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January 16, 2007

Mr. James Hosch  
Wisconsin Department of Natural Resources  
1401 Tower Avenue  
Superior, WI 54880

Re: Koppers Wood-Treating Site – Superior, Wisconsin  
Response to October 30, 2006 Letter

Dear Mr. Hosch:

This letter responds to comments provided by the Wisconsin Department of Natural Resources (WDNR) in an October 30, 2006 letter to Beazer East, Inc. (Beazer) regarding the ecological risk assessment (ERA) approach for the "off-property" portion of the Koppers Inc. wood-treating site in Superior, Wisconsin (Site). The WDNR letter provides comments on a section of the March 31, 2006 letter from Blasland, Bouck & Lee, Inc. (BBL, now known as ARCADIS U.S., Inc. [ARCADIS BBL]) to Mr. James Hosch of WDNR. Attached to BBL's letter were two technical memoranda prepared by AMEC Earth & Environmental (AMEC) that provided initial information regarding the off-property risk assessment processes. Attachment A was the first of two memoranda presenting the approach to the ERA. Attachment B discussed information related to the human health risk assessment.

The WDNR's October 30, 2006 comment letter addresses the ecological risk assessment (ERA). Beazer understands that comments on the human health risk assessment approach will be provided separately.

WDNR comments were categorized into the following topics:

- Comments on Potential Ecological Receptors;
- Comments on Assessment and Measurement Endpoints; and
- Comments on Figure 1 – Conceptual Site Model for Off-Property Ecological Exposures in Attachment A.

Each topic is discussed below, including a brief reiteration of the nature of the WDNR comment followed by Beazer's response.

Incorporated in these responses, where applicable, is the outcome of two conference calls. The first was between AMEC and Mr. Tom Janisch of WDNR on December 1, 2006; the second was between Beazer, BBL, AMEC and Messrs Hosch and Janisch of WDNR on January 2, 2007.

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## **Comments on Potential Ecological Receptors**

One main comment falls under this topic: the discussion of amphibians as potential ecological receptors at the Site.

**Summary of WDNR Comment:** *Rationales need to be provided as to why amphibians were not considered as receptors in the ERA approach. Frogs are considered bioindicators of environmental health. Frogs have a complex life-cycle and developmental phases that are particularly sensitive from exposures to contaminants. For example, different species of amphibians show variation in sensitivity to PAHs. PAHs can be extremely toxic to amphibians when the PAHs bioaccumulated in amphibians are simultaneously exposed to the UV component in sunlight.*

**Beazer Response:** Beazer will include discussion of amphibians as potential receptors in the risk assessment; however, based upon currently available information, the discussion is likely to conclude that potential risk to amphibians will not be estimated quantitatively in the ecological risk assessment. This conclusion is based primarily on the absence of good amphibian habitat in Crawford Creek and the floodplain. Although amphibians (e.g. frogs) may inhabit portions of the floodplain system, the unstable, flooding nature of the Crawford Creek area does not likely provide substantial habitat for frogs that generally need ponded water for egg-rearing. Moreover, as AMEC discussed in the December 1, 2006 phone call with Mr. Janisch, no amphibians (adult or juvenile) were observed during the spring/summer 2005 biological sampling of Crawford Creek. Amphibians were also not observed in the upstream reference locations. For this reason, and because published toxicity data or effects-based screening benchmarks for Site constituents of potential concern (COPCs) for amphibians are limited, potential risks to amphibians will likely not be quantified.

## **Comments on Assessment and Measurement Endpoints**

Six distinct comments fall under this topic. Each is addressed separately below.

### **1. Use of Equilibrium Sediment Partitioning Benchmarks**

**Summary of WDNR Comment:** *The use of U.S. EPA's (2003) Equilibrium Sediment Partitioning Benchmarks (ESBs) approach should also be considered. Also, while it is indicated the Sediment Quality Guidelines (SQGs) will be used as sediment screening benchmarks, based on Attachment 1 below, WDNR uses SQGs both in the screening level step of the ERA and the risk characterization step as lines of evidence to be integrated with the other measurement endpoints.*

**Beazer Response:** Beazer will include comparison of sediment results to ESBs as a third Measurement Endpoint for assessing potential effects of Site COPCs on benthic macroinvertebrate populations.



## 2. Use of Previously Conducted Site-Specific Benthic Community Analysis

**Summary of WDNR Comment:** *The Department disagrees with the interpretation of the data and metrics applied to the benthic community based on our preliminary assessment and the data interpretation as done by the consultant provided in the report titled, Off-Property Investigation Data Summary Report for Koppers Inc. Facility.*

**Beazer Response:** Beazer will include the previously collected benthic macroinvertebrate data as part of a line of evidence in the ERA and will acknowledge WDNR's interpretation of the data. Beazer may conduct further evaluations of the data during the ERA process. If such evaluations are conducted, results will be summarized in the ERA.

## 3. Surface Water Screening

**Summary of WDNR Comment:** *We request that NR 105, Wis. Admin Code acute and chronic toxicity criteria for the protection of aquatic life be used in any comparisons. NR 105 does not contain any numerical water quality criteria either for PAHs or dioxins-furans for the protection of aquatic life or wildlife.*

**Beazer Response:** Beazer will include comparison of surface water results to NR 105 criteria where available for those Site COPCs detected in surface water.

## 4. Use of Previously Conducted Site-Specific Fish Community Analysis

**Summary of WDNR Comment:** *As with the macroinvertebrate data collected for the site in 1999, there are differences in interpretation of the fish data collected for the site. ... there is disagreement on the interpretation of the data and metrics applied to the fish community based on our preliminary assessment and the data interpretation as done by the consultant.*

**Beazer Response:** Beazer will include the 1999 data as part of a line of evidence in the ERA and will acknowledge WDNR's interpretation of the data. Beazer may conduct further evaluations of the data during the ERA process. If such evaluations are conducted, results will be summarized in the ERA.

## 5. TCDD Body Burden Evaluation of Fish

**Summary of WDNR Comment:** *A 3<sup>rd</sup> Measurement Endpoint not included in the AMEC approach related to the potential effects to fish from TCDD –EQ bioaccumulated in their tissues that can be added is based on a comparison of the amount of bioaccumulated TCDD-EQ to fish tissue Toxicity Reference Values (TRVs) associated with effects.*

**Beazer Response:** Beazer will include a comparison of TCCD toxic equivalence quotient (TEQ) to fish tissue Toxicity Reference Values (TRVs) as the third Measurement Endpoint for Assessment Endpoint 2: assessing potential effects of Site COPC on fish populations.



#### 6. Tree Swallow as Representative Aerial Insectivore

**Summary of WDNR Comment:** *Additional information is necessary to evaluate the sensitivity of tree swallow to TCDD-EQ, one of the identified contaminants of concern for the site. Receptors differ in their relative sensitivities to dioxins and furans. Some such as the wood duck are apparently very sensitive (i.e. relatively low TRVs) while others such as tree swallows appear not to be (MDEQ, 2004). The tree swallow may not meet one of the criteria for selecting receptors for use in ecological risk assessments and that is sensitivity to the contaminant of concern. If not sensitive, it cannot be used as a receptor to assess site effects to avian species whose primary route of exposure is from ingesting aquatic insects with body burdens of TCDD-EQs.*

**Beazer Response:** AMEC discussed this comment in detail with Mr. Janisch during the December 1, 2006 phone call. Based on the outcome of the phone call, Beazer will continue with assessing the tree swallow in the ERA but will provide further discussion on the decision.

Beazer agrees with WDNR that wood ducks appear to be more sensitive to the effects of TCDD than tree swallows. It appears that, in general, birds that eat insects, fish and animals are less sensitive to the effects of bioaccumulative compounds (such as dioxin and PCBs) than are birds whose diet is comprised of primarily plant parts (such as granivores).

The toxicity reference value (TRV) that will be used in estimating potential risk to the tree swallow (to be discussed further in the second technical memorandum) is based on results of a pheasant study. Pheasants are granivores and, as discussed above, appear to be more sensitive to dioxins/PCBs than fish- or insect-eating birds (which as WDNR states, typically have higher TRVs). Beazer is therefore being conservative by using a pheasant-based TRV for the insectivorous tree swallow. Using the tree swallow is also conservative because the swallow has a relatively large food ingestion rate on a body weight basis. If this conservative approach predicts a potential risk for the tree swallow, Beazer may conduct a more detailed review of avian TCDD toxicity literature to refine the assessment of potential risk. As mentioned in AMEC's call with Mr. Janisch, AMEC conducted such a review as part of it's evaluation of the potential risks of TCDD to bald eagles in Maine. That review identified the wood duck study noted in WDNR's comments but also identified other literature from which a conservative TRV for the bald eagle could be derived.

### **Comments on Figure 1 – Conceptual Site Model for Off-Property Ecological Exposures in Attachment A**

There are five specific comments presented in this topic. Each is addressed separately below.

#### 1. Addition of Further Information on Historical Releases to the Figure: Primary Source

**Summary of WDNR Comment:** *Under the Primary Source column in Figure 1, there is a box titled "Historical Releases on-Site". The question an outside reviewer or stakeholder would ask*



is "Historical releases of what?" The box should read "Historical Releases of Wood Treatment Chemicals\*" with the specifics given next to the asterisk placed immediately under the Primary Source and Secondary Source flow diagram with an identification of the wood treatment chemicals used, namely a) Pentachlorophenol with its manufactured dioxin/furan by-products, and b) creosote with a fuel oil carrier which contained PAHs. Useful information to be placed on the CSM along with the treatment products use would be the span of years each was used at the facility. We request that this further elaboration on the identification of the contaminants of potential concern be added.

**Beazer Response:** As AMEC discussed with Mr. Janisch during the December 1, 2006 call, available information on historical practices, specifically the types of wood-treating materials used at the facility, summarized in previous investigation related documents, will be described in the ERA. The CSM will include a citation to the section of the ERA in which historical practices are described. As agreed to during the call, only information that can be confirmed will be included in the description of historical practices.

## 2. Addition of Further Information on Historical Releases to the Figure: Secondary Source

**Summary of WDNR Comment:** *It would seem a foot note is needed under the Secondary Source column in the CSM figure that indicates once the contaminant forms enter Drainage Ditch and Crawford Creek from the various Secondary Sources, they migrate or are transported in the system in various forms that may include dissolved, associated with sediment particles, as NAPLs (free product that is immiscible), as various mixtures of residual oils in various stages of weathering and sediments, and/or as sheens on the water surface. The fate and transport of the contaminants will need to be further elaborated on in the risk assessment.*

**Beazer Response:** As AMEC discussed with Mr. Janisch during the December 1, 2006 call, the ERA will include a general description of the mechanisms that affect fate and transport of wood-treating chemicals in aquatic environments. A detailed description of fate and transport will not be provided because specific information about the timing and characteristics of potential historical releases from the facility are not available. The CSM will include a citation to the section of the ERA in which general fate and transport mechanisms are described.

## 3. Inclusion of the Drainage Ditch in the CSM

**Summary of WDNR Comment:** *It is recognized that, as stated in Attachment A, remediation activities are anticipated for the portion of the ditch such that potential ecological risks that may exist under current conditions will be addressed by planned remediation activities. The ditch and its floodplain soils should be portrayed in the CSM figure as if remediation activities have not occurred. As with Crawford Creek, the Outfall 001 Drainage Ditch floodplain should be included under the Exposure Points column in the CSM diagram. It remains to be determined if the Primary Receptors and Secondary Receptors that apply to the Crawford Creek Floodplain Soils also apply to the 001 ditch floodplain soils. While the foot note on the CSM figure indicates the drainage ditch (floodplain not mentioned) was not quantitatively assessed as an aquatic habitat (with the assumption that remediation activities are planned), it would appear all of this needs to be discussed in the problem formulation process for the ERA. Even though it looks like the drainage ditch sediments, bank soils and floodplain soils will be remediated, the anticipated remediation has to be put into some context as to the type of habitats being remediated, what assessment endpoints will drive the remediation, the extent of ditch bottom,*



*banks, and floodplain soils that will be remediated, and what will be the cleanup goals of the remediation. Will the cleanup goals be performance-based standards or numerical cleanup goals based on certain site-related contaminants of concern? The drainage ditch and its associated floodplains have to be carried through the ERA process to answer these questions.*

**Beazer Response:** The response to this comment has three sections: 1) ditch nomenclature; 2) ditch floodplain; and 3) ditch remediation.

First, based upon discussions during the January 2, 2007 phone call, Beazer will identify the off-property portion of the Drainage Ditch (beginning at the downstream end of Hammond Ave) as "a tributary to Crawford Creek" in all subsequent documents.

Second, as suggested by WDNR in its comment, the portion of the Crawford Creek floodplain that is adjacent to the tributary to Crawford Creek (tributary) is included in the ERA and the CSM as part of the Crawford Creek floodplain. Beazer collected data from this portion of the tributary/creek floodplain during the 2005 sampling program in anticipation of including the tributary portion of the floodplain in the ERA. Beazer will further clarify this in the ERA.

Lastly, as discussed during the January 2, 2007 conference call, Beazer anticipates that surficial sediments along the bottom and sides of the tributary that have been impacted by historical releases from the facility will be addressed through the corrective action process. Although the exact nature of the remedy has not been finalized, the remedy will likely include removal of impacted surficial sediments and replacement with clean substrate. Because this type of remedy will eliminate potential exposure of both human and ecological receptors to historically released Site-related COPCs in surficial sediments, it will also eliminate potential risk. The Corrective Measures Study (CMS) will describe the tributary remedy in more detail and demonstrate that the corrective action is protective of both ecological and human receptors.

At the conclusion of the January 2 conference call, WDNR agreed with excluding the tributary from the quantitative portion of the ERA, provided Beazer adds further discussion in the ERA about the nature of the proposed corrective action for the tributary.

#### 4. Crawford Creek Sediments to Adult Flying Insect Pathway

**Summary of WDNR Comment:** *In the Figure 1 of the CSM, one of the Exposure Points is the Crawford Creek Floodplain Soils with one of the Primary Receptors being Adult Flying Insects and the Secondary Receptors being the aerial insectivores. The Exposure Point missing from the Figure 1 is that which involves the Crawford Creek and Drainage Ditch sediments and the Primary Receptor Group of the adult flying forms of insects that spend the early portions of their life cycles in bottom sediments of surface waters, such as the larvae of midge flies. The Secondary Receptors for this group of emerged adult flying insects would also be aerial insectivorous birds and mammals.*

**Beazer Response:** The exposure point WDNR describes (Crawford Creek sediments and adult flying insects) and the corresponding secondary receptors (aerial insectivorous



birds and mammals) are included in the CSM. Beazer will modify the lines in the figure of the ERA to clarify the pathways.

#### 5. Additional Information on Floodplain Soil Insects

**Summary of WDNR Comment:** *We are more familiar with the sediment-related source of flying insects such as tree swallows consuming a predominantly aquatic-based diet than a floodplain soil source. We are not aware of an ERA that has used the latter source as a Primary Receptor group in a CSM. More elaboration will need to be provided on ERAs where floodplain source adult flying insects have been used in a risk assessment, the species of insects involved, the life cycle form that is contact and exposed to COPCs in the soils, and the seasonal timing of hatches and emergence of the insects involved.*

**Beazer Response:** The CSM depicts the relationship between the concentration of COPCs in adult flying insects to concentrations in sediments, soils and surface water. The Primary Receptor of Adult Flying Insects is assumed to represent the dominant available food source in the creek/floodplain system for mammals and birds that eat flying insects. It represents a combination of insects emerging from creek sediments and insects emerging from floodplain soils. During the December 1, 2006 phone call between AMEC and Mr. Janisch, AMEC agreed with Mr. Janisch to add discussion to the ERA about potential exposure of representative terrestrial insects (including different life-stages) to Site-related COPCs in floodplain soils.

During AMEC's phone call with Mr. Janisch, Mr. Janisch requested that additional information on the adult flying insect sampling methods be included in the ERA. AMEC agreed to add information on how sampling locations were identified (e.g. why insect samplers were located in the floodplain) and the timing of sampling (e.g. why most samples were collected in June).

With this letter and recent discussions, Beazer believes all of WDNR's comments on the first Technical Memorandum have been addressed and that the potential exposure pathways and potential receptors have been agreed upon. Once Beazer receives confirmation from WDNR, Beazer will begin preparing the second ecological risk assessment Technical Memorandum which will describe the exposure assumptions, parameters and scenarios to be used in the ERA to evaluate potential risks to the receptors identified in the first Technical Memorandum. More specifically, the second memorandum will include: identification of COPCs; procedures for calculating exposure point concentrations (EPCs); identification of screening benchmarks; presentation of receptor exposure parameters (e.g., dietary fractions and ingestion rates); and, identification of TRVs.

Mr. James Hosch  
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Please feel free to contact me with any additional comments or questions. In the interim, AMEC will begin preparing the second Technical Memorandum for the off-property ERA. We look forward to discussing the second memorandum with WDNR and to submitting the ERA.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Anderson". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Paul Anderson  
Vice President  
Technical Director, Risk Assessment

cc: John Robinson, WDNR  
Mark Gordon, WDNR  
Tom Janisch, WDNR  
Jane Patarcity, Beazer  
Jeff Holden, ARCADIS BBL  
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Bob Egan, USEPA Region V  
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