

## Meeting Minutes

**Project:** Tronox (TRX)  
**Location:** NDEP – Las Vegas Office  
**Time and Date:** 8:30 AM, May 15, 2008  
**In Attendance:** NDEP – Brian Rakvica, Shannon Harbour  
Tronox – Susan Crowley  
Environmental Answers – Keith Bailey (for TRX)  
AIG – Cindy Hunter, Joseph Guerriero, Eric McCabe

CC: Jim Najima, Paul Hackenberry, Brian Giroux, Todd Croft

1. The meeting was held to discuss various topics including on-site and off-site remediation and sampling.
2. Mixing Zone Calculations
  - a. TRX has developed a spreadsheet to calculate the dilution factor needed dependent upon the flow remaining in the Las Vegas Wash after the SCOP project has been completed.
  - b. NDEP stated that NAC445A.144 contains the standards for beneficial use for toxic substances. Boron, manganese and iron appear to be the most likely issues, however, preliminary calculations show no problems.
  - c. TRX stated that the TDS that TRX discharges is currently 6,000 ppm, however, the addition of caustic for pH control (discussed below) is increasing the TDS.
  - d. TRX will provide the mixing zone calculations spreadsheet to the NDEP next week.  
**ACTION ITEM.**
  - e. NDEP stated that the SCOP project is projecting a base wash flow of 20 MGD and approximately 30 MGD of effluent flow from the existing wastewater treatment facilities.
  - f. NDEP stated that the City of North Las Vegas was constructing a wastewater treatment facility that would discharge directly into Las Vegas Wash when operational.
  - g. TRX stated that they hoped to maintain their existing discharge to the LV Wash.
3. NPDES Permit Exceedances
  - a. TRX stated that they have had several pH exceedances of their NPDES permit.
  - b. TRX has been adding approximately 330 gallons per day of 25% caustic in following the FBR system to bring the pH above 6.5 as specified in their permit.
  - c. TRX stated that they have been in communication with BWPC and were trying to talk with Al Tinney on the possibility of changing the pH limit to 6.0 as was reportedly allowed for the City of Henderson WRF discharge permit.
  - d. NDEP noted that changing the pH limit would open the permit up to EPA review.
  - e. NDEP and TRX discussed the possibility of discharging using an UIC permit but that TDS would make this problematic.
4. Alternative Remediation Testing
  - a. TRX noted that two remediation pilot tests were being considered and stated the following:
    - i. The first pilot test is for a vadose zone treatment pilot study using an Environmental Security Technology Certification Program (ESTCP) grant.
      - 1) Shaw Environmental has collected samples from several 35 ft by 35 ft test blocks near the old D-1 Building/slab and has initiated column studies. The samples contained approximately 50 mg/kg perchlorate.

- 2) TRX will provide the work plan for the pilot study to NDEP and AIG. **ACTION ITEM.**
- ii. The second test was for a groundwater treatment system using an Edible Oil Substrate Permeable Reactive Barrier (EOS PRB).
  - 1) TRX has been investigating the political and technological possibility of using the well line located north of the Athens Road Well Field (ARWF) on City of Henderson (COH) property for the EOS PRB.
  - 2) EOS would be injected into the groundwater followed by water (stabilized Lake Mead water or COH RIB water) to smear the EOS within the formation. The EOS would provide electron donor for the destruction of perchlorate.
  - 3) TRX speculates that each injection would last approximately 3 – 4 months.
  - 4) TRX has contacted COH and believes that COH is receptive to the idea.
  - 5) If the SCOP project uses the COH RIBs for infiltration of dewatering water, the EOS PRB would be adversely affected and TRX would look into moving the EOS PRB to approximately 200 ft downgradient of the Athens Road piezometer well line to minimize this effect.
  - 6) NDEP noted that TRX should consider the magnitude and impact of any metals that would be liberated in the reducing zone created by the EOC PRB.
  - 7) TRX stated that the reducing zone should be similar to the one created by AMPAC's in-situ bioremediation system (i.e. would have a similar ORP) and that adverse metals mobilization should not be a major issue.
  - 8) TRX stated that the objective of this location of the pilot treatment system would be to "plug" the possible gap in capture at ARWF and reduce the concentration of perchlorate in that area but not necessarily to concentrations less than 4 or 18 ppb.
5. Seep Capture
  - a. NDEP noted that the quarterly performance reports indicate low perchlorate mass recovery at the Seep Well Field.
  - b. TRX noted that NDEP's direction in the past has been to lower the perchlorate concentration in the Las Vegas Wash; therefore, TRX concentrated effort in the Seep area.
  - c. NDEP stated that with the current conditions in the Las Vegas Wash, the NDEP would prefer to capture the approximately 50 pounds per day perchlorate more efficiently.
  - d. NDEP and TRX discussed the possibility of an additional extraction well in the ARWF and eliminate the extraction from the Seep Well Field except for what was needed for dilution of the FRB influent for optimal system operation.
  - e. NDEP noted that part of this evaluation would also be to determine how long it would take the area between the ARWF and the Seep to "clean up".
  - f. It was also discussed that the pilot tests, if successful, might be helpful in cleaning up the area between the ARWF and the Seep.
  - g. Discussed how TRX would deal with dilution issues as the Seep water is partially used to dilute TDS. TRX noted that a limited number of Seep wells may be left on line or stabilized lake water may be used.
6. Groundwater Capture
  - a. TRX stated the groundwater capture investigation has demonstrated inward flow at the western end of the ARWF but the eastern end is slightly outward.

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- b. TRX is in the process of bringing ART-6 back online to try to achieve inward flow on the east side of the well field. ART-6 is currently covered by fill material for a COH building.
  - c. TRX stated that the COH is planning development of the area around the ARWF and will be raising the grade. TRX will have to raise the well heads as well as the utilities and pump flow lines. If wells are not raised, then TRX would have the wells located in vaults, creating confined space entry, which is not practical or cost effective for the current daily monitoring.
7. AP-5 Pond, GW-11, and FBR Remediation System
- a. TRX stated that the AP-5 Pond was recently sampled. Only the northwest quadrant exhibited crystals.
  - b. TRX noted that they are hoping to close this pond around April of 2009. Prior to disposal, the solids in AP-5 would be removed and washed. The wash water would be discharged into GW-11.
  - c. TRX stated that the perchlorate concentration in GW-11 is approximately 4 mg/L and the hexavalent chromium (Cr-VI) concentration is approximately 0.08 mg/L.
  - d. TRX stated that GW-11 would eventually be used as a large equalization basin for the FBR system. The conveyance system would be modified to send the extracted groundwater to GW-11 on a continual basis (instead current operations of discharge to GW-11 only when upset system conditions exist). The FBR system would then have a more consistent influent contaminant loading. TRX indicated that this would not likely occur within the next couple of years.
  - e. TRX stated that the GAC system pretreatment for the FBR system is to remove organics to prevent system upset. TRX indicated that the sampling on the effluent of the GAC system has been consistently less than 1 µg/L for organochlorine pesticides. TRX stated that Veolia will be replacing the GAC carbon this year.
8. Nevada Pic-A-Part (Parcel I)
- a. TRX conducted a site walk on this parcel yesterday and noted several small stained areas that had been left behind by the former tenant.
  - b. TRX has not been able to contact Mr. David Christensen, owner and operator of Nevada Pic-A-Part. TRX will have upper management attempt contact.
  - c. NDEP has also been unsuccessful in contacting Mr. Christensen. NDEP to follow up.
9. Remediation of Other Contaminants
- a. NDEP noted that TRX's NPDES permit limitation is focused on the remediation system objectives and that TRX should be aware that this may change at renewal.
  - b. NDEP stated that the TRX is responsible for any contamination discovered in the soil or groundwater on its property; therefore, TRX will ultimately have to treat any contaminants that enter their remediation systems regardless of the source. This is the direction NDEP is giving all of the companies.
10. Groundwater Sampling Plan
- a. NDEP stated that the review of this document has not been completed because the groundwater sampling locations will ultimately be based on the Phase A and Phase B investigation results.
  - b. TRX indicated that the Phase B Results should be available by the end of the year.
  - c. NDEP expects that the frequency will decrease; the number of sampling locations will decrease and the analytical suites will increase.