APPENDIX D – ALTERNATIVE WELL DESIGN CORRESPONDENCE

United States Environmental Protection Agency
Region 4
Atlanta Federal Center
61 Forsyth St. SW, Atlanta, GA 30303-8960

July 12, 2005

Mr. Michael Slenska, P.E.
Environmental Manager
Beazer East, Inc.
C/O Three Rivers Management, Inc.
One Oxford Centre, Suite 3000
Pittsburgh, PA 15219-6401

Subject: Cabot/Koppers Superfund Site, Gainesville, Florida ("Site")

Dear Mr. Slenska:

Thank you for your letter dated June 24, 2005, and your attached revised Floridan Monitoring Plan Addendum ("Beazer's Plan Addendum") which was hand delivered during our meeting of June 27, with Jimmy Palmer, Regional Administrator, United States Environmental Protection Agency (EPA), Region 4. EPA has carefully reviewed your submission and hereby disapproves Beazer's Plan Addendum and all other plans previously submitted. As further discussed below, EPA hereby directs Beazer to implement EPA's revised Floridan Monitoring Plan Addendum (enclosed).

In February 2005, Beazer submitted a draft Addendum to the 2004 Floridan Aquifer Monitoring Plan. Beazer received substantial comments on this Addendum from EPA, Gainesville Regional Utilities (GRU), the Florida Department of Environmental Protection (FDEP) and the Alachua County Environmental Protection Department (ACEPD). In a May 2005, letter, GeoTrans, Inc., on behalf of Beazer, responded to these comments and presented Beazer's revised approach. In a meeting held on June 15, 2005, EPA, GRU, FDEP and ACEPD conveyed objections to Beazer's approach.

As stated in your letter of June 24, all parties present at the June 15, meeting concur on the importance of additional upper Floridan aquifer groundwater monitoring at the Site. The seriousness of potential impacts to the Murphree Wellfield is demonstrated by the report submitted to EPA on June 8, 2005, by GRU's expert consultant panel. As you know, these consultants were hired by GRU to review Beazer's fate-and-transport model (completed in October 2004) which predicted that the Murphree Wellfield would not be threatened by Site contaminants. The GRU consultants found a significant error in Beazer's model, namely, that the thickness of the Upper Transmissive Zone (UTZ) of the Floridan aquifer was incorrectly applied. GRU's consultants concluded that several other values used for key parameters were not

representative of the Site. After correcting the model, GRU consultants predict that contaminants from the Koppers Site may reach the Murphree Wellfield in as few as 4 to 5 years. EPA has reviewed the GRU consultants' report and concur with its findings. The results of this model and GRU consultants' report were discussed with Beazer in our June 15, 2005, meeting.

Results of recent investigations conducted at the Site also demonstrate the seriousness of the threat to the Floridan Aquifer and the Murphree wellfield. Investigations have revealed the following: (1) creosote Dense Non-Aqueous Phase Liquids (DNAPLs) have been detected in the intermediate aquifer (Hawthorn Group) over a large area and have been found as deep as 120 feet below ground surface; (2) limited data in deeper zones of the Hawthorn Group indicate that DNAPL may have sunk to the top of, and possibly into, the Floridan aquifer; (3) data from newly-installed monitoring well FW-6, the only Floridan aquifer well drilled near a source area at the Koppers' property, have consistently shown creosote contaminants above Florida Groundwater Cleanup Target Levels; and (4) other Floridan aquifer wells (FW-2, FW-3, and FW-7) located along the perimeter of the Site have indicated low levels of contamination; however, these wells are too shallow to ascertain the potential for significant contamination deeper in the aquifer.

During the June 15, 2005, meeting, EPA, GRU, FDEP, and ACEPD conveyed to you the need for a more thorough and advanced monitoring network than that proposed by Beazer in order to assess the lateral and horizontal extent of contamination. EPA's revised Floridan Monitoring Plan Addendum, developed in collaboration with FDEP, ACEPD, and GRU, was presented to you during the meeting. The plan, which is enclosed with this letter, includes installation of multi-port, quadruple-cased monitoring wells in the Floridan aquifer, immediately downgradient of each of the four source areas, as well as in eight other locations at the Koppers' property. The plan is designed to prevent "carry-down" of DNAPL contaminants into the Floridan aquifer and to allow detection of contamination that may be flowing through discrete permeable zones in the karst aquifer system. The monitoring well locations specified in the plan are based on calculations from the groundwater modeling analysis conducted by GRU's consultants. Implementation of this plan will allow for more comprehensive characterization of contamination in the Floridan aquifer and the threat to the Murphree wellfield, and will support the development of appropriate remedial strategies that will be protective of human health and the environment.

As was the case with plans previously submitted by Beazer, Beazer's current Plan Addendum does not adequately assess the extent of contamination in the Floridan aquifer and the potential threat to the Murphree wellfield. Furthermore, Beazer's Plan Addendum is inconsistent with EPA's enclosed revised Floridan Monitoring Plan Addendum, as neither Beazer's proposed well locations, nor construction methods, correlate with those in EPA's plan. EPA's primary objections to Beazer's proposed Plan Addendum are summarized below:

(1) The source area wells are located too far away from the source areas. Contamination could easily follow flow paths that miss the proposed well locations.

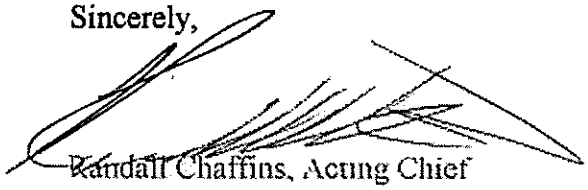
(2) The transect wells are located too far away from the source areas and too far from one another. Due to anisotropy and discrete flow paths typical of karst aquifers, significant plumes of contamination could be missed by Beazer's proposed wells.
(3) The well construction proposed by Beazer, in all but two wells, provides long, open bore holes which would promote vertical mixing of groundwater between aquifer zones. Problems presented with this construction include: significant dilution of contaminant concentrations, potential for transfer of contaminated water between zones, and inability to assess horizontal extent of contamination.

Pursuant to the Unilateral Administrative Order (UAO) issued by EPA to Beazer and Koppers Industries, Inc., on March 22, 1991, and amended on April 28, 1994, you are hereby directed to implement the attached revised Floridan Monitoring Plan Addendum. Section XI Paragraph A of the UAO gives EPA the authority to require Additional Work necessary to meet Site performance standards and protect human health and the environment. In the UAO Amendment, EPA made the determination that additional work was necessary to protect human health and the environment at the Site. Specifically, Paragraph 6 of the UAO Amendment requires Beazer and Koppers Industries, Inc., to "modify the RD workplan to include the feasibility study dealing with the source areas and the depth of the DNAPLs." Beazer is directed to perform the additional work required by the UAO Amendment by implementing the Revised Floridan Aquifer Monitoring Plan Addendum. Pursuant to the terms specified in the 1991 UAO (XI.A.) and the 1994 UAO Amendment (Paragraph 7), Beazer is required to notify EPA of its intent to perform such additional work within seven (7) days after receipt of this letter.

You state in your letter of June 24, that Beazer is currently pursuing implementation of its Plan Addendum. Please note that work conducted under a work plan not approved by EPA does not relieve Beazer of its obligation to comply with the UAO, or with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and its implementing regulations, or from implementing any other work required by EPA pursuant to CERCLA.

EPA looks forward to hearing from you within the time frame specified above. If you have any technical questions, please do not hesitate to call me at (404) 562-8910 or Amy Williams, Remedial Project Manager, at (404) 562-8776. If you have any legal questions, please call Caroline Philson, Assistant Regional Counsel, at (404) 562-9588.

Sincerely,



Randall Chaffins, Acting Chief
Superfund Remedial and
Technical Services Branch

Enclosure: Floridan Aquifer Monitoring Plan

cc: Kelsey Helton, FDEP
John Mousa, ACEPD
Brett Goodman, GRU
Rick Hutton, GRU

Revised Floridan Aquifer Monitoring Plan Addendum

Specifications for Drilling, Installation and Testing of Multilevel Wells in the Floridan Aquifer, Koppers, Gainesville

Introduction

The intent of this set of recommendations is to supplement the FAMP[1] by installation of 12 multilevel sampling wells in the upper transmissive zone (UTZ) of the Floridan Aquifer (FLA) beneath the Koppers facility. Instead of large open hole intervals of the type indicated in the FAMP, a suitable multilevel monitoring system must be used that isolates the zones being monitored and has been demonstrated to be suitable for long-term monitoring of the principal contaminants of concern, i.e., creosote components, other semi-volatile compounds detected beneath the Cabot Carbon/Koppers site, pentachlorophenol, 2,4-dimethylphenol, arsenic, copper and chromium.

Objective

The goal is to define the vertical and horizontal extent of contamination in the UTZ beneath the Koppers property. To install and test 12 multilevel wells capable of sampling ground water from the UTZ of the FLA beneath the Koppers facility in Gainesville, Florida. Eight of the multilevel well locations comprise a U-shaped transect across the site. The other 4 wells are situated close to each of the four identified source areas.

Because high levels of creosote contamination have been detected in Floridan monitoring well FW-6, and lower levels have been detected in FW-2, FW-3 and FW-7, there is the immediate need to characterize the nature of groundwater contamination in the Floridan Aquifer beneath the Koppers facility. The multilevel wells are necessary to identify and sample high hydraulic conductivity fracture/solution channel pathways and contaminant migration through the limestone matrix. The proposed transect pattern considers the potentially anisotropic nature of the karstic limestone, which could result in groundwater flow directions which are not parallel to the hydraulic gradient beneath the site.

The spacing between the current monitoring well locations in the Floridan aquifer is approximately 700 feet or more. Furthermore, all of these wells have single, 10-foot screens which penetrate less than 25 feet into the UTZ of the Ocala limestone. The proposed monitoring well transects provide a spacing of approximately 300 feet. The 300 ft spacing represents the maximum acceptable spacing due to the karstic nature of the aquifer (with its fractures and dissolution channels and cavities), and is necessary to increase the confidence that significant contaminant plumes will be identified.

This spacing is also necessary based on the potential mass discharge of contaminants from the site. To further assess the required spacing of the monitoring locations, two contaminant mass

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[1]Floridan Aquifer Monitoring Plan, Cabot Carbon/Koppers Superfund Site, Gainesville, Florida. Prepared for Beazer East, Inc., Gainesville, Florida. Prepared by TRC, Irvine, California, Project No. 29016402, June 2004. [Referred to as the 'FAMP']

discharge calculations were performed. Firstly, it was calculated that a contaminant mass discharge rate of 3 to 40 lbs/year arriving at the Murphree Well Field from the Koppers site would cause detectable contaminant concentrations (>0.5 μg/L) in the extracted water depending on the number of wells affected (based on individual wells (3 lbs/year) and 15 wells pumping 25.3 MGD (40 lbs/year). Secondly, the possible contaminant mass discharge rate leaving the Koppers site was estimated using an average naphthalene concentration of 1700 ug/L, which is based on concentrations measured in monitoring well FW-6.

If this monitoring well represented the contaminant concentrations in groundwater plume measuring 500 feet in width and 100 feet in thickness, the contaminant mass discharge rate leaving the Koppers site could be about 130 lbs/year (based on a hydraulic conductivity of 50 ft/day and a hydraulic gradient of 0.0013). Such a plume could migrate in this karstic limestone undetected between, and/or below the current monitoring locations and could have a substantial effect on the water quality at the well field. As a result of considering these mass discharge rate calculations and the karstic geology in the Ocala Limestone, a spacing of 300 feet or less is considered to be essential for the proposed well locations along the monitoring transect. Due to the downward vertical gradient in the Ocala Limestone and the results of the GeoTrans model showing pathlines substantially below the current shallow Floridan wells (less than 25 feet into the Ocala Limestone), the multilevels should have sampling ports approximately every 10 feet throughout the estimated 100 foot thickness of the UTZ of the Ocala Limestone. A determination of specific depths for sampling ports at each multilevel will be made after logging the well.

Multilevel System Specifications

1. The proposed Multilevel System (MS) shall be submitted for approval by stakeholders 30 days prior to proposed well construction in the form of a work plan. EPA shall have final authority on approving multilevel monitoring system.
2. Sufficient MS equipment and well construction materials shall be made available at the construction site to start installation of the MS within 24 hours after the completion of well development.
3. The MS shall have been proven in its capability to successfully characterize the vertical distribution of dissolved contamination in karstic rocks at depths of up to 300 ft.
4. The proposed MS shall be capable of monitoring a minimum of 10 discrete intervals within each single 4-inch nominal diameter borehole.
5. The MS shall provide for measurement of fluid pressure (or piezometric level), collection of fluid samples, and testing of hydraulic conductivity in each monitoring zone.
6. The MS shall accommodate design changes (i.e., number and/or relative positions of monitoring ports and packers) at any time up to the moment of installation. The equipment necessary to make design changes will be onsite at time of installation.
7. The MS shall be able to be installed through a temporary casing smaller than the borehole in order to reach the desired installation depth in cases of poor borehole conditions and/or

cavernous openings.

8. The MS shall be able to provide a good quality seal using packers in boreholes or casings ranging from 3 to 5-inches inside diameter without custom fabrication.
9. The MS shall allow for removal of the monitoring system and decommissioning of the monitoring well.
10. The MS shall accommodate periodic verification testing of hydraulic integrity of all components and proper functioning of all components, including calibration of pressure sensors.
11. Pressure sensing devices and water sampling devices shall be removable for maintenance or replacement in event of failure without compromising borehole seals.
12. The MS shall enable the periodic testing of individual borehole seals for purposes of evaluating seal integrity.
13. The system shall be capable of recovering groundwater samples at formation pressure.
14. The MS shall provide the option for continuous automated monitoring of fluid pressure for observation of long-term pressure trends or the transient effects of short-term pumping or other testing activities.

Well Locations

1. Well locations shall be as generally shown on Figure 1.
2. Final well locations shall be agreed upon by stakeholders 7 days prior to starting well construction.
3. Should a well need to be relocated, the following steps shall be completed before commencing with construction of the relocated well:
    a. Representatives from EPA, GRU, and ACEPD shall be contacted and informed of the field conditions necessitating well relocation.
    b. Well shall be relocated based on consensus of stakeholders and Beazer.
    c. Stakeholders shall have 6 hours from initial contact to comment on proposed new locations.
    d. EPA shall have final authority on relocating a well.
4. The sequence of well completions will be
        a. Install the eight transect wells
        b. Install the four source-area wells

    Precise order of installation of the wells will be determined during discussions between Beazer and stakeholders.
5. EPA shall have final authority on approving well locations and the order of installation.

Well Construction Specifications

These specifications address installation, completion and testing of the 12 multilevel sampling wells. Specifically, each of the twelve multilevel sampling wells shall be installed using appropriate methods to achieve a quadruple cased and grouted well to ensure there is no drag-down of contamination. All well drilling and construction operations shall be consistent

with the EPA Region 4 Science and Ecosystem Support Division's Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Florida Department of Environmental Regulation Chapter 62-532 F.A.C., and St. John's River Water Management District well construction requirements. All required state and water management district permits shall be obtained prior to well construction. Figure 2 (excerpted from GeoTrans, September 2004) is provided as a guide showing the construction for the upper two conductor casings. Note that Figure 2 is a triple cased well. The proposed wells are quadruple cased and the resulting borehole dimensions will differ from those in Figure 2. Figure 3 shows the lower two casings of the proposed quadruple cased wells. Borehole dimensions for each casing shall be adequate for a minimum 2-inch radial annulus.

The installation procedures are as follows:

1. Install black steel conductor casing and grout within the Upper Hawthorn Clay to prevent seepage of creosote or other contaminants into the borehole.
2. Set black steel conductor casing and grout within the Middle Hawthorn Clay.
3. Drill approximately 2-ft into the Lower Hawthorn Clay (LHC) and set black steel conductor casing and grout. During drilling, collect continuous core/split-spoon samples through the Hawthorn Group sediments between the middle Hawthorn Clay and the LHC and to the anticipated casing point. Cores/split-spoon samples shall be logged and photographed. If mobile or residual DNAPL is evident, submit soil samples for chemical analyses, and proceed to Step 4.
4. Proceed using the sonic drilling method - or another method that will assure that loss of circulation is avoided - to the top of the UTZ pulling and inspecting cores every five feet. If mobile DNAPL is observed in the cores below 20-ft below the top of the LHC, plug and abandon the borehole. If mobile DNAPL is absent, below 20-ft into the LHC, then set protective casing at the top of the UTZ (Ocala Limestone).
5. Drill a nominal 4-inch diameter hole to the contact between the UTZ and the semi-confining unit (SCU) within the FLA (or approximately to 250 ft below ground surface if the semi-confining unit is not clearly identified above that depth). The deepest sampling port within the UTZ should be as close to the UTZ-SCU contact as possible and if the manufacturer's recommendations for the MS system selected require a minimum depth of casing below the last sampling port, the final drilling depth should be sufficient to accommodate these recommendations. Rock cores should be collected and evaluated to determine the hydrogeologic characteristics of the aquifer materials and the contact of the UTZ and the SCU. HQ coring should be considered in selecting a methodology for drilling and coring the UTZ. If drilling fluid is required, add an appropriate conservative tracer to the drilling fluid.
6. Log the open hole using a caliper tool to determine borehole dimensions.
7. Develop the borehole by setting a pump in the open borehole at increasingly deep 10-foot sections and pumping until the discharge has less than 10 NTU. Monitor development water for presence of the conservative tracer.
8. Log the hole using down-hole video camera, caliper, flow meter, fluid conductivity, fluid temperature, long and short-normal resistivity, natural gamma, and compensated acoustic

tools. Fluid conductivity, fluid temperature, flow meter, and video tools should be run under both static and pumped conditions if possible.

9. Analyze the logging and core data and identify multilevel monitoring zones in which to set packers and install the monitoring ports.

a. Monitoring zones are anticipated to be every 10-feet, unless field conditions warrant longer or shorter monitoring zones.

b. Monitoring zones shall be selected as agreed to by stakeholder representatives and Beazer in the field.

c. EPA will have final authority on monitoring zone selection.

10. Install and complete multilevel monitoring system within 24 hours of the completion of well development and logging.

11. Purge each port or zone in each well of one liter of ground water prior to collecting the initial set of groundwater samples from each port. Purging prior to subsequent sampling events should not be necessary.

12. Conduct a rising head test of each multilevel zone to estimate the hydraulic conductivity of that zone.

Well Sampling Specifications

1. Sample collection procedures should be consistent with the methods recommended by the manufacturer of the multilevel monitoring wells. Water recovered during purging should be monitored, to the extent practical, for standard field parameters: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential, and turbidity.

2. Groundwater elevations will be recorded from every port at each multilevel installation prior to collection of groundwater samples.

3. Initial groundwater samples should be collected within 2 weeks of completion of construction of each multilevel monitoring well installation. After initial sampling and any repeat sampling (performed in the event of data rejection by the laboratory, e.g. "R" qualified data) or confirmatory sampling (see below), all multilevel installations should be sampled for two quarters. After that time, Beazer shall submit a plan to EPA for long-term monitoring of these installations and other Floridan aquifer monitoring wells. This plan must take into account observed contaminant concentrations, contaminant distributions in the UTZ, and other factors, as appropriate At a minimum, quarterly monitoring for 1 year will be required at all sampling points where ground-water contamination has been detected in either the initial sampling round or a confirmation monitoring event.

Analysis and Reporting

1. Groundwater samples should be analyzed for: volatile organic compounds (EPA Method 8260B); semi-volatile organic compounds (EPA Method 8270C); dissolved arsenic, chromium, copper and zinc (EPA Method 6020 or 6010B) comparable to the current Floridan aquifer monitoring program; and the conservative tracer.

2. Initial samples should be analyzed and reported within 2 weeks of sample collection. Analysis results should be transmitted to US EPA and all designated stakeholders by Beazer within 5 days of their receipt from the analytical laboratory. These results should be marked clearly as "preliminary" until subjected to data validation and reporting by Beazer.

3. The following is a listing of the names and affiliations of stakeholders that should receive copies of all preliminary results:

   Amy Williams, US EPA
   Kelsey Helton, FDEP
   John Mousa, ACEPD
   Brett Goodman, GRU

4. Confirmatory samples should be collected from any monitoring interval (i.e. specific port in a multilevel installation) within 2 weeks if the initial sample results from the transect monitoring installations yield concentrations exceeding MCLs (maximum concentration limits) for any individual constituent or 10 μg/L for the sum of phenolic compounds. The criterion for the phenolic compounds is based on their potential to cause taste and odor problems in finished water after chlorination. This procedure for confirmatory sampling will apply only to the transect wells and not to the source zone multilevel wells.

5. When all initial samples and any confirmatory samples from the multilevel wells have been collected, analyzed and subjected to quality assurance procedures, Beazer will submit a report to US EPA and all other stakeholders to present and describe the results. A comparable report will be submitted by Beazer for each subsequent round of quarterly sampling.

6. Following 2 quarters of monitoring after the initial sampling, Beazer will submit a proposal for long-term monitoring of groundwater elevations and groundwater quality from these installations. It is expected that continued routine sampling of all of the ports in all of the multilevel wells will not be necessary depending on the hydrogeologic and chemical results from the these installations and the findings of other site investigation activities.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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July 20, 2005

Mr. Michael Slenska, P.E.
Environmental Manager
Beazer East, Inc.
C/O Three Rivers Management, Inc.
One Oxford Centre, Suite 3000
Pittsburgh, PA 15219-6401

Subject: Cabot/Koppers Superfund Site, Gainesville, Florida

Dear Mr. Slenska:

The United States Environmental Protection Agency (EPA) is in receipt of your letter dated July 18, 2005, wherein you notified EPA of your intention to proceed on July 21st, with a modified version of Beazer's Floridan Monitoring Addendum. EPA strongly disagrees with your assertion that Beazer's plan substantially meets the requirements, or is otherwise a sub-set, of EPA's Revised Floridan Aquifer Monitoring Plan. Consequently, your July 18th proposal is rejected by EPA.

Specifically, your proposal is rejected for the following reasons:

(1) EPA does not approve the well construction (i.e., 100-foot open bore holes) specified in Beazer's July 18, 2005, plan. EPA has conveyed concerns regarding this on several occasions. As explained in EPA's July 12, 2005, letter, Beazer's proposed well construction "provides long, open bore holes which would promote vertical mixing of groundwater between aquifer zones. Problems presented with this construction include: significant dilution of contaminant concentrations, potential for transfer of contaminated water between zones, and inability to assess horizontal extent of contamination." Hydrogeologic literature is replete with cases of serious flaws in interpretation of contaminant distribution resulting from monitoring wells with long, open intervals; such wells are generally not considered acceptable for groundwater monitoring purposes. EPA has directed Beazer to utilize multilevel system specifications for the transect wells to seal specific zones of the Floridan aquifer, minimizing the potential for transfer of contaminated water between zones, and allowing samples to be collected at discrete depths. Completion of wells with long, open intervals weeks or months prior to their conversion to multilevel monitoring wells has the potential to cause a long-term inability to effectively monitor the groundwater using the multilevel monitoring system.

(2) Beazer's July 18, 2005, plan does not include the installation of additional Floridan aquifer wells near the four source areas at the Site. EPA has directed Beazer to install a monitoring well near each of the four source areas at the Site in the Floridan aquifer (see Figure 1 of EPA's "Revised Floridan Aquifer Monitoring Plan Addendum", enclosed with EPA's July 12, 2005, letter). These wells are required to be installed in addition to wells in the eight locations further downgradient of the source areas.

On July 12, 2005, EPA directed Beazer to implement EPA's "Revised Floridan Aquifer Monitoring Plan Addendum". Unless Beazer is prepared to comply with the specifications of EPA's July 12, 2005, plan, Beazer would be subject to statutory penalties pursuant to 42 U.S.C. § 9606(b). Moreover, if Beazer does not fully implement EPA's "Revised Floridan Aquifer Monitoring Plan Addendum, then pursuant to UAO Section XXVI. Enforcement and Reservations, EPA is prepared to implement the plan and, thereafter, Beazer would be subject to treble damages pursuant to 42 U.S.C. § 9607(c)(3). EPA reserves the right to take any and all other enforcement including penalties, damages, costs, and injunctions, including but not limited to those described in CERCLA §§ 106(a), 106 (b)(1), 107(a), and 107(c)(3). Please be advised that any work that Beazer performs at the Site that is not approved by EPA will not be considered by EPA to be carried out in compliance with CERCLA.

Pursuant to the terms specified in the 1991 UAO (XI.A.) and the 1994 UAO Amendment, please notify EPA of Beazer's intent to implement EPA's "Revised Floridan Aquifer Monitoring Plan Addendum" within seven (7) days of receipt of this letter. As you requested, your letter of July 18, and this response, will be placed in the Administrative Record for this Site.

Sincerely,

Winston A. Smith, Director
Waste Management Division

cc: Kelsey Helton, FDEP
John Mousa, ACEPD
Brett Goodman, GRU
Rick Hutton, GRU

Beazer

BEAZER EAST, INC. C/O THREE RIVERS MANAGEMENT, INC.
ONE OXFORD CENTRE, SUITE 3000, PITTSBURGH, PA 15219-6401

July 27, 2005

Mr. Winston A. Smith
Director, Waste Management Division
United States Environmental Protection Agency
Region IV, Superfund North Florida Section
61 Forsyth Street, SW
Atlanta, GA 30303

RE: USEPA July 20, 2005 Letter
Floridan Monitoring – Additional Well Installation
Cabot Carbon/Koppers Superfund Site in Gainesville, Florida

Dear Mr. Smith:

Beazer East, Inc. ("Beazer") is writing in response to the United States Environmental Protection Agency's ("USEPA") July 20, 2005 letter rejecting Beazer's proposed approach to installing additional Floridan aquifer monitoring wells as described in Beazer's July 18, 2005 letter to USEPA and directing Beazer to implement USEPA's Revised Floridan Aquifer Monitoring Plan Addendum *("USEPA's Floridan Monitoring Addendum")* which was attached to the USEPA's prior letter to Beazer dated July 12, 2005.

On July 21, 2005, Beazer initiated field activities regarding substantial implementation of *USEPA's Floridan Monitoring Addendum.* Please be advised that the work currently underway at the Site is consistent with *USEPA's Floridan Monitoring Addendum.* One of the initial activities to occur at the Site was to field locate the eight transect wells located downgradient of the four former source areas at the Site. Six of the eight transect wells could be field-located in the proposed locations indicated in *USEPA's Floridan Monitoring Addendum.* Two of the eight transect wells required relocation to accommodate existing Site constraints and limitations of how close the drill rig can get to existing features. The attached figure shows the proposed field locations for the eight downgradient transect wells. Over the next several weeks, Beazer will be installing the two uppermost conductor casings at the eight transect locations, which is consistent with the well design requested by USEPA in its July 12, 2005 letter.

As stated in its July 18, 2005 letter to USEPA, Beazer has every intention of taking reasonable, necessary and appropriate steps to address Site-related constituents in a manner that is protective of human health and the environment. Beazer proposed several modifications to the *USEPA's Floridan Monitoring Addendum* to accommodate two primary issues of concern. Beazer's first concern is the risk of potential short and/or long-term cross-contamination of the Upper Floridan aquifer by drilling through the lowermost Hawthorn Group clay unit where

Writer's Direct Dial: 412/208-8867

Dense Non-Aqueous Phase Liquid ("DNAPL") may be present, *i.e.*, in and near the identified Site source areas. Second, USEPA's requirement to install multi-level sampling equipment within the prescribed time frame presents physical and logistical difficulties, particularly in light of the lack of meaningful data that will result from the installation and use of such equipment.

Beazer discussed these issues with USEPA's Ms. Amy Williams in a telephone conversation on July 21, 2005. Ms. Williams indicated USEPA's willingness to meet with Beazer to develop modified language within *USEPA's Floridan Monitoring Addendum* that will address Beazer's concerns while at the same time maintaining the intended objectives outlined by the Addendum. During the July 21, 2005 conversation, Ms. Williams asked Beazer to specifically identify its issues in writing for USEPA's consideration in advance of such a meeting. As requested, the text below provides a detailed discussion of the two concerns listed above.

Risk of Cross-Contamination to the Floridan aquifer

As documented in correspondence to USEPA dated May 27, 2005, June 24, 2005 and July 18, 2005, Beazer maintains that the short and long-term cross-contamination risks associated with installing additional Floridan aquifer wells closer to the Site source areas are not warranted by the limited nature and extent of useful technical information that could be gained by such installation.

Despite this concern, in an attempt to accommodate USEPA's request, Beazer proposed the installation of Floridan aquifer wells near the Site source areas as described in the *Addendum To The Floridan Aquifer Monitoring Plan - Supplemental Upper Floridan Aquifer Monitoring Well Installation*, dated June 24, 2005 (*"Beazer's Floridan Monitoring Addendum"*). In *Beazer's Floridan Monitoring Addendum* a detailed protocol was described for completing each Upper Floridan aquifer well based on observations made during drilling. In short, the protocol stipulated that if DNAPL was observed in the Hawthorn Group lower clay unit, then the well location would not be completed as a Floridan aquifer well, but rather would be completed as a Lower Hawthorn Group well. Beazer proposed this protocol to avoid any potential "drag-down" of constituents during the drilling process that would result from drilling through DNAPL and into the Floridan aquifer.

It should be noted that this protocol only addresses the short-term "drag-down" risk associated with installing additional Floridan aquifer wells closer to the Site Source areas. The long-term risk of cross-contamination that could result from potentially imperfect grout seals across confining units would still remain. Nevertheless, this approach was proposed in *Beazer's Floridan Monitoring Addendum* in an attempt to satisfy USEPA's request to install Floridan aquifer monitoring wells near the Site source areas.

Beazer's concern regarding the risk of potential cross-contamination of the Upper Floridan aquifer is exacerbated by the well installation procedures described in the *USEPA's Floridan Monitoring Addendum* (p.9, Items 3 & 4). USEPA's well installation procedure

stipulates that the third well casing be installed only 2-feet into the lowermost Hawthorn Group clay unit. Further, EPA requires that a Floridan aquifer well be completed even if DNAPL is encountered beneath this third conductor casing as deep as 20-feet into the lowermost Hawthorn Group's clay unit. Because of the likely loss of drilling fluid and cuttings when drilling into the Floridan aquifer, this scenario would certainly create "drag-down" impacts to the Floridan aquifer making any groundwater data collected from such a well suspect, similar to the water quality data for well FW-6 that Beazer believes to be attributable to this "drag-down" effect. Impacted drilling fluid and drill cuttings were introduced into the Upper Floridan aquifer during the drilling of FW-6 as a result of encountering DNAPL below the lowermost conductor casing. The specifications required in *USEPA's Floridan Monitoring Addendum* will create a similar "drag-down" problem with wells that encounter DNAPL below the lowermost conductor casing.

Beazer cannot, based on sound science, agree to install Floridan aquifer wells following the procedures required by the *USEPA's Floridan Monitoring Addendum.* The risk of introducing contaminants to the Floridan aquifer is too great. However, Beazer understands that USEPA has committed to meet to discuss Beazer's concerns and agree on a modified installation protocol.

Concerns Regarding Multi-level Sampling Equipment Installation

As documented in correspondence to USEPA dated May 27, 2005, June 24, 2005 and July 18, 2005, Beazer maintains that the installation of multi-level sampling equipment is unnecessary because of the limited nature and extent of useful technical information that could be gained by such installation, particularly considering the inability to install this equipment in the time frame identified in USEPA's letter and the significant additional costs of such installation.

Beazer has several specific concerns associated with the required installation of multi-level sampling equipment in the newly installed Floridan aquifer wells. A significant concern is the required timing. The well installation procedures described in the *USEPA's Floridan Monitoring Addendum* dictates that Beazer "Install and complete multi-level monitoring system within 24 hours of the completion of well development and logging." (p.10, Item 10). Beazer, based on prior experience and recent consultation and advice from prospective multi-level sampling equipment vendors, does not believe that it is possible to install such equipment within 24 hours of the completion of well development and logging.

The best and most efficient approach to minimize the time required between completion of the well and installation of the multi-level sampling system is to complete the installation of all quadruple casings for the eight wells prior to drilling the approximately 100-foot long open borehole. Immediately after completing the drilling of the first 100-foot open borehole, the well development, geophysical logging and multi-level sample system installation should be started. The advantage to this approach is that the logging company and multi-level sampling equipment company will only have to mobilize to the Site one time and the boreholes will remain open for a minimal time period prior to completion.

However, even with this approach some of the boreholes will have to remain open for longer than a 24-hour period because of the need to sequence the drilling, development, geophysical logging and multi-level sampling system installation. The drilling company estimates that completing the drilling of the open borehole portion of each well will require approximately four hours with setup and drilling. This will allow the drilling company to complete the drilling of approximately two wells per day. On the other hand, the development of the well is estimated to require a minimum of four hours per well. The geophysical logging will also require a minimum of about four hours per well and the analysis of the geophysical logs will require at least two hours. Therefore, under ideal circumstances a minimum of one 10-hour day will be required per well to complete development and geophysical logging. Additionally, the multi-level sampling system will require a minimum of one 10-hour day to design, assemble, install and test the equipment, assuming that all equipment and components are present at the Site to allow for flexibility in the location of sampling ports. Therefore, the total minimum time necessary to develop and log a single well and install the multi-level sampling system will be two days per well.

Given the above outlined timing, the drilling of the 100-foot open holes will be completed in about four to five days, and the development, logging and multi-level systems will require a minimum of 10 days to complete. Hence, the boreholes for some wells will be open for a period of days before development and logging can be performed, with the last well being open for at least 5 to 6 days.

This schedule for developing, logging and installing the multi-level sampling systems is optimistic in that it assumes that the logging and multi-level sampling companies are available for mobilization when the drilling of the 100-foot open boreholes starts. This schedule also assumes that all of the equipment and components for the multi-level system are available at the Site allowing for a flexible design and construction of the system. Any delays in the availability of the subcontractors and equipment will further extend the time required to complete the multi-level sampling systems.

In addition, Well Construction Specification #9b and c states that Stakeholders and USEPA must approve the locations of the monitoring zones. Given the potential time delays in identifying sampling port locations and obtaining Stakeholder/USEPA approvals, Beazer cannot guarantee that the multi-level sampling system can be installed within the 24 hours specified by this requirement. Also, personnel will be working on an approximately 10 hour day schedule, such that data analysis and sampling port selection may extend over a two day period.

Beazer understands that USEPA has committed to meet to discuss Beazer's concerns and agree on a modified installation protocol. We trust that the above explanation provides USEPA with some of the basis for Beazer's concerns prior to that meeting.

Additional Concerns

In addition to the primary concerns discussed above, Beazer's review of *USEPA's Floridan Monitoring Addendum* has identified several other meaningful, but less significant, items that we would like to discuss with USEPA. These issues include certain notification requirements and reporting requirements (e.g., reporting obligations to Gainesville Regional Utilities, expedited turnaround times for groundwater sample analyses, etc.).

In addition, contrary to the assertions in your letter of July 20, 2005, Beazer believes that the implementation of *USEPA's Floridan Monitoring Addendum* in the manner proposed by Beazer is in compliance with the 1991 Unilateral Administrative Order ("UAO") and the 1994 UAO Amendment and is consistent with CERCLA, including the National Contingency Plan, in that it is protective of human health and the environment. Although Beazer acknowledges its responsibilities at this Site and its obligations under the UAO and the UAO Amendment, USEPA's insistence on requiring Beazer to implement unnecessarily risky actions without the realistic likelihood that meaningful additional data will be obtained, represents arbitrary and capricious Agency action which is not in compliance with law.

As stated above, on July 21, 2005, Beazer initiated field activities regarding substantial implementation of *USEPA's Floridan Monitoring Addendum* and the work currently underway at the Site is consistent with that plan. Beazer looks forward to USEPA's review of this letter and an upcoming meeting between USEPA and Beazer to discuss its content with the objective of developing modified language within *USEPA's Floridan Monitoring Addendum* that will mitigate Beazer's concerns while at the same time maintaining the intended objectives outlined by the plan.

We request that USEPA place this letter in the Administrative Record for this Site. If you should have any questions or require additional information, please contact me at 412-208-8812 or Michael Slenska of this office at 412-208-8867.

Sincerely,

Robert S. Markwell
Vice President

Attachment

cc: Amy Williams, USEPA
Jill Blundon
Mitch Brourman
Michael Slenska
Linda Paul, KI

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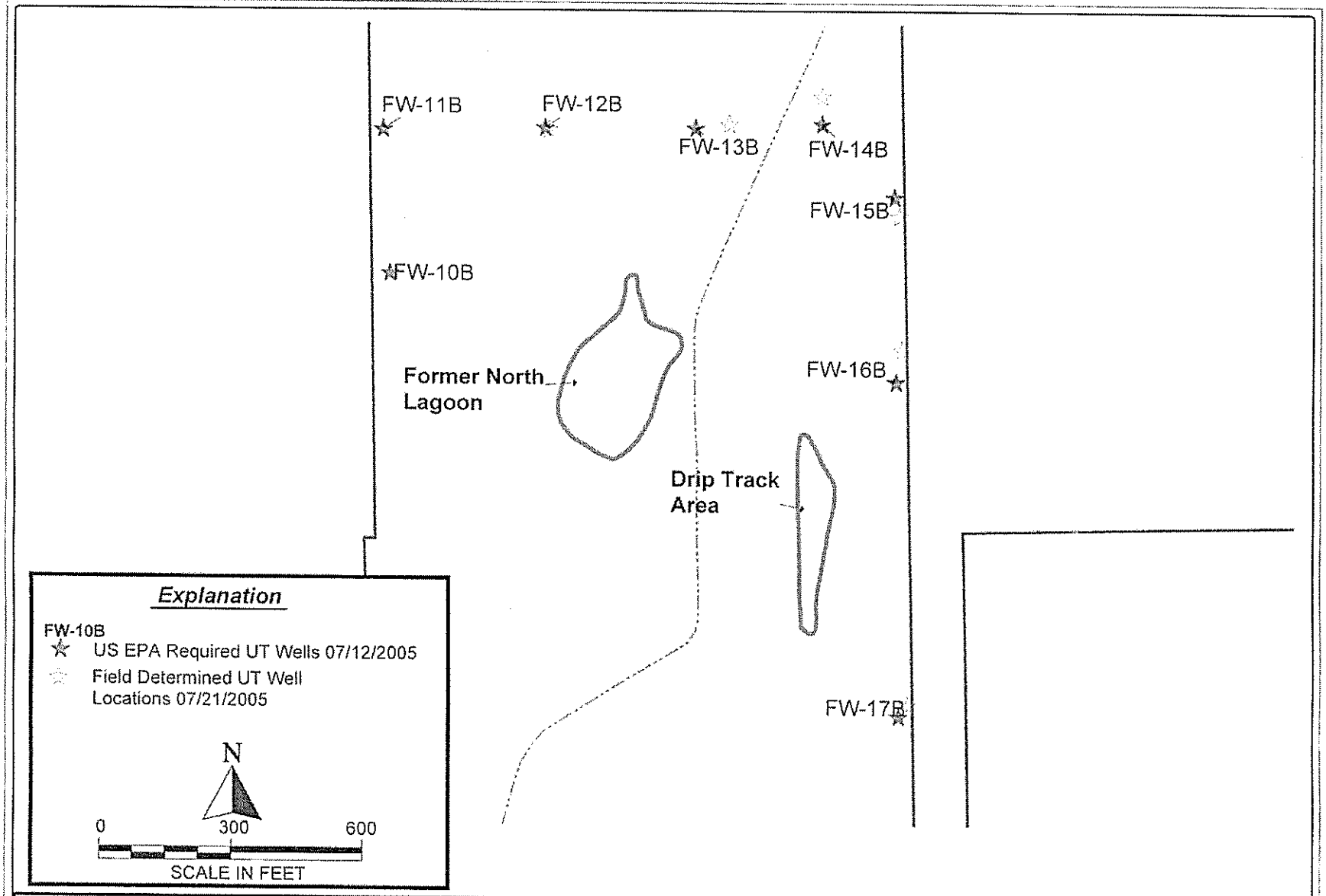

Figure 1. Locations of U.S. EPA required Upper Floridan Aquifer monitoring wells and field determined locations.

GeoTrans, Inc.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

August 4, 2005

Mr. Robert S. Markwell
Vice President
Beazer East, Inc.
C/O Three Rivers Management, Inc.
One Oxford Centre, Suite 3000
Pittsburgh, PA 15219-6401

Subject: Cabot/Koppers Superfund Site, Gainesville, Florida

Dear Mr. Markwell,

The United States Environmental Protection Agency ("EPA") is in receipt of your letter dated July 27, 2005, regarding Floridan aquifer monitoring at the Koppers portion of the Cabot/Koppers Superfund Site ("Site"). Your letter responds to EPA's July 20, 2005, letter, in which Beazer East, Inc. ("Beazer") was directed for a second time to notify EPA of it's intent to implement EPA's July 12, 2005, "Revised Floridan Aquifer Monitoring Plan Addendum" ("EPA's plan"). Your July 27, 2005, letter again failed to specify Beazer's intent to comply with EPA's direction.

Several concerns with respect to implementation of EPA's plan were raised in the July 27 letter. These concerns appear to be a result of misreading EPA's plan, and I believe they can be addressed by providing further clarification in this letter. EPA made an effort to answer questions and provide clarification of our plan during a July 14, 2005, telephone conference with Mike Slenska (Beazer) and Jim Erikson (GeoTrans, Inc.), and some of the concerns raised in the July 27 letter were discussed at that time. This letter provides further clarification of the EPA plan.

In your July 27 letter, an issue of concern was raised regarding cross-contamination risk associated with installing additional Floridan aquifer wells closer to the Site source areas, specifically, that there is a risk of Dense Non-Aqueous Phase Liquid ("DNAPL") "drag-down" in wells that encounter DNAPL below the third casing (page 3, paragraph 1 of July 27 letter). This issue is addressed in EPA's monitoring plan. Items 3 and 4 on page 9 of EPA's plan specify well construction procedures that include sealing off the overlying Hawthorn Group sediments from the lower Hawthorn Group clay with the third protective casing (specified to be set approximately 2 feet into the lower Hawthorn Clay) and abandonment of the well if DNAPL is detected below this third casing at a depth of 20 feet or greater into the lower Hawthorn Group clay. These procedures are intended to address a concern about the substantial head difference

between water levels in the sandier material above the lower clay and the Floridan aquifer (addressed by the third protective casing) and a concern about the potential for finding DNAPL in relatively permeable zones within the lower Hawthorn clay (addressed by specifying abandonment of the hole if mobile DNAPL is found in the lowermost part of the clay). Presumptions in the plan are that: (1) circulation of fluids could be avoided using sonic drilling and (2) mobile DNAPL would be the sole concern with regard to fluid movement out of the lower Hawthorn clay during the brief period when contaminant movement out of the lower Hawthorn and into the upper Floridan aquifer could occur.

Concern has been expressed that DNAPL could be encountered at some point below the third protective casing, but above the lowermost part of the lower Hawthorn clay. It is possible and consistent with EPA's monitoring plan to drill the borehole and set the third casing at a depth somewhat more than 2 feet into the lower Hawthorn Clay in areas where core (from immediately above or in the uppermost part of the clay) indicates a possibility of deeper penetration of DNAPL into the lower Hawthorn clay. This is why EPA's plan states that the third casing is to be set approximately 2 feet into the lower Hawthorn clay. In this circumstance, the third casing can be set at a depth below the point that any DNAPL contamination in the upper part of the lower Hawthorn clay is observed. Between the base of the third casing and the point at which well abandonment procedures are to be implemented per item 4, page 9 of EPA's monitoring plan, continuous cores will be obtained. Any DNAPL in sediments or any indications of DNAPL moving into the borehole below the third casing will be observed. If it appears that DNAPL is present in the borehole below the third casing and is either mobile (i.e. flowing into the hole) or may be transmitted into the upper part of the Floridan aquifer, through drag down during well construction or by lost circulation once the top of the Floridan is reached, then the borehole can always be abandoned, as if the condition specified in item 4 on page 9 of EPA's plan applied.[1]

In your July 27 letter, an issue of concern was raised regarding the requirement to install multi-level sampling equipment in newly installed Floridan aquifer wells within the prescribed time frame, presenting physical and logistical difficulties. This issue is clarified in the following two paragraphs.

In accordance with EPA's plan, a borehole may remain open for longer than 24 hours. EPA's plan submitted to Beazer specifies two time periods: (1) the time period defined when installation of the multilevel system must begin [i.e., when "Sufficient Multilevel System Specification ("MS") equipment and well construction materials shall be made available at the construction site to start installation of the MS], which is within 24 hours after the completion of

---

[1]Note that EPA's plan does not take precedence over field conditions that indicate another course of action is environmentally prudent. This approach is consistent with procedures that are routinely followed in the course of Superfund site investigations. For example, if a work plan called for backhoe excavations at a site and field monitoring indicated buried metal drums and potentially explosive air concentrations of organic contaminants in the excavation area, then the excavation would stop.

well development", as stated under the heading "Multilevel System Specifications"; and (2) the time period defined when the multilevel system must be completed, which is 24 hours after completion of the geophysical logging that should follow well development, as stated under the heading "Well Construction Specifications".

As an example, if well development is finished at noon on Monday, and geophysical logging is completed at 6 p.m., the installation of the Multilevel system should begin by noon on Tuesday, and the well must be completed by 6 p.m. that day. Thus, if it is considered that the open borehole condition applies from the time that well development ends (noon Monday) until the time the multilevel system is completed (6 p.m. on Tuesday), there are 30 hours of open hole conditions. Note, however, that EPA's plan does not specify that any time period begins when well development is initiated, or at any time while the well is still being drilled. Thus, if well development takes four hours, there are (for this example scenario) 34 hours between the time that well development begins and the multilevel system is installed. If well development lasts for eight hours, the time period between initiation of well development and completion of the well would be 38 hours.

I want to reiterate EPA's commitment to full implementation of the "Revised Floridan Aquifer Monitoring Plan Addendum", including installation of the four source area wells. The well design in EPA's plan is based on specifications allowing the collection of monitoring data at different depths in the Floridan aquifer at the four source areas, in conjunction with eight downgradient locations. The source area wells must be located close enough to the source to be able to detect any contamination present that may be flowing through discrete permeable zones in the karst aquifer system, and may not be detected in wells farther downstream. Immediate installation and monitoring of the four source area wells (in addition to the downgradient transect wells) are critical to collecting data needed to determine the nature and extent of contamination in the Floridan aquifer and to support the development of appropriate remedial strategies that are protective of human health and the environment.

EPA is willing to confer with Beazer to elaborate further on issues clarified in this letter, if necessary, as well as issues related to notification and reporting requirements specified in our plan. We remain hopeful that Beazer will fully comply with EPA's plan, but in order to avoid further delay, EPA has already begun initial steps to implement the plan, in the event that Beazer fails to do so. Pursuant to the terms specified in the 1991 Unilateral Administrative Order (UAO) (Section X.I.A.) and the 1994 UAO Amendment, please notify EPA of Beazer's intent to implement EPA's "Revised Floridan Aquifer Monitoring Plan Addendum", and submit a schedule for implementation of the plan, within seven (7) days of receipt of this letter.

Sincerely,

for Winston A. Smith, Director
Waste Management Division

cc: Kelsey Helton, FDEP
John Mousa, ACEPD
Brett Goodman, GRU
Rick Hutton, GRU

Beazer

BEAZER EAST, INC. C/O THREE RIVERS MANAGEMENT, INC.
ONE OXFORD CENTRE, SUITE 3000, PITTSBURGH, PA 15219-6401

August 10, 2005

Mr. Winston Smith
Director, Waste Management Division
United States Environmental Protection Agency
Region IV
61 Forsythe Street, SW
Atlanta, GA 30303

RE: USEPA August 4, 2005 Letter
Floridan Monitoring – Additional Well Installation
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

Dear Mr. Smith:

The intent of this letter is twofold: 1) to acknowledge the EPA August 4, 2005 letter of technical clarification regarding concerns we have expressed with some aspects of the EPA's Revised Floridan Aquifer Monitoring Plan Addendum *("EPA's Floridan Monitoring Addendum")* that was attached to the EPA's July 12, 2005 letter to Beazer; and 2) to notify EPA, as per the 1991 UAO and your request, that Beazer intends to implement *EPA's Floridan Monitoring Addendum.*

With regard to the technical clarifications provided in your letter, and as per conversations we have had recently with both your technical and legal staffs, we feel it is imperative that technical representatives from Beazer and EPA meet in the near term to discuss more specific and detailed procedures for the installation of the four "source-area" wells and for the installation of the multi-level sampling equipment, as well as for clarification of other, less pressing issues we identified in our July 27, 2005 letter. Our objective for this meeting would be to make sure that Beazer and EPA are in agreement with contingency measures to be undertaken based on field observations made during the drilling and installation of the "source-area" wells in order to provide sufficient protection of the Floridan aquifer, as well as to make sure both parties are aware of the timing issues and installation requirements for the multi-level sampling equipment.

We are committed to implementing both the source-area well installation and the multi-level sampling equipment. This commitment is made based on the premise that the technical meeting will provide both parties with a level of assurance that the well-installation procedures will adequately protect the Floridan aquifer, and that the installation of the multi-level sampling equipment will be performed consistent with realistic capabilities and expertise of the contractors implementing this program.

As you are aware, our contractors are already in the field, implementing the drilling of the eight downgradient transect wells consistent with *EPA's Floridan Monitoring Addendum.* We propose to meet in the near-term with no intended effect on the continuity of this ongoing work, or the completion of the program, and will propose an agenda to EPA in advance of the meeting. We

Writer's Direct Dial: 412/208-8812

propose that at the conclusion of that meeting, and based partially on the progress of the ongoing field effort, we can agree on a schedule for completion of the work as well. Mr. Michael Slenska of Beazer will arrange this meeting with Ms. Amy Williams of your staff.

As always, we request that EPA place this letter in the Administrative Record for the Site. If you should have questions or require additional information, please call me at 412-208-8812 or Michael Slenska at 412-208-8867.

Very truly yours,

Robert S. Markwell
Vice President

cc: Amy Williams, EPA
Jill Blundon
Mike Slenska
Mitch Brourman
Linda Paul, KI

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March 17, 2006

Ms. Amy McLaughlin
Remedial Project Manager
U.S. Environmental Protection Agency, Region IV
4WD-SRTMB
61 Forsyth Street
Atlanta, Georgia 30303-3104

Subject: Response to ACEPD Comments in Email Dated March 9, 2006 on the Upper Floridan Monitoring Alternative-Well Design, Koppers Inc. Site in Gainesville, FL

Dear Ms. McLaughlin:

On behalf of Beazer East, Inc. (Beazer), this letter provides a response to comments from ACEPD and the GRU Team concerning the alternative-well design being utilized for the Upper Floridan (UF) Aquifer monitoring program. The alternative-well design is consistent with the design discussed in our conference call with Stakeholders on October 12, 2005 and the GeoTrans' letter dated October 17, 2005 (see Attachment A). A copy of this letter was also e-mailed to the EPA, FDEP, GRU, ACEPD and JEA for Stakeholders comments prior to implementing these changes. The EPA and Stakeholders approval of the alternative-well design was provided to Beazer via an e-mail dated October 20, 2005 (see Attachment B). The October 12, 2005 conference call and the October 17, 2005 letter all provided a thorough discussion of the alternative-well design and changes to the program. The following is Beazers' response to ACEPD comments contained in the March 9, 2006 email:

Comment #1 -- *ACEPD is concerned that construction of the existing multi-zone wells allows water exchange between zones. The design of FW-22B and FW-23B should be modified to reduce the connectivity within the borehole between zones. Bentonite or some form of grout should be considered for use to separate the zones.*

Response: The well design utilized a fine-sand backfill opposite the blank casing between the four screen intervals to minimize the potential for vertical flow outside of the well casing. The concept for the use of a fine-sand material is that the permeability of the fine sand is lower than the average permeability of the Upper Transmissive Zone (UTZ). As such, in-situ groundwater will follow the path of least resistance through the natural aquifer material.

The well-graded, fine sand used for the well construction is a 30/65 mixture obtained from Standard Sand & Silca Co. in Ocala, Florida. The use of fine sand as backfill material to isolate screen intervals is common in Florida and routinely approved by the SJRWMD (Verbal communications SJRWMD, March 16, 2006). A fine sand was utilized because limited annular space between the well casing (4.5" OD) and rotasonic override casing (6.23" ID) prevented the use of a tremie pipe for placing either bentonite chips or grout. The only viable method for placing isolation backfill material was to pour it from land surface between the well casing and the rotasonic override casing, and allow the sand to free fall to the bottom of the borehole. Once the fine sand settles in the borehole it is further compacted in the annular space by applying sonic vibrations to the well casing during override casing extraction. The fine-sand used at the Site was the lowest permeability material that could be effectively placed to isolate the screen intervals with the alternative-well design.

Comment #2 -- *The design of proposed vertical extent well FW-24C must restrict flow between the zones, if constructed as a multi-zone well. It is extremely important to reduce the potential for vertical migration of contaminants within the borehole, since well FW-24C will likely be constructed deeper into the Ocala Limestone and possibly into the Avon Park.*

Response: The design for well FW-24C has not been finalized; however, it is anticipated that competent bedrock will be encountered throughout the Lower Transmissive Zone (LTZ). This deeper well will be completed as an open-borehole design, similar to the original design proposed for the UTZ wells. Multiple isolation casings will be installed to seal off the Hawthorn Group deposits and the UTZ. A 4" diameter casing will be grouted to the base of the semi-confining unit that separates the UTZ from the LTZ. A 4" diameter open borehole will extend from the base of the 4" casing to approximately 80 feet below it. Hence, multiple casing will be cement grouted from land surface to the top of the LTZ, effectively isolating the open borehole from impacted zones above the LTZ. It is assumed that a Westbay system will be installed to isolate zones within the open borehole for water sample collection and pressure measurements.

Comment #3 -- *The geophysical logging initially proposed has not been conducted. The current design of the multi-zone wells precludes the use of some types of geophysical logs. However, natural gamma ray, flow meter (static and pumped, if feasible) and temperature (static and pumped, if feasible) logs should be conducted. Since there does not appear to be distinct head (water level) differences among the zones within the wells, the flow meter and/or temperature logs may provide an indication of the water producing zone(s).*

Response: Geophysical logs were specified in the July 12, 2005 EPA letter under item #8 (Page 9): "*Log the hole using down-hole video camera, caliper, flow meter, fluid conductivity, fluid temperature, long and short-normal resistivity,*

natural gamma, and compensated acoustic tools. Fluid conductivity, fluid temperature, flow meter and video tools should be run under both static and pumped conditions if possible". Item #9 in the EPA letter discusses the purpose of the geophysical logs (Page 10): "*Analyze the logging and core data and identify multilevel monitoring zones in which to set packers and install the monitoring ports*". Hence, the primary purpose of the geophysical logs was to help identify suitable locations for setting packers to isolate monitoring zones in an open borehole. With the modification of the well design from an open borehole to multiple screen intervals the technical basis for the geophysical logs was eliminated.

The conference call with Stakeholders on October 12, 2005 and subsequent conversations with the EPA included the topic of eliminating the geophysical logs in the alternative-well design. To formalize the conclusion reached in these discussions, the October 17, 2005 letter states the following: "*The alternative well design will eliminate the need for geophysical logging. The original well design required geophysical logging be performed in the open borehole below the 4" diameter casing. The primary purpose of the geophysical logging was to identify the locations of packer seats and to quantify potential flow zones within the borehole. An open borehole will not be utilized in the alternative well design; therefore, geophysical logging will not be performed.*"

The March 9, 2006 ACEPD comment states: "*...natural gamma ray, flow meter (static and pumped, if feasible) and temperature (static and pumped, if feasible) logs should be conducted*". Although a natural gamma log could be run, there is no basis for it. In general, natural gamma logs are used to help identify geologic contacts when continuous core samples are not available. Because continuous core is being collected for all Floridan wells there is no technical basis for performing a natural gamma log. Flow-meter surveys and temperature logs were proposed to help with the identification of permeable zones within the UTZ. Because the locations of multiple screen intervals are prescribed within each well, there is no technical reason to perform flow meter and temperature logs.

The Westbay system has the capabilities of measuring pressures within each of the sampling ports. Pressure-transducer readings are routinely collected from each zone prior to the collection of groundwater samples. The combination of the pressure measurements and the elevation of the sample ports can be used to calculate a potentiometric surface elevation for each sample port. It is anticipated that hydraulic-head difference across the UTZ will be small, but discernable from these pressure transducer readings.

The following is Beazers' response to the GRU Team (RW Cleary) comments in an email dated March 9, 2006:

Comment #1 -- *With an alternating sequence of fine and coarse sands in the thin annular space outside the stainless steel well casing, if there is a significant*

vertical gradient, we are not likely to be able to measure it because of the hydraulic communication provided by the sands among different equipotential lines, resulting in some average head over the entire length of the multilevel well. There are other concerns as well including how the well was centered (it's doubtful they used special centralizers) and possible problems resulting from non-centering. I will follow this email up with more details and a copy of the latest chapter on multilevel designs by Murray Einarson (in David Nielsen's Monitoring book--2006) that will provide additional technical details GeoTrans needs to be aware of before they drill any more wells.

Response: The majority of these issues were addressed in a conference call with Stakeholders on October 12, 2005 and in the October 17, 2006 letter. As indicated above, the fine sand is the only alternative for an annular seal between screen intervals. Similarly, the conceptual model for the UTZ is that the permeability of this zone is relatively high, and as a result vertical hydraulic-head differences will tend to be small. The estimated average vertical hydraulic-head difference across the semi-confining unit that separates the UTZ and LTZ is only about 2 to 6 feet. The hydraulic-head difference across the UTZ is estimated to be on the order of a few tenths of feet. Significant vertical hydraulic gradients are not anticipated to be present within the UTZ, hence, the GRU Team concern is unfounded.

The GRU Team expressed a potential concern about the wells not being centered in the borehole. The well-design specifications for this program indicate that centralizers are to be used during the installation of the casings. In addition, GRU's consultant has been present at the Site during the past 8 months and should be aware that centralizers are being used for the well construction.

The primary reason for specifying the use of centralizers was to minimize the potential for channeling of grout during placement. Centralizers were used to set the 18"and 12" diameter isolation casings and the 4" well casing. No centralizers were used to set the 8" diameter isolation casing because the 8" casing (8.65" OD) was set inside of the override casing (9.65" ID). The difference in casing diameters between the 8" and override casing is 0.5" of annular space. Hence, centralizers were not needed for the 8" casing because the override casing served as the centralizer in the approximately 11" diameter borehole. In addition, the limited annular space between the override casing and 8" ID casing prevented the use of centralizers.

Similarly, the 4" well casing was set with a centralizer at the bottom of the well opposite the 15-foot sump and the 6.23" ID rotasonic override casing served as the centralizer for the upper portion of this well casing. External casing centralizers could not be utilized in the upper portion of the 4" well casing because they could result in bridging of filter pack and fine-sand materials during placement. In addition, centralizers would interfere with the numerous required tag-tape measurements to the top of the screen and casing backfill materials. In

summary, external casing centralizers were utilized where technically practical and the rotasonic override casing served as an effective centralizer when physical limitations prevented the use of external casing centralizers. With the combination of the external casing centralizers and the override casing, all well casings are approximately centered within the borehole.

Please feel free to contact me at (303) 665-4390, if you have any questions or comments.

Sincerely,

James R. Erickson

James R. Erickson
Program Manager

Attachments

cc: M. Slenska, BEI
M. Brourman, BEI
W. O'Steen, EPA
K. Helton, FDEP
L. Paul, KI
B. Goodman, GRU
J. Herbert, JEA
J. Mousa, ACEPD
R. Hallbourg, ACEPD
P. Salisbury, K

Attachment A
GeoTrans Letter To U.S. EPA dated October 17, 2005

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October 17, 2005

Ms. Amy McLaughlin
Remedial Project Manager
U.S. Environmental Protection Agency, Region IV
4WD-SRTMB
61 Forsyth Street
Atlanta, Georgia 30303-3104

Subject: Upper Floridan Monitoring Well Alternative Design, Koppers Inc. Site in Gainesville, FL

Dear Ms. McLaughlin:

On behalf of Beazer East, Inc. (Beazer), enclosed with this letter is the alternative well design (see Attachment A) for the Upper Floridan (UF) Aquifer monitoring program. The alternative well design is consistent with the design discussed in our conference call with Stakeholders on October 12, 2005. This alternative well design is only proposed for areas of the KI site (Site) where unconsolidated, UF deposits prevent the construction of the original well design. The original well design will be constructed in areas of the Site where competent, consolidated bedrock is present and allows for an open borehole completion in the UF Aquifer. Included with this attachment are two figures: 1) Figure 1 shows the temporary abandonment design for FW-10B, FW12B and FW-14B, and 2) Figure 2 shows the conceptual alternative well design for unconsolidated deposits at the Site.

Please feel free to contact me at (303) 665-4390 if you have any questions or comments.

Sincerely,

James R. Erickson

James R. Erickson
Program Manager

Attachment

cc: M. Slenska, BEI
M. Brourman, BEI
W. O'Steen, EPA
K. Helton, FDEP
B. Goodman, GRU
L. Paul, KI
J. Herber, JEA
J. Moussa, ACEPD

Attachment A:
Upper Floridan Monitoring Well Installation and Alternative Design

The following is a discussion of the modifications to the Upper Floridan (UF) Aquifer monitoring well installation program detailed in the U.S. EPA letter dated July 12, 2005, as requested in our telephone conversation on October 12, 2005.

The original well design for competent UF bedrock was based on a quadruple-casing design that telescopes from an 18" casing diameter at the surface down to a 4" diameter well casing completed about 5 feet into the top of the Upper Floridan Aquifer. After all four casings were grouted from their completion depth to land surface, a 4" nominal diameter open borehole was to be drilled 100 feet into the Upper Floridan Aquifer for the installation of a multi-level sampling system.

The alternative well design is proposed for areas of the site where the carbonate rocks in UF Aquifer are highly weathered and unconsolidated, such that an open borehole cannot be constructed below the 4" well casing. The alternative well design will consist of a 4" diameter multiple-screened well, completed in a nominal 8" diameter borehole. The following is a description of the well design changes as compared to the original well design discussed in the U.S. EPA July 12, 2005 letter to Beazer. This discussion will address each of the five major topic headings detailed in the U.S. EPA letter.

Section 1.0 Multilevel System Specifications

1) No changes to the Multilevel System (MS) requirements.

Section 2.0 Well Locations

1) No changes to the well locations, other than those previously discussed with the U.S. EPA at the start of the project.

Section 3.0 Well Construction Specifications

The U.S. EPA letter did not include a discussion of temporary well abandonment procedures for boreholes extending into the UF Aquifer. Figure 1 shows the conceptual design of well abandonment procedures performed for wells FW-10B, FW-12B and FW-14B. The temporary abandonment was performed to prevent vertical migration and mixing within the UF Aquifer, while the alternative well design was developed. The temporary abandonment basically consists of alternating layers of filter sand and low-permeability isolation sand over a 100-ft interval of the UF Aquifer. An approximately 30-ft cement grout plug was placed from the top of the UF Aquifer to the base of the 8" diameter isolation casing to minimize vertical migration within the lower Hawthorn Group clay unit. The abandonment design utilized for the UF Aquifer wells meets the criteria and specifications of the Saint Johns River Water Management District (SJRWMD) (Chapter 40C-3, F.A.C.).

Well construction and logging details for the original well design are discussed in items 1 through 12 in the U.S. EPA letter. The alternative well design will result in modifications to items 5 through 9. Specifically, a nominal 8" diameter borehole will be drilled approximately 100 feet below the top of the UF Aquifer contact. In addition, geophysical logging is not possible for the alternative well design and therefore, will not be performed. A detailed discussion of the alternative well design and procedures are provided below. The conceptual design for an alternative well is shown in Figure 2.

1) The primary change to the original well design is the installation of four, 4" diameter, 10-ft well screens in place of the previously proposed open borehole beneath the 4" diameter well casing. The alternative well design will consist of 10-ft stainless-steel, wire-wrapped screens separated from each other by 10-ft of blank stainless-steel casing. Ten-ft well screen intervals are typically used with the Westbay sampling system to allow for the multi-level sampling and purge ports to be approximately centered across the 10-ft screen. A shorter 5-ft screen interval would result in the sampling and purge ports being located on the top and bottom of the screen interval making it more difficult to purge and sample the well. Approximately 15 ft of blank casing will also be installed at the bottom of the well to accommodate the multi-level sampling system specifications and approximately 10 ft of blank casing will be installed across the upper 10 ft of the UF Aquifer to accommodate the installation of annular sealant and grout below the lower Hawthorn Group clay unit. Approximately 40 ft of stainless steel blank casing will extend from the top of the upper screen interval to the base of the 8" diameter black steel isolation casing. The remaining well casing will consist of approximately 110 ft of black steel casing extending to land surface.
2) The slot-size for the well screen will be established after samples of the unconsolidated carbonate rock are analyzed by the well-screen manufacturer. The well screen manufacturer will recommend an appropriate slot size and filter pack based on the physical properties of the UF Aquifer deposits.
3) The alternative well design will be constructed the same as the original design, through the installation of the three isolation casings. The only change in the well design will be the installation of the 4" casing. The alternative well design requires that the rotasonic rig advance the 7" nominal diameter override casing to the completion depth of the well (approximately 100 ft into the UF Aquifer). The original well design only had the 7" override casing advancing 5 ft into the UF Aquifer, with a 3.8" borehole extending the remaining 95 ft. The 7" override casing needs to be extended to the completion depth of the well in order to construct the 4" diameter well inside of the override casing. The well construction technique is similar to the construction of a monitoring well inside of a hollow-stem auger. The override casing prevents the unconsolidated deposits from flowing into the borehole during the construction of the well. The alternating blank casing and screens within the UF Aquifer will consist of 15 feet of blank casing at the base of the well, followed by 10 feet of screen and 10 feet of blank casing extending to within 10 feet of contact of the lower HG clay with the UF Aquifer. The top

of the uppermost screen will be approximately 10 feet below the contact of the lower Hawthorn Group clay and the UF Aquifer to allow for the placement of 5 ft of isolation material and 5 ft of cement grout below this contact.

4) Once the 7" override casing is advanced to the well completion depth and the drill cuttings have been flushed out of the inside of the casing, the 4" well will be constructed. The 4" well will be constructed by screwing flush-thread casing and screens together and lowering the assembled casing inside of the override casing. After the 4" casing and screens have been lowered to the completion depth, the screen filter pack and isolation material will be placed in the void space between the override casing and 4" well. The filter pack will be sized to match the screen slot size and the isolation material will consist of a fine, low-permeability sand, consistent with requirements of the SJRWMD. The void space opposite the 15 feet of blank casing at the base of the well will be backfilled with a fine sand isolation material. Once the isolation material has been placed, a coarse filter sand material will be placed opposite the screen interval extending approximately 1 foot below and 1 foot above the top of the screen interval. The alternating isolation material and filter sand material will progress upwards in the borehole until the upper screen filter material has been placed. Approximately 5 feet of isolation material will be placed above the uppermost screen interval to help prevent cement grout infiltration into the upper screen interval. A cement grout will extend from 5 ft above the upper screen interval to land surface.

5) The limited void space between the override casing (6.23" ID) and 4" well casing (4.5" OD) prevents the use of a tremmie pipe for the installation of the filter pack and isolation material. Therefore, all filter pack and isolation materials will be placed by pouring the material from land surface. To prevent bridging, the override and well casings will be vibrated during the material installation process. A measuring tape will be utilized during the material installation to tag the top of the filter pack and isolation material. In addition, the override casing will be slowly removed as the filter pack and isolation materials are placed. It is anticipated that the installation of the filter pack and isolation materials will require 1 to 1.5 days to complete to allow sufficient time for material settlement during the installation process.

6) After the final 5 ft of isolation material has been placed, the override casing will be completely removed from the borehole and a tremmie pipe will be installed to place the cement grout. The cement grout will be placed in two stages to help minimize cement contamination in the upper screen interval. The first grouting stage consists of placing approximately 35 feet of cement grout from the top of the isolation material to the base of the 8" isolation casing. This grout will be allowed to cure for 6 to 12 hrs before grouting the well to land surface

7) The alternative well design will eliminate the need for geophysical logging. The original well design required geophysical logging be performed in the open borehole below the 4" diameter casing. The primary purpose of the geophysical logging was to identify the locations of packer seats and to quantify potential flow zones within the borehole. An open borehole will not

be utilized in the alternative well design; therefore, geophysical logging will not be performed.

Section 4.0 Well Sampling Specifications

1) No changes to analysis and reporting.

Section 5.0 Analysis and Reporting

1) No changes to analysis and reporting.

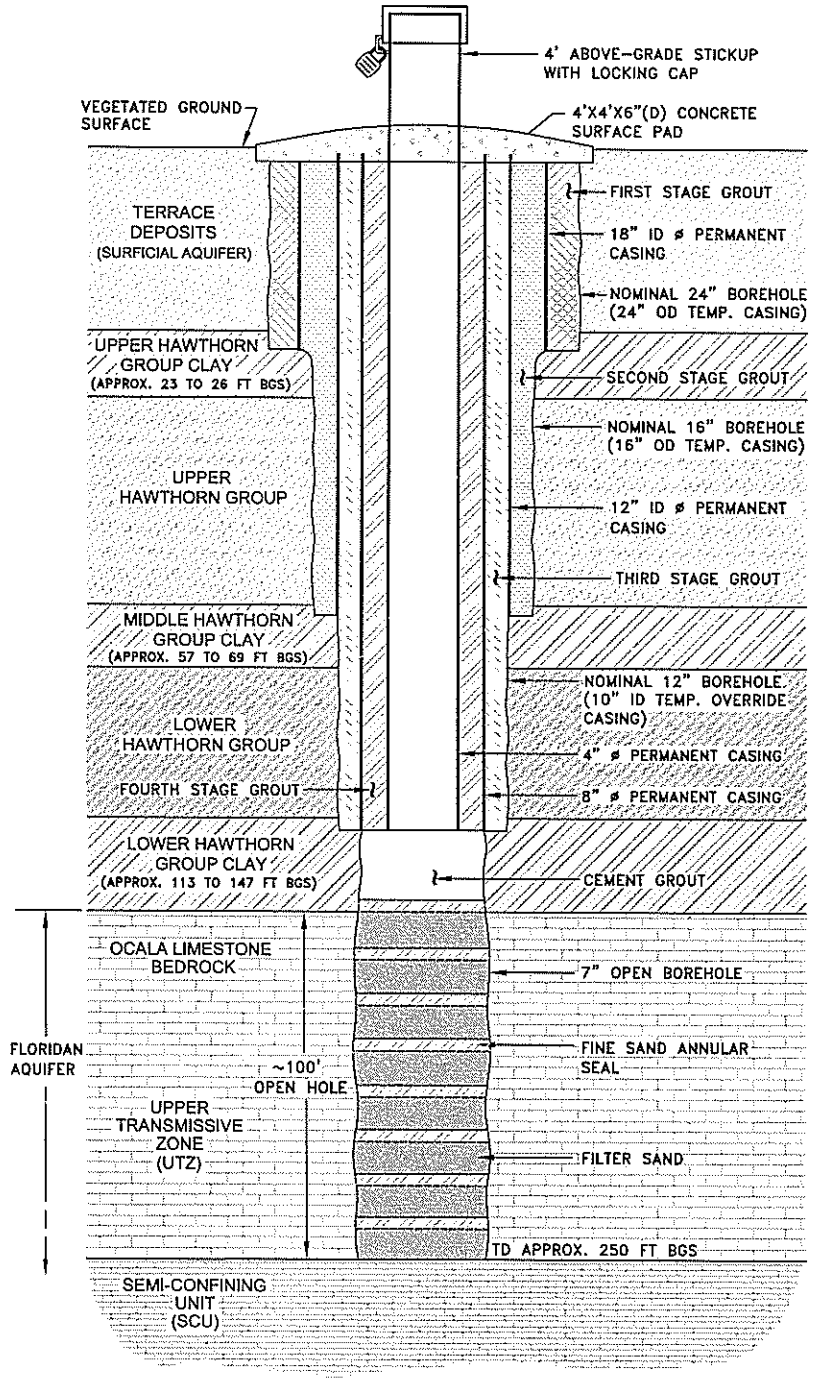
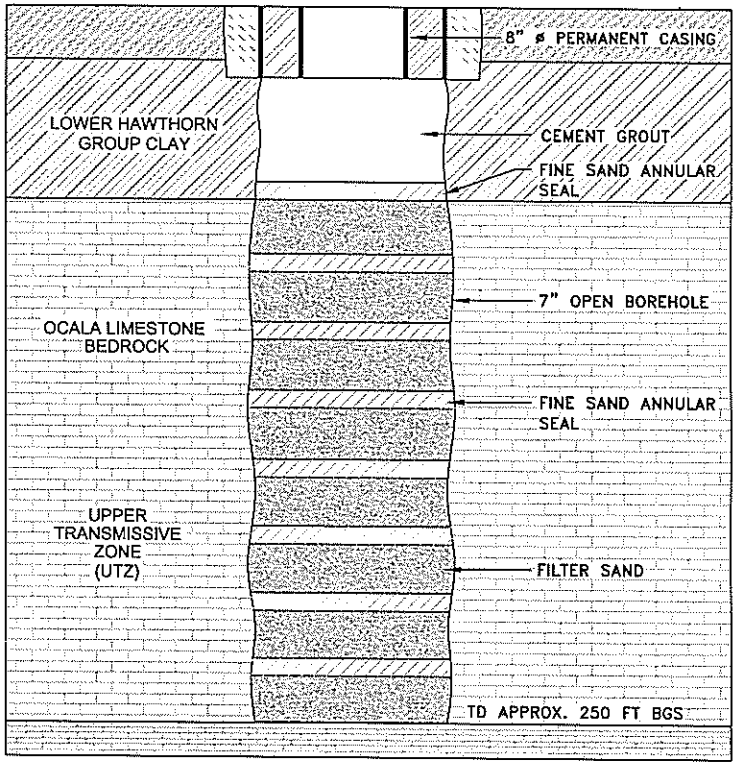


Figure 1.
Temporary abandonment design for boreholes extending into the Upper Floridan Aquifer.



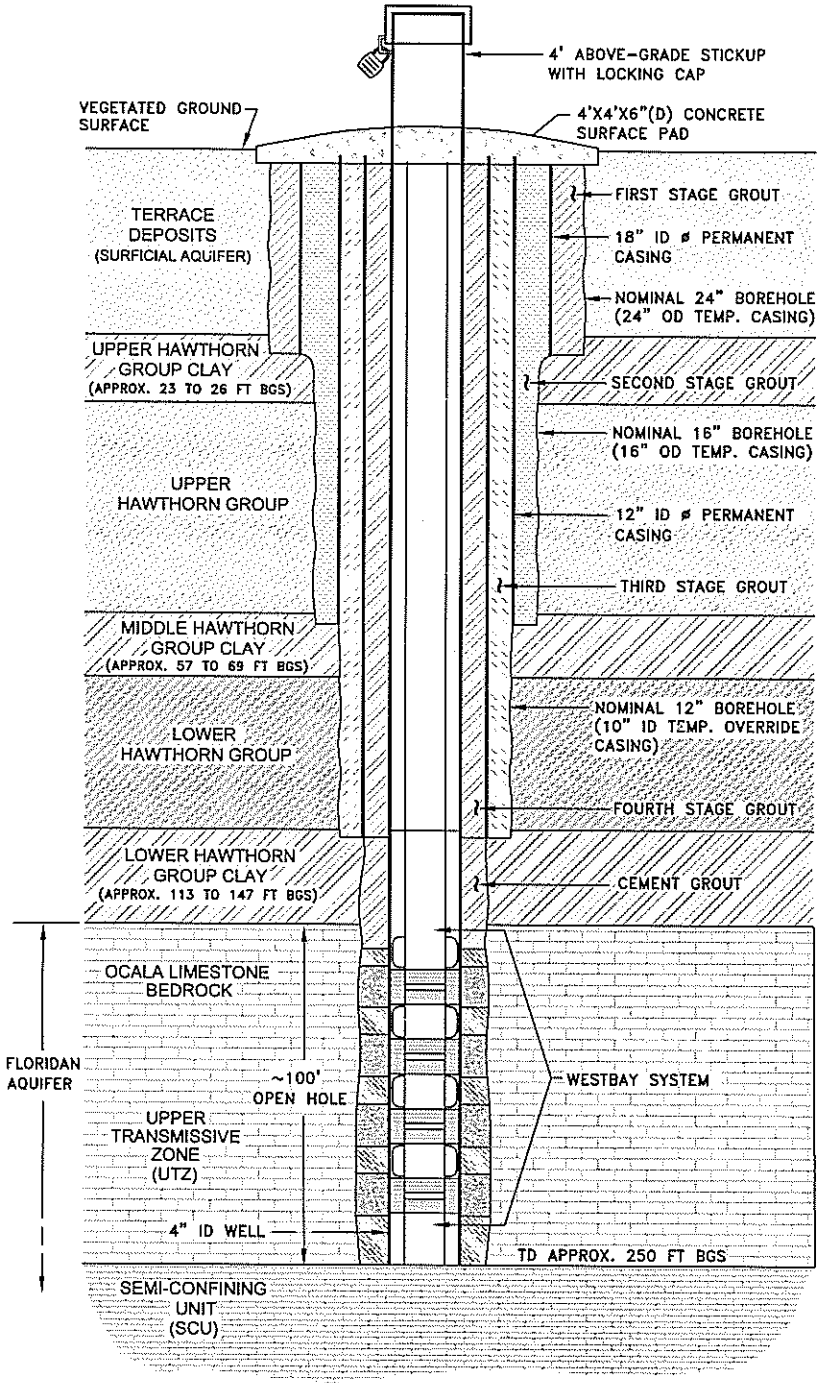
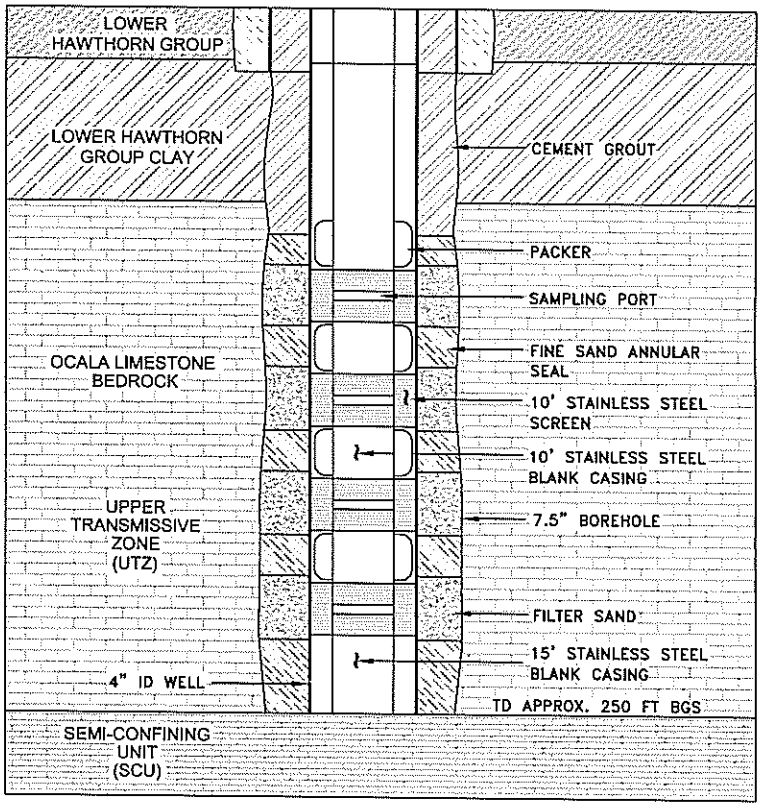


Figure 2.
Proposed alternative quadruple-cased Floridan aquifer well for the Upper Transmissive Zone, with multi-level screens and sampling system.



Attachment B
October 20, 2005 Email from U.S. EPA Approving Alternative Well Design

Jim & Mike,

Please go ahead with ordering well construction materials and with implementing the GeoTrans Upper Floridan Monitoring Well Alternative Design plan, dated October 17, 2005. The plan has been approved by EPA, GRU, ACEPD, and FDEP.
Thank you.

Amy McLaughlin
Remedial Project Manager
(404) 562-8776

----- Forwarded by Amy McLaughlin/R4/USEPA/US on 10/20/2005 10:22 AM-----

"Goodman, BrettP"
<goodmanbp@gru.com>
To Amy McLaughlin/R4/USEPA/US@EPA
cc
10/20/2005 10:09 AM JJM@alachua.fl.us, Kelsey.Helton@dep.state.fl.us, Janis Layne/R4/USEPA/US@EPA, Bill Osteen/R4/USEPA/US@EPA, "'Jim Erickson'" <jerickson@geotransinc.com>, Jim Toth <JimT@geotransinc.com>, "Goodman, Brett P" <goodmanbp@gru.com>, "Hutton, Rick H" <huttonrh@gru.com>, Mitch.Brouman@hanson.biz, SlenskaM@hansonle.com, JHerbert@jea.net, "Hutton, Rick H" <huttonrh@gru.com>, "John Herbert [JHerbert@jea.net]" <JHerbert@jea.net>, "Cleary, Bob" <RWCLEARY@aol.com>, "'dnapl@sympatico.ca'" <dnapl@sympatico.ca>, "Jackson, Dick" <rjackson@intera.com>, "Hutton, Rick H" <huttonrh@gru.com>

Subject RE: Alternative Well Design, Gainesville Koppers site

Per our conversation today, I want to clarify what was discussed in our October 18, 2005 conference call with the stakeholder group. I indicated that there were two separate issues being discussed: 1) The alternative well construction as proposed by Geotrans 2) the accurate characterization of the Floridan Aquifer.

Regarding the alternative well construction, as I indicated in the conference call on the 18th, GRU is accepting of the well construction as proposed by Geotrans for the wells that have been drilled into the Floridan thus far. I was under the impression that equipment was being ordered For the wells currently drilled and Beazer would be evaluating ordering additional components for future wells to expedite future wells.

Regarding the characterization of the Floridan, we are not in agreement With the characterization of the Floridan and the impact that the drilling Method maybe having on the accuracy of the characterization. Our understanding Is that the case is being made that the Floridan is unconsolidated for the entire depth of the wells being drilled. At this time, we don't agree with this assumption. I would be interested to know Mr. Ruff's opinion on the depths of unconsolidated material in the Floridan. I would also like to know his opinion on other drilling techniques that may be comparable or better to core the Florida to get an accurate characterization of the material.

I hope this clarifies our discussions,

Brett

Brett Goodman, P.E.
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-----Original Message-----
From: Jim Erickson [mailto:jerickson@geotransinc.com]
Sent: Tuesday, October 18, 2005 7:38 PM
To: Mclaughlin.Amy@epamail.epa.gov
Cc: JJM@alachua.fl.us; Kelsey.Helton@dep.state.fl.us; Layne.Janis@epamail.epa.gov; Osteen.Bill@epamail.epa.gov; Jim Toth; goodmanbp@gru.com; huttonrh@gru.com; Mitch.Brouman@hanson.biz; SlenskaM@hansonle.com; JHerbert@jea.net

Subject: Alternative Well Design, Gainesville Koppers site

Dear Ms. McLauglin, The issue was raised in our conference call today concerning the potential of the Rotasonic drilling causing the core samples to appear unconsolidated. As requested I contacted both Prosonic and our field representative (Jim Toth) to explore this possibility. The consensus from all persons directly involved with the drilling operation at this Site is that the core from the UF is representative and that the rotasonic drill rig is not significantly impacting the physical properties of the bedrock core samples. The following is a summary of the conversation:

Prosonic: Spoke to Michael Rice (PM for Gainesville Project) and George

Ruff (Supervisor for drillers in FL). Prosonic drills wells all over FL and in the Ocala Fm. It has been Prosonic experience that both unconsolidated and consolidated cores have been obtained from the Ocala. A few of the sites that Prosonic has drilled with rotasonic method into the UF are: 1) High Springs (20 minutes from KI site)-- obtained consolidated bedrock; 2) Marion County, Stavolin (Sp?) Farms-- obtained consolidated bedrock cores; Miami Biscayne Tunnel-- obtained consolidated bedrock cores; Tallevast FL site-- obtained both consolidated and unconsolidated bedrock cores.

George Ruff oversees all drilling operations for Prosonic in FL, including the Gainesville site. He indicated that there is no possibility that the drilling is causing unconsolidation of the core in the Ocala. They are basically drilling with low-impact procedures: 1) There is virtually no resistance to the rotasonic drilling, such that no down pressure is being applied to the core barrel; Typically, down pressure is applied to the core barrel to advance the drilling and as a result there is a potential to fracture the core; no downward pressure is required at the KI site; 2) In addition, Prosonic has the frequency vibration set to one of the lowest settings for the rig because the bedrock is so soft. Therefore, minimal potential impact to core.

Jim Toth, has been involved with multiple rotasonic drilling operations in FL. His experience at Tallavass is that the rotasonic method can fracture core, but the core breaks into larger pieces. It does not pulverize it into individual grains and shells, such as observed at the KI site. The lack of larger fractured rock pieces in the core at the Gainesville KI site supports the geologic conceptual model that it is highly indurated.

If needed, Prosonic's George Ruff would be available to be on our call tomorrow to confirm Prosonic's drilling experience discussed in this email.

One correction from our conference call today, Jim Toth indicated that a core barrel was not used at FW-6. Thanks Jim

>>> <Mclaughlin.Amy@epamail.epa.gov> 10/18/2005 10:11:34 AM >>>
The conference call to discuss the alternate well design for the Koppers-Gainesville site is now scheduled for TODAY at 2:45 EST (not 2:30).
Call in number: 1-866-299-3188
Conference code: 4045628040 (followed by the # sign)
Thank you.

Amy McLaughlin

Remedial Project Manager
(404) 562-8776

----- Forwarded by Amy McLaughlin/R4/USEPA/US on 10/18/2005 11:30 AM-----

Amy McLaughlin/R4/US EPA/US
To jerickson@geotransinc.com,

10/18/2005 10:52 JJM@alachua.fl.us, AM Kelsey.Helton@dep.state.fl.us,
Bill Osteen/R4/USEPA/US@EPA, goodmanbp@gru.com,
Mitch.Brouman@hanson.biz, SlenskaM@hansonle.com, JHerbert@jea.net,
huttonrh@gru.com
cc Randall Chaffins/R4/USEPA/US@EPA

Subject Conference call to discuss Alternative Well Design,
Gainesville Koppers site

All,
I would like to set up a conference call for this afternoon, if possible, to discuss the Alternative Well Design emailed by GeoTrans yesterday afternoon. Bill and I are available today at 2:30 p.m. EST. Please email me if you have a conflict with that time. Thank you.

Amy McLaughlin
Remedial Project Manger
(404) 562-8776