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FINAL DECISION AND RESPONSE TO COMMENTS ON THE SELECTION OF REMEDIES TO ADDRESS CONTAMINATION AT BEAZER EAST, INC., CARBONDALE, ILLINOIS

Introduction

The United States Environmental Protection Agency ("U.S. EPA" or "Agency") has selected a set of remedial measures to address contamination at the former Koppers Company, now Beazer East, Inc., at 1555 North Marion Street, Carbondale, Illinois (referred to here as "Beazer" or "facility"). The facility is contaminated with creosote and other wood-treatment chemicals. The remediation of hazardous waste and hazardous constituents at the facility falls under the jurisdiction of the Resource Conservation and Recovery Act (RCRA).

In August 2003, the Agency released a *Statement of Basis* (SB) for public review and comment which described the alternative remedial measures being considered, and identified the Agency's preferred set of remedies. The *SB* was publicized through a legal notice in the Southern Illinoisan, an announcement on the radio station W3DD, and individual mailings of a letter and fact sheet to potentially interested parties, including the adjacent property owners and local officials. The document was also placed on the U.S. EPA Region 5 home page on the Internet. The SB is Attachment One to this document.

After reviewing the comments that we received, the majority of which were from Beazer, the U.S. EPA has selected the Corrective Actions (cleanups) which the SB identified as the preferred set of remedies. These are described below, with some additional detail and clarification provided, based on the public comments. An Administrative Record Index is included as Attachment Two. This document presents the Agency's *Final Decision and Response to Comments*.

Summary of Selected Remedies

The Agency has selected a set of cleanup remedies which focus on containment, source removal and control, and the protection of human health and the environment. U.S. EPA guidelines allow for selection and construction of protective remedies without completing a comprehensive risk analyses, for the sake of expediency and to address immediate threats to human health and the environment. At Beazer, a decision was made in 2000 to proceed with remedy design following an acknowledgment that there were obvious unacceptable potential exposures following screening level risk analyses of contaminant concentrations in various media, and because of ongoing contamination of Glade Creek due to a failed interim remedy. In making this decision, comprehensive human health and ecological risk analyses were not completed and therefore corresponding risk management decisions remain to be made. For the creeks, further risk analysis will be included in the Monitored Natural Attenuation Plan and risk

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management decisions will be part of the Agency review and approval of the plan. The remedies include the following 12 components.

1) The Construction of a Corrective Action Management Unit

A corrective action management unit (CAMU) is a RCRA-specific waste containment area, like a secure landfill, located within a facility's boundaries which is used for storing and managing wastes from Corrective Actions at that facility. Beazer will construct a CAMU to contain approximately 18,000 cubic yards (cy) of contaminated soils, deconstruction debris, creek sediments, and piled waste soils. The footprint of the CAMU will be approximately 5.5 acres.

2) The Relocation of Glade Creek and the Construction of an Interceptor/Barrier Trench

There is a concentration of creosote (also referred to as "dense non-aqueous phase liquid" or DNAPL) and associated dissolved-phase chemicals beneath the ground surface at the eastern end of the property. The creosote in its raw form and chemicals dissolved in the groundwater discharge into a segment of Glade Creek. These contaminants pose a health risk to humans and the aquatic environment. In 1990, a grout blanket system was installed in the creekbed to block the discharge, however, the blanket has not been successful in eliminating creosote discharges into the creek. Beazer will relocate a 1,600-foot segment of the stream to a clean area to the east to isolate it from the source of contamination. The clean soils from the excavation will be used to backfill the old channel and an adjacent small pond.

Following relocation of the Glade Creek channel segment, an "interceptor/barrier trench" will be excavated approximately 30 feet deep within the (former) channel that will intercept subsurface creosote for collection and shipment off-site for re-use or disposal. The excavated soils, sediments, and grout blanket will be placed within the CAMU.

This remedy includes design elements to prevent DNAPL and contaminated groundwater migration to the new creek channel. If needed, groundwater will be pumped to adjust the hydraulics for engineering purposes and/or to ensure that a groundwater plume contaminated above acceptable levels does not migrate beyond the site boundaries or discharge into surface waters. Any collected groundwater will be treated on site and will either be discharged into the Carbondale Publicly Owned Treatment Works (POTW) under the limitations of a State-issued permit, or subjected to an alternative treatment as approved by U.S. EPA.

3) Excavation of Glade Creek Sediments

Beazer will excavate approximately 3,500 cy of contaminated sediments upstream and downstream of where the interceptor/barrier trench will be installed. The sediments will

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be dewatered, mixed with dry materials, and placed within the CAMU. Sediments which are visibly contaminated with creosote are designated for excavation. Monitored Natural Attenuation (MNA) is the selected remedy for the remaining contamination in the sediments (see remedy #7, below).

4) Placement of a Cover over Certain Soil Contamination

A low-permeability cover will be placed on 22 acres at the "former process area" where soil contamination exceeds safe exposure levels. The purpose of the cover is to provide a barrier between the soil and human and environmental receptors, and to reduce contaminant migration caused by rain water infiltration.

5) Extraction of Dense Non-Aqueous Phase Liquid (DNAPL)

Beazer will install a DNAPL recovery system well in the former process area to collect creosote for off-site reuse or disposal. If determined to be practicable, a limited number of other DNAPL recovery wells may be installed where source removal is needed, and if the wells are likely to recover a sufficient amount of DNAPL. Co-produced groundwater will be treated on site, then routed to the Carbondale POTW.

6) Waste Pile Containment

Approximately 10,000 cy of soil from two waste piles which were created during an earlier remedy will be placed in the CAMU. The soil may be used to stabilize wetter soils and sediments from the creek and trench excavation prior to their placement in the CAMU.

7) Excavation of Contaminated Sediments; Monitoring of Contaminated Sediments

Sediments of Smith Ditch, Glade Creek, Crab Orchard Creek, and Piles Fork are contaminated with creosote and other site-related constituents. A subset of the sediments from Glade Creek will be excavated and placed in the CAMU. The proposed remedy for the remaining contaminated sediments, including those in the other streams, is MNA. The sediments would be left in place and subject to natural breakdown and dispersion through biological, chemical, and physical processes. Per U.S. EPA's MNA guidelines and policy, an MNA Analysis Plan is required to model predicted effectiveness of the remedy, monitor constituent levels to determine whether natural attenuation is occurring as predicted, and to include a contingency plan if levels persist above acceptable levels beyond the predicted natural attenuation schedule. Agency MNA policy requires that monitoring be part of the remedy to measure its predicted effectiveness, and that a contingency plan be developed which would become activated if MNA does not meet expectations.

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8) Backfilling and Sealing Selected Wells

Thirty-seven wells that have been dropped from the site-wide interim groundwater monitoring network were proposed to be decommissioned as a remedy to minimize their potential as a downward conduit of DNAPL and site constituents to lower hydrologic units. Several of these wells have already been decommissioned under prior approval by U.S. EPA. Additional wells may be decommissioned based on the final design of the remedy.

9) Elimination of Discharge Point into Smith Ditch

A surface water underdrain system from the former process area discharges contaminated water into Smith Ditch. This discharge point will be eliminated during construction of the soil cover remedy.

10) Backfilling of the Small Unnamed Pond

A small pond (apparently excavated) west of Glade Creek is contaminated, as evidenced by an oily sheen on the water and dark, creosote-like staining along its banks. The pond will be emptied and backfilled to eliminate it as a human and environmental exposure point.

11) Institutional Controls

Use-restrictions, such as prohibiting consumption and contact uses of groundwater will be imposed at the facility to reduce the risk of human exposure to contaminated media, prohibiting excavation in the former process area (i.e., basement construction), and requiring current and future workers, including construction and utility workers, to follow a *Health and Safety Plan.* Future redevelopment will be confined to industrial/commercial land use.

12) Long-term Containment of Contaminated Groundwater Plume

The groundwater conditions will be monitored for a period of 30 years or longer after construction of the remedies. U.S. EPA requires that a groundwater point of compliance be established to ensure that contaminated groundwater will not pose unacceptable risks to groundwater users and surface water bodies. Often, the point of compliance is the facility boundary. In addition, the State of Illinois groundwater quality regulations allow for the establishment of a groundwater management zone (GMZ). At the facility, GMZ(s) and point(s) of compliance will be established in coordination with the Illinois Environmental Protection Agency (Illinois EPA).

Several monitoring wells were identified in the Interim Groundwater Monitoring Plan (IGMP) to provide site-wide coverage of groundwater conditions. The wells that will be

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used to monitor for potential off-site migration of a contaminated plume are near the facility boundary and are screened to allow sampling at each hydrogeologic unit (vertical zones in the aquifer). The current groundwater monitoring network will be re-evaluated to ensure that it provides site-wide coverage, and is sufficient for post-remedy monitoring. The final groundwater monitoring plan will be submitted for review and approval as part of the Operations and Maintenance Plan. If a contaminated groundwater plume should ever migrate beyond the point of compliance, then additional remediation measures will be considered and may be imposed on the facility, e.g. a groundwater pump-and-treat system. The plume containment remedy can be terminated if or when the groundwater quality has been restored to levels that allow for unrestricted use.

Public Participation Activities

The public had an opportunity to review and comment on the SB during the period of August 5 through September 22, 2003. The SB was publicized through a legal notice in the Southern Illinoisan, an announcement on the radio station W3DD, and individual mailings of a “letter to interested parties” which included a Fact Sheet to property owners adjacent to the facility and local officials. There were no requests for a public hearing and none was held.

Public Comments and the U.S. EPA Response

The U.S. EPA received four sets of comments from the public; the bulk of the comments were from Beazer. The written responses to the comments are provided below.

A) Comment received via e-mail on 9/2/03 from Dr. James Blackburn:

> 1. Excavation and containment of the sediment and waste piles is noted. Water monitoring wells are to be continued. "Visible" contamination is to be considered. It is unclear whether this inspection and remediation includes excavation for any known subsurface hot spots or whether it is for visible surface contamination only. Contaminated plume models are influenced greatly by the area normal to flow of the subsurface contamination and would be highly inaccurate if such hot spots were not removed prior to "natural attenuation."

U.S. EPA Response: Regarding the sediments - In 1986, Beazer surveyed the extent of the contamination in the sediments of Smith Ditch, Glade Creek, Crab Orchard Creek, and Piles Fork using an empirical method of visibly identifying creosote, creosote-stained sediment, and unstained sediment. Additionally, some sediment samples were analyzed for chemical content. In this remedy, some Glade Creek sediments will be excavated (the visually contaminated sediments) and placed in the CAMU. Monitored natural attenuation (MNA) is proposed for the remaining contamination. As you point out, “hot spot” removal, or source removal, is critical to the success of this remedy and is generally required by Agency policy.

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Regarding the soils - A considerable amount of the subsurface DNAPL will remain in place. It is recognized that the DNAPL is a continual source of dissolved-phase constituents. However, monitoring wells at the perimeter of the facility show that the levels of contaminants in the groundwater are generally below Maximum Contaminant Levels (MCLs) which are the Federal drinking water standards. The U.S. EPA will establish point(s) of compliance and groundwater management zone(s) in conjunction with the Illinois EPA. If a contaminated groundwater plume passes, or is anticipated to pass, the point of compliance, then Beazer must take action to address the problem. Additional source removal could be part of a future remedy.

2. A large fraction of the creosote at wood preserving plants has been shown in past cases to be removed by active surface bioremediation. The CAMU should not only be a long term storage feature, but should include in its design the use of a land-type or other type bioremediation unit. This unit should be operated on existing and newly discovered hot spot material and on material above a to-be-determined action level to reduce the inventory of PAHs and even PCP in the long-term material. Residuals in the soils for this type of treatment would be expected to be relatively immobile.

U.S. EPA Response: Such an approach was considered in an earlier remedy described in the 1995 Feasibility Study. A system was proposed to excavate soil from the former process area for placement in a bacterial treatment unit for eventual replacement on the site, requiring ten years for completion. This remedy was not selected because it was considered to take too long, to be cost-prohibitive, and risky in terms of re-release of contaminants to the environment during the processing.

Some degree of anaerobic decomposition of the materials stored in the CAMU will likely occur, however, the CAMU will not be designed for this process. Rather, the CAMU will be designed to contain the fill materials through a number of features. Wet fill materials will be stabilized before their placement within the CAMU, the cover will have low-permeability, and leachate collection and leak alarm systems will be installed.

3. Treatment of contaminated waters in the remediation should be on-site, not just sent to the POTW. It is possible that these waters may be quite contaminated and may pose a burden on the POTW including the release of some of the lower PAHs to the air through an air stripping mechanism at the POTW.

U.S. EPA Response: An on-site water treatment system is already in place. Groundwater that will be collected in the remedial systems will pass through a pre-treatment system prior to discharge to the POTW. The discharge is subject to limits established by an industrial discharge permit issued by the State.

B) Comment via e-mail on 9/23/03 from Ms. Priscilla Pimentel:

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You were very nice on the phone when we spoke earlier. My name is Priscilla R. Pimentel and I live in the city of Carbondale. I heard of the Contamination Remedies at Beazer East, INC. (formerly Koppers Company) only recently. I have looked over the materials in our public Library and found the plan to be well documented and laid out in fairly clear terms. I am not an expert in the field of contamination recovery, but the measures proposed seem reasonable and helpful in preventing further contamination. I do wish the comment period could have been extended, especially since some materials (some maps faxed to the library) did not arrive until the middle of the comment period, on September 11, 2003. The eleventh remedy proposed by the U.S. EPA, Institutional Controls, needs to include some kind of action to alert trespassers of the dangers of the site. I am thinking specifically of children who might explore and play in the contaminated areas, as well as anyone just wandering through. Thank you very much for taking the time to read my comment and for making materials available to the public.

U.S. EPA Response: The Agency is also concerned about trespassers being exposed to hazardous contamination at the site. This issue was raised with Beazer last year. We requested that a fence be erected along the southern boundary of the site which is shared with a residential area, and that "no trespassing" signs be posted warning of the presence of hazardous waste. Beazer has informed us that they have complied with the request. Further, a human-health risk-analysis will be required as documentation that Beazer has controlled unacceptable exposures to humans, including trespassers at the site.

C) Comments from Brad Cole, Mayor, the City of Carbondale, IL:

The Beazer East, Inc. project site is within the jurisdiction of the City of Carbondale's land use and development regulations. Any work performed at the site must comply with those regulations. In particular, work done in the floodplain must comply with the City of Carbondale's floodplain development standards. Prior to implementing the project, appropriate permits and approvals shall be applied for and received from the City of Carbondale.

U.S. EPA Response: This comment was relayed to the Beazer East, Inc. Project Manager who contacted staff in the Planning Department at the City of Carbondale to obtain the required permits and approvals.

D) The following comments are from Beazer East, Inc. (Beazer). Beazer has separated its comments into *general* and *specific* categories.

GENERAL COMMENTS

1. The scope of groundwater monitoring presented in the Statement of Basis appears to reflect the initial proposal made to the USEPA in 1997. Since that

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initial proposal, the scope of groundwater monitoring has been further developed in coordination with the USEPA, and the associated modifications to the monitoring well network have been made at the site. Specifically, the scope of the revised groundwater monitoring plan was summarized in a letter from BBL to the USEPA dated July 9, 2001. Associated field modifications (i.e., decommissioning of selected wells and installation of new and/or replacement wells) were performed in the fall of 2001 and documented in the *Summary of Field Investigations and Modifications to the IGMP Monitoring Well Network* (BBL, February 2002). This affects the following components of the Statement of Basis:

- Further well decommissioning associated with the revised groundwater monitoring program are not anticipated (Sections 2.8, 5.8, and 6.3 of the Statement of Basis). (Note, however, that decommissioning and/or replacement of selected wells will be necessary as a component of the proposed Glade Creek channel relocation in order to maintain the intent of the current program and to provide for post-construction monitoring of the channel relocation approach.)
- The current groundwater monitoring program includes sampling at 41 monitoring wells plus fluid-level measurements at 25 additional wells (Sections 2.12 and 5.9 of the Statement of Basis).
- The current monitoring frequency is semi-annual, not quarterly (Section 3.0).

U.S. EPA response: The remedy for the groundwater contamination is long-term containment, that is, a groundwater plume contaminated beyond acceptable levels may not leave the perimeter of the property or other established point of compliance, such as surface water bodies (see remedy summary #12, above). The existing site-wide monitoring well network and monitoring frequency which was established under the Interim Groundwater Monitoring Plan (and some subsequent revisions) will be evaluated for its adequacy, and may need to be modified for the Final Groundwater Monitoring Plan (or Operations and Maintenance Plan). Modifications would be based on a refined knowledge of the site, a need to further characterize and monitor groundwater conditions at the perimeter (e.g., the western boundary), and as post-construction monitoring points are selected. For a period of time while site conditions are stabilizing following the completion of remedy construction, monitoring frequency may need to be increased at selected wells. The U.S. EPA will coordinate with the Illinois EPA and Beazer to determine the point(s) of compliance and the standards or criteria that will define "acceptable levels." Acceptable levels are based on existing regulatory criteria or an analysis of potential risk to human and ecological receptors.

2. Numerous references within the Statement of Basis indicate that groundwater extraction will be performed from the trench-based dense, non-aqueous phase liquids (DNAPL) barrier to provide for hydraulic control of the former channel area. The primary purpose of the trench-based DNAPL barrier is to provide a capillary break to halt the potential for DNAPL migration toward the new channel.

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Please note that, as described in the *Glade Creek Channel Relocation Pre-Design Investigation Summary Report* (BBL, Revised May 2001), "active" groundwater extraction would only be performed if and as necessary, and the need for such extraction would be further evaluated during detailed design. Accordingly, the Statement of Basis should indicate that groundwater extraction will be performed to maintain hydraulic control only as necessary.

U.S. EPA Response: Glade Creek is at a low point in the surface topography and intercepts groundwater that discharges from the surrounding land area. The groundwater is in direct contact with subsurface DNAPL and is therefore contaminated with high levels of dissolved-phase site constituents, as is evidenced by sampling and analysis. It is clear that the subsurface hydrology in this area of the site will be altered following completion of the creek relocation and DNAPL interceptor barrier trench remedy. The groundwater will continue to move towards and into the barrier trench as well as to move within a regional flow pattern; it will discharge somewhere within the surface water system. The post-construction phase of remedies requires monitoring to determine whether a contaminated plume of groundwater is moving beyond an established point of compliance (e.g., the site perimeter or into surface water bodies). Post-construction monitoring of groundwater conditions around and downgradient of the interceptor/barrier trench, and potentially downgradient surface water bodies (Glade Creek and the Large Pond) will be required to determine the effectiveness of the remedy. The installation of additional groundwater monitoring wells will likely be required for this purpose. As indicated by design documentation submitted after the SB was released, some of the conditions that would trigger groundwater extraction (pumping) are the need 1) to maintain hydraulic control of the DNAPL migration, 2) to contain a contaminated groundwater plume, and 3) to control saturated conditions around the trench. As the SB indicates, any collected groundwater will be treated on-site before being discharged to the Carbondale POTW.

3. Various portions of the Statement of Basis (e.g., Section 2.2, 2.5, and 5.2) indicate that groundwater extracted from the trench-based DNAPL barrier will be pretreated and discharged to the Carbondale POTW. In the event that groundwater extraction from the trench is ultimately performed (refer to General Comment No. 2), Beazer would like to maintain flexibility for other water management approaches commensurate with the extraction rate, water quality, and other applicable regulations. Such alternate water management methods may include recycling, passive treatment (possibly including treatment via a constructed wetland, as proposed in the *Glade Creek Channel Relocation Pre-Design Investigation Summary Report*), onsite discharge of treated water, or direct discharge to the Carbondale POTW without pretreatment, subject to appropriate local, state, and federal approvals.

U.S. EPA Response: Alternative water management methods may be acceptable and alternatives will be reviewed as they are proposed. However, the Agency would likely disapprove the redistribution of contaminated water within the site, such as into a

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constructed wetland, if the contamination levels exceed human health or ecological effect threshold levels. Risk analysis would be factored into the decision whether to approve any alternative water management proposal.

4. With respect to the groundwater component of the proposed remedial approach, the Statement of Basis is unclear regarding what may trigger the need for further actions. Section 2.12 indicates that "if the contaminated groundwater should ever migrate beyond its current extent, then additional remediation measures would likely be needed." On the same point, Section 5.0 suggests that "should monitoring data demonstrate that *unacceptable expansion of contaminated groundwater* is occurring, an additional containment remedy will be imposed at the site" (emphasis supplied). Finally, Section 5.9 indicates that "if contaminated groundwater appears to be migrating out of the containment zone, *additional corrective measures* may be needed" (emphasis supplied). Beazer understands that a semiannual groundwater monitoring program will continue to be performed for the site, and that the boundaries of a groundwater "point of compliance" (anticipated to generally correspond to the property boundary) will be established in conjunction with the USEPA. In the event that future monitoring suggests that impacted groundwater migration may occur or has occurred beyond that "point of compliance," further investigation and evaluation activities may be performed to assess whether such migration represents a potential risk to offsite receptors. The need for and scope of further response actions (e.g., expansion of the monitoring network, evaluation of alternative groundwater remedial approaches, deed restrictions, or other) will be assessed in consideration of site conditions at that time.

U.S. EPA Response: *"Acceptable levels" for the point(s) of compliance are based on existing criteria, or will need to be determined through risk analyses and risk management decisions. Contamination levels in a groundwater plume are generally considered to be unacceptable if they are above Federal Maximum Contaminant Levels (MCLs) for drinking water (or an equivalent standard for drinking water as established by the State). At the Beazer facility, a site-wide point of compliance with MCLs will most likely be established at the facility perimeter, except for groundwater to surface water discharges. For groundwater to surface water discharges, the point of compliance will be at the interface with the surface water body. The acceptable level of contamination will be based on acceptable risk levels to be established for ecological and human health exposures, or they will correspond to Illinois surface water quality standards.*

The Agency will consult with the Illinois EPA to determine whether more specific points of compliance need to be established under the State Groundwater Management Zone program. Groundwater Management Zones correspond to specific remedies and may be required for Beazer remedies such as the closed surface impoundments and the CAMU.

5. The Statement of Basis is vague in discussing when the groundwater remedy

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can be terminated. Section 2.12 suggests that "the containment remedy can be terminated if or when the groundwater quality has been restored to levels that allow for unrestricted use," but does not suggest what such levels may be or where they may be applied. Section 5.9 indicates that long-term post-remediation monitoring will be required "for a period of 30 years or more." Note that the presence of DNAPL in the subsurface will likely preclude achievement of drinking water standards (the assumed level allowing for "unrestricted use" of groundwater) for the foreseeable future. However, institutional controls will be used in conjunction with the containment remedy and will preclude the use of onsite groundwater. Accordingly, continuous groundwater monitoring may not be required to provide for conditions that are protective of future site uses. Also, consistent with USEPA guidance, a 30-year monitoring period was assumed for remedial cost estimating purposes; this was not intended to reflect a specific monitoring duration. Beazer recognizes that long-term groundwater monitoring will be required as a component of the proposed remedy, but suggests that flexibility be maintained for modifying the groundwater monitoring program to reflect future site-specific considerations. Specifically, Beazer requests the flexibility to petition the USEPA for approval to reduce or eliminate groundwater monitoring if future monitoring suggests a sustained period of stable, predictable, and/or improving trends in post-remediation groundwater quality.

U.S. EPA Response: U.S. EPA has both short-term and long-term goals for the groundwater at this facility. In the short-term, EPA believes that facilities should take actions as soon as possible to ensure that (1) humans are not being exposed to unacceptable levels of contamination and (2) contaminated groundwater is not continuing to migrate beyond its current extent or into surface water bodies. The short-term goals correspond to the "Migration of Contaminated Groundwater under Control" Environmental Indicator goal for the Agency, and must be met at the facility.

The Agency's long-term goal is to restore groundwater to its maximum beneficial use, which is as drinking water. The "unrestricted use" levels refer to the Federal Maximum Contaminant Levels (MCLs) for drinking water, or an equivalent standard for protective of aquatic life and human exposure). As indicated in the SB, attaining this goal at the Beazer facility is, at this time, considered to be impracticable given the type of contamination, the subsurface site conditions and current technologies. Therefore, until a technology is developed that could restore the groundwater within a reasonable level of effort, the remedy, and long-term goal for the groundwater at this site is long-term plume containment.

Corresponding to long-term plume containment is long-term performance monitoring of chemical parameters to determine whether the remedy is performing as expected. That is, monitoring will determine whether the contamination plume continues to be contained within its established point(s) of compliance. To date, monitoring of the perimeter wells has demonstrated that contaminant levels in groundwater are below the MCLs, except for an occasional exceedance which is noted but which is not substantial enough to

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require a specific groundwater remedy.

Nonetheless, because the selected remedy allows DNAPL and contaminated soils to remain on the site, there is a perpetual (although unexpected) potential for a plume of contaminated groundwater to migrate beyond the facility perimeter. Therefore, monitoring will be required into perpetuity unless Beazer demonstrates that the groundwater has unrestricted uses, either through natural attenuation or through a future remedial measure. The performance monitoring schedule will be agreed to in an Operations and Maintenance Plan, or in the form of a Final Groundwater Monitoring Plan. If, at some point Beazer wishes to petition for a reduction in the frequency or duration of the groundwater monitoring program, the Agency will evaluate the request against applicable guidelines, requirements, and collected data. Conversely, if monitoring shows that contaminant levels are rising and the plume is migrating, the Agency will require an increase in the monitoring frequency and will evaluate whether a specific groundwater remedy is required, such as a pump-and-treat system.

For further information about groundwater policies, please refer to the U.S. EPA Handbook of Groundwater and Clean-up Policies for RCRA Corrective Action (Handbook), (revised April 2004).

6. As noted in Section 4.1 of the Statement of Basis, elevated background (i.e., naturally occurring) levels of arsenic are present in soils in the vicinity of the site. In fact, background levels in soil near the site have been shown to exceed human-health risk-based screening levels for arsenic. Section 4.1 of the Statement of Basis indicates that the proposed remedy at the former process area will "cover all the areas having elevated levels of site constituents, including arsenic." Although reference is made to Figure 5 for the estimated aerial extent of the cover, Section 5.1 of the Statement of Basis states more generically that the boundaries of the surface cover "would encompass areas where contamination levels exceed the risk threshold of 1×10^{-6}." Beazer would like to clarify that, as noted on Figure 5, the proposed surface cover does include portions of the former process area where arsenic concentrations exceed site-specific background levels, but does not include all areas exceeding a 1×10^{-6} risk level (since background arsenic concentrations exceed this level).

U.S. EPA Response: Comment noted. The cover limits will be confirmed during the Agency's Environmental Indicator for Human Health determination.

SPECIFIC COMMENTS

1. **Section 1.0, 3rd Paragraph, Page 1:** This section indicates that Beazer will produce a *Corrective Measures Final Design Report* for submittal to the USEPA. Please note that, in order to maintain the project schedule that has been discussed with the USEPA, Beazer may provide design-related information for the Glade Creek channel relocation component in advance of

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the USEPA's *Response to Comment and Final Decision* and in advance of design information for other remedial components. Each component of the remedial action will be designed and then built in accordance with the project schedule. To maintain the schedule, design of the next component will be completed during construction of the preceding component. Therefore, for the purpose of expediting the process, component-specific design information will be submitted in lieu of a single, comprehensive *Corrective Measures Final Design Report*.

U.S. EPA Response: Since the release of the SB, U.S. EPA has agreed that Beazer East, Inc. may submit separate design documents for the various remedies, according to an approved schedule, to accommodate the aggressive construction schedule proposed by Beazer. Beazer will also submit for approval certain comprehensive documents that relate to the entire remedy including a materials management plan, and an integrated operation and maintenance plan.

2. **Section 2.0, Page 2:** This section references Figure 2 to illustrate the "corrective action remedies at the facility." However, Figure 2 (a Site Plan) does not illustrate components of the remedial approach. Figure 2 does, however, show proposed soil borings and a proposed well decommissioning (each of which was completed as part of 2001 field activities); the relevance of those items to the Statement of Basis is unclear. If the USEPA intended Figure 2 to illustrate something different (e.g., the components of the overall remedial approach or a "basic" site plan), Beazer can provide such a figure at the USEPA's request.

U.S. EPA Response: The reader was referred to Figure 2 ("Site Plan") for an orientation to the facility grounds, as a means to reference the locations referred to in the Summary of Proposed Remedies Section.

3. **Section 2.2, Page 3:** This section indicates that soils excavated to construct the trench-based DNAPL barrier will be placed into the CAMU. While the conceptual CAMU design was developed with the capacity to include the trench soils, Beazer has requested that the USEPA allow the excavated soils to remain adjacent to the trench and be covered (as part of the backfill of the existing channel area) consistent with the adjacent in-situ soils (refer to handout from August 5, 2003 project meeting provided as Attachment 2). This approach is consistent with the USEPA's Area of Contamination (AOC) policy, would facilitate timely construction of the creek channel relocation component, and eliminate the need for temporary stockpiling in an alternate area pending CAMU construction. If the placement of trench soils adjacent to the trench (with subsequent cover by clean fill) is not ultimately approved by the USEPA, Beazer requests that the USEPA acknowledge applicability of the AOC policy to allow for relocation and temporary staging of those soils in the vicinity of the proposed CAMU pending preparation of the containment cell to accept those

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materials.

U.S. EPA Response: Since the time that Beazer submitted this comment the facility has withdrawn its request for stockpiling creek sediments and soils. Under the current construction schedule, a cell of the CAMU will be prepared to receive the materials as they are excavated and transported there.

4. **Section 2.3, Page 3:** As indicated in this section, a visual-based sediment removal approach has been proposed for Glade Creek. Based on the field reconnaissance performed in 1996, the estimated removal volume associated with this approach was approximately 3,500 cubic yards. In consideration of the current remedial approach for the creek channel, sediment removal may no longer be necessary in portions of the creek channel up- and downstream of the existing grout blanket where relocation will occur. Also, in consideration of the elapsed time, documented occurrence of natural attenuation, and planned source elimination (i.e., channel relocation), Beazer proposes that – prior to initiating removal activities – a follow-up reconnaissance be performed to verify the extent of removal necessary to achieve the remedial objective. This may also limit the amount of impact to the floodplain area (i.e., clearing and temporary access roads) that may be necessary to complete this component of work. (Note: this comment also applies to Section 5.3 of the Statement of Basis.)

U.S. EPA Response: The Agency agrees that a sediment sampling event should be scheduled to obtain information on current conditions. Fresh data are needed for a few reasons: 1) the grout blanket failure has resulted in the continual discharge of creosote into the creek and the current extent of the contamination is unknown, 2) current contaminant concentrations are required to evaluate the risk to human and ecological receptors, 3) the MNA Analysis Plan requires various data analyses that use baseline conditions , and 4) the extent of sediment dredging may need to be revised.

Consistent with U.S. EPA guidance, protective remedies for this facility were selected without completing a comprehensive risk analysis at areas where the risk was clear based on data collection and abbreviated risk analyses, for the sake of expediency. Where risk was obvious based on an analysis of site conditions, remedies were selected to preclude unacceptable levels of exposure. Nonetheless, some additional risk analyses will be necessary to establish acceptable levels for ecological and human health exposures to determine whether the residual contamination, such as in the sediment, poses any risk.

The remedy for the contaminated creek sediments includes MNA. U.S. EPA policy requires that "MNA be selected only were it meets all relevant remedy selection criteria, and where it will meet the site remediation objectives within a time frame that is reasonable compared to that of other alternatives." Further, a MNA remedy should be used with control or removal of source materials. At Beazer, source removal includes

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terminating the discharge of contaminated water into Smith Ditch, the interception and removal of DNAPL at the Glade Creek trench, and dredging. For its design of the MNA remedy, Beazer will be required to submit for approval an MNA Analysis Plan based on U.S. EPA guidance documents. Among other requirements of the guidance, the MNA Analysis Plan must 1) demonstrate the eligibility of the sediments for this remedy, 2) demonstrate a predicted rate of natural attenuation, 3) analyze the levels of contamination during the attenuation period in terms of human health and ecological risk, 4) demonstrate that ongoing and residual contamination levels do not pose an unacceptable risk to human health and the environment, and 5) establish a monitoring plan and predict the level of residual contamination at a specified endpoint. The MNA Plan will include a contingency plan to become activated if the MNA is not working at an acceptable rate. Based on the monitoring data, the U.S. EPA will determine whether natural attenuation is succeeding as predicted.

5. **Section 2.4, Page 3:** The Statement of Basis indicates that a 22-acre surface cover will be installed in the former process area to encompass soil areas exceeding a 1×10^{-6} excess cancer risk threshold (also refer to General Comment No. 6). Beazer originally proposed an approximately 10-acre surface cover to include areas exceeding a 1×10^{-5} risk level. In the interest of accelerating the approval process, Beazer agreed in 2001 to construct the larger cap in lieu of justifying the risk basis for the original cover area. Recently, and outside the scope of the Statement of Basis, the USEPA has suggested the need for additional investigations that could further expand the limits of the surface cover. As a result, Beazer reserves the option to perform a risk-based justification of alternate surface cover limits. (Note: this comment also applies to Section 5.1 of the Statement of Basis.)

U.S. EPA Response: The need for additional investigations was not a topic raised outside the SB. Presumably, in this comment Beazer is referring to its proposal to extend the surface cover over the wetlands along Smith Ditch to resolve an ongoing Agency concern regarding their level of contamination in response to the Agency's request that the wetlands be evaluated for excavation and placement in the CAMU. Section 5.12.3 of the SB which lists CAMU fill materials includes "potential additional materials depending on further characterization (i.e., 900 cy of sediments from Smith Ditch." Beazer proposes to address the wetland contamination through extending the cover rather than through excavation and containment. This issue has not been resolved.

There are a number of reasons why the Agency is concerned about the wetlands being highly contaminated and acting as a sink and secondary source of contamination to the rest of the Smith Ditch surface water system. The wetlands are adjacent to the closed surface impoundments which were not clean-closed. Old site diagrams show the footprint of the impoundments potentially extending into the wetlands. Creosote was observed in the sediments during the 1996 sampling event. Additionally, the surface water underdrain pipes which collect water from the former process area discharge

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water into the wetlands has an oily sheen. The downgradient end of the wetlands is bermed and water discharges into Smith Ditch via a culvert. Smith ditch drains into Glade Creek which drains into Crab Orchard Creek.

Beazer had proposed extending the cover to bury the wetlands. The agency is considering whether this approach is preferable to the wetland sediments and soils being excavated and placed in the CAMU.

6. **Section 2.6, Page 3:** The combined (not individual) volume of the two waste piles is estimated to be approximately 10,000 cubic yards. (Note: this comment also applies to Section 5.10 of the Statement of Basis.) Also, the waste pile soils are known to be impacted based on knowledge of their source. Regardless of constituent levels relative to "safe exposure levels," Beazer expects that these materials will be placed into the CAMU to minimize the potential for long-term exposure or migration of these materials. The waste pile soils will also help stabilize CAMU-bound soils with higher water content (e.g., from the trench-based DNAPL barrier excavation and Glade Creek sediment removal). Accordingly, sampling of waste pile soils and comparison of analytical data to "safe exposure levels" are not necessary and should not be performed.

U.S. EPA Response: While it is agreed that sampling of the waste pile soils will not be necessary for the soils to be placed in the CAMU, sampling of soils below the piles may be required after the piles are removed. This sampling may be necessary to confirm that soils underlying the waste pile soils do not contain residual contamination that poses unacceptable risks to human and ecological receptors.

7. **Section 2.9, Page 4:** The term "surface water underdrain system" is a misnomer. These pipes are merely storm sewers that convey collected storm water from catch basins and other surface water drainage points to surface water drainage ditches.

U.S. EPA Response: Comment noted. The term "surface water underdrain system" adequately describes the underground conveyance system of collected surface water.

8. **Section 2.11, Page 4:** The proposed institutional controls would not require all current and future site workers to follow a health and safety plan. The requirement for development and implementation of a health and safety plan would only be applicable to those workers/activities that would involve contact with impacted media.

U.S. EPA Response: Because high-risk levels of contaminated media will be left in place beneath the surface, Institutional Controls will be required to ensure that the current and future construction workers and on-site workers (including utility workers) will not become exposed to dangerous levels of contamination. Beazer must develop

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the controls through a site-specific health and safety plan and through other means such as deed restrictions that prohibit excavation on the site or only permit excavation activities that adequately protect current and future workers. The health and safety plan will specify which workers and which activities require protective clothing or other measures and restrictions.

9. **Section 3.0, 1st full Paragraph, Page 5:** It would be technically correct for the last sentence of this paragraph to read as follows: "Beneath the water table, both the free-phase and residual DNAPL slowly dissolve ("dissolved-phase constituents"), forming a plume of contaminated groundwater."

U.S. EPA Response: Either description is technically correct although the rate at which free-phase and residual DNAPL dissolve has not been established.

10. **Section 3.0 Section 3.0, Page 5, last Paragraph:** While no specific redevelopment plan has yet been identified, the proposed deed restriction will limit future development of portions of the property to commercial or industrial uses. The Illinois' Tiered Approach to Corrective-Action Objectives (TACO) standards being considered for the site are based on both commercial and industrial exposures such that the proposed remedial approach is consistent with either type of future use scenario. (Note: this comment also applies to Sections 2.11 and 5.11 of the Statement of Basis.)

U.S. EPA Response: Comment noted.

11. **Section 4.0, Page 6:** Piles Fork should not be identified as a "main area of contamination." Previous investigations suggest only low-level impacts to Piles Fork that are conducive to natural attenuation.

U.S. EPA Response: Creosote and PAHs were found during sediment sampling and analysis in Piles Fork. This type of contamination poses a risk to receptors in an aquatic system. U.S. EPA will require a MNA Analysis Plan to support the MNA remedy.

12. **Section 4.1, 4th Paragraph, Page 6:** This section indicates that TACO risk-based objectives for an industrial setting are based on a risk level of 1 x 10^{-5} cancer risk. Note that the TACO Tier 1 values for a commercial/industrial property reflect a 1 x 10^{-6} risk level, but are derived from commercial/industrial (rather than residential) exposure scenarios. Modification to reflect alternate risk-based levels is allowable under both TACO regulations and USEPA risk-based objectives.

U.S. EPA Response: Comment noted.

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13. **Section 4.2, 2nd Paragraph, Page 7:** The unqualified statement "although contaminant levels are high" is misleading. While concentrations of site-related constituents in groundwater may be "high" *in certain onsite locations*, they are not typically elevated in offsite or perimeter wells, and particularly not within the two-mile radius of the site referenced in the remainder of the sentence.

U.S. EPA Response: The contaminant levels were qualified in the previous paragraph where they were described as being above MCL and TACO (Illinois EPA's Tiered Approach to Corrective Action Objectives) thresholds for safe drinking water. Furthermore, the last sentence of the paragraph states that "It should also be noted that sampling results from monitoring wells at the site boundaries indicate that contaminated groundwater is not migrating off-site."

14. **Section 5.0, 1st Paragraph, Page 7:** Beazer agrees that applying the Technical Impracticability (TI) guidance referenced in this section is appropriate for this site. However, the last sentence of this paragraph implies that "all" free-phase DNAPL would need to be removed before USEPA evaluates the site-wide monitoring data and the effectiveness of the selected remedies using the TI guidance. Beazer believes that a TI evaluation must be performed *before* all free-phase DNAPL is removed from the site because, as acknowledged in the TI guidance, such removal may not be practicable.

U.S. EPA Response: Generally, the Agency's goal for cleaning groundwater is to restore it to its maximum beneficial use. Prior to its becoming contaminated, this was a drinking water aquifer, and therefore safe human consumption (potability) is its maximum beneficial use. Notwithstanding this, it is recognized that with current technologies, attaining such a goal at all RCRA sites may be impracticable if not impossible. The SB discusses the limitations of removing all the DNAPL from the site. It is agreed that the TI evaluation can occur before the remedies to remove free-phase DNAPL are completed.

15. **Section 5.1, 1st Paragraph, Page 8:** The areas from which the surficial "coal tar" materials will be removed are not within the portion of the former process area subject to surface cover as suggested in this section. As indicated in a letter from BBL to the USEPA dated August 17, 2001, the areas of surficial "coal tar" materials are located in the vicinity of the former lagoons. (Note: this comment also applies to Section 5.12.3 of the Statement of Basis.)

U.S. EPA Response: Comment noted.

16. **Section 5.4, Page 10:** The purpose of the DNAPL Recovery Pilot Test was not "to find a suitable site for DNAPL recovery," as stated in this

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section. The pilot test objectives were stated in Section 1.3 of the *DNAPL Recovery Pilot Investigation Work Plan* (BBL, May 1999) and reiterated in Section 1.2 of the *DNAPL Recovery Pilot Testing Results* (Key Environmental, Inc. July 2001). In summary, the objectives were related to evaluating the potential for DNAPL recovery in areas where DNAPL is consistently present and using various techniques to determine the most effective approach. It was also intended to provide information related to potential long-term operational parameters associated with operation of a full-scale DNAPL recovery system.

This section also states that groundwater that accumulates in the former process area DNAPL recovery well (i.e., RW-23) would be treated using the onsite water treatment system. As a point of clarification, only groundwater that is co-generated as a result of DNAPL recovery at this well would be treated using the onsite WWTS.

Finally, this section states that "additional recovery wells may be installed to further remove free product." As reflected in the established remedial action objectives (RAOs) for the site (refer to the Data Summary Document or FFS for a summary of RAOs), free product recovery is not a primary objective for this site. However, Beazer has agreed to implement a DNAPL recovery system at well RW-23 because this well exists and has shown to be moderately effective for product recovery. Given that recovery of all subsurface DNAPL is neither feasible, necessary to meet established objectives, nor likely to result in significant improvement in groundwater quality conditions in the foreseeable future, Beazer does not believe that the high cost of investigating, designing, installing, and operating additional DNAPL recovery wells is commensurate with the corresponding lack of risk reduction. For this reason, Beazer has not agreed to install or operate additional DNAPL recovery wells in the former process area or elsewhere at the site.

U.S. EPA Response: The clean-up of contaminated media, including source removal, has always been an objective at this site. A fundamental step of RCRA Corrective Action is the identification of the nature and extent of contamination from the facility, on and off-site, and the requirement that a facility take action to remedy unacceptable levels of contamination. At the Facility, there is an unknown and presumably large quantity of creosote beneath the surface which has contaminated the soil and which is a continual source of dissolved-phase chemicals to the groundwater. The removal of sources of contamination and contaminated media from the site has been proposed in various ways since the clean-up enforcement action began in 1986, including interceptor trench construction and soil bioremediation. While the U.S. EPA acknowledges that removing all of the creosote would be difficult with today's technologies, the concern remains that leaving it in the ground could pose a risk to human health and the environment at some future date, which is why we require an

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extended groundwater monitoring period.

The use of DNAPL recovery wells is one means of source control which was explored through limited pilot well testing. While the purpose of the pilot was to test recovery methods, the test locations were chosen based on their anticipated success (i.e., DNAPL has been present in nearby monitoring wells). RW-23, the pilot recovery well that had a successful yield, was added to the final remedy as a DNAPL recovery well. While acknowledging the limitations of recovery well technology based on subsurface conditions, the Agency has not accepted Beazer's conclusion that the recovery well technology is overall infeasible and should not be pursued further. Therefore, if free-phase DNAPL is identified at specific locations, e.g., it continually appears in a monitoring well(s), or if the long-term groundwater containment remedy starts to fail, the Agency may request that source removal be pursued and that the installation of an additional recovery well(s) be revisited.

17. **Section 5.6, 1st Paragraph, Page 10:** This paragraph states that the small pond "lacks aquatic life, surrounding vegetation, or any other type of habitat structure…" These statements are not supported or consistent with Beazer's observations. In fact, the pond is currently surrounded by vegetation (photographs available upon request).

U.S. EPA Response: Comment noted. During remedial activities, pond water will be drained and treated on-site, and the pond will subsequently be backfilled to eliminate it as a human and environmental exposure point.

18. **Section 5.6, 2nd Paragraph Page 10:** Similar to the approach proposed for water potentially extracted from the trench-based DNAPL barrier (refer to General Comment No. 3), Beazer would like to maintain flexibility for means of discharging water removed from the Small Pond. Such alternate water management methods may include recycling, passive treatment (possibly including treatment via a constructed wetland), onsite discharge of treated water, or direct discharge to Carbondale POTW without pretreatment, subject to appropriate local, state, and federal approvals.

U.S. EPA Response: Alternative water management methods may be acceptable and alternatives will be reviewed as they are proposed. However, the Agency would likely disapprove the redistribution of contaminated water within the site, such as into a constructed wetland, if the contamination levels of the water exceed human health or ecological effect threshold levels. A risk analysis would be required to make this determination.

19. **Section 5.7, 2nd Paragraph, Page 11:** The first sentence of this paragraph should also list "portions of Glade Creek" as an area proposed for natural attenuation of PAHs in sediment.

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U.S. EPA Response: Comment noted.

20. **Section 5.9, Page 11:** As discussed in General Comment No. 1, the scope of groundwater monitoring developed in coordination with the USEPA was described in a letter from BBL to the USEPA dated July 9, 2001, which supersedes the *Proposed Modifications to the Interim Groundwater Monitoring Program*.

U.S. EPA Response: Comment noted. Also refer to the Agency response to Beazer's General Comment #1.

21. **Section 5.12, Page 12:** This section indicates that the CAMU will include a 5.5-acre engineered landfill. Note that, while the CAMU boundaries may encompass approximately 5.5 acres, the containment cell located within the CAMU boundaries will occupy 2.5 acres or less (refer to the *Corrective Action Management Unit Demonstration Report*). The remainder of the CAMU area allows for material management and temporary staging, and provides an alternate area for construction of the containment cell in the event that the preferred location (i.e., on top of the closed former RCRA surface impoundments) is determined to be technically or administratively infeasible.

U.S. EPA Response: Comment noted.

22. **Section 5.12.1, Page 12:** This section states that the "proposed remedy *requires* that the CAMU be located on top of" the closed RCRA surface impoundments (emphasis supplied). While this approach has several benefits, the CAMU (or, more specifically, the containment cell within the CAMU) could be located in an alternate location if warranted by technical or administrative considerations.

U.S. EPA Response: Within the context of Section 5.12.1, the word "requires" means "calls for." As the remainder of the paragraph explains, depending on actual fill volumes and engineering constraints, alternative locations are possible.

23. **Section 5.12.3, 3rd Paragraph, Page 15:** This paragraph states that samples of materials consolidated in the CAMU will be analyzed and the results will be "compared to the *applicable* standards for CAMU-eligible wastes" (emphasis supplied). Note that the standards for CAMU eligible wastes are **not** applicable to this project because the proposed CAMU is "grandfathered" under the 1992 CAMU regulations, which do not include standards for CAMU-eligible wastes.

U.S. EPA Response: Comment noted.

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Future Actions

Beazer will prepare the final design documents for the remedies and submit them for U.S. EPA review and approval. The current construction schedule staggers construction of the remedies, beginning with the CAMU. The Agency has agreed to allow the submission of the remedy design documents separately and sequentially, so that construction may progress at a reasonably rapid rate.

The Agency will oversee the remedy construction and completion to ensure that the remedies achieve their remediation objectives. In the unlikely event that Beazer decides not to implement the selected remedy, the U.S. EPA may use its enforcement authorities to order Beazer to do so. Based on all indications, however, Beazer is ready to begin the remediation of its property.

As described in the SB, the Agency is requesting some additional sampling and analysis to further characterize contamination levels in specific areas of the facility, including the western end of the site, Smith Ditch and the wetlands at the headwaters of Smith Ditch, and the sediments of the other creeks. Additionally, some surface water samples may be requested in connection with risk analyses.

Future redevelopment of the site will be restricted to industrial and commercial land use. Newly constructed buildings will be prohibited from having basements so that contaminated groundwater will be precluded from releasing volatilized organic compounds within buildings and potentially contaminating indoor air at harmful levels. Additionally, excavation could expose and re-release DNAPL into the environment. Some limited excavation will likely occur to accommodate the installation of an infrastructure for redevelopment. Workers would be required to follow a health and safety plan to prevent exposure to hazardous contamination. Without further remediation to upgrade the site to residential cleanup standards, the Beazer property cannot be converted to residential land use.

Declaration

Based upon the Administrative Record compiled for this corrective action, U.S. EPA has determined that the selected remedy is appropriate and is protective of human health and the environment.

A copy of this *Final Decision and Response to Comments* is being provided to the Illinois Environmental Protection Agency.

Margaret Guerriero
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U.S. EPA, Region 5

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