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NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
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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

June 9, 2010

Matt Paque
Tronox LLC
PO BOX 268859
Oklahoma City, OK 73134

Re: **Tronox LLC (TRX)**
NDEP Facility ID #H-000539
Nevada Division of Environmental Protection (NDEP) Response to:
RZ-A Human Health Risk Assessment, Tronox LLC, Henderson, Nevada
Dated: May 11, 2010

Dear Mr. Paque,

The NDEP has received and reviewed TRX's above-identified Deliverable and provides comments in Attachment A. A revised Deliverable should be submitted **by June 23, 2010** based on the comments found in Attachment A. TRX should additionally provide an annotated response-to-comments letter as part of the revised Deliverable.

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

Sincerely,

for Shannon Harbour, P.E.
Staff Engineer III
Bureau of Corrective Actions
Special Projects Branch
NDEP-Las Vegas Office
Fax: 702-486-5733

SH:GL:gl

EC: Jim Najima, NDEP, BCA
Greg Lovato, NDEP, BCA
Carolyn Tanner, AG's Office, Carson City, NV
Mike Skromyda, Tronox LLC
Michael J. Foster, Tronox LLC
Keith Bailey, Environmental Answers LLC
Deni Chambers, Northgate Environmental
Brian Rakvica, McGinley and Associates
Kelly Black, Neptune and Company, Inc.
Teri Copeland, Neptune and Company, Inc.
Kurt Fehling, The Fehling Group, LLC
Joanne Otani,
Barry Conaty, Holland & Hart LLP
Brenda Pohlmann, City of Henderson
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9
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Joe McGinley, McGinley & Associates
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Craig Wilkinson, TIMET
Kirk Stowers, Broadbent & Associates
George Crouse, Syngenta Crop Protection, Inc.
Nick Pogoncheff, PES Environmental
Lee Erickson, Stauffer Management Company
Michael Bellotti, Olin Corporation
Curt Richards, Olin Corporation
Paul Sundberg, Montrose Chemical Corporation
Joe Kelly, Montrose Chemical Corporation of CA
Jeff Gibson, AMPAC
Larry Cummings, AMPAC

CC: Susan Crowley, C/O Tronox LLC, PO Box 55, Henderson, NV 89009

Attachment A

1. General comment, for future hard copy submittals, please include an electronic copy on CD-ROM of the entire human health risk assessment (HRA), including text, tables, figures, and appendices. Please also include the back-up documentation for the HRA data set (e.g., DVSR reports, individual laboratory reports, etc.). Please note that the data does not have to be separated into each remediation area due to time constraints. An electronic copy of these files on a CD-ROM is acceptable (these files do not need to be provided via electronic mail).
2. General comment, NDEP has noted that the HRA does not include risks associated with the inhalation of indoor (or outdoor) VOCs, so the cumulative incremental lifetime cancer risks (ILCRs) and hazard indices (HIs) are currently not known for this remediation zone (i.e., exposure unit). TRX should note that following completion and reporting of the site-wide soil vapor investigation, a HRA addendum will need to be prepared such that cumulative ILCRs and HIs for this exposure unit will be documented for purposes of risk management decisions to complete the closure process for this exposure unit.
3. General comment, NDEP has noted that the HRA does not include a "migration-to-groundwater" evaluation, which is a key component of a soil HRA (USEPA, 1996, 2002). TRX should note that a HRA addendum will need to be prepared in the future for this migration pathway in order to support risk management decisions for soil in this exposure unit.
4. General comment, asbestos is discussed in Section 2 and in Section 4. However, it is not discussed in Section 3 with the COPC selection process. TRX should add a discussion of asbestos to Section 3 and should identify asbestos in the list of COPCs on page 29.
5. General Comment, please add an executive summary to this report.
6. Section 1.1, page 2, last paragraph, TRX states that "The prevailing wind direction for the period between March 2003 and 2008 is to the northwest and south-southeast at wind speeds up to about 8 to 13 miles per hour." TRX should additionally discuss the implications of this information in regards as to what lies to the northwest of the facility, to the south-southeast of the facility, etc. Additionally, TRX should include wind rose diagrams to illustrate this information more clearly.
7. Section 2.1, page 5, NDEP has the following comments:
   a. Please review and revise the first sentence as a word appears to have been left out and as such, the meaning of the sentence is not clear.
   b. Please add cyanide to the list of SRCs.
8. Section 2.3, page 8, NDEP has the following comments:
   a. Please revise footnote 3 so that Section 3.5 is referenced instead of Section 3.9.
   b. For consistency with Section 3.1.1 of the Work Plan and Figure 4, please include inhalation exposure to radon among the potentially complete exposure pathways described in this section.
   c. NDEP has noted that in Section 3.5.1, TRX states that soil samples were generally collected from 0.5 to 2 feet below ground surface (fbgs) and from 10 to 11.5 fbgs. Please provide a discussion in Section 2.3 to explain the following:
      i. Why the 0 – 0.5 fbgs surface soil interval is not evaluated as an exposure medium
      ii. Why the 2 to 10 fbgs soil interval was not sampled.

9. Section 3, page 10, please provide a brief description of the protocol for collecting and processing the soil samples that support the risk assessment, including soil boring methods, sample volume, vertical integral of a soil sample, field sieving, etc.
10. Section 3.3, NDEP has the following comments:
    a. Pages 11-17, TRX should note that key components of the data usability (DU) evaluation (as per USEPA, 1992 and NDEP, 2008) were not included in this Section. In addition, it is not clear if there was a DU evaluation conducted for Area IV (referenced at the bottom of page 10) that would be relevant. TRX should contact NDEP to schedule a teleconference to discuss the DU evaluation. Additionally, please note that all laboratory reports are required as a component of the DU process (USEPA, 1992, NDEP, 2008) and should be provided with the HRA independently of the DVSR reference (see related general comment).
    b. Page 16, TRX states that "Most of the issues identified during this evaluation did not result in the qualification of laboratory data but did involve re-submittal of data from the laboratories to correct problems that were discovered during the validation process." Please provide more detail about the "issues identified" and the re-submittal process for the Site data.
11. Section 3.4, page18, the last sentence of the first paragraph refers to Section 3.4.2 but this section does not exist. Please revise.
12. Section 3.5.1, page 20, 3rd paragraph, TRX states that "Site data from locations within RZ-A at sample starting depths between 0 and 10 ft bgs were included in this evaluation." Please include a discussion about exact sample sizes, including how many samples were available from each depth for background and site data. This information should match the data presented in Table 4.
13. Section 3.5.1, page 20-21, 4th paragraph, TRX states that "EDA was performed using summary statistics... and quantile-quantile plots and side-by-side box-and-whisker plots to qualitatively evaluate whether the Site and background data are representative of a single population." NDEP has the following comments:
    a. Please reference that these plots are available in Appendix B.
       Please include more detail about quantile-quantile and box-and-whisker plots (either here or in Appendices B and C), such as:
       i. What purpose do they serve and how they are read and interpreted?
       ii. What is the significance of data which stray from the line in the Q-Q plots?
       iii. What do the solid circles, x's and open circles represent on the box plots?
    b. Please clarify whether:
       i. Normality tests were performed for the data in the quantile-quantile plots.
       ii. Any data determined to be non-normal based on the quantile-quantile plots. If so, please clarify how the non-normality was handled.
       iii. Any tests performed to determine if outliers exist in the Site data.
14. Section 3.5.1.1, page 24, the last sentence on this page refers to Section 3.3.2 but this section does not exist. Please revise.
15. Section 3.5.1.1, page 25, TRX states that "This difference could be to due to a number of reasons...item 3) there were generally many more samples in the background data set as compared to the RZ-A data." Please explain why more data in the background data set would lead to a finding of lower site data than background data and how this is considered a possible explanation for such a difference.

16. Section 3.5.1.2, page 26, 1st full paragraph, NDEP has the following comments:
    a. TRX states that "The results of the equivalence test for secular equilibrium of radionuclides in RZ-A are presented in Table 5a." Please provide more details about this test, including specifying the following:
        i. The null and alternative hypotheses for this test
        ii. The overall p-value represent
        iii. Delta
        iv. Why the upper and lower 95% confidence intervals were calculated
    b. TRX states that "...however, the RZ-A analysis is based on 42 samples whereas the site-wide analysis is based on 507 samples." Please explain the implications of this sentence.
17. Section 3.5.1.2, page 27, 2nd full paragraph, TRX states that "The correlation matrices show a positive correlation..." Please reference (Table 5b-i).
18. Section 3.5.2, page 29, 3rd full paragraph, TRX states that "Based on a review of readily available toxicology studies..." Please provide references for this statement.
19. Section 4.1.2, page 32, NDEP has the following comments:
    a. Pooled AS equation, please rewrite the equation so that the Pooled AS corresponds to that presented in the NDEP Asbestos Guidance document.
    b. Last paragraph, please write out the 95% UCL of the Poisson distribution for clarity.
20. Section 4.1.3, page 33, asbestos equation, NDEP has the following comments:
    a. TRX should note that when writing out this equation, the equations for the PEFs (both commercial workers and construction workers) should be included. These PEFs can be found in the NDEP Asbestos Guidance.
    b. Please provide the values for CF_1, CF_2, and CF_3 in the text for consistency.
21. Section 4.2.1, Inhalation, page 35, in future submittals, TRX should ensure that the equations presented in the text match the way in which it is implemented in the calculation spreadsheets. For example, the EC equation on page 35 does not have a conversion factor, soil concentration, or PEF term but these do appear in the spreadsheet calculations.
22. Section 5.0, please provide the asbestos cancer risk coefficients used in the risk assessment
23. Sections 6.2.1 through 6.2.3, pages 44-45, even though the HIs are less than 1, please identify the chemical(s) that have the highest contribution to the non-carcinogenic health hazard.
24. Section 6.3, page 45, please provide equations for asbestos cancer risk for consistency with Sections 6.1 and 6.2.
25. Section 6.4, page 45, please note in the text that uncertainty also arises from variability as well as lack of knowledge as this paragraph currently states.
26. Section 6.4.7, pages 49-50, NDEP has the following comments:
    a. Please discuss COPC-specific uncertainties in the toxicity criteria for COPCs that were the largest contributors to chemical cancer risk and HI.
    b. Please include a discussion of uncertainties related to the risk coefficients used for the asbestos risk assessment
27. Section 6.4.8, pages 50-51, please discuss the potential additivity of chemical and asbestos cancer risk.
28. Section 7.0, page 53, 1st bullet, please be explicit in the text that the ILCRs and HIs reported in the HRA are only for soil pathways and do not include the vapor inhalation pathway as determining whether ILCRs and HIs are below NDEP's point of departure levels can only be determined after characterization of the VOC inhalation pathway has been completed.

29. Tables 10 and 11, the chemical-specific bioavailability factors noted in these tables were not found in the report. Please provide these values in Table 12 and add footnotes to Tables 11 and 12 stating where the bioavailability and dermal absorption values are found.
30. Table 12, please provide the dates when IRIS, PPRTV, and NCEA were reviewed to acquire the toxicity criteria and provide citations or URLs for all references on the table.
31. Table 16, Uncertainty Analysis, this Table should integrate all aspects of the key data usability issues.
32. Figure 4, NDEP has the following comments:
    a. TRX should add the inhalation exposure pathway for gas-phase contaminants for the Migration to Groundwater Contact Medium.
    b. Under "Secondary Inter-media Transfer", TRX should add footnotes to the "Volatilization into Indoor/Outdoor Air" and "Migration to Groundwater" boxes to indicate that these pathways were not evaluated in the current soil HRA and will be evaluated in forthcoming reports.
33. Section 7.0, page 53, 1st bullet, please be explicit in the text that the ILCRs and HIs reported in the HRA are only for soil pathways and do not include the vapor inhalation pathway as determining whether ILCRs and HIs are below NDEP's point of departure levels can only be determined after characterization of the VOC inhalation pathway has been completed.

References Cited

NDEP, 2008. Supplemental Guidance for Assessing Data Usability for Environmental Investigations at the BMI Complex and Common Areas in Henderson, Nevada. Bureau of Corrective Actions, Special Projects Branch, October 22.

USEPA, 1996. Soil Screening Guidance: Technical Background Document. Office of Solid Waste and Emergency Response, May.
http://www.epa.gov/superfund/health/conmedia/soil/index.htm

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response, December.
http://www.epa.gov/superfund/health/conmedia/soil/index.htm