

Meeting Minutes

Project: Tronox (TRX)
Location: NDEP Conference Room, Las Vegas, NV
Time and Date: 9:00 AM, Wednesday, July 25, 2007
In Attendance: NDEP – Brian Rakvica, Shannon Harbour
Teri Copeland (for NDEP)
Hackenberry Assoc. – Paul Hackenberry (for NDEP)
Neptune – Paul Black (For NDEP)
Tronox – Keith Bailey, Susan Crowley
ENSR (for TRX) – Dave Gerry, Lisa Bradley, Brian Ho, Elizabeth Perry

CC: Jim Najima, Todd Croft

1. The meeting was held to discuss a variety of topics including the Phase A Report and Phase B Work Plan. The purpose of the meeting was to review the evaluation process in a conceptual manner.
2. TRX provided a number of draft tables and “working” figures for discussion purposes during the meeting. TRX did not provide this information in advance of the meeting as requested by the NDEP in order for TRX to facilitate a coordinated explanation of each figure and the logic of how each figure was derived. Therefore, the NDEP did not have an opportunity to review these tables or figures critically. NDEP would prefer to have informational documents that TRX is requesting NDEP to review before meetings with enough lead time to allow an opportunity for critical review. TRX will make efforts to provide such documents in the future.
3. Selection of chemicals, TRX has divided the site-related chemicals (SRCs) analyzed during Phase A ECA into four categories:
 - a. Impacts found in soil/groundwater and known uses on-site – Additional characterization recommended
 - b. Impacts found in soil/groundwater and no known uses on-site – Additional characterization recommended
 - c. Impacts not found in soil/groundwater and known uses on-site – No additional characterization recommended
 - d. Impacts not found in soil/groundwater and no known uses on-site – No additional characterization recommended
4. TRX stated that several SRCs were selected for discussion of specific characterization approaches and will be used as templates to review the other SRCs for the Phase A report/Phase B Work Plan.
5. Background Histograms, Comparison of TRX Phase A data; TRX Upgradient data; and COH/TIMET/BRC Background Data in Shallow and Deep Soils, TRX provided histograms for boron, cadmium, lead, manganese, uranium, and radium-226. While TRX averaged data from the surface down to 20 feet for the histograms, NDEP suggested that TRX not include the samples collected at 20 ft bgs in the shallow presentation or the results should be explained in the text of the report. For example, boron in shallow soils looks like there is an impact, perhaps because the 20 ft bgs data are included in a comparison to a shallower data set. ENSR will investigate.

6. Background data, TRX indicated that they were making some preliminary decisions based on the COH background, BRC/TIMET background, and TRX upgradient data sets.
 - a. NDEP stated that a background data for deeper soils (e.g.: the Upgradient data) set have not been approved for TRX so any decisions based on a background number would be considered tentative.
 - b. Both TRX and NDEP noted that the background dataset for groundwater is not sufficient and does not exist for some water bearing zones.
 - c. NDEP noted that it may not be productive for TRX to try and complete comparisons to Upgradient soils data as background. It was suggested that TRX compare to the existing, approved data sets and that the deeper soils issues be discussed as an uncertainty. It appears that there may not be many significant issues if this is completed for the following reasons:
 - i. For deeper soils a human health impact is not likely;
 - ii. If the deeper soils do not represent a leaching issue then the evaluation may be sufficient;
 - iii. It was noted, however, that deeper soils that are elevated relative to background and leaching criteria will be a data gap. It was suggested that TRX present a working hypothesis for this issue and address it once deep background data are available.
 - d. TRX stated that additional background groundwater characterization will be proposed in the Phase B work plan.
 - e. NDEP noted that it will be difficult to find background sampling locations for groundwater within the vicinity of the facilities. If TRX steps out too far, the water bearing zone is no longer comparable.
7. Specific chemical discussions, TRX provided draft versions of Proposed Phase B Sample Locations and Potential Contaminant Source Area Maps for discussion on location and number of borings/monitoring wells for 13 chemicals. The draft maps illustrated known and/or possible source areas, Phase A sampling points, proposed borings and/or groundwater monitoring wells, flagged data, and detection level and comparison level exceedances.
 - a. TRX noted that similar maps would be developed for approximately 60 compounds. The selected additional characterization borings and wells would then be compiled into a “master” map which would form the basis for the Phase B Site Investigation.
 - b. For all the draft maps reviewed, TRX will check the legend for errors, mislabeling, or omissions. Numerous errors and omissions were noted during the meeting.
 - c. For all the draft maps, TRX will state, as applicable, how background was determined for each chemical (i.e., max concentration in the background data sets or 95%-ile of background data sets, and the source of the data (whether it be truly background approved by NDEP or if it is from the Upgradient data set; etc.).
 - d. For all the draft maps, NDEP requested that all wells to be sampled as part of Phase B be labeled in future submittals.
 - e. TRX stated that the locations for all proposed borings, monitoring wells, and groundwater sampling points considered potential and known source locations.

- f. Boron
 - i. Background comparison level of 27 mg/kg was suggested by ENSR for boron. It was noted this is not an approved background number. This number is based on TRX Upgradient data and it was noted that the Upgradient data appears elevated versus background.
 - ii. NDEP noted that all sample concentrations are greater than comparison levels calculated using a DAF of 1.
- g. Manganese
 - i. TRX stated that the presented concentrations in groundwater samples are affected by turbidity. TRX has resampled these wells (following the approved SOP) and is awaiting the results.
 - ii. Unit 5 will be shaded as a source area for future submittals.
 - iii. Contour lines were based on results of both unfiltered and filtered samples; however, the elevated unfiltered samples were not included in the development of the contour lines. It was also noted that all contours were hand drawn. NDEP suggested that the data used for the contour line should be consistent.
- h. Uranium (as a metal)
 - i. Uranium is a naturally occurring component in the ore used by TRX but there are no other known sources on site that would explain the localized uranium levels near and north of Unit 6. Additional borings are proposed.
 - ii. Background concentration of 4 ppm was chosen by ENSR because it was near the upper end of concentrations in the background data set. NDEP does not agree and it was noted that the BRC/TIMET background value is significantly lower. NDEP also noted that comparison to a max background value is the least conservative comparison that can be made. TRX will work on consistency of background concentration selection.
 - iii. M39 will be resampled.
- i. Perchlorate
 - i. Contour shown was from semi-annual report (Feb 2007).
 - ii. A boring will be advanced through the basement of the Unit 4 building. Unit buildings 5 and 6 are still operational and not available for characterization sampling at this time.
 - iii. Per the request of NDEP, TRX is currently using 10 mg/kg (1/10th the USEPA Region IX PRG) as the soil screening level for determining nature and extent.
 - iv. TRX may review the soil values from TRECO, which has low soil concentration and high groundwater concentrations.
 - v. TRX has not created histograms for perchlorate. NDEP stated that background concentrations in soil may be higher than TRX expects because of the PEPCON explosion. TRX stated that they believe that the background concentrations would be less than a risk-based screening level.
- j. Chromium VI (CrVI)
 - i. TRX stated that known and potential source areas were considered when proposing additional borings for CrVI. The source area containing SA-10

was inadvertently included on the draft map. The source area will be removed from subsequent CrVI maps.

- ii. It was noted that the map does not include any of the historical results from the CSM, such as those under the P-Ponds, but that these data were considered during the evaluation and siting of proposed additional sample locations.
 - iii. TRX will include an additional boring north of the ChemStar plant.
 - iv. TRX will include additional borings north of SA11 and SA16.
 - v. NDEP suggested that source areas not selected for characterization should be discussed. This will need to be defensible for the risk assessment.
 - vi. Pond AP-5, TRX stated that characterization of the soil in this area for perchlorate is not necessary because the perchlorate concentrations in the pond water are extremely high and if the pond were leaking, the perchlorate concentrations in nearby wells would significantly increase. In addition, it was noted that the pond has a leak detection system. NDEP noted that these are all good CSM type reasons that should be discussed in the text of the report.
 - vii. TRX stated that the Phase A data and the regular groundwater monitoring data are refuting the hypothesis that there is a large on-site CrVI source area remaining in soil.
 - viii. TRX assumes that total Cr is all CrVI (conservative).
 - ix. TRX is using a screening level of 1/10 the tap water PRG per request of the NDEP.
- k. Chloroform
- i. NDEP stated that the recent letter requesting a work plan for vapor intrusion characterization was issued for downgradient properties. On-site soil gas is a separate issue. TRX will include on-site soil-gas sampling in the Phase B Work Plan.
 - ii. TRX stated that there are no known significant uses of chloroform onsite, this includes plant knowledge. It was noted, however, the area north of Unit Building 4 appears to be an obvious source.
 - iii. SA-11 exhibited surface detections of chloroform. NDEP wants the extent of this area investigated. NDEP also suggested that TRX review the analytical for this location.
- l. Beta-BHC
- i. Concentrations only noted in SA14 and M45.
 - ii. TRX stated that there are no known on-site sources for beta-BHC.
 - iii. NDEP stated that there is anecdotal evidence that Hardesty Chemical (aka AMECCO), north of Unit 2, could be a possible source area.
 - iv. NDEP stated that wind-blown dust from the west may also be the source of the beta-BHC.
 - v. TRX does not believe that the truck washing area is a source area for beta-BHC.
 - vi. NDEP noted that the Pioneer-Stauffer-Montrose group is currently conducting characterization to the west. This should help identify and off-

site sources of beta-BHC. NDEP encouraged TRX to review the grid sampling data that was collected for surface soils by Syngenta.

m. Ammonia

- i. TRX stated that the ammonia present on-site is likely associated with ammonium perchlorate and would be located in the vicinity of the AP production plant and not the sodium perchlorate production plant.
- ii. TRX noted that nitrate and nitrite may also be observed associated with the ammonium perchlorate production.
- iii. TRX stated that ammonia analyses for 15 of 116 soil samples were rejected but that TRX thinks resampling for those borings is unnecessary based on the associated low groundwater values, which were not rejected, for the groundwater samples associated with these borings (SA09, SA10, and SA14). TRX stated that the rejected data for SA-15 doesn't need resampling because other data already suggest that additional characterization is needed in this area.

n. Hexachlorobenzene (HCB)

- i. TRX stated that there are no known sources of HCB on-site.
- ii. NDEP noted that the SIM data were not posted on the draft map. NDEP requested that the SIM data be posted on the map for report submittal as these are the data that has meaningful detection limits.
- iii. TRX also presented historical data from historic reports. There were some detections of HCB (elevated versus all Phase A data) but not all the samples were labeled for location identification in the CSM. TRX will collect additional samples near the former Koch asphalt plant.
- iv. TRX will move proposed boring in the Beta Ditch near sampling point BDB-03 to near sampling point BDB-04.
- v. In discussing hexachlorobenzene, TRX noted that a high heptachlor value for groundwater at M05A was a lab error. There was interference with the first column during sample analysis by the laboratory; therefore, the lower value from the second column may be more accurate. This was not written up in the lab report but has been confirmed by the lab. TRX will include this in the revised DVSR for this data set.
- vi. TRX noted that HCB analysis may be conducted via the OC Pesticide method in Phase B. NDEP indicated that this is acceptable if the detection limits can be achieved.

o. Radium-226

- i. TRX stated that there is no known source for Ra-226 on-site other than as a decay product of uranium. Paul Black indicated that Phase A soil data may be consistent with secular equilibrium.
- ii. TRX generated a histogram for Ra-226.
- iii. There is no deep background data set for Ra-226.
- iv. A general increase in concentration with depth was observed.
- v. TRX stated that the groundwater samples were unfiltered.
- vi. TRX recommends no additional characterization for Ra-226.
- vii. TRX will recommend a defensible background concentration.

- viii. TRX stated that the groundwater concentration exhibited by SA02 was likely an artifact of turbidity.
- p. Lead
 - i. TRX stated that there are no known source areas for lead on-site. NDEP noted that the truck wash area could be a potential source area and that this source area has anomalous results for a number of compounds.
 - ii. TRX stated that only 2 soil samples were above background.
 - iii. Teri stated that the concentrations shown on the map should be dismissed by the toxicity criteria.
 - iv. TRX will not include lead in the metal analysis for Phase B.
 - v. TRX recommends no additional characterization for lead.
- q. TPH
 - i. NDEP stated that TRX did not have to use 10 ppm (1/10 the soil action level) as a screening level for TPH and could use the 100 ppm action level.
 - ii. TRX recommended no additional characterization for TPH.
 - iii. SA08 exhibited TPH diesel range of 3,600 ppm in the surface sample. TRX stated that this sample was under pavement and that there were no BTEX or PAH concentrations detected in this sample.
 - iv. NDEP and TRX consulted the CSM to discuss the different on-site source areas for TPH and discussed the findings.
 - 1) LOU 35: Truck dumping (near SA09), TRX stated that 16 samples were collected for SA09 with only 3 detects, all of which were less than 100 ppm. TRX recommended no additional characterization for TPH in this area and NDEP agreed.
 - 2) LOU 45: Diesel storage tank (north of ChemStar), NDEP noted that 3 historic samples collected in 1999 exhibited TPH concentrations as high as 16,000 ppm. TRX stated that excavation has not occurred in this area. NDEP suggested additional characterization be conducted in this area and may be a possible soil gas sampling location. TRX suggested that 5 borings be advanced in this area – one inside each of the corners of the bermed area and one in the center of the bermed area. TPH, BTEX, and PAHs will be analyzed.
 - 3) LOU 39: Drum on pallet (northwest for SA11 and M76), TRX stated that the soil in this area was excavated and recommends that no additional sampling be conducted in this area for TPH. The NDEP agreed.
 - 4) LOU 64: Former asphalt plant (SA10). NDEP pointed out that all historical data and SA10 were collected south of the former asphalt plant. Historically there were tanks and a trailer present. TPH figure will be revised to accurately reflect this area. NDEP suggested that this area be sampled for TPH, BTEX, and PAHs.
 - 5) LOU 4: Hardesty (former kerosene tank), TRX stated that the tank was removed under the supervision on CCHD and that a closure letter was received. Nothing further proposed.

- 6) LOU 65: Central building only (near SA03), TRX will remove shading from other buildings associated with this LOU. TRX stated that this area was excavated and recommends no additional characterization. NDEP agreed.
 - 7) LOU 63: former UST, TRX stated that the UST was removed under the supervision of CCHD. TRX recommended no additional characterization. NDEP agreed.
 - 8) LOU 28: hazardous waste storage area, TRX suggested using SA04 to demonstrate that no additional characterization is necessary. NDEP agreed.
 - 9) NV Pick-A Part, TRX will not include this area in the Phase B work plan. This area will be characterized under the Phase II work plan to be submitted by BRC. TRX plans on moving NV Pick-A-Part in 2009-2010 timeframe and remediating that area at that time.
 - 10) NDEP suggested that TRX consider sampling LOUs for soil gas if the historic use or sampling indicate TPH impacts may be present.
- r. Cyanide
- i. TRX stated that there are no known source areas for cyanide on-site.
 - ii. NDEP noted that State Industries (LOU 62), near SA02 had a release of ~9,000 gallons of liquid waste containing cyanide. TRX stated that many of the soil and groundwater samples were rejected due to poor performance of the analytical equipment. Paul Hackenberry stated that if the pH of the liquid waste were neutral to acidic, the cyanide would be converted to HCN and would no longer be present on-site. Neptune noted that the data were rejected due to low matrix spikes and holding times. NDEP agreed to leave the data as is.
8. Leaching pathway, ENSR stated that the concentration of a chemical in soil would have to be well above the background concentration to have leaching above background levels.
 9. Based on the filtered vs. unfiltered sampling results, in which many of the metal samples with high turbidity resulted in high groundwater concentrations, TRX will control turbidity when sampling. TRX stated that not all the wells sampled exhibit increased turbidity when the pumping rate is increased. NDEP noted that this speaks to well construction.
 10. Metals: TRX acknowledged that some metals tend to be more mobile in reducing environments such as the NW portion of the facility.
 11. NDEP noted that WAPA was almost finished with their characterization.
 12. NDEP stated that TRX will need to address each source area for data adequacy in the risk assessment. Historical data may not be used for the risk assessment if not validated. If historical data have lab QA/QC, then TRX can provide this data to NDEP and NDEP will have it validated.
 13. NDEP will attempt to provide TRX with a map of Pioneer-Stauffer-Montrose current on-site characterization to prevent duplication of effort. **ACTION ITEM.**
 14. NDEP will post the final Borrow Pit Risk Assessment on the NDEP's ftp site. **ACTION ITEM.**
 15. TRX stated that arsenic (As) may be a driver in their risk assessment and will schedule a conference call to discuss new groundwater sampling data after validation has been completed. The As data were complicated by turbidity issues. TRX additionally stated that

surface soil samples for As were mostly consistent with background except for a few samples at 17 – 22 mg/kg.

16. TRX stated that they will collect DO, ORP, and pH at time of future Phase B sampling.
17. Phase B laboratory analyses, TRX will provide a list of proposed analytes/suites for Phase B.

ACTION ITEM.

- a. SVOC, TRX recommends eliminating SVOC analysis for Phase B. HCB will be handled as described below.
 - b. HCB, TRX stated that they want to include the analysis for HCB in the OC pesticides analysis. TRX will check with the certification branch for any certification issues. TRX believes that the detection limit should be lower than the screening level. The BDB samples collected by Kleinfelder for the 1993 report were analyzed using method 8081. Teri raised a concern about adding another variable (different analytical methods) into the risk assessment. If certification becomes an issue, TRX may use the method because of the QA/QC that will be required for the DVSR.
 - c. Metals, TRX stated that the metal analyses are run on an individual basis so there is no non-reporting issue.
 - i. TRX to check again with lab for accuracy of this statement. NDEP stated again that if data are available, they need to be reported.
 - ii. Uranium will be run as a metal not as a radionuclide.
 - d. Dioxin/furans, TRX recommends eliminating this analysis since all Phase A full method data are below 1 ppb.
 - e. PCBs, TRX recommends eliminating this analysis since only one detection was found in Phase A and it was below comparison levels.
 - f. Radionuclides, TRX recommends using only gamma spec, if necessary at all.
 - g. Asbestos, TRX stated that about half of the EAs will have additional sampling for asbestos, both amphibole and non-amphibole.
 - i. All samples will be surface samples using the elutriation method.
 - ii. NDEP noted that only known remediation for asbestos is excavation and disposal.
 - iii. TRX will collect enough samples to run risk analysis. Neptune suggested TRX may wish to run the calculations backwards to determine how many samples will be necessary for acceptable risk dependent upon the number of detections. TRX was cautioned that analytical sensitivity issues can affect the risk assessment.
18. Teri will supply data usability notes and sample evaluation report to TRX for guidance.
ACTION ITEM
19. TRX to complete data validation for the May 2007 groundwater resample data by the end of July and will provide the data to NDEP. **ACTION ITEM**
20. Schedule: TRX will notify NDEP of the expected submittal date for the Phase A Report / Phase B Work Plan after internal discussion based upon the comments made at this meeting.
ACTION ITEM.