



Comments on
Draft Focused Remedial Investigation/Feasibility Study Report
Operable Unit 1 (OU1) Outfall Ditch
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General Comments

Environmental Stewardship Concepts has previously commented on the *Focused Remedial Investigation/Feasibility Study Work Plan* (January 2012) and the *Remedial Alternative Screening Technical Memorandum* (December 2012) for OU1 at Terry Creek. Many of the comments from these previous documents are still not addressed, and as such, are reiterated in this review of the Draft RI/FS. This RI/FS is incomplete and inadequate for a variety of reasons that are explained below. EPA is urged to insist on a revision to this draft.

EPA is urged to consider additional alternatives to the ones presented here and specifically include the following features that are variations on the proposed alternatives and could be appended to Alternative 3:

- employ a quadruple box culvert, instead of a three box culvert
- increase the amount and extent of sediment removal
- add a cap over the underlying sediments in the outfall ditch where contaminated sediments are left at depth and
- include a layer of activated carbon to the capping of sediments, in order to further reduce mobility and enhance possible degradation.
- consider biodegradation using the process that has been demonstrated by BioTech Restorations.

In an EPA document, *Ombudsman Report: More Information is Needed on Toxaphene Degradation Products* (USEPA 2005), the Office of Inspector General contends that more information is needed on toxaphene degradation products and that EPA should validate, approve, and use the gas chromatography with negative ion mass spectroscopy (NIMS) method that can test for these products. The EPA's report further states "Academia and the European Union have successfully used the NIMS method for at least 5 years to test for toxaphene degradation products in the environment," i.e. since the year 2000. As the method is currently being used, validation and approval steps would not be a difficult or lengthy process for the EPA.

Most important in the assessment of toxaphene to human and ecological health is that receptors are exposed to the degradation products, not the original technical toxaphene mixture. It should be further determined which toxaphene congeners pose the most risk to human health, where p26, p50, p62, p40, p41, and p44 have been found in fish tissues (Fiolet and van Veen 2001) or soil (Maruya 2001a) or both. Where some congeners are easily metabolized and excreted, others are poorly metabolized and not readily excreted, accumulating in the body (Maruya 2000). Studies indicate that only five (p26, p50, p40, p41, and p44) of the 200 congeners of toxaphene are not easily metabolized by the human body, these contributing to the long-term chronic toxaphene exposure in humans.

The potential pathways are also important to the assessment of toxaphene degradation products in human risk assessment. Scientific investigations indicate that the main exposure contributing to human health risk is from fish consumption and potential sources of drinking water (Fiolet and van Veen 2001, Buranatrevedh 2004). Additionally, babies are exposed to toxaphene degradation products *in utero* as well as after birth through mother's milk. Jacobson (1996) indicates that developing embryos are the most susceptible to organochlorines, such as toxaphene, which has been linked to impaired cognitive development (i.e. low IQ scores).

The Inspector General's report directly addresses Terry Creek, noting Method 8081's failure to detect toxaphene's degradation products in any fish samples taken in 1997. When the same samples were re-analyzed in 2001 by Dr. Maruya of the Skidaway Institute of Oceanography, the NIMS method found toxaphene congener concentrations of up to 1,420 ppb (2001b).

References

Buranatrevedh, S. 2004. Cancer Risk Assessment of Toxaphene. *Industrial Health*, 42: 321-327.

Jacobson, J.L. et al. 1996. Intellectual Impairment in Children Exposed to Polychlorinated Biphenyls in Utero. *New England Journal of Medicine*, 335: 783-789.

Fiolet, D.C.M. and M.P. van Veen. 2001. Toxaphene Exposure in the Netherlands. National Institute of Public Health and the Environment, RIVM Report 604502-003.

Maruya, Keith A. et al. 2000. Prominent Chlorobornane Residues in Estuarine Sediments Contaminated with Toxaphene. *Environmental Toxicology and Chemistry*. 19:2198-2203.

Maruya, Keith A., et al. 2001a. Selective Persistence and Bioaccumulation of Toxaphene in a Coastal Wetland. *American Chemical Society*, Chapter 12: 164-174.

Maruya, Keith A. et al. 2001b. Residues of toxaphene in finfish and Shellfish from Terry and Dupree Creeks. Georgia, USA Estuaries 24:585-596.

US EPA, Office of Inspector General. Ombudsman Report: More Information is Needed on Toxaphene Degradation Products. December 16, 2005. Report no. 2006-P-00007

Specific Comments

In reviewing the *Draft Focused Remedial Investigation/Feasibility Study*, several of our previously submitted comments for OU1 Terry Creek documents, *Focused Remedial Investigation/Feasibility Study Work Plan* (January 2012) and the *Remedial Alternative Screening Technical Memorandum* (December 2012), still apply and are listed here, followed by new comments.

Focused Remedial Investigation/Feasibility Study Work Plan (January 2012):

- “Dioxin concentrations need to be measured in all sediment samples owing to the presence of dioxin in toxaphene product.”
- “The report claims that method 8276 is not necessary because of previous data collection, as explained on page 14: “Since Method 1 is the most widely used method and is analogous to the SW 846 Method 8081B, the data from this method is what will be used to inform remedial decisions at the Site.” [now page 17].”
- “The Work Plan also anticipates leaving contamination in place that may pose continued risks to ecological receptors, indicated by the suggestion that the remediation may take the form of a performance based, rather than a standards-based or risk-based cleanup. The Work Plan needs to provide a method by which the remediation will be protective of ecological systems and human health.”

Remedial Alternative Screening Technical Memorandum (December 2012)

- “The RI/FS report basically discounts or ignores the chemicals besides toxaphene that are present as site contaminants. This omission underestimates the risks from chemicals to humans and ecological receptors.”
- “The RI/FS is correct that there is not enough sediment deposition to apply any form of natural recovery (an unproven approach for many situations, especially with chemicals that do not degrade naturally like toxaphene).”
- “Alternative and *in situ* methods could have been considered in the FS part of the report, but were completely absent. New methods may have advantages that are not possible with conventional approaches.”

- “Ultimately, none of the alternatives will bring this site to a conclusive cleanup if the ongoing source of toxaphene is not remediated successfully, and this report does nothing to address this most important issue.”
- “The considerable discussion over toxicity values for toxaphene presents an issue that remains unresolved. EPA needs to take a position on this matter and insist that the values developed and used by EPA are the ones that the company will ascribe to and use.”
- “In a similar manner, the methods for measuring toxaphene present an issue that needs to be resolved by the Agency. It is unclear what EPA testing method was used for “Method 1 Technical toxaphene” and no explanation is given to how “Method 2 Total Area Under the Curve (TUAC)” was calculated. Hercules did run some samples under Method 8276, which is a more improved method over Method 8081 for testing for weathered toxaphene, but these results are not given in the report. Hercules needs to use Method 8276 for the remaining samples.”
- “The text says that the detailed Conceptual Site Model is “under development” and will be in the final RI/FS report, contrary to guidance and standard. That is not the way to proceed. EcoRA guidelines from 1998 clearly state that the CSM comes first. Also see Glen Suter et al. textbooks on general Ecological Risk Assessment and ecological risk assessments for contaminated sites. The proposition that a conceptual site model is not prepared at a later time, but is supposed to be prepared at the outset.” The RI/FS must include a conceptual site model.
- “The plan calls for composite samples (page 24), which is inappropriate for characterizing the distribution, nature and extent of contamination, as EPA guidance dictates.”

New Comments

- This RI/FS wholly ignores conducting a Human Health Risk Assessment, with no mention of human health risks in a specific context. The RI/FS can at the very least include a summary of human health risks by noting the exposure pathways, types of health effects, what is known of dose-response relationships and a characterization of risks. But to completely exclude a section on human health is not acceptable.
- The report only contains an Ecological Conceptual Site Model, with no reference to an analysis of human health.
- The area surrounding the Outfall Ditch is too residential to be cleaned up to a non-residential standard.
- The RI/FS alternatives do nothing to permanently remove contaminated sediments, only to, ineffectively, remove contact with the contaminated sediment.

The capping remedies require monitoring in perpetuity, which would greatly increase their costs. These costs are not adequately and fully characterized.

- The RI/FS on page 38 indicates that dioxins were measured in two sediment samples, which is consistent with information that dioxin is a contaminant of toxaphene production. The next statement that the dioxin in sediment samples must be derived from other sources is not credible and needs to be removed.
- Any discussion about construction times, possible contamination during construction, and difficulties of remediating the existing ditch without re-routing, are all trivial. For a remediation project of this small scale (as compared to the Hudson River which is undergoing dredging), a greater amount of sediment removal must be a larger part of the alternatives.
- If shallow groundwater in the vicinity of the ditch likely discharges into the Outfall Ditch and Dupree Creek, then groundwater needs to be better characterized and analyzed as a possible source of contaminants. The groundwater plume associated with the plant, while being managed under RCRA, is wholly dismissed and mentioned only once in the RI/FS.
- The Ecological Conceptual Site Model only contains very general reference to groups of wildlife, not taking any one species specifically as a representative in that environment to determine its actual exposure pathways. Specific receptors can and should be used in the ecological risk assessment.
- The ecological risk assessment fails to consider the accumulation of toxaphene in marsh grass, *Spartina alterniflora* as a component in the exposure analysis and trophic transfer of toxaphene. ESC has previously submitted material on this point.
- Only one of the wildlife groups under consideration includes prey as a exposure pathway. This is wholly insufficient as prey items are a major source of contaminant exposure.
- The SLERA and the determination as to whether a BERA should follow must include the data analyzed under the NIMS method.
- Comparison of toxaphene and chlorinated camphenes found in fish pre- and post-remediation should not have been used to relax fish consumption guidelines when the post-remediation (2001) included different areas and species sampled than the pre-removal (1997) effort.
- The Outfall Ditch is being prioritized as a source of toxaphene to be remediated, but the larger issue is still the source of toxaphene to the Outfall Ditch, which has not been documented as remediated since the completion of corrective actions in 2010 on the Plant and the N-Street Ditch that feed into the Outfall Ditch. There was no reduction in fish tissue toxaphene in 2011. Additional testing must be done to confirm any measurable impact from the corrective actions.

- The NIMS method has been performed in consideration of planning for OU2 and OU3, but is not relied upon for OU1. As the Outfall Ditch is the source issue, it should be analyzed with the best/most sensitive congener evaluation available (Method 8276)
- The RI/FS contains the laboratory results of toxaphene breakdown products but the evaluation of the data will be performed under “separate cover” which means that the results will not adequately inform this remediation effort at the Outfall Ditch. The full data set and evaluation need to be included here.
- It is unclear if there was ever any dredging of the triple box culvert at any time in its history. A disadvantage of a culvert is the need for periodic cleanout of the silting sediment.
- It is unclear how the accumulated volume of sediment since the removal was calculated (estimated to be: Pre-weir = 7500 cy and post-weir = 10,500 cy)
- The seepage rate (net gain of groundwater into the Outfall Ditch) pre-weir is 1,352 gpd and post-weir is 2,593 gpd. This information indicates a lot of seepage from groundwater into the Outfall Ditch not to be considered a contaminated source
- Net groundwater discharged into OD may be substantial based on the area being a “gaining” area, but this section seems to downplay the potential VOC contribution of groundwater.
- Section 8.3.2 explains the Remedial Action Objectives. All four are objectives to reduce exposures with no objective for removal of the source material or eliminating toxicity. The completion exclusion of removal as an objective seems completely inconsistent with EPA directives and guidance to treat or remove toxicity before relying on covering the source. This RI/FS lacks consideration of removal options.
- Section 8.3.4 on page 60 refers to MNR associated with reductions in surface sediment toxaphene concentrations, but fails to note that toxaphene degradation in the sediment is sufficiently slow that burial is the process that takes place. Wisely, MNR is not considered any further.
- Similarly, in Section 8.3.4 on pages 60-61, the RI/FS discounts removal because it is too difficult and too expensive, but fails to provide any substantive or meaningful support for this position. The RI/FS needs to give more than token consideration to removal.
- There is no consideration given to bioremediation, despite the fact that Hercules has conducted pilot studies with new methods for bacterial degradation.
- There is no discussion of testing excavated material for contaminants that is temporarily stockpiled to be used as backfill.
- A report of this size and importance should have an Executive Summary and an Abbreviations page to make the material more accessible to the public.