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February 29, 2012

Illinois Environmental Protection Agency
Division of Land Pollution Control #33, Permits Section
(Groundwater Monitoring Unit)
1021 North Grand Avenue, East
Springfield, IL 62702

RE: 2011 RCRA Annual Groundwater Monitoring Report
Former Koppers Company Wood Treating Facility
Carbondale, Illinois
EPA I.D. # ILD 000 819 946

Greetings:

On behalf of Beazer East, Inc. (Beazer), enclosed are three copies of the 2011 Annual RCRA Groundwater Monitoring Report for the above-referenced facility. If you have any questions, please call Mr. Michael Slenska of Beazer at (412) 208-8867 or me at (412) 429-2694.

Best Regards,

Field & Technical Services, LLC

Angela M Gatchie

Angie Gatchie
Data Manager

Enclosure

cc: M. Slenska, Beazer (w/o enclosure)
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Site Copy

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT

FORMER KOPPERS WOOD-TREATING SITE
CARBONDALE, ILLINOIS

EPA ID No. ILD 000 819 946

Prepared for:

Beazer East, Inc.

Prepared by:

Field & Technical Services, LLC
200 Third Avenue
Carnegie, Pennsylvania 15106

February 29, 2012

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ABBREVIATIONS/ACRONYMS

AOC	Areas of Concern
Beazer	Beazer East, Inc.
BTEX	Benzene, Toluene, Ethylbenzene, and total Xylenes
CAMU	Corrective Action Management Unit
CZC	Chromated Zinc Chloride
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
FCAP	Fluoro-Chrome-Arsenate Phenol
FTS	Field & Technical Services, LLC
GMP	Groundwater Monitoring Plan
IEPA	Illinois Environmental Protection Agency
IGMP	Interim Groundwater Monitoring Program
IWQC	Illinois Water Quality Criteria
NAPL	Non-Aqueous Phase Liquid
Non-Com	Non-Combustible fire retardant
O&M	Operations and Maintenance
ORP	Oxygen Reduction Potential
PAHs	Polynuclear Aromatic Hydrocarbons
RCRA	Resource Conservation and Recovery Act
Site	Former Koppers Wood-Treating Site, North Marion Street, immediately northeast of Carbondale in Jackson County, Illinois (ILD 000 819 946)
SOP	Standard Operation Procedure
S.U.	Standard Units
TACO	Tiered Approach to Corrective Action Objectives (IEPA)
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

Field & Technical Services, LLC (FTS), on behalf of Beazer East, Inc. (Beazer), prepared this 2011 Annual Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Report for the Former Koppers Wood-Treating Site (Site) in Carbondale, Illinois. This report satisfies Beazer's obligations under the United States Environmental Protection Agency (USEPA) Administrative Order on Consent and the Illinois Environmental Protection Agency (IEPA) Consent Decree. The USEPA Identification Number for the Site is ILD 000 819 946, and the Illinois Site Inventory Number is 0778010002.

Beazer monitors Site groundwater on a semi-annual basis in accordance with the Interim Groundwater Monitoring Program (IGMP). The IGMP satisfies the requirements of the RCRA Interim Status closure and post-closure periods for the closed RCRA surface impoundments and was implemented in 1994 to evaluate Site-wide groundwater quality during the period between the completion of the remedial investigation and the initiation of remedial actions. The IEPA approved the original IGMP in January 1994, and the USEPA approved the revised IGMP in March 2001. Although remedial actions at the Site have been substantially completed, the IGMP will continue to be implemented until a long-term, post-remediation Groundwater Monitoring Plan (GMP) has been established. A proposed draft GMP was submitted to the USEPA on October 6, 2008.

This report provides a summary and evaluation of the groundwater monitoring data collected in 2011 and is organized into six sections.

- **Section 1** includes this introduction and report organization.
- **Section 2** reviews the Site background information, geology, and hydrogeology.
- **Section 3** presents information on the current monitoring program and well network at the Site, as well as field procedures.
- **Section 4** discusses the presence of non-aqueous phase liquid (NAPL), groundwater flow patterns and migration assessments, and vertical gradients at the Site.
- **Section 5** presents groundwater quality results.
- **Section 6** presents the conclusions and any proposed changes to the monitoring program.

2.0 SITE DESCRIPTION AND HISTORY

The Site is located on North Marion Street, immediately northeast of the city of Carbondale in Jackson County, Illinois. In approximately 1905, Ayer & Lord Tie Company began producing pressure-treated railroad crossties, utility poles, and other wood products at the Site. In 1940, Koppers Company purchased the facility. In 1944, Koppers Company was restructured and the Site became owned by Koppers Company, Inc. On December 29, 1988, Koppers Company, Inc. sold substantially all of its wood-treating business and assets, including the Carbondale Site and the "Koppers" name, to Koppers Industries, Inc., (now Koppers Inc.). On January 26, 1989, Koppers Company, Inc. changed its name to Beazer Materials and Services, Inc., and on April 16, 1990, that name was changed to Beazer East, Inc. (Beazer). In 2003, Koppers Industries, Inc. changed its name to Koppers Inc. Koppers Inc. ceased wood-treating operations at the Site in 1991 and conveyed the Site to Beazer on February 24, 1992. During the years of operation, a variety of chemicals were used at one time or another, including creosote, pentachlorophenol, fluoro-chrome-arsenate phenol (FCAP), chromated zinc chloride (CZC), and non-combustible fire retardant (Non-Com).

The USEPA and the IEPA identified the following eleven (11) areas of concern (AOCs) at the Site (as shown on Figure 1).

- Area 1 – the wood-treating cylinders
- Area 2 – the former sprayfield
- Area 3 – the drip track
- Area 4 – the former north drainage ditch
- Area 5 – the former wastepile area
- Area 6 – the former lagoon area
- Area 7 – the offsite spill area
- Area 8 – the service yard
- Area 9 – the storage tanks
- Area 10 – the closed RCRA surface impoundments
- Area 11 – the plant production area

Koppers Company discontinued use of the RCRA surface impoundment system (AOC 10) and sprayfield (AOC 2) in 1988, and excavated sludge and visibly impacted soil from within the impoundments for disposal in a permitted landfill. Beazer subsequently closed the surface impoundment system as a landfill (pursuant to the RCRA).

Beginning in 2004 and continuing through 2010, Beazer conducted various remediation activities as part of the RCRA corrective action program, including:

- Additional building/structure demolition in the former process area;
- The relocation of part of Glade Creek;
- The installation of a trench-based dense non-aqueous phase liquid (DNAPL) barrier near the former Glade Creek channel;
- Construction of a containment cell within a Corrective Action Management Unit (CAMU) to consolidate/manage various materials generated during the remediation activities;
- Excavation of waste piles, surficial "coal tar" materials and surficial soils from various areas at and south of the Site, including the Former North Drainage Ditch and surrounding area;
- Installation of a surface cover over the former Process Area and the Former Lagoon Area;
- Installation of a DNAPL recovery well at RW-23; and
- Excavation of visually impacted Glade Creek sediments.

Operation and maintenance (O&M) of the completed remedial components – including the DNAPL barrier, DNAPL recovery well, the wastewater treatment plant, and the CAMU containment cell – are being conducted. In addition to this O&M work, post-remediation groundwater monitoring is being conducted. A revised draft GMP was submitted to the USEPA on October 6, 2008, but has not yet been approved for implementation. In the interim, groundwater monitoring continues to be performed under the IGMP, with approved modifications to reflect current Site conditions and the status of the remediation activities.

2.1 SITE GEOLOGY

Site geology is characterized by unconsolidated, Pleistocene Age glacial sediments, which overlie Pennsylvanian Age bedrock. The glacial sediments are approximately 50 to 110 feet thick. The uppermost glacial sediments range from approximately 25 to 45 feet thick and average approximately 40 feet thick. In general, these glacial deposits consist of silty clay with trace sand and occasional sand lenses (not more than several inches thick).

Below the uppermost glacial sediments are the shallow (upper) glacial sediment deposits consisting of gray or dark brown uniform (massive) silty clay. These sediments are noted for their lack of sand particles, fracture joints, or bedding, and are also characterized by an occasional isolated clayey silt layer or peat deposit. This massive clay unit appears to be continuous across the Site and varies in thickness from approximately 10 to 30 feet.

The lower glacial sediment is gray, fine-to-medium sand with varying amounts of silt and occasional isolated silty clay lenses. This layer, situated just above bedrock, is encountered between 60 and 90 feet below ground surface and ranges from 15 to 40 feet thick.

Between the lower glacial sediment and the top of competent bedrock is a thin layer (up to several feet thick) of a very dense, variable color mixture of sand and gravel with significant amounts of clay and silt filling the coarse-grain voids. Particles of coal can be found within this layer, which is noticeably denser than the overlying materials.

The bedrock beneath the Site consists of Paleozoic Age sedimentary rock on the order of 10,000 feet thick. The bedrock surface beneath the Site is fairly flat with a slope of approximately 0.5 to 0.7 percent toward the northwest. The bedrock is predominantly light-to-dark shale with occasional thin layers of coal or limestone. The shale is thinly bedded, the coal and limestone layers are laminated, and all are moderately cemented.

2.2 SITE HYDROGEOLOGY

Groundwater at the Site exists in both the unconsolidated glacial deposits and in bedrock. Due to the vertical thickness and lithologic characteristics of the sediments, four monitoring intervals were identified. The intervals were designated as the A/B-, C-, D-, and E-units. The A/B- through D-units are monitoring intervals within the unconsolidated materials, and the E-unit is the monitoring interval within the uppermost portion of bedrock. These units correspond to the various geologic units identified above, as summarized in the following table:

Geologic Description	Reference Nomenclature	Comments
Glacial Uppermost Sediments	A/B-unit	The A-unit refers to the upper portion of the glacial deposit, including the water table and the unsaturated unit. The B-unit refers to the lower portion of the glacial deposit. The A- and B-units are considered one hydrogeologic unit (the A/B-unit) based on their similar nature and degree of interaction.
Shallow (Upper) Glacial Sediments	C-unit	The C-unit includes the massive silty clay layer.
Lower Glacial Sediments	D-unit	The D-unit includes a dense sand layer in addition to a sand and gravel layer and a weathered shale/residual soil layer.
Bedrock	E-unit	The E-unit is defined as competent bedrock.

The A/B-unit was originally designated as two separate units. However, review of historical information for the Site shows that, for the purposes of assessing groundwater movement and quality, the A- and B-units can be grouped into one hydrostratigraphic unit. Both units have similar water-transmitting properties and they are not separated by confining layers. Both units contain thin, discontinuous lenses of sand, although these lenses are more common in the B-unit but are not believed to significantly affect groundwater flow through the A/B-unit.

3.0 INTERIM GROUNDWATER MONITORING PROGRAM

FTS conducted the 2011 IGMP groundwater sampling events from February 7 through February 10, 2011, resampling on May 23, 2011 (See Section 5.7 for further details), and August 1 through August 4, 2011.

The current IGMP includes sampling of 48 wells plus gauging at all existing monitoring wells (currently 69), nine piezometers, six temporary piezometers, five surface water gauges, and two DNAPL barrier trench sumps. Figure 1 shows all monitoring locations (i.e., wells, piezometers, trench sumps, and surface water gauges). Table 1 identifies which monitoring locations were gauged and sampled during each 2011 semi-annual monitoring event. No changes to the IGMP occurred in 2011.

In February 2011, water levels were measured at 84 wells/piezometers and groundwater samples were collected from 48 wells (Table 1). Water-level measurements were also obtained at two DNAPL barrier trench sumps and four surface water gauges during the February 2011 event. Surface water gauge GC-1 was dry during the February 2011 sampling event.

In August 2011, water levels were measured at 84 wells/piezometers and groundwater samples were collected from 48 wells (Table 1). Water-level measurements were also obtained at two DNAPL barrier trench sumps and five surface water gauges during the August 2011 sampling event.

3.1 WELL GAUGING

At the beginning of each sampling event, FTS field technicians used an oil/water interface probe to gauge each well/piezometer for depth-to-water, depth-to-NAPL, and total well depth. If NAPL was detected, the technician confirmed its presence via a new, clear disposable bailer and, if applicable, measured its thickness. Prior to use at each well, the technician cleaned the oil/water interface probe using an Alconox™ solution and deionized water rinse. The disposable bailers were disposed of after a single use. The 2011 well gauging data are summarized in Tables 2 through 4.

3.2 WELL PURGING

Low-flow purging methods were used during both 2011 sampling events, in accordance with the updated Standard Operating Procedures (SOP) document titled "Low Flow (Minimal Drawdown) Groundwater Sampling Procedures," submitted to the USEPA on October 22, 2007. During the low-flow purging, groundwater was removed from each well using either a peristaltic pump, a stainless steel Monsoon submersible pump, or a stainless steel Hurricane pump and Teflon®-lined tubing.

Field measurements of water quality parameters (pH, dissolved oxygen [DO], oxygen reduction potential [ORP], specific conductivity, temperature, and turbidity) were measured while purging each well, using a YSI 556 multi-parameter meter and a La Motte 2020e or a Hanna turbidity meter. Field measurements were taken every three to five minutes. The field technicians recorded field observations on the groundwater sampling forms. Purging continued until field measurements had stabilized (i.e., three consecutive readings were obtained within the following criteria):

- ±0.1 standard units (S.U.) for pH;
- ±10% for DO;
- ±10 mv for ORP;
- ±3% for specific conductivity;
- ±0.1 degrees Celsius for temperature; and,
- ±10% for turbidity.

The field technicians cleaned the submersible pumps using the following procedures. Each pump had its own set of dedicated buckets for cleaning.

1) Wash in Alconox™ soap and deionized water
2) Rinse in deionized water
3) Rinse in acetone
4) Rinse in deionized water

3.3 GROUNDWATER SAMPLING

After the wells were purged, the technicians collected the groundwater samples. For wells that were purged dry, water levels were allowed to recover prior to sample collection. In accordance with the IGMP and low-flow sampling SOP, the FTS field crew collected groundwater samples using either a peristaltic pump, a stainless steel Monsoon submersible pump, or a stainless steel Hurricane pump and Teflon®-lined tubing. Samples collected for dissolved metals analysis were field-filtered using either a peristaltic pump, a stainless steel Monsoon submersible pump, or a stainless steel Hurricane pump equipped with a 0.45 micron filter and Teflon®-lined tubing. The samples were analyzed for the following constituents by TestAmerica (Pittsburgh, Pennsylvania):

- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) (USEPA SW-846 Method 8021B).

- Polynuclear aromatic hydrocarbons (PAHs) and pentachlorophenol (USEPA SW-846 Method 8270C/SIM).

- Total recoverable phenolics (USEPA SW-846 Method 9066).

- Total and dissolved arsenic, chromium, and copper (USEPA SW-846 Method 6010B).

3.4 MONITORING WELL INSPECTION

During the February 2011 event, a comprehensive well inspection was conducted, which included 69 wells, nine piezometers, six temporary piezometers, five surface water gauges, and two DNAPL barrier trench sumps. The technicians observed that the majority of the monitoring wells associated with the IGMP were in good condition, with only minor well repairs required. These minor well repairs were performed during or soon after the February 2011 event, and included relabeling wells. It was observed during the February 2011 well inspection that monitoring well OW-017D had a cracked pad and monitoring well OW-042B had a broken inner casing and a cracked pad. These monitoring wells were repaired in June 2011. The next comprehensive well inspection will be completed in conjunction with the first semi-annual monitoring event in 2012, and identified deficiencies will be addressed and repairs completed as necessary.

4.0 DNAPL DISTRIBUTION AND GROUNDWATER MIGRATION ASSESSMENT

4.1 NON-AQUEOUS PHASE LIQUIDS

As shown on Table 2, FTS observed measurable amounts of DNAPL in P-8A, OB23-04B, OW-205B, R-008A, R-013E and the south DNAPL barrier trench sump during both the February and August 2011 monitoring events. Additionally, a trace amount of DNAPL was observed in the north DNAPL barrier trench sump during the August 2011 monitoring event. Measured DNAPL thicknesses ranged from trace amount (north sump, August event) to 5.54 feet (OB23-04B, August event).

In 2011, DNAPL levels in R-013E were gauged on a monthly basis; DNAPL thicknesses ranged from 0.19 to 0.24 feet. Since May 2007, no appreciable amount of DNAPL has accumulated in R-013E; accordingly, none has been removed since that time.

Measurements of DNAPL thickness were also collected in wells P-8A, OW-205B, and R-008A throughout 2011. In well P-8A, DNAPL thicknesses ranged from 0.09 to 0.31 feet; no DNAPL was removed from P-8A in 2011. At well OW-205B, DNAPL thicknesses ranged from 0.55 to 0.98 feet in 2011. DNAPL was removed from well OW-205B on one occasion in 2011, yielding a volume of 0.33 gallons. In well R-008A, DNAPL thicknesses ranged from 0.24 to 3.01 feet. DNAPL was removed from R-008A on one occasion in 2011, yielding a volume of 1.75 gallons.

In late 2004, Beazer initiated DNAPL recovery from the south sump of the trench-based DNAPL barrier located near Glade Creek. In 2011, approximately 1,320 of DNAPL were recovered from the south sump. In June 2011, DNAPL was detected and recovery initiated in the north sump of the trench-based DNAPL barrier. In 2011, approximately 39 gallons of DNAPL were recovered from the north sump.

In late October 2005, Beazer initiated DNAPL recovery activities at recovery well RW-23, which is located in the former process area of the Site. Water is pumped from this well to increase the hydraulic gradient and draw DNAPL into the recovery well. DNAPL is pumped as it accumulates in the well. In 2011, approximately 594 gallons of DNAPL were recovered from RW-23.

4.2 GROUNDWATER FLOW PATTERNS

FTS used the depth-to-groundwater measurements from the A/B-, C-, D-, and E-unit monitoring wells, piezometers, and surface water gauges to calculate potentiometric surface elevations (Tables 3 and 4). These data were subsequently used to construct potentiometric surface maps and infer horizontal directions of groundwater flow in

each of the monitored units. Figures 2 through 9 provide the potentiometric surface maps for each unit during each semi-annual event. The potentiometric contours and associated flow patterns for both monitoring events are discussed below for each of the four hydrogeologic units.

4.2.1 A/B-UNIT

Figures 2 and 3 show the A/B-unit potentiometric contours for the 2011 February and August sampling events, respectively. Because localized vertical gradients exist within the A/B-unit, some well data may appear to conflict with the drawn A/B-unit contours or data from adjacent wells. Professional judgment was used to draw the contours in these locations. As shown on Figures 2 and 3, groundwater was mounded near the south central portion of the Site in both February and August. Groundwater in this portion of the Site generally moves outward from the center of the mound. The lateral extent of the drawdown cone developed by pumping at recovery well RW-23 (Figures 2 and 3) is expected to be small, given the low permeability of the A/B unit.

In the eastern portion of the Site, groundwater generally moves toward Glade Creek, which represents a discharge boundary in the unit. Groundwater flow patterns were consistent with previous observations, except that the anomalously high groundwater elevation at well OW-204A that was first noted in February 2009 occurred again in February 2010 and in February 2011. The measured groundwater elevation for this well in February 2011 is not used in the contouring shown on Figure 2. In 2012, Beazer will conduct investigations to assess the integrity of the well seal at OW-204A to determine if surface water (from precipitation or flooding) is preferentially migrating to the well screen, and to ultimately determine if this well needs to be repaired or replaced. Also in the eastern portion of the Site, the surface-water elevations for the two staff gauges that were installed (January 2010) to replace the existing gauges in the pond (i.e., Pond-1 and Pond-2) were anomalously low during the February 2011 event. These surface water gauges, as well as surface water gauge GC-1, were resurveyed on July 11, 2011. Surface water gauge GC-2 was unable to be accessed during the resurvey effort conducted on July 11, 2011; therefore, a second resurvey effort was conducted on December 23, 2011. The surface water elevations obtained from the resurvey efforts are provided in Table 4.

Historical groundwater and surface water elevation data indicate that Smith Ditch (a seasonal water body that flows to the north) changes between being a discharge and recharge feature for A/B-unit groundwater. In 2011, Smith Ditch appears to have been recharging groundwater during both monitoring events.

4.2.2 C-UNIT

Figures 4 and 5 show the C-unit potentiometric surfaces for the February and August 2011 sampling events, respectively. Because the C-unit acts as a confining unit between the A/B- and D-units, the direction of groundwater movement in the unit is predominantly vertical (downward); therefore, inferring groundwater flow directions from Figures 4 and 5 is not appropriate. The distributions of potentiometric head observed in the unit in 2011 are consistent with previous observations.

4.2.3 D-UNIT

Figures 6 and 7 show the D-unit potentiometric surfaces for the February and August 2011 sampling events, respectively. Throughout the Site, flow was generally to the north-northeast in both the February and August 2011 events. These groundwater elevations and flow patterns are consistent with previous observations.

4.2.4 E-UNIT

Figures 8 and 9 show the E-unit groundwater elevation contours for the February and August 2011 sampling events, respectively. During the February 2011 event, flow in the eastern portion of the Site was generally to the east. Flow in the western portion of the Site was to the northeast. Groundwater elevations observed in February 2011 were lower than those observed in February 2010.

During the August 2011 event, flow throughout the Site was generally to the east. August 2011 groundwater elevations were similar to those observed in August 2010 in the E-unit. Historical data show that there can be significant variations in the flow patterns for the E-unit.

4.3 GROUNDWATER MIGRATION ASSESSMENT

FTS calculated the average horizontal groundwater linear flow velocities (Table 5) for each sampling event using the Darcy flow equation:

$$\mathbf{V_L = \frac{K * i}{n_e}}$$

where:

V_L	=	average linear groundwater flow velocity
K	=	hydraulic conductivity
I	=	average horizontal hydraulic gradient
n_e	=	effective porosity

Horizontal gradients and linear groundwater velocities calculated using the 2011 groundwater elevation data for selected well pairs are summarized in Table 5. For February and August 2011, all of the average horizontal gradients (A/B-, C-, D-, and E-units) fall within the typical historical range as shown on Table 5.

It should be noted that constituent velocities will be less than the groundwater linear velocities presented in Table 5 because factors such as adsorption, dispersion, and biologic activity will retard the movement of dissolved constituents. Therefore, the groundwater linear velocity represents a conservatively high velocity when compared to constituent velocity.

4.4 VERTICAL HYDRAULIC GRADIENT

Vertical hydraulic gradients calculated using the 2011 groundwater elevation data for selected well pairs are presented in Table 6. A positive number indicates a downward gradient whereas a negative number indicates an upward gradient. An upward vertical gradient suggests that the vertical component of the groundwater flow will be from the lower to upper monitored interval. This potentially limits downward vertical migration of constituents. Figure 10 shows the calculated vertical gradient directions between the A-, B-, and C-units and between the D- and E-units. The overall results are similar to historical vertical gradients.

In the A/B-unit, groundwater flows downward and outward from the central portion of the Site (beneath the A/B-unit groundwater mound located near the former process area [Figures 2 and 3]), predominantly toward Glade Creek. Near Glade Creek, groundwater generally moves upward, discharging to the Creek as shown in the OW-044A/B well pair. In 2006 and 2008, Beazer installed additional wells closer to the new alignment of Glade Creek to monitor groundwater flow and constituent migration in this area.

The C-unit is an aquitard that is interpreted to separate the local groundwater flow system of the A/B-unit from a more regional flow system that includes the D- and E-units.

Groundwater flow in the D- and E-units is interpreted to be predominantly lateral beneath the Site. Vertical gradients between the D- and E-units vary spatially and seasonally and are likely controlled by spatial variability in hydraulic conductivity within the E-unit, and the degree of hydraulic communication between the D- and E-units.

5.0 GROUNDWATER QUALITY

TestAmerica analyzed the groundwater samples and FTS reviewed the resulting data for quality and completeness. Upon acceptance, FTS electronically transferred the data into a database for storage, reduction, and evaluation. Table 7 summarizes wells in which target analytes were detected during the 2011 groundwater monitoring events. Appendix A (Tables A-3 and A-4) summarizes the 2011 analytical results and compares them to applicable IEPA Tiered Approach to Corrective Action Objectives (TACO) Tier I groundwater standards. In doing so, data from D- and E-Unit wells are compared to Class I standards and data from A/B- and C-Unit wells are compared to Class II standards. Table 8 summarizes data that exceeded applicable TACO groundwater standards for the first and second semi-annual 2011 groundwater sampling events. Table 9 summarizes data collected from wells OW-041A, OW-41B, OW-205A, OW-206A, and OW-207A (located near Glade Creek) compared to the Illinois Water Quality Criteria (IWQC). Please note that the IWQC are not applicable to groundwater but comparison is being done as requested by USEPA.

5.1 FIELD MEASUREMENTS

The final field measurements collected during sampling are summarized in Appendix A (Tables A-1 and A-2). Field-measured specific conductivity, temperature, and pH data for 2011 are similar to those measured historically.

5.2 POLYNUCLEAR AROMATIC HYDROCARBONS

In accordance with the IGMP, TestAmerica analyzed the groundwater samples for 16 PAHs using USEPA SW-846 Method 8270C/SIM. The suite of PAHs consists of:

acenaphthene	benzo(g,h,i)perylene	fluorene
acenaphthylene	benzo(k)fluoranthene	indeno(1,2,3-cd)pyrene
anthracene	Chrysene	naphthalene
benzo(a)anthracene	dibenzo(a,h)anthracene	phenanthrene
benzo(a)pyrene	Fluoranthene	pyrene
benzo(b)fluoranthene		

Table 7 lists the wells with PAH detections and the range of total PAH detections for 2011. These results are similar to previous data in that low-level PAH detections appear sporadically in most wells.

As indicated in Table 8, one or more PAH concentrations in groundwater samples from wells OW-033E and OW-205A exceeded TACO groundwater standards in the first semi-annual 2011 event. Also, one PAH concentration in the groundwater sample from well OW-205A exceeded TACO groundwater standards in the second

semi-annual 2011 event. Well OW-205A was the only well to have exceedences in both sampling events. PAH results for all other wells/events were below the applicable TACO groundwater standards.

Low-level PAH exceedances observed in the February 2011 sample collected from well OW-033E are consistent with historical data for this well. PAHs have historically fluctuated in this well from non-detect to detections near standards. OW-33E only had minor exceedances observed from one of the sampling events conducted in 2011 and the same PAHs that exceeded standards during the first semi-annual sampling event were non-detect in the August 2011.

The exceedance of the TACO standard for naphthalene in the samples collected from OW-205A is consistent with historical data for this well.

5.3 PENTACHLOROPHENOL

Each groundwater sample was analyzed for pentachlorophenol using USEPA SW-846 Method 8270C. Table 7 shows there were no detections of pentachlorophenol in either sampling event for 2011. The pentachlorophenol results for 2011 are consistent with historical data.

5.4 VOLATILE ORGANIC COMPOUNDS

Groundwater samples were analyzed for BTEX using USEPA SW-846 Method 8021B. There were detections of BTEX in wells OW-027D, OW-201E, and OW-205A during the February 2011 event and in wells OW-039DR and OW-205A during the August 2011 event as shown in Table 7; however, there were no exceedances of the applicable TACO groundwater standards, as shown in Table 8. The VOC results for 2011 are consistent with historical data.

5.5 METALS

Each IGMP groundwater sample was analyzed for total (unfiltered) and dissolved (filtered) arsenic, chromium, and copper by USEPA SW-846 Method 6010B. As presented in Table 8, dissolved arsenic in well OW-026A was the only metal that exceeded an applicable TACO standard for both either sampling event. All other detections were below the applicable TACO groundwater standards. The metals results for 2011 are consistent with historical data.

5.6 TOTAL RECOVERABLE PHENOLICS

Groundwater samples were analyzed for total recoverable phenolics using USEPA SW-846 Method 9066. Table 7 lists the wells with detections and the range of results. Total recoverable phenolics were detected in samples from both 2011 events. The total recoverable phenolics results for the 2011 sampling events are similar to those reported historically, in that low-level total recoverable phenolics detections occur sporadically. There are no TACO Tier I groundwater standards for total recoverable phenolics.

5.7 DATA QUALITY

Field and laboratory data quality control measures were implemented as required by the IGMP. All of the necessary data qualifiers were added to the Site database and are presented in the data summary tables provided in Appendix A (Tables A-3 and A-4). Data Evaluation Reports are included in Appendix B. While some qualifiers were added to the data, none of the data were rejected based on evaluation of the quality control data.

The PAH detections observed in monitoring wells OW-26A, OW-27A, OW-40D, OW-201E, and R-014D during the February 2011 sampling event were not consistent with prior data for these wells. These monitoring wells were resampled on May 23, 2011. The results of the resampling of monitoring wells OW-26A, OW-27A, OW-40D, OW-201E, and R-014D for PAHs were consistent with historical results, confirming that the February 2011 detections were anomalous and likely due to laboratory contamination. The May 23, 2011 PAH results for monitoring wells OW-26A, OW-27A, OW-40D, OW-201E, and R-014D are presented in this submittal.

6.0 CONCLUSIONS AND CHANGES TO THE INTERIM GROUNDWATER MONITORING PROGRAM

Beazer has evaluated the 2011 IGMP data and reached the following conclusions:

- The 2011 groundwater flow directions and velocities for each monitored interval were similar to those reported historically.

- DNAPL was present in seven of the 91 Site monitoring points (OB23-04B, OW-205B, P-8A, R-008A, R-013E, north sump, and the south sump). The 91 locations are comprised of 84 wells/piezometers, five surface water gauges, and two trench sumps (north sump and south sump).

- The 2011 groundwater quality data are generally consistent with historical results.

- To further investigate the anomalously high groundwater elevations at OW-204A, Beazer will conduct investigations to assess the integrity of the well seal at OW-204A to determine if surface water (from precipitation or flooding) is preferentially migrating to the well screen, and to ultimately determine if this well needs to be repaired or replaced.

Beazer submitted a draft long-term, post-remediation GMP to the USEPA on November 16, 2007. Beazer and the USEPA discussed the draft GMP during a July 2008 meeting, and a revised draft GMP was submitted to the USEPA on October 6, 2008. The GMP proposes several modifications to the current IGMP, and will be implemented following approval by the USEPA. In the interim, groundwater monitoring will continue to be performed under the IGMP.

TABLES

Table 1
Summary of IGMP Program
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well Identification	2011 First Semi-Annual Event		2011 Second Semi-Annual Event	
	Gauged	Sampled	Gauged	Sampled
DNAPL Barrier Trench Sumps				
North Sump	X	---	X	---
South Sump	X	---	X	---
Surface Water Gauges				
GC-1	DRY	---	X	---
GC-2	X	---	X	---
Pond-1	X	---	X	---
Pond-2	X	---	X	---
Smith-1	X	---	X	---
A-Unit				
OW-003A	X	---	X	---
OW-017A	X	X	X	X
OW-026A	X	X	X	X
OW-027A	X	X	X	X
OW-031A	X	X	X	X
OW-041A	X	X	X	X
OW-044A	X	---	X	---
OW-202A	X	X	X	X
OW-203A	X	X	X	X
OW-204A	X	X	X	X
OW-205A	X	X	X	X
OW-206A	X	X	X	X
OW-207A	X	X	X	X
P-2	X	---	X	---
P-3	X	---	X	---
P-4A	X	---	X	---
P-6A	X	---	X	---
P-7A	X	---	X	---
P-8A	X	---	X	---
R-008A	X	---	X	---
R-013A	X	X	X	X
TP-5A	X	---	X	---
TP-11A	X	---	X	---
TP-12A	X	---	X	---
TP-13A	X	---	X	---
TP-14A	X	---	X	---
TP-15A	X	---	X	---
B-Unit				
OB23-04B	X	---	X	---
OW-010B	X	X	X	X
OW-022BR	X	X	X	X
OW-035B	X	X	X	X
OW-036B	X	X	X	X
OW-037B	X	X	X	X
OW-039BR2	X	X	X	X
OW-040B	X	X	X	X
OW-041B	X	X	X	X
OW-042B	X	X	X	X
OW-043B	X	---	X	---
OW-044B	X	---	X	---
OW-102B	X	X	X	X
OW-202B	X	X	X	X
OW-204B	X	X	X	X
OW-205B	X	---	X	---
P-5B	X	---	X	---
P-6B	X	---	X	---
P-7B	X	---	X	---
S-003B	X	---	X	---

Table 1 (Continued)
Summary of IGMP Program
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well Identification	2011 First Semi-Annual Event		2011 Second Semi-Annual Event	
	Gauged	Sampled	Gauged	Sampled
C-Unit				
OW-017C	X	X	X	X
OW-023C	X	X	X	X
OW-027C	X	---	X	---
OW-035C	X	X	X	X
OW-036C	X	---	X	---
R-013C	X	---	X	---
R-014C	X	X	X	X
D-Unit				
A-008D	X	---	X	---
OW-010D	X	---	X	---
OW-012D	X	X	X	X
OW-017D	X	---	X	---
OW-023D	X	X	X	X
OW-027D	X	X	X	X
OW-035DR	X	X	X	X
OW-036D	X	---	X	---
OW-037D	X	X	X	X
OW-039DR	X	X	X	X
OW-040D	X	X	X	X
OW-041D	X	X	X	X
OW-042DR	X	---	X	---
OW-044D	X	X	X	X
OW-102D	X	X	X	X
OW-202D	X	X	X	X
R-013D	X	---	X	---
R-014D	X	X	X	X
E-Unit				
A-008E	X	---	X	---
OW-003E	X	---	X	---
OW-012E	X	---	X	---
OW-027E	X	X	X	X
OW-033E	X	X	X	X
OW-035E	X	X	X	X
OW-039ER	X	X	X	X
OW-102E	X	X	X	X
OW-200E	X	X	X	X
OW-201E	X	X	X	X
R-013E	X	---	X	---
R-014E	X	X	X	X
Totals	**90**	**48**	**91**	**48**

Notes:
"X" indicates field applies to that well
"---" indicates field does not apply to that well
"NM" indicates well was not gauged

Table 2
Summary of 2011 DNAPL Thickness Measurements
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well Identification	First Semi-Annual (February 7, 2011)			Second Semi-Annual (August 1, 2011)		
	Depth to DNAPL (Feet TOC)	Total Well Depth (Feet TOC)	DNAPL Thickness (Feet)	Depth to DNAPL (Feet TOC)	Total Well Depth (Feet TOC)	DNAPL Thickness (Feet)
P-8A	18.10	18.19	0.09	18.00	18.20	0.20
R-008A	13.59	16.60	3.01	16.14	16.60	0.46
OB23-04B	51.92	53.48	1.56	46.41	51.95	5.54
OW-205B	30.51	31.10	0.59	30.55	31.10	0.55
R-013E	134.79	135.01	0.22	134.79	135.00	0.21
South Sump	49.81	51.30	1.49	50.11	51.30	1.19
North Sump	ND	ND	ND	51.40	51.40	Trace

Notes:
feet TOC - feet below top of casing
ND - DNAPL not detected

Table 3
Summary of Groundwater Elevations
February 7, 2011
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well	Gauging Date	Measuring Point Elevation (Feet msl)	Top of Screen Elevation (Feet msl)	Bottom of Screen Elevation (Feet msl)	Depth to Groundwater (Feet TOC)	Groundwater/ Surface Water Elevation (Feet msl)
DNAPL Barrier Trench Sumps						
North Sump	07-Feb-11	378.67	NA	NA	8.71	369.96
South Sump	07-Feb-11	377.01	NA	NA	7.51	369.50
Surface Water Gauges						
Pond-1	07-Feb-11	369.88	NA	NA	4.96	364.92
Pond-2	07-Feb-11	369.72	NA	NA	0.88	368.84
GC-1	07-Feb-11	369.02	NA	NA	Dry	NM
GC-2	07-Feb-11	363.06	NA	NA	0.45	362.61
Smith-1	07-Feb-11	388.90	NA	NA	4.31	384.59
A-Unit						
OW-003A	07-Feb-11	380.36	372.58	362.58	5.22	375.14
OW-017A	07-Feb-11	393.93	385.80	375.80	11.45	382.48
OW-026A	07-Feb-11	399.56	382.00	372.00	9.73	389.83
OW-027A	07-Feb-11	391.69	383.00	373.00	7.04	384.65
OW-031A	07-Feb-11	399.00	388.80	378.80	7.49	391.51
OW-041A	07-Feb-11	375.52	368.02	358.02	6.45	369.07
OW-044A	07-Feb-11	378.35	362.10	352.10	8.75	369.60
OW-202A	07-Feb-11	394.73	390.25	380.25	2.76	391.97
OW-203A	07-Feb-11	376.89	369.39	359.39	9.23	367.66
OW-204A	07-Feb-11	380.64	373.14	363.14	3.29	377.35
OW-205A	07-Feb-11	372.80	360.30	350.30	4.22	368.58
OW-206A	07-Feb-11	368.62	362.27	352.27	2.27	366.35
OW-207A	07-Feb-11	371.91	364.74	354.74	4.79	367.12
P-2	07-Feb-11	376.38	NA	NA	7.00	369.38
P-3	07-Feb-11	372.69	NA	NA	7.51	365.18
P-4A	07-Feb-11	376.64	369.14	359.14	3.35	373.29
P-6A	07-Feb-11	376.58	369.09	359.08	9.79	366.79
P-7A	07-Feb-11	377.84	370.34	360.34	6.90	370.94
P-8A	07-Feb-11	377.49	370.00	360.00	7.10	370.39
TP-5A	07-Feb-11	381.81	372.01	362.01	13.38	368.43
TP-11A	07-Feb-11	375.58	365.68	355.68	3.07	372.51
TP-12A	07-Feb-11	374.04	369.04	359.04	4.98	369.06
TP-13A	07-Feb-11	375.85	370.95	360.95	3.21	372.64
TP-14A	07-Feb-11	372.25	367.25	357.25	3.20	369.05
TP-15A	07-Feb-11	372.82	367.72	357.72	3.53	369.29
R-008A	07-Feb-11	387.89	381.10	371.10	2.52	385.37
R-013A	07-Feb-11	387.68	379.92	369.92	4.01	383.67
B-Unit						
OB23-04B	07-Feb-11	401.34	361.41	351.41	14.21	387.13
OW-010B	07-Feb-11	381.47	344.00	334.00	10.36	371.11
OW-022BR	07-Feb-11	395.97	361.24	351.24	6.90	389.07
OW-035B	07-Feb-11	399.35	371.50	361.50	10.01	389.34
OW-036B	07-Feb-11	396.78	360.90	350.90	18.81	377.97
OW-037B	07-Feb-11	394.74	361.20	351.20	4.69	390.05
OW-039BR2	07-Feb-11	382.69	365.19	355.19	15.69	367.00
OW-040B	07-Feb-11	377.91	342.20	332.20	11.24	366.67
OW-041B	07-Feb-11	375.16	333.90	323.90	5.90	369.26
OW-042B	07-Feb-11	388.68	357.65	347.65	5.01	383.67
OW-043B	07-Feb-11	394.38	363.90	353.90	11.16	383.22
OW-044B	07-Feb-11	378.78	342.10	332.10	8.78	370.00
OW-102B	07-Feb-11	397.19	364.00	354.00	7.41	389.78
OW-202B	07-Feb-11	395.26	365.37	355.37	8.02	387.24
OW-204B	07-Feb-11	381.04	363.54	353.54	13.64	367.40
OW-205B	07-Feb-11	373.37	350.87	340.87	7.15	366.22
P-5B	07-Feb-11	382.05	361.55	351.55	14.71	367.34
P-6B	07-Feb-11	376.51	359.01	349.01	9.96	366.55
P-7B	07-Feb-11	377.63	360.13	350.13	7.95	369.68
S-003B	07-Feb-11	392.19	362.30	352.30	7.80	384.39

Table 3 (Continued)
Summary of Groundwater Elevations
February 7, 2011
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well	Gauging Date	Measuring Point Elevation (Feet msl)	Top of Screen Elevation (Feet msl)	Bottom of Screen Elevation (Feet msl)	Depth to Groundwater (Feet TOC)	Groundwater/ Surface Water Elevation (Feet msl)
C-Unit						
OW-017C	07-Feb-11	393.31	322.91	312.91	20.42	372.89
OW-023C	07-Feb-11	401.43	313.97	303.97	28.43	373.00
OW-027C	07-Feb-11	391.14	320.53	310.53	17.86	373.28
OW-035C	07-Feb-11	400.02	313.30	303.30	27.25	372.77
OW-036C	07-Feb-11	396.93	311.27	301.27	25.51	371.42
R-013C	07-Feb-11	388.58	321.23	311.23	16.03	372.55
R-014C	07-Feb-11	393.35	321.30	311.30	19.93	373.42
D-Unit						
A-008D	07-Feb-11	388.71	279.30	269.30	16.31	372.40
OW-010D	07-Feb-11	382.19	296.58	286.58	11.69	370.50
OW-012D	07-Feb-11	395.82	286.70	276.70	23.95	371.87
OW-017D	07-Feb-11	394.08	291.05	281.05	21.57	372.51
OW-023D	07-Feb-11	401.42	287.81	272.81	28.81	372.61
OW-027D	07-Feb-11	391.40	278.53	268.53	18.97	372.43
OW-035DR	07-Feb-11	399.32	280.84	270.84	26.63	372.69
OW-036D	07-Feb-11	397.28	287.71	277.71	26.46	370.82
OW-037D	07-Feb-11	395.07	281.57	271.57	22.37	372.70
OW-039DR	07-Feb-11	381.85	284.35	274.35	12.05	369.80
OW-040D	07-Feb-11	377.68	291.40	281.40	7.64	370.04
OW-041D	07-Feb-11	376.68	294.10	284.10	6.29	370.39
OW-042DR	07-Feb-11	390.45	280.30	270.30	18.06	372.39
OW-044D	07-Feb-11	379.01	283.80	273.80	9.76	369.25
OW-102D	07-Feb-11	396.85	288.80	278.80	24.11	372.74
OW-202D	07-Feb-11	395.10	303.32	293.32	21.41	373.69
R-013D	07-Feb-11	387.03	280.91	270.91	14.62	372.41
R-014D	07-Feb-11	393.44	276.90	266.90	21.06	372.38
E-Unit						
A-008E	07-Feb-11	388.61	255.90	245.90	16.50	372.11
OW-003E	07-Feb-11	378.10	270.16	260.16	7.33	370.77
OW-012E	07-Feb-11	395.76	262.71	252.71	22.97	372.79
OW-027E	07-Feb-11	390.98	263.46	253.46	18.54	372.44
OW-033E	07-Feb-11	398.77	265.50	255.50	26.41	372.36
OW-035E	07-Feb-11	399.19	265.81	255.81	26.68	372.51
OW-039ER	07-Feb-11	382.04	261.54	251.54	11.65	370.39
OW-102E	07-Feb-11	396.91	264.80	254.80	22.74	374.17
OW-200E	07-Feb-11	387.47	262.89	252.89	15.48	371.99
OW-201E	07-Feb-11	389.69	264.30	254.30	17.25	372.44
R-013E	07-Feb-11	387.22	262.24	252.24	14.15	373.07
R-014E	07-Feb-11	392.87	259.46	249.46	20.69	372.18

Notes:
Feet msl - feet above mean sea level
Feet TOC - feet below top of casing
NA - not applicable or not available
NM - not measured or could not be located

Table 4
Summary of Groundwater Elevations
August 1, 2011
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well	Gauging Date	Measuring Point Elevation (Feet msl)	Top of Screen Elevation (Feet msl)	Bottom of Screen Elevation (Feet msl)	Depth to Groundwater / Surface Water (Feet TOC)	Groundwater/ Surface Water Elevation (Feet msl)
DNAPL Barrier Trench Sumps						
North Sump	01-Aug-11	378.67	NA	NA	8.01	370.66
South Sump	01-Aug-11	377.01	NA	NA	6.81	370.20
Surface Water Gauges						
Pond-1*	01-Aug-11	369.93	NA	NA	1.41	368.52
Pond-2*	01-Aug-11	369.78	NA	NA	1.11	368.67
GC-1*	01-Aug-11	368.89	NA	NA	1.78	367.11
GC-2**	01-Aug-11	363.16	NA	NA	0.54	362.62
Smith-1	01-Aug-11	388.90	NA	NA	3.25	385.65
A-Unit						
OW-003A	01-Aug-11	380.36	372.58	362.58	3.79	376.57
OW-017A	01-Aug-11	393.93	385.80	375.80	10.48	383.45
OW-026A	01-Aug-11	399.56	382.00	372.00	8.25	391.31
OW-027A	01-Aug-11	391.69	383.00	373.00	7.73	383.96
OW-031A	01-Aug-11	399.00	388.80	378.80	6.98	392.02
OW-041A	01-Aug-11	375.52	368.02	358.02	6.69	368.83
OW-044A	01-Aug-11	379.20	362.10	352.10	7.61	371.59
OW-202A	01-Aug-11	394.73	390.25	380.25	6.46	388.27
OW-203A	01-Aug-11	376.89	369.39	359.39	6.74	370.15
OW-204A*	01-Aug-11	380.76	373.14	363.14	10.42	370.34
OW-205A	01-Aug-11	372.80	360.30	350.30	4.19	368.61
OW-206A	01-Aug-11	368.62	362.27	352.27	3.65	364.97
OW-207A	01-Aug-11	371.91	364.74	354.74	5.65	366.26
P-2	01-Aug-11	376.38	NA	NA	7.56	368.82
P-3	01-Aug-11	372.69	NA	NA	6.60	366.09
P-4A	01-Aug-11	376.64	369.14	359.14	5.56	371.08
P-6A	01-Aug-11	376.58	369.09	359.08	7.14	369.44
P-7A	01-Aug-11	377.84	370.34	360.34	6.30	371.54
P-8A	01-Aug-11	377.49	370.00	360.00	4.69	372.80
TP-5A	01-Aug-11	381.81	372.01	362.01	10.54	371.27
TP-11A	01-Aug-11	375.58	365.68	355.68	4.20	371.38
TP-12A	01-Aug-11	374.04	369.04	359.04	5.59	368.45
TP-13A	01-Aug-11	375.85	370.95	360.95	7.09	368.76
TP-14A	01-Aug-11	372.25	367.25	357.25	4.99	367.26
TP-15A	01-Aug-11	372.82	367.72	357.72	5.72	367.10
R-008A	01-Aug-11	387.89	381.10	371.10	6.99	380.90
R-013A	01-Aug-11	387.68	379.92	369.92	4.75	382.93
B-Unit						
OB23-04B	01-Aug-11	401.34	361.41	351.41	15.44	385.90
OW-010B	01-Aug-11	381.47	344.00	334.00	8.11	373.36
OW-022BR	01-Aug-11	395.97	361.24	351.24	6.05	389.92
OW-035B	01-Aug-11	399.35	371.50	361.50	8.90	390.45
OW-036B	01-Aug-11	396.78	360.90	350.90	14.93	381.85
OW-037B	01-Aug-11	394.74	361.20	351.20	4.35	390.39
OW-039BR2	01-Aug-11	382.69	365.19	355.19	13.64	369.05
OW-040B	01-Aug-11	377.91	342.20	332.20	9.49	368.42
OW-041B	01-Aug-11	375.16	333.90	323.90	5.45	369.71
OW-042B	01-Aug-11	388.68	357.65	347.65	2.87	385.81
OW-043B	01-Aug-11	394.38	363.90	353.90	8.65	385.73
OW-044B	01-Aug-11	378.78	342.10	332.10	6.43	372.35
OW-102B	01-Aug-11	397.19	364.00	354.00	7.42	389.77
OW-202B	01-Aug-11	395.26	365.37	355.37	9.20	386.06
OW-204B	01-Aug-11	381.04	363.54	353.54	10.53	370.51
OW-205B	01-Aug-11	373.37	350.87	340.87	3.69	369.68
P-5B	01-Aug-11	382.05	361.55	351.55	12.22	369.83
P-6B	01-Aug-11	376.51	359.01	349.01	6.31	370.20
P-7B	01-Aug-11	377.63	360.13	350.13	2.67	374.96
S-003B	01-Aug-11	392.19	362.30	352.30	4.10	388.09

Table 4 (Continued)
Summary of Groundwater Elevations
August 1, 2011
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well	Gauging Date	Measuring Point Elevation (Feet msl)	Top of Screen Elevation (Feet msl)	Bottom of Screen Elevation (Feet msl)	Depth to Groundwater / Surface Water (Feet TOC)	Groundwater/ Surface Water Elevation (Feet msl)
C-Unit						
OW-017C	01-Aug-11	393.31	322.91	312.91	16.35	376.96
OW-023C	01-Aug-11	401.43	313.97	303.97	24.44	376.99
OW-027C	01-Aug-11	391.14	320.53	310.53	13.85	377.29
OW-035C	01-Aug-11	400.02	313.30	303.30	23.25	376.77
OW-036C	01-Aug-11	396.93	311.27	301.27	21.11	375.82
R-013C	01-Aug-11	388.58	321.23	311.23	11.87	376.71
R-014C	01-Aug-11	393.35	321.30	311.30	15.89	377.46
D-Unit						
A-008D	01-Aug-11	388.71	279.30	269.30	12.12	376.59
OW-010D	01-Aug-11	382.19	296.58	286.58	7.14	375.05
OW-012D	01-Aug-11	395.82	286.70	276.70	19.58	376.24
OW-017D	01-Aug-11	394.08	291.05	281.05	17.45	376.63
OW-023D	01-Aug-11	401.42	287.81	272.81	24.63	376.79
OW-027D	01-Aug-11	391.40	278.53	268.53	14.85	376.55
OW-035DR	01-Aug-11	399.32	280.84	270.84	22.51	376.81
OW-036D	01-Aug-11	397.28	287.71	277.71	21.76	375.52
OW-037D	01-Aug-11	395.07	281.57	271.57	18.26	376.81
OW-039DR	01-Aug-11	381.85	284.35	274.35	7.28	374.57
OW-040D	01-Aug-11	377.68	291.40	281.40	2.94	374.74
OW-041D	01-Aug-11	376.68	294.10	284.10	1.79	374.89
OW-042DR	01-Aug-11	390.45	280.30	270.30	13.99	376.46
OW-044D	01-Aug-11	379.89	283.80	273.80	4.98	374.91
OW-102D	01-Aug-11	396.85	288.80	278.80	19.96	376.89
OW-202D	01-Aug-11	395.10	303.32	293.32	17.50	377.60
R-013D	01-Aug-11	387.03	280.91	270.91	10.50	376.53
R-014D	01-Aug-11	393.44	276.90	266.90	16.86	376.58
E-Unit						
A-008E	01-Aug-11	388.61	255.90	245.90	12.41	376.20
OW-003E	01-Aug-11	378.10	270.16	260.16	2.81	375.29
OW-012E	01-Aug-11	395.76	262.71	252.71	19.54	376.22
OW-027E	01-Aug-11	390.98	263.46	253.46	14.41	376.57
OW-033E	01-Aug-11	398.77	265.50	255.50	22.35	376.42
OW-035E	01-Aug-11	399.19	265.81	255.81	22.55	376.64
OW-039ER	01-Aug-11	382.04	261.54	251.54	7.35	374.69
OW-102E	01-Aug-11	396.91	264.80	254.80	21.09	375.82
OW-200E	01-Aug-11	387.47	262.89	252.89	11.30	376.17
OW-201E	01-Aug-11	389.69	264.30	254.30	13.20	376.49
R-013E	01-Aug-11	387.22	262.24	252.24	10.62	376.60
R-014E	01-Aug-11	392.87	259.46	249.46	16.86	376.01

Notes:
Feet msl - feet above mean sea level
Feet TOC - feet below top of casing
NA - not applicable or not available
* Measuring Point Elevations were surveyed on July 11, 2011 by Shawnee Survey & Consulting, Inc.

Table 5
2011 Average Horizontal Groundwater Flow Velocities
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

First Semi-Annual (February 7, 2011)					Second Semi-Annual (August 1, 2011)				
Well Pair	**Horizontal Distance (feet)**	**Elevation Difference (feet)**	**Hydraulic Gradient (feet/feet)**	**Linear Flow Velocity (feet/day)**	**Well Pair**	**Horizontal Distance (feet)**	**Elevation Difference (feet)**	**Hydraulic Gradient (feet/feet)**	**Linear Flow Velocity (feet/day)**
A/B-Unit -- k=7.92E-7 ft/sec (6.8E-02 ft/day), n_e = 0.10, V_L = 3.8 E-3 to 1.45E-2 ft/day Typical historical hydraulic gradient: 0.004 to 0.020 ft/ft									
OW-031A to OW-042B	660	7.84	0.012	8.1E-03	OW-31A to OW-042B	660	6.21	0.009	6.4E-03
OW-017A to OW-003A	1050	7.34	0.007	4.8E-03	OW-017A to OW-003A	1050	6.88	0.007	4.5E-03
		Average	**0.009**	**6.4E-03**			**Average**	**0.008**	**5.4E-03**
C-Unit -- k=4.58E-8 ft/sec (3.95E-03 ft/day), n_e = 0.05, V_L = 8.24E-5 to 2.19E-4 ft/day Typical historical hydraulic gradient: 0.002 to 0.003 ft/ft									
R-014C to R-013C	240	0.87	0.0036	2.9E-04	R-014C to R-013C	240	0.75	0.0031	2.5E-04
OW-017C to OW-036C	860	1.47	0.0017	1.4E-04	OW-017C to OW-036C	860	1.14	0.0013	1.0E-04
		Average	**0.0027**	**2.1E-04**			**Average**	**0.0022**	**1.8E-04**
D-Unit -- k=1.85E-05 ft/sec (1.6 ft/day), n_e = 0.20, V_L = 6.5E-3 to 1.97E-2 ft/day Typical historical hydraulic gradient: 0.001 to 0.003 ft/ft									
OW-202D to OW-037D	1446	0.99	0.0007	5.5E-03	OW-202D to OW-037D	1446	0.79	0.0005	4.4E-03
OW-017D to OW-010D	1247	2.01	0.0016	1.3E-02	OW-017D to OW-010D	1247	1.58	0.0013	1.0E-02
		Average	**0.0011**	**9.2E-03**			**Average**	**0.0009**	**7.3E-03**
E-Unit -- k=5.33E-06 ft/sec (4.61E-01 ft/day), n_e = 0.05, V_L = 8.57E-3 to 1.7E-2 ft/day Typical historical hydraulic gradient: 0.002 to 0.004 ft/ft									
OW-102E to OW-033E	532	1.81	0.0034	3.1E-02	OW-035E to OW-0102E	940	0.82	0.0009	8.0E-03
OW-012E to OW-003E	500	2.02	0.0040	3.7E-02	OW-012E to OW-003E	500	0.93	0.0019	1.7E-02
		Average	**0.0037**	**3.4E-02**			**Average**	**0.0014**	**1.3E-02**

Notes:

v = (k * i) / ne

Where:

v = velocity

k = hydraulic conductivity

i = hydraulic gradient

ne = effective porosity

V_L = typical linear flow velocity of Unit

Table 6
2011 Vertical Hydraulic Gradients at Selected Well Clusters
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well Cluster	Vertical Gradient (feet/feet)	
	First Semi-Annual	Second Semi-Annual
A- and B-Unit to C-Unit		
OW-017A TO OW-017C	1.5E-01	1.0E-01
OW-027A TO OW-027C	1.8E-01	1.1E-01
OW-035B TO OW-035C	2.8E-01	2.4E-01
OW-036B TO OW-036C	1.3E-01	1.2E-01
OW-044A TO OW-044B	-2.0E-02	-3.8E-02
R-013A TO R-013C	1.9E-01	1.1E-01
D-Unit to E-Unit		
A-008D TO A-008E	1.2E-02	1.7E-02
OW-012D TO OW-012E	-3.8E-02	8.3E-04
OW-027D TO OW-027E	-6.6E-04	-1.3E-03
OW-035DR TO OW-035E	1.2E-02	1.1E-02
OW-102D TO OW-102E	-6.0E-02	4.5E-02
R-013D TO R-013E	-3.5E-02	-3.7E-03
R-014D TO R-014E	1.1E-02	3.3E-02

Notes:
Positive values indicate a downward vertical gradient.
Negative values indicate an upward vertical gradient.
The vertical gradient is calculated using the following equation:

$i_v = (GWE_{shallow} - GWE_{deep}) / (Mp_{shallow} - Mp_{deep})$

where:

i_v = vertical gradient
$GWE_{shallow}$ = groundwater elevation of the shallow well
GWE_{deep} = groundwater elevation of the deep well
$Mp_{shallow}$ = elevation of the midpoint of the shallow well screen
Mp_{deep} = elevation of the midpoint of the deep well screen

Table 7
2011 Summary of Wells with Detections
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Constituent	Wells Detected		Lowest Detected Concentration (sample, event)	Highest Detected Concentration (sample, event)
	First Semi-Annual	Second Semi-Annual		
Total PAHs [(a)]	OW-022BR OW-026A OW-033E OW-035B OW-037D OW-039DR OW-039ER OW-040B OW-042B OW-044D OW-200E OW-205A R-013A R-014E	OW-026A OW-035DR OW-035E OW-200E OW-201E OW-205A R-014E	0.21 (OW-040B, 1st)	2925.2 (OW-205A, 2nd)
Pentachlorophenol	None	None	None	None
BTEX [(b)]	OW-027D OW-027D DUP OW-201E OW-205A	OW-039DR OW-039DR DUP OW-205A	1.9 (OW-027D DUP, 1st)	61.6 (OW-205A, 1st)
Arsenic (Dissolved)	OW-017C OW-023C OW-026A OW-027A OW-035C OW-041B OW-041D OW-202D OW-202D DUP	OW-023C OW-026A OW-027A OW-027A DUP OW-041B OW-041D OW-202D R-014C	11 (OW-027A, 1st)	330 (OW-026A, 2nd)
Arsenic (Total)	OW-017C OW-023C OW-026A OW-027A OW-035C OW-041B OW-041D OW-202D OW-202D DUP R-014C	OW-017C OW-023C OW-026A OW-027A OW-027A DUP OW-041B OW-041D OW-202D OW-205A R-014C	10 (R-014C, 2nd)	300 (OW-026A, 2nd)
Chromium (Dissolved)	OW-102B OW-203A OW-204B	OW-204B	9.2 (OW-204B, 2nd)	165 (OW-203A, 1st)
Chromium (Total)	OW-010B OW-017C OW-022BR OW-023C OW-027E OW-033E OW-037B OW-039BR2 OW-040B OW-041A OW-044D OW-102B OW-202B OW-203A OW-204A OW-204B OW-206A OW-207A	OW-010B OW-017C OW-022BR OW-023C OW-033E OW-039BR2 OW-041A OW-102B OW-202D OW-203A OW-204A OW-204B OW-207A	5.3 (OW-027E, 1st)	1500 (OW-203A, 2nd)
Copper (Dissolved)	None	None	None	None
Copper (Total)	None	None	None	None
Total Recoverable Phenolics	OW-027A OW-027D DUP OW-027E OW-035E OW-037B OW-037D OW-039BR2 OW-041B OW-200E OW-201E OW-202A OW-204A OW-205A	OW-017A OW-023D OW-023D DUP OW-026A OW-027E OW-031A OW-035B OW-035E OW-036B OW-039DR OW-039DR DUP OW-102D OW-102E OW-202B OW-205A R-013A	0.01 (OW-037B, OW-202A, 1st; OW-023D, OW-102D, 2nd)	0.14 (OW-035E, 2nd)

Notes:

[(a)] Wells in which at least one PAH compound was detected. Concentrations listed are total PAHs.

[(b)] Wells in which at least one BTEX compound was detected. Concentrations listed are total BTEX.

Table 8
Summary of TACO Tier 1 Exceedances
First and Second Semi-Annual 2011 Sampling Events
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility - Carbondale, Illinois

Well	Parameter	Sample Result (ug/L)	TACO Class I (D- and E-Unit Wells)	TACO Class II (A/B and C-Unit Wells)
First Semi-Annual Sampling Event				
TACO Tier 1 Exceedance				
OW-026A	Arsenic, dissolved	234		200
OW-033E	Benzo(k)fluoranthene Dibenzo(a,h)anthracene	0.21 0.35	0.17 0.3	
OW-205A	Naphthalene	1500		220
Second Semi-Annual Sampling Event				
TACO Tier 1 Exceedance				
OW-026A	Arsenic, dissolved	330		200
OW-205A	Naphthalene	2600		220

Notes:
TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standards are different for Class I (D and E unit wells) and Class II (A/B and C unit wells).

Table 9
Summary of Analytical Data Compared to the IWQC
First and Second Semi-Annual 2011 Sampling Events
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	IWQC[1,2] Aquatic Life	IWQC[1,2] Human Health	OW-041A 2/8/2011	OW-041A 8/3/2011	OW-041B 2/9/2011	OW-041B 8/3/2011	OW-205A 2/10/2011	OW-205A 8/4/2011	OW-206A 2/9/2011	OW-206A 8/3/2011	OW-207A 2/9/2011	OW-207A 8/3/2011
Metals (Method 6010B)													
ARSENIC - SOLUBLE	UG/L	190	--	10 U	10 U	**34.1**	**50**	10 U	10 U	10 U	10 U	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	**30.7**	**52**	10 U	**12**	10 U	10 U	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	--	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	**17.7**	**7.7**	5 U	5 U	5 U	5 U	**15.4**	5 U	**16.5**	**5**
COPPER - SOLUBLE	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)													
BENZENE	UG/L	860	310	1 U	1 U	1 U	1 U	**9.8**	**6.9**	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	14	--	1 U	1 U	1 U	1 U	**37**	**33**	1 U	1 U	1 U	1 U
TOLUENE	UG/L	600	--	1 U	1 U	1 U	1 U	**2.8**	**3.4**	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	360	--	1 U	1 U	1 U	1 U	**12**	**15**	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)													
PENTACHLOROPHENOL	UG/L	13	2.5	1 U	0.98 U	1 U	0.96 U	1.1 U	0.94 U	0.99 U	0.97 U	1 U	0.97 U
SVOCs (Method 8270C SIM)													
ACENAPHTHENE	UG/L	62	--	0.2 U	0.2 U	0.21 U	0.19 U	**57**	**140**	0.2 U	0.19 U	0.2 U	0.19 U
ACENAPHTHYLENE	UG/L	15	--	0.2 U	0.2 U	0.21 U	0.19 U	**0.66**	**1.5**	0.2 U	0.19 U	0.2 U	0.19 U
ANTHRACENE	UG/L	0.53	35,000	0.2 U	0.2 U	0.21 U	0.19 U	**2**	**6.3**	0.2 U	0.19 U	0.2 U	0.19 U
BENZO(A)ANTHRACENE	UG/L	--	0.16	0.13 U	0.2 U	0.14 U	0.19 U	0.14 U	0.19 U	0.13 U	0.19 U	0.13 U	0.19 U
BENZO(A)PYRENE	UG/L	--	0.016	0.2 U	0.2 U	0.21 U	0.19 U	0.21 U	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U
BENZO(B)FLUORANTHENE	UG/L	--	0.16	0.18 U	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	0.18 U	0.19 U	0.18 U	0.19 U
BENZO(GHI)PERYLENE	UG/L	--	--	0.2 U	0.2 U	0.21 U	0.19 U	0.21 U	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U
BENZO(K)FLUORANTHENE	UG/L	--	1.6	0.17 U	0.2 U	0.18 U	0.19 U	0.18 U	0.19 U	0.17 U	0.19 U	0.17 U	0.19 U
CHRYSENE	UG/L	--	16	0.2 U	0.2 U	0.21 U	0.19 U	0.21 U	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U
DIBENZO(A,H)ANTHRACENE	UG/L	--	0.016	0.2 U	0.2 U	0.21 U	0.19 U	0.21 U	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U
FLUORANTHENE	UG/L	1.8	120	0.2 U	0.2 U	0.21 U	0.19 U	**1.2**	**6**	0.2 U	0.19 U	0.2 U	0.19 U
FLUORENE	UG/L	16	4,500	0.2 U	0.2 U	0.21 U	0.19 U	**17**	**79**	0.2 U	0.19 U	0.2 U	0.19 U
INDENO(1,2,3-CD)PYRENE	UG/L	--	0.16	0.2 U	0.2 U	0.21 U	0.19 U	0.21 U	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U
NAPHTHALENE	UG/L	68	--	0.2 U	0.2 U	0.21 U	0.19 U	**1500**	**2600**	0.2 U	0.19 U	0.2 U	0.19 U
PHENANTHRENE	UG/L	3.7	--	0.2 U	0.2 U	0.21 U	0.19 U	**17**	**90**	0.2 U	0.19 U	0.2 U	0.19 U
PYRENE	UG/L	--	3,500	0.2 U	0.2 U	0.21 U	0.19 U	**0.61**	**2.4**	0.2 U	0.19 U	0.2 U	0.19 U
Phenolics (Method 9066)													
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	**0.011**	0.01 U	**0.027**	**0.027**	0.01 U	0.01 U	0.01 U	0.01 U

Notes:

IWQC - Illinois Water Quality Criteria
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
Shade indicates concentration exceeds IWQC (Illinois Water Quality Criteria).

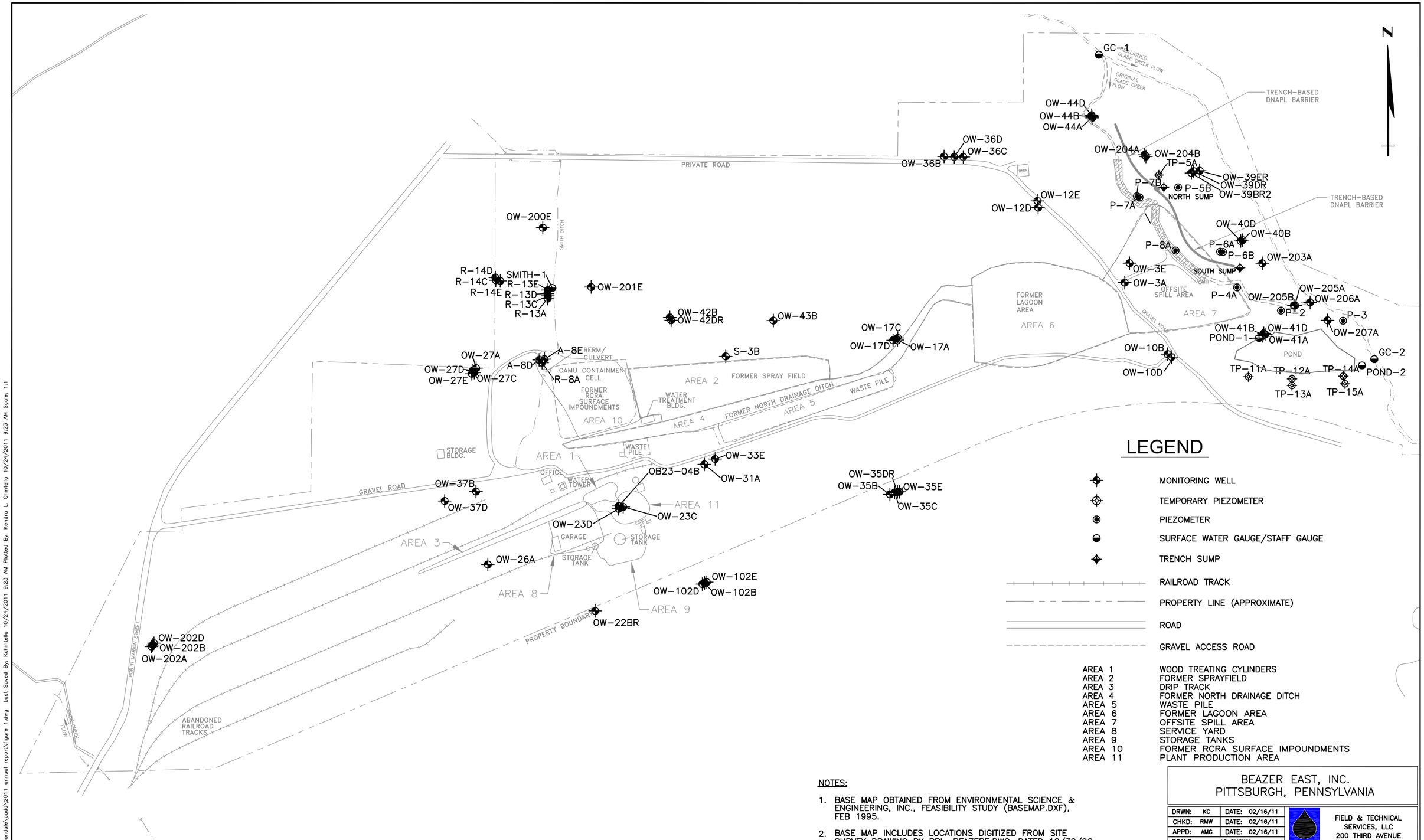
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample

B - field blank contamination
Bold - constituent detected

1 - For metals and BTEX, Illinois Water Quality Criteria obtained from 35 IAC 302.208. For PAHs and pentachlorophenol, Illinois Water Quality Criteria obtained from the following table: http://www.epa.sate.il.us/water/water-quality-standards/water-quality-criteria-list.pdf Aquatic life criteria represent the lower of the Acute Aquatic (AATC) and the Chronic Aquatic Toxicity Criterion (CATC). Human health criteria represent the lower of the Human Threshold Criterion (HTC) and the Human Nonthreshold Criterion (HNC).

2 - IWQC are not applicable to groundwater, but comparison being done as requested by USEPA.

FIGURES



NOTES:

1. BASE MAP OBTAINED FROM ENVIRONMENTAL SCIENCE & ENGINEERING, INC., FEASIBILITY STUDY (BASEMAP.DXF), FEB 1995.
2. BASE MAP INCLUDES LOCATIONS DIGITIZED FROM SITE SURVEY DRAWING BY BBL, BEAZERE.DWG, DATED 12/30/96, AT A SCALE OF 1" = 200' AND FROM AERIAL PHOTOGRAPHS TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1" = 500'.

REV #	DATE	DESCRIPTION	APPD
3			
2			
1			

REFERENCE:

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 02/16/11	
CHKD: RMW	DATE: 02/16/11	
APPD: AMG	DATE: 02/16/11	
SCALE: AS SHOWN		
ISSUE DATE:		

FTS
FIELD & TECHNICAL SERVICES, LLC
200 THIRD AVENUE
CARNEGIE, PA 15106

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

SITE PLAN

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 1

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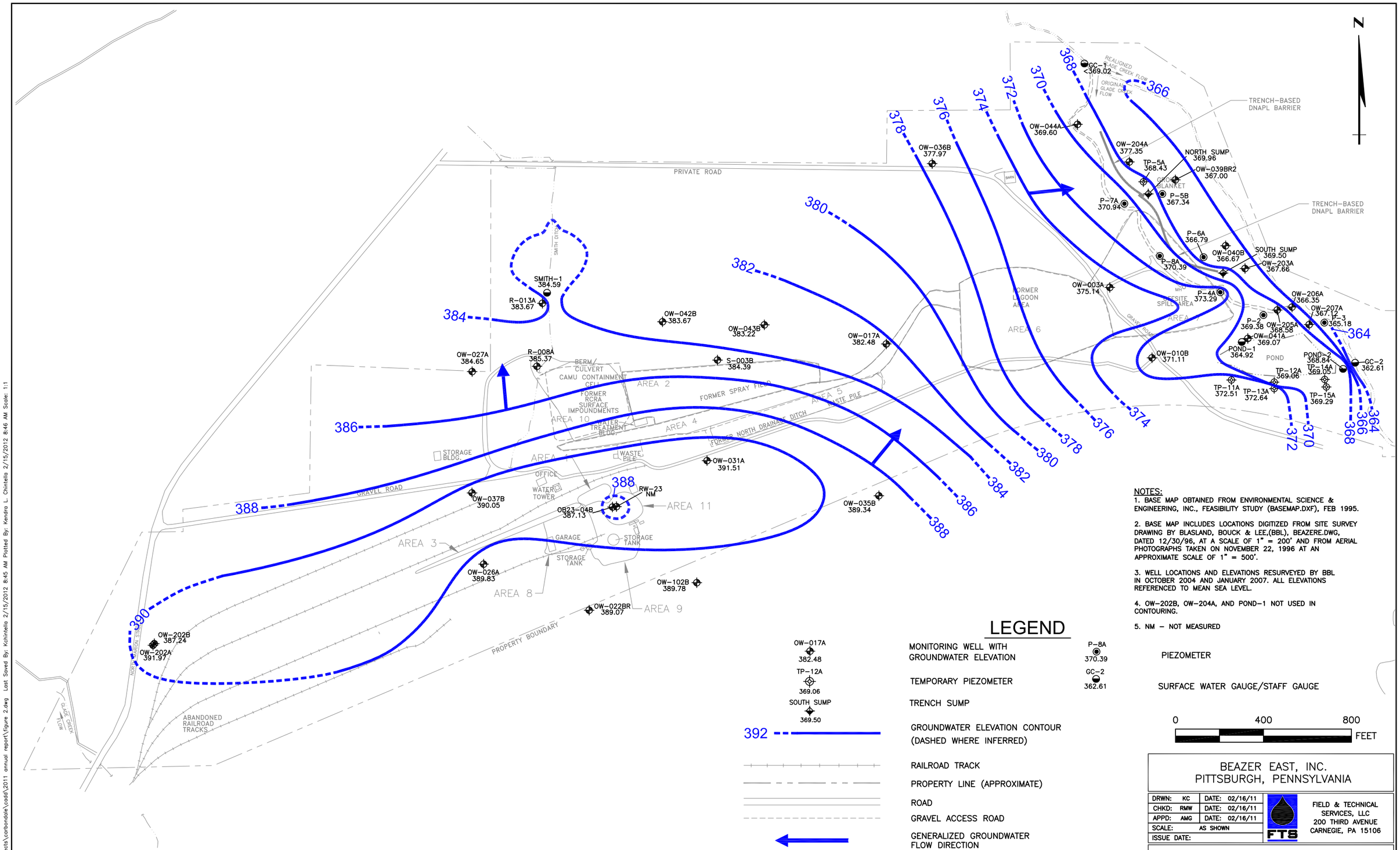

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3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

4. OW-202B, OW-204A, AND POND-1 NOT USED IN CONTOURING.

5. NM – NOT MEASURED

LEGEND

OW-017A 382.48	MONITORING WELL WITH GROUNDWATER ELEVATION
TP-12A 369.06	TEMPORARY PIEZOMETER
SOUTH SUMP 369.50	TRENCH SUMP
392	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD
	GENERALIZED GROUNDWATER FLOW DIRECTION
P-8A 370.39	PIEZOMETER
GC-2 362.61	SURFACE WATER GAUGE/STAFF GAUGE

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 02/16/11		FIELD & TECHNICAL SERVICES, LLC 200 THIRD AVENUE CARNEGIE, PA 15106
CHKD: RMW	DATE: 02/16/11		
APPD: AMG	DATE: 02/16/11		
SCALE: AS SHOWN			
ISSUE DATE:			

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

GROUNDWATER ELEVATION CONTOUR MAP A/B UNIT
FEBRUARY 7, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 2

REV #	DATE	DESCRIPTION	APPD

REFERENCE:

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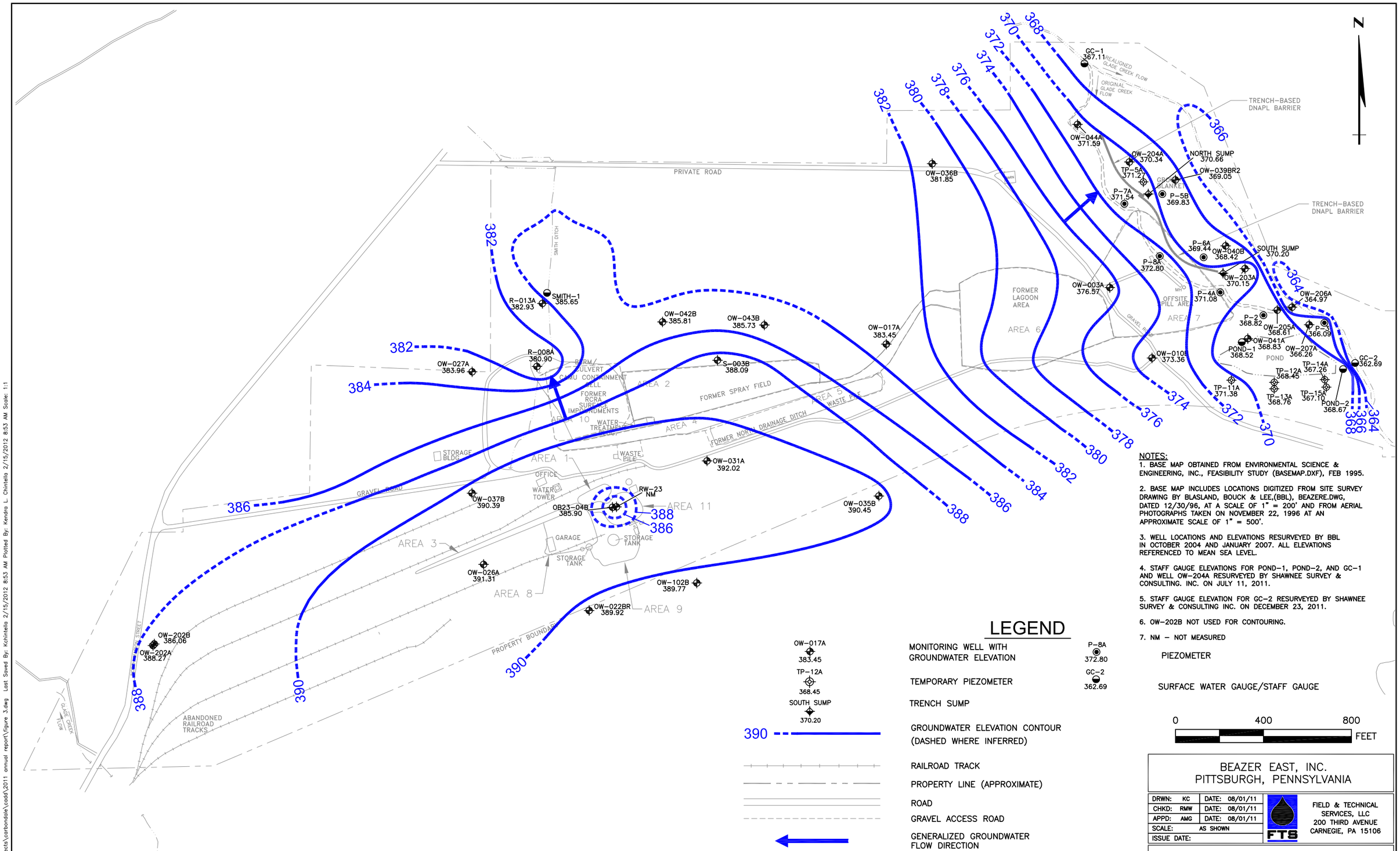

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3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

4. STAFF GAUGE ELEVATIONS FOR POND-1, POND-2, AND GC-1 AND WELL OW-204A RESURVEYED BY SHAWNEE SURVEY & CONSULTING. INC. ON JULY 11, 2011.

5. STAFF GAUGE ELEVATION FOR GC-2 RESURVEYED BY SHAWNEE SURVEY & CONSULTING INC. ON DECEMBER 23, 2011.

6. OW-202B NOT USED FOR CONTOURING.

7. NM – NOT MEASURED

LEGEND

OW-017A 383.45	MONITORING WELL WITH GROUNDWATER ELEVATION
TP-12A 368.45	TEMPORARY PIEZOMETER
SOUTH SUMP 370.20	TRENCH SUMP
390	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD
	GENERALIZED GROUNDWATER FLOW DIRECTION
P-8A 372.80	PIEZOMETER
GC-2 362.69	SURFACE WATER GAUGE/STAFF GAUGE

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 08/01/11		FIELD & TECHNICAL SERVICES, LLC 200 THIRD AVENUE CARNEGIE, PA 15106
CHKD: RMW	DATE: 08/01/11		
APPD: AMG	DATE: 08/01/11		
SCALE: AS SHOWN			
ISSUE DATE:			

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

GROUNDWATER ELEVATION CONTOUR MAP A/B UNIT
AUGUST 1, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 3

REV #	DATE	DESCRIPTION	APPD
1			
2			
3			

REFERENCE:

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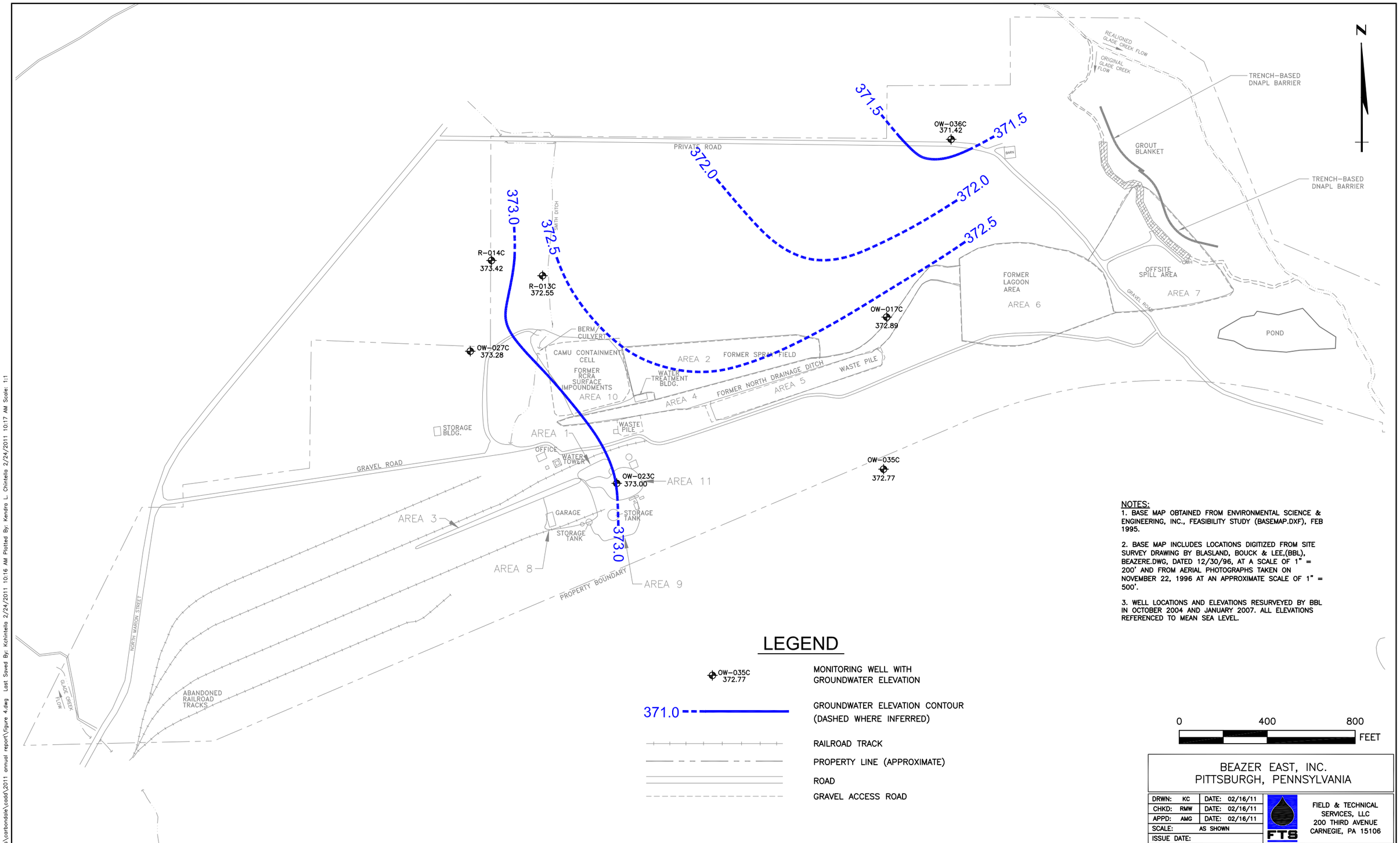


NOTES:

1. BASE MAP OBTAINED FROM ENVIRONMENTAL SCIENCE & ENGINEERING, INC., FEASIBILITY STUDY (BASEMAP.DXF), FEB 1995.

2. BASE MAP INCLUDES LOCATIONS DIGITIZED FROM SITE SURVEY DRAWING BY BLASLAND, BOUCK & LEE,(BBL), BEAZERE.DWG, DATED 12/30/96, AT A SCALE OF 1" = 200' AND FROM AERIAL PHOTOGRAPHS TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1" = 500'.

3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

LEGEND

OW-035C 372.77	MONITORING WELL WITH GROUNDWATER ELEVATION
371.0	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 02/16/11		FIELD & TECHNICAL SERVICES, LLC 200 THIRD AVENUE CARNEGIE, PA 15106
CHKD: RMW	DATE: 02/16/11		
APPD: AMG	DATE: 02/16/11		
SCALE: AS SHOWN			
ISSUE DATE:			

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

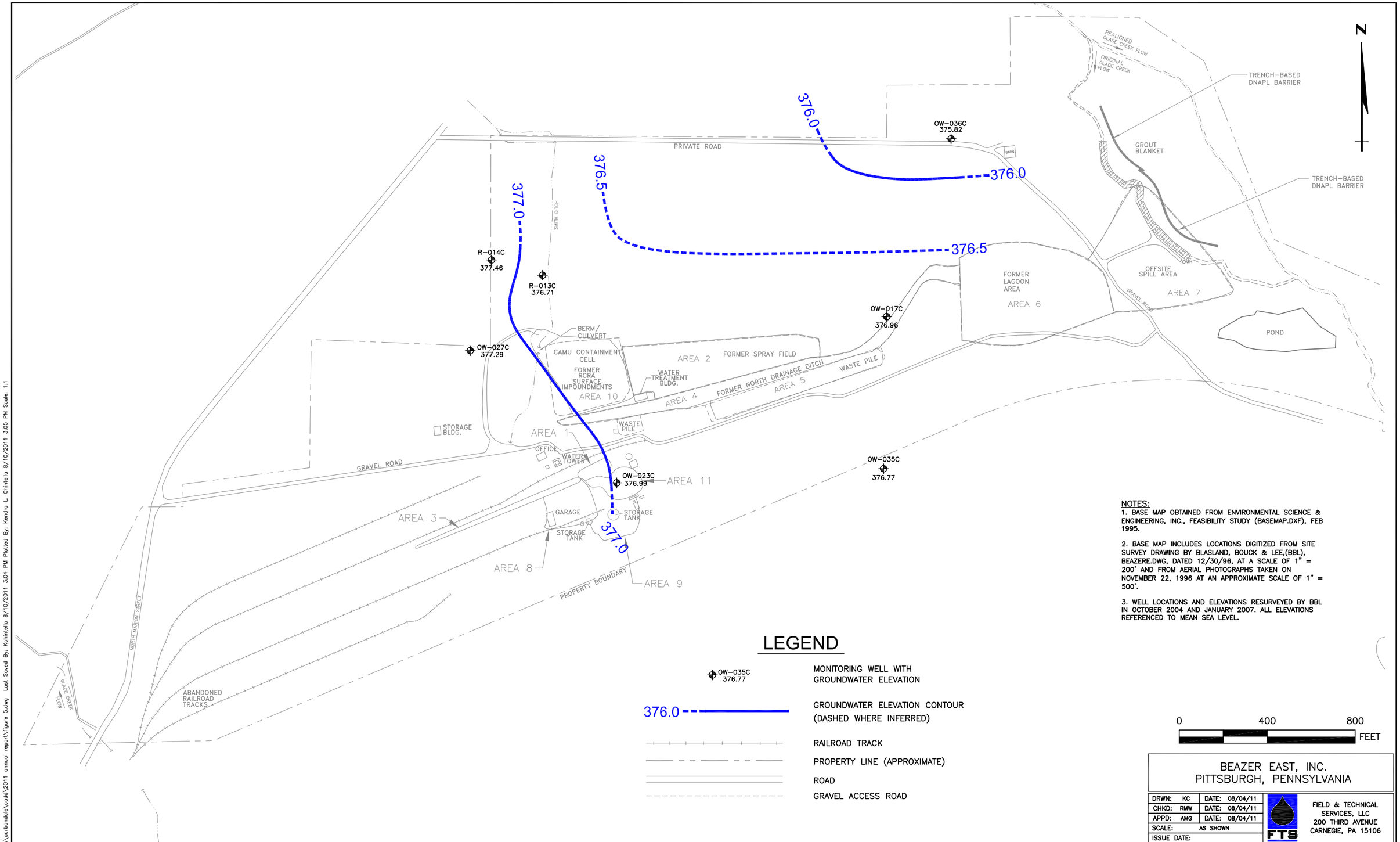
GROUNDWATER ELEVATION CONTOUR MAP C-UNIT
FEBRUARY 7, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 4

REV #	DATE	DESCRIPTION	APPD

REFERENCE:

q:\projects\beazer projects\carbondale\cadd\2011 annual report\figure 4.dwg Last Saved By: Kchintella 2/24/2011 10:16 AM Plotted By: Kendra L. Chintella 2/24/2011 10:17 AM Scale: 1:1



NOTES:

1. BASE MAP OBTAINED FROM ENVIRONMENTAL SCIENCE & ENGINEERING, INC., FEASIBILITY STUDY (BASEMAP.DXF), FEB 1995.

2. BASE MAP INCLUDES LOCATIONS DIGITIZED FROM SITE SURVEY DRAWING BY BLASLAND, BOUCK & LEE,(BBL), BEAZERE.DWG, DATED 12/30/96, AT A SCALE OF 1" = 200' AND FROM AERIAL PHOTOGRAPHS TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1" = 500'.

3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

LEGEND

OW-035C 376.77	MONITORING WELL WITH GROUNDWATER ELEVATION
376.0	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 08/04/11	
CHKD: RMW	DATE: 08/04/11	
APPD: AMG	DATE: 08/04/11	
SCALE: AS SHOWN		
ISSUE DATE:		

FTS

FIELD & TECHNICAL SERVICES, LLC
200 THIRD AVENUE
CARNEGIE, PA 15106

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

GROUNDWATER ELEVATION
CONTOUR MAP C-UNIT
AUGUST 1, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 5

REV #	DATE	DESCRIPTION	APPD

REFERENCE:

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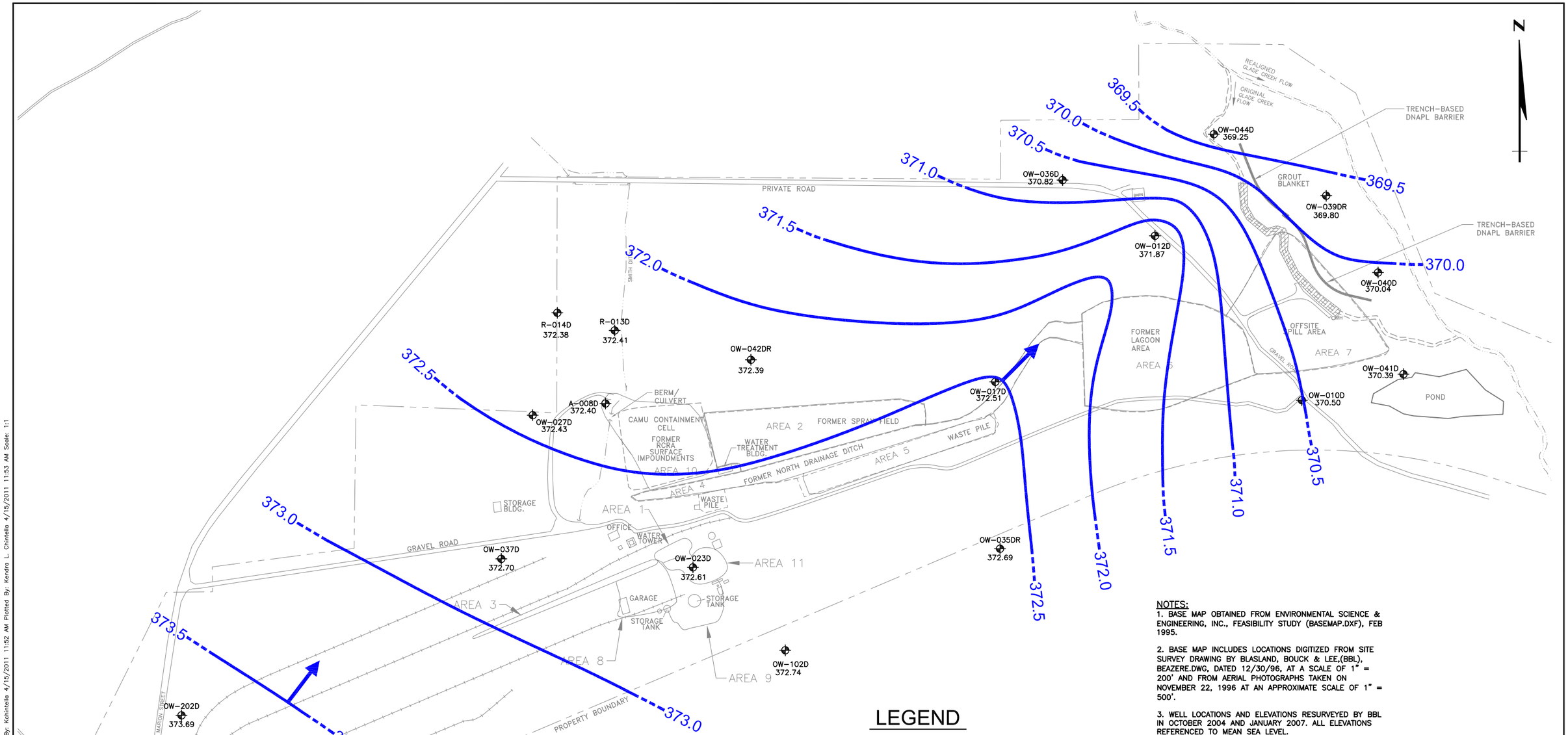

NOTES:

1. BASE MAP OBTAINED FROM ENVIRONMENTAL SCIENCE & ENGINEERING, INC., FEASIBILITY STUDY (BASEMAP.DXF), FEB 1995.

2. BASE MAP INCLUDES LOCATIONS DIGITIZED FROM SITE SURVEY DRAWING BY BLASLAND, BOUCK & LEE,(BBL), BEAZERE.DWG, DATED 12/30/96, AT A SCALE OF 1" = 200' AND FROM AERIAL PHOTOGRAPHS TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1" = 500'.

3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

LEGEND

OW-102D 372.74	MONITORING WELL WITH GROUNDWATER ELEVATION
373.0	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD
	GENERALIZED GROUNDWATER FLOW DIRECTION

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 02/16/11	FTS	FIELD & TECHNICAL SERVICES, LLC 200 THIRD AVENUE CARNEGIE, PA 15106
CHKD: RMW	DATE: 02/16/11		
APPD: AMG	DATE: 02/16/11		
SCALE: AS SHOWN			
ISSUE DATE:			

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

GROUNDWATER ELEVATION CONTOUR MAP D-UNIT
FEBRUARY 7, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 6

REV #	DATE	DESCRIPTION	APPD

REFERENCE:

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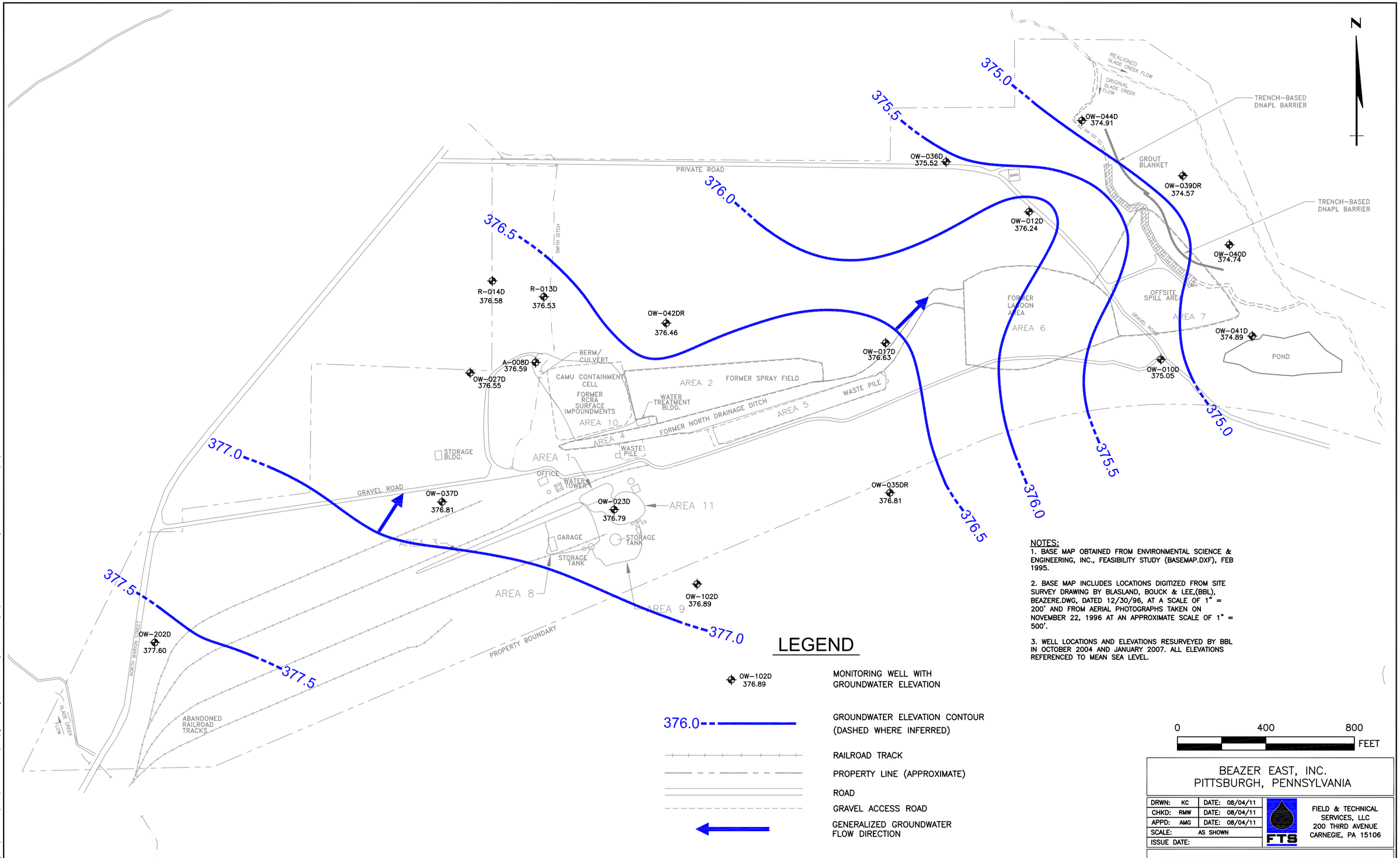

NOTES:

1. BASE MAP OBTAINED FROM ENVIRONMENTAL SCIENCE & ENGINEERING, INC., FEASIBILITY STUDY (BASEMAP.DXF), FEB 1995.

2. BASE MAP INCLUDES LOCATIONS DIGITIZED FROM SITE SURVEY DRAWING BY BLASLAND, BOUCK & LEE,(BBL), BEAZERE.DWG, DATED 12/30/96, AT A SCALE OF 1" = 200' AND FROM AERIAL PHOTOGRAPHS TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1" = 500'.

3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

LEGEND

OW-102D 376.89	MONITORING WELL WITH GROUNDWATER ELEVATION
376.0	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD
	GENERALIZED GROUNDWATER FLOW DIRECTION

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 08/04/11	FIELD & TECHNICAL SERVICES, LLC 200 THIRD AVENUE CARNEGIE, PA 15106
CHKD: RMW	DATE: 08/04/11	
APPD: AMG	DATE: 08/04/11	
SCALE: AS SHOWN		
ISSUE DATE:		

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

GROUNDWATER ELEVATION CONTOUR MAP D-UNIT
AUGUST 1, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 7

REV #	DATE	DESCRIPTION	APPD

REFERENCE:

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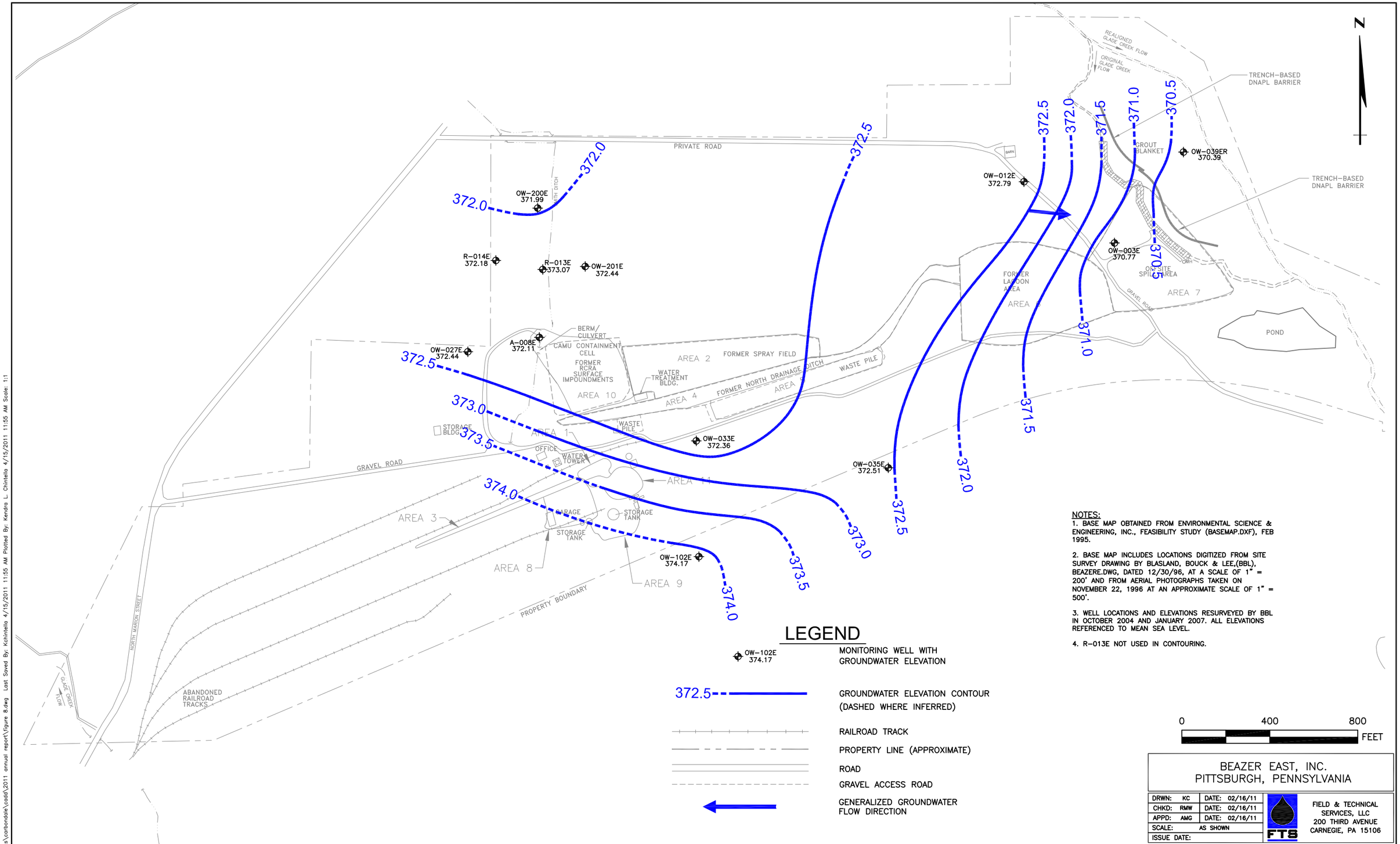

NOTES:

1. BASE MAP OBTAINED FROM ENVIRONMENTAL SCIENCE & ENGINEERING, INC., FEASIBILITY STUDY (BASEMAP.DXF), FEB 1995.

2. BASE MAP INCLUDES LOCATIONS DIGITIZED FROM SITE SURVEY DRAWING BY BLASLAND, BOUCK & LEE,(BBL), BEAZERE.DWG, DATED 12/30/96, AT A SCALE OF 1" = 200' AND FROM AERIAL PHOTOGRAPHS TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1" = 500'.

3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

4. R-013E NOT USED IN CONTOURING.

LEGEND

OW-102E 374.17	MONITORING WELL WITH GROUNDWATER ELEVATION
372.5	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD
	GENERALIZED GROUNDWATER FLOW DIRECTION

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 02/16/11		FIELD & TECHNICAL SERVICES, LLC 200 THIRD AVENUE CARNEGIE, PA 15106
CHKD: RMW	DATE: 02/16/11		
APPD: AMG	DATE: 02/16/11		
SCALE: AS SHOWN			
ISSUE DATE:			

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

GROUNDWATER ELEVATION CONTOUR MAP E-UNIT
FEBRUARY 7, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 8

REV #	DATE	DESCRIPTION	APPD
3			
2			
1			

REFERENCE:

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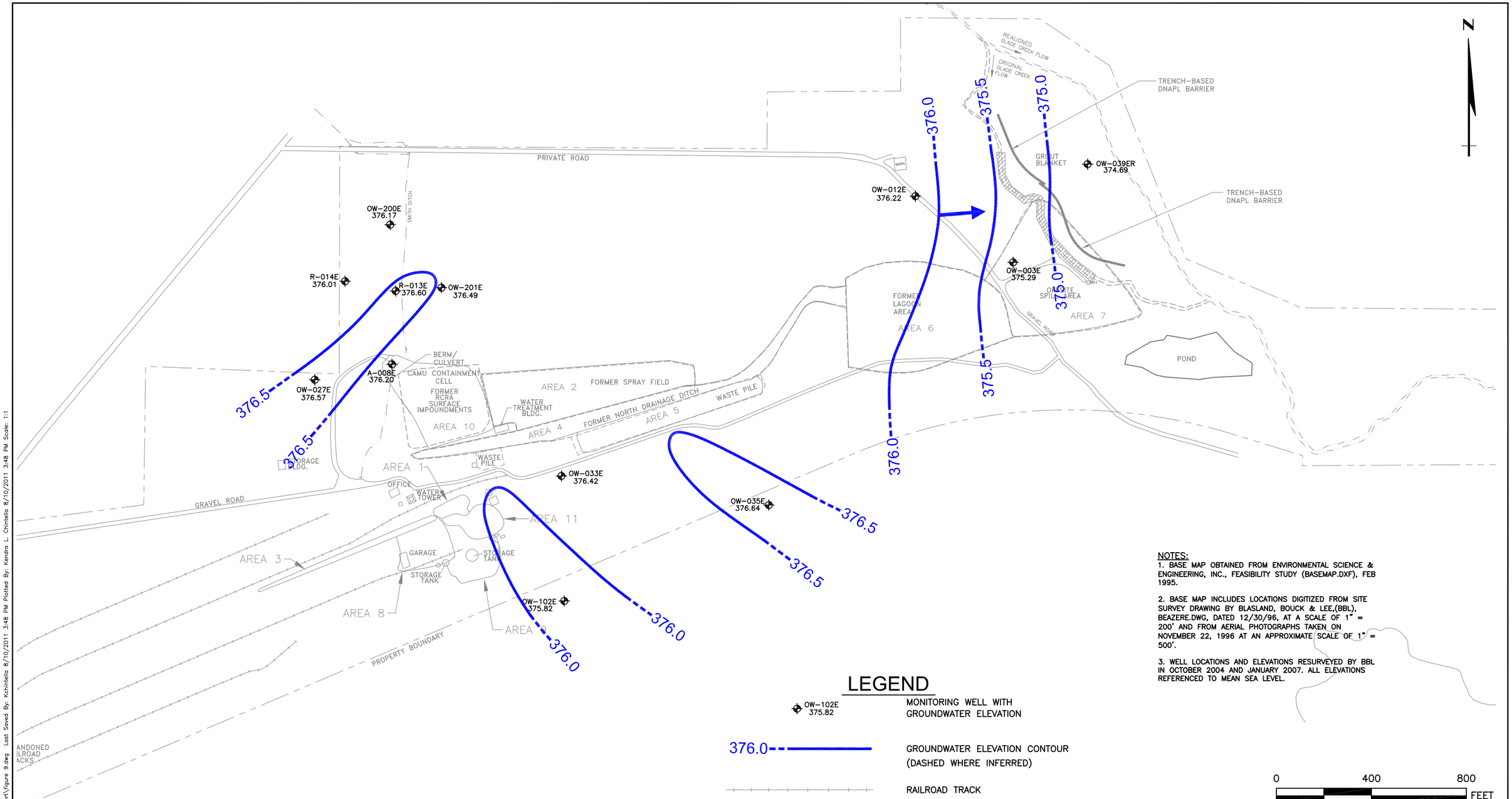

NOTES:

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2. BASE MAP INCLUDES LOCATIONS DIGITIZED FROM SITE SURVEY DRAWING BY BLASLAND, BOUCK & LEE,(BBL), BEAZERE.DWG, DATED 12/30/96, AT A SCALE OF 1" = 200' AND FROM AERIAL PHOTOGRAPHS TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1" = 500'.

3. WELL LOCATIONS AND ELEVATIONS RESURVEYED BY BBL IN OCTOBER 2004 AND JANUARY 2007. ALL ELEVATIONS REFERENCED TO MEAN SEA LEVEL.

LEGEND

OW-102E 375.82	MONITORING WELL WITH GROUNDWATER ELEVATION
376.0	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	RAILROAD TRACK
	PROPERTY LINE (APPROXIMATE)
	ROAD
	GRAVEL ACCESS ROAD
	GENERALIZED GROUNDWATER FLOW DIRECTION

0 400 800 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: KC	DATE: 08/04/11		FIELD & TECHNICAL SERVICES, LLC 200 THIRD AVENUE CARNEGIE, PA 15106
CHKD: RMW	DATE: 08/04/11		
APPD: AMG	DATE: 08/04/11		
SCALE: AS SHOWN			
ISSUE DATE:			

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

GROUNDWATER ELEVATION CONTOUR MAP E-UNIT
AUGUST 1, 2011

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 9

REV #	DATE	DESCRIPTION	APPD

REFERENCE:

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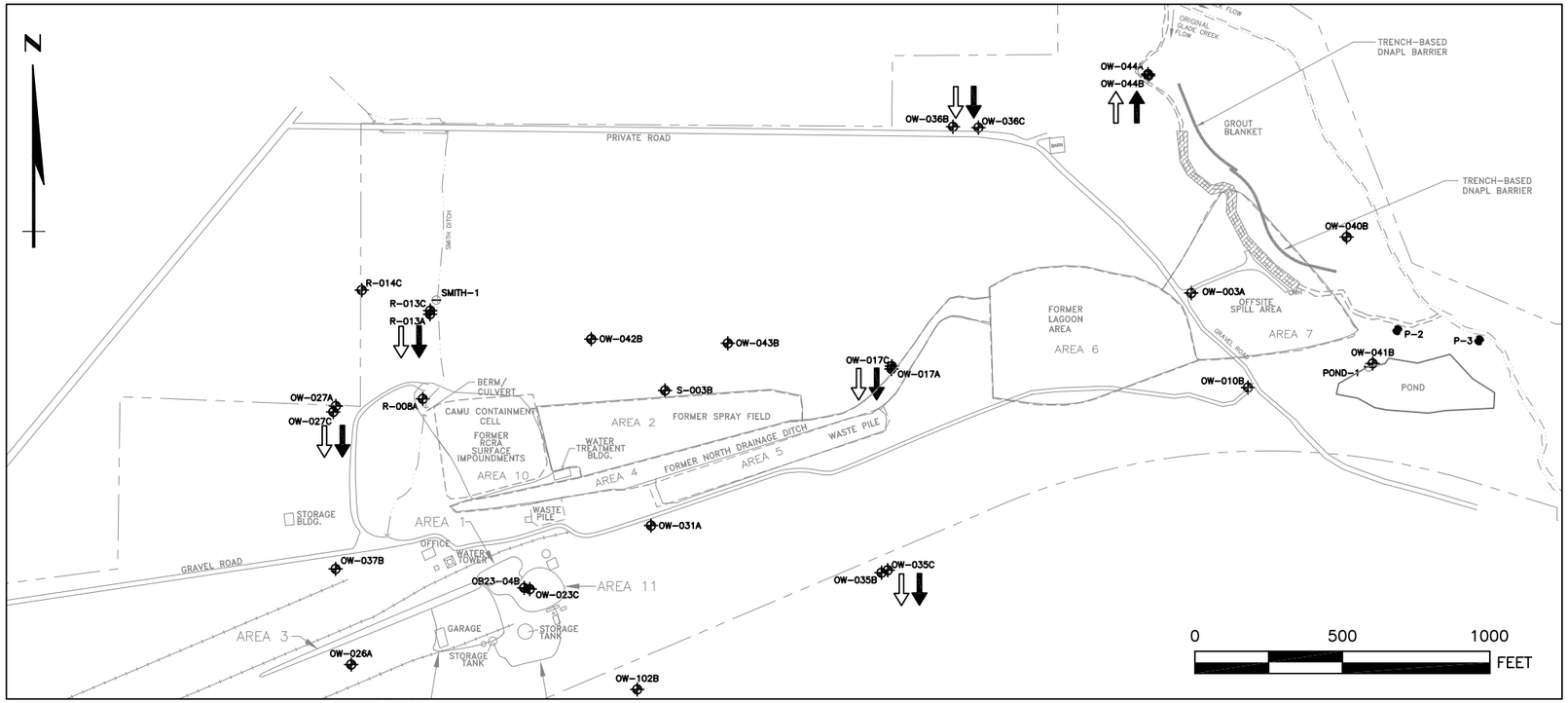
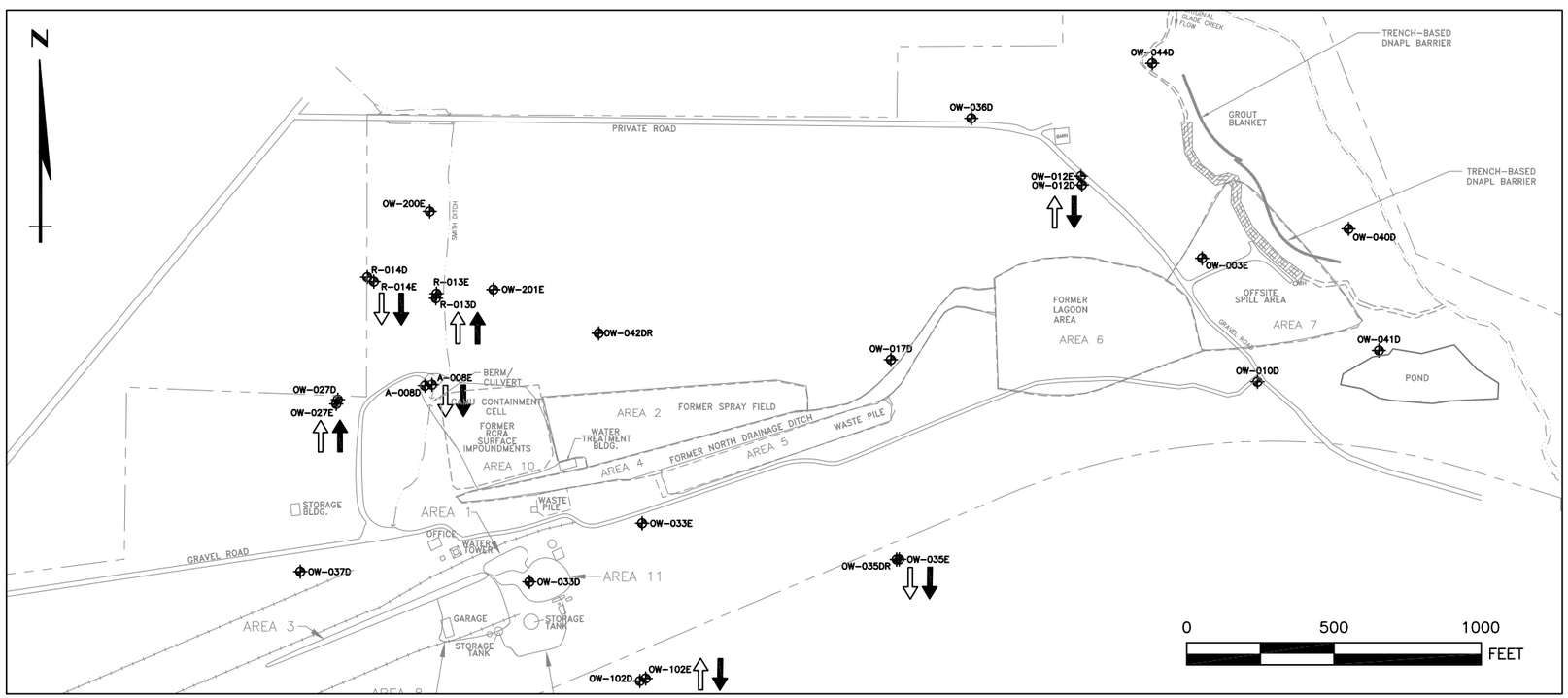
A-UNIT
B-UNIT
C-UNIT



D-UNIT
E-UNIT



LEGEND

- OW-017D — MONITORING WELL
- P-3 — PIEZOMETER
- SMITH-1 — SURFACE WATER GAUGE
- FIRST SEMIANNUAL VERTICAL HYDRAULIC GRADIENT DIRECTION
- SECOND SEMIANNUAL VERTICAL HYDRAULIC GRADIENT DIRECTION
- RAILROAD TRACK
- PROPERTY LINE (APPROXIMATE)
- ROAD
- GRAVEL ACCESS ROAD

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN:	KC	DATE:	08/12/11
CHKD:	RMW	DATE:	08/12/11
APPD:	AMG	DATE:	08/12/11
SCALE:	AS SHOWN		
ISSUE DATE:			

FTS

FIELD & TECHNICAL SERVICES, LLC
200 THIRD AVENUE
CARNEGIE, PA 15106

2011 ANNUAL RCRA GROUNDWATER MONITORING REPORT
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

2011 VERTICAL HYDRAULIC GRADIENT DIRECTIONS

PROJECT NO: OM041411
DRAWING NUMBER
FIGURE 10

REV #	DATE	DESCRIPTION	APPD
3			
2			
1			

REFERENCE:

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APPENDIX A

SUMMARY OF 2011 FIELD AND ANALYTICAL DATA

Table A-1
Groundwater Field Parameter Data
First Semi-Annual 2011
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well	pH (SU)	Specific Conductivity (µS/cm)	Temperature (°C)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
A Unit						
OW-017A	7.06	1186	9.82	-270.8	0.99	0.69
OW-026A	6.37	1299	10.22	12.8	0.97	8.81
OW-027A	7.28	355	8.78	-233.1	0.41	7.01
OW-031A	6.86	555	11.08	143.0	3.16	3.47
OW-041A	7.24	1045	11.25	110.0	5.69	10.10
OW-202A	6.15	787	8.94	201.4	1.25	2.80
OW-203A	6.67	2036	10.03	43.2	4.36	8.47
OW-204A	6.82	1899	9.05	168.7	0.93	6.83
OW-205A	6.61	997	10.70	138.2	0.98	12.00
OW-206A	7.61	8248	9.23	74.2	0.89	9.65
OW-207A	7.27	1135	9.91	247.4	1.09	54.60
R-013A	6.89	2550	9.19	130.5	1.98	4.13
B Unit						
OW-010B	6.80	2586	9.03	180.7	0.29	8.48
OW-022BR	7.77	515	13.90	110.4	2.70	4.11
OW-035B	7.50	873	12.39	-100.1	0.40	1.51
OW-036B	6.18	1917	9.54	130.3	1.31	2.08
OW-037B	7.68	687	11.30	-201.9	1.40	3.10
OW-039BR2	7.59	4782	11.57	7.4	1.08	19.00
OW-040B	6.85	5040	11.69	-94.1	0.42	2.81
OW-041B	7.44	1379	11.72	-107.2	0.10	14.30
OW-042B	6.56	4303	11.52	-82.0	0.51	2.55
OW-102B	6.45	3333	8.91	88.8	1.09	1.95
OW-202B	6.91	2784	12.55	64.4	1.79	5.40
OW-204B	8.61	3951	11.19	86.1	0.85	1.31
C Unit						
OW-017C	8.10	286	12.24	103.9	0.87	5.70
OW-023C	7.32	3719	10.03	77.3	0.71	9.98
OW-035C	7.02	1654	11.76	2.3	0.41	3.99
R-014C	8.00	243	10.01	89.7	0.81	6.35
D Unit						
OW-012D	8.12	1480	11.68	-92.1	0.14	8.01
OW-023D	8.07	3165	14.98	-188.7	0.64	5.01
OW-027D	7.41	5993	12.21	-257.1	0.16	0.82
OW-035DR	12.50	5219	11.64	-331.0	0.22	5.39
OW-037D	8.17	7238	12.51	76.3	0.75	2.97
OW-039DR	7.75	2080	14.02	-148.3	1.04	6.90
OW-040D	7.70	1946	12.92	-167.1	0.09	17.60
OW-041D	7.77	1705	11.97	-92.6	1.45	3.00
OW-044D	7.90	1730	13.14	-167.3	0.93	4.82
OW-102D	8.60	2301	13.25	-149.2	3.45	5.98
OW-202D	8.15	3117	12.59	-50.4	0.54	4.10
R-014D	8.50	560	13.69	86.4	0.50	5.11
E Unit						
OW-027E	13.61	1444	10.99	-267.1	0.21	6.51
OW-033E	7.25	8997	11.90	-36.4	1.57	7.32
OW-035E	11.89	7139	13.60	-192.0	0.75	3.25
OW-039ER	7.88	3214	8.83	-169.5	1.48	8.22
OW-102E	7.35	11120	8.94	-54.8	1.96	5.00
OW-200E	7.05	12210	12.31	45.8	0.73	4.51
OW-201E	12.58	7212	9.77	-220.1	2.07	2.67
R-014E	9.25	14500	7.42	74.6	0.75	18.00

Notes:
°C = degree celsius
mg/l = milligrams per liter
mV = millivolts
NTU = nephelometric turbidity unit
SU = standard units
uS/cm = microSiemens per centimeter

Table A-2
Groundwater Field Parameter Data
Second Semi-Annual 2011
2011 Annual RCRA Groundwater Monitoring Report
Carbondale Facility, Carbondale, Illinois

Well	pH (SU)	Specific Conductivity (µS/cm)	Temperature (°C)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
A Unit						
OW-017A	7.09	1001	18.91	20.2	0.50	2.00
OW-026A	6.44	1350	19.70	-111.5	0.12	7.54
OW-027A	6.67	2074	19.39	-17.3	0.33	7.15
OW-031A	6.75	665	20.27	53.9	0.31	4.11
OW-041A	6.90	1527	21.03	50.2	0.17	8.05
OW-202A	5.80	1170	21.61	42.8	0.31	5.29
OW-203A	6.28	5061	21.89	25.5	0.60	13.20
OW-204A	6.80	899	22.33	39.1	0.16	3.66
OW-205A	6.42	370	20.18	-74.1	0.16	11.10
OW-206A	6.40	8179	21.17	-35.4	0.17	10.92
OW-207A	7.09	1001	19.31	52.7	0.17	7.21
R-013A	6.42	2510	19.24	18.7	0.19	7.31
B Unit						
OW-010B	6.96	3594	17.61	-211.6	0.92	3.20
OW-022BR	6.82	4424	18.21	-54.3	0.25	11.50
OW-035B	7.30	752	17.77	105.9	0.35	4.02
OW-036B	6.40	2244	19.24	-155.1	0.24	4.66
OW-037B	6.66	3489	27.38	-86.7	0.48	11.30
OW-039BR2	7.71	4419	21.33	-128.2	1.35	17.50
OW-040B	6.78	5399	19.46	-214.1	0.09	2.00
OW-041B	7.71	180	21.60	-168.4	0.14	8.73
OW-042B	6.63	4334	20.15	-31.9	0.13	7.95
OW-102B	6.76	3588	18.48	-228.9	0.27	3.00
OW-202B	6.48	20.69	2990.00	-83.9	0.35	4.37
OW-204B	7.74	3146	22.01	24.7	0.29	12.40
C Unit						
OW-017C	7.39	2521	20.10	-37.9	0.57	3.36
OW-023C	7.24	4194	21.04	-77.4	1.56	8.11
OW-035C	7.14	2101	20.11	29.4	0.78	5.29
R-014C	7.16	2293	21.27	-68.2	1.74	1.90
D Unit						
OW-012D	8.24	1684	20.83	-39.3	0.26	5.14
OW-023D	7.67	3339	18.34	-85.3	0.37	2.94
OW-027D	7.38	5108	16.98	-123.6	2.06	10.50
OW-035DR	11.46	2566	19.60	-232.1	0.94	9.36
OW-037D	9.27	7859	18.33	-220.6	0.54	2.80
OW-039DR	6.73	158	16.29	-163.4	0.20	3.40
OW-040D	7.43	1414	20.13	-179.9	0.41	16.80
OW-041D	6.71	362	20.36	-199.2	0.53	2.80
OW-044D	7.46	517	17.37	-50.1	0.48	5.63
OW-102D	8.50	2490	16.98	19.2	0.51	0.98
OW-202D	7.78	4358	17.30	-234.6	0.15	2.90
R-014D	8.35	5142	17.49	-86.3	0.22	6.41
E Unit						
OW-027E	12.84	844	19.93	-133.4	0.98	11.82
OW-033E	7.11	9549	17.61	-167.4	0.53	2.60
OW-035E	11.98	9888	24.99	-130.9	1.12	5.13
OW-039ER	7.74	2259	18.56	-205.6	0.12	6.80
OW-102E	7.44	15110	17.40	-177.4	0.73	2.19
OW-200E	8.91	12070	18.14	-184.5	0.17	16.80
OW-201E	11.45	6795	17.64	-187.9	0.79	13.80
R-014E	9.36	16860	18.47	5.3	0.18	7.11

Notes:
°C = degree celsius
mg/l = milligrams per liter
mV = millivolts
NTU = nephelometric turbidity unit
SU = standard units
uS/cm = microSiemens per centimeter

Table A-3
Analytical Summary
First Semi-Annual 2011 RCRA Groundwater Data
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Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-010B 2/9/2011	OW-012D 2/10/2011	OW-012D DUP	OW-017A 2/8/2011	OW-017C 2/9/2011	OW-022BR 2/9/2011	OW-023C 2/10/2011	OW-023D 2/8/2011	OW-026A* 2/10/2011	OW-027A* 2/9/2011
Metals (Method 6010B)													
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	**23.4**	10 U	**25.7**	10 U	**234**	**11**
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	10 U	**27.4**	10 U	**20.3**	10 U	**240**	**12.7**
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	**61.1**	5 U	5 U	5 U	**10.5**	**302**	**15.5**	5 U	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)													
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)													
PENTACHLOROPHENOL	UG/L	1	5	0.99 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)													
ACENAPHTHENE	UG/L	420	2,100	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	**1.6**	0.21 U	0.21 U	**1.7**	0.2 U
ACENAPHTHYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
ANTHRACENE	UG/L	2,100	10,500	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	**0.46**	0.2 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.13 U	0.13 U	0.13 U	0.14 U	0.14 U	0.13 U	0.13 U	0.13 U	0.2 U	0.2 U
BENZO(A)PYRENE	UG/L	0.2	2	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U	0.18 U	0.19 U	0.19 U	0.2 U	0.2 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.17 U	0.17 U	0.18 U	0.18 U	0.18 U	0.17 U	0.18 U	0.18 U	0.2 U	0.2 U
CHRYSENE	UG/L	1.5	7.5	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
FLUORANTHENE	UG/L	280	1,400	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	**0.37**	0.21 U	0.21 U	0.2 U	0.2 U
FLUORENE	UG/L	280	1,400	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	**0.21**	0.21 U	0.21 U	0.2 U	0.2 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
NAPHTHALENE	UG/L	140	220	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
PHENANTHRENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
PYRENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
Phenolics (Method 9066)													
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.02**

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - SVOC results are from samples taken on May 23, 2011

Table A-3 (Continued)
Analytical Summary
First Semi-Annual 2011 RCRA Groundwater Data
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Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-027D 2/8/2011	OW-027D DUP	OW-027E 2/9/2011	OW-031A 2/8/2011	OW-033E 2/10/2011	OW-035B 2/10/2011	OW-035C 2/9/2011	OW-035DR 2/10/2011	OW-035E 2/10/2011	OW-036B 2/9/2011	OW-037B 2/9/2011	OW-037D 2/10/2011
Metals (Method 6010B)															
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	10 U	10 U	**37**	10 U	10 U	10 U	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	10 U	10 U	10 U	**22.8**	10 U	10 U	10 U	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	5 U	5 U	**5.3**	5 U	**49.2**	5 U	5 U	5 U	5 U	5 U	**9.6**	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)															
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	**3.1 J**	**1.9 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)															
PENTACHLOROPHENOL	UG/L	1	5	0.94 U	0.94 U	0.96 U	1 U	0.95 U	0.94 U	1 U	1 U	0.94 U	1 U	1 U	0.99 U
SVOCs (Method 8270C SIM)															
ACENAPHTHENE	UG/L	420	2,100	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	**8**
ACENAPHTHYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
ANTHRACENE	UG/L	2,100	10,500	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.12 U	0.12 U	0.12 U	0.14 U	0.12 U	0.12 U	0.13 U	0.13 U	0.12 U	0.13 U	0.13 U	0.13 U
BENZO(A)PYRENE	UG/L	0.2	2	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.17 U	0.17 U	0.17 U	0.19 U	0.17 U	0.17 U	0.19 U	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.21 U	**0.27**	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.16 U	0.16 U	0.16 U	0.18 U	**0.21**	0.16 U	0.18 U	0.17 U	0.16 U	0.17 U	0.17 U	0.17 U
CHRYSENE	UG/L	1.5	7.5	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.19 U	0.19 U	0.19 U	0.21 U	**0.35**	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
FLUORANTHENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	**0.3**	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
FLUORENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.19 U	0.19 U	0.19 U	0.21 U	**0.23**	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
NAPHTHALENE	UG/L	140	220	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
PHENANTHRENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
PYRENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	**0.5**	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U
Phenolics (Method 9066)															
PHENOLICS	MG/L	--	--	0.01 U	**0.11**	**0.02**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.13**	0.01 U	**0.01**	**0.013**

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - SVOC results are from samples taken on May 23, 2011

Table A-3 (Continued)
Analytical Summary
First Semi-Annual 2011 RCRA Groundwater Data
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Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-039BR2 2/10/2011	OW-039DR 2/8/2011	OW-039ER 2/8/2011	OW-040B 2/8/2011	OW-040D* 2/8/2011	OW-040D* DUP	OW-041A 2/8/2011	OW-041B 2/9/2011	OW-041D 2/9/2011
Metals (Method 6010B)												
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**34.1**	**12.3**
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**30.7**	**11.4**
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	**82.8**	5 U	5 U	**6.9**	5 U	5 U	**17.7**	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)												
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)												
PENTACHLOROPHENOL	UG/L	1	5	0.98 U	1 U	1 U	0.95 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)												
ACENAPHTHENE	UG/L	420	2,100	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
ACENAPHTHYLENE	UG/L	210	1,050	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
ANTHRACENE	UG/L	2,100	10,500	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.13 U	0.13 U	0.13 U	0.12 U	0.2 U	0.2 U	0.13 U	0.14 U	0.13 U
BENZO(A)PYRENE	UG/L	0.2	2	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.18 U	0.19 U	0.18 U	0.17 U	0.2 U	0.2 U	0.18 U	0.19 U	0.18 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.17 U	0.18 U	0.17 U	0.16 U	0.2 U	0.2 U	0.17 U	0.18 U	0.17 U
CHRYSENE	UG/L	1.5	7.5	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
FLUORANTHENE	UG/L	280	1,400	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
FLUORENE	UG/L	280	1,400	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
NAPHTHALENE	UG/L	140	220	0.2 U	**0.24**	**0.24**	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
PHENANTHRENE	UG/L	210	1,050	0.2 U	**0.27**	0.2 U	**0.21**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
PYRENE	UG/L	210	1,050	0.2 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
Phenolics (Method 9066)												
PHENOLICS	MG/L	--	--	**0.021**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.011**	0.01 U

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - SVOC results are from samples taken on May 23, 2011

Table A-3 (Continued)
Analytical Summary
First Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-042B 2/8/2011	OW-044D 2/8/2011	OW-102B 2/9/2011	OW-102D 2/8/2011	OW-102E 2/8/2011	OW-200E 2/10/2011	OW-201E* 2/9/2011	OW-202A 2/9/2011	OW-202B 2/8/2011	OW-202D 2/9/2011	OW-202D DUP
Metals (Method 6010B)														
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**25.7**	**24.2**
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**25**	**25.1**
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	**10.4**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	5 U	**21.8**	**23.4**	5 U	5 U	5 U	5 U	5 U	**5.8**	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)														
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	**5**	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)														
PENTACHLOROPHENOL	UG/L	1	5	1 U	1 U	1 U	0.96 U	0.98 U	1 U	0.97 U	1 U	0.97 U	0.96 U	0.97 U
SVOCs (Method 8270C SIM)														
ACENAPHTHENE	UG/L	420	2,100	**0.33**	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
ACENAPHTHYLENE	UG/L	210	1,050	0.21 U	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
ANTHRACENE	UG/L	2,100	10,500	0.21 U	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.14 U	0.13 U	0.13 U	0.12 U	0.13 U	0.13 U	0.19 U	0.13 U	0.13 U	0.12 U	0.13 U
BENZO(A)PYRENE	UG/L	0.2	2	0.21 U	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.19 U	0.18 U	0.18 U	0.17 U	0.18 U	0.19 U	0.19 U	0.18 U	0.17 U	0.17 U	0.17 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.21 U	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.18 U	0.17 U	0.17 U	0.16 U	0.17 U	0.18 U	0.19 U	0.17 U	0.16 U	0.16 U	0.16 U
CHRYSENE	UG/L	1.5	7.5	0.21 U	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.21 U	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
FLUORANTHENE	UG/L	280	1,400	**0.75**	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
FLUORENE	UG/L	280	1,400	**0.32**	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.21 U	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
NAPHTHALENE	UG/L	140	220	0.21 U	**0.32**	0.2 U	0.19 U	0.2 U	**0.44**	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
PHENANTHRENE	UG/L	210	1,050	**1.3**	**0.29**	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
PYRENE	UG/L	210	1,050	**0.54**	0.2 U	0.2 U	0.19 U	0.2 U	0.21 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U
Phenolics (Method 9066)														
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.013**	**0.025**	**0.01**	0.01 U	0.01 U	0.01 U

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - SVOC results are from samples taken on May 23, 2011

Table A-3 (Continued)
Analytical Summary
First Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-203A 2/8/2011	OW-204A 2/10/2011	OW-204B 2/9/2011	OW-205A 2/10/2011	OW-206A 2/9/2011	OW-207A 2/9/2011	R-013A 2/8/2011	R-014C 2/9/2011	R-014D* 2/9/2011	R-014D* DUP	R-014E 2/10/2011
Metals (Method 6010B)														
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**13.2**	10 U	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	100	1,000	**165**	5 U	**17.6**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	**296**	**46.9**	**19.4**	5 U	**15.4**	**16.5**	5 U	5 U	5 U	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)														
BENZENE	UG/L	5	25	1 U	1 U	1 U	**9.8**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	**37**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	**2.8**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	**12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)														
PENTACHLOROPHENOL	UG/L	1	5	1 U	0.99 U	1 U	1.1 U	0.99 U	1 U	0.99 U	1 U	0.99 U	0.99 U	0.99 U
SVOCs (Method 8270C SIM)														
ACENAPHTHENE	UG/L	420	2,100	0.2 U	0.2 U	0.2 U	**57**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
ACENAPHTHYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.2 U	**0.66**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
ANTHRACENE	UG/L	2,100	10,500	0.2 U	0.2 U	0.2 U	**2**	0.2 U	0.2 U	**0.24**	0.21 U	0.2 U	0.2 U	0.2 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.13 U	0.13 U	0.13 U	0.14 U	0.13 U	0.13 U	0.13 U	0.14 U	0.2 U	0.2 U	0.13 U
BENZO(A)PYRENE	UG/L	0.2	2	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.19 U	0.2 U	0.2 U	0.18 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.17 U	0.17 U	0.17 U	0.18 U	0.17 U	0.17 U	0.17 U	0.18 U	0.2 U	0.2 U	0.17 U
CHRYSENE	UG/L	1.5	7.5	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
FLUORANTHENE	UG/L	280	1,400	0.2 U	0.2 U	0.2 U	**1.2**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
FLUORENE	UG/L	280	1,400	0.2 U	0.2 U	0.2 U	**17**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
NAPHTHALENE	UG/L	140	220	0.2 U	0.2 U	0.2 U	**1500**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	**0.42**
PHENANTHRENE	UG/L	210	1,050	0.2 U	0.2 U	0.2 U	**17**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	**0.34**
PYRENE	UG/L	210	1,050	0.2 U	0.2 U	0.2 U	**0.61**	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U
Phenolics (Method 9066)														
PHENOLICS	MG/L	--	--	0.01 U	**0.044**	0.01 U	**0.027**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - SVOC results are from samples taken on May 23, 2011

Table A-3 (Continued)
Analytical Summary
First Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	BOTTLE BLANK 2/9/2011	EB 2/8/2011	EB-1079 2/8/2011	EB-1101 2/8/2011	EB-1176 2/8/2011	EB-1415 2/8/2011	EB 2/9/2011	EB 2/10/2011	TB 2/8/2011	TB 2/9/2011	TB 2/10/2011
Metals (Method 6010B)														
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA
CHROMIUM - TOTAL	UG/L	--	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	NA	NA	NA
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	NA	NA	NA
BTEX (Method 8021B)														
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)														
PENTACHLOROPHENOL	UG/L	1	5	1 U	1 U	1 U	1 U	0.99 U	1.1 U	1.1 U	0.96 U	NA	NA	NA
SVOCs (Method 8270C SIM)														
ACENAPHTHENE	UG/L	420	2,100	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
ACENAPHTHYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
ANTHRACENE	UG/L	2,100	10,500	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.13 U	0.13 U	0.14 U	0.13 U	0.13 U	**0.15**	0.14 U	0.12 U	NA	NA	NA
BENZO(A)PYRENE	UG/L	0.2	2	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	**0.41**	0.2 U	0.17 U	NA	NA	NA
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	**0.5**	0.22 U	0.19 U	NA	NA	NA
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.17 U	0.17 U	0.18 U	0.17 U	0.17 U	**0.48**	0.19 U	0.16 U	NA	NA	NA
CHRYSENE	UG/L	1.5	7.5	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	**0.3**	0.22 U	0.19 U	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	**0.66**	0.22 U	0.19 U	NA	NA	NA
FLUORANTHENE	UG/L	280	1,400	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
FLUORENE	UG/L	280	1,400	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	**0.61**	0.22 U	0.19 U	NA	NA	NA
NAPHTHALENE	UG/L	140	220	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
PHENANTHRENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
PYRENE	UG/L	210	1,050	0.2 U	0.2 U	0.21 U	0.2 U	0.2 U	0.22 U	0.22 U	0.19 U	NA	NA	NA
Phenolics (Method 9066)														
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - SVOC results are from samples taken on May 23, 2011

Table A-4
Analytical Summary
Second Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-010B 8/3/2011	OW-012D 8/2/2011	OW-017A 8/2/2011	OW-017C 8/3/2011	OW-022BR 8/4/2011	OW-023C 8/3/2011	OW-023D 8/2/2011	OW-023D DUP	OW-026A 8/4/2011
Metals (Method 6010B)												
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	10 U	**31**	10 U	10 U	**330**
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	**11**	10 U	**27**	10 U	10 U	**300**
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	**9.7**	5 U	5 U	**22**	**63**	**12**	5 U	5 U	10 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)												
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)												
PENTACHLOROPHENOL	UG/L	1	5	0.96 U	1 U	0.97 U	1 U	0.95 U	1 U	0.99 U	1 U	0.95 U
SVOCs (Method 8270C SIM)												
ACENAPHTHENE	UG/L	420	2,100	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	**1.6 B**
ACENAPHTHYLENE	UG/L	210	1,050	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
ANTHRACENE	UG/L	2,100	10,500	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	**0.44**
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
BENZO(A)PYRENE	UG/L	0.2	2	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
CHRYSENE	UG/L	1.5	7.5	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
FLUORANTHENE	UG/L	280	1,400	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
FLUORENE	UG/L	280	1,400	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
NAPHTHALENE	UG/L	140	220	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
PHENANTHRENE	UG/L	210	1,050	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
PYRENE	UG/L	210	1,050	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.19 U
Phenolics (Method 9066)												
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	**0.011 B**	0.01 U	0.01 U	0.01 U	**0.01 B**	**0.012 B**	**0.033**

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - BTEX results are from samples taken on August 2, 2011
** - SVOC results are from samples taken on August 4, 2011

Table A-4 (Continued)
Analytical Summary
Second Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-027A 8/3/2011	OW-027A DUP	OW-027D 8/4/2011	OW-027E 8/2/2011	OW-031A** 8/2/2011	OW-033E 8/4/2011	OW-035B 8/4/2011	OW-035C 8/3/2011	OW-035C DUP	OW-035DR* 8/4/2011
Metals (Method 6010B)													
ARSENIC - SOLUBLE	UG/L	50	200	**26**	**23**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	**25**	**26**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	5 U	5 U	5 U	5 U	5 U	**13**	5 U	5 U	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)													
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)													
PENTACHLOROPHENOL	UG/L	1	5	0.96 U	0.96 U	0.95 U	0.94 U	0.98 U	0.98 U	0.97 U	0.99 U	0.95 U	0.98 U
SVOCs (Method 8270C SIM)													
ACENAPHTHENE	UG/L	420	2,100	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
ACENAPHTHYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
ANTHRACENE	UG/L	2,100	10,500	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
BENZO(A)PYRENE	UG/L	0.2	2	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
CHRYSENE	UG/L	1.5	7.5	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
FLUORANTHENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
FLUORENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
NAPHTHALENE	UG/L	140	220	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
PHENANTHRENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	**0.29 B**
PYRENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U
Phenolics (Method 9066)													
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	0.01 U	**0.026 B**	**0.018 B**	0.01 U	**0.081**	0.01 U	0.01 U	0.01 U

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - BTEX results are from samples taken on August 2, 2011
** - SVOC results are from samples taken on August 4, 2011

Table A-4 (Continued)
Analytical Summary
Second Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-035E 8/2/2011	OW-036B 8/2/2011	OW-037B 8/3/2011	OW-037D 8/4/2011	OW-039BR2 8/3/2011	OW-039DR 8/4/2011	OW-039DR DUP	OW-039ER 8/4/2011	OW-040B 8/3/2011	OW-040B DUP
Metals (Method 6010B)													
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	5 U	5 U	5 U	5 U	**500**	5 U	5 U	5 U	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)													
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	**3.2**	**3.1**	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)													
PENTACHLOROPHENOL	UG/L	1	5	0.94 U	0.96 U	0.96 U	0.96 U	0.95 U	0.96 U	0.97 U	0.96 U	0.97 U	0.97 U
SVOCs (Method 8270C SIM)													
ACENAPHTHENE	UG/L	420	2,100	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
ACENAPHTHYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
ANTHRACENE	UG/L	2,100	10,500	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(A)PYRENE	UG/L	0.2	2	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
CHRYSENE	UG/L	1.5	7.5	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
FLUORANTHENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
FLUORENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
NAPHTHALENE	UG/L	140	220	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
PHENANTHRENE	UG/L	210	1,050	**0.23**	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
PYRENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Phenolics (Method 9066)													
PHENOLICS	MG/L	--	--	**0.14**	**0.013 B**	0.01 U	0.01 U	0.01 U	**0.024**	**0.022**	0.01 U	0.01 U	0.01 U

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - BTEX results are from samples taken on August 2, 2011
** - SVOC results are from samples taken on August 4, 2011

Table A-4 (Continued)
Analytical Summary
Second Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-040D* 8/4/2011	OW-041A 8/3/2011	OW-041B 8/3/2011	OW-041D 8/3/2011	OW-042B 8/4/2011	OW-044D 8/4/2011	OW-102B 8/3/2011	OW-102D 8/2/2011	OW-102E** 8/2/2011	OW-200E 8/4/2011
Metals (Method 6010B)													
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	**50**	**14**	10 U	10 U	10 U	10 U	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	**52**	**14**	10 U	10 U	10 U	10 U	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	5 U	**7.7**	5 U	5 U	5 U	5 U	**26**	5 U	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)													
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)													
PENTACHLOROPHENOL	UG/L	1	5	0.98 U	0.98 U	0.96 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	0.98 U	0.95 U
SVOCs (Method 8270C SIM)													
ACENAPHTHENE	UG/L	420	2,100	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
ACENAPHTHYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
ANTHRACENE	UG/L	2,100	10,500	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
BENZO(A)PYRENE	UG/L	0.2	2	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
CHRYSENE	UG/L	1.5	7.5	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
FLUORANTHENE	UG/L	280	1,400	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
FLUORENE	UG/L	280	1,400	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
NAPHTHALENE	UG/L	140	220	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	**0.49 B**
PHENANTHRENE	UG/L	210	1,050	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	**0.19 B**
PYRENE	UG/L	210	1,050	0.2 U	0.2 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U	0.19 U
Phenolics (Method 9066)													
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.01 B**	**0.014 B**	0.01 U

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - BTEX results are from samples taken on August 2, 2011
** - SVOC results are from samples taken on August 4, 2011

Table A-4 (Continued)
Analytical Summary
Second Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	OW-201E 8/4/2011	OW-202A 8/2/2011	OW-202B 8/2/2011	OW-202D 8/3/2011	OW-203A 8/3/2011	OW-204A 8/3/2011	OW-204B 8/3/2011	OW-205A 8/4/2011	OW-206A 8/3/2011	OW-207A 8/3/2011
Metals (Method 6010B)													
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	**19**	10 U	10 U	10 U	10 U	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	**21**	10 U	10 U	10 U	**12**	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	**9.2**	5 U	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	5 U	5 U	5 U	**52**	**1500**	**30**	**12**	5 U	5 U	**5**
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
BTEX (Method 8021B)													
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**6.9**	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**33**	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**3.4**	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**15**	1 U	1 U
SVOCs (Method 8270C SIM)													
PENTACHLOROPHENOL	UG/L	1	5	0.97 U	0.96 U	0.97 U	0.96 U	0.95 U	0.95 U	0.94 U	0.94 U	0.97 U	0.97 U
SVOCs (Method 8270C SIM)													
ACENAPHTHENE	UG/L	420	2,100	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**140**	0.19 U	0.19 U
ACENAPHTHYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**1.5**	0.19 U	0.19 U
ANTHRACENE	UG/L	2,100	10,500	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**6.3**	0.19 U	0.19 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(A)PYRENE	UG/L	0.2	2	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
CHRYSENE	UG/L	1.5	7.5	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
FLUORANTHENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**6**	0.19 U	0.19 U
FLUORENE	UG/L	280	1,400	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**79**	0.19 U	0.19 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
NAPHTHALENE	UG/L	140	220	**0.68 B**	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**2600**	0.19 U	0.19 U
PHENANTHRENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**90**	0.19 U	0.19 U
PYRENE	UG/L	210	1,050	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**2.4**	0.19 U	0.19 U
Phenolics (Method 9066)													
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	**0.011 B**	0.01 U	0.01 U	0.01 U	0.01 U	**0.027**	0.01 U	0.01 U

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - BTEX results are from samples taken on August 2, 2011
** - SVOC results are from samples taken on August 4, 2011

Table A-4 (Continued)
Analytical Summary
Second Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	R-013A 8/4/2011	R-014C 8/3/2011	R-014D 8/2/2011	R-014E 8/4/2011	BOTTLE BLANK 8/2/2011	EB 8/2/2011	EB-1101 8/2/2011	EB-1176 8/2/2011	EB-1415 8/2/2011
Metals (Method 6010B)												
ARSENIC - SOLUBLE	UG/L	50	200	10 U	**12**	10 U	10 U	10 U	10 U	NA	10 U	10 U
ARSENIC - TOTAL	UG/L	--	--	10 U	**10**	10 U	10 U	10 U	10 U	NA	10 U	10 U
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	5 U	5 U	5 U	NA	5 U	5 U
CHROMIUM - TOTAL	UG/L	--	--	5 U	5 U	5 U	5 U	5 U	5 U	NA	5 U	5 U
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	25 U	25 U	25 U	NA	25 U	25 U
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	25 U	25 U	25 U	NA	25 U	25 U
BTEX (Method 8021B)												
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)												
PENTACHLOROPHENOL	UG/L	1	5	0.95 U	1 U	1 U	0.97 U	0.97 U	1.1 U	NA	0.98 U	0.99 U
SVOCs (Method 8270C SIM)												
ACENAPHTHENE	UG/L	420	2,100	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
ACENAPHTHYLENE	UG/L	210	1,050	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
ANTHRACENE	UG/L	2,100	10,500	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
BENZO(A)PYRENE	UG/L	0.2	2	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
BENZO(GHI)PERYLENE	UG/L	210	1,050	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
CHRYSENE	UG/L	1.5	7.5	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
FLUORANTHENE	UG/L	280	1,400	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
FLUORENE	UG/L	280	1,400	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
NAPHTHALENE	UG/L	140	220	0.19 U	0.2 U	0.21 U	**0.21 B**	0.19 U	0.22 U	NA	0.2 U	0.2 U
PHENANTHRENE	UG/L	210	1,050	0.19 U	0.2 U	0.21 U	**0.23 B**	0.19 U	0.22 U	NA	0.2 U	0.2 U
PYRENE	UG/L	210	1,050	0.19 U	0.2 U	0.21 U	0.19 U	0.19 U	0.22 U	NA	0.2 U	0.2 U
Phenolics (Method 9066)												
PHENOLICS	MG/L	--	--	**0.017**	0.01 U	0.01 U	0.01 U	**0.02**	**0.016**	NA	**0.018**	**0.017**

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - BTEX results are from samples taken on August 2, 2011
** - SVOC results are from samples taken on August 4, 2011

Table A-4 (Continued)
Analytical Summary
Second Semi-Annual 2011 RCRA Groundwater Data
2011 Annual RCRA Groundwater Moniroting Report
Carbondale Facility, Carbondale, Illinois

ANALYTE	UNITS	Class I (D- and E-Unit Wells)	Class II (A/B and C-Unit Wells)	EB 8/3/2011	EB 8/4/2011	EB 8/4/2011	TB 8/2/2011	TB 8/3/2011	TB 8/4/2011
Metals (Method 6010B)									
ARSENIC - SOLUBLE	UG/L	50	200	10 U	10 U	10 U	NA	NA	NA
ARSENIC - TOTAL	UG/L	--	--	10 U	10 U	10 U	NA	NA	NA
CHROMIUM - SOLUBLE	UG/L	100	1,000	5 U	5 U	5 U	NA	NA	NA
CHROMIUM - TOTAL	UG/L	--	--	5 U	5 U	5 U	NA	NA	NA
COPPER - SOLUBLE	UG/L	650	650	25 U	25 U	25 U	NA	NA	NA
COPPER - TOTAL	UG/L	--	--	25 U	25 U	25 U	NA	NA	NA
BTEX (Method 8021B)									
BENZENE	UG/L	5	25	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	UG/L	700	1,000	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	UG/L	1,000	2,500	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL XYLENES	UG/L	10,000	10,000	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (Method 8270C SIM)									
PENTACHLOROPHENOL	UG/L	1	5	0.98 U	0.95 U	0.97 U	NA	NA	NA
SVOCs (Method 8270C SIM)									
ACENAPHTHENE	UG/L	420	2,100	0.2 U	0.19 U	**0.33**	NA	NA	NA
ACENAPHTHYLENE	UG/L	210	1,050	0.2 U	0.19 U	0.19 U	NA	NA	NA
ANTHRACENE	UG/L	2,100	10,500	0.2 U	0.19 U	0.19 U	NA	NA	NA
BENZO(A)ANTHRACENE	UG/L	0.13	0.65	0.2 U	0.19 U	0.19 U	NA	NA	NA
BENZO(A)PYRENE	UG/L	0.2	2	0.2 U	0.19 U	0.19 U	NA	NA	NA
BENZO(B)FLUORANTHENE	UG/L	0.13	0.9	0.2 U	0.19 U	0.19 U	NA	NA	NA
BENZO(GHI)PERYLENE	UG/L	210	1,050	**0.25**	0.19 U	0.19 U	NA	NA	NA
BENZO(K)FLUORANTHENE	UG/L	0.17	0.85	**0.28**	0.19 U	0.19 U	NA	NA	NA
CHRYSENE	UG/L	1.5	7.5	**0.26**	0.19 U	0.19 U	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	UG/L	0.3	1.5	**0.35**	0.19 U	0.19 U	NA	NA	NA
FLUORANTHENE	UG/L	280	1,400	0.2 U	0.19 U	0.19 U	NA	NA	NA
FLUORENE	UG/L	280	1,400	0.2 U	**0.19**	**0.3**	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	UG/L	0.43	2.15	**0.25**	0.19 U	0.19 U	NA	NA	NA
NAPHTHALENE	UG/L	140	220	0.2 U	**0.42**	**0.47**	NA	NA	NA
PHENANTHRENE	UG/L	210	1,050	0.2 U	**0.38**	**0.74**	NA	NA	NA
PYRENE	UG/L	210	1,050	0.2 U	0.19 U	0.19 U	NA	NA	NA
Phenolics (Method 9066)									
PHENOLICS	MG/L	--	--	0.01 U	0.01 U	0.01 U	NA	NA	NA

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
SVOCs - semivolatile organic compounds
U - compound was analyzed but not detected
J - an estimated result
DUP - Duplicate sample
B - field blank contamination
EB - Equipment blank
TB - Trip blank
Bold - constituent detected
Shade - indicates concentration exceeds TACO (Tiered Approach to Corrective Action Objectives, IEPA) Tier 1 Standard.
* - BTEX results are from samples taken on August 2, 2011
** - SVOC results are from samples taken on August 4, 2011

APPENDIX B

DATA EVALUATION REPORTS FOR 2011

FTS, LLC

DATE: March 25, 2011

FROM: Kendra Chintella

SUBJECT: Carbondale Semi-Annual GW

SAMPLE DELIVERY GROUP (SDG): C1B090533

SAMPLES: PB-1101, PB-1415, PB-1176, PB-1079, OW-023D, OW-202B, OW-99A(OW-027D), OW-99B(OW-040D), OW-042B, OW-027D, OW-017A, OW-039DR, OW-039ER, OW-044D, TRIP BLANK, EB-020811-1079, OW-040D, OW-040B, OW-102D, OW-041A, R-013A, OW-031A, OW-102E, OW-203A

ANALYSES: Method 8021B (VOCs), 8270C/SIM (SVOCs), 6010B (Total/Dissolved Metals), 9066 (Phenolics)

LABORATORY: TestAmerica Laboratories, Inc., Pittsburgh

The data contained in this SDG were evaluated with regard to the following parameters:

□ Data Completeness
Noncompliances: None

□ Holding Times
Noncompliances: None

□ Laboratory Blank Contamination
Noncompliances: None

□ Field Blank Contamination
Noncompliances: Benzo(a)anthracene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenzo(ah)anthracene, and indeno(1,2,3-cd)pyrene were detected in the pump blank. See attached page for details.

□ Field Duplicate Precision:
Noncompliances: See attached page for details.

□ Surrogate Recoveries
Noncompliances: None

□ Matrix Spike and Matrix Spike Duplicate
Noncompliances: The MS/MSD recovery of total recoverable phenolics was above the control limits. The RPDs of benzene, phenanthrene, and toluene were above the control limits. No action was taken as the LCS recoveries were compliant.

□ Laboratory Control Sample
Noncompliances: None

Field Blank Contamination:

The following analytes were detected in the aqueous pump blank, PB-1415, at the following concentrations:

Analyte	Maximum Concentration	Blank Action Level
Benzo(a)anthracene	0.15 ug/l	0.75 ug/l
Benzo(b)fluoranthene	0.41 ug/l	2.05 ug/l
Benzo(ghi)perylene	0.5 ug/l	2.5 ug/l
Benzo(k)fluoranthene	0.48 ug/l	2.4 ug/l
Chrysene	0.3 ug/l	1.5 ug/l
Dibenzo(ah)anthracene	0.66 ug/l	3.3 ug/l
Indeno(1,2,3-cd)pyrene	0.61 ug/l	3.05 ug/l

An action level of 5X the maximum concentration was used to evaluate the sample data for field blank contamination. Associated samples with concentrations below the blank action level were qualified as “B” for field blank contamination.

Field Duplicate Precision:

FIELD DUPLICATE PRECISION					
ANALYTE	OW-027D	QUAL	OW-99A	QUAL	RPD
Total Recoverable Phenolics	0.01	U	0.11		NC
Toluene	3.1		1.9		48*
ANALYTE	OW-040D	QUAL	OW-99B	QUAL	RPD
Anthracene	1.2		1.1		8.70
Benzo(a)anthracene	8.5		7.5		12.5
Benzo(a)pyrene	6		6		0
Benzo(b)fluoranthene	7.6		7.1		6.80
Benzo(ghi)perylene	7.4		7.2		2.74
Benzo(k)fluoranthene	7.1		6.7		5.80
Chrysene	6.8		7.1		4.32
Dibenzo(ah)anthracene	7.9		7.4		6.54
Fluoranthene	2.6		2.3		12.24
Indeno(1,2,3-cd)pyrene	7.2		7.1		1.40
Phenanthrene	0.46		0.39		16.47
Pyrene	3.2		2.9		9.84

NC – not calculated due to nondetect result
* - RPD is greater than 30%, associated samples are qualified as estimated, “J,” due to laboratory or field sampling imprecision.

FTS, LLC

DATE: March 25, 2011

FROM: Kendra Chintella

SUBJECT: Carbondale Semi-Annual GW

SAMPLE DELIVERY GROUP (SDG): C1B110486

SAMPLES: BB-020911, EB-020911-1176, OW-202D, OW-035C, OW-204B, OW-99C(OW-202D), OW-041D, OW-041B, OW-207A, OW-206A, OW-010B, OW-202A, OW-036B, OW-102B, OW-017C, OW-22BR, R-14D, OW-99D(R-14D), R-14C, OW-201E, OW-037B, OW-27E, OW-027A, TRIPBLANK

ANALYSES: Method 8021B (VOCs), 8270C/SIM (SVOCs), 6010B (Total/Dissolved Metals), 9066 (Phenolics)

LABORATORY: TestAmerica Laboratories, Inc., Pittsburgh

The data contained in this SDG were evaluated with regard to the following parameters:

□ Data Completeness
Noncompliances: None

□ Holding Times
Noncompliances: None

□ Laboratory Blank Contamination
Noncompliances: None

□ Field Blank Contamination
Noncompliances: None

□ Field Duplicate Precision:
Noncompliances: See attached page for details.

□ Surrogate Recoveries
Noncompliances: None

□ Matrix Spike and Matrix Spike Duplicate
Noncompliances: The MS/MSD recoveries of acenaphthene and benzo(k)fluoranthene fell below the control limits. The MS/MSD recovery of total recoverable phenolics was above the control limits. No action was taken as the LCS recoveries were compliant.

□ Laboratory Control Sample
Noncompliances: None

Field Duplicate Precision:

FIELD DUPLICATE PRECISION					
ANALYTE	OW-202D	QUAL	OW-99C	QUAL	RPD
Arsenic, dissolved	25.7		24.2		6.01
Arsenic, total	25		25.1		0.40
ANALYTE	R-14D	QUAL	OW-99D	QUAL	RPD
Anthracene	0.2	U	0.22		NC
Benzo(a)anthracene	0.34		1.8		136.45*
Benzo(a)pyrene	0.29		1.4		131.36*
Benzo(b)fluoranthene	0.45		2		126.53*
Benzo(ghi)perylene	0.47		2.2		129.59*
Benzo(k)fluoranthene	0.49		2.2		127.14*
Chrysene	0.47		2.1		126.85*
Dibenzo(ah)anthracene	0.51		2.2		124.72*
Fluoranthene	0.2	U	0.7		NC
Indeno(1,2,3-cd)pyrene	0.52		2.2		123.53*
Pyrene	0.2	U	0.71		NC

NC – not calculated due to nondetect result
* - RPD is greater than 30%, associated samples are qualified as estimated, “J,” due to laboratory or field sampling imprecision.

FTS, LLC

DATE: March 25, 2011

FROM: Kendra Chintella

SUBJECT: Carbondale Semi-Annual GW

SAMPLE DELIVERY GROUP (SDG): C1B110499

SAMPLES: EB-021011-1415, OW-035DR, OW-037D, OW-035B, OW-012D, OW-204A, OW-023C, OW-200E, R-014E, OW-035E, OW-039BR2, OW-033E, OW-026A, OW-205A, OW-99E(OW-012D), TRIPBLANK

ANALYSES: Method 8021B (VOCs), 8270C/SIM (SVOCs), 6010B (Total/Dissolved Metals), 9066 (Phenolics)

LABORATORY: TestAmerica Laboratories, Inc., Pittsburgh

The data contained in this SDG were evaluated with regard to the following parameters:

□ Data Completeness
Noncompliances: None

□ Holding Times
Noncompliances: None

□ Laboratory Blank Contamination
Noncompliances: None

□ Field Blank Contamination
Noncompliances: None

□ Field Duplicate Precision:
Noncompliances: None

□ Surrogate Recoveries
Noncompliances: The surrogate recovery of trifluorotoluene above above the control limits in OW-037D. No action was taken on this basis.

□ Matrix Spike and Matrix Spike Duplicate
Noncompliances: The MS/MSD recoveries of acenaphthene and benzo(k)fluoranthene fell below the control limits. The MS/MSD recovery of total recoverable phenolics was above the control limits. No action was taken as the LCS recoveries were compliant.

□ Laboratory Control Sample
Noncompliances: None

FTS, LLC

DATE: June 8, 2011

FROM: Kendra Chintella

SUBJECT: Carbondale Semi-Annual GW

SAMPLE DELIVERY GROUP (SDG): 180-447-1

SAMPLES: PUMP BLANK-1121-052311, OW-40D-052311, OW-201E-052311, OW-27A-052311, R-014D-052311, OW-26A-052311, M-99A-052311(OW-40D), M-99B-052311(R-014D), BOTTLE BLANK-052311

ANALYSES: Method 8270C/SIM (SVOCs)

LABORATORY: TestAmerica Laboratories, Inc., Pittsburgh

The data contained in this SDG were evaluated with regard to the following parameters:

- □ Data Completeness
  Noncompliances: None

- □ Holding Times
  Noncompliances: None

- □ Laboratory Blank Contamination
  Noncompliances: None

- □ Field Blank Contamination
  Noncompliances: None

- □ Field Duplicate Precision:
  Noncompliances: None

- □ Surrogate Recoveries
  Noncompliances: None

- □ Matrix Spike and Matrix Spike Duplicate
  Noncompliances: None

- □ Laboratory Control Sample
  Noncompliances: None

FTS, LLC

DATE: September 8, 2011

FROM: Kendra Chintella

SUBJECT: Carbondale Semi-Annual GW

SAMPLE DELIVERY GROUP (SDG): 180-2565-1

SAMPLES: BOTTLE BLANK, PB-1415, PB-1176, PB-1101, OW-23D, OW-99A(OW-23D), OW-36B, EB-080211, OW-12D, R-014D, OW-17A, OW-31A, OW-202A, OW-202B, OW-35E, OW-102D, OW-027E, OW-102E, OW-35DR, OW-40D, TRIP BLANK-072511

ANALYSES: Method 8021B (VOCs), 8270C/SIM (SVOCs), 6010B (Total/Dissolved Metals), 9066 (Phenolics)

LABORATORY: TestAmerica Laboratories, Inc., Pittsburgh

The data contained in this SDG were evaluated with regard to the following parameters:

□ Data Completeness
Noncompliances: None

□ Holding Times
Noncompliances: None

□ Laboratory Blank Contamination
Noncompliances: None

□ **Field Blank Contamination**
Noncompliances: Total recoverable phenolics was detected in the bottle blank, pump blanks, and equipment blank. See attached page for details.

□ Field Duplicate Precision:
Noncompliances: See attached page for details.

□ Surrogate Recoveries
Noncompliances: None

□ Matrix Spike and Matrix Spike Duplicate
Noncompliances: The MS/MSD recovery of benzene was above the control limits. No action was taken as the LCS recovery was compliant.

□ Laboratory Control Sample
Noncompliances: None

Field Blank Contamination:

The following analyte was detected in the aqueous bottle blank, BOTTLE BLANK, at the following concentration:

Analyte	Maximum Concentration	Blank Action Level
Total recoverable phenolics	0.02 mg/l	0.1 mg/l

The following analyte was detected in the aqueous pump blank, PB-1415, at the following concentration:

Analyte	Maximum Concentration	Blank Action Level
Total recoverable phenolics	0.017 mg/l	0.085 mg/l

The following analyte was detected in the aqueous pump blank, PB-1176, at the following concentration:

Analyte	Maximum Concentration	Blank Action Level
Total recoverable phenolics	0.018 mg/l	0.09 mg/l

The following analyte was detected in the aqueous equipment blank, EB-080211, at the following concentration:

Analyte	Maximum Concentration	Blank Action Level
Total recoverable phenolics	0.016 mg/l	0.08 mg/l

An action level of 5X the maximum concentration was used to evaluate the sample data for field blank contamination. Associated samples with concentrations below the blank action level were qualified as “B” for field blank contamination.

Field Duplicate Precision:

FIELD DUPLICATE PRECISION					
ANALYTE	OW-023D	QUAL	OW-99A	QUAL	RPD
Total recoverable phenolics	0.01		0.012		18.18

FTS, LLC

DATE: September 8, 2011

FROM: Kendra Chintella

SUBJECT: Carbondale Semi-Annual GW

SAMPLE DELIVERY GROUP (SDG): 180-2605-1

SAMPLES: OW-37B, OW-41D, OW-27A, R-014C, OW-206A, OW-207A, OW-41A, OW-204B, OW-202D, OW-41B, OW-102B, OW-35C, OW-17C, OW-23C, OW-204A, OW-10B, OW-39BR2, OW-203A, OW-40B, OW-99B(OW-35C), OW-99C(OW-27A), EB-080311, TRIPBLANK, OW-99D(OW-40B)

ANALYSES: Method 8021B (VOCs), 8270C/SIM (SVOCs), 6010B (Total/Dissolved Metals), 9066 (Phenolics)

LABORATORY: TestAmerica Laboratories, Inc., Pittsburgh

The data contained in this SDG were evaluated with regard to the following parameters:

□ Data Completeness
Noncompliances: None

□ Holding Times
Noncompliances: None

□ Laboratory Blank Contamination
Noncompliances: None

□ **Field Blank Contamination**
Noncompliances: Benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected in the equipment blank. See attached page for details.

□ Field Duplicate Precision:
Noncompliances: See attached page for details.

□ Surrogate Recoveries
Noncompliances: None

□ Matrix Spike and Matrix Spike Duplicate
Noncompliances: The MS/MSD recovery of total recoverable phenolics was above the control limits. The RPD recovery for phenanthrene was above the control limits. No action was taken as the LCS recoveries were compliant.

□ Laboratory Control Sample
Noncompliances: None

Field Blank Contamination:

The following analytes were detected in the aqueous equipment blank, EB-080311, at the following concentrations:

Analyte	Maximum Concentration	Blank Action Level
Benzo(g,h,i)perylene	0.25 ug/l	1.25 ug/l
Benzo(k)fluoranthene	0.28 ug/l	1.4 ug/l
Chrysene	0.26 ug/l	1.3 ug/l
Dibenzo(a,h)anthracene	0.35 ug/l	1.75 ug/l
Indeno(1,2,3-cd)pyrene	0.25 ug/l	1.25 ug/l

An action level of 5X the maximum concentration was used to evaluate the sample data for field blank contamination. Associated samples with concentrations below the blank action level were qualified as “B” for field blank contamination.

Field Duplicate Precision:

FIELD DUPLICATE PRECISION					
ANALYTE	OW-027A	QUAL	OW-099C	QUAL	RPD
Arsenic, dissolved	26		23		12.24
Arsenic, total	25		26		3.92

FTS, LLC

DATE: September 8, 2011

FROM: Kendra Chintella

SUBJECT: Carbondale Semi-Annual GW

SAMPLE DELIVERY GROUP (SDG): 180-2663-1

SAMPLES: OW-44D, R-014E, PB-1415, R-13A, OW-35B, OW-26A, OW-42B, OW-205A, OW-201E, OW-27D, OW-22BR, OW-200E, OW-39ER, OW-39DR, OW-99E(OW-39DR), OW-33E, OW-37D, EB-080411, OW-31A, OW-102E, OW-35DR, OW-40D, TRIP BLANK

ANALYSES: Method 8021B (VOCs), 8270C/SIM (SVOCs), 6010B (Total/Dissolved Metals), 9066 (Phenolics)

LABORATORY: TestAmerica Laboratories, Inc., Pittsburgh

The data contained in this SDG were evaluated with regard to the following parameters:

□ Data Completeness
Noncompliances: None

□ Holding Times
Noncompliances: None

□ Laboratory Blank Contamination
Noncompliances: None

□ **Field Blank Contamination**
Noncompliances: Fluorene, naphthalene, and phenanthrene were detected in the pump blank and the equipment blank. Acenaphthene was detected in the pump blank. See attached page for details.

□ Field Duplicate Precision:
Noncompliances: See attached page for details.

□ Surrogate Recoveries
Noncompliances: None

□ Matrix Spike and Matrix Spike Duplicate
Noncompliances: The MS/MSD recovery of total recoverable phenolics was above the control limits. The RPD recoveries of anthracene, benzo(g,h,i)perylene, dibenzo(a.h)anthracene, fluoranthene, and pyrene were above the control limits. No action was taken as the LCS recoveries were compliant.

□ Laboratory Control Sample
Noncompliances: None

Field Blank Contamination:

The following analytes were detected in the aqueous pump blank, PB-1415, at the following concentrations:

Analyte	Maximum Concentration	Blank Action Level
Acenaphthene	0.33 ug/l	1.65 ug/l
Fluorene	0.3 ug/l	1.5 ug/l
Naphthalene	0.47 ug/l	2.35 ug/l
Phenanthrene	0.74 ug/l	3.7 ug/l

The following analytes were detected in the aqueous equipment blank, EB-080411, at the following concentrations:

Analyte	Maximum Concentration	Blank Action Level
Fluorene	0.19 ug/l	0.95 ug/l
Naphthalene	0.42 ug/l	2.1 ug/l
Phenanthrene	0.38 ug/l	1.9 ug/l

An action level of 5X the maximum concentration was used to evaluate the sample data for field blank contamination. Associated samples with concentrations below the blank action level were qualified as “B” for field blank contamination.

Field Duplicate Precision:

FIELD DUPLICATE PRECISION					
ANALYTE	OW-39DR	QUAL	OW-99E	QUAL	RPD
Toluene	3.2		3.1		3.17
Total recoverable phenolics	0.024		0.022		8.70