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April 6, 2006

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 FW-24C Design, Cabot Carbon/Koppers Site in Gainesville, FL

Dear Ms. McLaughlin:

On behalf of Beazer East, Inc. (Beazer), enclosed with this letter is the proposed well design (see Attachment A) for the Upper Floridan (UF) Aquifer monitoring well FW-24C. Included with this attachment are two figures: 1) Figure 1 shows the primary well design consisting of isolation casings and an open borehole monitoring interval, and 2) Figure 2 shows an alternative well design in the event that unstable borehole conditions prevent the use of an open borehole. The alternative well design consists of a 3-inch ID diameter, stainless-steel multiple-screen well.

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. Herbert, JEA
J. Mousa, ACEPD

Attachment A:
Upper Floridan Monitoring Well FW-24C Design and Installation

The following is a discussion of the proposed Upper Floridan (UF) Aquifer monitoring well design and installation program for the deep well FW-24C. This well was initially proposed in the February 10, 2006 Beazer letter to the U.S. Environmental Protection Agency (EPA) and therefore was not specifically addressed in the July 12, 2005 EPA letter. The design of this well will closely approximate the original design proposed in the EPA letter referenced above, with the exception that the majority of the Upper Transmissive Zone (UTZ) will be sealed off to allow for a deeper well completion depth.

Well FW-24C is proposed to be completed in the vicinity of well FW-12B to investigate the vertical extent of potential organic impacts in this area. One concern in the design of this well is to minimize the potential of creating a pathway from the Upper Transmissive Zone (UTZ) to the Lower Transmissive Zone (LTZ). As such, well FW-24C will be isolated in the upper half of the Ocala Formation semi-confining unit, such that the LTZ is not penetrated by this well. It is also anticipated that an open borehole design will be possible in the semi-confining unit, such that a multiple-screen well design will not be needed for this well.

In the unlikely event that an open borehole cannot be completed, an alternative design that consists of a multiple-screen monitoring well will be proposed. The multiple-screen well design will be similar to the previous UF wells with the exception that bentonite will be used to isolate the borehole between screen intervals. A bentonite isolation material will be required in this design because the Ocala semi-confining unit average vertical hydraulic conductivity is lower than the average vertical hydraulic conductivity of the UTZ where a fine sand was used as backfill between the screen intervals. In addition, the greater depth of this well will require the use of a tremie pipe to place the filter pack, bentonite and cement grout materials. Because of these requirements the well diameter will be reduced to 3-inch ID to allow for the use of a 1-inch ID diameter tremie pipe. It should be stressed that it is not anticipated that this alternative well design will be required; however, it is included with this conceptual design document in the event that it is needed.

The following is a description of the well design changes as compared to the original UTZ 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, with the exception that three depth intervals will be monitored in the final well design. The uppermost interval will be approximately equivalent to the depth of the

15-foot sump in well FW-12B, with two deeper monitoring intervals in the Ocala semi-confining unit.

Section 2.0 Well Locations

1) The proposed location for FW-24C is approximately 25 feet to the north and downgradient of well FW-12B.

Section 3.0 Well Construction Specifications

Two well construction specifications are presented. The primary and alternative well designs are identical for the three isolation casings that extend to the base of the UTZ. The difference between these designs is the use of an additional casing string in the alternative design.

Primary Well Design

The conceptual design for well FW-24C will be similar to the original design proposed for the UF Aquifer monitoring program in the UTZ. The design will consist of telescoping isolation casings to the base of the UTZ, with an open borehole beneath this depth. The open borehole will be instrumented with a multi-level Westbay system.

Well FW-24C will be completed at a depth that is approximately 60 feet below FW-12B. In addition, the majority of the UTZ will be sealed off in the final completion of FW-24C to investigate the vertical extent of impacts beneath the lowermost monitoring interval in well FW-12B. Specifically, Beazer is proposing to complete FW-24C, such that groundwater conditions in the approximately lower 15 feet of the UTZ and the upper 50 feet of the underlying Ocala semi-confining unit can be monitored.

Geologic cores from the 14 recently installed UF Aquifer wells indicate that the UTZ is moderately consolidated near the base of this unit. In addition, the Ocala semi-confining unit that underlies the UTZ has been described as competent bedrock throughout the county. Therefore, it is probable that an open borehole design can be utilized for the completion of this well. The conceptual design proposed for well FW-24C consists of three permanent isolation casings, with a Westbay system installed in an open borehole. The following is a description of the primary well design:

1) A temporary casing consisting of a 24-inch ID diameter black carbon steel will be installed to an approximate depth of 65 feet into the upper few feet of the Hawthorn Group (HG) middle clay unit with a cable-tool rig. The temporary casing will effectively seal the Surficial Aquifer groundwater from the Upper HG deposits, until the permanent 18-inch casing installation is completed.

2) After the 24-inch casing is installed to depth, a permanent 18-inch ID diameter casing will be installed inside of the 24-inch casing and cement grouted. The 24-inch temporary casing will be removed contemporaneously with the grouting of the 18-inch casing. The grout for the 18-inch casing will be allowed to cure for a minimum of 12 hours before additional work is performed in this well.

3) After the 18-inch casing grout has set for 12 hours, a 16-inch ID temporary casing will be advanced to the HG lower clay unit with a cable-tool rig. A permanent 12-inch ID casing will be installed into the upper 10 feet of the HG lower clay unit and cement grouted. The grout for the 12-inch casing will be allowed to cure for a minimum of 12 hours before additional work is performed in this well.

4) The next phase of the drilling will include obtaining an approximately steady-state water level for the UF Aquifer. The steady-state water level for the upper portion of the UF Aquifer will be used to help document vertical hydraulic gradients across the UTZ. A 10-inch ID rotasonic override casing will be advanced to within 5 feet of the base of the HG lower clay unit. The override casing will be flushed with clean tracer-tagged water and then the override casing will be raised approximately 3 feet. A 3-foot bentonite plug will be placed into the open borehole. The override casing will then be advanced approximately 8 feet to the top of the UF Aquifer. The bentonite plug will help to seal the bottom of the override casing as it is advanced by sealing the approximately 1/8-inch gap outside the override casing as the casing is advanced to the top of the UF Aquifer.

5) Once the override casing is advanced to the top of the UF Aquifer, a 4-inch OD diameter core barrel will be advanced approximately 10 feet into the UF Aquifer and the core will be removed. The water level in the open core hole will be monitored for a period of hours until the water level equilibrates to an approximately steady-state level. After a steady-state water level is obtained, the borehole will be advanced to its completion depth.

6) The rotasonic 10-inch ID diameter override casing will be advanced to approximately 90 feet below the top of the UF Aquifer. Continuous 10-foot cores will be collected as the override casing is advanced to the base of the UTZ. An 8-inch ID diameter black carbon steel casing will be installed and grouted from land surface to within 10 feet of the base of the UTZ at a depth of approximately 230 feet. This 8-inch casing will effectively isolate the UTZ from the monitoring zones below this casing. The grout for the 8-inch casing will be allowed to cure for a minimum of 12 hours before additional work is performed in this well.

7) A 4-inch diameter open borehole will be advanced approximately 55 feet below the base of the 8-inch casing. Geophysical logs will be obtained in the open borehole consistent with the EPA July 12, 2005 letter.

8) Well development will be performed until bromide tracer concentrations are within acceptable levels and the temporal concentration trends approach an asymptote.

9) The 4-inch diameter open borehole will be instrumented with a Westbay multi-port system after borehole logging and well development activities are completed. A 3-inch ID diameter guide tube will be used to install the Westbay system in the open borehole. The conceptual design of the well and Westbay system is shown in Figure 1.

Alternative Well Design

In the event that unconsolidated deposits result in an unstable borehole beneath the base of the 8-inch casing, the alternative well design will be implemented. It should be noted that an unstable borehole is not anticipated to be encountered at the FW-24C completion depth, necessitating the implementation of the alternative well design.

The alternative well design is similar to the design of the multiple-screen wells previously installed in the UTZ, with the exception that the well diameter will be reduced from a 4-inch ID well to a 3-inch ID well. In addition, bentonite seals will be used to isolate the borehole between the three multiple-screen intervals. The conceptual design of the well is shown in Figure 2.

1) A 7-inch ID diameter override casing will be advanced approximately 65 feet below the base of the 8-inch isolation casing.

2) Once the 7-inch override casing has been flushed with clean tracer-tagged water, a 3-inch ID diameter stainless-steel multiple-screen well will be lowered into the override casing. The stainless steel well will consist of 10-foot wire-wrapped screens with 10-foot blank casing separating the screens. The bottom of the well casing will have a 15-foot sump to accommodate the Westbay system. In addition, casing centralizer straps will be attached to the bottom of the well casing to help center the well in the borehole. A 1-inch diameter tremie pipe will be lowered along side of the 3-inch casing for the installation of the filter sand, bentonite seals and cement grout.

3) The 3-inch ID diameter well will be constructed by screwing flush-thread casing and screens together and lowering the assembled casing inside of the override casing. After the 3-inch casing and screens (and 1-inch tremie pipe) have been lowered to the completion depth, the screen filter pack and isolation material will be placed in the annular space between the override casing and

the 3-inch well. The filter pack will be sized to match the screen slot size and the isolation material will consist of a bentonite seal, consistent with requirements of the SJRWMD. The annular space opposite the 15 foot sump will be backfilled with bentonite material. Once the bentonite 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 bentonite 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.

4) 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 deposits.

5) The 7-inch override casing needs to be extended to the completion depth of the well in order to construct the 3-inch 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 the base of the 8-inch casing.

6) 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.

7) After the final isolation material has been placed, the override casing and tremie pipe will be completely removed from the borehole and the pipe will be re-installed to place the cement grout.

8) A Westbay system consisting of three monitoring ports will be installed inside of the 3-inch well similar to the existing UTZ wells at the Site.

9) The alternative well design will eliminate the need for geophysical logging. The primary well design included geophysical logs of the open borehole below the 8-inch diameter isolation casing. The primary purpose of the geophysical logs 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 well sampling specifications.

Section 5.0 Analysis and Reporting

1) No changes to analysis and reporting.

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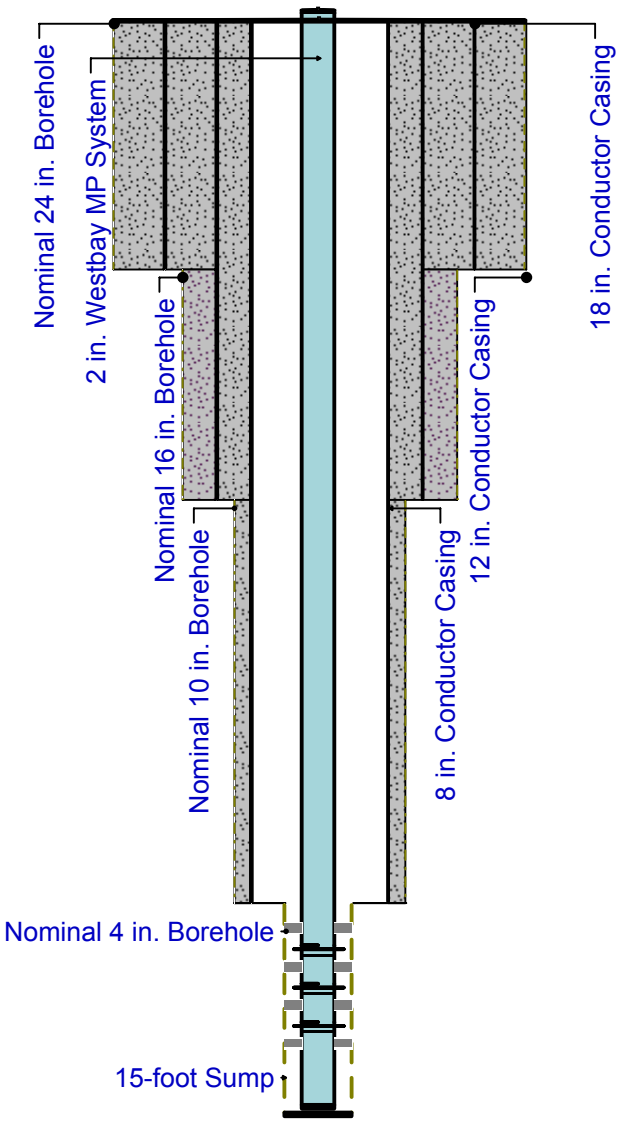
Figure 1. Primary Well Design for FW-24C

Project: Beazer - Gainesville
Project No.: 2201.083
Client: Beazer
Location: Gainesville, FL
Project Manager: J. Erickson

SUBSURFACE PROFILE			SAMPLE	
Depth	Symbol	Description	Recovery	Well Completion Details
-5		Ground Surface		
5		Terrace Deposits (Surficial Aquifer)		
15				
25		Upper Hawthorn Group Clay		
35		Hawthorn Group Clayey Sand		
45				
55				
65		Middle Hawthorn Group Clay		
75		Hawthorn Group Clayey Sand		
85				
95				
105				
115		Lower Hawthorn Group Clay		
125				
135				
145		Upper Floridan Ocala Formation		
155				
165				
175				
185				
195				
205				
215				
225				
235				
245		Ocala Semi-Confining Unit		
255				
265				
275				
285				
295				



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Drill Method: Cable Tool and Rotasonic
Drill Date:

Hole Size:
Datum: Land Surface
Sheet:

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Figure 2. Alternative Well Design for FW-24C

Project: Beazer - Gainesville
Project No.: 2201.083
Client: Beazer
Location: Gainesville, FL
Project Manager: J. Erickson

SUBSURFACE PROFILE			SAMPLE	
Depth	Symbol	Description	Recovery	Well Completion Details
-5		Ground Surface		
5		Terrace Deposits (Surficial Aquifer)		
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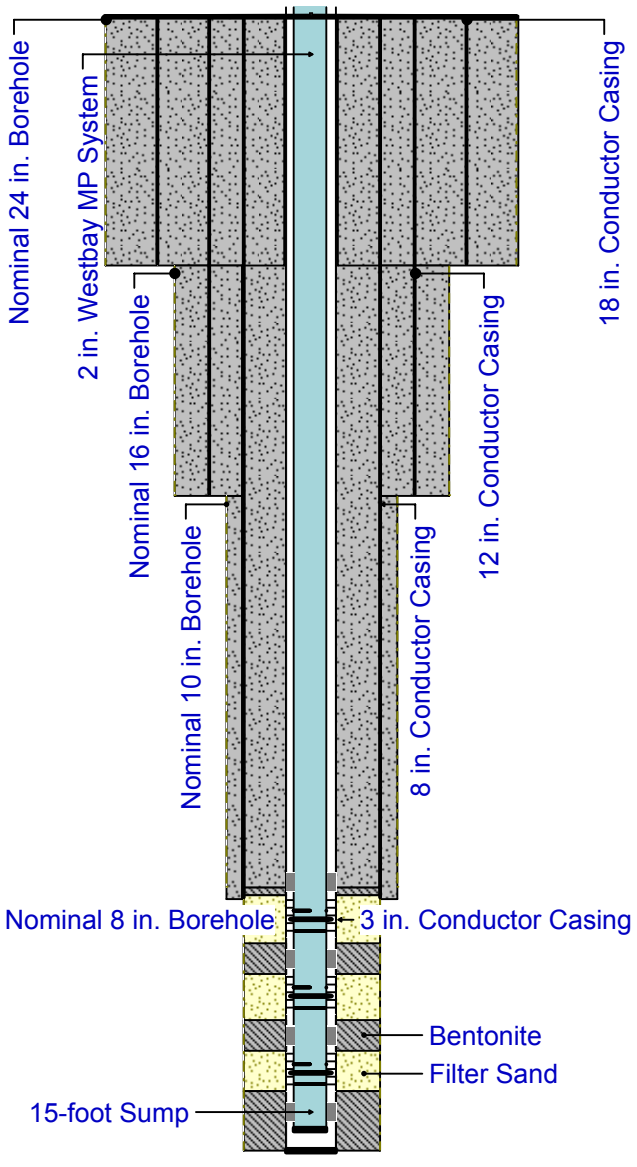
45				
55				
65		Middle Hawthorn Group Clay		
75		Hawthorn Group Clayey Sand		
85				
95				
105				
115		Lower Hawthorn Group Clay		
125				
135				
145		Upper Floridan Ocala Formation		
155				
165				
175				
185				
195				
205				
215				
225				
235				
245		Ocala Semi-Confining Unit		
255				
265				
275				
285				
295				



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