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.

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
Ranajit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite100, Novato, CA 94947
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312
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
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, 1st 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, 1st and 2nd 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 <u>either</u> 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 o 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.