



environmental management, inc.

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**Date:** July 26, 2010

**To:** Shannon Harbour, PE  
Nevada Division of Environmental Protection

**RE:** Response to July 2, 2010 Nevada Division of Environmental Protection comments on *Excavation Plan for Phase B Soil Remediation of RZ-D, Tronox LLC, Henderson, Nevada*, dated June 21, 2010

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## RESPONSE TO COMMENTS

Northgate Environmental Management, Inc. (Northgate) submits this Response to Comments on the *Draft Excavation Plan for Phase B Soil Remediation of RZ-D* (EP) on behalf of Tronox LLC (Tronox; Northgate June 21, 2010). Tronox has reviewed the July 2, 2010 Nevada Department of Environmental Protection (NDEP) comments and has revised the EP document accordingly.

### Remediation Zone (RZ) D EP TEXT AND FIGURES

#### NDEP July 2, 2010 Comments on EP

1. *General comment, please note that NDEP has not included comments which pertain to typographical and grammatical issues.*

**Response:** The Excavation Plan has been reviewed and typographical and grammatical issues noted have been corrected.

2. *General comment, NDEP noted on the June 15, 2010 telephone call that additional samples will be taken to refine the understanding of the nature and extent of contamination. NDEP requests that confirmation samples be taken at the property boundary wherever property boundaries are used to constrain remediation areas.*

**Response:** Pre-confirmation samples have been added to Figure 1 wherever excavation areas are constrained by property boundaries in response to this comment.

3. *General comment, NDEP has noted that the remediation polygons are named differently throughout the document. For example, the remediation polygon located on the northwest side of RZ-D is labeled RZ-D-03 on Figure 3 and RZ-D-3 in Table 1. This inconsistency was also noted in the text. TRX should revise this Deliverable for consistency in the nomenclature of the remediation polygons.*

**Response:** The EP text, tables, and figures have been revised to remove the inconsistency.

4. *Section 1.0, page 1, TRX should acknowledge that the remediation limits presented in this Deliverable do not consider the soil-to-groundwater leaching pathway and discuss how this issue will be addressed.*

**Response:** Tronox has added text to Section 1 to address how the soil-to-groundwater pathway will be addressed.

5. *Section 1.0, page 1, NDEP has the following comments:*
- a. *1<sup>st</sup> paragraph, TRX should remove the statement that this Deliverable only addresses the top 10 feet of soil at the Site.*
  - b. *2<sup>nd</sup> paragraph, TRX references “modified risk-based goals agreed upon by NDEP.” Please clarify what is being referenced here (e.g. dioxins/furans, lead, etc.).*
  - c. *2<sup>nd</sup> paragraph, TRX should clarify and explicitly state that this document does not address all soil-to-groundwater leaching issues and include soil-to-groundwater leaching in the definitions of “contaminated soil”.*

**Response:**

- a. This excavation plan is an addendum to the Removal Action Work Plan (RAW; see document references, Northgate, 2010). As stated in the NDEP-approved RAW, the purpose of the RAW was to address contaminated soil within 10 feet of the ground surface. This statement is in agreement with the stated purpose of the RAW. Tronox, Northgate and NDEP met on July 13th to discuss and resolve the proposed depth of excavation issue raised in these comments. This issue has not yet been resolved and will be the subject of future discussions. The statement regarding the 10 foot maximum depth of excavation has not been removed.
  - b. 3<sup>rd</sup> paragraph, TRX references “modified risk-based goals agreed upon by NDEP.” The site-specific risk based goals are for dioxins/furans. This change has been made throughout the document.
  - c. 2<sup>nd</sup> paragraph, the soil-to-groundwater leaching in the definitions of “contaminated soil” has been addressed in Section 1, 3<sup>rd</sup> paragraph.
6. *Section 1.1, page 2, please differentiate between active facilities and historic facilities. For example, it would help to note that the groundwater treatment system and Veolia facility are active.*

**Response:** Wherever applicable, additional text has been added to note if the facility or feature is active or historical.

7. *Section 1.2, page 2, 2<sup>nd</sup> paragraph and Section 4.0, page 12, where TRX references “dioxins”, this should be changed to dioxins/furans. This is a global comment and will not be repeated.*

**Response:** “Dioxin” has been changed to “dioxins/furans” throughout the document.

8. *Section 2.0, page 4, bulleted list, please indicate the approval status of all referenced Deliverables.*

**Response:** The approval dates have been added to the bulleted list.

9. *Section 2.1.1, page 5, please clarify if the 50’ buffer is geotechnically and structurally based. If it is, please provide the supporting documentation.*



**Response:** The proposed 50-foot zone is based on protecting the existing berms from slope stability failures due to undercutting the toe of the berm slopes. Geotechnical analyses have been prepared and will be submitted to NDEP in a stand-alone report.

10. *Section 2.1.3, page 5, TRX states that the historic Trade Effluent Pond berms will be used as backfill and proposes to collect data on these berms in the future. NDEP requests that the sampling and analysis plan for this be developed and submitted **by July 14, 2010.***

**Response:** The *Work Plan for Additional Sampling of a Portion of the Former Trade Effluent Pond Berm Northwest Portion of Remediation Zone D* was prepared and submitted to NDEP on July 9, 2010.

11. *Section 2.1.4, page 5, please clarify if the referenced rail alignment is active or not. If it is inactive, NDEP requests that this area be remediated. Please revise as necessary.*

**Response:** The noted rail alignment is inactive and has been noted as such in the text. The excavation areas Remediation Zones (RZ) -D-13 and -D-14 have been revised to include the rail alignment as appropriate.

12. *Section 2.1.5, page 6, NDEP disagrees with TRX's decision logic for restricting excavation to unpaved areas only.*

**Response:** Figure 1 has been revised to show excavation in the current asphalt pavement areas including Veolia and the area included in RZ-D-26. The area under 9<sup>th</sup> Street has not been included and is discussed in Section 2.1.5 of the EP.

13. *Section 2.1.6, page 6, NDEP notes that the described sort of soil disturbance could have exacerbated the contamination at the Veolia facility instead of removing it as TRX speculates. NDEP believes that very deliberate remediation could occur at vast portions of the Veolia facility without interrupting the groundwater treatment system. NDEP requests that TRX contact NDEP for further discussion on this matter as soon as possible.*

**Response:** Figure 1 has been revised to extend the excavation area of RZ-D-25 as close to the Veolia structures as possible including the asphalt concrete paved areas. The excavation area depth is 0.5 feet. The original discussion centered on the idea that during construction of the foundation for a building or industrial facility, the soil within the footprint is removed to construct the foundations. Typically, foundations for structures like the Veolia facilities are at least several feet below existing grades and the associated slabs-on-grade with gravel under layers are 18 or more inches deep. Because the asbestos contaminated soil in the proposed excavation area is 0.5 feet in depth, it is Tronox's opinion that the 0.5 feet of soil under the building and facilities that would have required remediation has already been removed and is no longer present below the facilities.

14. *Section 2.1.7, page 6, NDEP has the following comments:*
- Reference to RZ-D-6 should be RZ-D-16. Please revise.*
  - TRX proposes additional sampling between the re-injection trenches. NDEP requests that the sampling and analysis plan for this be developed and submitted **by July 14, 2010.***



**Response:**

- a. This reference has been corrected.
- b. The requested sampling and analysis plan is being prepared and will be submitted to NDEP.

15. *Section 2.1.8, page 6, please clarify how the referenced limits of fill are known. TRX should note that excavation of RZ-D-06 and RZ-D-07 should continue based on visual observation of remaining fill. Confirmation sampling for these remediation polygons should be conducted. Please include a line item in the remediation schedule for the submittal of a post-remediation sampling plan for those remediation polygons that have been / will be determined to need additional confirmation sampling.*

**Response:** Pre-confirmation samples are being collected to assess the limits of the contaminated soil east of RZ-D-06 and RZ-D-07 as shown on Figure 1.

16. *Section 2.2, page 7, 1<sup>st</sup> sentence, NDEP has the following comments:*
- a. *References to RZ-D-13 in this section should reference RZ-D-22. Please revise.*
  - b. *RZ-D-22 should be m excavated to 1 foot below ground surface (fbgs) based on NDEP's response to TRX's June 21, 2010 Relative Risk Reduction Associated with Arsenic Removal in RZ-B09 and RZ-B-6 at the Tronox LLC Site, Henderson, Nevada.*

**Response:**

- a. The reference has been corrected. The new excavation number is RZ-D-24.
- b. The depth of excavation for RZ-D-24 has been revised to 1 foot.

17. *Section 3.1, page 8, NDEP has the following comments:*
- a. *TRX states that debris will be staged in non-working areas, however, it is not known if the debris is contaminated or not. TRX should specify whether the debris will be staged in other contaminated non-working areas or clarify how the clean soil will be protected in place.*
  - b. *TRX states that an asbestos-removal contractor will be hired to remove asbestos from the berms: however, there is no mention of sampling and analysis to address the nature and extent of contamination. TRX should submit a sampling and analysis plan for this proposed sampling **by July 14, 2010.***

**Response:**

- a. Section 3.1 has been revised to describe that the debris will be tested before being disposed off-site or moved to a different portion of the facility.
- b. Tronox is preparing a sampling and analysis plan to address this comment.



18. Section 3.2, page 9, TRX states that wells that are damaged will be replaced. TRX should discuss this matter with NDEP prior to excavation and determine whether specific wells will require replacement or if sufficient well coverage exists in a particular area.

**Response:** Section 3.2 has been revised to be responsive to this comment.

19. Section 3.3, page 9, TRX should note that unless otherwise explicitly documented by NDEP for specific remediation polygons, TRX will need to provide data at 10 fbgs based on **final grade** for risk assessment.

**Response:** As discussed during a conference call between Tronox, Northgate and NDEP on July 13<sup>th</sup>, the data to be used in the risk assessment is shown in RZ-D Appendix A tables and includes data representative of the 0-10 feet bgs soil column. Table 1 indicates those excavations that are anticipated to be backfilled. As discussed in Section 1.3, pg 4, last paragraph, representative backfill concentrations will be used in areas indicated to be backfilled down to 10 feet bgs.

20. Section 3.4, page 10, NDEP has the following comments regarding backfill. These comments are also based on statements made a previous meetings and conference calls and as were previously stated in NDEP's June 22, 2010 response to the Excavation Plan for Phase B Soil Remediation of RZ-B, Tronox LLC, Henderson, Nevada):

- a. NDEP did not mean to imply by "not regulating backfill" that NDEP was not concerned with backfill sources especially if Site soils will be used.
- b. By stating that NDEP will not regulate backfill; NDEP was establishing that NDEP will not grant or deny approval of a backfill source.
- c. However, the TRX needs to collect sufficient data for a Human Risk Assessment. This is especially true if Site soils will be used as backfill.

**Response:**

- a. Comment noted.
- b. Comment noted.
- c. Section 1.3 has been added to address this and other data evaluation issues.

21. Section 4.0, page 12, the NDEP provides the following comments:

- a. For confirmation purposes and to assist in development of any controls determined to be appropriate, NDEP requests that TRX collect and analyze soil samples immediately adjacent to areas with soil contamination that are not excavated due to surface obstructions.
- b. TRX did not include the Veolia facility in the referenced Deliverable. Additionally, please see above-comments regarding the Veolia facility.
- c. 3rd paragraph, TRX has not demonstrated that the existing asphalt has functioned and would continue to function as an engineered cap.
- d. Last paragraph, TRX is referencing an "NDEP-approved Revised Environmental Covenants, Institutional and Engineering Control Plan submitted by Tronox on June 9,



2010 for NDEP review and comment.” NDEP has the following comments:

- i. Please revise for clarity by providing the Deliverable date instead of the submittal date.
- ii. NDEP has not responded to the referenced Deliverable; therefore, it cannot be “NDEP-approved”. Please revise accordingly.

**Response:**

- a. Locations where proposed excavation areas are adjacent to obstruction have been identified and pre-confirmation samples have been shown in these areas (Veolia and 9<sup>th</sup> Street), see Figure 1.
- b. See response to Comment 13.
- c. Tronox has revised the excavation areas to include the asphalt concrete paved areas, except at the 9<sup>th</sup> Street location (see RZ-D-29 and RZ-D-30.) This area is discussed in Section 2.1.5.
- d.
  - i. The date has been changed to the deliverable date as requested.
  - ii. As requested, “NDEP Approved” has been removed.

22. Table 1, NDEP has the following comments:

- a. TRX should change the name of column “Chemicals Group Driving Excavation Depth” to “Chemicals Driving Remediation. Additionally please add the following chemicals to this column for the as noted: (Please note that the nomenclature used in the Table has been used for this comment)
  - i. RZ-D-5: Dioxins/Furans
  - ii. RZ-D-7: Dioxins/Furans, HCB, Perchlorate
  - iii. RZ-D-11: HCB
  - iv. RZ-D-14: Dioxins/Furans, HCB
  - v. RZ-D-20: HCB, Arsenic
  - vi. RZ-D-22: HCB
  - vii. RZ-D-24, Dioxins/Furans
- b. TRX should add the following columns:
  - i. Property Boundary Samples: indicating how many property boundary samples will be collected post-remediation.
  - ii. Rationale: listing the rationale used for the determination of cutlines
  - iii. HRA Data: indicates whether 0 – 10 fbgs (final expected grade) has been collected

**Response:**

- a. The column title has been changed to “Chemicals Driving Remediation.”
  - i. RZ-D-05 is correct as stated
  - ii. Dioxins/furans and perchlorate have been added.



- iii. RZ-D-11 is correct as stated
- iv. RZ-D-14 is correct as stated.
- v. Arsenic has been added to RZ-D-20 (now RZ-D-21)
- vi. RZ-D-22 (now RZ-D-24) is correct as stated.
- vii. RZ-D-24 (now RZ-D-27) is correct as stated.

b.

- i. The requested column indicating how many property boundary samples are proposed has been added.
- ii. Comment noted.
- iii. See response to comment 19.

23. Figures, NDEP has the following comments,

- a. *TRX should add a Figure showing the approximate location and number of post-excavation samples that will be collected from those remediation polygons located along the property boundary.*
- b. *Please combine the information presented in Figures 1 and 3 into one Figure. NDEP understands that the map may need to be broken into smaller areas for clarity that may result in multiple Figures for the Remediation Zone area.*
- c. *Sampling data from the Parcels investigation that is adjacent to the Remediation Zone should also be included. Based on the data provided, it does not appear that TRX followed the sampling rationale approved by NDEP in a letter dated June 9, 2010 RE: Dioxin Surface Soil Sampling Rationale. NDEP has noted many samples where dioxins/furans were detected with no proposed excavation that do not indicate that surface samples for dioxins/furans are pending. Please contact NDEP as soon as possible to discuss how this comment will be addressed as the results of this sampling may impact the proposed excavation limits.*
- d. *Figure 1, there are numerous sample locations on this Figure that are shaded green; however, the data for these locations are absent on Figure 1. This severely limits NDEP's ability to review this Figure. Please include all relevant data to facilitate review.*
- e. *Figure 3, NDEP provides the following comments:*
  - i.
    1. *NDEP notes that there are samples pending results that may refine the following comments.*
    2. *RSAI2, the analytical results indicate that this area should be excavated to over 15 fbgs based upon hexachlorobenzene (HCB) contamination, which extends beyond the depth of sampling.*
    3. *RSAI3, the analytical results indicate that this area should be excavated to over 13 fbgs based upon dioxins/furans contamination, which extends beyond the depth of sampling.*



4. SSAI2-02, the analytical results indicate that this area should be excavated to 11 fbgs.
- ii. RZ-D-02, the derivation of the 3 fbgs excavation depth is unclear. Please clarify.
- iii. RZ-D-05, the derivation of the 8 fbgs excavation depth is unclear. Please clarify.
- iv. RZ-D-06, the derivation of the 1.5 fbgs excavation depth is unclear. Please clarify.
- v. RZ-D-15, RSAJ5 and RSAJ6 indicate dioxins/furans and HCB contamination up to 7 and 10 fbgs, respectively. This data does not seem to be considered in the excavation depth. Please clarify or revise as necessary.
- vi. RZ-D-16, the derivation of the 9 fbgs excavation depth is unclear. Please clarify.
- vii. RZ-D-17, the derivation of the 2 fbgs excavation depth is unclear. Please clarify.
- viii. RZ-D-19, NDEP provides the following comments:
  1. NDEP also notes that the depth of contamination for dioxins/furans and HCB has not been determined for this remediation polygon, which may impact the depth of excavation necessary for this area. Please see the following comments.
  2. Sample location SSAK7-02, NDEP requests that this location be excavated to over 13 fbgs based upon dioxins/furans and HCB contamination, which as noted above extends beyond the depth of sampling.
  3. Sample locations SSAJ6-01 and SSAK7-01, NDEP requests that this location be excavated to (or over) 11 fbgs based upon dioxins/furans contamination.
- ix. RZ-D-22, see comment above regarding Section 2.2 and arsenic.
- x. RZ-D-26, the depth of the excavation is not bounded by data. Please clarify.
- xi. RZ-D-27, there is no data, yet excavation is proposed. Please clarify.
- xii. RSAK4, based on the concentration data presented, this data point should be green. Please revise.
- xiii. SSAK8-06, results data for this sample contain dioxins/furans at a concentration of 2,800 ppt TEQ at the 2-3 fbgs interval yet it is not targeted for remediation even though the target soil level is 2,700 ppt. Please designate a remediation polygon for this sample.

**Response:**

23.

- a. The location and number of pre-confirmation samples is shown in Figure 1. Pre-confirmation samples are represented by purple hexagons.
- b. As requested, Figures 1 and 3 have been combined into Figure 1. Figure 1 is now an E size figure for readability.
- c. Sample data from adjacent parcel have not been included due to space and clarity consideration, but the data are available in the Appendix A table. The approved dioxin/furans surfaces soil sampling rationale memo (June 2, 2010) that was approved in NDEP's June 9, 2010 memo outlined an approach that





indicated soil samples with concentrations between 900 and 2700 ppt in the 0.5 to 2.0 feet bgs would be sampled for surface dioxin/furan concentrations with some surface samples to be collected in borings with dioxin/furan concentrations between 500 to 900 ppt. The rationale did not include dioxin/furan surface sampling of all sample locations in which dioxin/furan was detected. Therefore, it is unclear exactly what locations NDEP is questioning. Tronox will further discuss the surface dioxin/furan issue and impact on polygons pending receipt of surface dioxin data.

- d. The requested data have not been included on the figure for clarity and space considerations. However the data are available in the Appendix A table to facilitate review.
- e.
  - i.
    - 1. Comment noted.
    - 2. Comment noted, see Response to Comment 5.
    - 3. Comment noted, see Response to Comment 5.
    - 4. Comment noted, see Response to Comment 5.
  - ii. Boring SSAJ2-02 has screening data exceeding the BCL for HCB and Risk-based goals for dioxins/furans. The first sample meeting the BCL and other criteria is at a depth of 3 feet.
  - iii. Boring SSAI3-05 has screening data exceeding the BCL for HCB. The first sample meeting the criteria is at a depth of 8 feet.
  - iv. The first sample meeting the BCL or other criteria is at a depth of 2 feet. The depth of 1.5 has been changed to 2 feet in Figure 1 and in Table 1.
  - v. The depth of RZ-D-15 has been revised to 10 feet bgs.
  - vi. The depth of RZ-D-16 was selected based on dioxins/furans and HCB concentrations. The first sample meeting the BCL or other criteria is at 9 feet. Asbestos is not considered a deep contaminant.
  - vii. Boring SSAK6-03 has screening data exceeding the BCL for HCB and Risk-based goals for dioxins/furans. The first sample meeting the criteria is at a depth of 3 feet. The depth of 2 feet has been changed to 3 feet in Figure 1 and in Table 1.
  - viii.
    - 1. Comment noted. As indicated on Figure 1, the depth of RZ-D-19 (now RZ-D- 21) is shown as 10 feet.
    - 2. Comment noted. See Response to Comment 5.
    - 3. Comment noted. See Response to Comment 5.



- ix. The proposed depth of excavation has been revised to 1 foot as requested. See response to comment 16 b.
- x. The depth of excavation of 0.5 is approximate for RZ-D-26. The results of the asbestos analyses for the two locations indicate depths of 0.33 feet and greater than 0.5 foot. When the analyses are complete, the area will be split into two areas with different depths.
- xi. The defining data for RZ-D-27 (now RZ-D-31) are Borings RSAM7 and SSAM7-02. These are the same defining borings as RZ-D-26 (now RZ-D-29). The final depth of this excavation area will be adjusted when the analyses are complete.
- xii. RSAK4 has an exceedance of the BCL for HCB at a depth of 1.5 to 2 feet; therefore, orange is correct.
- xiii. An excavation area (RZ-D-24) has been added to include boring SSAK8-06 (see Figure 1).

