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**NDEP Comments on LOU Data Packages for the Tronox Facility
(LOUs 1, 4, 20, 43, and 49)**

It is noted that some of these comments have been discussed previously with Tronox (TRX) at our meeting on 2/14/08. These comments are repeated herein for completeness.

1. General comment, TRX could group the LOUs into the Evaluation Areas for the submittal of several SAPs instead of one site-wide Phase B SAP. This would reduce the response time of the NDEP so that TRX could be more likely to meet their anticipated field work commencement date. This would also reduce the chance that all work would be postponed because of one or two areas. TRX suggested submitting the first group in draft for NDEP review and comment on LOU grouping (e.g.: evaluation areas (EAs), thirds of facility, etc.) in the SAP as well as content.
2. General comment, Figures, the NDEP has the following comments:
 - a. TRX should add all available groundwater monitoring wells to the maps; however, the wells not proposed for sampling could be “ghosted” for increased clarity of the overall figure.
 - b. General comment, to facilitate the identification of existing versus proposed sample locations, the NDEP suggests the use of distinctly different color codes on the figures. The current color codes are difficult to distinguish from one another.
 - c. General comment, all known and potential source features should be identified on the LOU figure(s) and specifically discussed in the text.
 - d. General comment, TRX should superimpose the 4-acre grid on each of the LOU package maps.
 - e. General comment, the groundwater gradient and wind directions should be indicated on the figures for each LOU
3. General comment, please note that soil gas borings could be co-located with the Phase B borings to try to limit duplication of effort.
4. General comment, TRX indicated that LOUs with associated piping could be in multiple LOU packages depending on the location of the piping. TRX should list any associated LOUs that will contribute to the sampling of the associated piping.
5. General comment, since the focus of the investigation is on “source areas”, TRX should provide rationale for the inclusion of data points in the LOU tables that are not located in the vicinity of the source(s).
6. General comment, all data tables should include units and the metric that TRX is using for comparison (e.g. numerical value of one-tenth the industrial PRG).
7. General comment, TRX should ensure that explanatory footnotes are included in tables.
8. General comment, it is not evident to the NDEP that the CSM for the LOUs are being specifically used to locate samples. Please contemplate this key step in regard to source characterization and data usability.
9. General comment, the NDEP noted that for many of the LOUs, there are more Phase B samples located outside of the LOU than within the LOU. This trend is not consistent with the intent of Phase B to be a source assessment investigation. In general, random samples

- (for a source investigation) should be placed within the source areas. Step-out sampling is generally conducted after source areas are characterized.
10. General comment, dioxins and furans were detected in most or all of the samples analyzed for these compounds. Known and potential sources including delineation of extent should be considered as part of the Phase B investigation.
 11. General comment, the asbestos data needs to be reported in useable units. For example, the Phase A asbestos results are currently reported in structures per gram PM10 (s/gPM10) instead of structures per sample.
 12. General comment, it would be helpful if the sub-area-specific Phase B work plans included a conceptual site diagram “cartoon”; a conceptual site model “diagram” (aka the “measles chart”); plume maps; and cross-sections (as appropriate).
 13. General comment, given that TRX has two closure goals of full unrestricted closure and continuing current use, TRX should define “current use” very thoroughly.
 14. General comment, due to the geographical arrangements of LOUs, if a limited use is an appropriate closure goal for a specific LOU, then it is important that the contiguous LOUs be considered in light of potential consequences of the remaining neighboring contamination.
 15. General comment, TRX should consider adding a summary table to the Phase B work plans that list the closure goals for each LOU.
 16. General comment, the section on Known or Potential Release Mechanisms for each LOU currently gives only a simple understanding of the site conceptual model. Such questions as the potential depth of anticipated migration of contaminants; wind direction when relevant; subsurface gradient; dispersion mechanisms historically, recently, or currently acting on the site; and consideration of mobility of chemical classes through the potential release mechanisms would be very useful.
 17. General comment, in the footnotes to the metals tables, the full name of each metal is given (the standard chemical abbreviations are used in the table). The abbreviations could be listed in a List of Acronyms so that they don’t need to be repeated for each metals table
 18. Cover Letter, Closure Goals, since sampling access is limited in areas of current production operations (and therefore it is likely that these areas cannot be fully characterized at this time), perhaps TRX should prioritize completion of site characterization for the areas for which unrestricted closure is currently being sought.
 19. Cover Letter, Proposed Phase B Source Area Investigation and Risk Assessment Process, the NDEP strongly suggests that TRX submit interim deliverables prior to the initiation of the health risk assessment (HRA). Typical HRA interim deliverables include (1) the final site characterization data set to be used in the HRA, data validation/data usability evaluation (including CSM[s]) and (2) chemical of potential concern (COPC) selection, identification of exposure areas and exposure point concentrations (EPCs). Specific interim deliverables, and their benefits and content, can be finalized with TRX at a future date.
 20. LOU 1, Description, TRX should indicate the current status of the French Drain. If this is not known, please state this. It appears that coverage is sufficient to address this issue, however, the clarification would provide transparency to the CSM.
 21. LOU 1, Description, it would be helpful if the contents of the hazardous waste landfill were discussed. This would provide support for the selection of chemical analytes associated with this LOU. If the contents are not known, the suite of analytes needs to be broader.
 22. LOU 1, Known or Potential Chemical Classes, the NDEP has the following comments:

- a. TRX states that pesticides may be of concern due to the “use of the acid drain system”. If acids were conveyed in the acid drains system, and the acid drain system leaked, this could create an environment where naturally occurring radionuclides could be leached out of the formation.
 - b. TRX states that the chemical composition from the US Government Operations is “unknown”. This provides a basis for use of broader suites of analytes.
 - c. This section does not consider adjacent sources, which may influence LOU 1.
23. LOU 1, Known or Potential Release Mechanisms, as discussed above, the concept of acid leaching should be discussed. In addition, if anoxic conditions exist this should also be discussed.
 24. LOU 1, Proposed Phase B Constituents List for Soils, the NDEP requests that radionuclides and pH be added to this list. The issue of whether or not radionuclides are an issue at the Site has not been resolved. In addition, the concepts discussed above provide some basis for inclusion of radionuclide analyses.
 25. LOU 1, Soil and Groundwater Characterization Data, the NDEP has noted that dioxins/furans were detected in Phase A samples SA21, SA22, and SA23 (0.5 ft samples). The potential sources for these compounds should be discussed (in particular, SA-23 results) and extent of contamination should be delineated.
 26. LOU 1, Figure X, the NDEP has the following comments:
 - a. The NDEP notes that according to the figure and scale, the LOU does not appear to be 70 acres. TRX should confirm acreage for each LOU.
 - b. TRX indicates the potential for seepage from the ponds in the LOU 1 figure. If site characterization data indicate that the sources in the LOU have led to releases outside of the LOU, then the LOU should be redefined to include those impacted areas.
 - c. The NDEP notes that the seepage area to the north of the former Trade Effluent Ponds has been sampled during the Parcel-specific investigations. TRX should review and indicate previous investigation boring locations on each of the LOU maps to limit duplication of effort.
 - d. TRX should indicate in the text and map of LOU1 that the Hazardous Waste Landfill is LOU 10. These two LOUs along with LOUs 22 and 23, could be considered in one package to limit duplication of effort and ease of review.
 - e. TRX should clarify the text on the LOU 1 map to indicate that the “surface conveyance” was not over-ground but within some kind of open-top channel.
 27. LOU 1, TRX should clarify in the text why test pits will be used to characterize the area between the Former Trade Effluent Ponds and the Hazardous Waste Landfill.
 28. LOU 1, TRX should note and consider that LOU 1 may have been impacted with pesticides by runoff from the road between the Olin and TRX facilities.
 29. LOU 1, NDEP could not locate proposed boring SA120 listed in sixth full bullet on page 4 of 8 on the LOU 1 figure. The figure does have SA129 shown in the vicinity of the conveyance. TRX should ensure that all previous and proposed sample locations are cross-checked from text/tables and figures.
 30. LOU 1, the NDEP believes that rationale for the locations of the Phase B soil vapor samples is not clear. For example, two soil vapor samples are proposed in the western portion of the LOU, but none are proposed within the remainder of the LOU, including former pond areas. TRX should add rationale to provide clarity and transparency.

31. LOU 4, it is not clear why the LOU is separated into two non-contiguous locations, when piping ran between the two areas. TRX should consider redefining this LOU to include the two areas plus the area in between (i.e., where the piping ran) since the location of the piping is unknown.
32. LOU 4, VOCs have been detected; however, soil vapor sampling is not proposed. TRX should provide justification or additional soil vapor sampling locations.
33. LOU 4, the NDEP has noted that there are no specific source features (e.g., as identified in the text) shown on the figure.
34. LOU 4, TRX should show the “sewer” location on the figure.
35. LOU 4, TRX should provide rationale for excluding dioxins/furans and PCBs from the Phase B suites. The NDEP notes that dioxins were detected at SA04, which is listed in this section as a sample location associated with LOU 4. If SA04 data are not relevant to LOU 4, TRX should provide rationale and remove the data from the LOU 4 data tables.
36. LOU 4, NDEP noted that no random borings are located in this LOU. It appears that this is due to the fact that this LOU is less than 4 acres.
37. LOU 20, as stated in NDEP’s previous comments, the relevance of sample SA17 to this LOU has not been documented. The current submittal states that this sample “was not specifically designed to evaluate this LOU”. Consistent with our general comment, TRX should provide rationale for the inclusion of data points in the LOU tables that are not located in the vicinity of the source(s).
38. LOU 20, NDEP’s previous comment about the history of the pond liner, was not addressed in this submittal. The submittal states “Pond was constructed with a single layer 60-mil liner: PVC floor was reinforced with butyl rubber side walls. Lining was removed in 1996”. It is NDEP’s understanding that the liner was removed (“burrito wrapped”) and over excavation of impacted soils was completed. This is not clear in the submitted document, additional clarification is requested. In lieu of specific information, grid sampling could be considered.
39. LOU 20, TRX should show source-related geographic locations as referenced in this submittal (e.g. 9th Street).
40. LOU 20, areas of piping systems associated with source features must be included as part of the LOU or if piping traverses other LOUs, the piping may be considered a part of the other LOU but reference should be made in all affected LOUs.
41. LOU 20, dioxins/furans were detected in Phase A sample SA17 (0.5 ft). The potential sources for these compounds should be discussed and extent of contamination should be delineated.
42. LOU 20, TRX should review NDEP’s previous comments on LOU 20 to make sure they are addressed.
43. LOU 43 & LOU 61, TRX should indicate the location of LOU 61 on the LOU figure.
44. LOU 43 & LOU 61, there are two areas in this LOU (Unit 4 and Unit 5). Unit 4 is targeted for regulatory closure; Unit 5 is categorized as “continuation of current use – regulatory closure not presently requested.” Based on different schedules and closure goals, TRX could consider splitting this LOU.
45. LOU 43 & LOU 61, if there is potential for the area between Unit 4 and Unit 5 to have been impacted, then this area should be added to the LOU (e.g., for purposes of defining exposure areas).
46. LOU 43 & LOU 61, the LOU summary states that historical groundwater samples address the potential release. NDEP does not necessarily agree and believes it is more accurate to

state that the groundwater samples that were identified by TRX partially address the potential release. It is likely that the “full extent of the release” is perhaps addressed by additional sampling locations that are not shown and perhaps additional sampling locations will be addressed in the future.

47. LOU 43 & LOU 61, the LOU summary states that Phase A samples are “not completely” located in worst case areas. NDEP disagrees. The Phase A samples are not located in the worst case areas. In some cases this is due to logistical constraints. In other cases this may be due to lack of historical documentation. NDEP believes that it is fair to state that the Phase A samples were biased towards areas of believed higher impacts.
48. LOU 43 & LOU 61, dioxins/furans were detected in Phase A samples SA6 and SA7 (0.5 ft). The potential sources for these compounds should be discussed and extent of contamination should be delineated.
49. LOU 43 & LOU 61, three borings are proposed within the LOU and nine borings are proposed outside of the LOU. For purposes of characterizing source areas, the NDEP believes that the emphasis should be on sampling within the source area. Based on source area data, decisions are then made regarding the need for step-out samples.
50. LOU 43 & LOU 61, data for “total chromium” must be accompanied with data for hexavalent chromium, given the potential for hexavalent chromium. TRX should identify the extraction method and analytical method for hexavalent chromium data. Otherwise, TRX should provide the assumption that the total chromium concentrations is equal to the hexavalent chromium concentration.
51. LOU 49, the LOUs in the Manganese Leach Plant Area could be combined for reduction of repetition and ease of review. Please note that the following comments for LOU 49 may be addressed by this combination of LOU areas.
52. LOU 49, the area identified for this source location is very small relative to a HRA exposure area.
53. LOU 49, the LOU summary is not clear as to the orientation of the storage tank relative to the leach tanks and other relevant source features which have not been described. All features relevant to the LOU should be described and shown on the figure.
54. LOU 49, the LOU summary is not clear what the source of metals is.
55. LOU 49, the proposed Phase B soil sample locations are (1) SA140 located approximately 20 feet north of LOU 49 and (2) “although not specifically designed to evaluate LOU 49” SA37 and SA38 are proposed. Please provide rationale as to the representativeness of these sample locations for a “source investigation” and coverage of the specific source features (i.e., storage tank and leach tanks).