

**The following items are for your:**

- |   |  |                                      |
|---|--|--------------------------------------|
| <input type="checkbox"/> Return             | <input type="checkbox"/> Review & Comments | <input type="checkbox"/> Signature   |
| <input checked="" type="checkbox"/> Records | <input type="checkbox"/> Review & Approval | <input type="checkbox"/> Information |

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**We are transmitting the following:**

Tronox Parcels A, B Asbestos Data Review Memo\_Rev1 1.9.08  
1 hard copy & 1 electronic copy

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**Comments:**

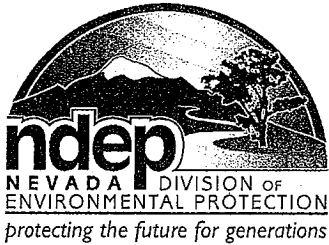
Please call Ron Sahu if you have any questions 626-382-0001.

---

**Received by:** \_\_\_\_\_

cc: Brian Rakvica, NDEP, BCA, Las Vegas  
Jim Najima, NDEP Carson City





# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 8, 2007

Susan Crowley  
Tronox LLC  
PO Box 55  
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**  
**NDEP Facility ID #H-000539**  
Nevada Division of Environmental Protection Response to:  
*Quarterly Performance Report for Remediation Systems Tronox LLC, Henderson,  
Nevada, July – September 2007*  
Dated November 28, 2007

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's Quarterly Performance Report identified above and provides comments in Attachment A. TRX should address these comments in next Performance Report submittal and additionally provide an annotated response-to-comments letter as a part of this submittal. Please contact the undersigned with any questions at [sharbour@ndep.nv.gov](mailto:sharbour@ndep.nv.gov) or (702) 486-2850 x 240.

Sincerely,

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

SH:bar:sh



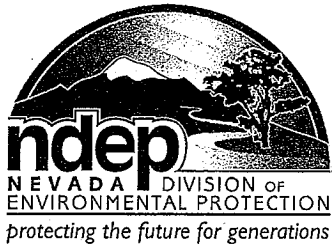
CC: Jim Najima, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013  
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727  
Barry Conaty, Akin, Gump, Strauss, Hauer & Feld, L.L.P., 1333 New 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  
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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. Section 2.0, the NDEP has the following comments:
  - a. Page 2-1, last paragraph, TRX should identify which wells are selected for redevelopment.
  - b. The last paragraph on page 2-1 states that the effected wells will be redeveloped by early 2008 and the last paragraph on page 2-2 states that the wells should be redeveloped by mid-2008. Please reconcile.
  - c. Page 2-2, first paragraph, the NDEP notes that TRX has not provided evidence that supports these assumptions.
2. Section 3.0, page 3-2, first paragraph, TRX states that ARP-5 has been dry since December 2006. TRX should review the well log, well completion forms, etc. for ARP-5 to determine whether this piezometer is currently representative of the first water bearing zone (including the saturated portion of the Upper Muddy Creek formation). TRX could also proactively conduct this review for the other ARP wells to determine their likelihood of becoming dry and their continued representativeness of the first water bearing zone (including the saturated portion of the Upper Muddy Creek formation).
3. Section 4.0, third paragraph, TRX states that the monthly average perchlorate mass removed from the Seep Area Well Field has decreased because of an overall decrease in the perchlorate mass loading to the well field. Please provide more detail such as whether the perchlorate concentrations in the area have decreased, pumping rates have decreased, etc.
4. Table 5, please clarify whether "Capacity" means the maximum flow rate of each system component or the operational flow rate of each system component based on the current contaminant concentrations (i.e. the flow rates of each system component are limited by a maximum allowable contaminant concentration into the FBR remedial system).
5. Appendix C, the NDEP has the following comments to TRX Response to October 5, 2007 NDEP comments on the *Annual Remedial Performance Report for Chromium and Perchlorate* dated August 29, 2007:
  - a. Response to comments (RTC) 3.c, TRX states that the inclusion of the lithologic log information from CLD2-R indicated that there is a Muddy Creek high on the east side of the well field. According to Figure 2 of the August 29, 2007 *Annual Remedial Performance Report*, the elevation of the Muddy Creek interface is approximately 1,721 ft at I-K (easternmost well in Interceptor Well Field) and 1,717 ft at CLD2-R, which is lower than I-K; however, the top of the mound between these two wells is shown at 1,723 ft. Please clarify how TRX interpreted the existence of the mound between locations I-K and CLD2-R.
  - b. RTC 11.a, please see and respond to above-comment 4.a.
  - c. RTC 11.b, the NDEP believes that the text of a report should correspond to the information given in the figures provided in that report. Any changes made to the text of the report should be reflected in the corresponding figures.
  - d. TRC 11.c, TRX's response does not address NDEP's comment. Please provide analytical data to substantiate the statement that the three activated carbon vessels (indicated in Figure 7 – located in Appendix C) "remove organics which could harm bacteria".
  - e. RTC 13, TRX states that "monitoring data for all of the wells sampled during the reporting period are provided in the Access accessible database in Appendix C." Neither



Appendix C of the August 29, 2007 *Annual Remedial Performance Report* nor Appendix B of the November 28, 2007 *Quarterly Performance Report* have this database included. Only laboratory reports and field sheets are included in these appendices. Additionally, the NDEP has requested that the electronic version of the database include all historic and current site-related data. Please provide this data in the next performance report submittal.



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 7, 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 Response to: *Tronox LLC Facility Fact Sheet*  
Dated December 13, 2007

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified Fact Sheet 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 x 240.

Sincerely,

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

SH:sh



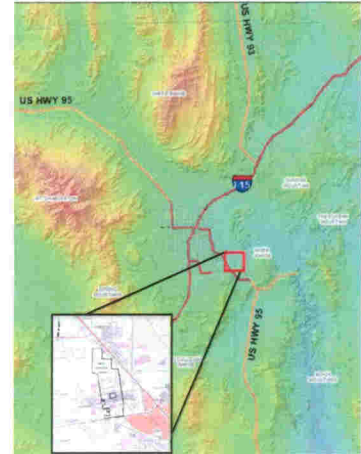
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Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island,  
WA 98110

# 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 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 Location



Air Photo of Tronox LLC Site

## 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**

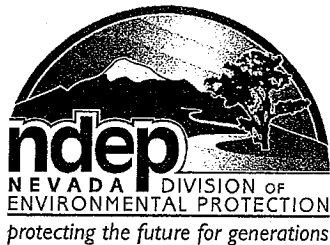
The groundwater remediation systems will continue to operate under the direction of NDEP.

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. A proposal for a subsequent Phase B Site Investigation to complete characterization of the site was submitted to NDEP as part of the Phase A report.

## **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 the second half 2008, will establish site-specific risk-based action levels and identify additional remedial requirements if any.

December 13, 2007



# STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 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 Response to: *Data Validation Summary Report: Appendix D of Quarterly Performance Report for Remediation Systems, Tronox LLC, Henderson, Nevada, July – September 2007*

Dated November 28, 2007

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified Data Validation Summary Report 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 x 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  
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