



MEMORANDUM

Superfund Records Center

SITE: Centredale Manor

BREAK: 3.1

OTHER: 522356

TO: Anna Krasko, RPM  
FROM: Michael Murphy  
DATE: September 28, 2012  
SUBJECT: Requested Information – Centredale Manor Restoration Project Superfund Site

Please find attached, per your request, a review of comments included in the October 19, 2006 letter from Bingham McCutchen LLC (on behalf of Emhart Industries, Inc.) to USEPA concerning documents prepared for the Centredale Manor Restoration Project Superfund Site. The attached review is focused on comments that related to the Remedial Investigation Report (2005), the Interim Final Baseline Human Health Risk Assessment (2005), the Interim Final Baseline Ecological Risk Assessment (2004), and the Interim Final Preliminary Remediation Goals Report (2005). Thank you.



## PART 1 HUMAN HEALTH

A letter from Bingham McCutchen (on behalf of Emhart Industries) dated October 19, 2006, contains comments by AMEC Earth & Environmental, Inc. (AMEC) on the Interim Final Baseline Human Health Risk Assessment (BHHRA) prepared in 2004 and revised in 2005 and the Interim Final Preliminary Remediation Goals Report published in November 2005. In general, the comments maintain that the health risks were overestimated because of the use and application of incorrect and invalid assumptions and approaches. AMEC's comments were focused on the exposure assessment and risk characterization for the fish consumption pathway and the ingestion of soil. A review of the major topics identified in the comments is presented below.

### BASELINE HUMAN HEALTH RISK ASSESSMENT

#### Fish consumption pathway

##### Derivation of exposure point concentrations

- Data are limited – small numbers of fish tissue samples, inconsistent species and numbers of samples among exposure points. The BHHRA utilized the available fish tissue samples and associated analytical data. During the collection of fish samples during the Remedial Investigation, the target numbers of fish samples of the representative species were not achieved in each of the river reaches, despite extensive efforts to do so. If certain fish species were not available in specific reaches, they obviously could not be collected. While this may result in some inconsistencies, it reflects the nature of the fish populations in the reaches that were sampled. Additional fish and sediment data collection closer to the time of the remediation effort has been always anticipated in the RI/FS to adjust the cleanup levels if needed.
- Fish tissue data for Allendale and Lyman Mill not representative of current conditions - most data collected after dam breach and before dam reconstruction when fish could freely move between the two ponds – body burdens in fish linked to sediment – but difficult to link specific fish and sediment at same point in time. The Draft Technical Memorandum, Comparison of Pre-breach and Post-breach Data and the Potential Impact of the Allendale Dam Breach on Preliminary Remediation Goal Development (May 2005) evaluated the fish tissue data with respect to the dam breach, the BHHRA, and the development of Biota Sediment Accumulation Factors (BSAFs), and health risk-based Preliminary Remediation Goals. That report compared calculated BSAFs for the river reaches and the background and reference areas and it concluded the following:
  - *Sediment PRGs should be calculated for the exposure areas other than Lyman Mill Pond. The BSAFs for the exposure areas other than Lyman Mill Pond appear to be consistent.*

- *The calculation of BSAFs and sediment PRGs for white sucker and largemouth bass should include an outlier analysis for chemical concentration data in sediments and fish tissue. Outliers should be removed from the data sets prior to calculation of BSAFs and PRGs. Alternatively, geometric mean concentrations of both organic carbon normalized sediment concentrations and of lipid normalized fish tissue concentrations could be used in the BSAF calculations in order to minimize the impacts of outliers in the data sets.*
- *Based on the evaluation of the data from pre-breach and post-breach conditions and a comparison of draft sediment PRGs to background sediment concentrations, the available data appear to be sufficient for PRG development and additional sampling and analysis is not recommended at this time.*
- Species selection
  - Combined fish diet assumes average of fish species EPCs is representative – assumption of equal contribution to combined fish diet by each species is not supported. EPA applied professional judgement in identifying the composition of the hypothetical future combined fish diet. In the literature, there was information to suggest that there are substantial differences in fish consumption patterns among different cultural groups and this suggested that the three main fish species could be consumed in the future. There was no quantitative information available that could be used to quantify the potential combined fish diet in a more detailed manner.
- Whole body vs. fillet
  - Eel whole body somewhat reasonable, whole body white sucker – bony, whole body consumption not reasonable. EPA did recognize that white sucker might not be prepared and consumed in the same manner as largemouth bass or even eel. In fact, it was assumed that white sucker might be most likely to be consumed if it were a component of a fish stew or other similar meal (as a whole body).
- The same three species (eel, white sucker, and bass) are not represented in the data for the four river reaches – bass fillet should be the basis for the risk calculations (game fish). All three species were not equally available in all exposure areas during the Remedial Investigation sampling programs. The available data were utilized in the BHHRA, with the inconsistency recognized as an uncertainty.
- Dioxin TEQ concentrations may be overestimated – should have screened dioxin/furan congeners to determine if compounds should have been eliminated from the TEQ calculations. EPA employed a conservative approach in calculating the dioxin TEQ concentrations. The impact of inclusion of all congeners in the calculation of dioxin TEQ did not add considerable uncertainty to the BHHRA. For biota tissue and sediment samples from Allendale Pond and Lyman Mill Pond, the 2,3,7,8-TCDD

dioxin concentrations were, by far, the largest contributor to the overall dioxin TEQ concentration. There is no indication that inclusion of dioxin/furan congeners that were infrequently detected in the calculation of dioxin TEQ concentrations had any substantial impact on the results and conclusions of the BHHRA.

- Fish consumption rates, Maine Angler Study appropriate, but manipulations of the rates not appropriate. No sharing introduces uncertainty and overestimates risk. The fish consumption rates used in the BHHRA and in the derivation of Preliminary Remediation Goals were estimates of future fish consumption rates for a “fishable” condition for the Woonasquatucket River. Determining current fish consumption rates would not be appropriate, since the State of Rhode Island has issued advisories against consumption of fish for the river (including portions of the river associated with the site). Therefore, current fish consumption rates would not be useful in evaluating potential future fish consumption (when advisories against fish consumption would not be in place).

USEPA recognized and acknowledged the importance of the fish consumption rates with respect to estimation of human health risks and the derivation of health risk-based Preliminary Remediation Goals. During the Remedial Investigation and the BHHRA, EPA conducted a survey of local anglers to obtain information concerning current fishing and fish consumption activities. In addition, published literature was searched to identify fish consumption rate studies that might contain information helpful in identifying potential future fish consumption rates for the site. The published studies were evaluated and based on several factors, the information from the Maine Angler Study was selected as the most appropriate for evaluating fish consumption at the site.

EPA considered the evaluation of subsistence fishing as a potential future scenario for the site, but determined that subsistence fishing was unlikely and should not be the basis for the fish consumption exposure scenario and was used as an upper boundary of the exposure uncertainty. The published literature was searched with a preference for “recreational” angling and for studies conducted in the northeast United States, if possible. EPA selected the Maine Angler Study information, and, as indicated in the comments received, AMEC agreed that selection of that study was appropriate. EPA applied professional judgement and discretion in using information from the Maine Angler Study to identify, for use in the BHHRA, realistic, yet conservative, potential future fish consumption rates for the Visiting Recreational Angler and the Resident Living Along the River for the three age groups (adult, adolescent, adult) evaluated in the BHHRA.

- Impact of preparation and cooking on exposure point concentrations - Cooking loss 25% - 75%, trimming of fish eliminates lipid (and therefore dioxins). EPA considered the literature information concerning potential

cooking losses for various chemicals of potential concern as well as potential reduction in concentrations of fish tissue during meal preparation and based on professional judgement determined that the available information did not support a quantitative adjustment of exposure concentrations.

### **Swimming and Wading**

Swimming and wading frequency overestimated. The swimming and wading frequencies used in the BHHRA were based on available guidance, a conservative approach for considering potential future use of the river, and professional judgement.

### **Surface Water Exposure Assessment**

Using Allendale and Lyman Mill data for surface water to represent Manton and Dyerville unacceptable. In the absence of surface water data for the two ponds, the use of data for Allendale and Lyman Mill Ponds was considered a conservative approach to address the uncertainty associated with the lack of data. As indicated in the Interim Final BHHRA, the incremental human health risks associated with surface water exposures for the Visiting Recreational Angler and the Resident Living Along the River were not above the Superfund cancer risk range nor was the non-cancer hazard index above one. Appendix I discusses the uncertainties associated with potential dermal exposures to chemicals of potential concern in surface water. The approach for evaluating the potential surface water exposures and risks for Manton and Dyerville reaches was conservative and concluded that no action was required for human health risks associated with surface water exposure.

### **Soil direct contact**

- Comments suggest that more recent studies support alternatives to the age-group-specific soil ingestion rates utilized in the BHHRA. EPA utilized available agency guidance and professional judgement in identifying soil ingestion rates for the age groups and receptors evaluated in the BHHRA. There has been constant evolution of exposure assessment guidance at EPA, but even current exposure factors guidance remains consistent with the values utilized in the BHHRA.

### **Toxicity of Dioxin**

EPA has never published a cancer slope factor for dioxin (2,3,7,8-TCDD) in the Integrated Risk Information System (IRIS) database and the toxicity of dioxin is a matter of much debate. The full range of possible cancer potency factors should be discussed. EPA acknowledges that the toxicity of 2,3,7,8-TCDD has been a matter of much debate. EPA has used in the BHHRA, consistent with agency guidance, the cancer slope factor published in EPA's Health Effects Assessment Summary Tables (HEAST). HEAST is a Tier 3 source of toxicity values to be used in the CERCLA process.

## **Interim Final Preliminary Remediation Goals Document, November 2005 – Human Health Component**

Document lacks required transparency. The document contains extensive documentation of the approaches utilized and the calculations conducted in text, tables, and appendices. The documentation is sufficient to duplicate the derivation of the human health risk-based PRGs.

Document relies on unrealistically conservative exposure parameters utilized in the BHHRA. The derivation of PRGs by definition relies, in part, on the exposure assessment conducted in the BHHRA. As discussed in responses to comments for the risk assessments conducted for the Oxbow Area floodplain soils as well as in the text presented above concerning the BHHRA, the selection of exposure parameters was conducted using USEPA Regional and national guidance as well as professional judgement and discretion, given the need to evaluate potential risks associated with both current conditions and uses of the Woonasquatucket River as well as potential future conditions and uses of the river.

The document is internally inconsistent.

Section 2.0 has no description of development of fish tissue PRGs. Section 2.1 presents a text description of the derivation of the fish tissue PRGs, including the mathematical equations used in the derivation. Table 3-5 of the PRG document includes the receptor exposure parameter values used in the derivation, the equations used to calculate PRGs based on both cancer risk and non-cancer risk, and the table also presents the calculated human health risk-based PRGs for all of the identified COCs for the fish consumption pathway. In addition, the equations utilized in calculating the fish tissue PRGs are presented in Appendix B of the PRG Report. The fish tissue PRGs are a function of the assumed fish consumption rates for the age groups evaluated, the exposure parameters for the age groups evaluated, and the toxicity values employed in the BHHRA. Those PRGs (mass concentrations) are identical for the combined fish diet or for any single species that might be considered.

- It is not clear how outlier analysis was employed in PRG development. The outlier analysis is presented in Appendix A of the PRG Report. The PRGs were derived in a manner consistent with the recommendations of the Draft Technical Memorandum, Comparison of Pre-breach and Post-breach Data and the Potential Impact of the Allendale Dam Breach on Preliminary Remediation Goal Development (May 2005), which are identified in previous text of this memorandum. This approach utilizes geometric mean values to minimize the impacts of potential outlier values.

There should be more discussion of the full range of possible toxicity values related to carcinogenic potential for TCDD. EPA acknowledges that the toxicity of 2,3,7,8-TCDD has been a matter of much debate. EPA has used in the BHHRA, consistent with

Review of Comments – October 19, 2006 Letter from Bingham McCutchen to USEPA – RI, BHHRA, BERA, and PRG Report - Centredale Manor Restoration Project Superfund Site

agency guidance, the cancer slope factor published in EPA's Health Effects Assessment Summary Tables (HEAST). HEAST is a Tier 3 source of toxicity values to be used in the CERCLA process.

## **PART 2 ECOLOGICAL**

### **Review of PRP comments on the Interim-Final Baseline Ecological Risk Assessment Report; prepared by AMEC Earth and Environment, Inc., dated 19 October, 2006.**

The following summarizes a general review of the major issues raised in the referenced AMEC submission.

#### **Executive Summary.**

Overall conclusions regarding risks to demersal and pelagic fish. While the inconsistencies between the Executive Summary and statements in Sections 5 and 6 are acknowledged, the overall findings of both demersal and pelagic fish assessment endpoints support a conclusion that fish populations in both Allendale and Lyman Mill Pond “may be at substantial risk of harm”. As clearly demonstrated in Tables 89 and 98 (weight of evidence integrations for demersal and pelagic fish populations, respectively), individual outcomes of the various measurement endpoints (measure of effect) did not support a unique risk determination and it was conservatively decided to retain these populations for remedial consideration.

#### **Section 3.0 Problem Formulation.**

Failure to incorporate relevant information in life history summaries and basis for reference area selection. EPA believes that the selection of endpoint receptors is adequately substantiated and disagrees with the suggestion that the documented occurrence of a particular receptor is a requirement for selecting a trophic guild representative. EPA believes that the BERA provides adequate information supporting the use of Assapumpset Pond as a reference area for the assessment.

#### **Section 4.0 Aquatic Invertebrate Community Risk Evaluation.**

Additional methodological details and justifications requested. EPA believes that the analysis was conducted in accordance with generally accepted protocols and that the information presented is sufficient to support the risk findings and decision-making.

Failure to consider benthic community assessment data in the lentic assessment. Macroinvertebrate community sampling was limited to free-flowing reaches of the Woonasquatucket River and the findings are not relevant to assessing potential risks in aquatic habitats with little current flow (i.e., lentic).

#### **Section 5.0 Floodplain Invertebrate Community Risk Evaluation.**

Additional information on representativeness and uncertainties associated with the analysis necessary. See remarks under Section 11.

#### **Section 6.0 Demersal Fish Population Risk Evaluation.**

Statistical analysis of fish population data sets and interpretation of study results. EPA believes that the information presented is sufficient to support the risk findings and decision-making and given the documented ichthyoplankton study issues, maintains that the findings were inconclusive.

Derived early life stage fish Effect Concentrations (ECs) may not reflect TCDD exposures. The consistency between the ECs derived from the study and literature values supports the conclusion that TCDD exposures were adequately characterized in the study.

Use of large fish to estimate exposure concentrations. In general, fish captured from the ponds were large specimens and are thus most representative of available biomass. In addition, use of the larger fish is consistent with EPA's general desire to err, where necessary, on the side of conservatism; in addition, this issue was identified as an uncertainty in the BERA.

### **Section 7.0 Pelagic Fish Population Risk Evaluation.**

Relative weighting of separate measurement endpoints. EPA used professional judgment in assigning relative weights to each endpoint.

Use of large fish to estimate exposure concentrations and selected maternal/embryo transfer factor. See above. EPA applied discretionary judgment, based on the recommendation of a pre-eminent national aquatic dioxin expert, in selecting the maternal/embryo transfer factor used in the BERA.

### **Section 8.0 Piscivorous Mammal and Bird Populations Risk Evaluation.**

Selection of food web modeling parameters, uptake factors and exposure point concentrations (EPCs). EPA used professional judgment to estimate exposure parameters and uptake factors and followed guidance in developing EPCs; selection of specific fish samples is discussed above.

Characterization of risk uncertainties. EPA believes that the BERA presented a thorough discussion of major risk uncertainties and considers the evaluation sufficient to support decision making.

### **Section 9.0 Insectivorous Mammal and Bird Populations Risk Evaluation.**

Selection of food web modeling parameters, uptake factors and exposure duration terms. EPA used professional judgment to estimate exposure parameters and uptake factors that is consistent with available guidance.

### **Section 10.0 Omnivorous Mammal and Bird Populations Risk Evaluation.**

Estimation of receptor homer range. EPA used professional judgment to estimate exposure parameters and consistent with agency policy erred on the side of conservatism, when necessary.

### **Section 11.0 Ecological Risk Uncertainty Analysis.**

Discussion of uncertainties should have been more fully developed. Although qualitative in nature, the relative importance of different sources of the main BERA uncertainties is discussed and EPA believes that the information presented is sufficient to support decision-making.

### **Appendix H. Early Life Stage Toxicity Report.**

Adequacy of EC values and comparison of laboratory and field measurement endpoint results. See Section 6.0 regarding the characterization of EC values. While

acknowledging the logistical issues encountered during the conduct of the ichthyoplankton study, EPA believes that the absence of fish eggs of sensitive species in the field study supports the toxicity test results. In addition, sufficient information is provided in the ELS toxicity report to interpret the significance of the pathology results referenced.

**Section 12.0 Conclusions.**

Alleged errors and lack of transparency and consistency in BERA. EPA believes that the BERA was conducted in accordance with established guidance, is accurate and that the conclusions are robust and sufficient to support remedial decision-making for the site. Where necessary and consistent with its standard preferences regarding Type I and II errors, the BERA applied conservative assumptions to derive risk estimates.

**Review of PRP comments on the Interim-Final Preliminary Remediation Goals Report – Part II Ecological; prepared by AMEC Earth and Environment, Inc., dated 19 October, 2006.**

The following summarizes a general review of the major issues raised in the referenced AMEC submission.

**Section 2.0 General Report Comments.**

Determination of assessment receptors at risk. As discussed in the review of the AMEC comments on the BERA above, EPA concluded that fish populations and macroinvertebrates in ponded portions of the site are potentially at risk and consequently require remedial consideration.

**Section 3.0 Technical Approach and Procedures for Development of PRGs.**

Risk management issues related to PRG application. Information regarding how the PRGs were used to develop cleanup goals is provided in the Feasibility Study.

Degree of conservatism of the PRG development methodology. Consistent with general policy, the PRG methodology errs on the side of conservatism, where necessary. A range of target hazard indices were calculated in order that EPA would have discretionary flexibility in application of the PRG values.

TCDD bioavailability in the ELS study and estimation of uptake factors. See review of issues above.

**Section 4.0 Calculation and Presentation of PRGs.**

Adequacy of uptake factors for invertebrates. As discussed in the review of PRP comments on the BERA, EPA believes that the information presented is appropriate and sufficient to support decision-making.

**Section 5.0 Discussion of Uncertainties.**

Adequacy of uncertainty discussion. See remarks on under AMEC comments on Section 11 of the BERA.

**Section 6.0 Comparison of PRGs to Background and Site Concentrations.**

Application of PRGs. The comparison of PRGs to individual sample location results was not intended to suggest that individual exceedances would require remediation, which is a risk management issue. The specific methodology of how PRGs (actually cleanup goals) will be applied will be identified in the Final Design documents.

### **PART 3 REMEDIAL INVESTIGATION**

#### **Review of PRP comments on the Interim-Final Remedial Investigation Report; prepared by AMEC Earth and Environment, Inc., dated 19 October, 2006.**

The following summarizes a general review of the major issues raised in the referenced AMEC submission.

The report does not discuss impacts of potential transport and release mechanisms including the 1972 fire at the NECC plant and reworking of site soils during construction of the Brook Village and Centredale Manor apartment buildings. The RI report discusses the chronology of events at the Site, including the 1972 fire and construction of the Brook Village and Centredale Manor apartment buildings at the Source Area. While it is possible that these events may have released and/or redistributed contamination at the Site, the conceptual site model (CSM) presented in EPA's RI report focuses on the most significant fate and transport processes that currently influence the movement of contaminants at the Site as this information is critical for remedial decision making. Historical release and transport mechanisms are also summarized as part of the CSM; this information is important for liability purposes but is less significant for purposes of the CSM. Overall, the CSM presented in EPA's RI and subsequent reports and decision documents (FS, Proposed Plan) identified the Source Area as the source of contaminants found on the ground, in groundwater and in the River. This assessment remains accurate.

The report does not adequately describe collection of data to support a groundwater mound located beneath the Brook Village parking lot. The RI report summarizes and presents all data available at the time of the RI that was used to characterize groundwater flow at the Site. The RI report indicated that the localized groundwater mound beneath the Brook Village parking lot was apparent based on water level measurement data collected at the Source Area in the spring of 2001 and 2002, and less pronounced in the fall of 2001 and 2002. Supplemental investigations performed in support of the FS revealed that the groundwater mound was also evident in the winter of 2006. A definitive explanation for the groundwater mound was not apparent based on the available information, but professional judgment was used to suggest that it could have been associated with groundwater perched above a low permeability silt lens or man-made structure. Following the release of the RI report, the PRPs have also conducted groundwater investigations at the Source Area and implemented a removal action at the Brook Village parking lot in 2009 to remove contaminated sediment and groundwater. Conditions at this area are no longer representative from that presented in the RI report.

Results reported for HCX do not meet normal quality standards. Dioxin and HCX data were validated at a Tier III level using first the Method 1613B, September 15, 1997 and the criteria in EPA Method 1668A, December 1999, defaulting next to *Region I, EPA-NE*

*Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria, and to EPA Region I's Environmental Services Assistance Team Dioxin Data Validation SOP ESAT-01-0007 (01/31/01) and PCB Congener data Validation ESTA-01-0008 Draft (8/31/01). Where HCX peaks exhibited poor chromatography, the validator used professional judgment to qualify the HCX data as estimates. While the RI evaluated the nature and extent of HCX contamination at the Site (along with other contaminants), this contaminant was not identified as a chemical of concern based on the baseline human health and ecological risk assessments and was not used for remedial decision making.