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CALENDAR YEAR 2004
GROUNDWATER MONITORING REPORT,
U.S. DEPARTMENT OF ENERGY
Y-12 NATIONAL SECURITY COMPLEX,
OAK RIDGE, TENNESSEE

Y-12 NATIONAL SECURITY COMPLEX

September 2005

Prepared by

Elvado Environmental LLC
Under Subcontract No. 4300030332

for the

Environmental Compliance Department
Environment, Safety, and Health Division
Y-12 National Security Complex
Oak Ridge, Tennessee 37831

Managed by

BWXT Y-12, L.L.C.
for the U.S. Department of Energy
Under Contract No. DE-AC05-00OR22800

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BWXT Y-12, L.L.C.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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List of Acronyms and Abbreviations

ACO	Analytical Chemistry Organization
BCK	Bear Creek kilometer
BCBG	Bear Creek Burial Grounds
BCV	Bear Creek Valley
Bear Creek Regime	Bear Creek Hydrogeologic Regime
BG	Burial Ground
bgs	below ground surface
BJC	Bechtel Jacobs Company LLC
BT	buried tributary
BWXT	BWXT Y-12, L.L.C.
CDL	Construction/Demolition Landfill
CE	counting error
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CRSDB	Chestnut Ridge Sediment Disposal Basin
CRSP	Chestnut Ridge Security Pits
CTET	carbon tetrachloride
CY	calendar year
DFS	Duratek Federal Services
DNAPL	dense nonaqueous phase liquids
DOE	U.S. Department of Energy
DQO	data quality objective
East Fork Regime	Upper East Fork Poplar Creek Hydrogeologic Regime
EMWMF	Environmental Management Waste Management Facility
ETB	ethylbenzene
FCAP	Filled Coal Ash Pond
ft	feet
ft/d	feet per day
gpm	gallons per minute
GWPP	Groundwater Protection Program
HCDA	Hazardous Chemical Disposal Area
ILF	Industrial Landfill
LMES	Lockheed Martin Energy Systems, Inc.
MC	methylene chloride
MCL	maximum contaminant level
MDA	minimum detectable activity
MDM	MDM Services Corporation
mg/d	million gallons per day
µg/L	micrograms per liter
mg/L	milligrams per liter
MMES	Martin Marietta Energy Systems, Inc.
mrem/yr	millirems per year
msl	mean sea level
NHP	New Hope Pond
NPDES	National Pollution Discharge Elimination System

List of Acronyms and Abbreviations (continued)

NT	northern tributary (of Bear Creek)
OF	outfall
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PCE	tetrachloroethene
pCi/L	picoCuries per liter
POC	point-of-compliance
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
REDOX	oxidation-reduction potential
ROD	record of decision (CERCLA)
SAP	sampling and analysis plan
SCR	south Chestnut Ridge
SDWA	Safe Drinking Water Act
SS	south side (of Bear Creek)
SWDF	Solid Waste Disposal Facility
Tc-99	technetium-99
TCE	trichloroethene
TCFM	trichlorofluoromethane
TDEC	Tennessee Department of Environment and Conservation
TDS	total dissolved solids
U-234	uranium-234
U-238	uranium-238
UEFPC	Upper East Fork Poplar Creek
UST	underground storage tank
VC	vinyl chloride
VOC	volatile organic compound
WMA	waste management area
WRRP	Water Resources Restoration Program
Y-12	Y-12 National Security Complex
yd^3	cubic yards
111TCA	1,1,1-trichloroethane
11DCA	1,1-dichloroethane
11DCE	1,1-dichloroethene
12DCA	1,2-dichloroethane
12DCE	1,2-dichloroethene
12DCP	1,2-dichloropropane
c12DCE	cis-1,2-dichloroethene
t12DCE	trans-1,2-dichloroethene

1.0 INTRODUCTION

This report contains the groundwater and surface water monitoring data that were obtained during calendar year (CY) 2004 at the U.S. Department of Energy (DOE) Y-12 National Security Complex (hereafter referenced as Y-12) on the DOE Oak Ridge Reservation (ORR) in Oak Ridge, Tennessee. The CY 2004 monitoring data were obtained from groundwater and surface water sampling locations in three hydrogeologic regimes at Y-12 (Figure A.1). The Bear Creek Hydrogeologic Regime (Bear Creek Regime) encompasses a section of Bear Creek Valley (BCV) between the west end of Y-12 and the west end of the Bear Creek Watershed (directions are in reference to the Y-12 grid system). The Upper East Fork Poplar Creek Hydrogeologic Regime (East Fork Regime) encompasses the Y-12 industrial facilities and support structures in BCV. The Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime) encompasses a section of Chestnut Ridge south of Y-12.

The CY 2004 monitoring data were obtained under the Y-12 Groundwater Protection Program (GWPP) managed by BWXT Y-12, L.L.C. (BWXT) and several monitoring programs managed by Bechtel Jacobs Company LLC (BJC). Data contained in this report meet applicable requirements of DOE Order 450.1 (*Environmental Protection Program*) regarding evaluation of groundwater and surface water quality in areas: (1) which are, or could be, affected by operations at Y-12 (surveillance monitoring); and (2) where contaminants from Y-12 are most likely to migrate beyond the boundaries of the ORR (exit pathway/perimeter monitoring). However, detailed analysis, evaluation, and interpretation of the CY 2004 monitoring data is deferred to the *Y-12 Groundwater Protection Program Groundwater Monitoring Data Compendium* (BWXT 2005). For each monitoring well, spring, and surface water sampling station included in this report, the GWPP Compendium provides: (1) pertinent well installation and construction information; (2) a complete sampling history, including sampling methods and distinguishing sampling characteristics; (3) an evaluation of hydrologic characteristics, based on pre-sampling groundwater elevations, along with a compilation of available test results (e.g., hydraulic conductivity test data); (4) a discussion of geochemical characteristics based on evaluation of the analytical results for the primary anions and cations; and (5) a detailed analysis and interpretation of the available data for the principal groundwater contaminants at Y-12: nitrate, uranium, volatile organic compounds (VOCs), gross alpha activity, and gross beta activity.

The following sections of this report provide details regarding the CY 2004 groundwater and surface water monitoring activities in the Bear Creek, East Fork, and Chestnut Ridge Regime. Section 2 briefly describes the hydrogeologic system and generalized extent of groundwater contamination in each regime. Section 3 describes the monitoring programs implemented and associated sampling activities performed in each regime during CY 2004. Section 4 presents an a summary of the CY 2004 monitoring data with regard to the provisions of DOE Order 450.1 (surveillance and exit pathway/perimeter monitoring), including highlights of notable findings and time-series plots of data for CY 2004 sampling locations that provide representative examples of long-term contaminant concentration trends. Brief conclusions and proposed recommendations are provided in Section 5. Section 6 lists the documents cited for more detailed operational, regulatory, and technical information.

The narrative sections of the report reference several appendices. Figures (maps and diagrams) and tables (excluding data summary tables presented in the narrative sections) are in Appendix A and Appendix B, respectively. Monitoring well construction details are in Appendix C. Results of field measurements and laboratory analyses of the groundwater and surface water samples collected during CY 2004 are in Appendix D (Bear Creek Regime), Appendix E (East Fork Regime and surrounding areas), and Appendix F

(Chestnut Ridge Regime). Appendix G contains data for quality assurance/quality control (QA/QC) samples associated with monitoring performed in each regime by the Y-12 GWPP.

2.0 BACKGROUND INFORMATION

The following sections provide information relevant to groundwater and surface water quality monitoring in three hydrogeologic regimes at Y-12 (Figure A.1). Included are a short description of the topography and geology in each regime; an overview of the hydrogeologic system in each regime; and a discussion of the extent of groundwater contamination in each regime.

2.1 TOPOGRAPHY AND BEDROCK GEOLOGY

The Bear Creek Regime and the East Fork Regime are each in BCV, which is bound to the north by Pine Ridge and to the south by Chestnut Ridge (Figure A.2). The Bear Creek Regime encompasses several miles of BCV between the western end of the Bear Creek watershed and a low topographic and hydrologic divide near the west end of Y-12. The East Fork Regime encompasses about three miles of BCV east of this topographic/hydrologic divide and west of the ORR property boundary along Scarboro Road. Ground surface elevations along the axis of BCV in each regime range from about 1,000 feet (ft) above mean sea level (msl) near the topographic/hydrologic divide to about 800 ft above msl where Bear Creek cuts through Pine Ridge and about 900 ft above msl where Upper East Fork Poplar Creek (UEFPC) cuts through Pine Ridge.

The Chestnut Ridge Regime is directly south of Y-12 and encompasses a portion of the ridge bordered by BCV to the north, Scarboro Road to the east, Bethel Valley Road to the south, and Dunaway Branch to the west (Figure A.2). The northern flank of the ridge forms a steep slope rising more than 200 ft above the floor of BCV. The crest of the ridge slopes toward the east from an elevation of about 1,200 ft above msl southwest of Y-12 to about 1,060 ft above msl where Scarboro Road crosses the ridge. A series of prominent hills dominates the central part of the broad southern flank of Chestnut Ridge, which gently slopes toward Bethel Valley.

Bedrock geology in the vicinity of Y-12 is characterized by thrust-faulted sequences of southeast-dipping, clastic (primarily shale and siltstone) and carbonate (limestone and dolostone) strata of Lower Cambrian to Upper Ordovician age (Figure A.2). Geologic units in the Bear Creek Regime and the East Fork Regime are the shales and siltstones of the Rome Formation underlying Pine Ridge and the interbedded limestone and shale formations of the Conasauga Group that underlie BCV and the southern flank of Pine Ridge. Carbonates (primarily dolostone) of the Knox Group and the overlying argillaceous limestones and interbedded shales of the Chickamauga Group are the geologic units in the Chestnut Ridge Regime. Strike and dip of bedding in each hydrogeologic regime is generally N55° E and 45° SE, respectively (as referenced to true north).

In BCV, unweathered bedrock is overlain by up to 40 ft of several unconsolidated materials, including alluvium, colluvium, fine-grained residuum, and saprolite (weathered bedrock). Where undisturbed, the saprolite often retains primary textural features of the unweathered bedrock, including fractures (Solomon, et. al. 1992). However, extensive areas of cut-and-fill within Y-12 have substantially altered the shallow subsurface in BCV throughout much of the East Fork Regime. Most of the fill, which contains many voids and generally consists of 5 to 25 ft of a heterogeneous mixture of building debris and re-compacted soil/residuum (Sutton and Field 1995), was placed in the tributaries and main channel of UEFPC (Figure A.3).

On Chestnut Ridge, bedrock is overlain by as much as 100 ft of red-brown to yellow-orange residuum. The residuum, which is predominantly composed of clay and hematite, contains semicontinuous relict beds of fractured chert and other lithologic heterogeneities (such as silt bodies) that provide a weakly connected network through which saturated flow can occur (Solomon, et. al. 1992). Also, residuum on Chestnut Ridge is thin or nonexistent near karst features such as dolines (sink holes), swallets (sinking streams), and solution pan features (Ketelle and Huff 1984).

2.2 SURFACE WATER DRAINAGE

The following subsections provide a brief description of surface water drainage systems in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime.

2.2.1 Bear Creek

Surface water in the Bear Creek Regime is drained by Bear Creek and its tributaries (Figure A.2). From its headwaters near the west end of Y-12, Bear Creek flows southwest for approximately 4.5 miles, where it turns northward to flow into East Fork Poplar Creek. Monitoring locations along the main channel of Bear Creek are specified by the Bear Creek kilometer (BCK) value corresponding to the distance upstream from the confluence with East Fork Poplar Creek (e.g., BCK-09.20). Sections of the main channel are referenced as upper Bear Creek (upstream of BCK-11.84), middle Bear Creek (between BCK-11.84 and BCK-09.20), and lower Bear Creek (downstream of BCK-09.20). Tributaries are designated as north tributary (NT) or south tributary along with a value representing the tributary number counted downstream from the headwaters (e.g., NT-1). Major springs along the south side (SS) of Bear Creek are numbered in ascending order downstream from the headwaters (e.g., SS-1).

Approximately half of the annual precipitation in BCV exits via surface water flow in Bear Creek, and possibly higher proportions during winter and early spring, with the remainder of the annual precipitation lost to evapotranspiration and recharge to the groundwater system (DOE 1997a). Flow in the creek increases rapidly during rainfall and afterward reflects the relative contributions of overland flow, stormflow, and groundwater discharge. Flow in the main channel and tributaries generally returns to pre-precipitation levels within one or two days. Major sections of upper and middle Bear Creek are seasonally dry, but flow is perennial in lower Bear Creek.

The main channel of Bear Creek functions as a major conduit of the shallow karst network within the Maynardville Limestone (DOE 1997a). Discharge from springs located along the Maynardville Limestone/Copper Ridge Dolomite boundary on the north slope of Chestnut Ridge dominate the hydrology of the creek, especially during droughts when springs provide most of the flow in the main channel. Additionally, the main channel contains alternating gaining and losing reaches. Each gaining reach generally correlates with a major groundwater discharge area. Losing reaches in upper and middle Bear Creek, particularly a section of the main channel directly south of Sanitary Landfill I, play an important role in transferring contaminants from Bear Creek into the Maynardville Limestone, which directly underlies the creek throughout much of BCV.

2.2.2 Upper East Fork Poplar Creek

Surface water in the East Fork Regime is drained by UEFPC, which was extensively modified during construction of Y-12 (Figure A.3). The East Fork Regime is divided into the three major areas for the purposes of this report: the western Y-12 area between Old Bear Creek Road and grid coordinate easting 55,000; the central Y-12 area between grid coordinate eastings 55,000 and 62,000; and the eastern Y-12 area between grid coordinate easting 62,000 and Scarboro Road. The headwaters and several thousand feet of the main channel in the upper reach of UEFPC, including all its northern tributaries in the western and central Y-12 areas, were filled and replaced with an extensive network of underground storm drains. For reference purposes, each buried tributary (BT) of UEFPC is designated with a value (e.g., BT-1) representing the tributary number counted downstream (west to east) from the headwaters. The storm drains direct surface runoff into the exposed portion of the UEFPC channel at several locations. Outfall (OF) 200 is at the beginning of the exposed portion of the UEFPC channel about 6,000 ft upstream of New Hope Pond (NHP)/Lake Reality (Figure A.3). Closed and capped in 1988, NHP was an unlined surface impoundment constructed in 1963 to regulate the quantity and quality of surface water exiting Y-12. Lake Reality is a lined surface impoundment that was built in 1988 to replace NHP.

During normal operations, flow in UEFPC is directed through a concrete-lined distribution channel located around the south and east side of NHP/Lake Reality (Figure A.3). Also, a gravel and perforated pipe underdrain beneath portions of the distribution channel captures shallow groundwater. Until December 1996 when flow was rerouted to bypass Lake Reality, surface flow in the UEFPC distribution channel discharged into Lake Reality (and exited through a weir in the western berm). Beginning in July 1998, flow in the UEFPC distribution channel was diverted through the Lake Reality spillway, which discharges into the mainstream of UEFPC directly north (downstream) of Lake Reality. Bypassing Lake Reality reduces mercury contributions to dry-weather flow in UEFPC.

About 70% of dry-weather flow in UEFPC, is attributable to once-through non-contact cooling water, condensate, and cooling tower blowdown, and the remaining 30% is from groundwater discharge (Shevenell 1994). Beginning in July 1996 a flow management program was implemented whereby water from the Clinch River is discharged near OF 200 to augment flow in UEFPC, which decreased from as much as 15 million gallons per day (mg/d) to about 2.5 mg/d because of reduced operations at Y-12 in recent years. Flow management is needed to achieve the National Pollution Discharge Elimination System (NPDES) minimum daily flow requirement of 7 mg/d at Station 17, which is where UEFPC exits the ORR downstream from Lake Reality (Figure A.3). Flow management also allows compliance with NPDES toxicity requirements and helps lower the elevated water temperature in UEFPC.

2.2.3 Chestnut Ridge

The Chestnut Ridge Regime encompasses five primary tributary drainage basins on south Chestnut Ridge (SCR), informally numbered from west to east (SCR1 through SCR5): Dunaway Branch (SCR 1) and SCR2 in the western part of the regime, McCoy Branch (SCR3) in the central part of the regime; and SCR4 and SCR5 in the eastern part of the regime (Figure A.2). These tributaries are mainly intermittent at elevations higher than 900 ft above msl. Each receives flow via surface runoff, stormflow discharge, and groundwater baseflow, which increases with distance downstream and includes substantial contributions from springs. All of the tributaries convey surface flow south toward Bethel Valley and discharge into Melton Hill Lake (Clinch River) south of the Chestnut Ridge Regime.

2.3 GROUNDWATER SYSTEM

The following overview of the groundwater system near Y-12 is based on the conceptual hydrogeologic models described in *Report on the Remedial Investigation of Bear Creek Valley at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee* (DOE 1997a) and *Report on the Remedial Investigation of the Upper East Fork Poplar Creek Characterization Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee* (DOE 1998), both of which incorporate the hydrogeologic framework and associated nomenclature described in *Status Report — A Hydrologic Framework for the Oak Ridge Reservation* (Solomon, et. al. 1992).

There are two basic hydrogeologic units in the vicinity of Y-12: the aquifer and the aquitard (Figure A.2). The aquifer includes the uppermost formation of the Conasauga Group (Maynardville Limestone) and the overlying formations of the Knox Group. The aquitard consists of the remaining Conasauga Group formations (Nolichucky Shale, Maryville Limestone, Rogersville Shale, Rutledge Limestone, and Pumpkin Valley Shale) and the underlying Rome Formation. The following discussion provides a short description of each hydrogeologic unit.

2.3.1 Aquifer

Components of the aquifer underlie the axis of BCV (Maynardville Limestone) and form Chestnut Ridge (Knox Group). Separate overviews of the hydrologic characteristics of the Maynardville Limestone and the Knox Group are provided below.

2.3.1.1 Maynardville Limestone

Most groundwater flow in the Maynardville Limestone occurs at depths less than 100 ft below ground surface (bgs) in an extensively interconnected network of solution conduits and cavities (karst network). Flow in the shallow karst network is relatively rapid and occurs as "quickflow" discharge to nearby surface drainage features (e.g., Bear Creek). Below the shallow karst network, fractures provide the primary flowpaths. Also, there are seven distinct stratigraphic zones (numbered from bottom to top) in the Maynardville Limestone near Y-12 (Shevenell 1995). Because of vuggy porosity related to dissolution of gypsum nodules, the uppermost stratigraphic zone (Zone 6) is the most permeable and probably transmits the bulk of the groundwater in the Maynardville Limestone (Goldstrand 1995).

Available data indicated fairly homogeneous groundwater geochemistry in the Maynardville Limestone; almost every monitoring well in this formation, regardless of depth, yields calcium-magnesium-bicarbonate groundwater. Some shallow wells monitor sulfate-enriched groundwater, which probably reflects dissolution of locally disseminated secondary minerals, including gypsum, anhydrite, and pyrite. Also, several deep wells monitor calcium-magnesium-sulfate groundwater with very high total dissolved solids (TDS).

Isopleths of groundwater elevations in the Maynardville Limestone show a low hydrologic divide in BCV near the west end of Y-12, with flow along geologic strike to the west-southwest in the Bear Creek Regime (Figure A.4) and along geologic strike to the east-southeast in the East Fork Regime (Figure A.5). In the Bear Creek Regime, groundwater from the deeper flow system in the Maynardville Limestone discharges along major gaining (influent) reaches of Bear Creek. These discharge areas are possibly related to large-scale structural (e.g., cross-strike faults) or stratigraphic discontinuities in the Maynardville Limestone. Also, in the East Fork Regime, shallow flow in the Maynardville Limestone in the eastern Y-12 area is primarily to the east (along geologic strike) toward Union Valley east of the ORR boundary, but the UEFPC distribution channel underdrain apparently functions as a highly permeable groundwater flow path and a constant head (recharge) boundary that strongly influence local flow directions (BJC 1998).

Results of a long-term pumping test and concurrent dye-trace test performed in July 1998 provide the most recent data regarding the hydrologic characteristics of the intermediate and deep groundwater flowpaths in the Maynardville Limestone in the East Fork Regime, and the degree of hydraulic connection between the shallow and deep flow systems in the eastern Y-12 area (BJC 1998). A stepped pump test was performed using a well (GW-845) installed in the Maynardville Limestone about 250 ft southeast of NHP. Groundwater was pumped continuously from the well (which has an open-hole interval from 157 to 438 ft bgs) at progressively increased discharge rates: 25 gallons per minute (gpm) for 24 hours, 50 gpm for 24 hours, and 100 gpm for seven days (pumping started on July 9, 1998 and stopped on July 18, 1998). Water level drawdown and recovery data obtained from nearby monitoring wells indicated: (1) rapid, large responses in wells located along strike to the east and across strike to the north of the pumping well, (2) more moderate responses in wells located oblique to strike near the contact with the Nolichucky Shale to the east of the pumping well, (3) weak responses in upgradient wells in the Maynardville Limestone to the west of the pumping well, and (4) little if any response in wells located adjacent to Lake Reality and the UEFPC distribution channel underdrain to the north and northeast of the pumping well. The maximum observed radius of influence from the pumping well encompassed the entire subcrop of the Maynardville Limestone in the eastern Y-12 area, with particularly strong anisotropies to the east (along strike) and north (up-dip) of the well and low-permeability boundary effects along the contact with the Nolichucky Shale (BJC 1998).

In conjunction with the pumping test, eosine dye was injected in a shallow (60 ft bgs) well (GW-153) located about 450 ft southwest (upgradient) of the pumping well (GW-845). Rapid breakthrough of the dye observed in the pumping well clearly demonstrated the hydraulic connection between the shallow and intermediate/deep groundwater flowpaths along strike in the Maynardville Limestone. Additionally, confirmed detection of the dye in two shallow wells (GW-220 and GW-832) located about 600 ft northeast (across geologic strike) of the injection well (and about 300 ft northwest of the pumping well) suggests that the degree of hydrologic connection with the UEFPC distribution channel underdrain and groundwater movement along dip parallel or conjugate fracture flowpaths in the shallow flow system are strong enough to overcome the hydraulic capture zone created at the 100 gpm pumping rate in the intermediate to deep flow systems (BJC 1998).

Based on the information obtained from the long-term pumping test and associated dye trace, well GW-845 was designated as the groundwater extraction point for the contaminant plume capture system required under an interim action Record of Decision (ROD) for Union Valley (DOE 1997b). Full operation of the system began in October 2000 and has involved pumping well GW-845 at a rate of 25 gpm and treating the groundwater to remove particulates, iron, manganese, and VOCs. Monthly water level measurements in selected observation wells show that continuous operation of the system has generally maintained 15 to 17 ft of drawdown in the immediate vicinity of well GW-845 (Figure A.5) and has established an elongated zone of influence that extends parallel with geologic strike for at least 900 ft to the east (downgradient) and 600 ft to the west (upgradient) of the pumping well (DOE 2002).

2.3.1.2 Knox Group

The Knox Group formations underlying Chestnut Ridge comprise three vertically gradational hydrogeologic subsystems: (1) the stormflow zone, (2) the vadose zone, and (3) the groundwater zone. The subsystems are distinguished by groundwater flux, which decreases with depth (Solomon, et. al. 1992).

Investigations on Chestnut Ridge in a watershed located approximately 4,000 ft west of the Chestnut Ridge Regime show that groundwater occurs intermittently above the water table in a shallow "stormflow zone" that extends to a depth of about 8 ft bgs (Wilson et al. 1990). Macropores and mesopores provide the primary channels for lateral flow in the stormflow zone, which lasts only a few days (5 - 10) after rainfall. Most groundwater within the stormflow zone is either lost to evapotranspiration or recharge to the water table, and the remaining water discharges at nearby seeps, springs, or streams (Moore 1989).

The vadose zone occurs between the stormflow zone and the water table, which typically occurs near the bedrock/residuum interface. Soil moisture content in the vadose zone is below the saturation limit except in the capillary fringe above the water table and within wetting fronts during periods of vertical percolation from the stormflow zone (Moore 1989). Most recharge through the vadose zone is episodic and occurs along discrete permeable fractures that become saturated, although surrounding micropores remain unsaturated (Solomon, et. al. 1992). The residuum is hydrologically heterogeneous, with quickflow via dolines to conduits in the subsurface; residuum on Chestnut Ridge near the Oak Ridge National Laboratory (ORNL) has a mean hydraulic conductivity of about 0.006 feet per day (ft/d) (Moore 1988).

Groundwater below the vadose zone occurs within orthogonal sets of permeable, planar fractures that form water-producing zones within an essentially impermeable matrix. Dissolution of bedrock carbonates has enlarged fractures and produced an interconnected conduit-flow system characteristic of karst aquifers. Because the occurrence of solution features and the frequency, aperture, and connectivity of permeable fractures decrease with depth, the bulk hydraulic conductivity of the groundwater zone is vertically gradational. Most groundwater flux occurs within the transitional horizon between residuum and unweathered bedrock (water table interval); lower flux (and longer solute residence times) occurs at successively greater depths in the bedrock (Solomon, et. al. 1992).

Available data show that hydraulic conductivity in the Knox Group varies over multiple orders of magnitude, which is typical of karst aquifers. Results of straddle packer tests in core holes indicate hydraulic conductivity ranging from 0.0002 to 3.1 ft/d at depths generally less than 600 ft bgs in the lower Knox Group (King and Haase 1988). Hydraulic conductivity values calculated from results of falling-head slug tests performed in monitoring wells completed at shallow depths (60 to 195 ft bgs) in the middle Knox Group range from about 0.003 to 14 ft/d (Jones 1998). Also, results of a preliminary dye-tracer test at the Chestnut Ridge Security Pits (CRSP) indicate flow rates of about 100 to 300 ft/d (Martin Marietta Energy Systems, Inc. [MMES] 1990). Although not confirmed by a second test using different tracers (MMES 1993), these findings are supported by the range of flow rates (490 to 1,250 ft/d) indicated by results of a dye-tracer test performed on Chestnut Ridge near ORNL (Ketelle and Huff 1984).

Groundwater elevations on Chestnut Ridge generally mirror surface topography (Figure A.6). Along the crest of the ridge, which is a recharge area and a flow divide, groundwater generally flows from west to east (parallel to geologic strike), with radial components of flow north into BCV and south toward tributary headwaters on the southern flank of the ridge (across geologic strike). The central part of the regime is characterized by radial flow directions from local groundwater flow divides along hilltops between tributaries. Groundwater flow directions in the southern part of the regime are generally south toward Melton Hill Lake. The overall directions of groundwater flow throughout the Chestnut Ridge Regime do not significantly change during seasonal groundwater flow conditions. Horizontal hydraulic gradients throughout the year are highest along the steep northern flank of Chestnut Ridge (i.e., across geologic strike) and in the upper reaches of tributaries on the southern ridge flank, and are nearly flat along the southern boundary of the regime.

Groundwater in the Knox Group has fairly homogeneous geochemistry. Most wells yield calcium-magnesium-bicarbonate groundwater with pH of 7.5 to 8.0; TDS above 150 milligrams per liter (mg/L); equal or nearly equal molar concentrations of calcium and magnesium; low proportions (<5%) of chloride, sodium, sulfate, and potassium; and very low (i.e., <1 mg/L) carbonate alkalinity and nitrate (as N) concentrations (hereafter synonymous with "nitrate" concentrations). Some wells yield groundwater with enriched chloride and sulfate concentrations that probably reflect the geochemical influence of locally disseminated evaporates (e.g., gypsum) or sulfides (e.g., pyrite). Additionally, groundwater within low permeability (matrix) intervals in the upper Knox Group (e.g., Mascot Dolomite), as indicated by data for several wells at Kerr Hollow Quarry, often exhibits greater proportions of sulfate and potassium and higher trace metal concentrations (e.g., strontium) than typical of the groundwater from low yield intervals within the lower Knox Group formations (e.g., Copper Ridge Dolomite). These geochemical differences potentially reflect corresponding differences between carbonate mineralogies in the upper and lower sections of the Knox Group or the proximity to and types of disseminated secondary minerals (Lockheed Martin Energy Systems, Inc. [LMES] 1996).

2.3.2 Aquitard

The geologic formations that comprise the aquitard directly underlie the primary contaminant source areas in the Bear Creek Regime and the East Fork Regime and are hydraulically upgradient of the Maynardville Limestone throughout much of BCV. Fractures provide the primary groundwater flowpaths in the aquitard; flow through the rock matrix is negligible but nevertheless plays an important role in contaminant migration because of matrix diffusion processes. Flow directions are primarily parallel to bedding (along geologic strike and dip), which may or may not coincide with the direction of maximum horizontal hydraulic gradient inferred from groundwater elevation isopleths. Most flow occurs within the shallow bedrock interval less than 100 ft bgs. Flow across bedding occurs primarily along permeable zones formed by cross-cutting fractures or fracture zones (and possibly small faults). Some of these cross-cutting structures may act as barriers to lateral flow, causing groundwater from deeper intervals to upwell and discharge to the shallower flow system. Others may serve as preferential pathways for migration of contaminants from the aquitard into the Maynardville Limestone.

Most groundwater flow in the aquitard occurs within a highly permeable interval near the bedrock/residuum interface. West of Y-12 in the Bear Creek Regime, flow in the aquitard above the water table occurs in response to precipitation when flowpaths in the residual soils become saturated and rapidly transmit water laterally (stormflow) down slope toward springs, seeps, streams and vertically (recharge) to the water table interval. In the East Fork Regime, however, infiltration into the subsurface and recharge to the water table interval is strongly influenced by the many buildings and other impervious surfaces that cover much of the regime as well as the extensive areas of fill and networks of subsurface storm drains, sewers, and process lines.

Recharge to the water table interval in the aquitard promotes strike-parallel groundwater flow toward nearby discharge areas, which include the subsurface drainage network in the East Fork Regime and the northern tributaries of Bear Creek in the Bear Creek Regime. Although the presence of contaminants in groundwater more than 200 ft bgs in the Nolichucky Shale clearly indicates permeable flowpaths at depth, flow is most active at depths less than 100 ft bgs, and only a small percentage of total flow ultimately recharges the deeper bedrock, where upward hydraulic gradients predominate. In the Bear Creek Regime, about 94% of the available groundwater in the aquitard discharges to Bear Creek tributaries, about 5% flows along cross-cutting fractures into the aquifer, and about 1% flows through strike-parallel pathways in the deeper subsurface (DOE 1997a).

Decreasing groundwater flux with depth in the aquitard in BCV also is reflected by distinct changes in groundwater geochemistry. Most water table interval and shallow (i.e., <100 ft bgs) bedrock wells monitor calcium-magnesium-bicarbonate groundwater. A fairly abrupt change to sodium-bicarbonate groundwater, which is interpreted to be a function of longer groundwater residence time related to reduced fracture aperture or increased fracture spacing (Solomon, et. al. 1992), occurs at a depth of about 100 ft bgs. Further reduced groundwater flux is indicated by the transition from sodium-bicarbonate groundwater to sodium-chloride groundwater that usually occurs at a depth of about 400 ft bgs. The transition to the sodium-chloride groundwater is accompanied by a general increase in TDS.

Isopleths of seasonal groundwater surface elevations in the aquitard (water table interval) in the Bear Creek Regime (Figure A.4) and East Fork Regime (Figure A.5) indicate flow to the west-southwest and east-southeasterly, respectively, toward the Maynardville Limestone. In the East Fork Regime, however, the operation of basement dewatering sumps and the network of subsurface storm drains and utilities throughout much of the western and central Y-12 areas (Figure A.3) strongly influences the movement and discharge of shallow groundwater. For instance, operation of sumps to suppress the local water table below the basement floor of Buildings 9204-4, 9201-5, and 9201-4, and possibly 9204-2 strongly influences local groundwater flow and contaminant transport patterns (DOE 1998).

2.4 GROUNDWATER CONTAMINATION

Groundwater quality monitoring data obtained from the extensive network of monitoring wells associated with Y-12 show that the most widespread groundwater contaminants are nitrate, VOCs, uranium isotopes (primarily uranium-234 [U-234] and uranium-238 [U-238]), and technetium-99 (Tc-99). Maps illustrating the generalized extent of nitrate, VOCs, uranium isotopes (as indicated by gross alpha radioactivity), and Tc-99 (as indicated by gross beta radioactivity) are provided on Figures A.7, A.8, A.9, and A.10, respectively. The following sections provide an overview of groundwater contamination in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime.

2.4.1 Bear Creek Regime

The following sections briefly describe the primary sources of groundwater contamination in the Bear Creek Regime (the S-3 Site, the Oil Landfarm waste management area [WMA], and the Bear Creek Burial Grounds [BCBG] WMA) and the principal groundwater transport pathway in the regime (the Maynardville Limestone).

2.4.1.1 S-3 Site

Operation of the former S-3 Ponds emplaced a large reservoir of contamination in the aquitard (Nolichucky Shale) consisting of a heterogeneous mix of inorganic, organic, and radioactive constituents. The principal contaminants are nitrate, Tc-99, uranium isotopes, trace metals (e.g., cadmium), and VOCs. Contaminant concentrations in the aquitard nearest the site have probably reached maximum levels, with the center of mass of the plume slowly moving westward. Westward, strike parallel migration of contaminants in the aquitard occurs until encountering a cross-cutting structure that promotes upward discharge into the shallow flow system or cross-strike flow into the Maynardville Limestone (DOE 1997a). Additionally, matrix diffusion and advective transport processes are slowly releasing contaminants (e.g., nitrate) from the deeper reservoir into the more active (shallow) aquitard flow system.

In the aquitard, nitrate from the former S-3 Ponds extends directly south in the water table interval into the upper reach of Bear Creek and along strike in the water table interval and the deeper bedrock for over 3,000 ft to the west. Because it is highly mobile and chemically stable, nitrate delineates the maximum extent of groundwater transport from the S-3 Site and effectively traces the principal migration pathways in the aquitard. Nitrate concentrations within the plume exceed 10,000 mg/L in the deep bedrock directly below the S-3 Site, 1,000 mg/L in the shallow groundwater near the site, and 10 mg/L near the plume boundaries.

Gross alpha activity and gross beta activity within the S-3 Site contaminant plume exceed 1,000 picoCuries per liter (pCi/L). Although a diverse population of radioisotopes is present in the groundwater closest to the site, elevated gross alpha and gross beta activity in the groundwater probably delineate migration of uranium isotopes (U-234 and U-238) and Tc-99, respectively, since these were the dominant radiological constituents in wastes placed into the former S-3 Ponds. Also, sludge produced by denitrification of the waste water in each pond was left in place after closure of the site. Sludge within the saturated zone may release Tc-99 and uranium isotopes to the shallow groundwater flow system in the aquitard (DOE 1997a). These contaminants then may be transported southward towards Bear Creek and westward through the water table interval toward discharge points in NT-1 (DOE 1997a).

Other components of the S-3 Site contaminant plume are trace metals and VOCs. The distribution of trace metals is less extensive than that of nitrate and radioactivity, but the most mobile metals within the plume (e.g., barium) have been transported beyond the acidic groundwater (pH <5) nearest the site. Acetone and tetrachloroethene (PCE) are the principal VOCs within the plume. Concentrations of PCE exceed 5,000 micrograms per liter (µg/L) in wells adjacent to the site, potentially indicating the presence of dense nonaqueous phase liquids (DNAPL) in the subsurface, but decrease to less than 50 µg/L about 500 ft downgradient of the site. This reflects the limited extent of PCE migration and suggests substantial natural attenuation in the subsurface.

2.4.1.2 Oil Landfarm WMA

The primary sources of groundwater contaminants in the Oil Landfarm WMA are the Boneyard/Burnyard, the Hazardous Chemical Disposal Area (HCDA), the Oil Landfarm disposal plots, and Sanitary Landfill I. Each of these sites except the Boneyard/Burnyard is a known or suspected source of VOCs in the shallow groundwater; the Boneyard/Burnyard is a major source of elemental uranium and alpha radioactivity in the Bear Creek Regime.

The Boneyard was used for the disposal of magnesium chips and construction debris (e.g., concrete) in unlined shallow trenches. Filled trenches were covered with topsoil and seeded with grass. The Burnyard consisted of two unlined trenches, each about 300 ft long by 40 ft wide, in which various types of refuse (including pesticide containers, metal shavings, solvents, oils, and laboratory chemicals) were burned. Some residues may have been buried in the Boneyard. Because the Boneyard/Burnyard is a primary source of uranium in the groundwater and surface water in BCV (DOE 1997a), this site was prioritized for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial action, which was performed in three phases. Remedial designs for the site were prepared during Phase I and remedial action field work began with Phase II. Completed in November 2001, Phase II primarily involved construction of an upgradient subsurface drain to hydraulically isolate the buried wastes at the site in order to reduce the flux of contaminants from the site and to dry the site in preparation of the Phase III field work, which began in May 2002. Phase III focused on the excavation, disposal, and consolidation of wastes from the site and the reconstruction of a section of NT-3 that drains the site. Waste removal actions were completed in October 2002 and involved the excavation of about 64,000 cubic yards (yd^3) of waste materials with the highest concentrations of uranium that were in contact with groundwater. These wastes were disposed in the Environmental Management Waste Management Facility (EMWMF). About 17,000 yd^3 of other waste materials that had lower levels of uranium contamination and were not in contact with groundwater also were excavated, consolidated onsite, and covered with a low-permeability recompacted clay cap. Installation of the cap, including seeding/mulching the topsoil cover, was completed in November 2002. Field work to restore the NT-3 stream channel with natural meanders and gradients in order to reduce erosion of the bank and more efficiently transport water and sediment load through the site was completed in May 2003.

The HCDA was constructed on top of the Burnyard in 1975 and was used as an area for releasing compressed gas from cylinders with leaking or damaged valves and for disposal of reactive or explosive laboratory chemicals. The chemicals were handled to induce the expected reaction or explosion, and remaining liquids were discharged into a small unlined surface impoundment. A low permeability cap was constructed over the HCDA during closure of the Oil Landfarm. In June 2002, a section of the northwest corner of the cap was excavated and removed during Phase III of the CERCLA remedial action at the Boneyard/Burnyard. Excavated wastes were replaced with uncontaminated soil and the filled area was graded to drain, mulched, and seeded with grass.

Groundwater contaminants at the Oil Landfarm are principally VOCs, and a commingled plume containing two distinct suites of VOCs are evident: one to the northeast dominated by 1,1,1-trichloroethane (111TCA), 1,1-dichloroethane (11DCA), and 1,1-dichloroethene (11DCE); and one to the south dominated by PCE, cis-1,2-dichloroethene (c12DCE), trans-1,2-dichloroethene (t12DCE), and trichloroethene (TCE) (MMES 1989). The dissolved VOC plume appears to be restricted to the shallow flow system. Summed VOC concentrations exceed 1,000 µg/L in the northeast part of the plume and 100 µg/L in the southern part of the plume; maximum concentrations within the plume do not indicate the presence of DNAPL in the subsurface.

Sanitary Landfill I is a probable source of 11DCA, c12DCE, and t12DCE in the shallow groundwater (aquitard and aquifer) downgradient to the south of the site. Maximum VOC concentrations are typically less than 50 µg/L. In the Maynardville Limestone, these constituents have intermingled with the VOC plume (primarily TCE and c12DCE) originating from upgradient sources. Sanitary Landfill I also may be a source of boron in the groundwater at several wells immediately downgradient (west) of the site.

2.4.1.3 Bear Creek Burial Grounds WMA

Groundwater in the aquitard underlying the BCBG WMA is extensively contaminated with VOCs at both shallow (water table) and deep (bedrock) intervals. There are five primary source areas: Burial Ground (BG)-A (North and South), BG-C (East and West), and the Walk-In Pits (Figure A.8). Dissolved VOC plumes in the shallow groundwater at several of these source areas are probably related to widespread occurrence of DNAPL in the subsurface. Contamination in the deeper groundwater flow system reflects density-driven, downward migration of DNAPL.

The disposal trenches comprising BG-A (North and South) received almost two million gallons of waste oils and coolants, and DNAPL has been encountered at 260 ft and 330 ft bgs in monitoring wells downdip of source trenches in BG-A South. Dissolved VOC plumes in the groundwater underlying both areas are dominated by PCE, TCE, and c12DCE. Other common plume constituents are 111TCA, 11DCA, and 1,2-dichloroethane (12DCA). Summed concentrations of these plume constituents exceed 100,000 µg/L. Groundwater in the water table interval transports the plume constituents along strike toward discharge areas in NT-7. Strike-parallel migration also occurs below the water table interval, as reflected by westward (strike-parallel) transport of PCE indicated by data obtained from deeper bedrock wells west of BG-A South.

Separate plumes of dissolved VOCs apparently occur in the shallow groundwater at BG-C East and BG-C West, each plume dominated by c12DCE with lesser amounts of vinyl chloride (VC), both of which are degradation products of PCE. The concentrations of VOCs in each plume are generally less than 500 µg/L. Groundwater containing these VOCs discharges to the NT-8 catchment on the northwest side of the BCBG WMA. Data for both source areas do not clearly indicate the presence of DNAPL in the subsurface (DOE 1997a).

Groundwater near the Walk-In Pits contains a distinct plume of dissolved VOCs dominated by PCE. Concentrations exceed 2,000 µg/L, which is about 1% of the maximum PCE solubility and possibly indicates DNAPL in the subsurface. Contaminants in the shallow groundwater flow system near the Walk-In Pits may not discharge extensively to surface water (DOE 1997a).

Although large quantities of uranium wastes were disposed in the BCBG WMA, few monitoring wells in the area yield radioactive groundwater samples. However, data for soil samples and surface water samples collected from NT-6, NT-7, and NT-8 indicate that uranium isotopes from BG-A South and BG-C East are probable sources of elevated alpha and beta radioactivity (DOE 1997a). Maximum gross alpha and gross beta activities in the samples from these tributaries ranged from about 20 pCi/L to more than 100 pCi/L. The disparity with the groundwater sample data may be an artifact of the monitoring well network (few wells are screened within the shallowest water table interval where radioactive contamination likely occurs), but the relatively low levels of radioactivity in the groundwater also suggest that the bulk of the uranium wastes in BG-A South and BG-C East are not within the saturated zone (DOE 1997a).

Boron is the primary trace metal contaminant in the groundwater at the BCBG WMA. Elevated boron concentrations occur primarily in the shallow groundwater near BG-A South and BG-C (East and West) and probably resulted from disposal of borax wastewater from Y-12. Boron is most likely present in the groundwater as borate [$B(OH)_3$], which is chemically stable and relatively mobile, and is transported toward discharge points in Bear Creek tributaries NT-7 and NT-8.

2.4.1.4 Maynardville Limestone Exit Pathway

Groundwater contaminants in the Maynardville Limestone originate from the S-3 Site (nitrate and Tc-99), the Boneyard/Burnyard (uranium isotopes), Sanitary Landfill I (VOCs), the BCBG WMA (VOCs and uranium isotopes), and the Rust Spoil Area (VOCs) or an unidentified source area in the Bear Creek floodplain adjacent to the Rust Spoil Area. These contaminants enter the Maynardville Limestone through direct recharge, hydrologic communication with surface water in Bear Creek, and inflow of shallow groundwater from the aquitard. Relative contributions from the source areas and the geochemical characteristics of the contaminants have produced two primary plumes of contamination in the groundwater: one containing nitrate and radioactivity and another containing VOCs. Both plumes occur in the shallow karst network and the deeper fracture flowpaths and are commingled downgradient of the Boneyard/ Burnyard.

The nitrate plume (Figure A.7) in the aquifer essentially delineates the maximum extent of contaminant transport from the former S-3 Ponds and effectively traces the principal migration pathways in the Maynardville Limestone. The plume is continuous in the deeper bedrock from south of the S-3 Site for about 10,000 ft along strike to the west, whereas attenuation from more active recharge and groundwater flux has reduced nitrate levels and produced a more discontinuous nitrate plume in the shallow karst network. Nitrate concentrations within the plume exceed 500 mg/L south of the S-3 Site, but rapidly decrease to less than 50 mg/L south of the Oil Landfarm WMA, and are typically highest in the fracture-dominated groundwater flow system at depths greater than 100 ft bgs.

The distribution of VOCs (Figure A.8) in the Maynardville Limestone reflects the relative contributions of several source areas and commingling during downgradient transport. Plume constituents in the upper part of BCV are TCE, c12DCE, and PCE; probable source areas are Spoil Area I, the S-3 Site, and possibly the Fire Training Facility in the East Fork Regime. The major inputs to the plume occur from the Rust Spoil Area (TCE) or a nearby source in the Bear Creek floodplain, the HCDA (TCE and c12DCE), Sanitary Landfill I (111TCA and 11DCA), and discharge from the Bear Creek tributary (NT-7) that traverses BG-A North and A South (c12DCE and 12DCA). The highest concentrations within the plume (i.e., >300 µg/L) occur in the deeper groundwater south (down dip) of the HCDA. These high concentrations coincide with the downward vertical hydraulic gradients in the Maynardville Limestone in this area and the major losing reach of middle Bear Creek south of Sanitary Landfill I.

Radioactivity in the groundwater in the Maynardville Limestone is primarily from uranium isotopes and Tc-99. The extent of these radionuclides is generally delineated by gross alpha activity (Figure A.9) and gross beta activity (Figure A.10), respectively. The distribution of gross beta activity mirrors that of nitrate, indicating both a common source of nitrate and Tc-99 (the S-3 Site) and migration along common flowpaths. Increased gross alpha activity in the groundwater downstream of the NT-3 catchment reflects inputs of uranium isotopes from former sources in the Boneyard/Burnyard. Before their excavation and removal in May 2002 (see Sect. 2.4.1.2), waste materials containing high concentrations of uranium were within the saturated zone during seasonally high groundwater levels. Uranium isotopes that were leached from the wastes were transported with the shallow groundwater that discharges into NT-3 and recharges directly into the Maynardville Limestone. Prior to the removal of the wastes, gross alpha and gross beta activity exceeded 1,000 pCi/L in the shallow groundwater along NT-3 from the northwest corner of the site to the confluence of NT-3 and Bear Creek (Figure A.9).

Most trace metal contamination in the Maynardville Limestone occurs in the shallow groundwater near the S-3 Site and the Boneyard/Burnyard. Near the S-3 Site, the principal trace metal contaminants are barium, boron, cadmium, copper, lead, mercury, strontium, and uranium. Some of these metals (e.g., cadmium) were entrained in the highly acidic wastes disposed at the site, and others (e.g., barium and strontium) were dissolved from the underlying bedrock. Trace metal contamination is sporadic in the groundwater at the Boneyard/Burnyard and the principal contaminants are beryllium, manganese, mercury, nickel, and uranium. Boron and uranium are the most common trace metal contaminants in the aquifer downgradient of the S-3 Site and the Boneyard/Burnyard, which indicates that relatively mobile ionic species of both metals are present in the groundwater.

2.4.2 East Fork Regime

Sources of groundwater contamination in the East Fork Regime include hazardous and nonhazardous waste treatment, storage, or disposal sites; bulk product transfer, storage, and use areas; former petroleum-fuel underground storage tanks (USTs) and associated dispensing facilities; industrial process buildings; waste and product spill areas; and the many process pipelines, effluent drains, and utilities associated with the industrial operations at Y-12. Also, operation of the former S-3 Ponds emplaced a large reservoir of contamination in the western Y-12 area. Intermingling of contaminants from multiple source areas has produced an extensive, essentially continuous groundwater contaminant plume of varying composition that extends from the western Y-12 area through the southern part of the central and eastern Y-12 areas and into Union Valley east of the ORR (Figure A.8).

A plume of nitrate contamination originating from the former S-3 Ponds extends vertically in the aquitard at least 150 ft bgs and laterally at least 5,000 ft into the western Y-12 area. Nitrate concentrations within the plume exceed 10,000 mg/L. The geometry of the nitrate plume indicates two principal migration pathways: (1) relatively rapid migration along fairly short, shallow pathways (<30 ft bgs) that typically terminate in storm drains or other utilities, building sumps, and the buried tributaries and original mainstream of UEFPC; and (2) substantially slower migration along much longer strike-parallel pathways at greater depths in the bedrock toward basement sumps in Buildings 9204-4, 9201-4, and 9201-5 (DOE 1998). The S-2 Site also is a minor source of nitrate.

The low pH groundwater within the contaminant plume originating from the former S-3 Ponds contains a diverse mix of metal ions and/or ion-complexes (beryllium, cadmium, cobalt, manganese, mercury, and nickel) that are usually not mobile (or are more readily attenuated) in less acidic groundwater, as well as metals that are mobile under a wider range of groundwater pH conditions (barium, boron, strontium, and uranium). Some of these metals were entrained in the acidic wastes disposed at the site (e.g., uranium), and others were dissolved from the underlying saprolite and bedrock (e.g., barium and strontium). Concentrations of several trace metals (e.g., barium) within the plume exceed the applicable Safe Drinking Water Act (SDWA) maximum contaminant level (MCL) for drinking water by an order-of-magnitude or more. Similarly elevated concentrations of several other trace metals (including boron, cadmium, cobalt, copper, mercury, and uranium) occur in the groundwater elsewhere in the East Fork Regime, notably the S-2 Site, but available data do not indicate that extensive plumes of metal ions and/or ion-complexes have developed in the groundwater beyond the immediate vicinity of these sites.

Volatile organic compounds are the most pervasive groundwater contaminants in the East Fork Regime. The principal components of dissolved VOC plumes in the western Y-12 area and the central Y-12 area are PCE, TCE, c12DCE, 11DCE, and VC. Chloroethanes (primarily 111TCA and 11DCA) are also major components of several plumes in the central Y-12 area. In the eastern Y-12 area, dissolved chloromethanes, primarily carbon tetrachloride (CTET), chloroform, and methylene chloride (MC) are primary components of the VOC plume. Additionally, residual plumes of dissolved petroleum hydrocarbons (benzene, ethylbenzene, dimethylbenzene, and toluene) occur in shallow groundwater near former petroleum fuel USTs. In the aquitard, concentrations of individual plume constituents exceed 1,000 µg/L in the shallow groundwater near the Waste Coolant Processing Area, Building 9212, and Tank 0134-U and indicate the presence of DNAPL in the subsurface. At shallow depths (<100 ft bgs) in the Maynardville Limestone, a relatively continuous plume of dissolved VOCs begins near the Fire Training Facility in the western Y-12 area, intermingles with VOC plumes from several sources in the central Y-12 area, and extends underneath NHP in the eastern Y-12 area. The extent of the plume at intermediate (>200 ft bgs) and deep (>400 ft bgs) intervals in the

Maynardville Limestone is not well defined in the western and central Y-12 areas because of limited well coverage. However, data from the network of wells in the eastern Y-12 area show that a plume of dissolved chloromethanes (primarily CTET), which is believed to originate from suspected DNAPL in the Maynardville Limestone west of NHP near Building 9720-6, extends vertically more than 400 ft bgs and laterally (parallel with geologic strike) into Union Valley at least 2,000 ft east of the ORR boundary.

Groundwater with radiological contamination occurs primarily in the aquitard east of the former S-3 Ponds, at Tank 0134-U, Buildings 9204-4 and 9201-5, and the Salvage Yard. In the Maynardville Limestone, radiological contamination occurs near the S-2 Site and upgradient of NHP (the Uranium Oxide Vault, wells GW-605 and GW-606, and the former Oil Skimmer Basin). The former S-3 Ponds are the principal source of uranium isotopes (primarily U-234 and U-238) and Tc-99; the migration of Tc-99 generally mirrors that of nitrate from the site. Gross alpha radioactivity levels within the plume exceed the 15 pCi/L MCL and gross beta radioactivity levels within the plume exceed the SDWA screening level (50 pCi/L) for a 4 millirem per year (mrem/yr) dose equivalent (the drinking water MCL for gross beta radioactivity). Relatively limited influx of radiological contamination directly into the aquifer (or extensive dilution) in the East Fork Regime is indicated by the greatly decreased gross alpha, gross beta, and isotopic uranium activity in the groundwater downgradient of known source areas (e.g., S-2 Site and the former Oil Skimmer Basin).

2.4.3 Chestnut Ridge Regime

Groundwater contamination is much less extensive in the Chestnut Ridge Regime and VOCs are the most common groundwater contaminants (Figure A.8). Dissolved VOCs (primarily chloroethanes and chloroethenes) have been detected in the groundwater samples collected from monitoring wells downgradient from the CRSP and Industrial Landfill (ILF) IV. However, a clearly distinct plume of dissolved VOCs is indicated only by the data for wells at the CRSP.

The CRSP are located on the crest of Chestnut Ridge directly south of the central portion of Y-12, and consist of two areas containing a series of east-west oriented trenches that are about 8 to 10 ft wide, 10 to 18 ft deep, and 700 to 800 ft long. Beginning in 1973, the trenches received hazardous wastes until December 1984 and nonhazardous wastes until the site was closed in November 1988. Data obtained from monitoring wells at the site indicate that a narrow, elongated plume of dissolved VOCs extends parallel with geologic strike for at least 2,600 ft downgradient to the east, and perpendicular to geologic strike for at least 500 ft downgradient to the north and south. The primary components of the plume include 111TCA, 11DCA, and 11DCE near the western trench area, and PCE, TCE, and 1,2-dichloroethene (12DCE) isomers near the eastern trench area. The distribution of the dissolved plume constituents relative to the respective source areas and elongation of the plume along the axis of Chestnut Ridge, despite steeper hydraulic gradients toward the ridge flanks, suggest primarily strike-parallel horizontal transport (west to east) in the groundwater (and possibly vapor phase transport). The maximum depth of vertical migration of the VOCs has not been conclusively determined, but is at least 150 ft bgs in the western trench area, 250 ft bgs near the middle of the site, and 270 ft bgs downgradient of the eastern trench area.

Data obtained since the early 1990s show that low concentrations (many are estimated values below analytical reporting limits) of one or more VOCs (primarily 111TCA) are present in the groundwater at two wells hydraulically downgradient of the waste disposal trenches at the CRSP: well GW-796, which is located at ILF V about 400 ft directly south of the site, and well GW-798, which is located at Construction/ Demolition Landfill (CDL) VII about 1,600 ft south-southeast of the site (Figure A.8). Subsequent monitoring results indicate that VOC levels in both wells remain relatively low, with the more recent data showing that PCE concentrations in well GW-798 occasionally exceed the MCL (5 µg/L). The repeated detection of these compounds in the groundwater at both wells probably reflects southward transport from the CRSP because this site is the only known source of VOCs that is hydraulically upgradient of either well.

The ILF IV, which is located on the crest of Chestnut Ridge directly south of the west end of Y-12, has received non-hazardous solid waste since October 1989 and is a suspected source of 111TCA, 11DCA, 11DCE, and boron in the groundwater downgradient of the site. Elevated total boron concentrations occur in a well located downgradient to the east of the site (GW-217), while VOCs have been repeatedly detected in a well located south of the eastern portion of the site (GW-305). These results potentially indicate groundwater transport along permeable flowpaths from the unlined portion (about 150 ft X 150 ft) at the eastern end of ILF IV. Although the source of these contaminants has not been formally confirmed, no other waste management facility is located upgradient of these wells.

Kerr Hollow Quarry is on the broad southern flank of Chestnut Ridge about 1,000 ft north of Bethel Valley Road and served as a source of stone construction material until it filled with water and was abandoned in the late 1940's. From the early 1950s until November 1988, the quarry was used for the disposal of reactive materials from Y-12 and ORNL. Wastes were removed from the quarry between mid-1990 and late 1993 to obtain certified clean-closure status from the Tennessee Department of Environment and Conservation (TDEC), but the site was finally closed with some wastes remaining in place. Low levels (<5 µg/L) of several VOCs, primarily CTET, chloroform, and PCE, occur in the groundwater at monitoring wells located to the south (GW-144) and southeast (GW-142) of Kerr Hollow Quarry. Each of these VOCs may be present at low concentrations in the groundwater downgradient of the site, possibly as a consequence of wastes being disturbed during attempts to obtain clean closure of the site, but none of the compounds have been detected in the Resource Conservation and Recovery Act (RCRA) wells at the site since 1997.

3.0 CY 2004 MONITORING PROGRAMS

Groundwater and surface water sampling and analysis activities performed during CY 2004 to specifically meet DOE Order 450.1 surveillance monitoring requirements were implemented in accordance with the Y-12 GWPP sampling and analysis plan (SAP) for CY 2004 (BWXT 2003a), as modified by applicable addenda (Table B.1). These sampling and analysis activities are hereafter referenced as DOE Order monitoring. In January 2003, DOE replaced Order 5400.1 with Order 450.1. This transition from a command and control-based approach to environmental protection to an environmental management system was federally mandated through Executive Order 13148. The GWPP reviewed the new DOE Order and determined that the requirements for an integrated approach to monitoring and protection of groundwater resources are consistent with current practices of the respective groundwater programs on the ORR. Thus, no changes were proposed or implemented.

Groundwater and surface water sampling and analysis activities managed by BJC during CY 2004 were performed as part of: (1) the ORR Water Resources Restoration Program (WRRP), (2) the operation of the EMWMF, and (3) the ORR Landfill Operations for Solid Waste Disposal. Monitoring activities for the following programs were performed in accordance with the WRRP SAP for fiscal years 2004 (BJC 2003a) and 2005 (BJC 2004): (1) RCRA post-closure detection monitoring and RCRA post-closure corrective action monitoring (collectively referenced as RCRA monitoring), as specified in applicable RCRA post-closure permits issued by the TDEC; (2) CERCLA ROD monitoring, as specified in the applicable ROD or decision documents pending final approval; and (3) CERCLA baseline monitoring to evaluate pre-remediation water quality. Quarterly CERCLA detection monitoring at the EMWMF, located in the Bear Creek Regime, was performed in accordance with the site-specific requirements of an environmental monitoring plan for the site (Duratek Federal Services [DFS] 2003a). Detection monitoring for several nonhazardous solid waste disposal facilities (SWDFs) located in the Chestnut Ridge Regime (referenced as SWDF detection monitoring) was performed in accordance with the SAP issued by the subcontractor responsible for the operations of the SWDFs (DFS 2003b) and to comply with site-specific operating permits issued by the TDEC.

The following sections provide details regarding the groundwater and surface water sampling and analysis activities performed in each hydrogeologic regime during CY 2004, including: the respective network of sampling locations; QA/QC sampling; groundwater and surface water sampling methods; field measurements and laboratory analytes; data management protocols and data quality objectives (DQOs); and groundwater elevation monitoring.

3.1 SAMPLING LOCATIONS AND FREQUENCY

The CY 2004 groundwater and surface water quality monitoring addressed in this report includes a total of 218 sampling locations: 170 monitoring wells (complete construction details for each well are provided in Appendix C), 14 springs, and 33 surface water stations, and one building sump. Cooperation between the Y-12 GWPP and BJC monitoring programs (i.e., preparing SAPs, coordinating sample collection, and sharing data) ensures that the CY 2004 monitoring results fulfill requirements of all the applicable monitoring drivers (DOE Order, RCRA, CERCLA, and SWDF) with no duplication of sampling and analysis activities. The following sections identify the specific monitoring driver under which samples were collected in each regime.

3.1.1 Bear Creek Regime

As shown below in Table 1, a total of 61 monitoring wells, five springs, and 19 surface water stations in the Bear Creek Regime were sampled during CY 2004 for the purposes of DOE Order monitoring, RCRA monitoring, and CERCLA monitoring.

Table 1. CY 2004 sampling locations in the Bear Creek Regime

Monitoring Driver	Monitoring Wells	Springs	Surface Water Stations
DOE Order	33	3	3
RCRA	8	1	0
CERCLA	20	2	17
Totals:	**61**	**5 ***	**19 ***

Note: * = The total number is less than the sum because separate samples were collected from one spring (SS-6) for CERCLA (January) and RCRA (July) monitoring purposes; and from one surface water station (NT-01) for both DOE Order (January and July) and CERCLA (each quarter) monitoring purposes (see Table B.2).

Samples were collected semiannually during CY 2004 from most of the sampling locations (Table B.2). Six wells (GW-056, GW-115, GW-133, GW-134, GW-135, and GW-715) and one spring (SS-6.6) were sampled once during CY 2004; three surface water stations (BCK-12.34, BCK-12.47, and NT-01) and the monitoring locations (13 wells and four surface water stations) associated with the EMWMF were sampled during each quarter of the year, if adequate water was available.

Thirty-three monitoring wells were sampled for the specific purposes of DOE Order surveillance monitoring during CY 2004 (Table B.2 and Figure A.11). Most (25) of these wells are located near waste management facilities in BCV, including the primary sources of groundwater contamination in the regime (S-3 Site, Oil Landfarm WMA, and BCBG WMA). Three of the wells located near the S-3 Site are equipped with a Westbay™ multi-port sampling apparatus (Westbay wells GW-133, GW-134, and GW-135), with sampling ports set at discrete depths intervals in the well (Figure A.12). Additionally, eight wells are components of two Exit Pathway Pickets in the regime: Picket B (four wells) is located about 2,000 ft west of the Oil Landfarm and Picket C (four wells) is located about 3,000 ft west of the S-3 Site (Figure A.11). The wells in each Exit Pathway Picket are completed at various depths along strike-normal transects of the Maynardville Limestone (Figure A.13), which is the primary contaminant migration pathway in the Bear Creek Regime.

Samples were collected from three springs and three surface water sampling stations for the purposes of DOE Order exit pathway/perimeter monitoring during CY 2004 (Table B.2 and Figure A.11). The springs, which discharge into Bear Creek, are located southwest (hydraulically downgradient) of the S-3 Site (SS-1), the Oil Landfarm (SS-4), and the BCBG WMA (SS-5). The surface water stations are located north of Pine Ridge near the confluence of Bear Creek and East Fork Poplar Creek (BCK-00.63); near the west end of BCV (BCK-04.55); and in a northern tributary of Bear Creek (NT-01) about 1,500 ft west of the S-3 Site (Figure A.11).

Eight monitoring wells and one spring were sampled for the specific purposes of RCRA post-closure corrective action monitoring during CY 2004 (Table B.2). These wells include point-of-compliance (POC) wells located downgradient of the S-3 Site (GW-276), the Oil Landfarm (GW-008), and the BCBG WMA

(GW-046); and four plume boundary wells (GW-712, GW-713, GW-714, and GW-715) at Exit Pathway Picket W (Figure A.11 and Figure A.13). Additionally, a sample was collected in January from well GW-115, formerly a RCRA upgradient/background monitoring well (Table B.2). Beginning in July 2004, spring SS-6 replaced well GW-715 for plume boundary monitoring purposes.

Twenty monitoring wells, two springs, and 17 surface water stations in the Bear Creek Regime were sampled for CERCLA monitoring purposes during CY 2004 (Table B.2 and Figure A.11). Thirteen monitoring wells and four surface water stations were sampled for CERCLA detection monitoring purposes at the EMWMF. Seven monitoring wells, two springs, and 11 surface water stations were sampled for the purposes of CERCLA ROD monitoring. Note that attempts to collect samples at springs SS-7 and SS-8 during CY 2004 were unsuccessful because a beaver dam constructed across Bear Creek has submerged the area. Two surface water stations located near the BCBG WMA (NT-07, and NT-08) were sampled for CERCLA baseline monitoring purposes (Figure A.11).

3.1.2 East Fork Regime

As shown below in Table 2, a total of 58 monitoring wells, four springs, nine surface water stations, and one building sump in the East Fork Regime (and surrounding areas) were sampled during CY 2004 for the purposes of DOE Order monitoring, RCRA monitoring, and CERCLA monitoring.

Table 2. CY 2004 sampling locations in the East Fork Regime, north of Pine Ridge, and in Union Valley

Monitoring Driver	Monitoring Wells	Springs	Surface Water Stations	Building Sump
DOE Order	38	2	5	1
RCRA	5	0	0	0
CERCLA	17	2	4	0
Totals:	**58 ***	**4**	**9**	**1**

Note: * = The total number is less than the sum because separate samples were collected from two wells (GW-380 and GW-722) for DOE Order and CERCLA monitoring purposes (see Table B.3).

Fifty-nine of these CY 2004 sampling locations lie within the boundaries of the East Fork Regime. The other thirteen sampling locations lie outside the boundaries of the regime, including six wells and two springs located in Union Valley east the ORR boundary at Scarboro Road (Figure A.14), and five surface water stations located in drainage features along the ORR boundary on the north side of Pine Ridge (Figure A.15). Samples were collected semiannually from most of the CY 2004 sampling locations. However, one monitoring well in the eastern Y-12 Area (GW-722) and three monitoring wells in Union Valley (GW-169, GW-170, and GW-232) were sampled during each quarter, and nine locations (eight wells and one spring) were sampled only once during the year (Table B.3).

A total of 38 monitoring wells, two springs, five surface water stations, and one building sump were sampled to meet DOE Order monitoring requirements in the East Fork Regime during CY 2004. Groundwater samples from 29 monitoring wells were collected for the specific purposes of DOE Order surveillance monitoring (Table B.3). Three of these wells are located in the western Y-12 area, 20 wells are in the central Y-12 area, and six wells are in the eastern Y-12 area (Figure A.14). Nine monitoring wells, two springs, five surface water locations, and one building sump were sampled for the purposes of DOE Order exit pathway/perimeter monitoring (Table B.3). Three of these monitoring wells are located next to UEFPC in the gap through Pine Ridge northeast of Y-12 (Figure A.14) and the other six wells are located between UEFPC and Scarboro Road at the east end of Y-12. One of these wells is equipped with a dedicated Westbay™ multi-port sampling apparatus (Westbay well GW-722), with sampling ports set at ten discrete depths intervals in the well (Figure A.16). The springs are located north of Bear Creek Road near the S-3 Site (SPR14.0SP) and in the basement of Building 9201-3 (9201-3C-4SP). Surface water samples were collected from five tributaries located north of Pine Ridge (Figure A.15), and samples were collected from a sump in the basement of building 9201-1 (Figure A.14).

Five wells were sampled for the specific purposes of RCRA post-closure corrective action monitoring in the East Fork Regime during CY 2004. These wells include one POC well (GW-108) which is located in the western Y-12 area about 800 ft southeast of the S-3 Site, and four plume delineation wells (GW-193, GW-605, GW-606, and GW-733) which are located several thousand ft east-southeast of the S-3 Site (Figure A.14).

Seventeen monitoring wells, two springs, and four surface water stations were sampled during CY 2004 specifically for CERCLA monitoring purposes (Table B.3). Six monitoring wells and two springs located in Union Valley east of the ORR boundary along Scarboro Road, and eight monitoring wells (GW-151, GW-154, GW-223, GW-380, GW-382, GW-722, GW-762, and GW-832) in the eastern Y-12 area were sampled for CERCLA ROD monitoring purposes (Figure A.14). Sampling locations used for CERCLA baseline monitoring include three monitoring wells and four surface water stations (Table B.3). The wells are located in the eastern Y-12 area (GW-281, GW-658, and GW-802), and the surface water stations are located in the central (OF 51, OF 200, and Station 8) and eastern (Station 17) Y-12 areas (Figure A.14).

3.1.3 Chestnut Ridge Regime

As shown below in Table 3, a total of 51 monitoring wells, five springs, and five surface water stations in the Chestnut Ridge Regime were sampled during CY 2004 to meet the requirements of DOE Order monitoring, SWDF detection monitoring, RCRA monitoring, and CERCLA monitoring.

Table 3. CY 2004 sampling locations in the Chestnut Ridge Regime

Monitoring Driver	Monitoring Wells	Springs	Surface Water Stations
DOE Order	15	2	3
SWDF	21	1	0
RCRA	11	0	0
CERCLA	4	2	2
Totals:	**51**	**5**	**5**

Groundwater samples were collected semiannually during CY 2004 from all of the monitoring wells except for one well (GW-305) that was sampled during each quarter of the year (Table B.4). Samples were collected from the springs and surface water stations during seasonally wet (January-March) and seasonally dry (July-August) flow conditions (Table B.4).

Three surface water stations and two springs were sampled during CY 2004 for the specific purposes of DOE Order exit pathway/perimeter monitoring (Table B.4). The surface water sampling stations (SCR1.5SW, SCR3.5SW, and S17) are located along Bethel Valley Road in main channels of drainage features where surface water exits the Chestnut Ridge Regime (Figure A.17). The springs (SCR2.1SP and SCR2.2SP) are located in the southwestern portion of the regime (Figure A.17).

Twenty-one monitoring wells and one spring were sampled during CY 2004 for the purposes of SWDF detection monitoring (Table B.4). The monitoring wells are located at five SWDFs: three wells at ILF II; five wells at ILF IV; five wells at ILF V; four wells at CDL VI; and four wells at CDL VII (Figure A.16). A spring (SCR4.3SP) was sampled for the purposes of SWDF detection monitoring at ILF V and is located about 2,400 ft southeast of the site (Figure A.17). At the request of the TDEC, samples were collected quarterly from well GW-305 at ILF IV during CY 2004 because the nickel concentration reported for the sample collected in July 1999 exceeded the Groundwater Protection Standard defined in the operating permit for the site (TDEC 1999).

A total of 11 monitoring wells were sampled for RCRA monitoring purposes during CY 2004 in the Chestnut Ridge Regime: three wells for RCRA post-closure corrective action monitoring and eight wells for RCRA post-closure detective monitoring (Table B.4). RCRA post-closure corrective action monitoring at the CRSP included one POC well (GW-177) located at the west end of the site and four plume delineation wells: one at the former Chestnut Ridge Borrow Area Waste Pile (GW-301) about 3,000 ft east of the site; and one at the Filled Coal Ash Pond (GW-831) about 2,000 ft southwest of the site (Figure A.17). Note that the SWDF detection monitoring results for six monitoring wells and one spring also serve the purposes of RCRA post-closure corrective action monitoring at the CRSP. The monitoring wells include one background well (GW-521) and four plume delineation wells (GW-557, GW-562, GW-799, and GW-801) (Table B.4 and Figure A.17). The spring sampling location (SCR4.3SP) is located south of CDL VII (Figure A.17). During CY 2004, RCRA post-closure detection monitoring included four wells at the Chestnut Ridge Sediment Disposal Basin (CRSDB) and four wells at Kerr Hollow Quarry (Table B.4). The RCRA monitoring well network at the CRSDB includes one well (GW-159) located hydraulically upgradient (northwest) of the site and three POC wells (GW-156, GW-731, and GW-732) to the east-southeast (hydraulically downgradient) of the site (Figure A.17). One upgradient/background well (GW-231) and three downgradient POC wells (GW-143, GW-144, and GW-145) comprise the RCRA monitoring well network at Kerr Hollow Quarry (Figure A.17).

Samples were collected from four monitoring wells, two springs, and two surface water stations for the specific purposes of CERCLA monitoring in the Chestnut Ridge Regime during CY 2004. The wells, located at the United Nuclear Corporation Site, were sampled for CERCLA ROD monitoring purposes (Figure A.17 and Table B.4). Two surface water stations (MCK 2.0 and MCK 2.05) and one spring (SCR3.5SP) located in McCoy Branch and one spring (SCR1.25SP) in the southwestern portion of the regime (Figure A.17) were sampled for CERCLA baseline monitoring purposes (Table B.4).

3.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLING

The following discussion pertains to the QA/QC sampling activities managed by the Y-12 GWPP during CY 2004. Comparable QA/QC protocols were performed by monitoring programs managed by BJC (BJC 1999 and DFS 2003a). As shown in Table 4, the QA/QC samples associated with the groundwater and surface water monitoring performed under the Y-12 GWPP during CY 2004 include a total of 101 trip blanks, 55 method (laboratory) blanks, four field blanks, five equipment rinsate samples, and 30 duplicate groundwater and surface water samples.

Table 4. QA/QC samples analyzed in CY 2004 for the Y-12 GWPP

Sample Type	Total Number of Samples per Quarter of CY 2004				Annual Total
	First	Second	Third	Fourth	
Trip Blank Samples	20	27	27	27	**101**
Method Blank Samples	13	12	16	14	**55**
Field Blank Samples	1	1	1	1	**4**
Equipment Rinsate Samples	1	0	4	0	**5**
Duplicate Groundwater/Surface Water Samples	6	8	9	7	**30**

The blanks and equipment rinsate samples were prepared and analyzed as specified in the *Quality Assurance Plan for the Analytical Chemistry Organization* (BWXT 2003b). Analytical results for the blank samples help assess the environmental conditions in the field and laboratory under which associated groundwater and surface water samples were collected, transported, stored, and analyzed. Trip blanks were samples of deionized water prepared in the laboratory and transported to the field and then to the laboratory in coolers containing groundwater and surface water samples. Field blanks were samples of deionized water that were transported to the field in a sealed glass container and transferred to sample bottles at monitoring wells GW-071 (first and third quarters) and GW-782 (second and fourth quarters) and then transported to the laboratory in a cooler containing the other samples from the well. Method blanks were samples of deionized water that were prepared in the laboratory and analyzed along with one or more associated groundwater or surface water samples. Equipment rinsates were samples of the deionized water from the final rinse of the decontaminated portable sampling equipment after sampling was completed at wells equipped with Westbay™ multi-port sampling systems (GW-133, GW-134, GW-135, and GW-722) during CY 2004.

Method blanks, trip blanks, field blanks, and equipment rinsate samples were analyzed for VOCs; equipment rinsates also were analyzed for miscellaneous analytes (e.g., suspended solids), major ions, trace metals, and radioanalytes. Appendix G provides a summary of detected results for the QA/QC blanks and equipment rinsate samples, and shows the method blank and trip blank samples associated with each groundwater and surface water sample collected under management of the GWPP during CY 2004.

A total of 30 field duplicate samples were collected for QA/QC purposes from sampling locations monitored under management of the Y-12 GWPP during CY 2004. These sampling locations include nine wells, one surface water station, and one spring in the Bear Creek Regime (Table B.2); 10 wells in the East Fork Regime and two surface water stations located north of Pine Ridge (Table B.3); and four wells and two surface water stations in the Chestnut Ridge Regime (Table B.4). The duplicate samples were analyzed for the same constituents and parameters specified for the sampling location from which they were collected; analytical results are presented with the regular sample results in Appendices D, E, and F.

3.3 SAMPLE COLLECTION AND HANDLING

The following discussion pertains to the groundwater and surface water sampling activities managed by the Y-12 GWPP during CY 2004. Personnel from the Sampling Support Group of the Y-12 Analytical Chemistry Organization (ACO) were responsible for collection, transportation, and chain-of-custody control of the groundwater and surface water samples. Sampling was performed in accordance with the most recent version of the technical procedures approved by the Y-12 GWPP Manager (LMES 1999a and BWXT 2000a). All samples were collected in appropriate containers, preserved as required, labeled, logged, placed in ice-filled coolers, and transported to the designated ACO laboratory in accordance with chain-of-custody control requirements. Similar protocols were followed under the monitoring programs managed by BJC during CY 2004 (MDM Services Corporation [MDM] 2000, MDM 2001, and MDM 2002).

Unfiltered samples were collected from the monitoring wells, springs, and surface water stations in each hydrogeologic regime during CY 2004. Groundwater samples were collected from most monitoring wells with dedicated bladder pumps (Well Wizard™). However, samples were obtained from three wells (one in each Regime) with portable Bennett pumps and from four well equipped with a dedicated Westbay ™ multi-port sampling apparatus (Westbay™ wells GW-133, GW-134, GW-134, and GW-722).

The low-flow minimal drawdown sampling method was used to obtain groundwater samples from the wells equipped with dedicated bladder pumps. Under this method, a representative sample is obtained from a discrete depth interval without introducing stagnant water from the well casing. The well is pumped at a flow rate which is low enough (<300 milliliters per minute) to minimize drawdown of the water level in the well (<0.1 ft per quarter-hour). At five-minute intervals after the water-level drawdown has stabilized, field personnel record measurements of the pH, conductivity, water temperature, oxidation-reduction potential (REDOX), and dissolved oxygen. Samples of the groundwater in the well are collected once the field measurements for each parameter show minimal variation over four consecutive readings.

During CY 2004, samples were collected from three wells with portable Bennett pumps using the "conventional" sampling method: well GW-229 in the Bear Creek Regime (Table B.2), well GW-698 in the East Fork Regime (Table B.3), and well GW-612 in the Chestnut Ridge Regime (Table B.4). The conventional sampling method, used before the Y-12 GWPP began using the low-flow sampling method (October 1997), involved purging at least three well volumes of groundwater (or until the well is dry) at a much higher pumping rate (1.0 - 1.8 gallons per minute) before collecting samples. These three wells were selected for conventional sampling to help characterize differences between previous conventional sampling and low-flow sampling results for the wells (BWXT 2002a). To confirm the suspected sensitivity to the groundwater sampling method, "paired" groundwater samples were collected from these monitoring on consecutive days, with the low-flow sampling method used the first day and the conventional sampling method used the next.

Groundwater samples were collected from Westbay™ wells GW-133, GW134, GW-135, and GW-722 in accordance with the most recent and approved version of the operating procedures for the multi-port sampling equipment (BWXT 2002b and BWXT 2002c). One or more 250-milliliter non-vented stainless steel sample collection bottles were used to obtain groundwater samples from the sampling ports. The sample collection bottles were lowered to the designated sampling port, the sampling port valve was opened, and the bottles were allowed to fill with groundwater. The filled bottles were retrieved to the surface and the contents were poured into the appropriate laboratory sample bottle(s). The sample collection bottles were lowered, filled, and retrieved as many times as needed to completely fill the laboratory sample bottles. Groundwater in the first sample collection bottle retrieved from each sampling port was used as a "formation rinse" to obtain field measurements and to condition the sample collection bottle.

3.4 FIELD MEASUREMENTS AND LABORATORY ANALYTES

The following discussion pertains to the field measurements and laboratory analytes associated with the CY 2004 groundwater and surface water sampling activities in the Bear Creek, East Fork, and Chestnut Ridge hydrogeologic regimes that were performed by the Y-12 GWPP. Functionally equivalent field measurements and laboratory analyses were performed under the monitoring programs managed by BJC during CY 2004 (BJC 2003a, BJC 2004, DFS 2003a, and DFS 2003b).

Field personnel measured the depth to the static water surface before sampling groundwater in each monitoring well and recorded field measurements of pH, temperature, conductivity, dissolved oxygen, and REDOX for each groundwater and surface water sampling location (Table B.5). Note that the depth to water and REDOX were not recorded for the Westbay™ wells (not applicable when a well is equipped with a multiport sampling apparatus). Field measurements were obtained in accordance with the most recent and approved technical procedures, as referenced in the Y-12 GWPP SAP for CY 2004 (BWXT 2003a). The field measurements recorded for the sampling locations in each regime are presented in Appendices D.1, E.1, and F.1.

All of the CY 2004 groundwater samples and surface water samples were analyzed for: (1) miscellaneous laboratory analytes—turbidity, total suspended solids, and total dissolved solids; (2) major ions and trace metals; (3) VOCs; and (4) gross alpha and gross beta activity (Table B.5). Laboratory analyses of the samples were performed by the Y-12 ACO laboratories in accordance with the analytical methods and procedures listed in Table B.5. Analytical results are presented in Appendix D (Bear Creek Regime), Appendix E (East Fork Regime), and Appendix F (Chestnut Ridge Regime).

3.5 DATA MANAGEMENT AND DQO EVALUATION

The ACO laboratories provided electronic files and hardcopy printouts of the analytical results and field measurements for the groundwater and surface water samples collected during CY 2004 under management of the Y-12 GWPP. The GWPP groundwater database management subcontractor downloaded the electronic files directly into SAS® files and verified the data in accordance with the *Y-12 Groundwater Protection Program Data Management Plan* (BWXT 2003c). Appropriate ACO staff and the groundwater database management subcontractor worked to resolve any incomplete data transfers, irregular parameter names or reporting units, and discrepancies between electronic and hardcopy versions of the data.

Analytical results and field measurements associated with monitoring programs managed by BJC were extracted from the project database by the GWPP groundwater database management subcontractor and formatted as SAS® files for presentation in this report. The BJC data management process (BJC 2003b) is similar to the process described above for the Y-12 GWPP.

The CY 2004 groundwater and surface water monitoring data presented in this report have been evaluated with respect to the DQO criteria defined in the *Y-12 Groundwater Protection Program Data Management Plan* (BWXT 2003c) and the functionally equivalent DQO criteria for the monitoring programs managed by BJC (BJC 2003b). Specific DQO criteria apply to analytical results for field measurements, major ions, trace metals, VOCs, radiological analytes (gross alpha, gross beta, and radionuclides), and miscellaneous laboratory analytes (e.g., total suspended solids). Monitoring results that do not meet applicable DQOs are flagged with an "R" or "Q" qualifier and described in the introductory section of the applicable data appendices (Appendix D, Appendix E, and Appendix F).

3.6 GROUNDWATER ELEVATION MONITORING

As shown in Table 5, respective networks of selected monitoring wells in the Bear Creek, East Fork, and Chestnut Ridge hydrogeologic regimes were used to monitor representative groundwater elevations during seasonally low flow conditions in CY 2004.

Table 5. Summary of CY 2004 groundwater elevation monitoring in the Bear Creek, East Fork, and Chestnut Ridge regimes

REGIME	DEPTH-TO-WATER MEASUREMENTS		GROUNDWATER ELEVATIONS	
	No. of Wells	Dates	Data	Isopleth Map
Bear Creek	66	September 2-14, 2004	Table B.6	Figure A.4
East Fork	57	September 8-15, 2004	Table B.7	Figure A.5
Chestnut Ridge	77	September 7-16, 2004	Table B.8	Figure A.6

Field personnel subcontracted by BJC measured the depth to the static water surface in each well.

4.0 CY 2004 MONITORING DATA

This following discussion describes the monitoring data obtained during CY 2004 from monitoring wells and surface water sampling stations in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime. Separate discussions of groundwater and surface water monitoring results obtained in each hydrogeologic regime address surveillance monitoring and exit pathway/perimeter monitoring provisions of DOE Order 450.1. Both discussions focus on the principal groundwater contaminants at Y-12, as defined by: (1) nitrate concentrations that exceed the MCL for drinking water (10 mg/L); (2) total uranium concentrations that exceed the MCL (0.03 mg/L); (3) individual VOC concentrations that exceed applicable MCLs or summed VOC concentrations that exceed 5 µg/L; (4) gross alpha activity above the MCL (15 pCi/L); and (5) gross beta radioactivity above the SDWA screening level (50 pCi/L) for a 4 mrem/yr dose equivalent (the MCL for gross beta activity). The discussions only provide brief overviews of the CY 2004 sampling results for these principal contaminants, with short descriptions of noteworthy findings and updated time-series plots for wells selected as representative examples of increasing, decreasing, and indeterminate (not increasing or decreasing) long-term contaminant concentration trends. More detailed analysis, evaluation, and interpretation of the data for each well is deferred to the GWPP Compendium (see Section 1.0).

4.1 SURVEILLANCE MONITORING

Results of groundwater quality monitoring performed during CY 2004 in areas that are, or could be, affected by Y-12 operations are discussed in this section. Separate discussions of the surveillance monitoring data obtained from respective networks of sampling locations in the Bear Creek, East Fork, and Chestnut Ridge hydrogeologic regimes are provided.

4.1.1 Bear Creek Regime

Monitoring results for 56 of the monitoring wells in the Bear Creek Regime that were sampled during CY 2004 serve surveillance monitoring purposes (Table B.2). Most (35) of the wells are completed in the geologic formations comprising the aquitard (Nolichucky Shale, Maryville Limestone, Rogersville Shale, Pumpkin Valley Shale, and Rome Formation). The remaining 21 wells are completed in the geologic formations (Copper Ridge Dolomite and Maynardville Limestone) that comprise the aquifer. Westbay™ well GW-134 has sampling ports in both the aquifer (Maynardville Limestone) and the aquitard (Maryville Limestone and Nolichucky Shale) (Figure A.12).

4.1.1.1 Aquitard Wells

Elevated concentrations of one or more of the principal groundwater contaminants at Y-12 were reported for at least one of the groundwater samples collected during CY 2004 from 16 of the aquitard monitoring wells that serve the purposes of surveillance monitoring in the Bear Creek Regime (Table B.9). The presence of these contaminants in the groundwater at each of these wells is attributable to transport/migration of the mobile components of the contaminant plumes emplaced during historical operations of the former S-3 Ponds, the Oil Landfarm WMA, and the BCBG WMA.

As shown in Table 6, elevated concentrations of nitrate (>10 mg/L) and/or total uranium (>0.03 mg/L) were reported for at least one groundwater sample collected during CY 2004 from eight aquitard monitoring wells. The nitrate and uranium results for these wells, which are listed in Table 6 in sequence from closest to farthest from the former S-3 Ponds (from north and east [hydraulically upgradient] to south and west [hydraulically downgradient]), are generally consistent with respective historical data and continue to support the long-term trends indicated by historical nitrate and uranium data for each well (Table B.9).

Table 6. Bear Creek Regime CY 2004: elevated nitrate and uranium concentrations in surveillance monitoring aquitard wells

Well Number	Direction - Distance from S-3 Site (Figure A.11)		Total Depth (ft bgs)	Nitrate (mg/L)		Uranium (mg/L)	
				1st Qtr. 2004	3rd Qtr. 2004	1st Qtr. 2004	3rd Qtr. 2004
GW-246	South	50 ft	76	2,980	2,850	0.595	0.591
GW-615		50 ft	245	11,000	11,000	1.18	1.22
GW-276	Southeast	200 ft	18.5	32	30.6	0.613	0.86
GW-134-21		300 ft	381	NS	733	NS	<
GW-134-18		300 ft	436	NS	1,340	NS	<
GW-134-15		300 ft	496	NS	887	NS	<
GW-134-11		300 ft	588	NS	877	NS	<
GW-134-05		300 ft	750	NS	860	NS	<
GW-101	West	160 ft	17.5	61.2	84.2	<	<
GW-526		1,300 ft	123	1,310	1,150	.	.
GW-537		2,500 ft	23.3	566	539	<	<
GW-085		3,000 ft	58.8	120	70.7	.	.

Note: "." = Not detected; "NS" = not sampled; "<" = less than the MCL.

The CY 2004 sampling results for wells located most proximal to the former S-3 Ponds indicate divergent long-term contaminant concentrations trends. For instance, nitrate concentrations in the shallow groundwater immediately down-dip of the ponds, as indicated by sampling results for well GW-246, appear to have remained relatively unchanged, as illustrated by the nitrate results reported for the samples collected from the well in November 1987 (2,860 mg/L) and August 2004 (2,850 mg/L). Farther downgradient to the southeast (GW-276) and along strike to the west (GW-101), clearly decreasing concentration trends are evident for nitrate and uranium in the shallow groundwater (Figure A.18). Conversely, the CY 2004 sampling results for well GW-615, which yields highly contaminated groundwater from deeper in the aquitard down-dips of the site, show an increasing concentration trend for uranium and an indeterminate trend for nitrate (Figure A.18). Indeterminate trends for nitrate also are evident for the deepest sampling ports in Westbay™ well GW-134.

One or more dissolved VOCs were detected at individual or summed concentrations of 5 µg/L or more in at least one of the groundwater samples collected during CY 2004 from eleven of the aquitard wells used for surveillance monitoring in the Bear Creek Regime (Table B.9). As shown in Table 7, groundwater samples collected from these wells contained maximum concentrations of PCE, TCE, c12DCE, 11DCE, VC, 111TCA, 12DCA, MC and benzene that exceed the respective drinking water MCL for each compound. The presence of dissolved VOCs in the groundwater at these wells reflect transport/migration from the contaminant plumes emplaced during historical operations of the former S-3 Ponds (GW-246, GW-276, and GW-615), Oil

Landfarm (GW-008 and GW-098), and various waste disposal areas within the BCBG WMA (GW-046, GW-071, GW-082, GW-257, GW-627, and GW-653).

Table 7. Bear Creek Regime CY 2004: maximum VOC concentrations in surveillance monitoring aquitard wells

Well Number	Concentration (µg/L)								
	PCE	TCE	c12DCE	11DCE	VC	111TCA	12DCA	MC	Benzene
GW-008	24	14	<	7	.	.	.	.	<
GW-046	2,100	1,700	4,900	110	610	<	6	.	63
GW-071	540	74	<	74	3	240	.	.	1,100
GW-082	.	.	560	<	120	.	.	.	<
GW-098	.	13	<	<	.	.	.	.	.
GW-246	120	<	.	<	.	.	.	21	.
GW-257	210	.	.	.	.	.	.	.	.
GW-276	10	.	.	.	.	.	.	.	.
GW-615	.	.	.	.	.	.	.	7	.
GW-627	830	230	<	34	29	.	.	.	.
GW-653	<	<	<	<	.	.	.	.	.
MCL (µg/L)	5	5	70	7	2	200	5	5	5

Note: "." = Not detected; "<" = Less than MCL

As noted previously with nitrate and uranium concentrations in the groundwater from wells located near the former S-3 Ponds, the CY 2004 VOC results for these wells exhibit divergent long-term concentration trends. For instance, the concentrations of PCE appear to have increased in the shallow groundwater at well GW-246 but have decreased in the shallow groundwater at well GW-276 (Figure A.19). The CY 2004 results for other aquitard wells in the regime generally support the long-term concentration trends indicated by respective historical VOC data (Table B.9).

Groundwater samples collected during CY 2004 from 11 of the aquitard wells used for surveillance monitoring in the Bear Creek Regime contained gross alpha activity and/or gross beta activity above the associated minimum detectable activity (MDA) and the corresponding counting error (CE). However, as shown in Table 8, elevated levels of gross alpha activity (>15 pCi/L) and/or gross beta activity (>50 pCi/L) were reported only for six of these wells. Elevated levels of gross alpha and gross beta activity in the groundwater at these wells reflect transport/migration of radiological components (primarily uranium isotopes and Tc-99) of the groundwater contaminant plumes emplaced during historical operations of the former S-3 Ponds. Moreover, as with inorganic contaminants and VOCs in the groundwater near this site, the CY 2004 sampling results for gross alpha and gross beta activity indicate divergent long-term trends, with indeterminate trends evident for the shallow groundwater at well GW-246 (Table B.9), but a clearly decreasing trend for shallow groundwater at well GW-276 (Figure A.20).

Table 8. Bear Creek Regime CY 2004: elevated gross alpha activity and gross beta activity in surveillance monitoring aquitard wells

Well	Date Sampled	Gross Alpha Activity (pCi/L)				Gross Beta Activity (pCi/L)			
		MDA	Activity ± CE			MDA	Activity ± CE		
GW-085	02/23/04	5.4	<MDA			9.8	120	±	11
GW-085	08/03/04	7	<MDA			11	80	±	11
GW-246	03/10/04	170	430	±	190	240	24,000	±	770
GW-246	08/19/04	180	<MDA			210	9,800	±	480
GW-276	01/06/04	2.5	343	±	15.97	7.58	280	±	10.7
GW-276	07/08/04	6.12	292	±	14.4	6.13	325	<	10.4
GW-526	02/17/04	12.7	542	±	15	39.76	<MDA		
GW-526	08/16/04	29.3	<MDA			39.76	<MDA		
GW-537	02/23/04	16	<MDA			15	390	±	25
GW-537	08/03/04	74	<MDA			61	400	±	64
GW-615	03/10/04	550	<MDA			480	988	±	395
GW-615	08/19/04	630	<MDA			670	<MDA		
Screening Level		15 pCi/L				50 pCi/L			

The CY 2004 sampling results show that gross beta activity remains extremely high in the aquitard (Nolichucky Shale) nearest to the former S-3 Ponds (well GW-246); exceeds 350 pCi/L in the shallow groundwater 2,500 ft west of the site (well GW-537); and fluctuates above and below 100 pCi/L near the leading edge of the groundwater contaminant plume in the aquitard about 3,000 ft west of the site (well GW-085). Historical data confirm Tc-99 is the primary beta-emitting radionuclide in the groundwater at each well. The gross beta results for wells GW-085 and GW-537 also show a consistent positive correlation with nitrate concentrations (Figure A.21), which probably reflects the similar transport characteristics of nitrate and Tc-99 in the groundwater. Additionally, the data for well GW-085 suggest distinctive, long-term fluctuations in gross beta activity (and nitrate concentrations), with the CY 2004 results apparently continuing the downward limb of a second temporal "pulse" in the level of gross beta activity in the shallow groundwater at this well.

4.1.1.2 Aquifer Wells

Elevated concentrations of one or more of the principal groundwater contaminants at Y-12 were reported for the groundwater samples collected during CY 2004 from 18 of the aquifer wells that serve the purposes of surveillance monitoring in the Bear Creek Regime (Table B.9). Eight of these wells are components of two Exit Pathway Pickets in the Bear Creek Regime: Picket B (GW-695, GW-703, GW-704, and GW-706) and Picket C (GW-724, GW-725, GW-738, and GW-740). The wells that comprise each Exit Pathway Picket are completed at various depths within different hydrostratigraphic zones along a strike-normal transect across the Maynardville Limestone and lower Knox Group (Figure A.13). The remaining wells are located near the eastern end of the regime at the S-3 Site (GW-134 and GW-135), Rust Spoil Area (GW-311), or Spoil Area I (GW-315); on the north side of Bear Creek about 750 ft downstream of the former S-3 Ponds (GW-100 and GW-236); and near Bear Creek directly south of the Oil Landfarm WMA (GW-225, GW-226, and GW-229) or the BCBG WMA (GW-052).

As shown in Table 9, elevated concentrations of nitrate (>10 mg/L) and/or total uranium (>0.03 mg/L) were reported for at least one groundwater sample collected during CY 2004 from 13 of the aquifer wells used for surveillance monitoring in the Bear Creek Regime. Elevated concentrations of nitrate and/or uranium in the groundwater at these wells reflect transport/migration from the S-3 Site or within the intermingled contaminant plume in the Maynardville Limestone.

Table 9. Bear Creek Regime CY 2004: elevated nitrate and uranium concentrations in surveillance monitoring aquifer wells

Well Location / Number		Distance and Direction from S-3 Site (Figures A.11, A.12)	Nitrate (mg/L)		Uranium (mg/L)	
			1st Qtr. 2004	3rd Qtr. 2004	1st Qtr. 2004	3rd Qtr. 2004
S-3 Site	GW-134-36	350 ft Southeast	NS	81.8	NS	.
	GW-134-35		NS	160	NS	.
	GW-134-33		NS	91.4	NS	.
	GW-100	1,100 ft West	54.3	51.3	.	<
	GW-236	1,650 ft West	63.5	42.5	<	<
Exit Pathway Picket C	GW-724	3,000 ft West	22.7	19.5	<	<
	GW-725		56	13.8	<	<
Oil Landfarm WMA	GW-225	4,500 ft West	34.2	37.6	<	<
	GW-226		32.3	20.9	<	<
	GW-229	5,000 ft West	.	.	0.182	0.206
	GW-229(C)		.	.	0.131	0.208
Exit Pathway Picket B	GW-695	7,000 ft West	11.6	<	<	<
	GW-703		20.2	19.1	<	<
	GW-704		17.4	<	<	<
	GW-706		27.4	24.2	0.0724	0.0773
BCBG	GW-052	8,600 ft West	<	<	0.0262	0.0467
MCL			10 mg/L		0.03 mg/L	

Note: (C) = Conventional sampling result; "." = Not detected; "<" = Less than MCL; "NS" = not sampled.

The CY 2004 monitoring results for the aquifer wells nearest the S-3 Site reflect decreasing (or indeterminate from lack of data) concentration trends. For example, nitrate concentrations in the groundwater samples from well GW-100 show a clearly decreasing concentration trend (Figure A.22). Additionally, the CY 2004 monitoring results for aquifer wells located farther from the former S-3 Ponds support the long-term concentration trends indicated by respective historical nitrate and uranium data for each well (Table B.9), including the increasing uranium concentrations in well GW-229 and the increasing nitrate levels in well GW-695 (Figure A.22). As shown in Table 9, the increasing uranium concentrations at well GW-229 are not an artifact of changing sampling methods; there is no significant difference in the results obtained by both methods in CY 2004.

One or more dissolved VOCs were detected at individual or summed concentrations of 5 µg/L or more in at least one groundwater sample collected during CY 2004 from 20 of the aquifer wells used for surveillance monitoring in the Bear Creek Regime (Table B.9). As shown in Table 10, the maximum concentrations of PCE, TCE, c12DCE, 11DCE, VC, CTET, and benzene reported for at least one groundwater sample from these wells exceed the respective drinking water MCL for each compound. The presence of dissolved VOCs in the groundwater at most of these wells reflect transport/migration of the intermingled contaminant plume in the Maynardville Limestone.

Table 10. Bear Creek Regime CY 2004: maximum VOC concentrations in surveillance monitoring aquifer wells

Well Number	Concentration (µg/L)						
	PCE	**TCE**	**c12DCE**	**11DCE**	**VC**	**CTET**	**Benzene**
GW-134-33	8	<	<	.	.	.	.
GW-134-35	15	16	<	<	.	.	.
GW-135-03	.	.	.	.	.	.	15
GW-135-06	<	.	.	.	.	.	22
GW-135-11	.	.	.	.	.	.	26
GW-135-23	.	.	.	.	.	.	19
GW-135-26	.	.	.	.	.	.	6
GW-225	<	240	<	<	.	5	.
GW-226	<	210	<	<	.	<	.
GW-229	<	10	140	13	42	.	7
GW-229 (C)	<	16	280	41	23	.	9
GW-311	<	5	.	.	.	.	.
GW-315	8	<	<	.	.	.	.
GW-695	.	5	<	.	.	.	.
GW-703	.	14	<	.	.	.	.
GW-704	.	37	<	<	.	.	.
GW-706	.	10	<	.	.	.	.
GW-724	<	96	<	.	.	<	.
GW-725	<	310	<	8	.	12	.
GW-738	.	25	<	.	.	.	.
GW-740	.	50	<	<	.	.	.
MCL (µg/L)	5	5	70	7	2	5	5
Note: (C) = Conventional sampling result; ”.” = Not detected; “<“ = Less than MCL							

The CY 2004 monitoring results for these aquifer wells generally support the long-term concentration trends indicated by historical VOC data for each well (Table B.9). For example, decreasing (e.g., GW-311), indeterminate (e.g., GW-225), and increasing (e.g., GW-695) trends for the TCE concentrations in these wells have continued through CY 2004 (Figure A.23).

Groundwater samples collected during CY 2004 from 20 of the surveillance monitoring aquifer wells in the Bear Creek Regime contained gross alpha activity and/or gross beta activity above the associated MDA and the corresponding CE (Appendix D.3). However, as shown in Table 11, elevated gross alpha activity (>15 pCi/L) and/or gross beta activity (>50 pCi/L) were reported only for seven of these wells. Elevated levels of gross alpha and gross beta activity in the groundwater at these wells reflect transport/migration of radiological components of the intermingled contaminant plume in the Maynardville Limestone.

Table 11. Bear Creek Regime CY 2004: elevated gross alpha activity and gross beta activity in surveillance monitoring aquifer wells

Well	Date Sampled	Gross Alpha Activity (pCi/L)		Gross Beta Activity (pCi/L)	
		MDA	Activity ± CE	MDA	Activity ± CE
GW-052	03/04/04	3.1	17 ± 5	6.8	<
GW-052	08/16/04	4.2	16 ± 5.6	10	<
GW-134-33	08/11/04	8.7	<MDA	13	130 ± 15
GW-134-35	08/11/04	6.8	<MDA	7	220 ± 13
GW-134-36	08/11/04	7.8	<MDA	8.3	130 ± 11
GW-229	02/11/04	4.5	83 ± 14	7.9	57 ± 7.9
GW-229(C)	02/12/04	4.8	65 ± 12	7.3	<
GW-229	07/28/04	12	71 ± 17	18	53 ± 14
GW-229(C)	07/29/04	6.7	87 ± 19	12	<
GW-236	03/08/04	6.4	<MDA	12	73 ± 12
GW-236	08/18/04	4.9	<MDA	9.5	52 ± 8.5
GW-703	02/03/04	3	<	7	54 ± 7.5
GW-703	07/21/04	6.7	<	8.3	<
GW-704	02/04/04	2.5	<	7.8	52 ± 7.9
GW-704	07/22/04	6	<MDA	9.5	<MDA
GW-706	02/04/04	4.7	37 ± 8.8	6.5	98 ± 9.2
GW-706	07/22/04	7.6	20 ± 7.2	8.4	81 ± 9.5
Screening Level		15 pCi/L		50 pCi/L	
Note: (C) = Conventional sampling result; “<“ = Less than or equal to screening level					

The CY 2004 monitoring results show that the highest levels of gross alpha activity occur in the groundwater from aquifer wells located downgradient (west-southwest) of the former Boneyard/Burnyard/HCDA. This finding is consistent with historical data and indicates the principal source of gross alpha radioactivity in the groundwater at these wells is uranium isotopes from the contaminant plume emplaced during historical operation of the Boneyard/Burnyard/HCDA. The CY 2004 monitoring results generally support the long-term activity trends indicated by historical gross alpha results for the aquifer wells (Table B.9), for example the increasing and indeterminate trends evident for wells GW-229 and GW-706, respectively (Figure A.24). Additionally, as illustrated by the data shown in Table 11, the CY 2004 paired conventional/low-flow sampling results for well GW-229 (see Section 3.3) indicate little difference between the levels of gross alpha activity detected in samples obtained with either method.

The CY 2004 monitoring results show that the highest levels of gross beta activity occur in the groundwater nearest to the former S-3 Ponds (e.g., GW-134). This finding is consistent with historical data for these wells and indicates that Tc-99 from this site is the principal source of beta radioactivity in the Maynardville Limestone. Also, the CY 2004 monitoring results for the aquifer wells support the long-term activity trends indicated by respective historical gross beta results (Table B.9), including the slightly decreasing trend for well GW-236 and the increasing trend for well GW-703 (Figure A.25). Note that the well GW-229 conventional/low-flow sampling results for gross beta activity, like the paired sampling results for gross alpha activity, do not indicate substantial differences between respective results for samples obtained with either method (Figure A.24).

4.1.2 East Fork Regime

Monitoring results for 46 of the monitoring wells in the East Fork Regime that were sampled during CY 2004 serve surveillance monitoring purposes (Table B.3). Half (23) of the wells are completed in the geologic formations comprising the aquitard (Nolichucky Shale, Maryville Limestone, Rogersville Shale, Pumpkin Valley Shale, and Rome Formation). The remaining 23 wells are completed in the geologic formations comprising the aquifer (Copper Ridge Dolomite and Maynardville Limestone).

4.1.2.1 Aquitard Wells

Elevated concentrations of one or more of the principal groundwater contaminants at Y-12 were reported for at least one of the groundwater samples collected during CY 2004 from 15 of the aquitard monitoring wells that serve the purposes of surveillance monitoring in the East Fork Regime (Table B.10), including two wells in the western Y-12 area, nine wells in the central Y-12 area, and four wells in the eastern Y-12 area.

Sampling results obtained during CY 2004 for aquitard wells that serve the purposes of surveillance monitoring in the East Fork Regime show elevated concentrations of nitrate (>10 mg/L) in groundwater from wells 55-1A, 55-2B, GW-108, and GW-633, with elevated total uranium (>0.03 mg/L) groundwater from well GW-204 (Table 12). Elevated concentrations of nitrate in the groundwater at these wells reflect transport/migration from the contaminant plume emplaced during historical operations of the former S-3 Ponds. Although uranium (and uranium isotopes) are a component of the S-3 Ponds contaminant plume, the elevated uranium levels in the groundwater at well GW-204 probably reflects transport from other nearby sources.

Table 12. East Fork Regime CY 2004: elevated nitrate and uranium concentrations in surveillance monitoring aquitard wells

Well Location/Number		Nitrate (mg/L)		Uranium (mg/L)	
		1st/2nd Qtr. 2003	**3rd/4th Qtr. 2003**	**1st/2nd Qtr. 2003**	**3rd/4th Qtr. 2003**
Western Y-12 Area	GW-108	8,940	9,520	<	<
	GW-633	1,280	1,270	<	<
Central Y-12 Area	55-1A	12.1	<	.	.
	55-2B	222	225	.	.
	GW-204	<	<	0.0434	0.052
	MCL	10 mg/L		0.03 mg/L	
Note: "." = Not detected; "<" = Less than MCL					

The CY 2004 monitoring results show that nitrate concentrations remain above 1,000 mg/L in the aquitard wells nearest to the former S-3 Ponds, with concentrations evident in the water table interval (GW-633) being lower than concentrations evident deeper in the bedrock interval (GW-108). Moreover, sampling results for well 55-2B show nitrate concentrations remain well above 200 mg/L in the aquitard more than 2,500 ft east-southeast of the site. Nitrate and uranium results for these wells support the long-term concentration trends indicated by respective historical data for each well (Table B.10), including the increasing nitrate trend for well 55-2B and decreasing nitrate trends for wells GW-108 and GW-633 (Figure A.26).

One or more dissolved VOCs were detected at individual or summed concentrations of 5 µg/L or more in at least one groundwater sample collected during CY 2004 from 13 of the aquitard wells used for surveillance monitoring in the East Fork Regime (Table B.10). As shown in Table 13, the maximum concentrations of PCE, TCE, c12DCE, 11DCE, VC, 12DCA, 1,2-dichloropropane (12DCP), CTET, MC, benzene, ethylbenzene (ETB), and toluene reported for at least one of these wells exceed the respective drinking water MCL for each compound. The presence of dissolved VOCs in the groundwater at these wells reflect transport/migration from the contaminant plumes emplaced during historical operations of the former S-3 Ponds (GW-108); petroleum dispensing facilities associated with the Rust Garage Area (GW-633) and the East End Fuel Facility (GW-658); and other unspecified sources within Y-12 (55-2B, 56-2A, 56-2B, GW-383, GW-762, GW-763, GW-769, GW-770, GW-782, and GW-791).

Table 13. East Fork Regime CY 2004: maximum VOC concentrations in surveillance monitoring aquitard wells

Y-12 Area/ Well	Maximum Concentration (µg/L)											
	PCE	TCE	c12 DCE	11 DCE	VC	12 DCA	12 DCP	CTET	MC	Ben-zene	ETB	Tol-uene
Western												
GW-108	<	<	.	.	.	.	.	.	51	<	.	.
GW-633	240	8	<	<	.	.	.	.	28	1,300	<	<
Central												
55-2B	670	250	930	26	21	.	.	.	.	.	.	.
56-2A	13	<	<	.	.	.	.	.	.	.	.	.
56-2B	1,400	85	140	<	.	.	.	.	.	.	.	.
GW-769	16	<	<	<	.	.	.	100	.	.	.	.
GW-770	.	.	.	.	.	.	.	14	.	.	.	.
GW-782	160	49	<	59	3	.	.	.	.	.	.	.
GW-791	500	<	<	.	.	.	.	.	.	.	.	.
Eastern												
GW-383	440	180	190	<	3	.	.	.	.	.	.	.
GW-658	.	.	.	.	.	690	15	.	.	7,900	1,100	4,200
GW-762	3,100	130	<	69	7	.	.	.	.	.	.	.
GW-763	30	8	140	6	9	.	.	.	.	.	.	.
MCL (µg/L)	5	5	70	7	2	5	5	5	5	5	700	1,000
Note: "." = Not detected; "<" = Less than MCL												

These monitoring results show that concentrations of dissolved VOCs remain very high in the aquitard at several locations within Y-12, with the levels of some compounds (e.g., PCE > 1,000 µg/L) suggesting the presence of DNAPL in the subsurface near some wells. Also, the CY 2004 sampling results generally continue the long-term concentration trends indicated by historical VOC data for the aquitard wells (Table B.10), including the decreasing concentration trend in well 56-2A, the indeterminate concentration trend in well GW-763, and the increasing concentration trend in well GW-383 (Figure A-27).

Groundwater samples collected during CY 2004 from 11 aquitard wells used for surveillance monitoring in the East Fork Regime contained gross alpha activity and/or gross beta activity above the associated MDA and the corresponding CE (Appendix E.3). However, as shown in Table 14, only groundwater samples from four of these wells had elevated gross alpha activity (>15 pCi/L) and/or gross beta activity (>50 pCi/L). Elevated levels of gross alpha and gross beta activity in the groundwater at these wells reflect transport/migration of radiological components of the groundwater contaminant plume emplaced during historical operations of the former S-3 Ponds (GW-108 and GW-633), and from unspecified sources of radiological contaminants (primarily uranium isotopes) in the central Y-12 area (GW-204 and GW-782).

Table 14. East Fork Regime CY 2004: elevated gross alpha activity and gross beta activity in surveillance monitoring aquitard wells

Location and Well	Date Sampled	Gross Alpha (pCi/L)		Gross Beta (pCi/L)	
		MDA	Activity ± CE	MDA	Activity ± CE
Western Y-12 Area					
GW-108	01/07/04	171	551 ± 153	309.5	12,613 ± 453
GW-108	07/08/04	99.7	137 ± 74.4	222	12,101 ± 377
GW-633	05/05/04	65	<MDA	120	2,600 ± 160
GW-633	10/26/04	73	<MDA	80	2,400 ± 140
Central Y-12 Area					
GW-204	05/03/04	4.9	21 ± 5.7	6.9	<
GW-204	10/25/04	4.4	37 ± 7	9.4	<
GW-782	05/05/04	8.1	17 7	8	<MDA
GW-782	10/26/04	3.4	20 5.3	7	<
Screening Level		15 pCi/L		50 pCi/L	
Note: "<" = Less than or equal to screening level					

The highest levels of gross alpha and gross beta activity were reported for the groundwater samples collected from aquitard well GW-108, which is located downgradient (east-southeast) of the former S-3 Ponds. Uranium isotopes (and daughter products) are the primary alpha-emitting radionuclides in the groundwater at this well and probably account for some of the gross beta activity, but Tc-99, which is the "signature" component of the S-3 Ponds contaminant plume in the East Fork Regime, is the principal beta-emitting radionuclide in the well. Elevated gross beta activity in the shallow groundwater at well GW-633 likewise is attributable the presence of Tc-99 from the S-3 Ponds plume. The CY 2004 monitoring results also support the long-term activity trends indicated by historical gross alpha and/or gross beta results for these aquitard wells (Table B.10), as illustrated by the data for wells GW-108, GW-204, and GW-633 (Figure A.28).

4.1.2.2 Aquifer Wells

Elevated concentrations of one or more of the principal groundwater contaminants at Y-12 were reported for groundwater samples collected during CY 2004 from 15 of the aquifer wells that serve the purposes of surveillance monitoring in the East Fork Regime (Table B.10), including two wells located in the western Y-12 area; five wells located in the central Y-12 area; and eight wells in the eastern Y-12 area.

As shown in Table 15, elevated concentrations of nitrate (>10 mg/L) or total uranium (>0.03 mg/L) were detected in the groundwater samples collected during CY 2004 from one aquifer well in the western Y-12 area, two wells in the central Y-12 area, and four wells in the eastern Y-12 area. Elevated concentrations of nitrate and/or uranium in the groundwater at these wells reflect transport/migration from the contaminant plume emplaced during historical operations of the S-2 Site (GW-251), the Uranium Oxide Vault (GW-219), the Oil Skimmer Basin (GW-154, GW-222, and GW-223), and one or more unspecified sources of uranium in the central or eastern (GW-605) Y-12 area.

Table 15. East Fork Regime CY 2004: elevated nitrate and uranium concentrations in surveillance monitoring aquifer wells

Well Location/Number		Nitrate (mg/L)		Uranium (mg/L)	
		1st/2nd Qtr. 2004	3rd/4th Qtr. 2004	1st/2nd Qtr. 2004	3rd/4th Qtr. 2004
Western Y-12 Area	GW-251	61.9	51.5	<	<
Central Y-12 Area	GW-219	.	.	0.338	0.525
	GW-698	131	118	<	<
	GW-698(C)	35	55.9	<	<
Eastern Y-12 Area	GW-154	NA	NA	0.477	0.61
	GW-222	<	<	0.0777	0.0654
	GW-223	.	.	0.0412	0.0465
	GW-605	<	<	0.098	0.158
	MCL	10 mg/L		0.03 mg/L	

Note: (C) = Conventional sampling results; "." = Not detected; "<" = Less than MCL; NA = Not analyzed.

As shown in Table 15, the highest nitrate concentrations were reported for the groundwater samples collected from aquifer well GW-698, which is more than 2000 ft downgradient of the known sources of nitrate in the East Fork Regime: the S-2 Ponds and the contaminant plume emplaced during historical operation of the former S-3 Ponds. Also, results of paired conventional/low-flow sampling during CY 2004 (see Section 3.3), show substantially higher nitrate concentrations in samples obtained with the low-flow sampling method. This finding suggests that the conventional sampling method may induce greater relative inflow of less nitrate-contaminated groundwater into the well. Additionally, the CY 2004 monitoring results for the other aquifer wells continue the long-term concentration trends indicated by historical nitrate and uranium data for each well (Table B.10), including the decreasing nitrate concentration trend for well GW-251, the indeterminate uranium concentration trend for well GW-154, and the increasing uranium concentration trend for well GW-223 (Figure A.29).

Groundwater samples collected during CY 2004 from 15 of the aquifer wells used for surveillance monitoring in the East Fork Regime contained one or more dissolved VOCs at individual or summed concentrations of 5 µg/L or more (Table B.10). As shown in Table 16, the maximum concentrations of PCE, TCE, CTET, chloroform (total trihalomethanes), MC, and benzene reported for the groundwater samples from 12 of these wells exceed the respective drinking water MCL for each compound. The presence of dissolved VOCs in the groundwater at these wells reflect transport/migration of the intermingled plume(s) of VOCs in the Maynardville Limestone. Additionally, the CY 2004 monitoring results for these aquifer wells generally support respective historical data showing a wide range of long-term VOC concentration trends (Table B.10), including decreasing (e.g., GW-382), indeterminate (e.g., GW-251), and increasing (e.g., GW-151) trends for the VOCs detected in each well (Figure A.30).

Table 16. East Fork Regime CY 2004: maximum VOC concentrations in surveillance monitoring aquifer wells

Location and Well	Maximum Concentration (µg/L)					
	PCE	TCE	CTET	Chloroform	MC	Benzene
Western Y-12 Area						
GW-251	280	120	<	<	.	.
GW-620	6	<	.	.	.	.
Central Y-12 Area						
GW-193	.	.	.	.	.	9
GW-691	1,300	10	.	.	.	.
GW-692	8	<	.	<	.	.
GW-698	120	440	7	<	.	.
GW-698 (C)	150	200	.	<	.	.
Eastern Y-12 Area						
GW-153	<	.	83	<	.	.
GW-223	18	9	.	.	.	.
GW-381	6	<	260	780	29	.
GW-382	26	<	930	200	.	.
GW-605	45	44	24	<	.	.
GW-606	6	.	72	130	.	.
MCL (µg/L)	5	5	5	80*	5	5

Note: (C) = Conventional sampling results; ". " = Not detected; "<" = Less than the MCL;
* = MCL for total trihalomethanes.

In contrast to the substantial difference between the nitrate results obtained from paired conventional/low-flow sampling of groundwater in well GW-698, the paired sampling results for VOCs show a mixed response to the groundwater sampling method, as illustrated by the data summarized in Table 16. Thus, it is not clear what effect, if any, the sampling method may have on the concentrations of VOCs in the groundwater samples from this well.

Summed concentrations of chlorinated solvents (PCE, TCE, 12DCE, CTET, chloroform, and chloromethane) detected in the groundwater samples collected during CY 2004 from aquifer wells GW-169 (2 µg/L), GW-170 (11- 15 µg/L) and GW-230 (6-8 µg/L) illustrate concentrations within the plume of dissolved VOCs that extends eastward from Y-12 (parallel with geologic strike in the Maynardville Limestone) into Union Valley east of the ORR boundary along Scarboro Road (Figure A.8). The maximum concentration of the individual compounds are currently less than or equal to the applicable MCLs. As shown on Table B.10, the long-term VOC concentration trend is decreasing at well GW-170. Additionally, the groundwater geochemistry at GW-170 has changed significantly since CY 1999; the pH and potassium levels have increased which probably reflects localized contamination from the cement (grout) used to construct the well. Perhaps construction activities performed during CY 1999 near well GW-170, including the widening of Highway 61 east of the well and the construction of an office building to the west of the well, in some way altered the groundwater geochemistry and the matrix of groundwater flowpaths (and contaminant transport pathways) intercepted by the well.

Groundwater samples collected during CY 2004 from 17 of the aquifer wells used for surveillance monitoring in the East Fork Regime contained gross alpha activity and/or gross beta activity above the MDA and corresponding CE (Appendix E.3). However, as shown in Table 17, elevated gross alpha activity (>15 pCi/L) or gross beta activity (>50 pCi/L) was reported only for five of these wells. Elevated levels of gross alpha and gross beta activity in the groundwater at these aquifer wells reflect the transport/migration of radiological contaminants (primarily uranium isotopes) from the contaminant plume emplaced during historical operations of the Uranium Oxide Vault (GW-219), the Oil Skimmer Basin (GW-154, GW-222, and GW-223), and one or more unspecified sources in the central or eastern Y-12 area (GW-605).

Table 17. East Fork Regime CY 2004: elevated gross alpha activity and gross beta activity in surveillance monitoring aquifer wells

Well	Date Sampled	Gross Alpha (pCi/L)		Gross Beta (pCi/L)	
		MDA	Activity ± CE	MDA	Activity ± CE
Central Y-12 Area					
GW-219	04/26/04	9.2	79 ± 15	8.4	82 ± 9
GW-219	11/11/04	5.4	110 ± 16	8.4	97 ± 9.8
Eastern Y-12 Area					
GW-154	02/18/04	2.14	621 ± 14.1	3.19	107 ± 4.5
GW-154	08/11/04	3.65	698 ± 21.5	6.64	289 ± 10.1
GW-222	06/10/04	8.4	18 ± 7.7	11	<
GW-222	11/30/04	3.2	30 ± 6.6	7.4	<
GW-223	02/18/04	1.44	24 ± 2.64	2.47	<
GW-223	08/10/04	1.93	21 ± 3.03	4.15	<
GW-605	01/07/04	1.3	93 ± 4.78	2.32	<
GW-605	07/12/04	1.91	87.7 ± 5.93	3.59	<
Screening Level		15 pCi/L		50 pCi/L	

Note: "<" = Less than or equal to screening level

These monitoring results also support the indeterminate long-term trends indicated by historical gross alpha results for several of these aquifer wells (Table B.10), as illustrated by the data for well GW-219, and continue the increasing levels of gross alpha activity indicated by historical data for wells GW-154 and GW-223 (Figure A.31).

4.1.3 Chestnut Ridge Regime

The CY 2004 groundwater sampling results for 51 wells on Chestnut Ridge serve the purposes of surveillance monitoring in the Chestnut Ridge Regime. Sampling results show that most of these wells continue to yield uncontaminated groundwater, with data for a few wells being likely artifacts of well installation/construction, including elevated nickel from corrosion of the stainless steel well screen (GW-305) and the geochemical influence of cement grout, such as strongly basic pH and unusually high potassium concentrations (wells GW-205, GW-679, and GW-757). Aside from these artifacts, VOCs were the most frequently detected contaminants in the groundwater samples collected during CY 2004, with at least one compound detected in samples from 12 wells (Table B.11).

The CRSP are the source of the VOCs in the groundwater at wells GW-173, GW-175, GW-176, GW-177, GW-178, GW-179, GW-177, GW-322, GW-612, GW-796, and GW-798. Historical operation of the eastern and western waste disposal trench areas at the CRSP emplaced an elongated plume of dissolved VOCs in the groundwater that extends more than 2,500 ft east-northeast along the ridge crest (parallel with geologic strike) and at least 500 ft to the north and south down the ridge flanks. The existing network of monitoring wells at the site shows that 111TCA, 11DCA, and 11DCE are the primary compounds in the groundwater near the western disposal trench area and PCE, TCE, and 12DCE are the principal compounds in the groundwater near the eastern disposal trench area. Elongation of the VOC plume along the axis of the ridge and the distribution of plume constituents relative to suspected source trenches indicate primarily west-to-east groundwater flow/contaminant transport via strike-parallel flowpaths in the Knox Group (e.g., bedding-plane fractures).

As shown below in Table 18, PCE, 11DCE, 111TCA, 11DCA, trichlorofluoromethane (TCFM), and 1,1,2-trichloro-1,2,2-trifluoroethane (also known as freon-113) are the VOCs detected most frequently in the groundwater samples collected from CRSP monitoring wells during CY 2004, with maximum concentration of PCE and/or 11DCE reported for seven wells exceeding the respective drinking water MCL for each compound.

Table 18. Chestnut Ridge Regime CY 2004: maximum VOC concentrations in surveillance monitoring wells

Well	Maximum Concentration (µg/L)						
	PCE	**11DCE**	**111TCA**	**11DCA**	**TCFM**	**Freon-113**	**Chloroform**
GW-173	15	.	.	.	3 J	3 J	.
GW-175	14	.	2 J	.	16	.	.
GW-176	2 J	22	25	50	.	.	.
GW-177	.	5 J	8	15	.	–	.
GW-178	.	3 J	8	12	.	.	.
GW-179	1 J	24	21	36	11	.	.
GW-305	.	4.8	21	17	.	.	.
GW-322	6	93	51	110	38	5	.
GW-544	.	.	.	.	.	.	16
GW-612	5	41	21	71	.	.	.
GW-612(C)	6	50	44	72	2 J	.	.
GW-796	.	.	0.77 J	.	.	.	.
GW-798	6	4 J	2 J	2 J	9	2 J	.
MCL (µg/L)	5	7	200	NA	NA	NA	NA

Note: ". " = Not detected; "J" = Estimated value; "–" = Not analyzed; NA = Not applicable; (C) = Conventional sampling results

The highest summed VOC concentrations were reported for the groundwater samples collected during CY 2004 from well GW-322 (303 µg/L) and GW-612 (169 µg/L) , which are both located immediately south (down-dip) of the eastern disposal trenches at the CRSP. Also, as illustrated by the data in Table 18, the CY 2004 paired conventional/low-flow sampling results for well GW-612 (see Section 3.3) do not indicate significant differences between VOC concentrations in samples obtained with either method.

Historical data show that concentrations of the primary VOCs (PCE and 111TCA) in groundwater have generally decreased in samples from the wells located at the CRSP, while the concentrations of 111TCA degradation products (11DCE and/or 11DCA) have increased in wells GW-177, GW-178, and GW-322 (Table B.11). The CY 2004 monitoring results for each of the CRSP surveillance monitoring wells, with the exception of wells GW-173 and GW-177, continue the generally decreasing long-term concentration trends indicated by respective historical summed VOC data for each well, as illustrated by the data summarized below in Table 19.

Table 19. Chestnut Ridge Regime: long-term changes in VOC concentrations in surveillance monitoring wells at the CRSP

Well	Annual Average Summed VOC Concentration (µg/L)				
	1990	**1992**	**1995**	**2001**	**2004**
GW-173	13.5	11.7	NS	NS	9.5
GW-175	39	30	21.5	7.5	13
GW-176	248	140	NS	NS	95
GW-177	20.8	25.5	24.3	34	22.5
GW-178	30.5	31.5	NS	NS	21
GW-179	460	262	NS	NS	69
GW-322	744	538	NS	NS	284
GW-611	16	13.5	5.5	NS	.
GW-612	511	367	NS	84	139

Note: NS = Not sampled; "." = not detected; excludes TCFM, freon-113, and acetone concentrations

Concentrations of VOCs reported for the groundwater samples from wells GW-173 and GW-177 have remained relatively stable over the past 15 years, as illustrated by the nearly equal summed concentrations of VOCs detected in the samples collected in May 1991 (19 µg/L) and July 2004 (17 µg/L) from well GW-177. Conversely, summed VOC concentrations for several of the wells at the CRSP have decreased more than 50% from historical maximum levels evident during the early 1990s. Recent data suggest that the rate of decrease has slowed considerably.

Data obtained since the early 1990s show that low concentrations of VOCs (primarily 111TCA and PCE) are present in the groundwater at two wells hydraulically downgradient of the CRSP: well GW-796, which is located at ILF V about 400 ft directly south of the site, and well GW-798, which is located at CDL VII about 1,600 ft south-southeast of the site (Figure A.17). Subsequent monitoring results indicate that VOC levels in both wells remain relatively low, with the CY 2004 results showing that PCE concentration in well GW-798 exceeds the MCL (Table 18). The repeated detection of these compounds in the groundwater at both wells probably reflects southward transport from the CRSP because this site is the only known source of VOCs that is hydraulically upgradient of either well.

Each of the groundwater samples collected from well GW-305 during CY 2004 contained 11DCE, 11DCA, and 111TCA (Table 18); low levels (< 5 µg/L) of chloromethane also were detected in the samples collected in July and October 2004 (the well was sampled during each quarter of the year). Industrial Landfill IV is the likely source of the contaminants in the groundwater at well GW-305 because the landfill is the only potential source of groundwater contamination that is hydraulically upgradient of the well. Along with the historical data, the CY 2004 monitoring results continue the concentration trends evident after the sequential detection of 111TCA, 11DCA, and 11DCE beginning in January 1992 (Figure A.32). The data strongly suggest the arrival of the parent compound (111TCA) followed by the related degradation products (11DCA and 11DCE), although the CY 2004 monitoring results show that the concentrations of 111TCA and 11DCE remain below the respective drinking water MCL for each compound (Table 18).

Chloroform and bromodichloromethane were detected in the groundwater samples collected from well GW-544 during CY 2004, with the chloroform concentration evident in January 2004 (16 µg/L) suggesting a peak in the concentration trend indicated by historical data (Figure A.33). The well is hydraulically downgradient of CDL VI, which is a closed landfill containing construction spoil and demolition debris generated at Y-12 and elsewhere on the ORR. The presence of trihalomethanes (chloroform and bromodichloromethane) in the groundwater samples from this well is most likely related to local recharge of chlorinated water. The recharge occurred throughout the operation of a septic drain field for sanitary hand washing and toilet facilities housed in a portable building located about 500 ft east (uphill and hydraulically upgradient) of the well. Chloroform and other trihalomethanes form as a consequence of chemical reactions between chlorine in the treated (chlorinated) water and natural organic material in the subsurface. In April 2004, the restroom facilities were permanently closed and the flow-control valve for the potable water supply pipeline to the building was turned off. Thus, the septic tank/drain field no longer promotes local recharge of chlorinated water into the Knox Aquifer upgradient of well GW-544. With the presumed source of the chloroform no longer active, continued monitoring would be expected to eventually show reduced levels of chloroform in the groundwater at well GW-544.

4.2 EXIT PATHWAY/PERIMETER MONITORING

This section describes results of groundwater and surface water quality monitoring performed during CY 2004 in areas where contaminants associated with Y-12 are most likely to be transported beyond the boundary of the DOE ORR. Separate discussions of the monitoring data obtained from respective networks of exit pathway/perimeter sampling locations in the Bear Creek, East Fork, and Chestnut Ridge hydrogeologic regimes are provided.

4.2.1 Bear Creek Regime

The CY 2004 monitoring results and respective historical data for the monitoring wells, springs, and surface water sampling locations listed in Table 20 serve the purposes of exit pathway/perimeter monitoring in the Bear Creek Regime.

Table 20. Bear Creek Regime CY 2004: sampling locations used for exit pathway/perimeter monitoring

Monitoring Wells		Springs	Surface Water Stations			
Well Number	Monitored Interval Depth (ft bgs)		Bear Creek Main Channel		Bear Creek Tributaries	
GW-712	441.5 - 457.5	SS-1	BCK-00.63	BCK-09.47	EMWNT-03A	NT-03
GW-713	305.0 - 315.2	SS-4	BCK-03.30	BCK-11.54	EMWNT-05	NT-04
GW-714	115.1 - 145.0	SS-5	BCK-04.55	BCK-11.84	EMW-VWEIR	NT-07
GW-715	32.0 - 44.0	SS-6	BCK-07.87	BCK-12.34	NT-01	NT-08
		SS-6.6	BCK-09.20	BCK-12.47	NT-02 (S07)	

For the purposes of this report, these sampling locations are assigned to three areas: Upper, Middle, and Lower Bear Creek. Upper Bear Creek encompasses the surface water sampling locations upstream (east) of BCK-11.84 (Figure A.11), including one spring (SS-1) and the sampling locations in northern tributary (NT) NT-1 (NT-01) and NT-2 (S07). Middle Bear Creek encompasses the surface water sampling locations downstream (west) of BCK-11.84 and upstream of BCK-09.20, including two springs (SS-4 and SS-5) and sampling locations in NT-3 (NT-03 and EMWNT-03A), NT-4 (NT-04), NT-5 (EMWNT-05 and EMW-VWIER), NT-7 (NT-07), and NT-8 (NT-08). Lower Bear Creek encompasses the monitoring wells listed in Table 20 and the surface water sampling locations downstream of BCK-09.20, including springs SS-6 and SS-6.6 (Figure A.11).

4.2.1.1 Upper Bear Creek

The chemical quality of surface water in Upper Bear Creek is largely controlled by inflow of groundwater containing the primary components of the contaminant plume emplaced during historical operations of the former S-3 Ponds. To the west of this site, highly contaminated groundwater discharges from the aquitard (Nolichucky Shale) as base flow into NT-1, which enters Bear Creek about 2,500 ft downstream of the site. Also, the highly contaminated groundwater in the Nolichucky Shale extends west of NT-1 (parallel with geologic strike) where it upwells into the shallow flow system, continues westward in the shallow groundwater and ultimately discharges into NT-2, which enters the main channel of Bear Creek about 1,400 ft downstream of its confluence with NT-1 (Figure A.11). In addition to the influx of contaminants from the NT-1 and NT-2 catchments, contaminated groundwater in the Maynardville Limestone discharges into Bear Creek via seeps and springs (e.g., SS-1) along the main channel of the creek.

As shown in Table 21, monitoring results obtained during CY 2004 show nitrate concentrations, (total) uranium levels, and gross alpha and gross beta activity in Upper Bear Creek remain well above respective screening levels. Additionally, PCE concentrations in NT-1 remain substantially above the drinking water MCL.

Table 21. Upper Bear Creek CY 2004: maximum contaminant concentrations

Sampling Point	Nitrate (mg/L)	Uranium (mg/L)	PCE (µg/L)	Radioactivity (pCi/)	
				Alpha	Beta
BCK-12.47	NA	**0.628**	NA	NA	NA
SS-1	**13.7**	0.0274	.	14	47
NT-01	**183**	**0.0315**	**25**	**17**	**600**
BCK-12.34	NA	**0.281**	NA	NA	NA
NT-02 (S07)	**130**	.	NA	NA	NA
Screening Level	10 mg/L	0.03 mg/L	5 µg/L	15 pCi/L	50 pCi/L
Note: "**.**" = Not detected; J = Estimated concentration; NA = Not analyzed; **BOLD** = Exceeds screening level					

These results are consistent with historical data for each respective sampling location and show that contaminants associated with historical operations at Y-12 continue to substantially impact the quality of surface water in Upper Bear Creek.

4.2.1.2 Middle Bear Creek

Surface water quality in Middle Bear Creek is impacted by a mixture of contaminants from the former S-3 Ponds (nitrate, uranium, and radioactivity), the former Boneyard/Burnyard/HCDA (uranium and VOCs), and the BCBG WMA (uranium, VOCs, and radioactivity). Also, results of a study by the U.S. Geological Survey show that much of Middle Bear Creek loses flow to the Maynardville Limestone, particularly the section of the channel immediately south of the Oil Landfarm WMA. This section of the main channel of Bear Creek plays an important role in transferring contaminants from the creek into the groundwater system (DOE 1997a).

As shown in Table 22, elevated concentrations (i.e., > screening level) of one or more of the principal contaminants in the Bear Creek Regime were reported for each exit pathway sampling location in Middle Bear Creek except the surface water sampling locations in Bear Creek tributaries NT-3 (NT-03 and EMWNT-03A), NT-4 (NT-04), and NT-5 (EMWNT-05 and EMWNT-VWIER). As in previous years, the highest nitrate concentrations were evident in samples from the easternmost (upstream) sampling locations (e.g., BCK-11.84) closest to the former S-3 Ponds, with the highest uranium levels reported for sampling locations in NT-8, west of the BCBG WMA. The former Boneyard/Burnyard was a major source of uranium flux in Bear Creek via NT-3, but uranium levels in NT-3 decreased substantially in response to the CERCLA remedial actions at the site (see Section 2.4.1.2).

Table 22. Middle Bear Creek CY 2004: maximum contaminant concentrations

Sampling Point	Nitrate (mg/L)	Uranium (mg/L)	Chloroethenes (µg/L)					Radioactivity (pCi/L)	
			PCE	TCE	c12DCE	11DCE	VC	Alpha	Beta
BCK-11.84	**67.5**	**0.187**	.	.	.	.	.	NA	**186**
EMWNT-03A	NA	NA	.	.	NA	NA	NA	NA	NA
NT-03	.	NA	.	.	.	.	.	NA	NA
BCK-11.54	**49.5**	**0.145**	.	.	.	.	.	NA	**147**
NT-04	NA	NA	.	.	NA	NA	NA	NA	NA
EMWNT-05	NA	.	.	.	NA	NA	NA	NA	NA
EMW-VWEIR	NA	.	.	.	NA	NA	NA	NA	NA
SS-4	**17.1**	**0.0693**	.	**6**	4 J	.	.	**29**	**51**
NT-07	0.11	0.0137	**22**	**17**	58	3 J	4 J	NA	NA
NT-08	0.11	**0.354**	**8**	5 J	46	1 J	.	NA	NA
BCK-09.47	**14.5**	**0.12**	3 J	2 J	14	.	.	NA	**61**
SS-5	9.22	**0.0421**	.	.	.	.	.	**17**	29
BCK-09.20	8.6	**0.0655**	.	.	5 J	.	.	NA	37.4
Screening Level	10 mg/L	0.03 mg/L	5 µg/L	5 µg/L	70 µg/L	7 µg/L	2 µg/L	15 pCi/L	50 pCi/L

Note: "**.**" = Not detected; J = Estimated concentration; NA = Not analyzed; **BOLD** = Exceeds screening level

These monitoring results are consistent with historical data for each applicable sampling location and show that contaminants associated with Y-12, particularly total uranium, continue to impact the quality of surface water in Middle Bear Creek.

4.2.1.3 Lower Bear Creek

The quality of groundwater and surface water in Lower Bear Creek is substantially less impacted by contaminants present in upstream areas of BCV, with uranium and gross alpha activity being the Y-12 contaminants most commonly present. This is reflected by the CY 2004 monitoring results, summarized below in Table 23, which show elevated uranium levels at BCK-07.87 and BCK-04.55.

Table 23. Lower Bear Creek CY 2004: maximum contaminant concentrations

Sampling Point	Nitrate (mg/L)	Uranium (mg/L)	Summed VOCs (µg/L)	Radioactivity (pCi/L)	
				Gross Alpha	Gross Beta
GW-712	.	.	.	0.87	4.1
GW-713	.	.	.	1.86	5.29
GW-714	1.1	.	.	2.6	5.24
GW-715	0.67	.	.	1.73	2.43
BCK-07.87	7.6	**0.0567**	NA	NA	36.4
SS-6	0.5	.	.	3.33	5.66
SS-6.6	0.38	.	.	NA	8.71
BCK-04.55	4.43	**0.0303**	.	13	21
BCK-03.30	3	0.022	NA	NA	10.99
BCK-00.63	1.88	0.0144	.	5.9	11
Screening Level	10 mg/L	0.03 mg/L	MCL or Sum >5 µg/L	15 pCi/L	50 pCi/L
Note: "." = not detected; NA = not analyzed; **BOLD** = Exceeds screening level					

The monitoring results for each groundwater and surface water sampling location are consistent with respective historical data and show that contaminants (especially uranium) associated with Y-12 continue to impact the quality of surface water in Lower Bear Creek.

4.2.2 East Fork Regime

The CY 2004 monitoring results and respective historical data for the following monitoring wells and surface water sampling locations serve the purposes of exit pathway/perimeter monitoring in the East Fork Regime.

Table 24. East Fork Regime CY 2004: sampling locations for exit pathway/perimeter monitoring

Monitoring Wells				Surface Water Sampling Locations	
Well Number	Monitored Interval Depth (ft bgs)	Well Number	Monitored Interval Depth (ft bgs)	UEFPC	North of Pine Ridge
GW-151	85.0 - 110.0	GW-735	67.5 - 79.2	OF 200	GHK2.51ESW
GW-207	100.0 - 109.6	GW-744	55.0 - 69.5	STATION 8	GHK2.51WSW
GW-208	404.0 - 412.8	GW-747	67.4 - 79.6	OF 51	NPR07.0SW
GW-220	31.0 - 45.2	GW-750	61.2 - 72.7	STATION 17	NPR12.0SW
GW-722	75.0 - 644.3	GW-816	2.9 - 15.8		NPR23.0SW
GW-733	240.1 - 256.5	GW-832	4.0 - 11.8		

The monitoring wells are located near the eastern end of Y-12 and are hydraulically downgradient (north/northeast or east/southeast) of NHP/Lake Reality, with all but two of the wells (GW-151 and GW-220) being within 500 ft of the ORR boundary along Scarboro Road (Figure A.13). The surface water sampling stations in the East Fork Regime include two outfalls (OF 51 and OF 200) and two sampling locations in UEFPC: Station 8, located in the south-central part of Y-12, and Station 17, located near the intersection of Bear Creek Road and Scarboro Road (Figure A.13). In addition to these surface water sampling locations within the East Fork Regime, analytical results reported for the surface water samples collected during CY 2004 from five sampling stations (GHK2.51ESW, GHK2.51WSW, NPR07.0SW, NPR12.0SW, and NPR23.0SW), located in drainage features along the ORR boundary north of Pine Ridge (Figure A.15) also serve exit pathway/perimeter monitoring purposes.

4.2.2.1 Groundwater

At least one of the groundwater samples collected during CY 2004 from exit pathway wells GW-151, GW-220, GW-722, GW-733, and GW-832 contained summed concentrations of dissolved VOCs of at least 5 µg/L. Each of these wells are located within 1,000 ft of the groundwater extraction well (GW-845) being used to capture the plume of dissolved VOCs present in the groundwater (Maynardville Limestone) extending from the eastern end of Y-12 into Union Valley east of the ORR boundary along Scarboro Road (see Section 2.3.1.1). As shown in Table 25, the groundwater samples from each of these wells contained maximum concentrations of PCE, TCE, and CTET that exceed respective drinking water MCLs.

Table 25. East Fork Regime CY 2004: maximum VOC concentrations in exit pathway/perimeter monitoring wells

Well	Maximum Concentration (µg/L)		
	PCE	TCE	CTET
GW-151	740	140	1,600
GW-220	480	100	1,100
GW-722-22	12	3 J	38
GW-722-20	20	4 J	160
GW-722-17	9	2 J	92
GW-722-14	6	2 J	54
GW-733	.	.	8
GW-832	6	.	10
MCL (µg/L)	5	5	5

Note: "**.**" = Not detected; J = Estimated concentration

These results are consistent with respective historical data for each well and illustrate the range of VOC concentrations within in the shallow karst network (GW-151, GW-220, and GW-832) and deeper bedrock intervals (GW-722 and GW-733) in the Maynardville Limestone at the east end of Y-12. Additionally, the CY 2004 monitoring results continue the long-term concentration trends indicated by respective historical VOC data for these wells (Table B.10), including the decreasing PCE trends for sampling ports in Westbay™ well GW-722 (e.g., GW-722-14), the indeterminate PCE trend for well GW-832, and the increasing PCE trend for well GW-151 (Figure A.34). The VOC concentration trends evident for some wells, particularly Westbay™ well GW-722, suggest a direct response to the long-term operation of groundwater extraction well GW-845.

4.2.2.2 Surface Water

Based on maximum concentrations reported for samples collected during CY 2004, summarized below in Table 26, at least one of the primary groundwater contaminants associated with Y-12 was detected at each of the surface water sampling stations used for exit pathway/perimeter monitoring in the East Fork Regime (listed in order from farthest upstream to farthest downstream).

Table 26. East Fork Regime CY 2004: maximum contaminant concentrations at the UEFPC exit pathway/perimeter sampling locations

Sampling Point	Nitrate (mg/L)	Uranium (mg/L)	Summed VOCs (µg/L)	Radioactivity (pCi/L)	
				Alpha	Beta
OF 200	NA	**0.055**	NA	NA	NA
STATION 8	NA	0.017	NA	12.99	8.43
OF 51	3.6	0.00883	**31**	4.22	4.37
STATION 17	NA	0.00764	NA	NA	NA
Screening Level	10 mg/L	0.03 mg/L	5 µg/L	15 pCi/L	50 pCi/L
Note: "**.**" = not detected; NA = not analyzed; **BOLD** = Exceeds screening level					

These results show elevated uranium levels in discharge from OF 200 and relatively low levels of several VOCs in discharge from OF 51, including PCE and TCE concentrations at or above respective drinking water MCLs (5 µg/L). Additionally, the uranium and VOC results for OF 200 and OF 51 continue respective indeterminate long-term concentration trends indicated by historical monitoring results for each sampling location (Table B.10). Contaminant concentrations evident at OF 200 and OF 51 during CY 2004 reflect the continued impact of legacy Y-12 operations on the quality of surface water in UEFPC upstream of the ORR boundary.

4.2.3 Chestnut Ridge Regime

The CY 2004 monitoring results reported for the springs and surface water sampling stations listed below in Table 27 serve as the exit pathway/perimeter monitoring locations in the Chestnut Ridge Regime.

Table 27. Chestnut Ridge Regime CY 2004: sampling locations used for exit pathway/perimeter monitoring

Groundwater		Surface Water	
SCR1.25SP	SCR3.5SP	SCR1.5SW	MCK 2.0
SCR2.1SP	SCR4.3SP	SCR3.5SW	MCK 2.05
SCR2.2SP		S17	

4.2.3.1 Groundwater

The springs used for exit pathway/perimeter monitoring in the Chestnut Ridge Regime are located in four of the primary surface drainage features that traverse the southern flank of Chestnut Ridge, exit the ORR, and discharge into the Melton Hill Lake south of Bethel Valley Road (Figure A.17). The CY 2004 monitoring results for these springs are consistent with respective historical data and show that the springs discharge uncontaminated calcium-magnesium-bicarbonate groundwater characterized by a wide range of calcium:magnesium ratios; variable but generally low molar proportions (<10%) of chloride, potassium, sodium, and sulfate; and low concentrations of several trace metals, notably barium, iron, manganese, and strontium. Results for nitrate and uranium are either non-detect values or within the range of background levels in the Chestnut Ridge Regime. Also, VOCs were not detected in the groundwater samples collected from each spring. Gross alpha or gross beta activity above the associated MDA was reported at least one sample from springs SCR1.25SP, SCR2.1SP, and SCR3.5SP, but each of these results are low values (<6 pCi/L) indicative of natural background radiation. These results indicate that operations at Y-12 do not appear to have impacted the quality of groundwater discharged from natural springs located in the surface drainage features that traverse the Chestnut Ridge Regime and exit the ORR.

4.2.3.2 Surface Water

The surface water sampling stations used for exit pathway/perimeter monitoring in the Chestnut Ridge Regime during CY 2004 are located in Dunaway Branch (SCR1.5SW) at the western boundary of the regime; in an unnamed tributary east of Industrial Landfill II (SCR2.2SW); in McCoy Branch immediately downstream of the Filled Coal Ash Pond (FCAP) (MCK 2.05 and MCK 2.0) and immediately upstream of Rogers Quarry (SCR3.5SW); and in an unnamed tributary (SCR5) downstream of Kerr Hollow Quarry (S17) near the southeastern boundary of the regime (Figure A.17).

Analytical results for the surface water samples collected from McCoy Branch during CY 2004 indicate contamination downstream of the FCAP at MCK 2.0 and MCK 2.05. These surface water sampling stations are located upstream (MCK 2.05) and downstream (MCK 2.0) of the FCAP Discharge Treatment Wetland, which was constructed as part of the CERCLA remedial action specified in the ROD for the site (DOE 1996). Samples from MCK 2.05 are representative of FCAP “influent” to the wetland and samples from MCK 2.0 are representative of “effluent” from the wetland (DOE 2002). Historical data show that the surface water samples from both locations are distinguished by elevated concentrations of sulfate and arsenic. Sulfate concentrations in the samples collected from both sampling locations during CY 2004 exceed background levels, with the highest concentrations reported for samples collected from MCK 2.0 (26 mg/L) and MCK 2.05 (36.6 mg/L) in February 2004 (seasonally high flow conditions). The monitoring results obtained during CY 2004 show that the maximum arsenic concentration at MCK 2.0 (0.0447 mg/L) and from MCK 2.05 (0.0392 mg/L in February 2004) remain below the current MCL (0.05 mg/L). The August 2004 sample from MCK 2.05 had unusually high levels of suspended solids (866 mg/L), gross alpha activity (15.2 pCi/L), and several metals, including arsenic (7.18 mg/L) which are inconsistent with historical measurements. These atypical metals and alpha activity results probably reflect interferences from the suspended solids in the sample. Notably, arsenic was not detected at surface water station SCR3.5SW, located about 2000 ft downstream from MCK 2.0. Nevertheless, the elevated sulfate levels reported for samples from MCK 2.0 and MCK 2.02 show continued impacts on surface water quality in upper McCoy Branch near the FCAP.

The CY 2004 monitoring results for surface water stations located in the other drainage features in the Chestnut Ridge Regime show non-detect values or background levels of nitrate and uranium. Similarly, VOCs were not detected in the samples collected from these surface water stations, and gross alpha activity and gross beta activity for these samples were below the associated MDAs. Historical and current waste management operations do not appear to have significantly affected surface-water quality in these other drainage features.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The groundwater and surface water quality data obtained during CY 2004 are generally consistent with: (1) the presence of the principal Y-12 groundwater contaminants from known and suspected source areas in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime; (2) the types of contaminants from respective source areas in each regime and the overall pattern and extent of contaminant transport in each regime; and (3) the long-term contaminant concentration trends evident for the respective groundwater and surface water sampling locations in each regime.

The CY 2004 monitoring results reported for 35 aquitard wells and 21 aquifer wells (including three Westbay™ wells, one with sampling ports in both hydrogeologic units) meet the purposes of surveillance monitoring in the Bear Creek Regime. Groundwater samples from 16 of the aquitard wells and 18 of the aquifer wells had elevated concentrations of one or more of the principal contaminants at Y-12, with the highest concentrations reported for samples from wells located near the former S-3 Ponds, the former Boneyard/Burnyard/HCDA, and the BCBG WMA. Analytical results for these wells do not indicate any significant change in the overall extent of groundwater contamination in the Bear Creek Regime or the relative distribution of contaminants from the primary source areas.

The CY 2004 monitoring results reported for 19 surface water stations in Bear Creek (including seven northern tributaries), five springs that discharge into Bear Creek, and four aquifer wells at the westernmost Exit Pathway Picket (Picket W) meet the purposes of exit pathway/perimeter monitoring in the Bear Creek Regime. None of the groundwater samples from the Picket W wells had elevated concentrations of the principal groundwater contaminants at Y-12, but elevated concentrations of one or more of the contaminants were detected in surface water samples from 12 Bear Creek sampling stations and three springs. These results are consistent with historical data and show that contaminant concentrations in Bear Creek decrease with distance from each of the principal source areas (the former S-3 Ponds, Boneyard/Burnyard/HCDA, and BCBG WMA, including inflow of contaminated water from the northern tributaries of the creek that drain these sites). Although contaminant concentrations decrease downstream, the CY 2004 monitoring results indicate elevated total uranium concentrations at Bear Creek sampling station BCK-04.55, which is located where the creek turns north and flows through a gap in Pine Ridge at the westernmost extent of the Bear Creek Regime. Further downstream, at station BCK-00.63 located near the confluence with East Fork Poplar Creek, the CY 2004 concentrations of all principal contaminants were below applicable screening levels.

The CY 2004 monitoring results for applicable surveillance and exit-pathway/perimeter sampling locations in the Bear Creek Regime continue the long-term contaminant concentration trends. This is indicated by historical data for each applicable sampling location, with increasing concentrations evident for contaminants detected in samples from ten wells, one spring, and two surface water stations and decreasing or indeterminate (not increasing or decreasing) evident for contaminants detected in samples from 24 wells, ten surface water stations, and two springs. Assuming that the contaminant concentration trends for the wells potentially mirror the relative (advective) flux of contaminants in the groundwater, the increasing trends suggest increasing contaminant flux, the decreasing trends suggest decreasing flux, and the indeterminate trends suggest variable flux. Because the exit pathway/perimeter monitoring results for the springs and surface water stations are not flow proportionate, the contaminant concentration trends indicated by these results do not support interpretations of the contaminant flux at each applicable sampling location.

The CY 2004 monitoring results reported for 39 aquitard wells and 27 aquifer wells (including six wells located in Union Valley east of the ORR boundary along Scarboro Road) meet the purposes of surveillance monitoring in the East Fork Regime. Groundwater samples from 14 of the aquitard wells and 15 of the aquifer wells had elevated concentrations of one or more of the principal contaminants at Y-12. The highest contaminant concentrations were reported for samples from aquitard wells located in a portion of the western Y-12 area impacted by the contaminant plume emplaced during historical operations of the former S-3 Ponds. Aquifer wells with the highest contaminant concentrations are located immediately downgradient (east) of the former S-2 Ponds in the western Y-12 area and in the eastern Y-12 area near NHP/Lake Reality where groundwater is impacted by the plume of dissolved VOCs that extends eastward from Y-12 into Union Valley. Analytical results for these wells do not indicate any significant change in the overall extent of groundwater contamination in the East Fork Regime or the relative distribution of contaminants from the primary source areas.

The CY 2004 monitoring results reported for 12 monitoring wells (including one Westbay™ well) located in the eastern Y-12 area and four surface water sampling stations along UEFPC serve the purposes of exit-pathway/perimeter monitoring in the East Fork Regime. Elevated concentrations of one or more of the principal groundwater contaminants at Y-12, primarily VOCs, were reported for at least one of the groundwater/surface water samples from five of the wells and two of the surface water sampling stations. Sampling results for some of the wells exhibit a direct response to the operation of the groundwater extraction well used to help capture the plume and deter continued migration of VOCs into Union Valley. Analytical results for the surface water sampling stations suggest that the concentrations of the principal groundwater contaminants remain below screening levels in UEFPC where it exits the ORR through a gap in Pine Ridge directly northeast of Y-12.

The CY 2004 monitoring results for applicable surveillance and exit-pathway/perimeter sampling locations in the East Fork Regime continue the long-term contaminant concentration trends indicated by historical data for each applicable sampling location, with increasing concentrations evident for contaminants detected in samples from 11 wells and decreasing or indeterminate (not increasing or decreasing) concentration trends evident for contaminants detected in samples from 18 wells and two surface water stations. Assuming that the contaminant concentration trends for the wells potentially mirror the relative (advective) flux of contaminants in the groundwater, the increasing trends suggest increasing contaminant flux, the decreasing trends suggest decreasing flux, and the indeterminate trends suggest variable flux. Note that the exit pathway/perimeter monitoring results for the surface water stations are not flow proportionate and do not support interpretations of the contaminant flux at each applicable sampling location.

The CY 2004 sampling results for 51 wells located on Chestnut Ridge serve the purposes of surveillance monitoring in the Chestnut Ridge Regime. Results indicative of contamination associated with operations at Y-12 were reported for well GW-305 at Industrial Landfill IV, well GW-544 at CDL VI, and 12 wells at the CRSP. These wells each yield VOC-contaminated groundwater, with concentrations above applicable drinking water MCLs reported for compounds detected in samples only from the wells at the CRSP. Analytical results for these wells do not indicate any significant change in the overall extent of VOC-contaminated groundwater in the regime or the relative distribution of contaminants. Additionally, the CY 2004 sampling results continue the indeterminate or decreasing VOC concentration trends indicated by historical data for the wells at the CRSP; are consistent with the recent indeterminate trends evident since the initial detection of VOCs in well GW-305; and suggest that concentrations of trihalomethanes (primarily chloroform) in groundwater at well GW-544 may have decreased from the historical peak evident in January 2004.

The CY 2004 monitoring results reported for five natural springs and four sampling stations located in major drainage features that traverse the southern flank of Chestnut Ridge serve the purposes of exit-pathway/perimeter monitoring in the Chestnut Ridge Regime. The principal contaminants at Y-12 were either not detected in the samples from each spring and surface water station, or were detected at concentrations within the range of background levels in the regime. However, the CY 2004 sampling results for sampling stations in McCoy Branch show elevated sulfate (> 30 mg/L) immediately downstream of the FCAP but not farther downstream where this drainage feature exits the ORR and enters the Clinch River (Melton Hill Lake).

Based on groundwater and surface water monitoring data obtained in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime during CY 2004, the following actions are recommended:

- Relatively few wells (about 10 wells) have been confirmed to show sampling method bias, yielding significantly different contaminant concentrations for samples collected on consecutive days using the low-flow method and the conventional method. To evaluate the potential effect of the pump intake depth on sampling method bias, samples could be collected from a selected well after raising and lowering the pump. After collecting a sample from the current intake location (near the monitored interval midpoint), samples could be obtained from near the top of the monitored interval and near the bottom of the monitored interval on subsequent days. Similar results for the samples from each depth would confirm that pump intake placement has no effect on sampling method bias. A detailed evaluation of the wells with confirmed sampling method bias should be performed to select the best candidate for the multiple depth sampling event.

- Well GW-170 in Union Valley and wells GW-205, GW-679, and GW-757 in the Chestnut Ridge Regime should be redeveloped to reduce the apparent grout contamination in each well. Also, in order to ensure collection of the most representative (i.e., least grout-contaminated) groundwater samples from these wells, the conventional sampling method should be considered or, if the low-flow sampling method is used, each well should be purged until the pH is below 9 before the groundwater samples are obtained.

- Continued use of a standard suite of analytical parameters for all wells, springs, and surface water stations sampled by the Y-12 GWPP should be re-evaluated, with the goal of developing a systematic approach for paring the standard suite to a specific list for each sampling location. The list of analytes tailored for each location could be a baseline suite of field measurements and indicator parameters (e.g., TDS) combined with a specific list of contaminants and/or constituents of concern, the latter being identified from the historical data for each sampling location. Also, the process for tailoring the list of analytes for each wells, springs, and surface water station could include evaluation criteria regarding the sampling history, monitoring program/purpose, and location. For instance, groundwater samples from newly installed monitoring wells and/or existing wells with limited sampling histories would be analyzed for a more comprehensive suite of analytes than other wells with more extensive sampling histories (and more data to tailor a specific list of analytes). Similarly, samples from wells, springs, and surface water stations that serve the purposes of exit-pathway monitoring would be analyzed for all contaminants known to be present in the upgradient groundwater/surface water, whereas wells at a known source of contamination would be only for the site-specific contaminants. The overall approach and evaluation criteria associated with assigning the monitored parameters appropriate for each sampling locations could be incorporated into the Y-12 GWPP Monitoring Optimization Plan, which designated the “active” or “inactive” status of each well and defines the process for determining the relative priority for collecting groundwater samples from the wells granted active status under the Y-12 GWPP (BWXT 2003e).

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APPENDIX A

FIGURES

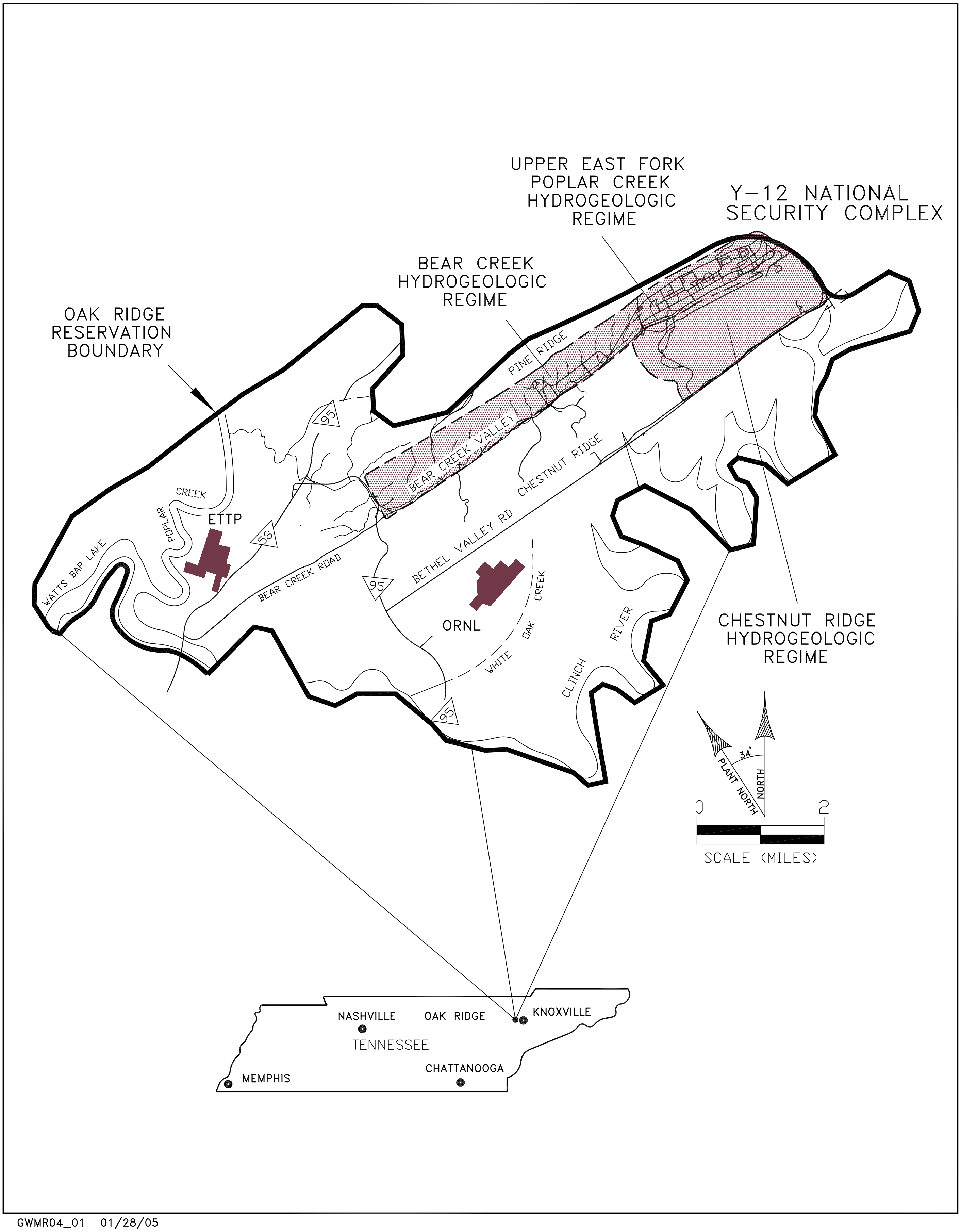
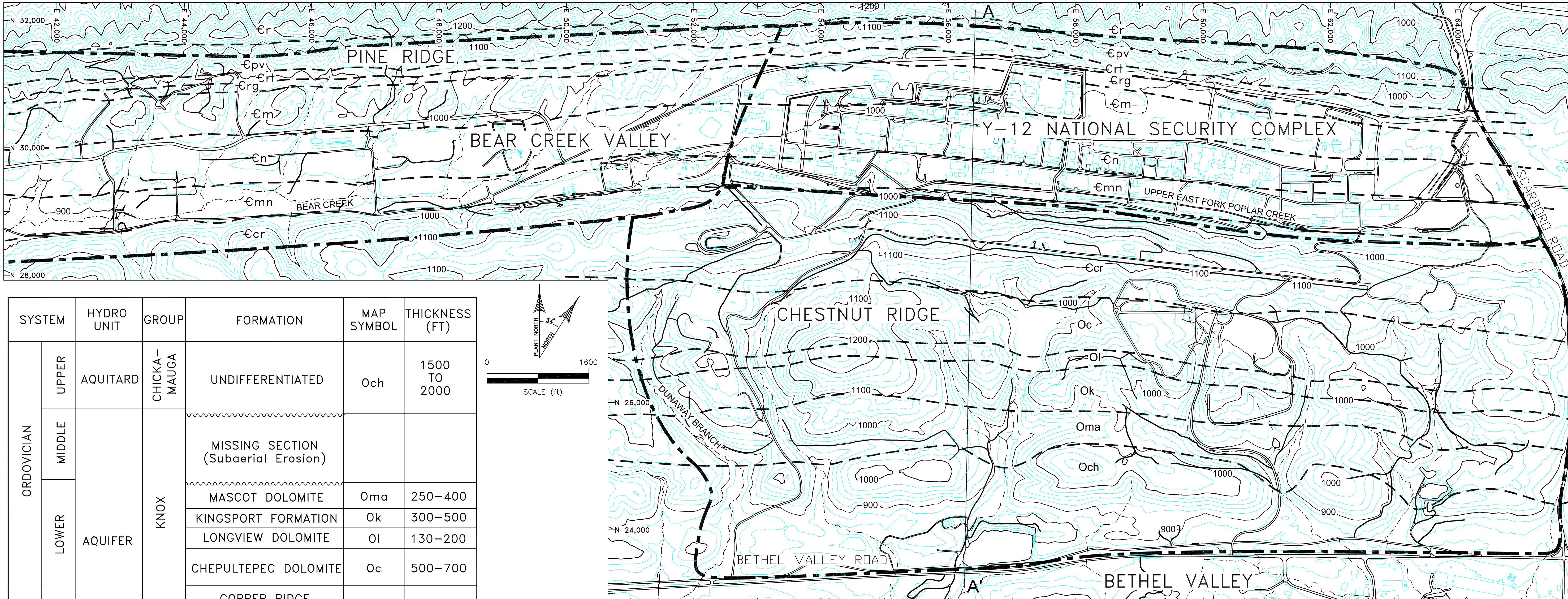
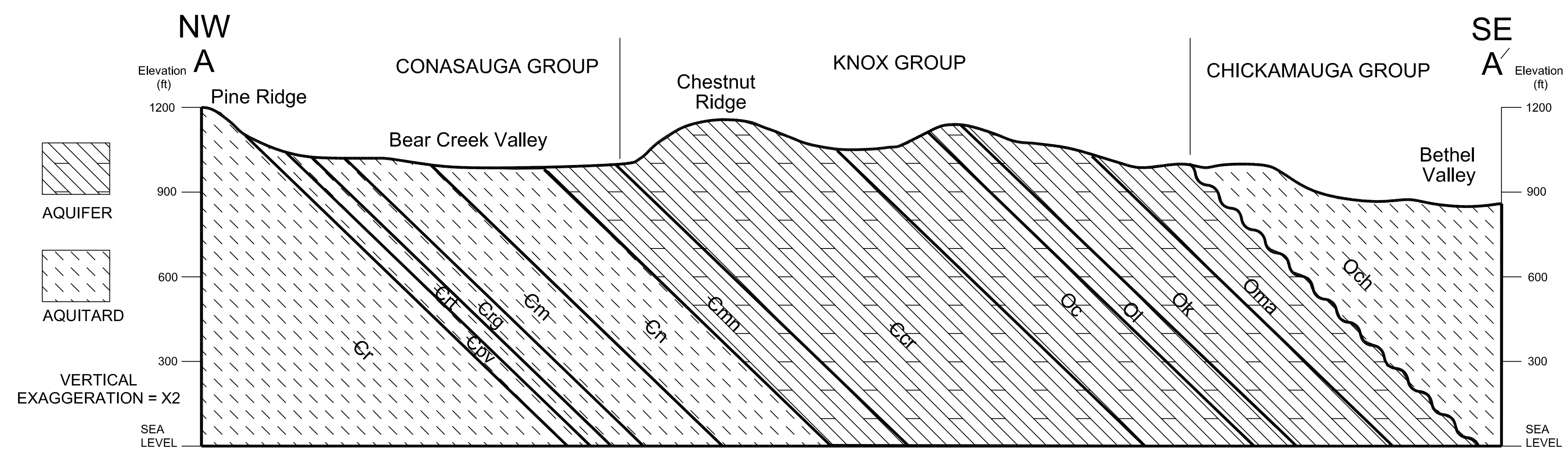


Fig. A.1. Hydrogeologic regimes at the Y-12 National Security Complex.



SYSTEM		HYDRO UNIT	GROUP	FORMATION	MAP SYMBOL	THICKNESS (FT)
ORDOVICIAN	UPPER	AQUITARD	CHICKA-MAUGA	UNDIFFERENTIATED	Och	1500 TO 2000
	MIDDLE	AQUIFER	KNOX	MISSING SECTION (Subaerial Erosion)		
	LOWER			MASCOT DOLOMITE	Oma	250–400
				KINGSPORT FORMATION	Ok	300–500
				LONGVIEW DOLOMITE	Ol	130–200
				CHEPULTEPEC DOLOMITE	Oc	500–700
CAMBRIAN	UPPER			COPPER RIDGE DOLOMITE	Ꞓcr	800–1,100
			CONASAUGA	MAYNARDVILLE LIMESTONE	Ꞓmn	418–450
	MIDDLE	AQUITARD		NOLICHUCKY SHALE	Ꞓn	490–590
				MARYVILLE LIMESTONE	Ꞓm	346–445
				ROGERSVILLE SHALE	Ꞓrg	90–120
				RUTLEDGE LIMESTONE	Ꞓrt	90–120
				PUMPKIN VALLEY SHALE	Ꞓpv	260–320
	LOWER			ROME	Ꞓr	NOT DETERMINED

SOURCES: King and Haas 1987
Hatcher et al. 1992

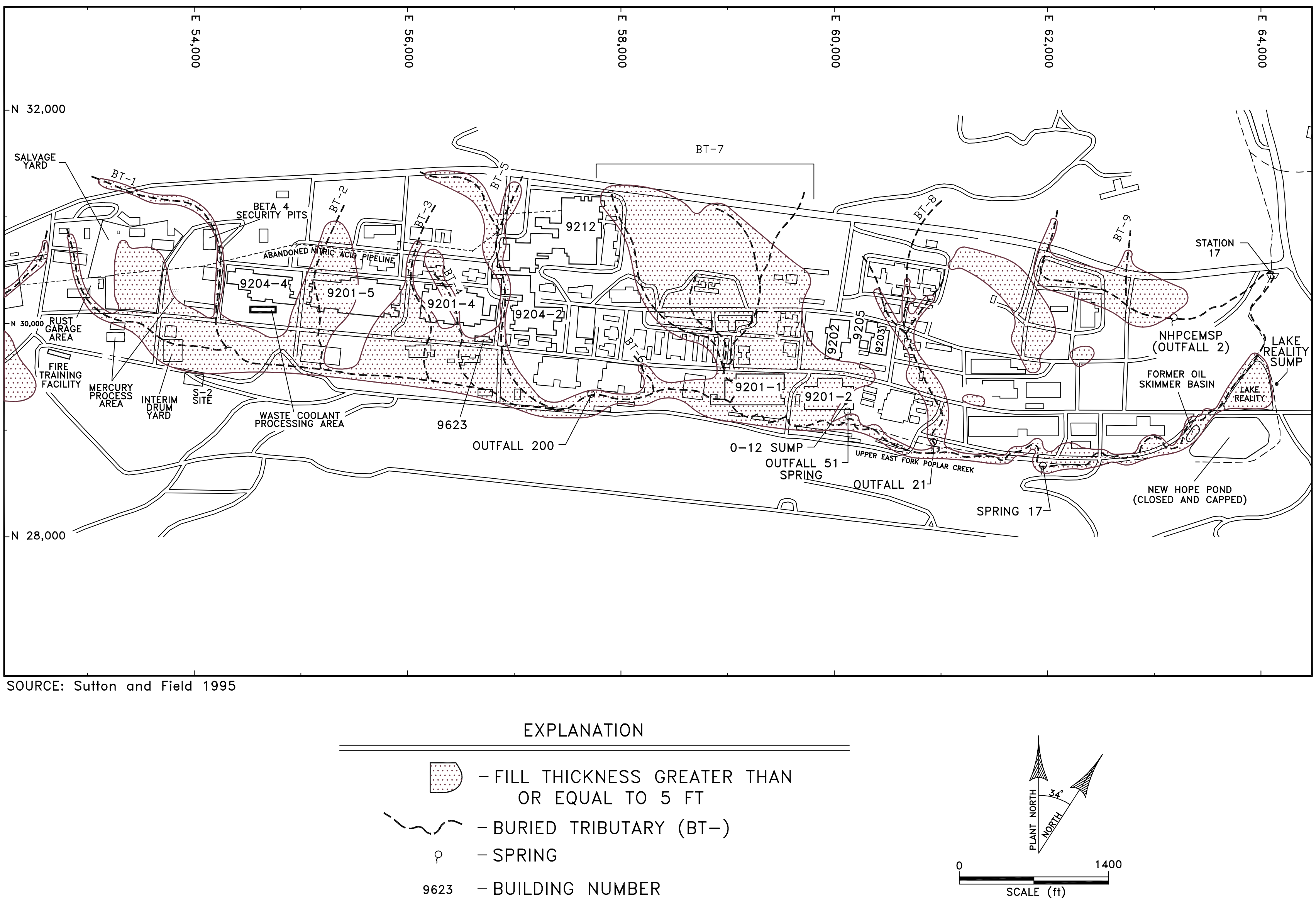


GENERALIZED GEOLOGIC CROSS SECTION

GWMR04_2 12/10/04

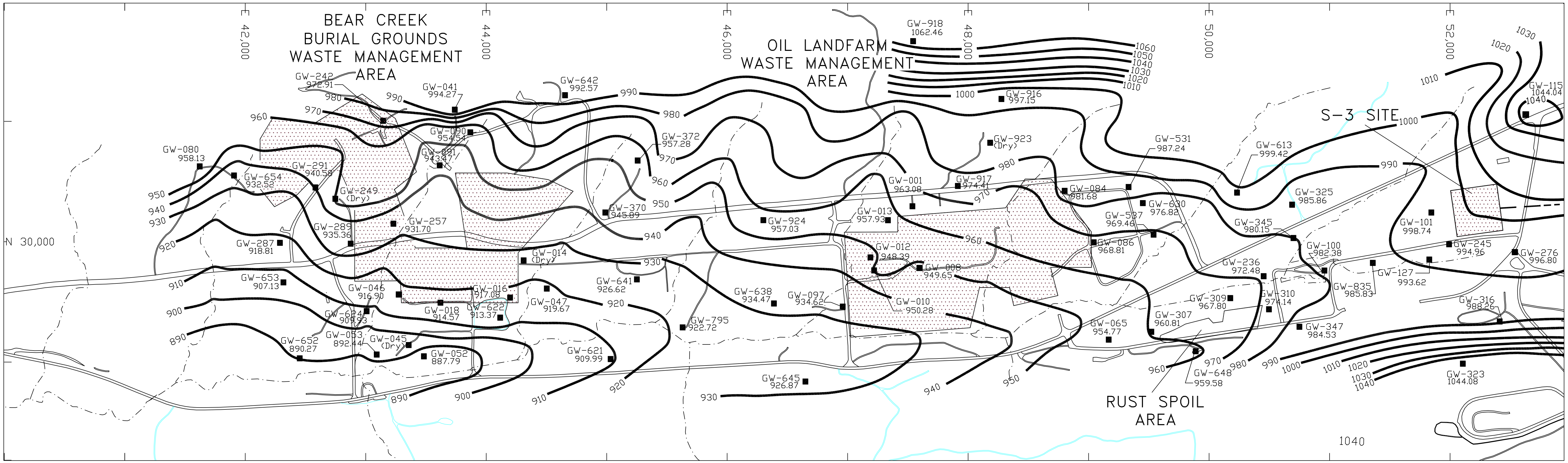
Fig. A.2. Topography and bedrock geology at the Y-12 National Security Complex.

GWMR04_03 01/28/05



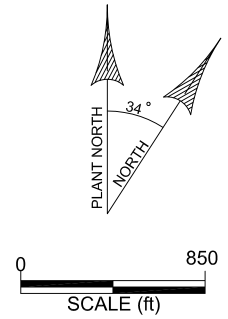
SOURCE: Sutton and Field 1995

Fig. A.3. Fill areas and pre-construction drainage features in the Upper East Fork Poplar Creek Hydrogeologic Regime.



Note: Plume boundary wells are located about 5,000 feet west of map area.

GROUNDWATER ELEVATIONS SEPTEMBER 2 - 14, 2004



EXPLANATION

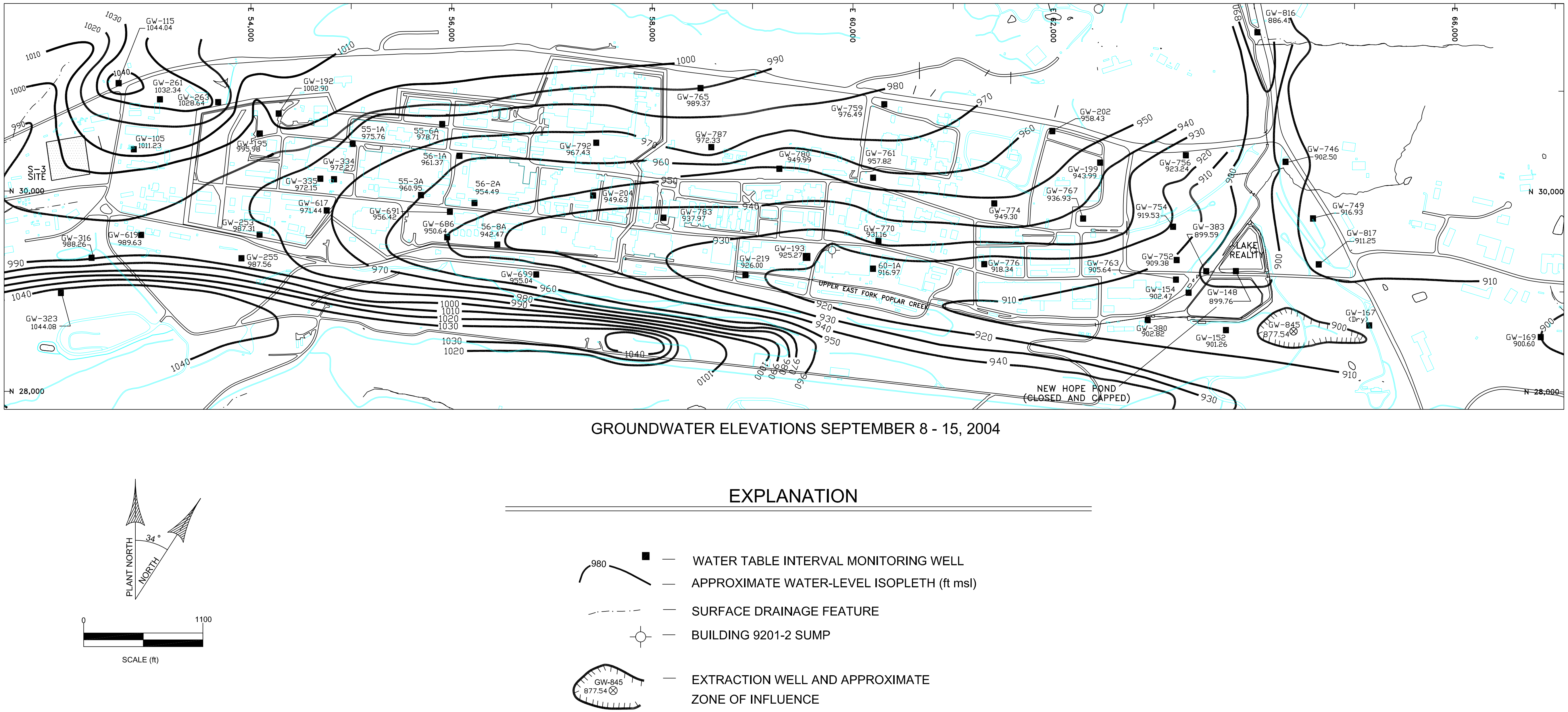
■ WATER TABLE INTERVAL MONITORING WELL

920 APPROXIMATE WATER-LEVEL ISOPLETH (ft msl)

SURFACE DRAINAGE FEATURE

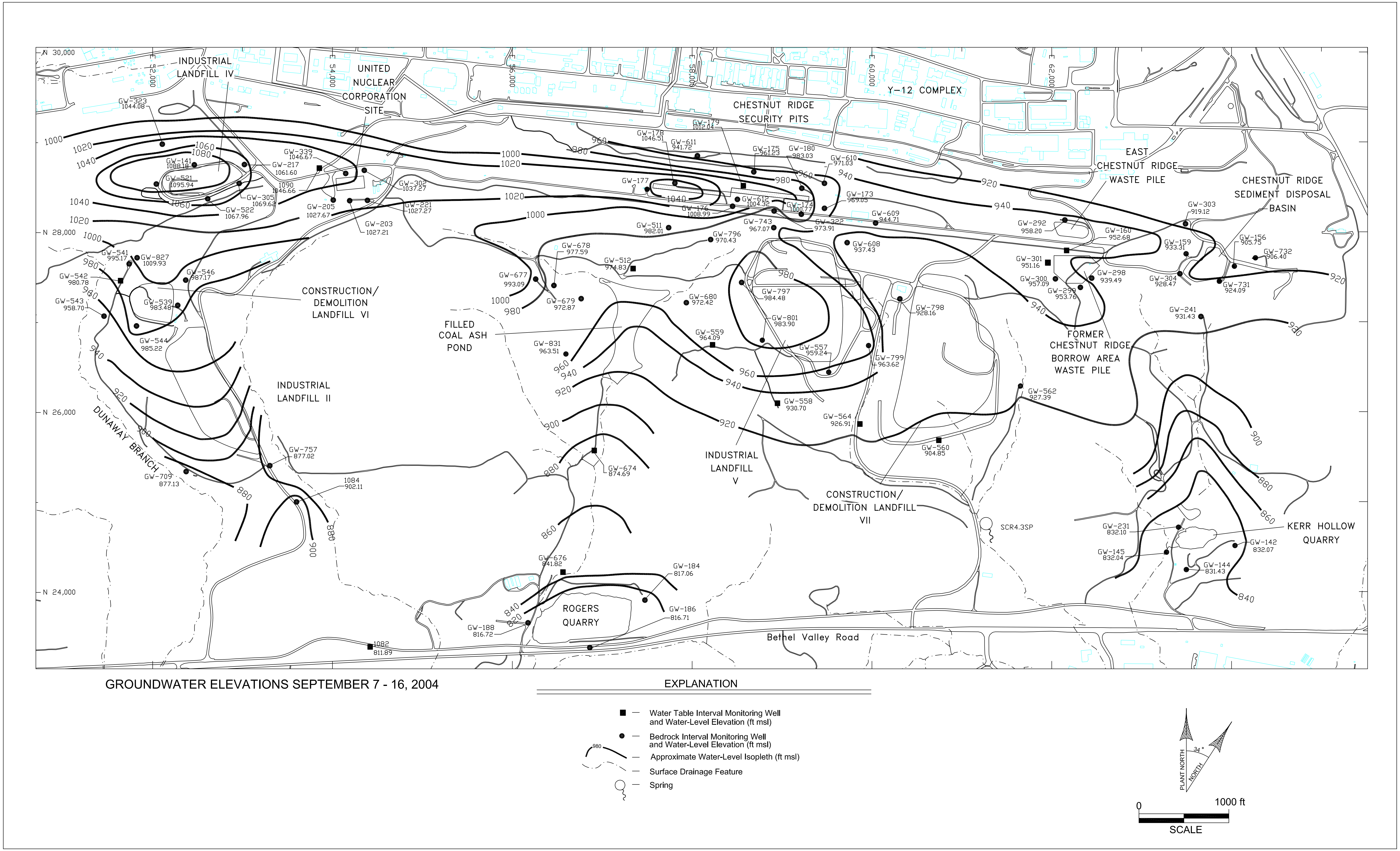
GWMR04_4.DWG 02/07/2005

Fig. A.4. Groundwater elevations in the Bear Creek Hydrogeologic Regime, September 2004.



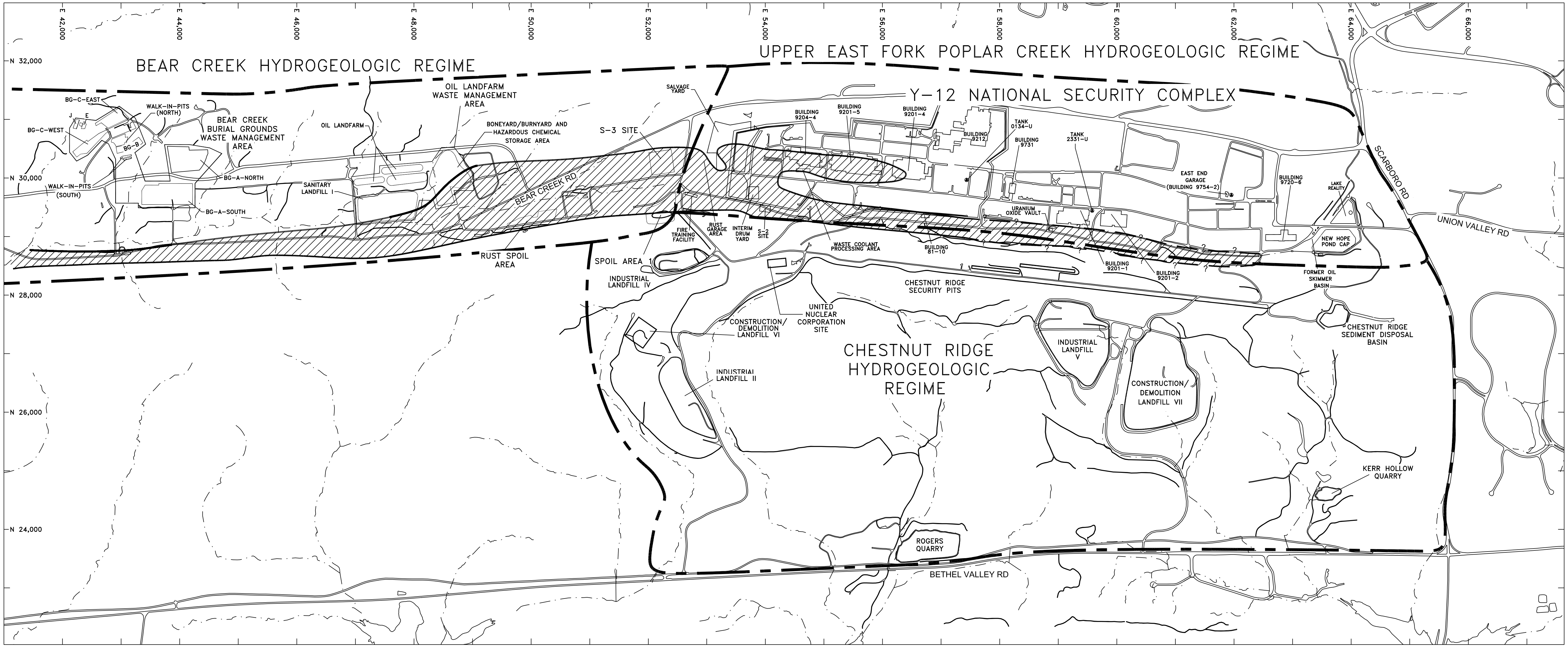
GWMR04_5.DWG 02/07/2005

Fig. A.5. Groundwater elevations in the Upper East Fork Poplar Creek Hydrogeologic Regime, September 2004.



GWMR04_6.DWG 03/06/05

Fig. A.6. Groundwater elevations in the Chestnut Ridge Hydrogeologic Regime, September 2004.



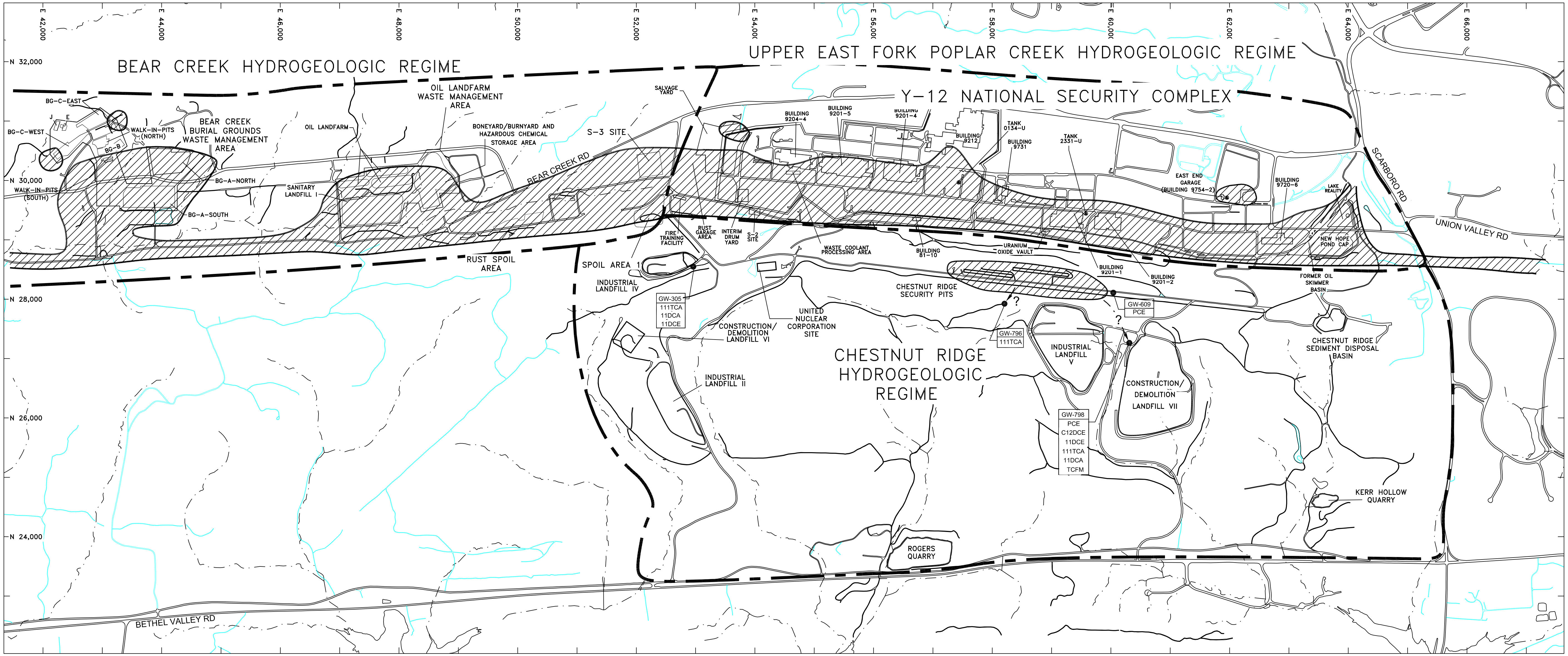
SOURCES: U.S. Department of Energy 1997a
U.S. Department of Energy 1998

EXPLANATION

SURFACE DRAINAGE FEATURE
BOUNDARY OF SITE
Nitrate > 10mg/L (Nitrate as N)

GWMR04_07 02/07/05

Fig. A.7. Generalized extent of nitrate in groundwater at the Y-12 National Security Complex.



SOURCES: U.S. Department of Energy 1997a
U.S. Department of Energy 1998

EXPLANATION

- — BEDROCK MONITORING WELL
- — SURFACE DRAINAGE FEATURE
- — BOUNDARY OF SITE
- — SUMMED VOC's > 5ug/L

111TCA	1,1,1-trichloroethane
11DCA	1,1-dichloroethane
11DCE	1,1-dichloroethene
c12DCE	cis-1,2-dichloroethene
PCE	tetrachloroethene
TCFM	trichlorofluoromethane

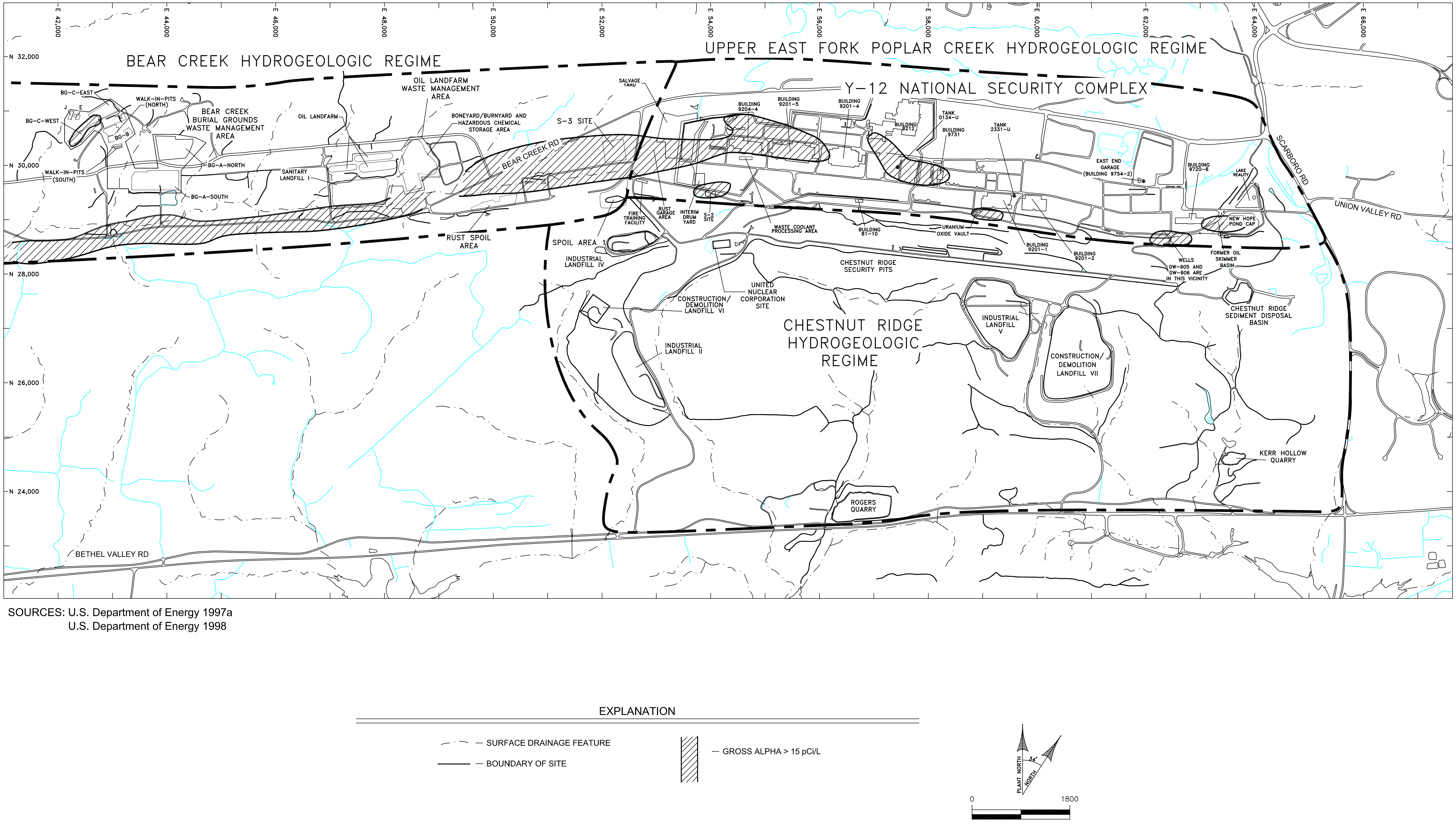
? — — GENERALIZED GROUNDWATER CONTAMINANT PATHWAY

PLANT NORTH
34°
NORTH

0 1800
SCALE (ft)

GWMR04_08 02/07/05

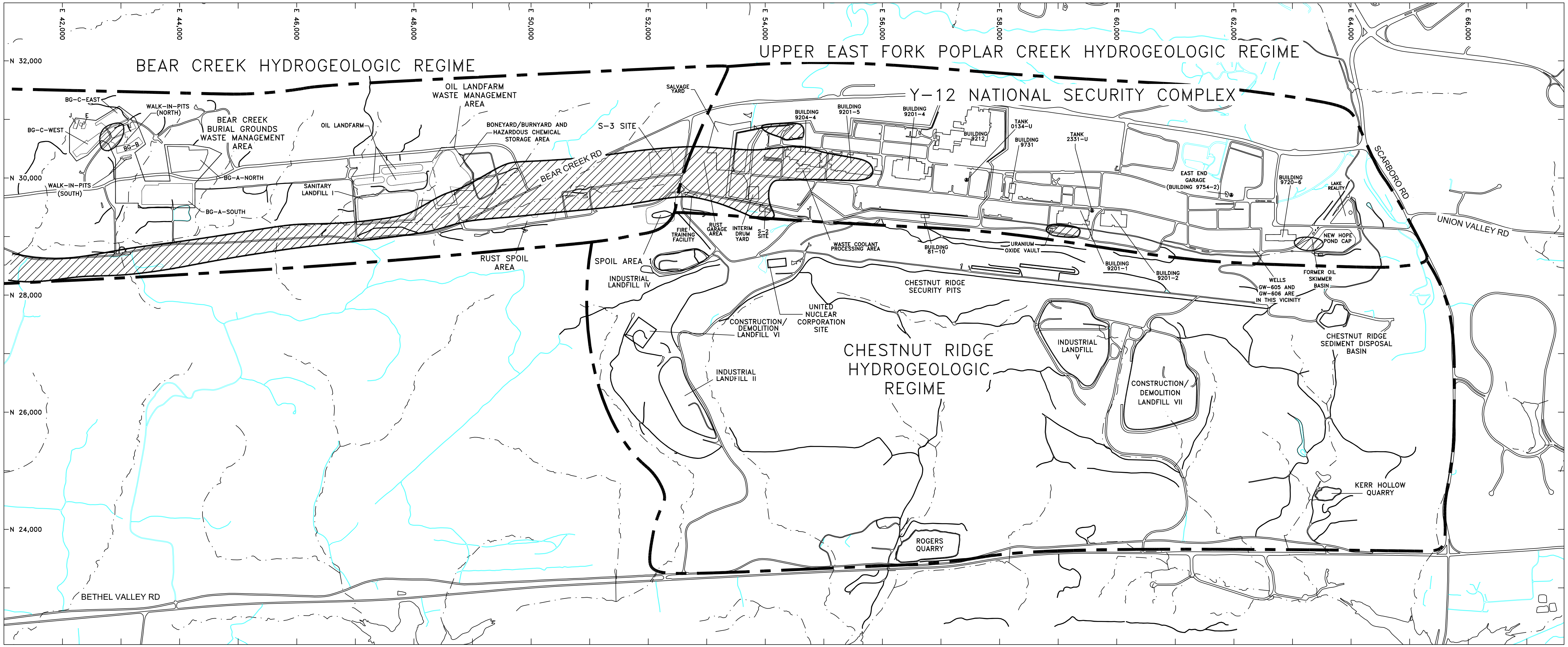
Fig. A.8. Generalized extent of volatile organic compounds in groundwater at the Y-12 National Security Complex.



SOURCES: U.S. Department of Energy 1997a
U.S. Department of Energy 1998

GWMR04_09 02/07/05

Fig. A.9. Generalized extent of gross alpha activity in groundwater at the Y-12 National Security Complex.



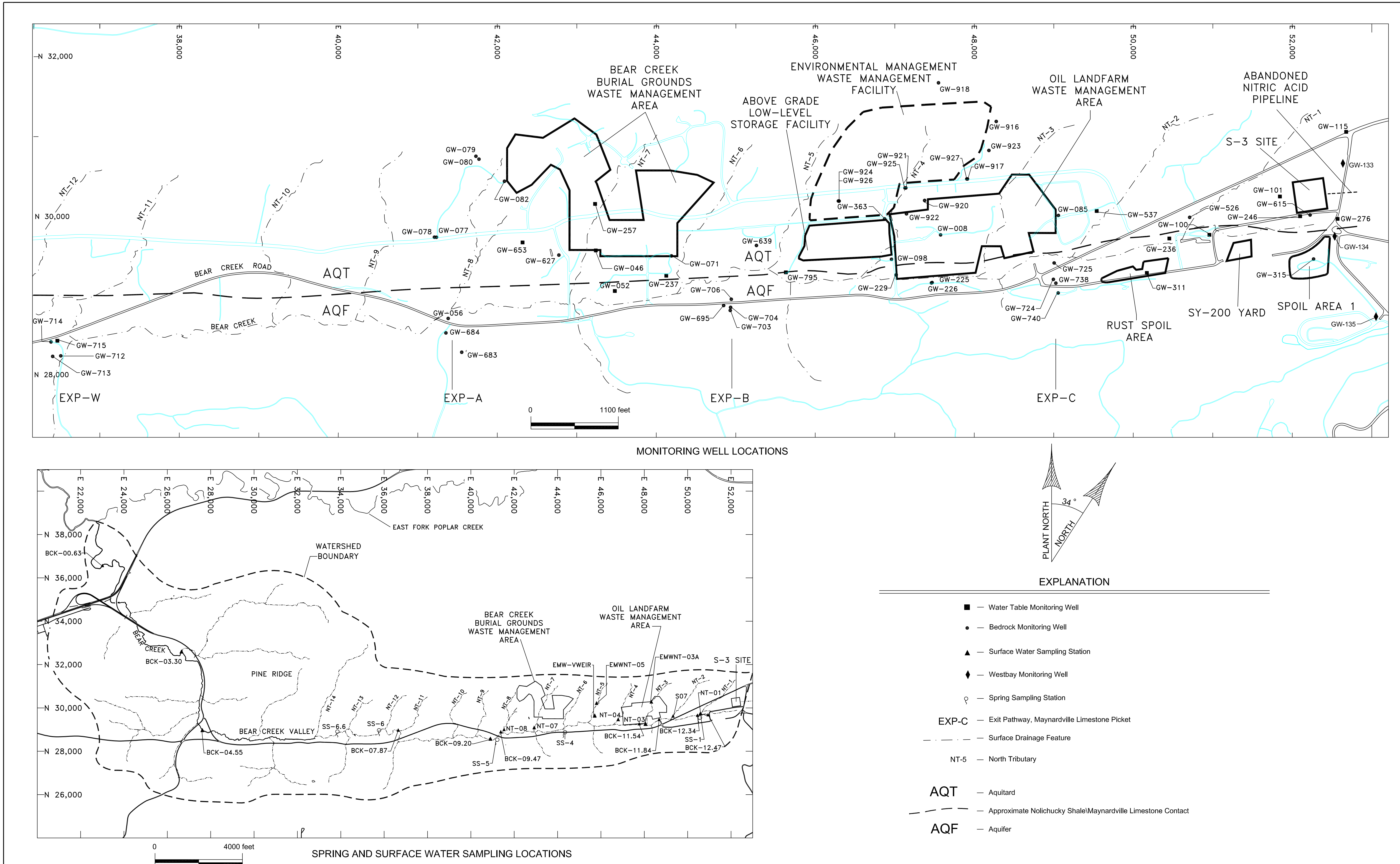
SOURCES: U.S. Department of Energy 1997a
U.S. Department of Energy 1998

EXPLANATION

— SURFACE DRAINAGE FEATURE
— BOUNDARY OF SITE
— GROSS BETA > 50 pCi/L

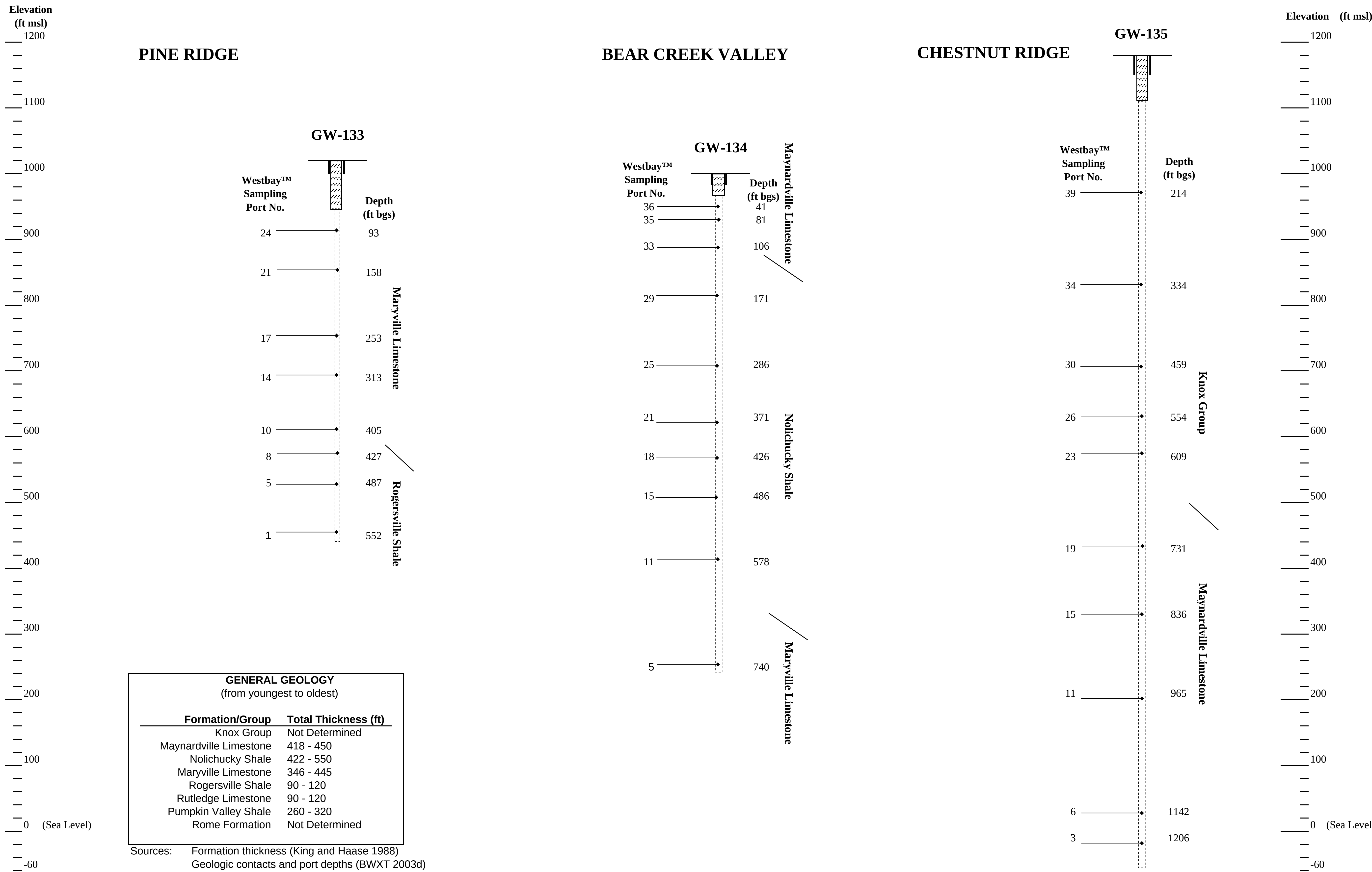
GWMR04_10 02/07/05

Fig. A.10. Generalized extent of gross beta activity in groundwater at the Y-12 National Security Complex.



GWMR04_11 02/07/05

Fig. A.11. CY 2004 sampling locations in the Bear Creek Hydrogeologic Regime.



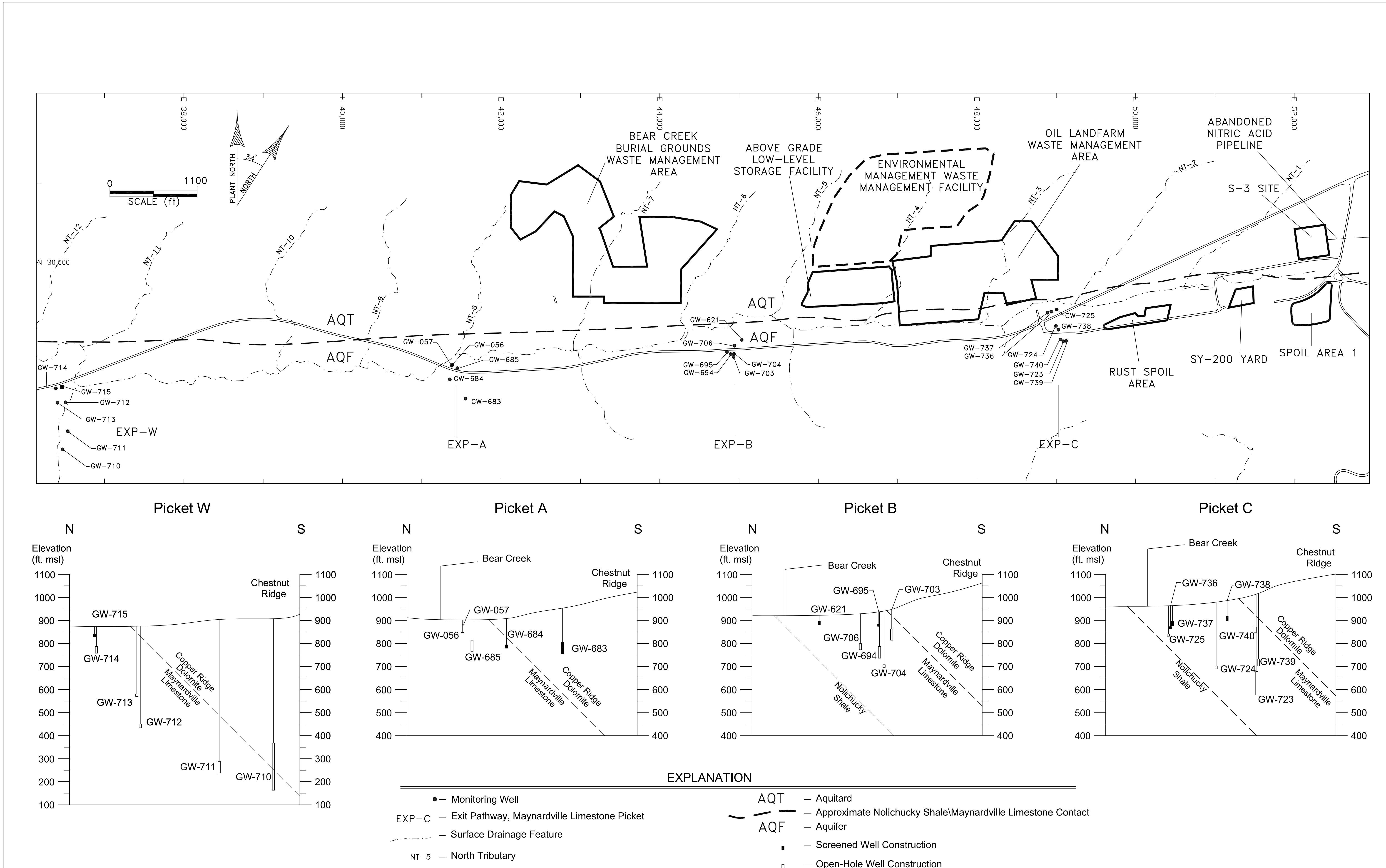
GENERAL GEOLOGY
(from youngest to oldest)

Formation/Group	Total Thickness (ft)
Knox Group	Not Determined
Maynardville Limestone	418 - 450
Nolichucky Shale	422 - 550
Maryville Limestone	346 - 445
Rogersville Shale	90 - 120
Rutledge Limestone	90 - 120
Pumpkin Valley Shale	260 - 320
Rome Formation	Not Determined

Sources: Formation thickness (King and Haase 1988)
Geologic contacts and port depths (BWXT 2003d)

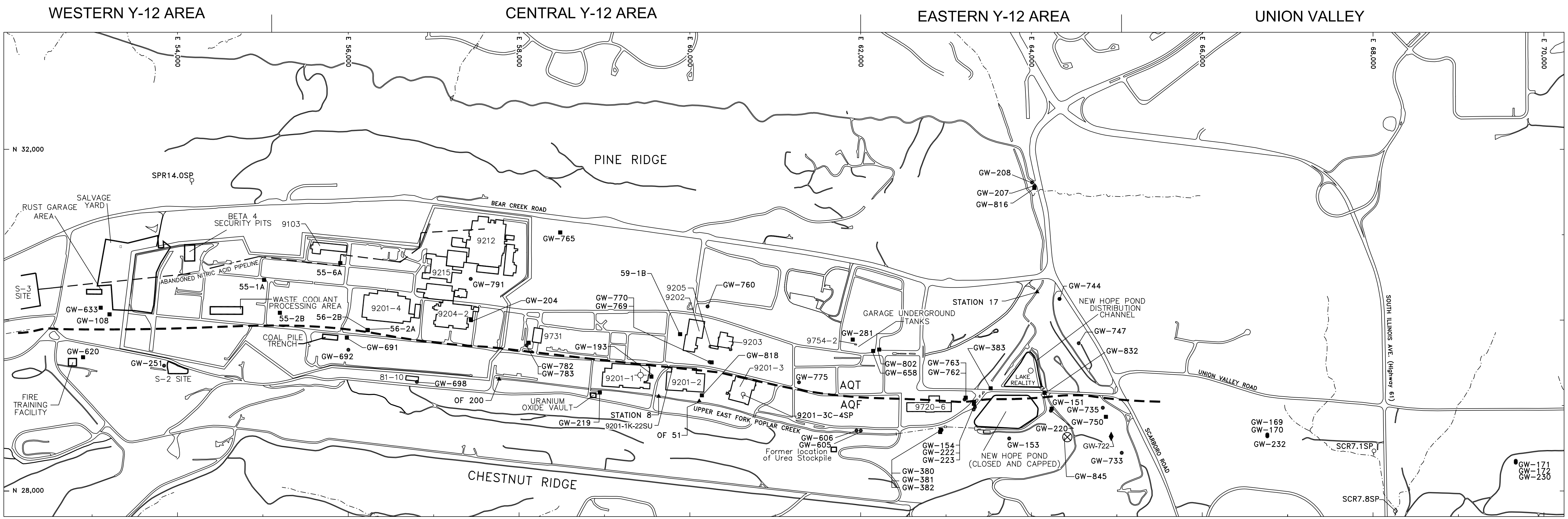
GWMR04_12 09/26/05

Fig. A.12. Westbay™ monitoring system sampling port depths in wells GW-133, GW-134, and GW-135.



GWMR04_12.DWG 02/07/05

Fig. A.13. Components of Maynardville Limestone exit pathway pickets A, B, C, and W.



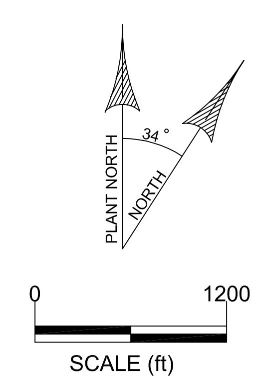
EXPLANATION

- Water Table Monitoring Well
- Bedrock Monitoring Well
- Westbay Monitoring Well
- GW-845 Plume Capture Well
- Spring Sampling Location
- Surface Water Sampling Location
- Building Sump Sampling Location

AQT – Aquitard

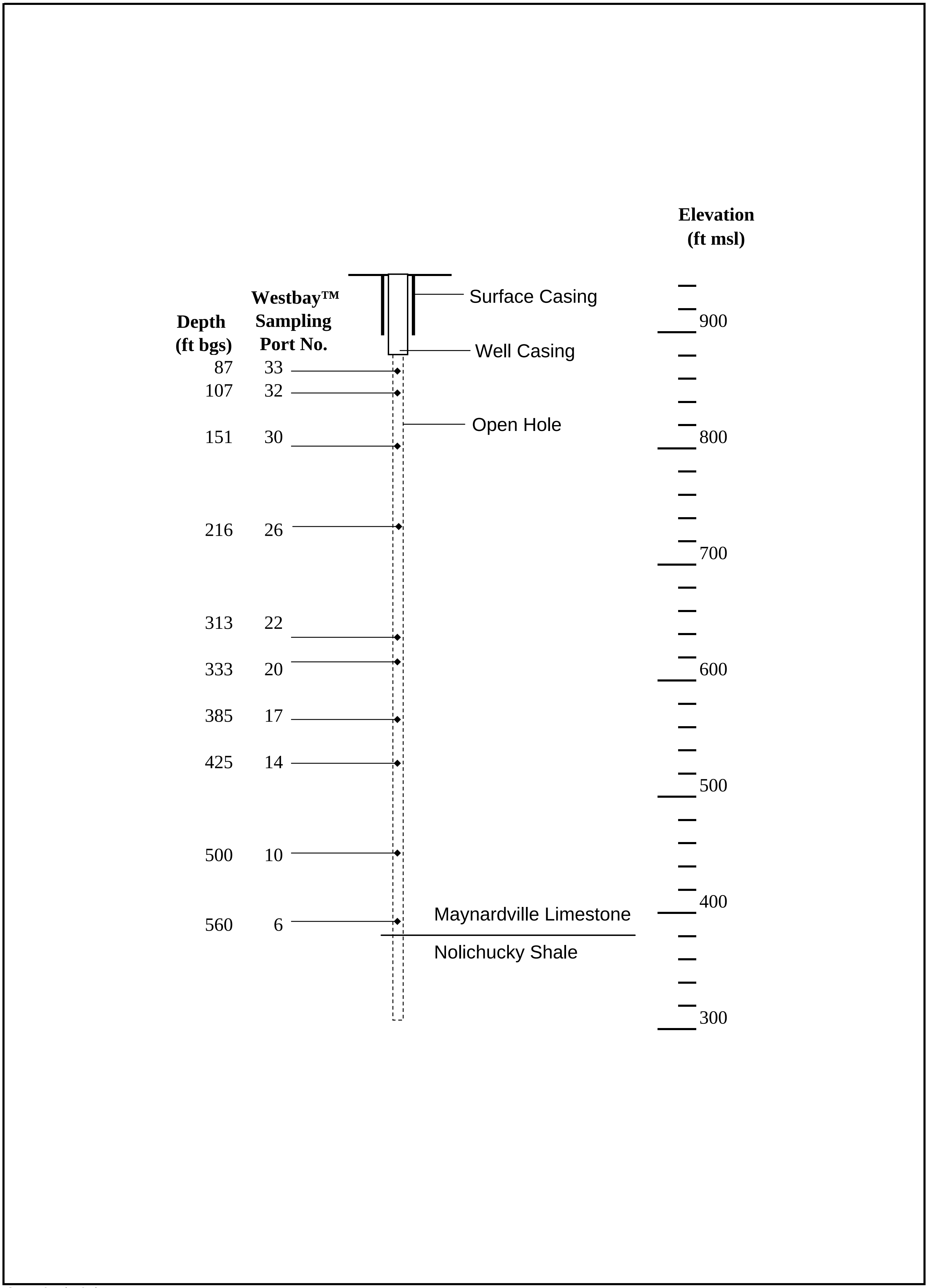
– Approximate Nolichucky Shale\Maynardville Limestone Contact

AQF – Aquifer



GWMR04_14.DWG 03/06/05

Fig. A.14. CY 2004 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime and in Union Valley.



GWMR04 Fig16.xls

Fig. A.16. Westbay™ monitoring system sampling port depths in well GW-722.

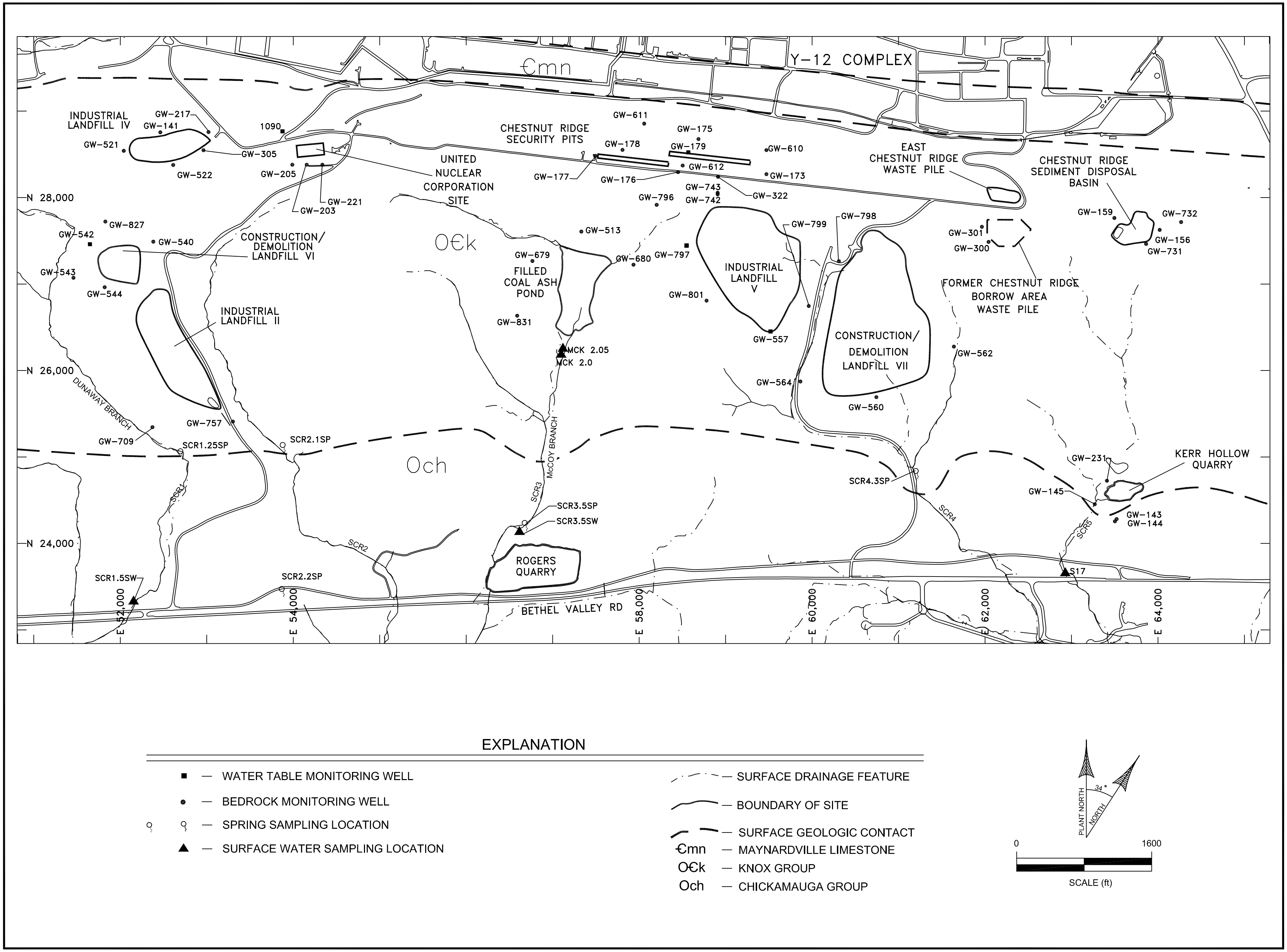
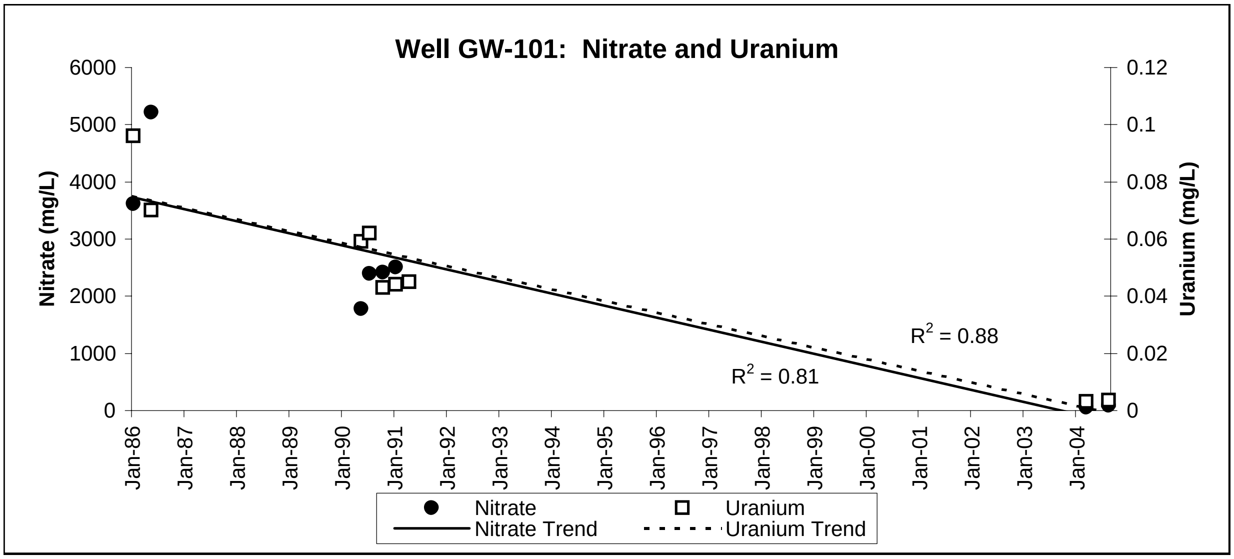
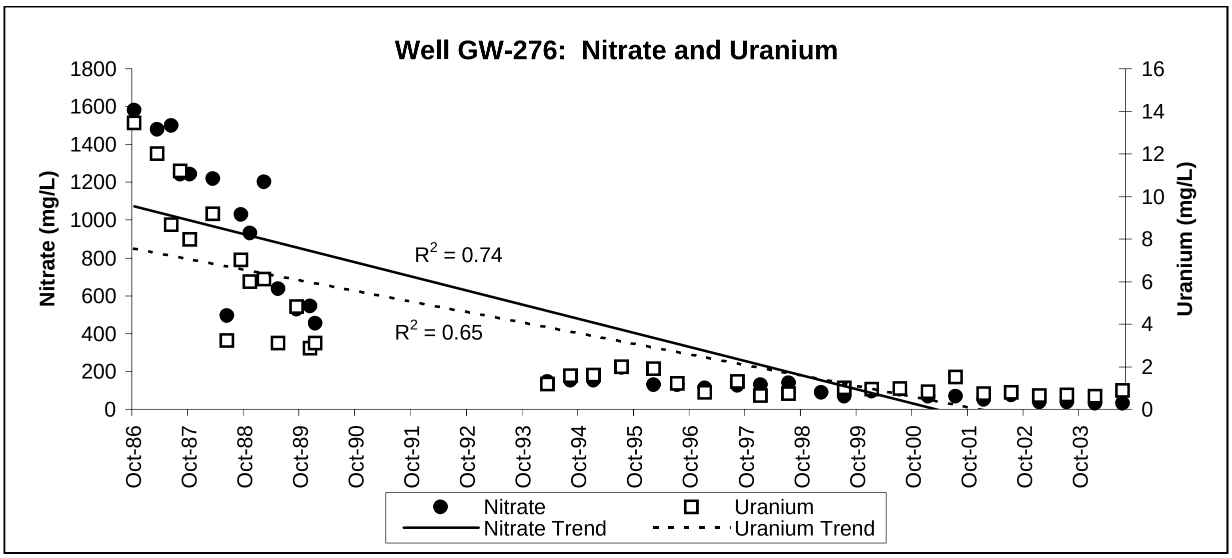
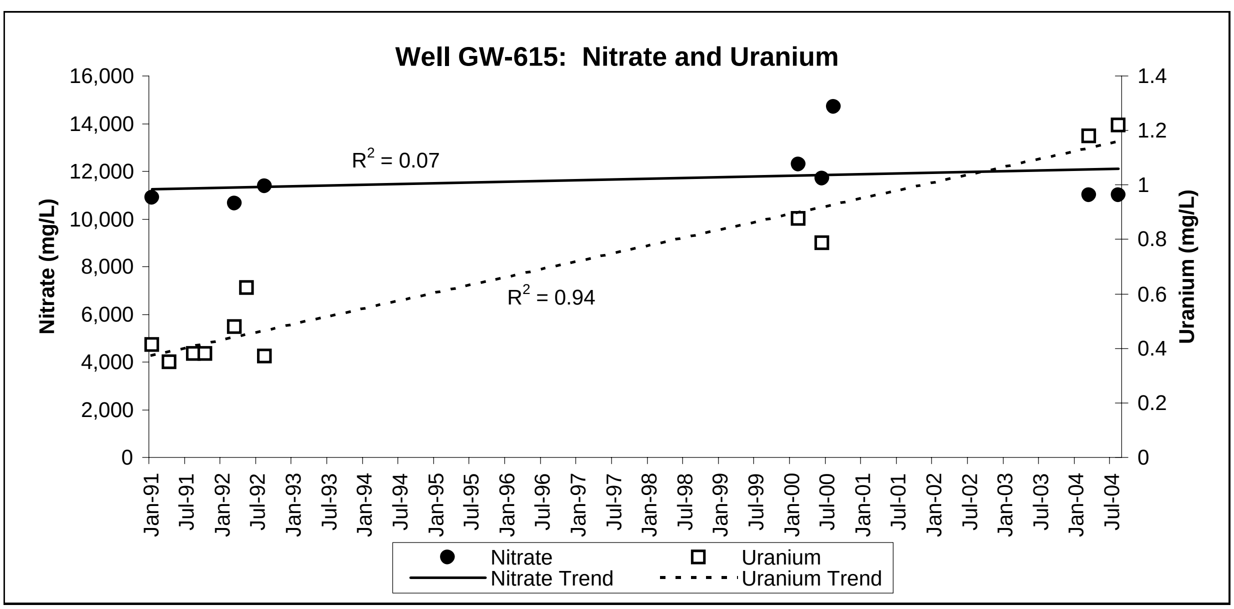


Fig. A.17. CY 2004 sampling locations in the Chestnut Ridge Hydrogeologic Regime.

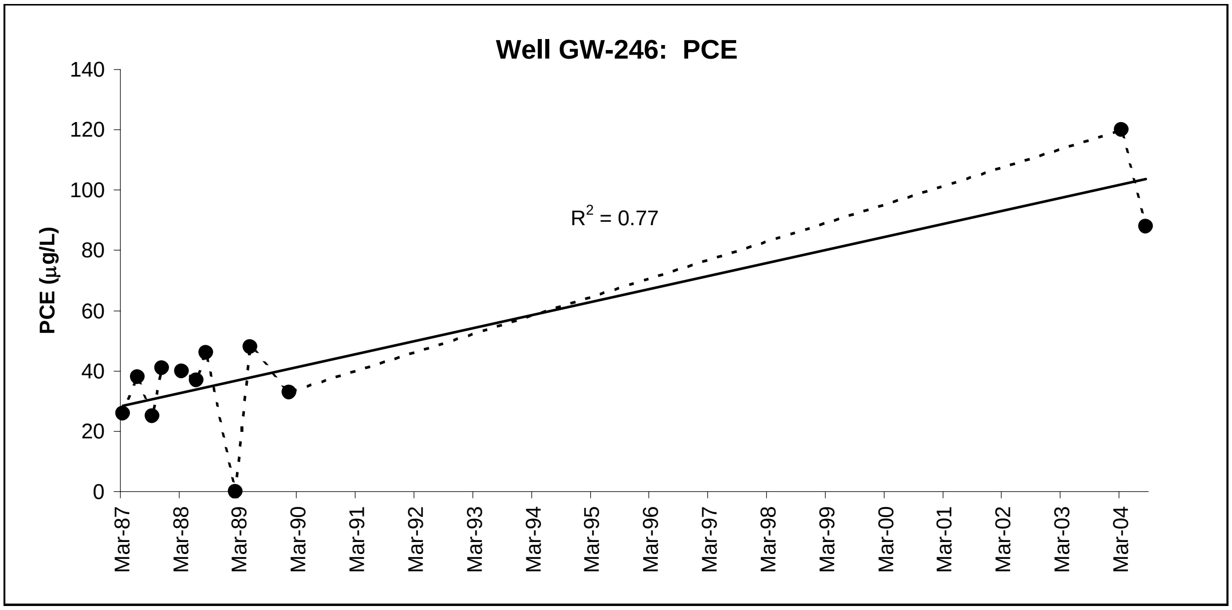


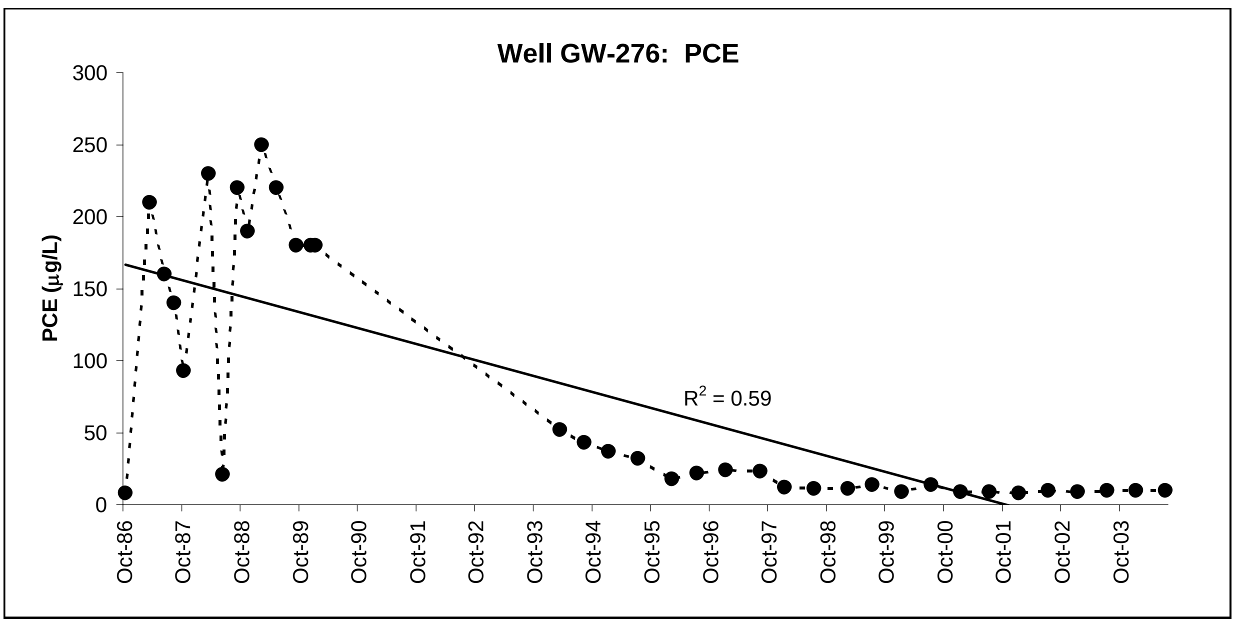




GWMR04 07/12/05

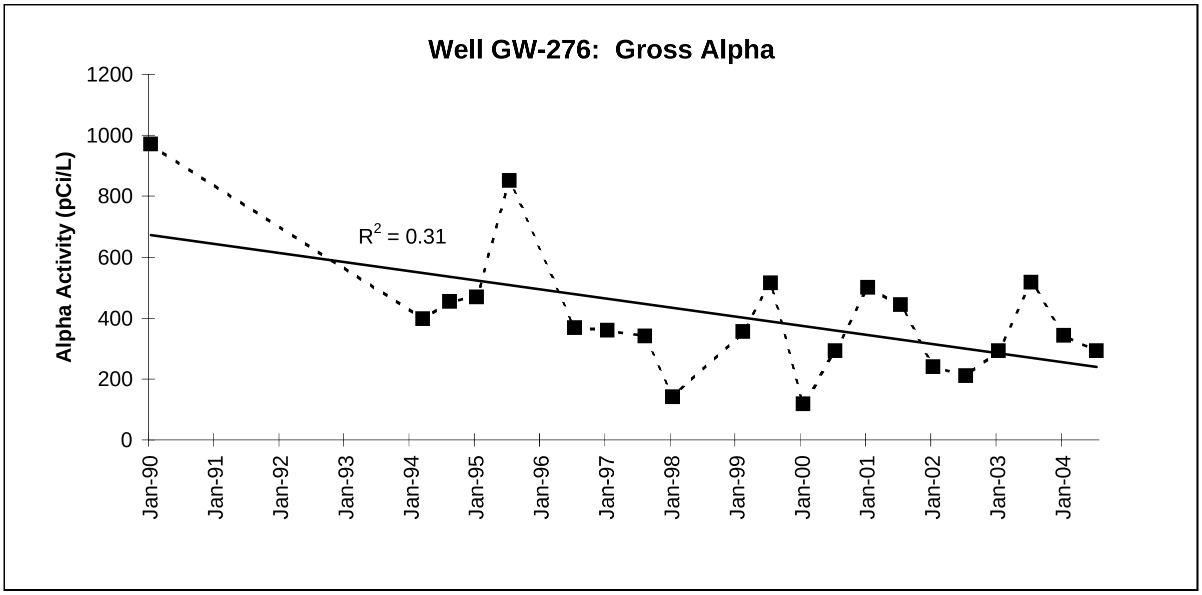
Fig. A.18. Nitrate and uranium concentrations in wells GW-101, GW-276, and GW-615.

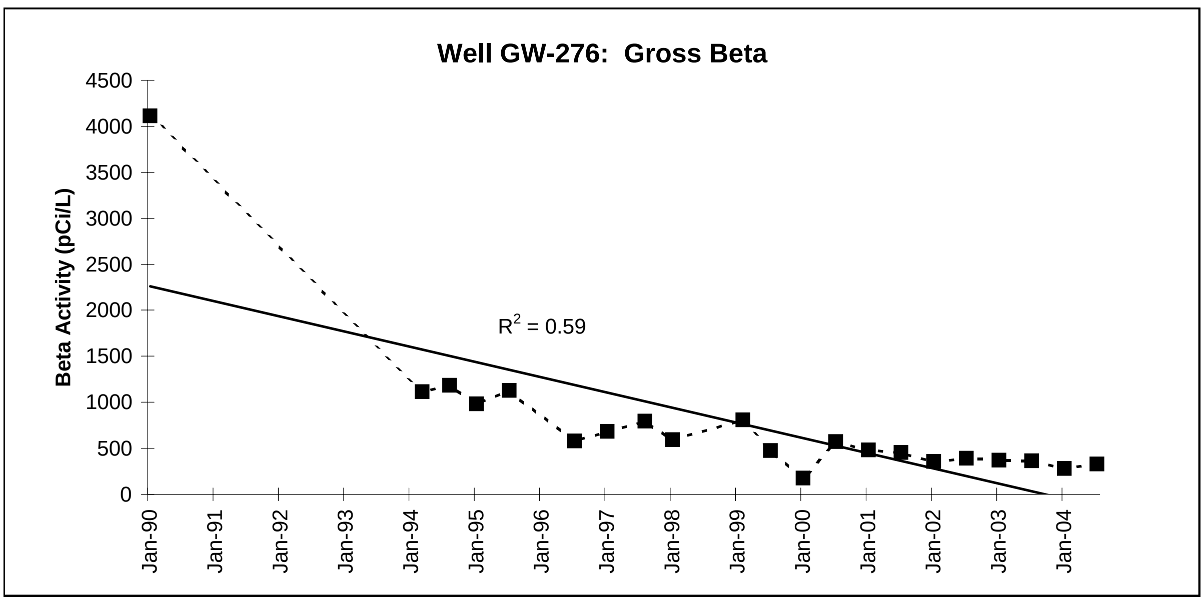




GWMR04 07/12/05

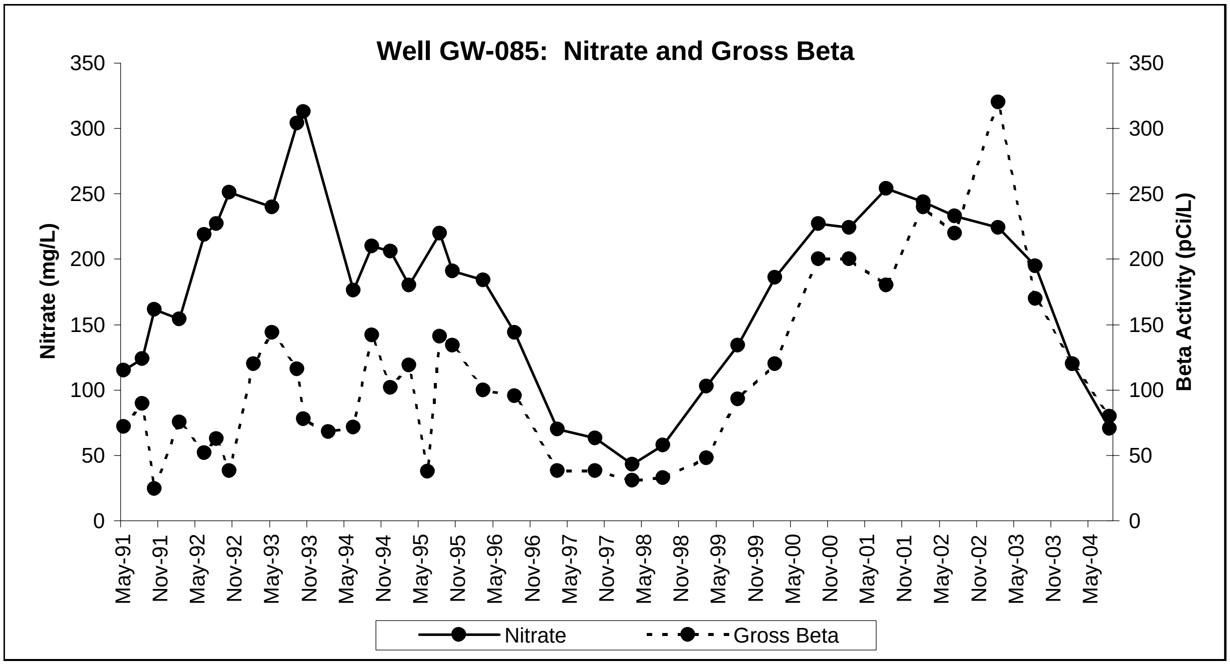
Fig. A.19. PCE concentrations in wells GW-246 and GW-276.

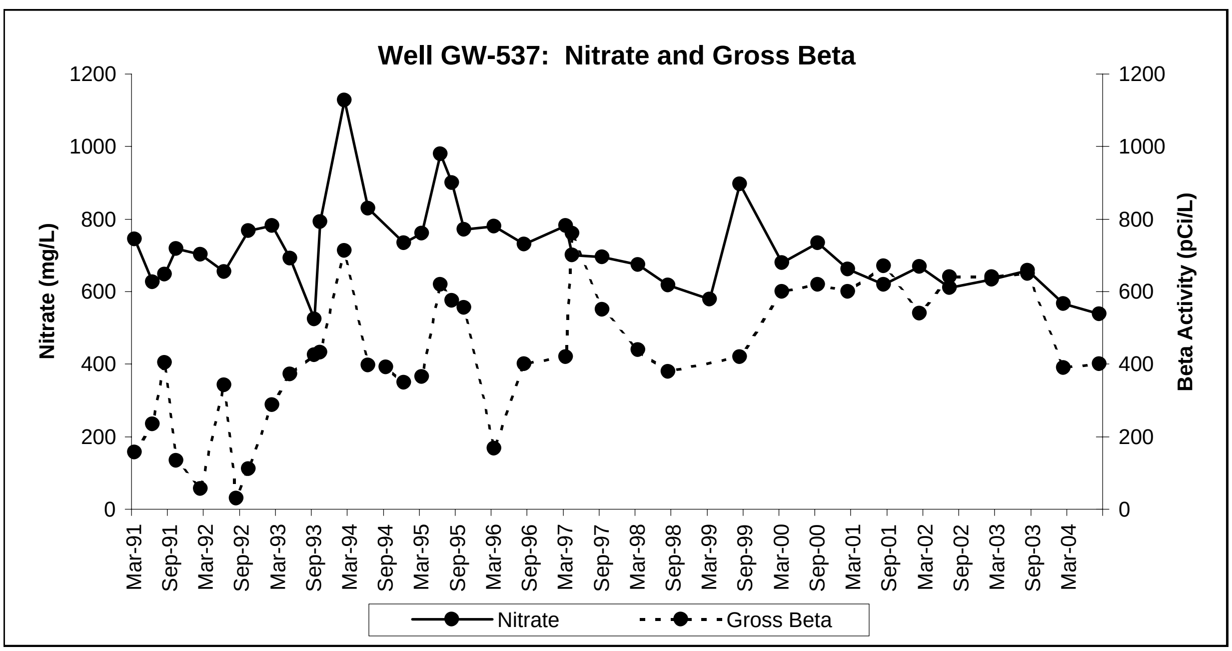




GWMR04 07/12/05

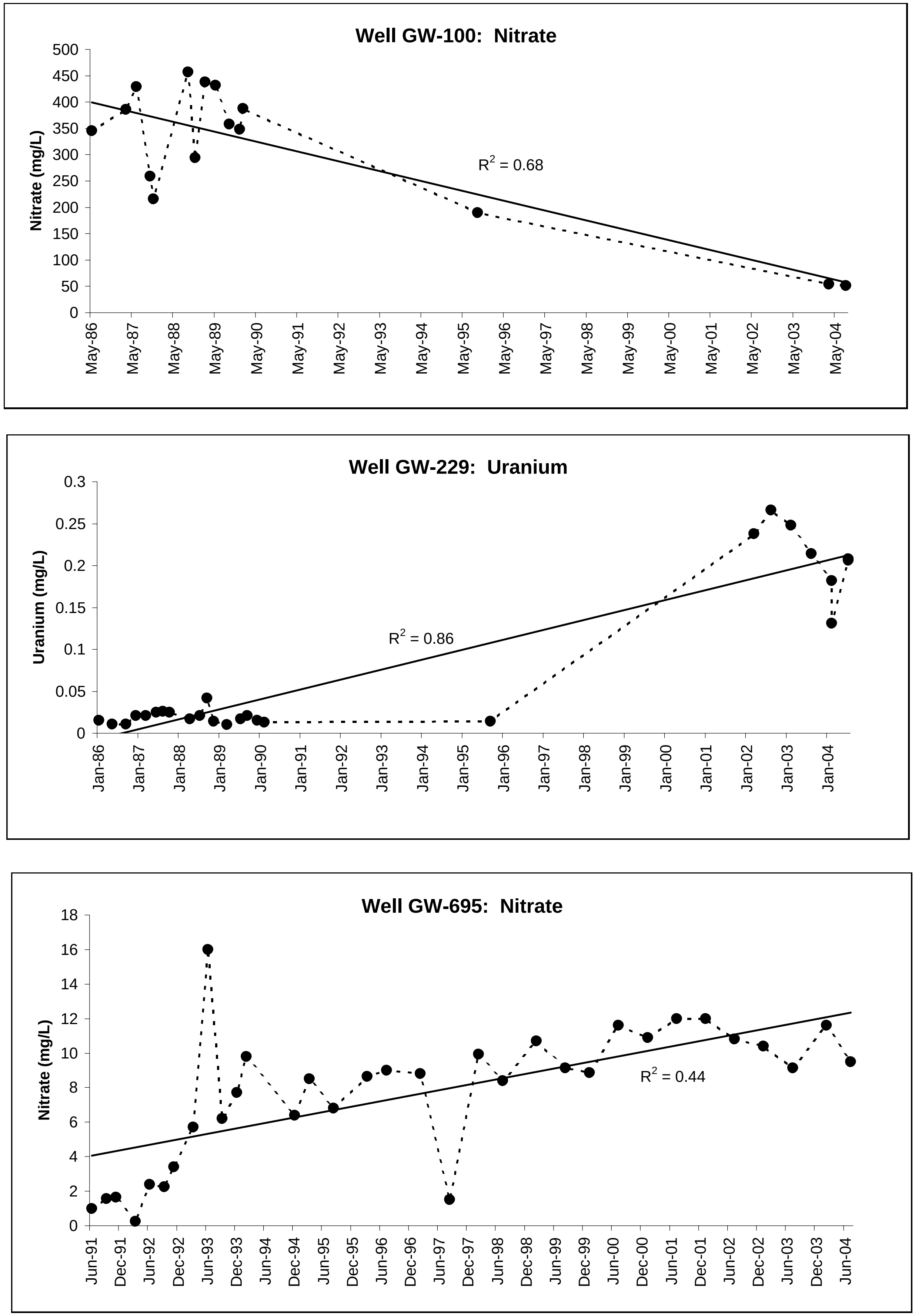
Fig. A.20. Gross alpha and gross beta activity in well GW-276.





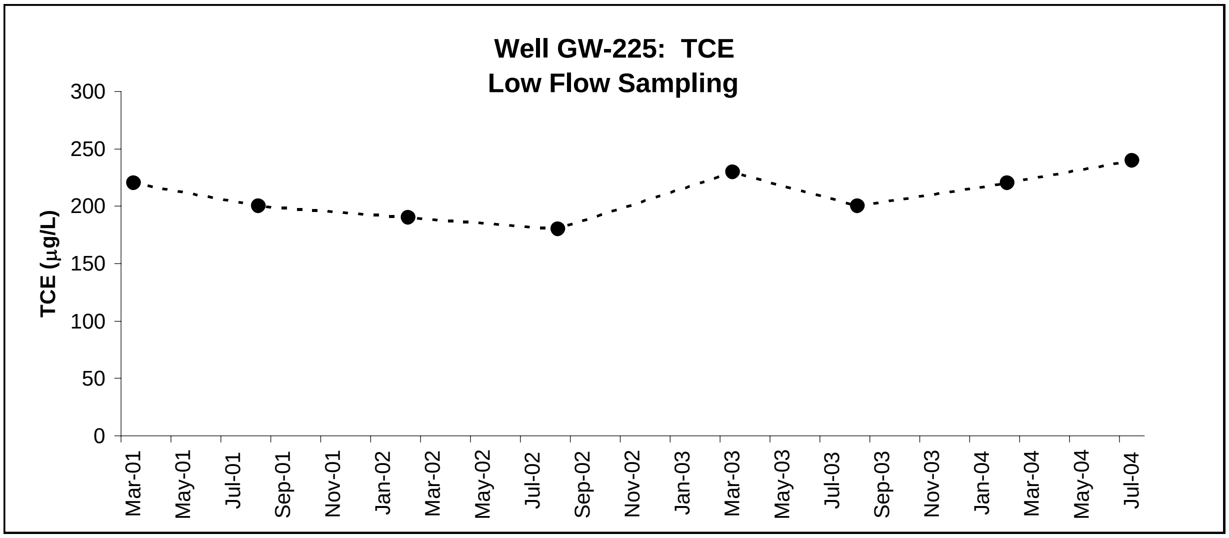
GWMR04 07/12/05

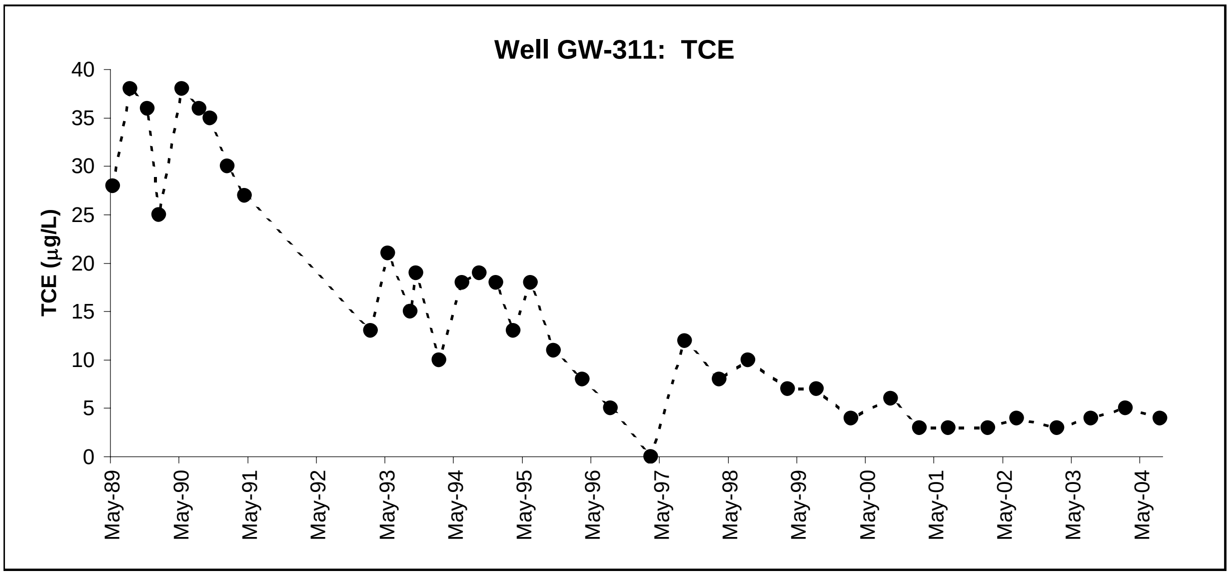
Fig. A.21. Gross beta activity and nitrate concentrations in wells GW-085 and GW-537.

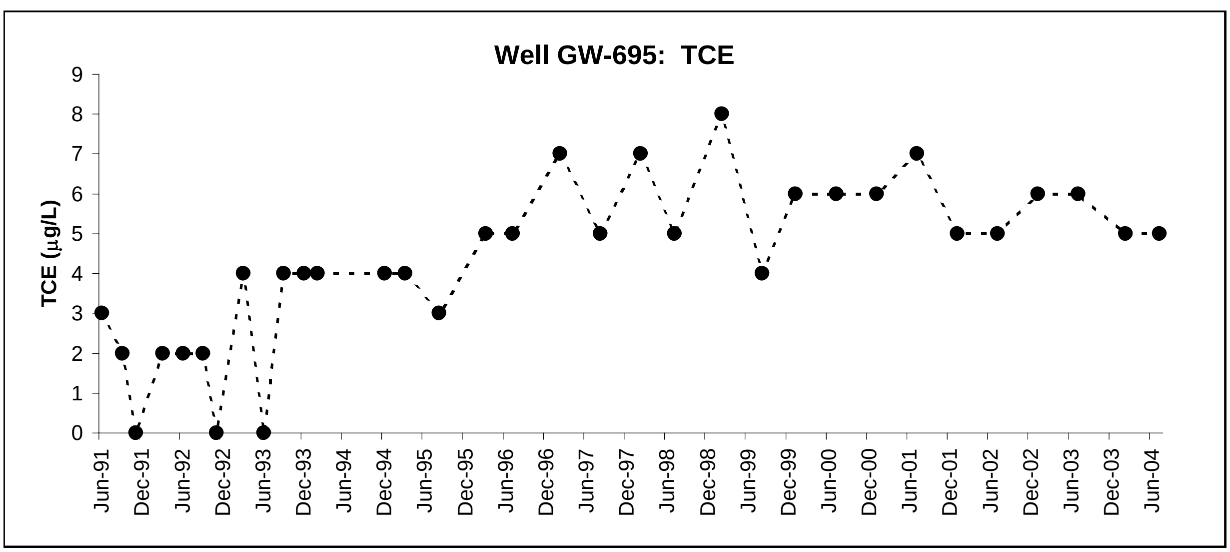


GWMR04 07/12/05

Fig. A.22. Concentrations of selected contaminants in wells GW-100, GW-229, and GW-695.

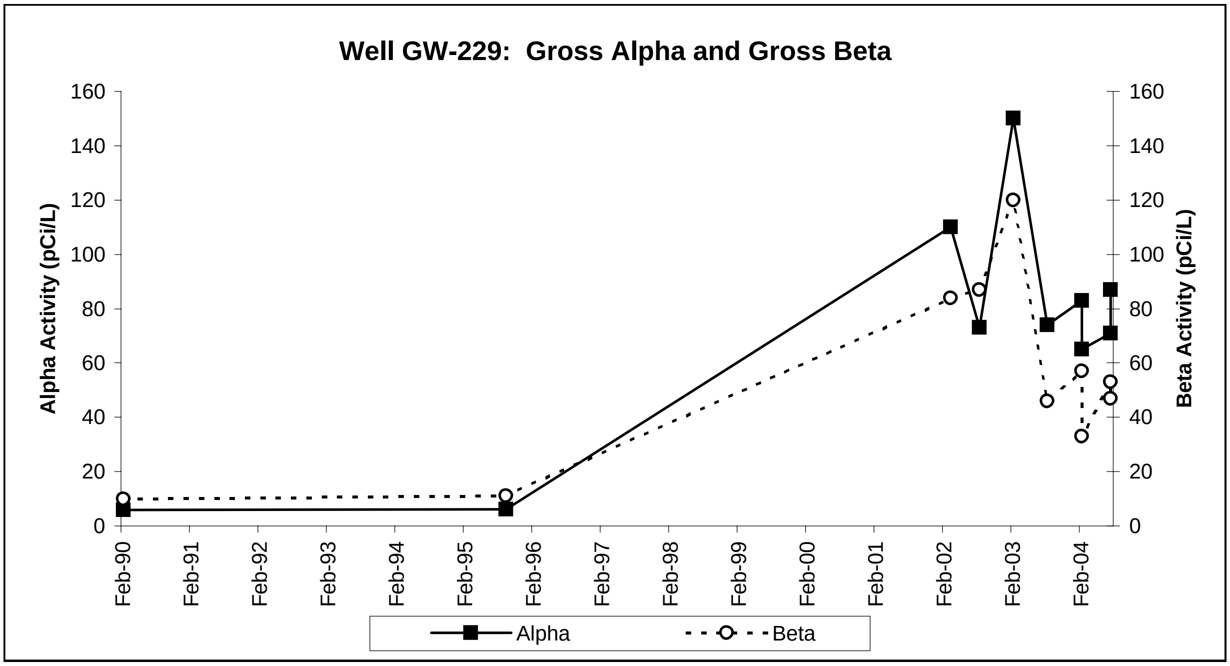






GWMR04 07/12/05

Fig. A.23. TCE concentrations in wells GW-225, GW-311, and GW-695.



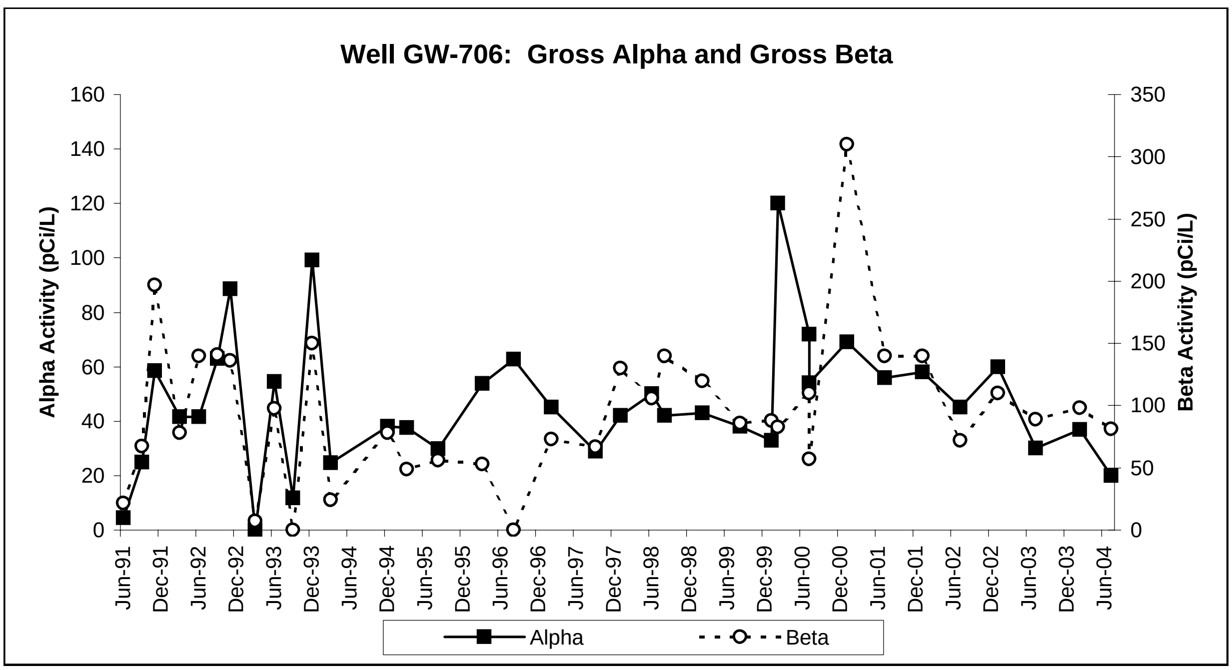
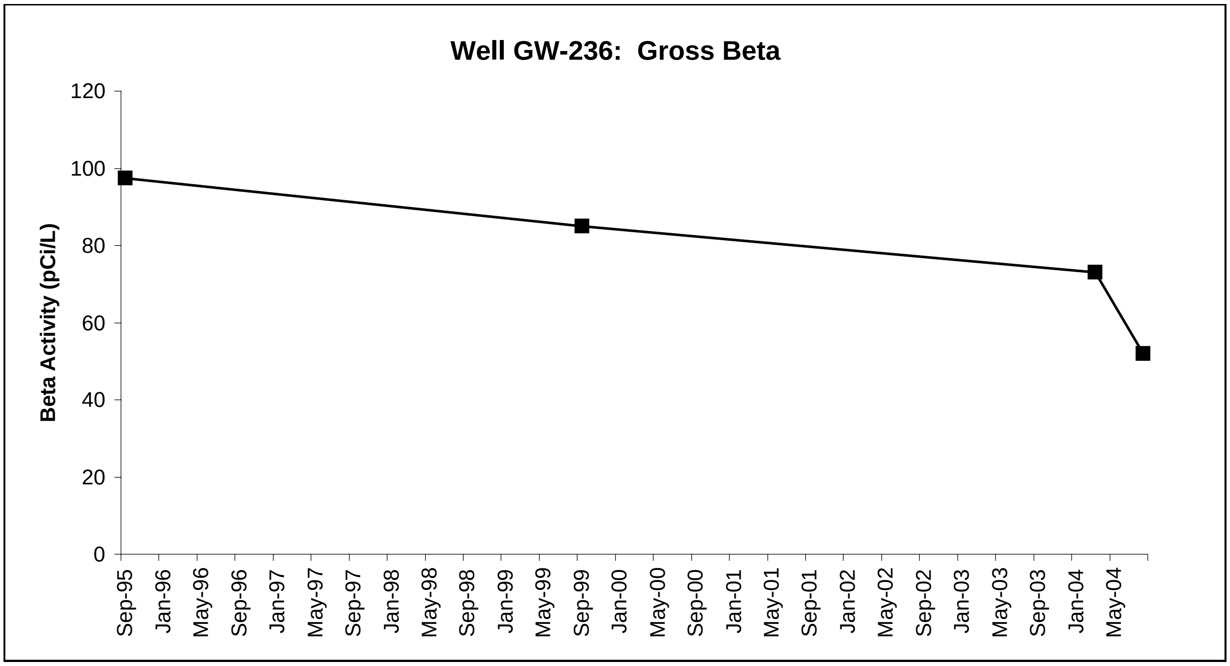
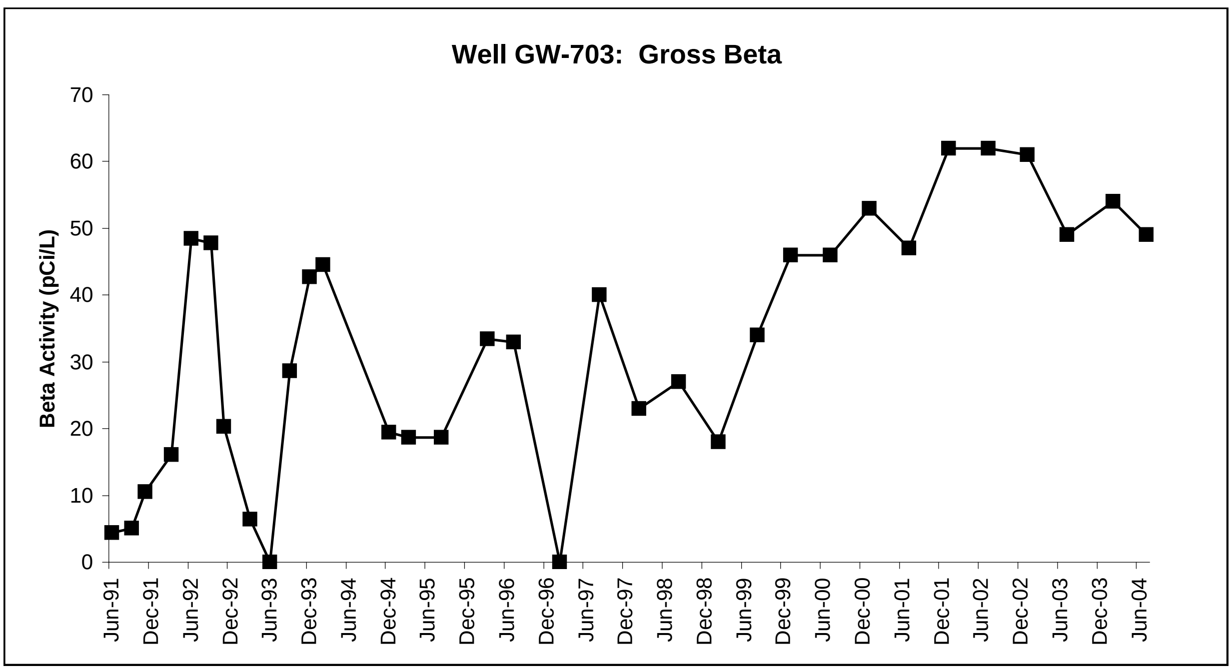


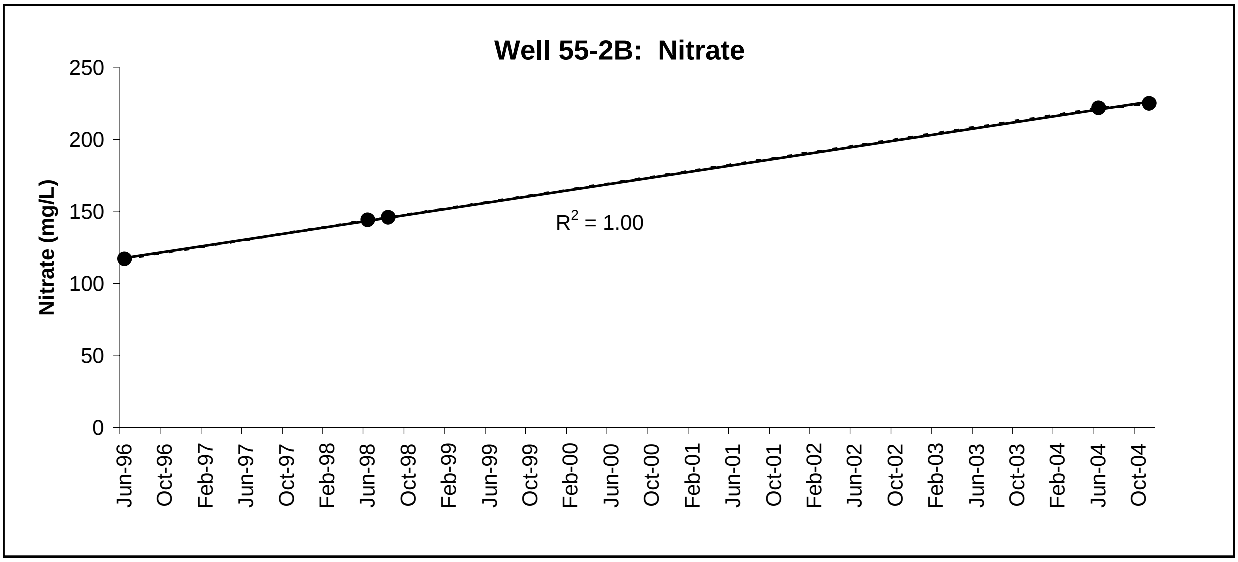
Fig. A.24. Gross alpha and gross beta activity in wells GW-229 and GW-706.

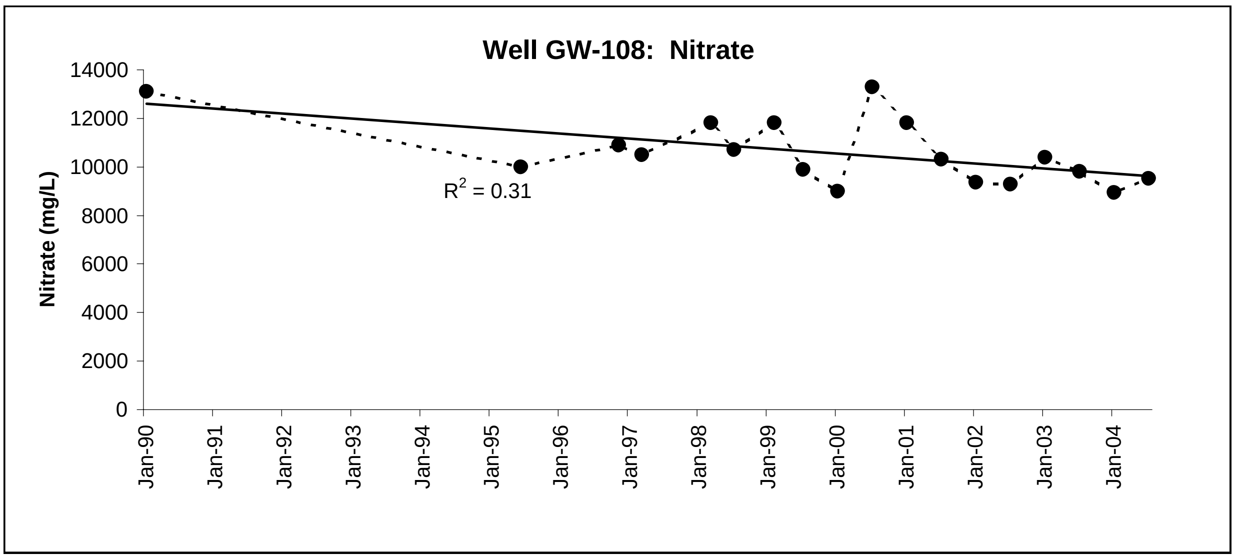


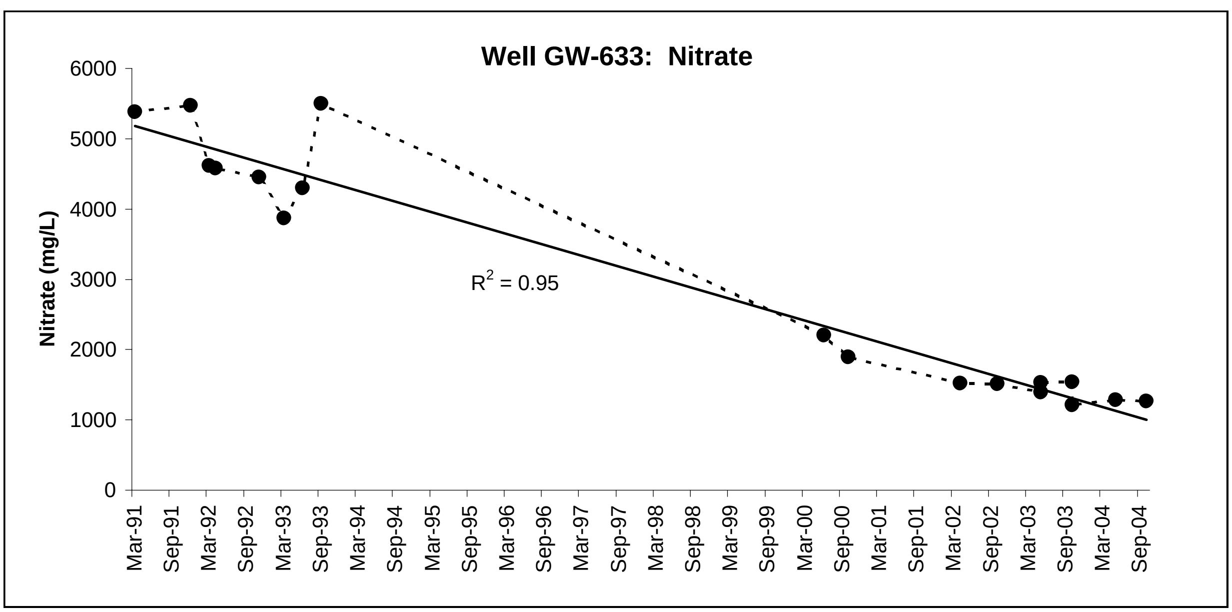


GWMR04 07/12/05

Fig. A.25. Gross gross beta activity in wells GW-236 and GW-703.

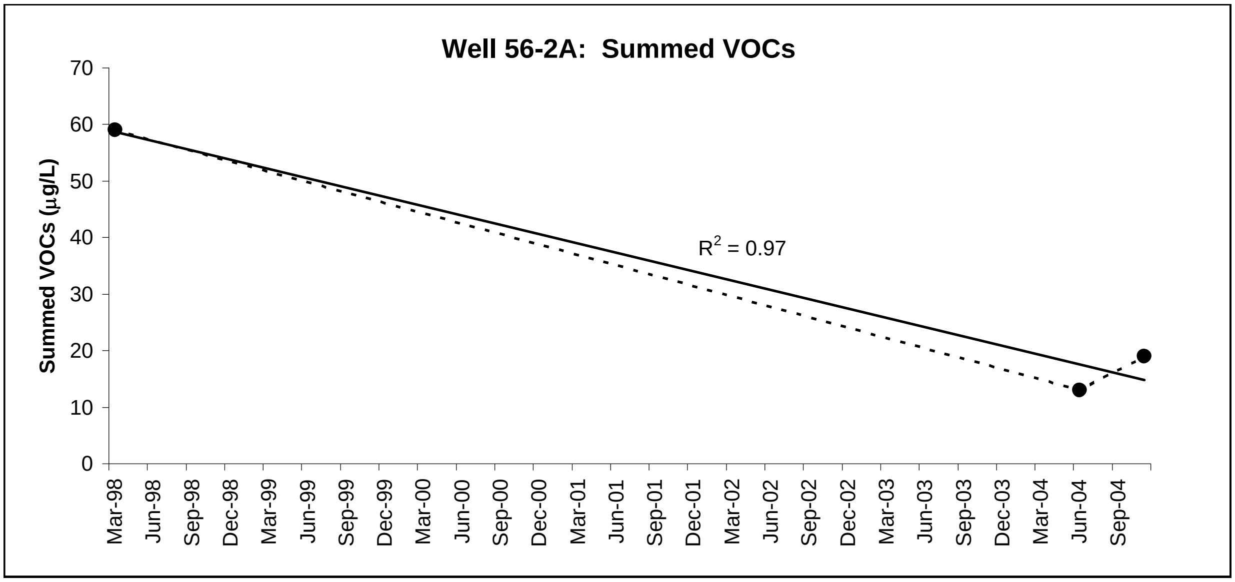


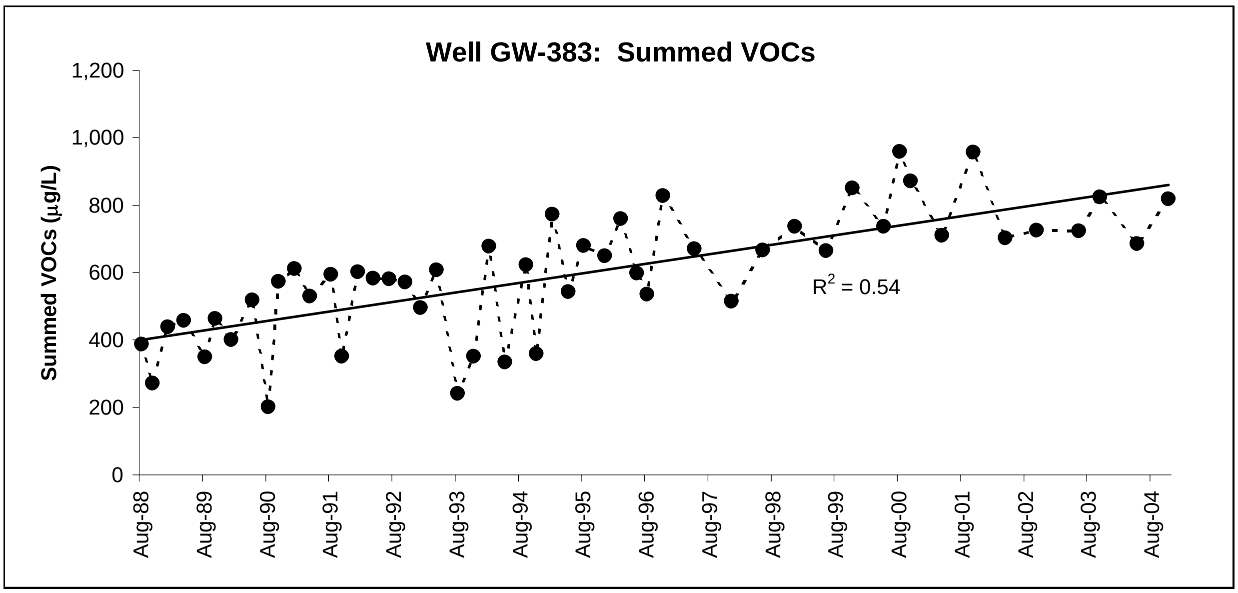


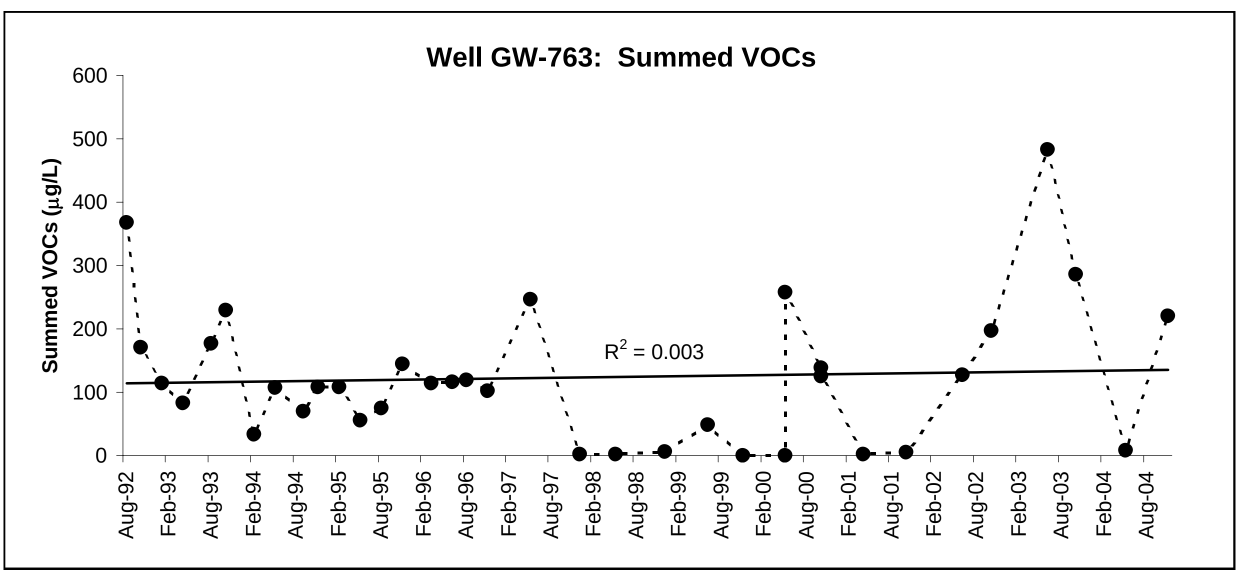


GWMR04 07/12/05

Fig. A.26. Nitrate concentrations in wells 55-2B, GW-108, and GW-633.

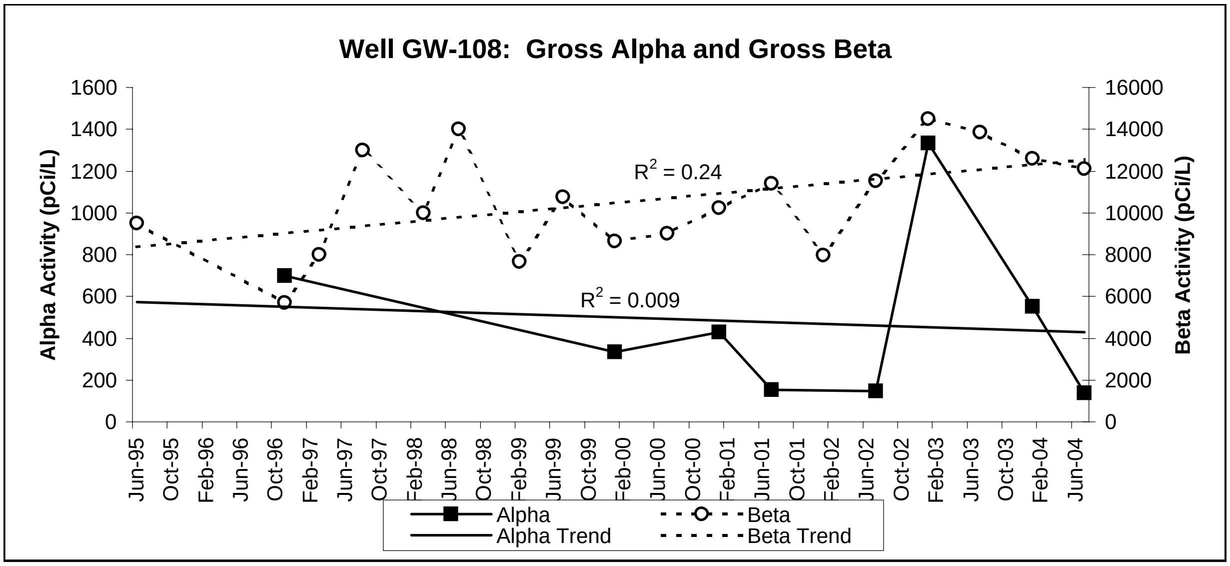


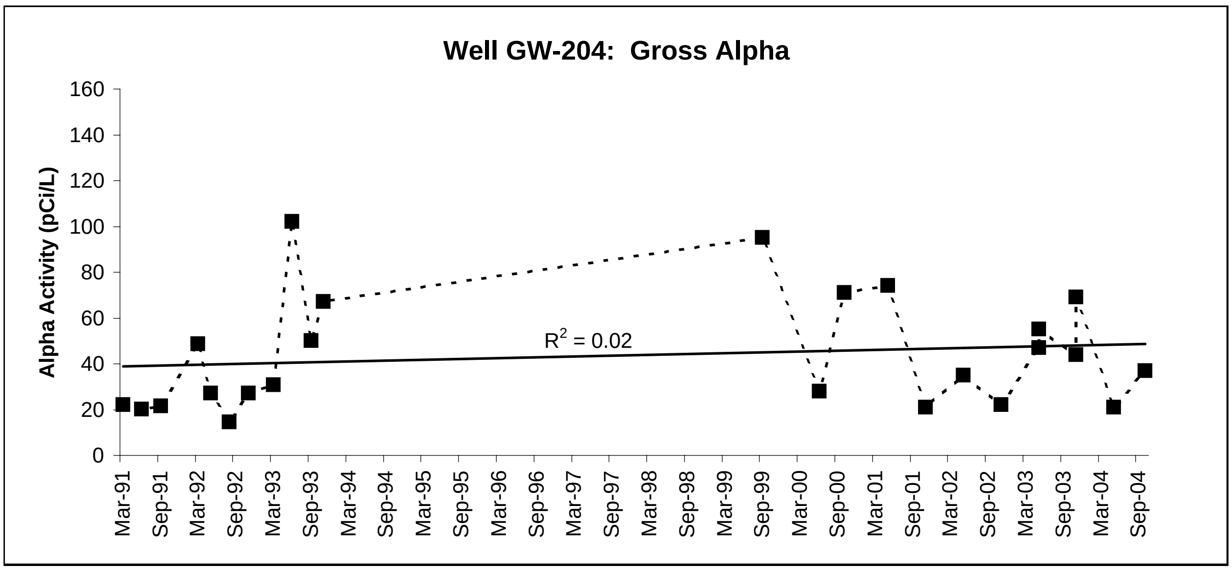


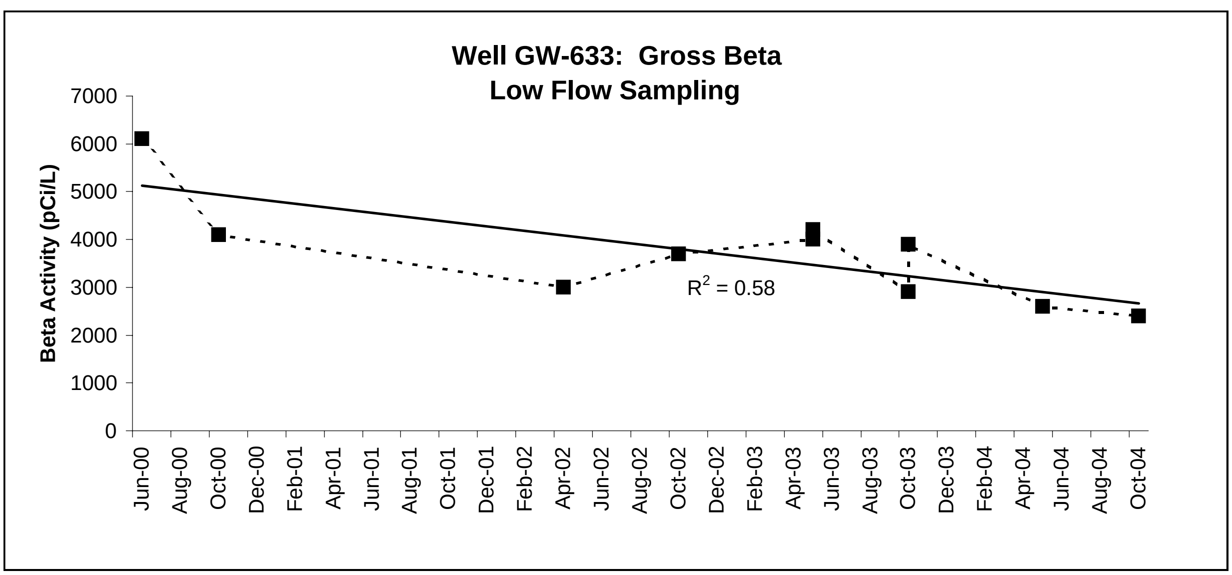


GWMR04 07/12/05

Fig. A.27. Summed VOC concentrations in wells 56-2A, GW-383, and GW-763.

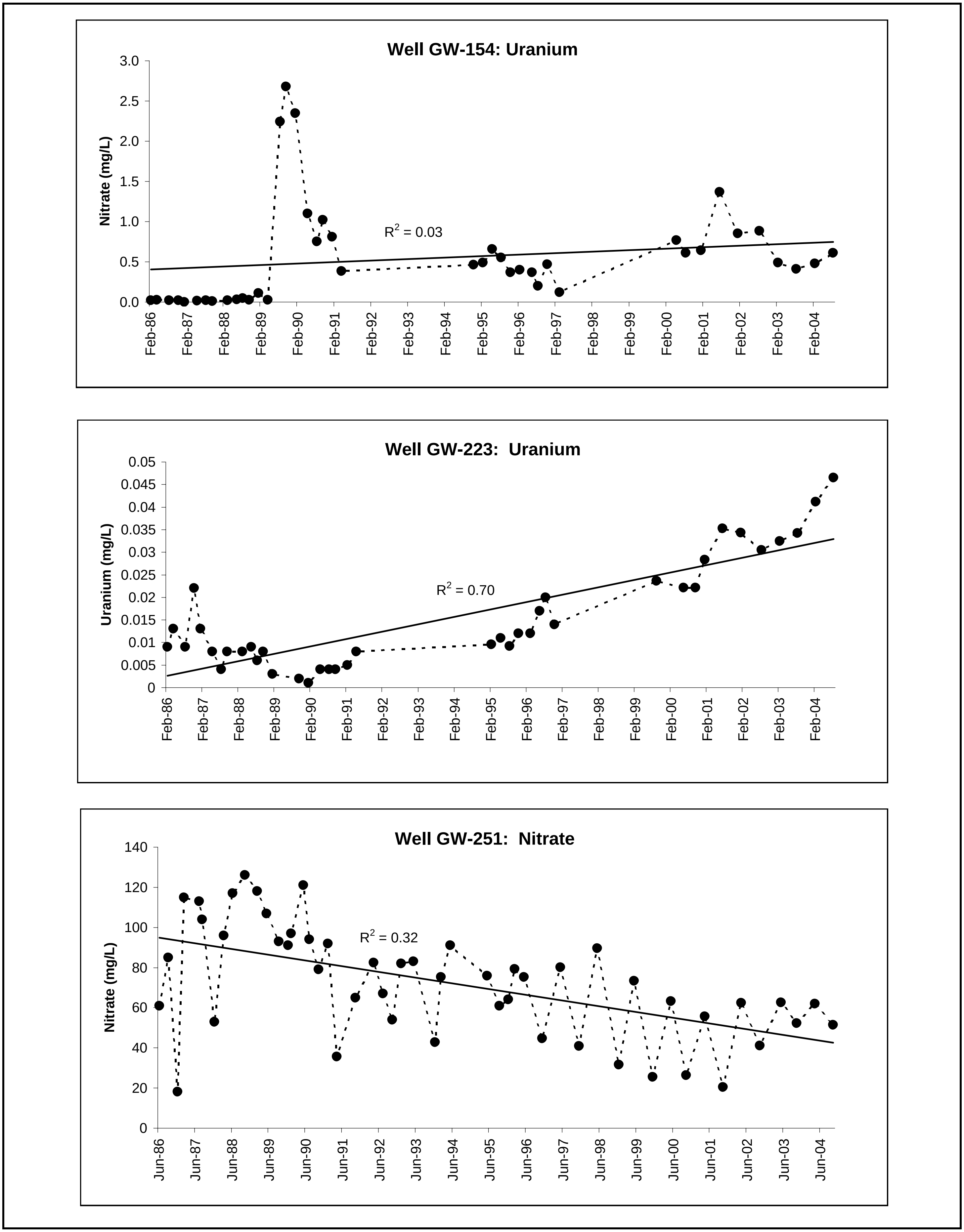






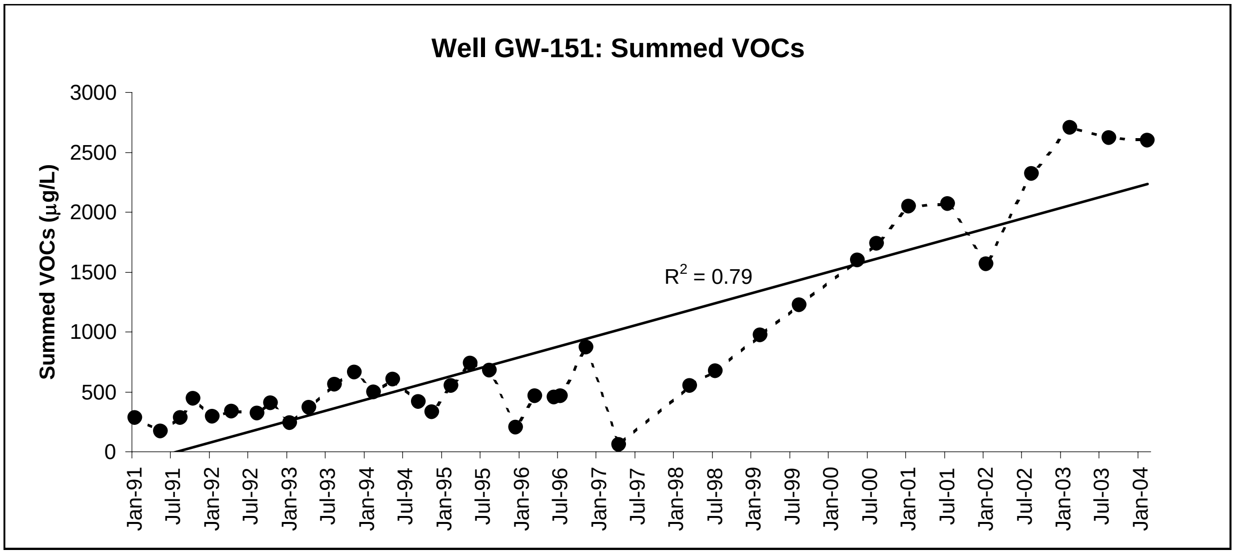
GWMR04 07/12/05

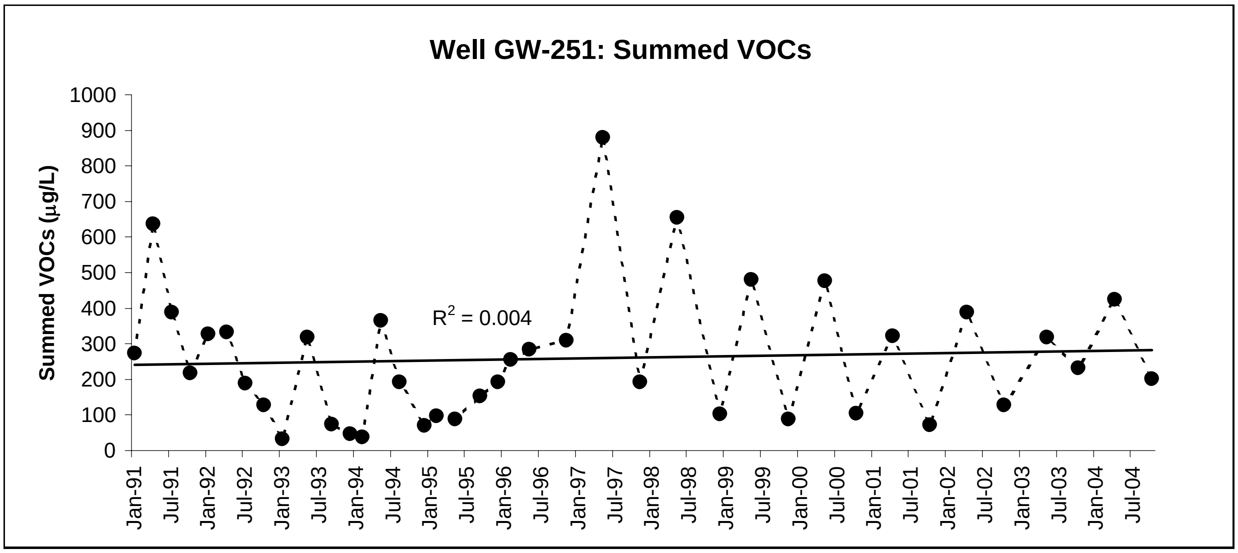
Fig. A.28. Gross alpha and/or gross beta activity in wells GW-108, GW-204, and GW-633.

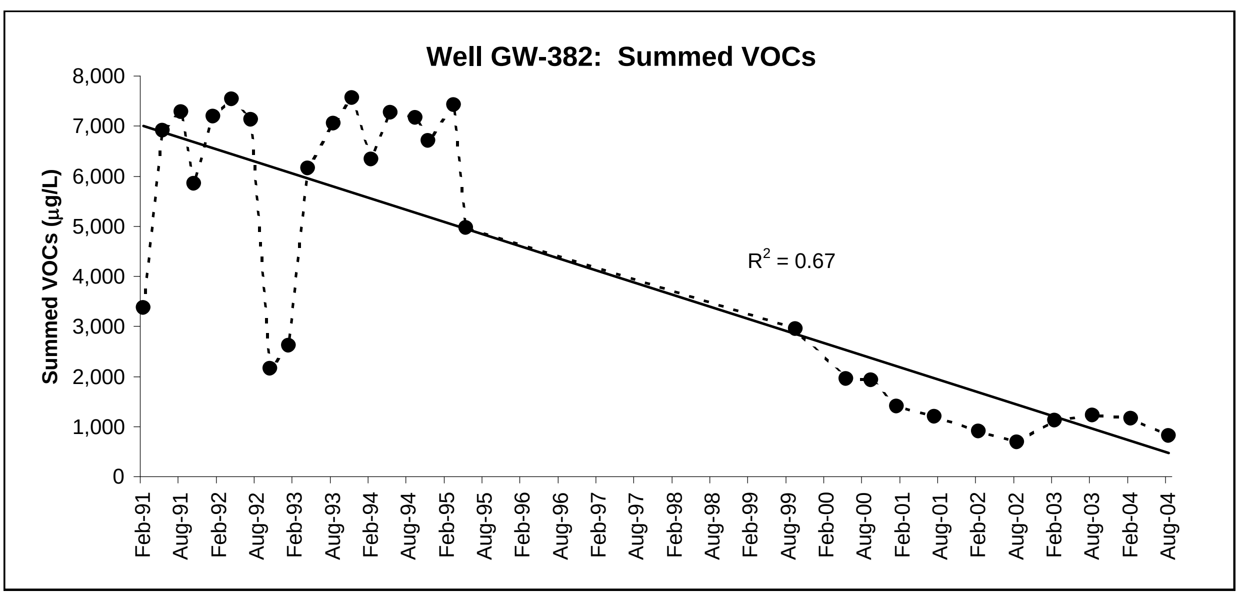


GWMR04 07/12/05

Fig. A.29. Concentrations of selected contaminants in wells GW-154, GW-223, and GW-251.

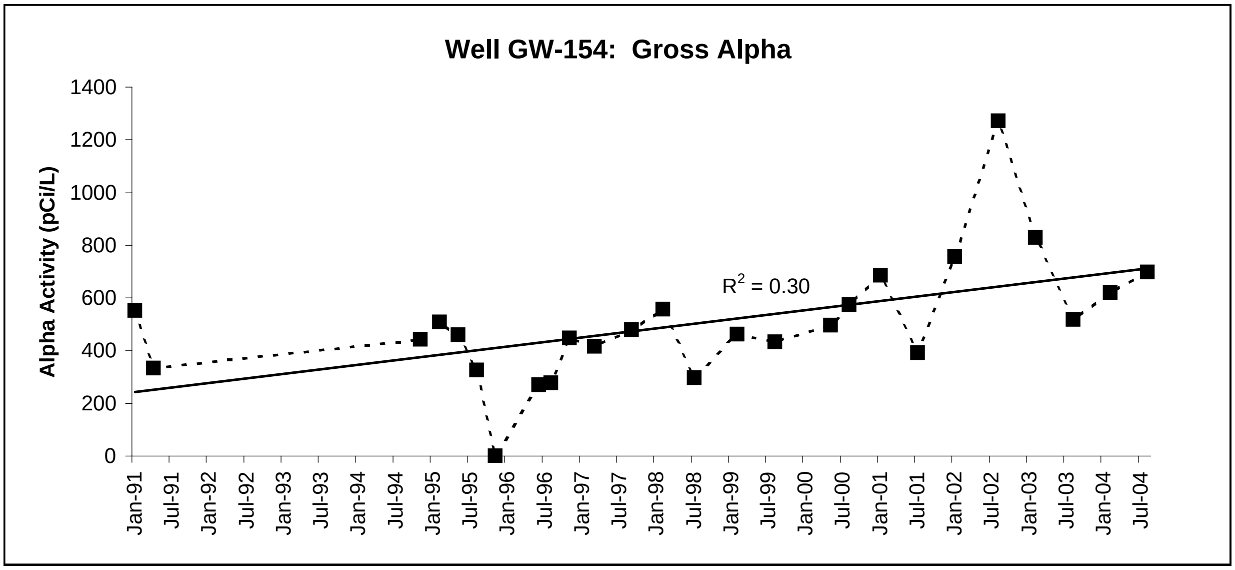


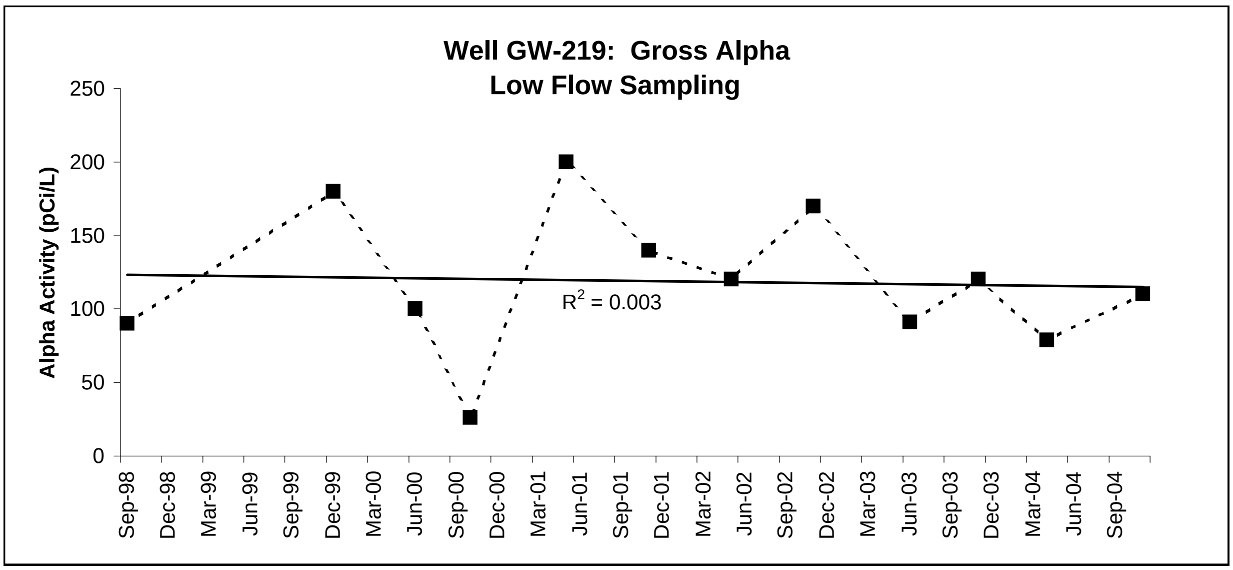


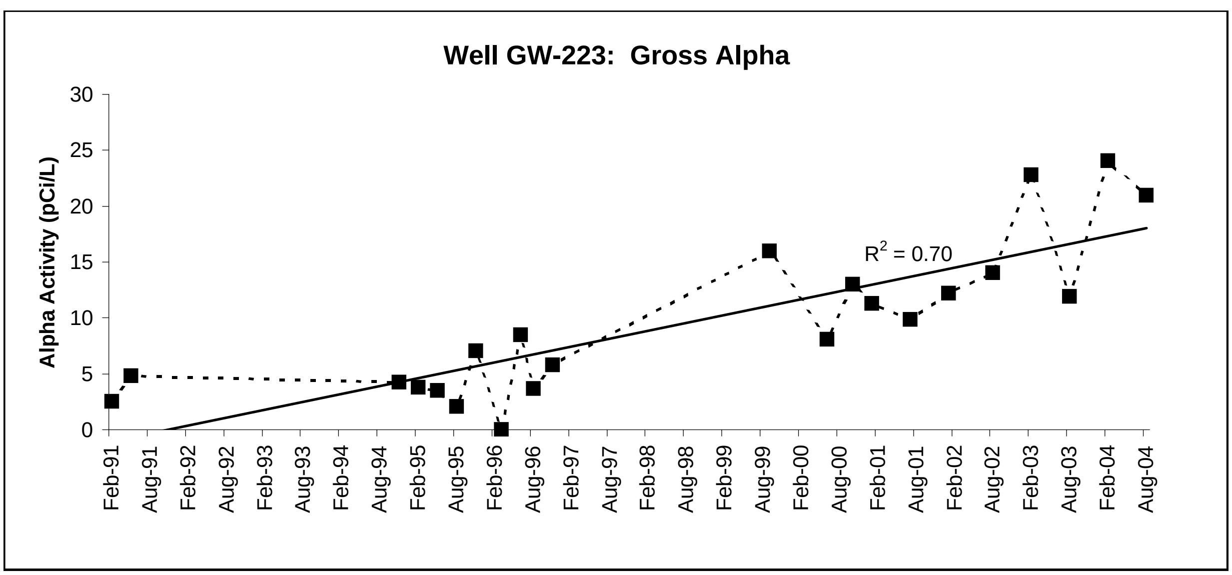


GWMR04 07/12/05

Fig. A.30. Summed VOC concentrations in wells GW-151, GW-251, and GW-382.

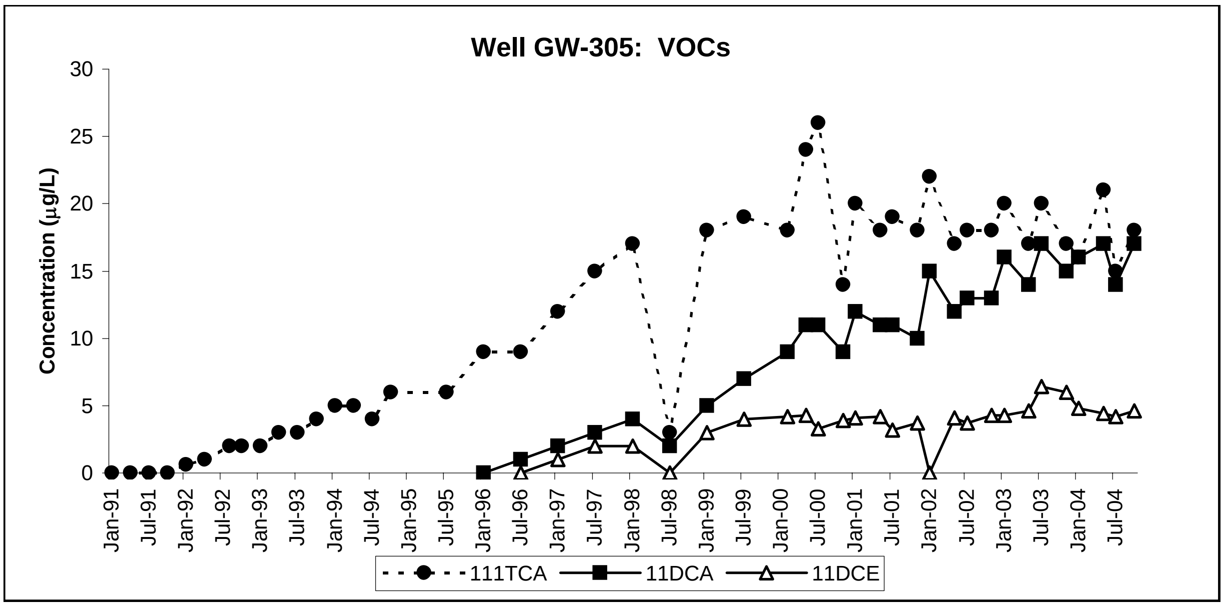






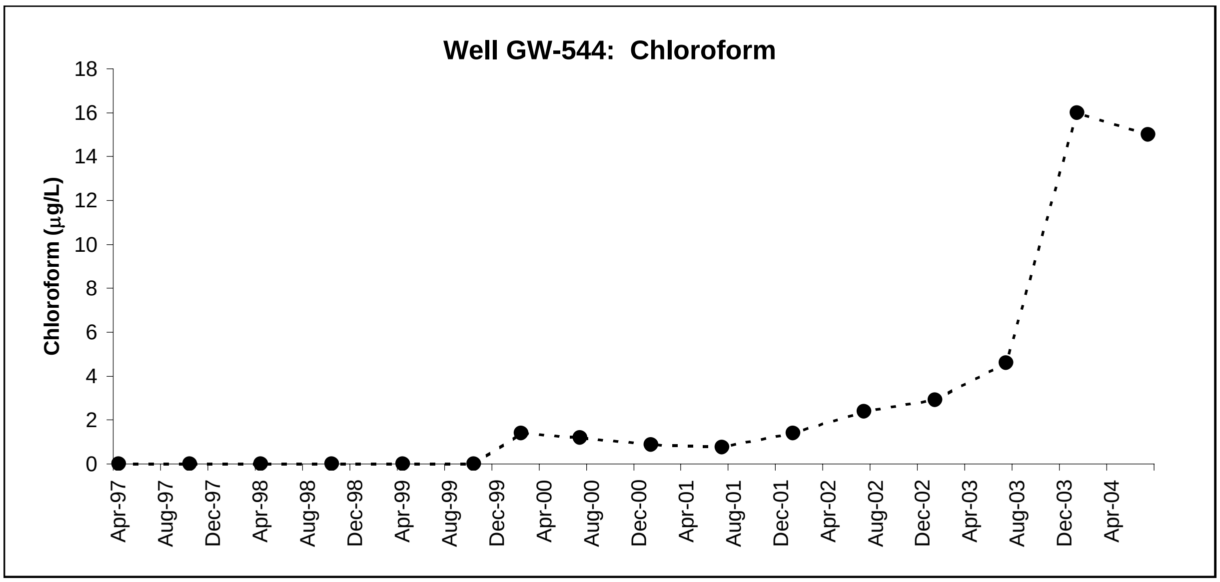
GWMR04 07/12/05

Fig. A.31. Gross alpha activity in wells GW-154, GW-219, and GW-223.



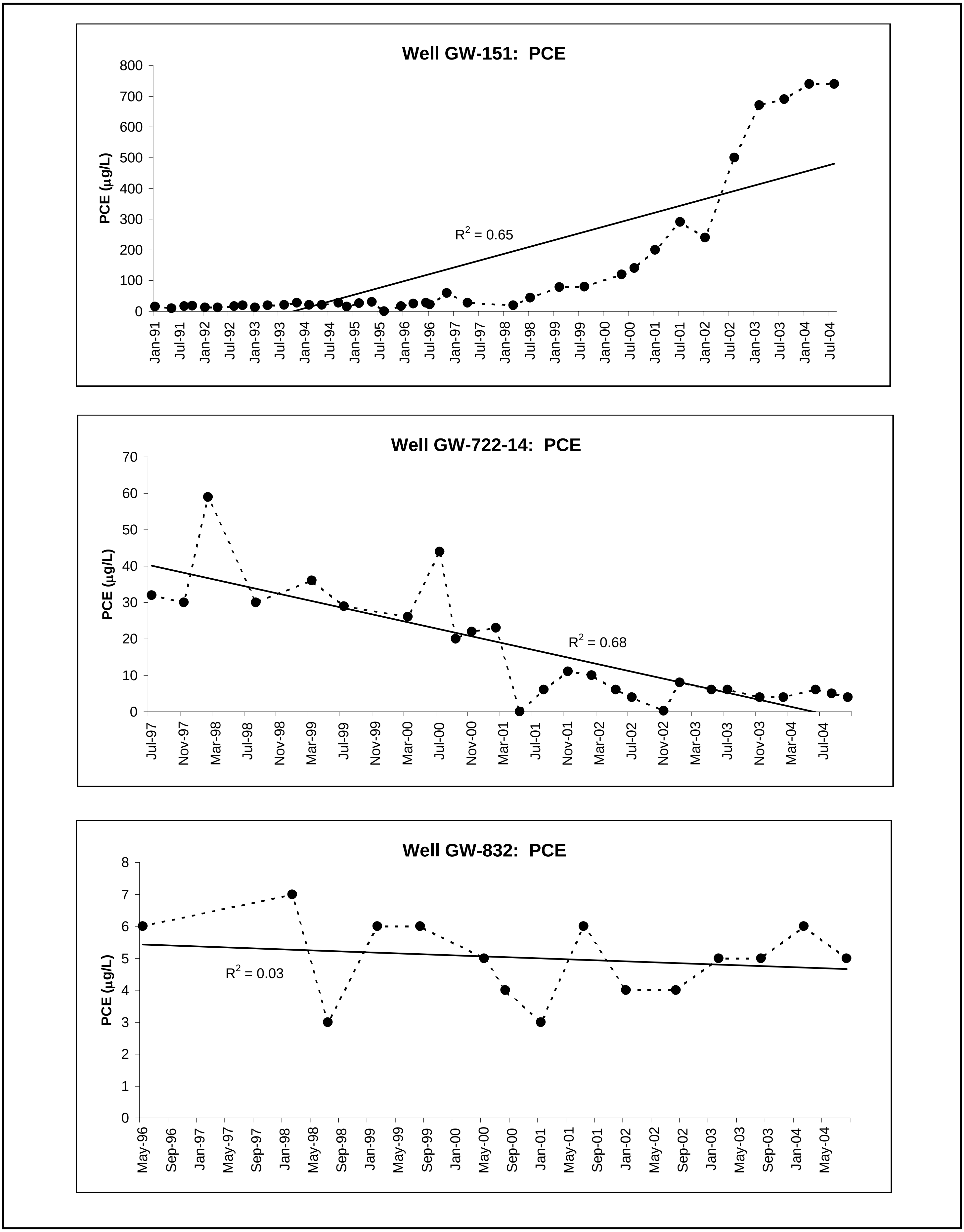
GWMR04 07/12/05

Fig. A.32. Concentrations of 111TCA, 11DCA, and 11DCE in well GW-305.



GWMR04 07/12/05

Fig. A.33. Chloroform concentrations in well GW-544.



GWMR04 07/12/05

Fig. A.34. PCE concentrations in wells GW-151, GW-722-14, and GW-832.

APPENDIX B

TABLES

Table B.1. Summary of CY 2004 sampling and analysis plan addenda

Addendum No.	Effective Date	Modification to the CY 2004 Sampling and Analysis Plan [1]
2004-01	01/01/04	Reporting limits for cadmium and chromium under MET(1) were raised (Table B.2). Cadmium: 0.0005 to 0.0025 mg/L Chromium: 0.0025 to 0.01 mg/L
2004-02	01/01/04	Change the analyte name “Dimethylbenzene” to “Total Xylene” (Table B.2).
2004-03	01/26/04	Added “Turbidity” to the “CHEM” parameter group (Table B.2).
2004-04	02/02/04	Change the sampling frequency for well GW-818 (EF-4, Table B.1) from “Q2,Q4" to “Q1".
2004-05	02/11/04	Add well GW-795 to sample group BC-1 (Table B.1).
2004-06	02/12/04	Add spring SPR14.0SP to sample group EF-4 (Table B.1).
2004-07	04/01/04	Add six wells for evaluation microbial activity (Table B.1): GW-380 and GW-775 (EF-2); GW-760 and GW-765 (EF-3); 59-1B (EF-4); GW-056 (BC-4).
2004-08	04/01/04	Add evaluation of microbial activity to wells GW-219 and GW-770 (EF-2, Table B.1).
2004-09	01/01/04	Remove well GW-174 and GW-180 from sample group CR-3 (Table B.1).
2004-10	04/06/04	Add spring 9201-3C-4SP to sample group EF-2 (Table B.1).
2004-11	05/28/04	Resample well GW-680 (CR-2) and discard results of initial sampling (collected April 20, 2004); initial sample was highly turbid, redevelopment discovered an obstruction that prevented the pump intake from reaching the screened interval of the well.
2004-12	06/18/04	Add sump sampling location 9201-1K-22SU to sample group EF-2 (Table B.1).
2004-13	07/01/04	Add 28 sampling ports in Westbay™ wells GW-133 (8 ports, BC-5), GW-134 (10 ports, BC-6), and GW-135 (10 ports, BC-7) for sample collection during the third quarter only.

Note:

1 Modification to the *Y-12 Groundwater Protection Program Groundwater and Surface Water Sampling and Analysis Plan for Calendar Year 2004* (BWXT 2003a).

Table B.2. CY 2004 groundwater and surface water sampling dates in the Bear Creek Hydrogeologic Regime

BJC [1]									CERCLA ROD (●), Detection (□), and Baseline (○) Monitoring
								RCRA Post-Closure Corrective Action Monitoring	
GWPP [2]							DOE Order Exit Pathway/Perimeter Monitoring		
						DOE Order Surveillance Monitoring			
Sampling Point [3]	Functional Area [4]	CY 2004 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
BCK-00.63	EXP-SW	01/27/04	.	07/20/04	.		●		
BCK-03.30	EXP-SW	03/02/04	.	09/14/04	.		x		●
BCK-04.55	EXP-SW	01/27/04	.	07/20/04	.		●		
BCK-07.87	EXP-SW	03/02/04	.	09/14/04	.				●
BCK-09.20	EXP-SW	03/01/04	.	09/13/04	.		x		●
BCK-09.47	EXP-SW	03/01/04	.	09/13/04	.		x		●
BCK-11.54	EXP-SW	03/01/04	.	09/13/04	.		x		●
BCK-11.84	EXP-SW	03/01/04	.	09/13/04	.		x		●
BCK-12.34	EXP-SW	01/12/04	06/02/04	07/26/04	11/02/04		x		●
BCK-12.47	EXP-SW	01/12/04	06/02/04	07/26/04	11/02/04		x		●
EMWNT-03A	EXP-SW	03/09/04	06/08/04	09/02/04	12/02/04		x		□
EMWNT-05	EXP-SW	**03/09/04 D**	06/08/04	**09/02/04 D**	12/02/04		x		□
EMW-VWEIR	EXP-SW	03/09/04	.	.	12/02/04		x		□
GW-008	OLF	01/07/04	.	07/07/04	.	x		●	
GW-046	BG	01/06/04	.	07/08/04	.	x		●	
GW-052	BG	03/04/04	.	08/16/04	.	●			
GW-056	EXP-A	.	04/27/04	.	.	●			
GW-071	BG	03/01/04	.	08/05/04	.	●			
GW-077	BG	02/17/04	.	08/12/04	.	x			●
GW-078	BG	02/17/04	.	08/12/04	.	x			●
GW-079	BG	02/17/04	.	08/12/04	.	x			●
GW-080	BG	**02/17/04 D**	.	**08/12/04 D**	.	x			●
GW-082	BG	03/01/04	.	**08/05/04 D**	.	●			
GW-085	OLF	**02/23/04 D**	.	08/03/04	.	●			
GW-098	OLF	02/19/04	.	08/03/04	.	●			
GW-100	S3	03/04/04	.	**08/17/04 D**	.	●			
GW-101	S3	03/08/04	.	08/18/04	.	●			
GW-115	S3	01/06/04	.	.	.	x		●	
GW-133-01	S3	.	.	08/23/04	.	●			
GW-133-05	S3	.	.	08/23/04	.	●			
GW-133-08	S3	.	.	08/23/04	.	●			
GW-133-10	S3	.	.	08/24/04	.	●			
GW-133-14	S3	.	.	08/26/04	.	●			
GW-133-17	S3	.	.	08/26/04	.	●			
GW-133-21	S3	.	.	**08/26/04 D**	.	●			
GW-133-24	S3	.	.	08/26/04	.	●			

Table B.2 (continued)

BJC [1] / GWPP [2]		CY 2004 Sampling Date [5]				DOE Order Surveillance Monitoring	DOE Order Exit Pathway/Perimeter Monitoring	RCRA Post-Closure Corrective Action Monitoring	CERCLA ROD (●), Detection (☐), and Baseline (○) Monitoring
Sampling Point [3]	**Functional Area [4]**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**				
GW-134-05	S3	.	.	08/08/04	.	●			
GW-134-11	S3	.	.	08/08/04	.	●			
GW-134-15	S3	.	.	**08/09/04 D**	.	●			
GW-134-18	S3	.	.	08/10/04	.	●			
GW-134-21	S3	.	.	08/10/04	.	●			
GW-134-25	S3	.	.	08/10/04	.	●			
GW-134-29	S3	.	.	08/11/04	.	●			
GW-134-33	S3	.	.	08/11/04	.	●			
GW-134-35	S3	.	.	08/11/04	.	●			
GW-134-36	S3	.	.	08/11/04	.	●			
GW-135-03	S3	.	.	08/21/04	.	●			
GW-135-06	S3	.	.	08/21/04	.	●			
GW-135-11	S3	.	.	08/21/04	.	●			
GW-135-15	S3	.	.	08/21/04	.	●			
GW-135-19	S3	.	.	08/22/04	.	●			
GW-135-23	S3	.	.	08/22/04	.	●			
GW-135-26	S3	.	.	08/22/04	.	●			
GW-135-30	S3	.	.	08/22/04	.	●			
GW-135-34	S3	.	.	08/22/04	.	●			
GW-135-39	S3	.	.	**08/22/04 D**	.	●			
GW-225	OLF	02/17/04	.	07/29/04	.	●			
GW-226	OLF	02/17/04	.	07/28/04	.	●			
GW-229	OLF	02/11/04	.	07/28/04	.	●			
GW-229	OLF	02/12/04 **C**	.	07/29/04 **C**	.	●			
GW-236	S3	**03/08/04 D**	.	08/18/04	.	●			
GW-237	BG	03/03/04	.	09/20/04	.	●			
GW-246	S3	03/10/04	.	08/19/04	.	●			
GW-257	BG	03/03/04	.	08/16/04	.	●			
GW-276	S3	01/06/04	.	07/08/04	.	**x**		●	
GW-311	RS	02/18/04	.	08/02/04	.	●			
GW-315	SPI	02/18/04	.	08/02/04	.	●			
GW-363	EMWMF	03/15/04	06/08/04	09/08/04	11/18/04	**x**			☐
GW-526	S3	02/17/04	.	08/16/04	.	**x**			●
GW-537	OLF	02/23/04	.	08/03/04	.	●			
GW-615	S3	03/10/04	.	08/19/04	.	●			
GW-627	BG	02/25/04	.	08/04/04	.	●			

Table B.2 (continued)

BJC [1] / GWPP [2] Sampling Point [3]	Functional Area [4]	CY 2004 Sampling Date [5] 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	DOE Order Surveillance Monitoring	DOE Order Exit Pathway/Perimeter Monitoring	RCRA Post-Closure Corrective Action Monitoring	CERCLA ROD (●), Detection (□), and Baseline (○) Monitoring
GW-639	EMWMF	03/10/04	06/08/04	09/14/04	11/11/04	**x**			□
GW-653	BG	02/25/04	.	08/04/04	.	●			
GW-683	EXP-A	02/19/04	.	08/16/04	.	**x**			●
GW-684	EXP-A	02/19/04	.	08/16/04	.	**x**			●
GW-695	EXP-B	02/03/04	.	07/21/04	.	●			
GW-703	EXP-B	02/03/04	.	07/21/04	.	●			
GW-704	EXP-B	02/04/04	.	07/22/04	.	●			
GW-706	EXP-B	02/04/04	.	07/22/04	.	●			
GW-712	EXP-W	01/06/04	.	07/07/04	.		**x**	●	
GW-713	EXP-W	01/05/04	.	**07/07/04 D**	.		**x**	●	
GW-714	EXP-W	01/05/04	.	07/07/04	.		**x**	●	
GW-715	EXP-W	**01/05/04 D**	.	.	.		**x**	●	
GW-724	EXP-C	02/10/04	.	07/27/04	.	●			
GW-725	EXP-C	**02/11/04 D**	.	07/27/04	.	●			
GW-738	EXP-C	02/09/04	.	**07/26/04 D**	.	●			
GW-740	EXP-C	02/09/04	.	07/26/04	.	●			
GW-795	AGLLWSF	02/12/04	.	08/17/04	.	●			
GW-916	EMWMF	03/08/04	06/02/04	09/13/04	11/10/04	**x**			□
GW-917	EMWMF	03/09/04	06/03/04	09/07/04	11/04/04	**x**			□
GW-918	EMWMF	03/15/04	06/02/04	09/09/04	11/10/04	**x**			□
GW-920	EMWMF	03/11/04	06/01/04	09/02/04	11/09/04	**x**			□
GW-921	EMWMF	03/08/04	06/01/04	09/02/04	11/04/04	**x**			□
GW-922	EMWMF	03/10/04	06/02/04	09/09/04	11/15/04	**x**			□
GW-923	EMWMF	03/15/04	.	.	11/15/04 *****	**x**			□
GW-924	EMWMF	**03/11/04 D**	**06/07/04 D**	**09/07/04 D**	**11/17/04 D**	**x**			□
GW-925	EMWMF	03/09/04	06/01/04	09/01/04	11/08/04	**x**			□
GW-926	EMWMF	03/11/04	06/07/04	09/07/04	11/17/04	**x**			□
GW-927	EMWMF	03/09/04	06/03/04	09/07/04	11/16/04	**x**			□
NT-01	EXP-SW	01/27/04	.	**07/20/04 D**	.		●		
NT-01	EXP-SW	01/12/04	06/02/04	07/26/04	11/02/04		**x**		●
NT-03	EXP-SW	03/01/04	.	09/13/04	.		**x**		●
NT-04	EXP-SW	03/09/04	06/08/04	09/02/04	12/02/04		**x**		□
NT-07	EXP-SW	03/02/04	.	09/14/04	.		**x**		○
NT-08	EXP-SW	03/02/04	.	09/14/04	.		**x**		○
S07(NT-02)	EXP-SW	03/01/04	.	09/13/04	.		**x**		●

Table B.2 (continued)

BJC [1] / GWPP [2]									CERCLA ROD (●), Detection (□), and Baseline (○) Monitoring
								RCRA Post-Closure Corrective Action Monitoring	
							DOE Order Exit Pathway/Perimeter Monitoring		
						DOE Order Surveillance Monitoring			
Sampling Point [3]	Functional Area [4]	CY 2004 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
SS-1	EXP-SW	01/27/04	.	07/20/04	.		●		
SS-4	EXP-SW	01/27/04	.	07/20/04	.		●		
SS-5	EXP-SW	**01/27/04 D**	.	07/20/04	.		●		
SS-6	EXP-SW	03/02/04	.	.	.		**x**		●
SS-6	EXP-SW	.	.	07/07/04	.		**x**	●	
SS-6.6	EXP-SW	03/02/04	.	.	.		**x**		●

Notes:

1 Groundwater and surface water sampling performed for monitoring programs managed by Bechtel Jacobs Company LLC (BJC).

2 Groundwater and surface water sampling performed for the Y-12 Groundwater Protection Program (GWPP), managed by BWXT Y-12, L.L.C.

x - Denotes the DOE Order monitoring category (surveillance or exit pathway/perimeter) fulfilled by samples collected under programs managed by BJC. Although the CY 2004 samples were collected for various monitoring purposes, all of the data meet DOE Order monitoring requirements. Surveillance and exit pathway/perimeter monitoring data evaluations are provided in Section 4.

3
- BCK - Bear Creek Kilometer
- ET - East Tributary to Bear Creek (White Wing Scrap Yard)
- GW - Groundwater Monitoring Well
- NT - Northern Tributary (to Bear Creek)
- S07 - Surface water location in NT-2
- SS - Spring sampling location (south side of Bear Creek)

4
- AGLLWSF - Above Grade Low Level Waste Storage Facility
- BG - Bear Creek Burial Grounds Waste Management Area
- EMWMF - Environmental Management Waste Management Facility
- EXP-A - Exit Pathway (Maynardville Limestone) Picket A
- EXP-B - Exit Pathway Picket B
- EXP-C - Exit Pathway Picket C
- EXP-SW - Exit Pathway (Bear Creek) Surface Water
- EXP-W - Exit Pathway Picket W
- OLF - Oil Landfarm Waste Management Area
- RS - Rust Spoil Area
- S3 - S-3 Site
- SPI - Spoil Area I

5
- **.** - Not sampled
- **C** - Sample collected using the conventional sampling method
- **D** - Duplicate sample collected on specified date (shown in bold typeface)
- * - Samples collected on three consecutive days; low volume and slow recovery.

Table B.3. CY 2004 groundwater and surface water sampling dates in the Upper East Fork Poplar Creek Hydrogeologic Regime

BJC [1]									CERCLA ROD (●) and Baseline (○) Monitoring
								RCRA Post-Closure Corrective Action Monitoring	
GWPP [2]							DOE Order Exit Pathway/Perimeter Monitoring		
						DOE Order Surveillance Monitoring			
Sampling Point [3]	Functional Area [4]	CY 2004 Sampling Date [5] 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
55-1A	GRID B2	.	06/08/04	.	11/16/04	●			
55-2B	GRID B3	.	06/10/04	.	11/29/04	●			
55-6A	B9103	.	06/07/04	.	11/16/04	●			
56-2A	GRID C3	.	06/09/04	.	11/18/04	●			
56-2B	GRID C3	.	06/09/04	.	**11/18/04 D**	●			
59-1B	B9202	.	04/28/04	.	.	●			
9201-1K-22SU	EXP-SW	.	06/22/04	.	10/27/04		●		
9201-3C-4SP	EXP-SW	.	05/18/04	.	10/27/04		●		
GHK2.51ESW	EXP-SW	.	04/13/04	.	12/01/04		●		
GHK2.51WSW	EXP-SW	.	04/13/04	.	**12/01/04 D**		●		
GW-108	S3	01/07/04	.	07/08/04	.	**x**		●	
GW-151	NHP	02/12/04	.	08/10/04	.		**x**		●
GW-153	NHP	.	05/20/04	.	**11/01/04 D**	●			
GW-154	NHP	02/18/04	.	08/11/04	.	**x**			●
GW-169	EXP-UV	02/09/04	04/20/04	08/09/04	10/25/04	**x**			●
GW-170	EXP-UV	**02/09/04 D**	**04/20/04 D**	**08/09/04 D**	**10/25/04 D**	**x**			●
GW-171	EXP-UV	02/10/04	.	08/09/04	.	**x**			●
GW-172	EXP-UV	02/09/04	.	08/09/04	.	**x**			●
GW-193	T2331	01/08/04	.	07/13/04	.	**x**		●	
GW-204	T0134	.	05/03/04	.	**10/25/04 D**	●			
GW-207	EXP-SR	.	05/25/04	.	11/09/04		●		
GW-208	EXP-SR	.	05/25/04	.	11/09/04		●		
GW-219	UOV	.	04/26/04	.	11/11/04	●			
GW-220	NHP	.	05/27/04	.	11/15/04		●		
GW-222	NHP	.	**06/10/04 D**	.	11/30/04	●			
GW-223	NHP	02/18/04	.	08/10/04	.	**x**			●
GW-230	EXP-UV	02/10/04	.	08/09/04	.	**x**			●
GW-232	EXP-UV	02/09/04	04/20/04	08/09/04	10/25/04	**x**			●
GW-251	S2	.	**04/29/04 D**	.	10/21/04	●			
GW-281	FF	.	05/10/04	.	.	**x**			○
GW-380	NHP	.	04/29/04	.	.	●			
GW-380	NHP	02/18/04	.	08/11/04	.	**x**			●
GW-381	NHP	.	05/19/04	.	11/02/04	●			
GW-382	NHP	02/11/04	.	08/11/04	.	**x**			●
GW-383	NHP	.	05/20/04	.	11/03/04	●			

Table B.3 (continued)

BJC[1]						DOE Order Surveillance Monitoring	DOE Order Exit Pathway/Perimeter Monitoring	RCRA Post-Closure Corrective Action Monitoring	CERCLA ROD (●) and Baseline (○) Monitoring
GWPP[2]									
Sampling Point[3]	Functional Area[4]	CY 2004 Sampling Date[5] 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
GW-605	EXP-I	**01/07/04 D**	.	**07/12/04 D**	.	x		●	
GW-606	EXP-I	01/07/04	.	07/12/04	.	x		●	
GW-620	FTF	.	04/29/04	.	10/21/04	●			
GW-633	RG	.	05/05/04	.	10/26/04	●			
GW-658	FF	.	05/10/04	.	.	x			○
GW-691	CPT	.	06/09/04	.	11/17/04	●			
GW-692	CPT	.	06/08/04	.	11/17/04	●			
GW-698	B8110	.	05/18/04	.	11/02/04	●			
GW-698	B8110	.	05/19/04 **C**	.	11/03/04 **C**	●			
GW-722-06	EXP-J	02/22/04	.	08/07/04	.		●		
GW-722-06	EXP-J	.	06/14/04	.	10/25/04		x		●
GW-722-10	EXP-J	02/22/04	.	08/07/04	.		●		
GW-722-10	EXP-J	.	06/17/04	.	10/27/04		x		●
GW-722-14	EXP-J	02/23/04	.	08/07/04	.		●		
GW-722-14	EXP-J	.	06/24/04	.	10/28/04		x		●
GW-722-17	EXP-J	02/23/04	.	08/07/04	.		●		
GW-722-17	EXP-J	.	06/28/04	.	10/28/04		x		●
GW-722-20	EXP-J	02/23/04	.	08/07/04	.		●		
GW-722-20	EXP-J	.	06/24/04	.	10/27/04		x		●
GW-722-22	EXP-J	**02/23/04 D**	.	**08/07/04 D**	.		●		
GW-722-22	EXP-J	.	06/24/04	.	10/27/04		x		●
GW-722-26	EXP-J	02/22/04	.	08/07/04	.		●		
GW-722-26	EXP-J	.	**06/16/04 D**	.	**10/26/04 D**		x		●
GW-722-30	EXP-J	02/22/04	.	08/07/04	.		●		
GW-722-30	EXP-J	.	06/14/04	.	10/25/04		x		●
GW-722-32	EXP-J	02/22/04	.	08/07/04	.		●		
GW-722-32	EXP-J	.	06/16/04	.	10/26/04		x		●
GW-722-33	EXP-J	02/22/04	.	08/07/04	.		●		
GW-722-33	EXP-J	.	06/17/04	.	10/27/04		x		●
GW-733	EXP-J	01/08/04	.	07/08/04	.		x	●	
GW-735	EXP-J	.	05/27/04	.	**11/15/04 D**		●		
GW-744	GRIDK1	.	05/24/04	.	11/10/04		●		
GW-747	GRIDK2	.	**05/26/04 D**	.	11/10/04		●		
GW-750	EXP-J	.	05/26/04	.	11/15/04		●		
GW-760	GRID G2	.	04/27/04	.	.	●			

Table B.3 (continued)

BJC [1] / GWPP [2]		CY 2004 Sampling Date [5]				DOE Order Surveillance Monitoring	DOE Order Exit Pathway/Perimeter Monitoring	RCRA Post-Closure Corrective Action Monitoring	CERCLA ROD (●) and Baseline (○) Monitoring
Sampling Point [3]	**Functional Area [4]**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**				
GW-762	GRIDJ3	**02/11/04 D**	.	**08/05/04 D**	.	**x**			●
GW-763	GRIDJ3	.	05/17/04	.	11/01/04	●			
GW-765	GRID E1	.	04/27/04	.	.	●			
GW-769	GRIDG3	.	**05/17/04 D**	.	10/28/04	●			
GW-770	GRIDG3	.	**04/26/04 D**	.	10/28/04	●			
GW-775	GRIDH3	.	04/28/04	.	.	●			
GW-782	GRIDE3	.	05/05/04	.	10/26/04	●			
GW-783	GRIDE3	.	04/27/04	.	.	●			
GW-791	GRIDD2	.	05/03/04	.	10/25/04	●			
GW-802	FF	.	05/10/04	.	.	**x**			○
GW-816	EXP-SR	.	05/24/04	.	11/09/04		●		
GW-818	B9201-2	02/10/04	.	.	.	●			
GW-832	NHP	02/18/04	.	08/16/04	.		**x**		●
NPR07.0SW	EXP-SW	.	04/13/04	.	12/01/04		●		
NPR12.0SW	EXP-SW	.	04/13/04	.	12/01/04		●		
NPR23.0SW	EXP-SW	.	**04/13/04 D**	.	12/01/04		●		
OF 51	EXP-SW	03/15/04	.	08/18/04	.		**x**		○
OF 200	EXP-SW	02/12/04 **S**	.	07/27/04 **S**	.		**x**		○
SCR7.1SP	EXP-SW	02/02/04	.	07/19/04	.		**x**		●
SCR7.8SP	EXP-SW	02/02/04	.	07/19/04	.		**x**		●
SPR14.0SP	EXP-SW	02/19/04	.	.	.		●		
STATION 17	EXP-SW	02/12/04 **S**	.	07/27/04 **S**	.		**x**		○
STATION 8	EXP-SW	02/12/04 **S**	.	07/27/04 **S**	.		**x**		○

__Notes__:

1 Groundwater and surface water sampling performed for monitoring programs managed by Bechtel Jacobs Company LLC (BJC).

2 Groundwater and surface water sampling performed for the Y-12 Groundwater Protection Program (GWPP), managed by BWXT Y-12, L.L.C.

x - Denotes the DOE Order monitoring category (surveillance or exit pathway/perimeter) fulfilled by samples collected under programs managed by BJC. Although the CY 2004 samples were collected for various monitoring purposes, all of the data meet DOE Order monitoring requirements. Surveillance and exit pathway/perimeter monitoring data evaluations are provided in Section 4.

Table B.3 (continued)

Notes: (continued)

3	GHK	-	Gum Hollow Branch Kilometer (surface water sampling station)
	GW	-	Groundwater Monitoring Well (also locations beginning with numbers)
	NPR	-	North of Pine Ridge near the Scarboro Community (surface water sampling station)
	OF	-	Storm drain outfall (surface water sampling station)
	SCR	-	Spring sampling location in Union Valley (prefix)
	SP	-	Spring sampling location (suffix)
	STATION	-	Surface water sampling location in Upper East Fork Poplar Creek
	SW	-	Surface water sampling location (suffix)
4	B4	-	Beta-4 Security Pits
	B8110	-	Building 81-10
	B9103	-	Building 9103
	B9201-2	-	Building 9201-2
	B9202	-	Building 9202
	CPT	-	Coal Pile Trench
	EXP-I	-	Exit Pathway Picket I
	EXP-J	-	Exit Pathway Picket J
	EXP-SR	-	Along Scarboro Road in the gap through Pine Ridge
	EXP-SW	-	Surface water or spring sampling station
	EXP-UV	-	East of the Oak Ridge Reservation boundary in Union Valley
	FF	-	Fuel Facility (Building 9754-2)
	FTF	-	Fire Training Facility
	GRID	-	Comprehensive Groundwater Monitoring Plan Grid Location
	NHP	-	New Hope Pond
	RG	-	Rust Garage Area
	S2	-	S-2 Site
	S3	-	S-3 Site
	T0134	-	Tank 0134-U
	T2331	-	Tank 2331-U
	UOV	-	Uranium Oxide Vault
5	**.**	-	Not sampled.
	C	-	Conventional sampling method used (see Section 4.0)
	D	-	Duplicate sample collected on specified date (shown in bold typeface).
	S	-	Two sets of samples were collected during each sampling event at OF 200, STATION 8, and STATION 17: a stormflow sample on the date shown (within six hours after a 0.5-inch or more rainfall) and a baseflow sample collected later during the first quarter (03/15/04) and the third quarter (08/18/04).

Table B.4. CY 2004 groundwater and surface water sampling dates in the Chestnut Ridge Hydrogeologic Regime

BJC [1] / GWPP [2]		CY 2004 Sampling Date [5]				DOE Order Surveillance Monitoring	DOE Order Exit Pathway/Perimeter Monitoring	CERCLA ROD (●) and Baseline (○) Monitoring	RCRA Post-Closure Detection (●) and Corrective Action (○) Monitoring	Solid Waste Disposal Facility Detection Monitoring
Sampling Point [3]	Functional Area [4]	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter					
1090	UNCS	02/24/04	.	08/04/04	.	x		●		
GW-141	LIV	01/22/04	.	07/15/04	.	x				●
GW-143	KHQ	.	04/12/04	.	10/12/04	x			●	
GW-144	KHQ	.	04/12/04	.	10/12/04	x			●	
GW-145	KHQ	.	04/13/04	.	10/12/04	x			●	
GW-156	CRSDB	.	**04/13/04 D**	.	**10/14/04 D**	x			●	
GW-159	CRSDB	.	04/14/04	.	10/13/04	x			●	
GW-173	CRSP	.	**05/06/04 D**	.	10/04/04	●				
GW-175	CRSP	.	05/06/04	.	10/06/04	●				
GW-176	CRSP	.	05/10/04	.	10/07/04	●				
GW-177	CRSP	01/12/04	.	07/13/04	.	x			○	
GW-178	CRSP	.	05/10/04	.	10/06/04	●				
GW-179	CRSP	.	05/11/04	.	**10/07/04 D**	●				
GW-203	UNCS	02/25/04	.	08/03/04	.	x		●		
GW-205	UNCS	02/24/04	.	08/03/04	.	x		●		
GW-217	LIV	01/14/04	.	07/14/04	.	x				●
GW-221	UNCS	02/25/04	.	08/04/04	.	x		●		
GW-231	KHQ	.	**04/08/04 D**	.	**10/11/04 D**	x			●	
GW-300	CRBAWP	.	04/19/04	.	10/12/04	●				
GW-301	CRBAWP	**01/12/04 D**	.	**07/12/04 D**	.	x			○	
GW-305	LIV	01/14/04	05/03/04	07/14/04	10/26/04	x				●
GW-322	CRSP	.	05/13/04	.	10/11/04	●				
GW-513	FCAP	.	**04/20/04 D**	.	10/13/04	●				
GW-521	LIV	01/14/04	.	07/14/04	.	x				●
GW-522	LIV	01/14/04	.	07/14/04	.	x				●
GW-540	LII/CDLVI	01/22/04	.	07/21/04	.	x				●
GW-542	CDLVI	01/15/04	.	07/21/04	.	x				●
GW-543	CDLVI	01/21/04	.	07/21/04	.	x				●
GW-544	CDLVI	01/21/04	.	07/21/04	.	x				●
GW-557	LV	**01/13/04 D**	.	**07/20/04 D**	.	x				●
GW-560	CDLVII	01/21/04	.	07/19/04	.	x				●
GW-562	CDLVII	01/21/04	.	07/19/04	.	x				●
GW-564	CDLVII	**01/20/04 D**	.	**07/19/04 D**	.	x				●

Table B.4 (continued)

BJC[1] / GWPP[2] Sampling Point[3]	Functional Area[4]	CY 2004 Sampling Date[5] 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	DOE Order Surveillance Monitoring	DOE Order Exit Pathway/Perimeter Monitoring	CERCLA ROD (●) and Baseline (○) Monitoring	RCRA Post-Closure Detection (●) and Corrective Action (○) Monitoring	Solid Waste Disposal Facility Detection Monitoring
GW-610	CRSP	.	04/22/04	.	10/20/04	●				
GW-611	CRSP	.	04/22/04	.	**10/20/04 D**	●				
GW-612	CRSP	.	05/11/04	.	10/04/04	●				
GW-612	CRSP	.	05/12/04 **C**	.	10/05/04 **C**	●				
GW-679	FCAP	.	04/19/04	.	10/12/04	●				
GW-680	FCAP	.	06/07/04	.	10/13/04	●				
GW-709	LII	01/20/04	.	07/22/04	.	**x**				●
GW-731	CRSDB	.	04/14/04	.	10/13/04	**x**			●	
GW-732	CRSDB	.	04/08/04	.	10/14/04	**x**			●	
GW-742	CRSP	.	04/21/04	.	10/18/04	●				
GW-743	CRSP	.	04/21/04	.	10/18/04	●				
GW-757	LII	01/20/04	.	07/22/04	.	**x**				●
GW-796	LV	01/13/04	.	07/20/04	.	**x**				●
GW-797	LV	01/15/04	.	07/15/04	.	**x**				●
GW-798	CDLVII	01/12/04	.	07/20/04	.	**x**				●
GW-799	LV	01/15/04	.	07/19/04	.	**x**				●
GW-801	LV	01/13/04	.	07/15/04	.	**x**				●
GW-827	CDLVI	01/15/04	.	07/20/04	.	**x**				●
GW-831	FCAP	01/13/04	.	07/12/04	.	**x**			○	
MCK 2.0	FCAP	02/18/04	.	08/16/04	.		**x**	●		
MCK 2.05	FCAP	**02/18/04 D**	.	**08/16/04 D**	.		**x**	●		
S17	EXP-SW	01/29/04	.	07/19/04	.		●			
SCR1.25SP	EXP-SW	03/11/04	.	08/17/04	.		**x**	○		
SCR1.5SW	EXP-SW	01/29/04	.	**07/19/04 D**	.		●			
SCR2.1SP	EXP-SW	01/29/04	.	07/19/04	.		●			
SCR2.2SP	EXP-SW	01/29/04	.	07/19/04	.		●			
SCR3.5SP	EXP-SW	03/11/04	.	08/17/04	.		**x**	●		
SCR3.5SW	EXP-SW	**01/29/04 D**	.	07/19/04	.		●			
SCR4.3SP	EXP-SW	01/13/04	.	07/22/04	.		**x**			●

Table B.4 (continued)

Notes:

1 Groundwater and surface water sampling performed under monitoring programs managed by Bechtel Jacobs Company LLC (BJC).

2 Surface water sampling performed under the Y-12 Groundwater Protection Program (GWPP) managed by BWXT Y-12, L.L.C.

x	-	Denotes the DOE Order monitoring category (site surveillance or exit pathway/perimeter) fulfilled by samples collected under programs managed by BJC. Although the CY 2004 samples were collected for various monitoring purposes, all of the data meet DOE Order monitoring requirements. Surveillance and exit pathway/perimeter monitoring data evaluations are provided in Section 4.

3

GW	-	Groundwater monitoring well (also 1090)
MCK	-	McCoy Branch Kilometer
SCR	-	South Chestnut Ridge (tributary prefix)
SP	-	Spring sampling location (suffix)
SW	-	Surface water sampling location (suffix)

4

CDLVI	-	Construction/Demolition Landfill VI
CDLVII	-	Construction/Demolition Landfill VII
CRBAWP	-	Chestnut Ridge Borrow Area Waste Pile (formerly)
CRSDB	-	Chestnut Ridge Sediment Disposal Basin
CRSP	-	Chestnut Ridge Security Pits
EXP-SW	-	Exit Pathway (spring or surface water sampling location)
FCAP	-	Filled Coal Ash Pond
KHQ	-	Kerr Hollow Quarry
LII	-	Industrial Landfill II
LIV	-	Industrial Landfill IV
LV	-	Industrial Landfill V
UNCS	-	United Nuclear Corporation Site

5

.	-	Not Sampled.
C	-	Conventional sampling method used (see Section 4.0)
D	-	Duplicate sample collected on specified date (shown in bold typeface).

Table B.5. Field measurements and laboratory analytes for CY 2004 groundwater and surface water samples obtained by the Y-12 GWPP

Field Measurements	Analytical Method [1]	Reporting Limit [2]	Units [3]
Depth to Water	NA	NA	ft
Water Temperature	NA	NA	centigrade
pH	NA	NA	pH units
Conductivity	NA	NA	µmho/cm
Dissolved Oxygen	NA	NA	ppm
Oxidation-Reduction Potential	NA	NA	mV
Miscellaneous Laboratory Analytes			
Total Dissolved Solids	EPA-160.1	1	mg/L
Total Suspended Solids	EPA-160.2	1	mg/L
Turbidity	EPA-180.1	0.1	NTU
Additional Laboratory Analytes			
Heterotropic Aerobic Bacteria	Y/P65-4210	NA	cfu/ml
Iron Related Bacteria	Y/P65-4210	NA	cfu/ml
Slime Forming Bacteria	Y/P65-4210	NA	cfu/ml
Sulfate Reducing Bacteria	Y/P65-4210	NA	cfu/ml
Anions			
Alkalinity - HCO3	EPA-310.1	1.0	mg/L
Alkalinity - CO3	EPA-310.1	1.0	mg/L
Chloride	EPA-300.0	0.2	mg/L
Fluoride	EPA-340.2	0.1	mg/L
Nitrate (as Nitrogen)	EPA-300.0	0.028	mg/L
Nitrate/Nitrite (as Nitrogen)	EPA-353.2	0.05	mg/L
Sulfate	EPA-300.0	0.25	mg/L
Metals/Cations			
Aluminum	SW846-6010B	0.2	mg/L
Antimony	EPA-200.8	0.0025	mg/L
Arsenic	EPA-200.8	0.005	mg/L
Barium	SW846-6010B	0.004	mg/L
Beryllium	SW846-6010B	0.0005	mg/L
Boron	SW846-6010B	0.1	mg/L
Cadmium	EPA-200.8	0.0025	mg/L
Calcium	SW846-6010B	0.2	mg/L
Chromium	EPA-200.8	0.01	mg/L
Cobalt	SW846-6010B	0.02	mg/L
Copper	SW846-6010B	0.02	mg/L
Iron	SW846-6010B	0.05	mg/L
Lead	EPA-200.8	0.0005	mg/L
Lithium	SW846-6010B	0.01	mg/L
Magnesium	SW846-6010B	0.2	mg/L
Manganese	SW846-6010B	0.005	mg/L

Table B.5 (continued)

Metals/Cations (continued)	Analytical Method [1]	Reporting Limit [2]	Units [3]
Mercury	SW846-7470	0.0002	mg/L
Molybdenum	SW846-6010B	0.05	mg/L
Nickel	EPA-200.8	0.005	mg/L
Potassium	SW846-6010B	2	mg/L
Selenium	EPA-200.8	0.01	mg/L
Silver	SW846-6010B	0.02	mg/L
Sodium	SW846-6010B	0.2	mg/L
Strontium	SW846-6010B	0.005	mg/L
Thallium	EPA-200.8	0.0005	mg/L
Thorium	SW846-6010B	0.2	mg/L
Uranium	EPA-200.8	0.0005	mg/L
Vanadium	SW846-6010B	0.02	mg/L
Zinc	SW846-6010B	0.05	mg/L
Volatile Organic Compounds		**CRQL [4]**	
Acetone	SW846-8260B UP	10	µg/L
Acrolein	SW846-8260B UP	10	µg/L
Acrylonitrile	SW846-8260B UP	5	µg/L
Benzene	SW846-8260B UP	5	µg/L
Bromochloromethane	SW846-8260B UP	5	µg/L
Bromodichloromethane	SW846-8260B UP	5	µg/L
Bromoform	SW846-8260B UP	5	µg/L
Bromomethane	SW846-8260B UP	5	µg/L
2-Butanone	SW846-8260B UP	5	µg/L
Carbon disulfide	SW846-8260B UP	5	µg/L
Carbon tetrachloride	SW846-8260B UP	5	µg/L
Chlorobenzene	SW846-8260B UP	5	µg/L
Chloroethane	SW846-8260B UP	5	µg/L
2-Chloroethyl vinyl ether	SW846-8260B UP	10	µg/L
Chloroform	SW846-8260B UP	5	µg/L
Chloromethane	SW846-8260B UP	5	µg/L
Dibromochloromethane	SW846-8260B UP	5	µg/L
1,2-Dibromo-3-chloropropane	SW846-8260B UP	10	µg/L
1,2-Dibromoethane	SW846-8260B UP	5	µg/L
Dibromomethane	SW846-8260B UP	5	µg/L
1,2-Dichlorobenzene	SW846-8260B UP	5	µg/L
1,4-Dichlorobenzene	SW846-8260B UP	5	µg/L
1,4-Dichloro-2-butene	SW846-8260B UP	5	µg/L
trans-1,4-Dichloro-2-butene	SW846-8260B UP	5	µg/L
Dichlorodifluoromethane	SW846-8260B UP	5	µg/L
1,1-Dichloroethane	SW846-8260B UP	5	µg/L
1,2-Dichloroethane	SW846-8260B UP	5	µg/L
1,1-Dichloroethene	SW846-8260B UP	5	µg/L

Table B.5 (continued)

Volatile Organic Compounds (cont'd)	Analytical Method [1]	CRQL [4]	Units [3]
cis-1,2-Dichloroethene	SW846-8260B UP	5	µg/L
trans-1,2-Dichloroethene	SW846-8260B UP	5	µg/L
1,2-Dichloropropane	SW846-8260B UP	5	µg/L
cis-1,3-Dichloropropene	SW846-8260B UP	5	µg/L
trans-1,3-Dichloropropene	SW846-8260B UP	5	µg/L
Dimethylbenzene	SW846-8260B UP	5	µg/L
Ethanol	SW846-8260B UP	200	µg/L
Ethylbenzene	SW846-8260B UP	5	µg/L
Ethyl methacrylate	SW846-8260B UP	5	µg/L
2-Hexanone	SW846-8260B UP	5	µg/L
Iodomethane	SW846-8260B UP	5	µg/L
4-Methyl-2-pentanone	SW846-8260B UP	5	µg/L
Methylene chloride	SW846-8260B UP	5	µg/L
Styrene	SW846-8260B UP	5	µg/L
1,1,1,2-Tetrachloroethane	SW846-8260B UP	5	µg/L
1,1,2,2-Tetrachloroethane	SW846-8260B UP	5	µg/L
Tetrachloroethene	SW846-8260B UP	5	µg/L
Toluene	SW846-8260B UP	5	µg/L
1,1,1-Trichloroethane	SW846-8260B UP	5	µg/L
1,1,2-Trichloroethane	SW846-8260B UP	5	µg/L
Trichloroethene	SW846-8260B UP	5	µg/L
Trichlorofluoromethane	SW846-8260B UP	5	µg/L
1,1,2-Trichloro-1,2,2-trifluoroethane	SW846-8260B UP	5	µg/L
1,2,3-Trichloropropane	SW846-8260B UP	10	µg/L
Vinyl acetate	SW846-8260B UP	10	µg/L
Vinyl chloride	SW846-8260B UP	2	µg/L
Radiological Analytes		**Target MDA [5]**	
Gross Alpha Activity	EPA-900.0	3.5	pCi/L
Gross Beta Activity	EPA-900.0	7.0	pCi/L
Technetium-99	Y/P65-7060	10	pCi/L
Uranium-234, 235, & 238	Y/P65-7061	0.4	pCi/L

Table B.5 (continued)

Notes:

1 NA - not applicable

Analytical methods from:

- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (U.S. Environmental Protection Agency 1996)
- *Methods for Chemical Analysis of Water and Wastes* (U.S. Environmental Protection Agency 1983)
- BWXT Y-12 Analytical Chemistry Organization Control Procedures: (Y/P65-7060 and Y/P65-7061)

2 The lowest concentration reported.

NA - not applicable

3 cfu/ml - colony forming units per milliliter
ft - feet
µg/L - micrograms per liter
µmho/cm - micromhos per centimeter
mg/L - milligrams per liter
mV - millivolts
NTU - nephelometric turbidity units
ppm - parts per million
pCi/L - picoCuries per liter

4 CRQL - contract-required quantitation limit; estimated values are reported below this level and above the instrument detection limit. Results below the instrument detection limit are reported as not detected at the CRQL.

5 MDA - minimum detectable activity. The target MDA may be obtained under optimal analytical conditions; actual MDAs are sample-specific and, in some cases, may vary significantly from the target value.

Table B.6. Depth-to-water measurements and groundwater elevations in the Bear Creek Hydrogeologic Regime, September 2004

Well Number	Location [1]	Hydrogeologic Unit		Measuring Point [2]	Date Measured	Depth to Water [3]	Groundwater Elevation [4]
		Aquifer	Aquitard				
GW-001	OLF			981.00	09/14/04	17.92	963.08
GW-008	OLF			965.39	09/14/04	15.74	949.65
GW-010	OLF			952.70	09/14/04	2.42	950.28
GW-012	OLF			955.57	09/14/04	7.18	948.39
GW-013	OLF			965.14	09/14/04	7.21	957.93
GW-014	BG			934.50	09/08/04	Dry	.
GW-016	BG			928.81	09/08/04	11.73	917.08
GW-018	BG			924.49	09/08/04	9.92	914.57
GW-041	BG			1008.10	09/07/04	13.83	994.27
GW-045	BG	●		910.29	09/07/04	Dry	.
GW-046	BG			921.17	09/08/04	4.27	916.9
GW-047	BG			929.00	09/07/04	9.33	919.67
GW-052	BG	●		905.70	09/07/04	17.91	887.79
GW-053	BG			903.42	09/07/04	10.98	892.44
GW-065	OLF			982.50	09/10/04	27.73	954.77
GW-080	BG			981.00	09/08/04	22.87	958.13
GW-084	OLF			997.18	09/14/04	15.5	981.68
GW-086	OLF			982.80	09/14/04	13.99	968.81
GW-090	BG			961.88	09/07/04	7.34	954.54
GW-091	BG			952.62	09/07/04	9.15	943.47
GW-097	OLF			945.41	09/14/04	10.79	934.62
GW-100	S3			987.40	09/14/04	5.02	982.38
GW-101	S3			1008.00	09/09/04	9.26	998.74
GW-115	S3			1055.01	09/08/04	10.97	1044.04
GW-127	S3			1005.90	09/08/04	12.28	993.62
GW-236	S3			983.21	09/08/04	10.73	972.48
GW-242	BG			978.69	09/08/04	5.78	972.91
GW-245	S3			1009.08	09/09/04	14.12	994.96
GW-249	BG			991.15	09/07/04	Dry	.
GW-257	BG			961.68	09/08/04	29.98	931.7
GW-276	S3			1001.57	09/08/04	4.77	996.8
GW-287	BG			927.04	09/08/04	8.23	918.81
GW-289	BG			948.73	09/08/04	13.37	935.36
GW-291	BG			948.66	09/08/04	8.08	940.58
GW-307	RS			993.14	09/10/04	32.33	960.81
GW-309	RS			988.17	09/10/04	20.37	967.8
GW-310	RS			995.35	09/10/04	21.21	974.14
GW-316	SPI			1047.17	09/08/04	58.91	988.26
GW-323	SPI			1130.11	09/10/04	86.03	1044.08

Table B.6 (continued)

Well Number	Location[1]	Hydrogeologic Unit		Measuring Point[2]	Date Measured	Depth to Water[3]	Groundwater Elevation[4]
		Aquifer	Aquitard				
GW-325	S3			1003.00	09/08/04	17.14	985.86
GW-345	S3			999.63	09/08/04	19.48	980.15
GW-347	S3	●		1001.25	09/10/04	16.72	984.53
GW-370	BG			960.81	09/08/04	14.92	945.89
GW-372	BG			983.16	09/08/04	25.88	957.28
GW-531	LD			1004.61	09/14/04	17.37	987.24
GW-537	OLF			976.65	09/14/04	7.19	969.46
GW-613	S3			1013.58	09/08/04	14.16	999.42
GW-621	EXP-B			925.45	09/14/04	15.46	909.99
GW-622	BG			924.16	09/14/04	10.79	913.37
GW-624	BG			922.15	09/07/04	12.22	909.93
GW-630	LD			986.65	09/14/04	9.83	976.82
GW-638	OLF			941.77	09/14/04	7.3	934.47
GW-641	BG			946.66	09/14/04	20.04	926.62
GW-642	BG			1014.95	09/07/04	22.38	992.57
GW-645	OLF	●		1006.40	09/08/04	79.53	926.87
GW-648	RS	●		1029.20	09/10/04	69.62	959.58
GW-652	BG	●		900.83	09/08/04	10.56	890.27
GW-653	BG			931.84	09/08/04	24.71	907.13
GW-654	BG			940.79	09/14/04	8.27	932.52
GW-795	AGLLWSF			926.18	09/08/04	3.46	922.72
GW-835	S3			1000.91	09/14/04	15.08	985.83
GW-916	EMWMF			1002.85	09/13/04	5.7	997.15
GW-917	EMWMF			997.10	09/07/04	22.69	974.41
GW-918	EMWMF			1067.96	09/09/04	5.5	1062.46
GW-923	EMWMF			1016.73	09/13/04	Dry	.
GW-924	EMWMF			968.90	09/07/04	11.87	957.03

Notes:

1 AGLLWSF - Above Grade Low-Level Waste Storage Facility
BG - Bear Creek Burial Grounds Waste Management Area
EMWMF - Environmental Management Waste Management Facility
EXP-B - Exit Pathway (Maynardville Limestone) Picket B
LD - Lysimeter Demonstration Site
OLF - Oil Landfarm Waste Management Area
RS - Rust Spoil Area
SPI - Spoil Area I
S3 - S-3 Site

Table B.6 (continued)

Notes: (continued)

2 The measuring point is the surveyed elevation of a mark on either the top of the innermost well casing or the top of dedicated sampling equipment, in feet above mean sea level.

3 The depth to water is in feet below the measuring point; recorded as “Dry” if no measurable water was encountered.

4 The groundwater elevation (measuring point ! depth to water) is in feet above mean sea level.

Table B.7. Depth-to-water measurements and groundwater elevations in the Upper East Fork Poplar Creek Hydrogeologic Regime, September 2004

Well Number	Location [1]	Hydrogeologic Unit		Measuring Point [2]	Date Measured	Depth to Water [3]	Groundwater Elevation [4]
		Aquifer	Aquitard				
55-1A	Y12			986.67	09/15/04	10.91	975.76
55-3A	Y12			972.46	09/15/04	11.51	960.95
55-6A	Y12			989.04	09/15/04	10.33	978.71
56-1A	Y12			969.25	09/15/04	7.88	961.37
56-2A	Y12			963.30	09/15/04	8.81	954.49
56-8A	Y12			962.46	09/15/04	19.99	942.47
60-1A	Y12			929.66	09/13/04	12.69	916.97
GW-105	S3			1018.20	09/08/04	6.97	1011.23
GW-108	S3			999.00	09/08/04	6.83	992.17
GW-115	S3			1055.01	09/08/04	10.97	1044.04
GW-148	NHP			908.22	09/10/04	8.46	899.76
GW-152	NHP			921.18	09/09/04	19.92	901.26
GW-154	NHP			911.70	09/13/04	9.23	902.47
GW-167	EXP			931.95	09/09/04	Dry	.
GW-169	EXP-UV			932.12	09/14/04	31.52	900.60
GW-192	B4			1008.83	09/15/04	5.93	1002.90
GW-193	T2331			934.17	09/15/04	8.90	925.27
GW-195	B4			1002.90	09/15/04	6.92	995.98
GW-199	GRIDI1			961.08	09/13/04	17.09	943.99
GW-202	RDS			968.02	09/13/04	9.59	958.43
GW-204	T0134			958.74	09/15/04	9.11	949.63
GW-219	UOV			935.83	09/13/04	9.83	926.00
GW-253	S2			1004.24	09/13/04	16.93	987.31
GW-255	S2			1027.13	09/13/04	39.57	987.56
GW-261	SY			1049.99	09/13/04	17.65	1032.34
GW-263	SY			1057.73	09/13/04	29.09	1028.64
GW-334	WC			983.73	09/15/04	11.46	972.27
GW-335	WC			981.88	09/15/04	9.73	972.15
GW-380	NHP			913.75	09/14/04	10.93	902.82
GW-383	NHP			908.77	09/10/04	9.18	899.59
GW-617	EXP-E			985.28	09/15/04	13.84	971.44
GW-619	FTF			1015.42	09/14/04	25.79	989.63
GW-686	CPT			963.76	09/15/04	13.12	950.64
GW-691	CPT			968.59	09/15/04	12.17	956.42
GW-699	B8110			971.14	09/13/04	16.10	955.04
GW-746	GRIDK1			907.07	09/13/04	4.57	902.50
GW-749	GRIDK2			921.34	09/09/04	4.41	916.93
GW-752	GRIDJ3			912.78	09/09/04	3.40	909.38
GW-754	GRIDJ2			928.78	09/09/04	9.25	919.53

Table B.7 (continued)

Well Number	Location [1]	Hydrogeologic Unit		Measuring Point [2]	Date Measured	Depth to Water [3]	Groundwater Elevation [4]
		Aquifer	Aquitard				
GW-756	GRIDJ1			928.11	09/09/04	4.87	923.24
GW-759	GRIDG1			994.01	09/13/04	17.52	976.49
GW-761	GRIDG2			968.23	09/13/04	10.41	957.82
GW-763	GRIDJ3			915.03	09/13/04	9.39	905.64
GW-765	GRIDE1			1008.74	09/13/04	19.37	989.37
GW-767	GRIDI2			948.54	09/13/04	11.61	936.93
GW-770	GRIDG3			944.72	09/13/04	13.56	931.16
GW-774	GRIDH2			963.16	09/13/04	13.86	949.30
GW-776	GRIDH3			931.25	09/13/04	12.91	918.34
GW-780	GRIDF2			963.40	09/13/04	13.41	949.99
GW-783	GRIDE3			948.49	09/13/04	10.52	937.97
GW-787	GRIDE2			987.85	09/13/04	15.52	972.33
GW-792	GRIDD2			992.74	09/15/04	25.31	967.43
GW-816	EXP-SR			898.42	09/09/04	12.01	886.41
GW-817	GRIDK3			918.30	09/09/04	7.05	911.25

Notes:

1 B4 - Beta-4 Security Pits
B8110 - Building 81-10
CPT - Coal Pile Trench
EXP - Exit Pathway (Maynardville Limestone) monitoring well
- -E, -I, or -J: Maynardville Limestone Picket
- -UV: Offsite in Union Valley
- -SR: Along Scarboro Road in the gap through Pine Ridge

FTF - Fire Training Facility
GRID - Comprehensive Groundwater Monitoring Plan Grid Location
NHP - New Hope Pond
RDS - Ravine Disposal Site
S2 - S-2 Site
S3 - S-3 Ponds Site
SY - Y-12 Plant Salvage Yard
T0134 - Tank 0134-U
T2331 - Tank 2331-U
UOV - Uranium Oxide Vault
WC - Waste Coolant Processing Area
Y12 - Y-12 Complex

3 The measuring point is the surveyed elevation of a mark on either the top of the innermost well casing or the top of dedicated sampling equipment, in feet above mean sea level.

4 The depth to water is in feet below the measuring point.

5 The groundwater elevation (measuring point ! depth to water) is in feet above mean sea level.

Table B.8. Depth-to-water measurements and groundwater elevations in the Chestnut Ridge Hydrogeologic Regime, September 2004

Well Number	Location [1]	Measuring Point [2]	Date Measured	Depth to Water [3]	Groundwater Elevation [4]
1082	ORSF	837.28	09/10/04	25.39	811.89
1084	ORSF	965.40	09/10/04	63.29	902.11
1090	UNCS	1104.48	09/13/04	57.82	1046.66
GW-141	LIV	1186.23	09/16/04	98.05	1088.18
GW-142	KHQ	971.15	09/09/04	139.08	832.07
GW-144	KHQ	913.54	09/09/04	82.11	831.43
GW-145	KHQ	840.24	09/09/04	8.20	832.04
GW-156	CRSDB	1049.28	09/10/04	143.53	905.75
GW-159	CRSDB	1051.38	09/10/04	118.07	933.31
GW-160	CRBAWP	1093.09	09/09/04	140.41	952.68
GW-173	CRSP	1115.00	09/13/04	145.95	969.05
GW-174	CRSP	1116.66	09/13/04	115.89	1000.77
GW-175	CRSP	1084.19	09/13/04	122.96	961.23
GW-176	CRSP	1125.30	09/13/04	116.31	1008.99
GW-177	CRSP	1158.20	09/13/04	119.46	1038.74
GW-178	CRSP	1143.49	09/13/04	96.98	1046.51
GW-179	CRSP	1128.00	09/13/04	115.96	1012.04
GW-180	CRSP	1104.14	09/13/04	121.11	983.03
GW-184	RQ	927.63	09/09/04	110.57	817.06
GW-186	RQ	831.32	09/09/04	14.61	816.71
GW-188	RQ	837.09	09/09/04	20.37	816.72
GW-203	UNCS	1105.45	09/13/04	78.24	1027.21
GW-205	UNCS	1104.14	09/13/04	76.47	1027.67
GW-217	LIV	1177.03	09/14/04	115.43	1061.60
GW-221	UNCS	1106.16	09/13/04	78.89	1027.27
GW-231	KHQ	849.67	09/09/04	17.57	832.10
GW-241	CRSDB	982.84	09/09/04	51.41	931.43
GW-292	ECRWP	1073.00	09/13/04	114.80	958.20
GW-298	CRBAWP	1049.01	09/09/04	109.52	939.49
GW-299	CRBAWP	1053.86	09/09/04	100.10	953.76
GW-300	CRBAWP	1073.12	09/09/04	116.03	957.09
GW-301	CRBAWP	1086.55	09/09/04	135.39	951.16
GW-302	UNCS	1141.84	09/13/04	104.57	1037.27
GW-303	CRSDB	1007.16	09/10/04	88.04	919.12
GW-304	CRSDB	1045.49	09/10/04	117.02	928.47
GW-305	LIV	1183.72	09/10/04	114.10	1069.62
GW-322	CRSP	1134.71	09/13/04	160.80	973.91
GW-339	UNCS	1124.83	09/13/04	78.16	1046.67
GW-511	CRSP	1093.21	09/09/04	111.20	982.01
GW-512	FCAP	1001.54	09/09/04	26.71	974.83

Table B.8 (continued)

Well Number	Location[1]	Measuring Point[2]	Date Measured	Depth to Water[3]	Groundwater Elevation[4]
GW-521	LIV	1182.88	09/10/04	86.94	1095.94
GW-522	LIV	1175.48	09/10/04	107.52	1067.96
GW-539	LII	1093.20	09/10/04	109.72	983.48
GW-541	CDLVI	1058.60	09/10/04	63.43	995.17
GW-542	CDLVI	1051.81	09/10/04	71.03	980.78
GW-543	CDLVI	1024.01	09/10/04	65.31	958.70
GW-544	CDLVI	1045.19	09/10/04	59.97	985.22
GW-546	CDLVI	1072.21	09/14/04	85.04	987.17
GW-557	LV	1081.36	09/09/04	122.12	959.24
GW-558	SSCR	981.42	09/09/04	50.72	930.70
GW-559	SSCR	1102.79	09/14/04	138.70	964.09
GW-560	CDLVII	949.05	09/09/04	44.20	904.85
GW-562	CDLVII	934.69	09/09/04	7.30	927.39
GW-564	CDLVII	938.07	09/09/04	11.16	926.91
GW-608	CRSP	1074.75	09/09/04	137.32	937.43
GW-609	CRSP	1112.31	09/13/04	167.60	944.71
GW-610	CRSP	1059.44	09/13/04	88.41	971.03
GW-611	CRSP	1048.38	09/13/04	106.66	941.72
GW-612	CRSP	1131.03	09/13/04	126.71	1004.32
GW-674	FCAP	883.79	09/09/04	9.10	874.69
GW-676	FCAP	846.50	09/09/04	4.68	841.82
GW-677	FCAP	1030.40	09/09/04	37.31	993.09
GW-678	FCAP	1000.70	09/09/04	23.11	977.59
GW-679	FCAP	1026.90	09/09/04	54.03	972.87
GW-680	FCAP	1001.50	09/09/04	29.08	972.42
GW-709	LII	906.81	09/10/04	29.68	877.13
GW-731	CRSDB	1049.29	09/10/04	125.20	924.09
GW-732	CRSDB	1064.29	09/10/04	157.89	906.40
GW-743	CRSP	1100.36	09/09/04	133.29	967.07
GW-757	LII	961.64	09/10/04	84.62	877.02
GW-796	LV	1052.62	09/09/04	82.19	970.43
GW-797	LV	1060.00	09/09/04	75.52	984.48
GW-798	CDLVII	1006.00	09/09/04	77.84	928.16
GW-799	LV	981.29	09/14/04	17.67	963.62
GW-801	LV	1097.16	09/14/04	113.26	983.90
GW-827	CDLVI	1051.60	09/10/04	41.67	1009.93
GW-831	FCAP	1091.29	09/13/04	127.78	963.51

Table B.8 (continued)

<u>Notes</u>:

1

CDLVI	-	Construction/Demolition Landfill VI
CDLVII	-	Construction/Demolition Landfill VII
CRBAWP	-	Chestnut Ridge Borrow Area Waste Pile
CRSDB	-	Chestnut Ridge Sediment Disposal Basin
CRSP	-	Chestnut Ridge Security Pits
ECRWP	-	East Chestnut Ridge Waste Pile
FCAP	-	Filled Coal Ash Pond
KHQ	-	Kerr Hollow Quarry
LII	-	Industrial Landfill II
LIV	-	Industrial Landfill IV
LV	-	Industrial Landfill V
ORSF	-	Oak Ridge Sludge Farm
RQ	-	Rogers Quarry
SSCR	-	South Side Chestnut Ridge
UNCS	-	United Nuclear Corporation Site

2 The measuring point is the surveyed elevation of a mark on either the top of the innermost well casing or the top of dedicated sampling equipment, in feet above mean sea level.

3 The depth to water is in feet below the measuring point.

4 The groundwater elevation (measuring point − depth to water) is in feet above mean sea level.

Table B.9 Concentration trends for the principal contaminants detected at CY 2004 sampling locations in the Bear Creek Hydrogeologic Regime

CY 2004 Sampling Location[1]	Hydro. Unit[2]		Contaminant Type and Long-Term Trend[3] (○ = indeterminate, [= increasing, – = decreasing)							
			Inorganics[4]		VOCs[5]				Radioactivity[6]	
	AQT	AQF	NO3	U	Ethenes	Ethanes	Methanes	Petrol.	Alpha	Beta
BCK-00.63	.	.	.	.	.	.	.	.	.	.
BCK-03.30	.	.	.	.	NA	NA	NA	NA	NA	.
BCK-04.55	.	.	.	○	.	.	.	.	○	.
BCK-07.87	.	.	.	–	NA	NA	NA	NA	NA	.
BCK-09.20	.	.	○	–	○	.	.	.	NA	.
BCK-09.47	.	.	[	–	○			.	NA	[
BCK-11.54	.	.	○	○	.	.	.	.	NA	○
BCK-11.84	.	.	–	–	.	.	.	.	NA	–
BCK-12.34	.	.	NA	○	NA	NA	NA	NA	NA	NA
BCK-12.47	.	.	NA	○	NA	NA	NA	NA	NA	NA
EMWNT-03A	.	.	NA	NA	.	NA	.	.	NA	NA
EMWNT-05	.	.	NA	NA	.	NA	.	.	NA	NA
EMW-VWEIR	.	.	NA	NA	.	NA	.	.	NA	NA
GW-008	●		.	.	○	○	.	.	.	.
GW-046	●		.	.	○	○	○	○	.	.
GW-052		●	.	○	.	.	.	.	–	.
GW-056		●	NA	.	NA	NA	NA	NA	NA	NA
GW-071	●		.	.	○	[	[	.	.	.
GW-077	●		NA	.	.	.	.	.	NA	NA
GW-078	●		NA	.	.	.	.	.	NA	NA
GW-079	●		NA	.	.	.	.	.	NA	NA
GW-080	●		NA	.	.	.	.	.	NA	NA
GW-082	●		.	.	[	[	.	.	.	.
GW-085	●		○	.	.	.	.	.	.	[
GW-098	●		.	.	○	.	.	.	.	.
GW-100		●	–	.	.	.	.	.	.	.
GW-101	●		–	.	.	.	.	.	.	.
GW-115	●		.	.	.	.	.	.	.	.
GW-133-01	●		.	.	.	.	.	.	.	.
GW-133-05	●		.	.	.	.	.	.	.	.
GW-133-08	●		.	.	.	.	.	.	.	.
GW-133-10	●		.	.	.	.	.	.	.	.
GW-133-14	●		.	.	.	.	.	○	.	.
GW-133-17	●		.	.	.	.	.	.	.	.
GW-133-21	●		.	.	.	.	.	.	.	.
GW-133-24	●		.	.	.	.	.	.	.	.
GW-134-05	●		○	.	.	.	.	.	.	.
GW-134-11	●		○	.	.	.	.	.	.	.
GW-134-15	●		○	.	.	.	.	.	.	.

Table B.9 (continued)

CY 2004 Sampling Location [1]	Hydro. Unit [2]		Contaminant Type and Long-Term Trend [3] (○ = indeterminate, [= increasing, – = decreasing)							
			Inorganics [4]		VOCs [5]				Radioactivity [6]	
	AQT	AQF	NO3	U	Ethenes	Ethanes	Methanes	Petrol.	Alpha	Beta
GW-134-18	●		○	.	.	.	.	.	.	.
GW-134-21	●		○	.	.	.	.	.	.	.
GW-134-25	●		.	.	.	.	.	.	.	.
GW-134-29	●		.	.	.	.	.	.	.	.
GW-134-33		●	○	.	○	.	.	.	.	○
GW-134-35		●	○	.	○	.	.	.	.	○
GW-134-36		●	○	.	.	.	.	.	.	○
GW-135-03		●	.	.	.	.	.	○	.	.
GW-135-06		●	.	.	.	.	.	○	.	.
GW-135-11		●	.	.	.	.	.	○	.	.
GW-135-15		●	.	.	.	.	.	.	.	.
GW-135-19		●	.	.	.	.	.	.	.	.
GW-135-23		●	.	.	.	.	.	○	.	.
GW-135-26		●	.	.	.	.	.	○	.	.
GW-135-30		●	.	.	.	.	.	.	.	.
GW-135-34		●	.	.	.	.	.	.	.	.
GW-135-39		●	.	.	.	.	.	.	.	.
GW-225		●	–	.	○	.	○	.	.	.
GW-226		●	○	○	○	.	○	.	.	.
GW-229		●	.	[	[	○	.	○	[	[
GW-236		●	–	.	.	.	.	.	.	–
GW-237		●	.	.	.	.	.	.	.	.
GW-246	●		○	○	[	.	[	.	○	○
GW-257	●		.	.	○	.	.	.	.	.
GW-276	●		–	–	–	.	.	.	–	–
GW-311		●	.	.	–	.	.	.	.	.
GW-315		●	.	.	–	.	.	.	.	.
GW-363	●		NA	NA	.	NA	.	.	NA	NA
GW-526	●		[	.	.	.	.	.	○	.
GW-537	●		○	.	.	.	.	.	.	[
GW-615	●		○	[	.	.	○	.	.	○
GW-627	●		.	.	[	[	.	.	.	.
GW-639	●		NA	NA	.	NA	.	.	NA	NA
GW-653	●		.	.	[	.	.	.	.	.
GW-683		●	.	.	.	.	.	.	.	.
GW-684		●	.	.	.	.	.	.	.	.
GW-695		●	[	.	[	.	.	.	.	.
GW-703		●	○	.	–	.	.	.	.	[
GW-704		●	–	.	–	.	.	.	.	[
GW-706		●	–	○	○	.	.	.	○	○

Table B.9 (continued)

CY 2004 Sampling Location [1]	Hydro. Unit [2]		Contaminant Type and Long-Term Trend [3] (○ = indeterminate, [= increasing, – = decreasing)							
	AQT	AQF	Inorganics [4]		VOCs [5]				Radioactivity [6]	
			NO3	U	Ethenes	Ethanes	Methanes	Petrol.	Alpha	Beta
GW-712		●	.	.	.	.	.	.	.	.
GW-713		●	.	.	.	.	.	.	.	.
GW-714		●	.	.	.	.	.	.	.	.
GW-715		●	.	.	.	.	.	.	.	.
GW-724		●	–	.	○	.	.	.	.	.
GW-725		●	○	.	–	.	.	.	.	.
GW-738		●	.	.	–	.	.	.	.	.
GW-740		●	.	.	○	.	.	.	.	.
GW-795	●		.	.	.	.	.	.	.	.
GW-916	●		NA	NA	.	NA	.	.	NA	NA
GW-917	●		NA	NA	.	NA	.	.	NA	NA
GW-918	●		NA	NA	.	NA	.	.	NA	NA
GW-920	●		NA	NA	.	NA	.	.	NA	NA
GW-921	●		NA	NA	.	NA	.	.	NA	NA
GW-922	●		NA	NA	.	NA	.	.	NA	NA
GW-923	●		NA	NA	.	NA	.	.	NA	NA
GW-924	●		NA	NA	.	NA	.	.	NA	NA
GW-925	●		NA	NA	.	NA	.	.	NA	NA
GW-926	●		NA	NA	.	NA	.	.	NA	NA
GW-927	●		NA	NA	.	NA	.	.	NA	NA
NT-01	.	.	[	○	[	.	.	.	○	[
NT-03	.	.	.	NA	.	.	.	.	NA	NA
NT-04	.	.	NA	NA	.	NA	.	.	NA	NA
NT-07	.	.	.	.	–	–	.	.	NA	NA
NT-08	.	.	.	–	–	○	.	.	NA	NA
S07 (NT-2)	.	.	○	NA	NA	NA	NA	NA	NA	NA
SS-1	.	.	○	.	.	.	.	.	○	.
SS-4	.	.	○	○	[	.	.	.	○	○
SS-5	.	.	.	○	.	.	.	.	○	.
SS-6	.	.	.	.	.	.	.	.	.	.
SS-6.6	.	.	.	.	.	.	.	.	.	.

Notes:

1 The exit pathway/perimeter monitoring locations are in bold typeface.

2 Hydrostratigraphic Unit

AQF - Monitored interval in the formations comprising the aquifer
AQT - Monitoring interval in the formations comprising the aquitard

Table B.9 (continued)

Notes: (continued)

3 Trend types were interpreted from data tables or plots of concentration changes over time.

.	-	Not a contaminant (criteria defined below, in notes 4, 5, and 6).
NA	-	Not analyzed
○	-	Indeterminate trend: insufficient data, fairly stable trend, affected by sampling methods or highly fluctuating with no clear upward or downward trend.
–	-	Generally decreasing trend.
[	-	Generally increasing tend.

4 CY 2004 nitrate (NO3) concentration greater than or equal to 10 mg/L.
Total uranium (U) concentration greater than or equal to 0.03 mg/L.

5 Summed CY 2004 concentration of a VOC group (see below) greater than or equal to 5 µg/L.

Ethenes = Summed chloroethenes (PCE, TCE, 12DCE, 11DCE, 11DCE, vinyl chloride)
Ethanes = Summed chloroethanes (111TCA, 11DCA, chloroethane)
Methanes = Summed chloromethanes (carbon tetrachloride, chloroform, methylene chloride)
Petrol. = Summed petroleum hydrocarbons (benzene, toluene, ethylbenzene, xylene)

6 Maximum CY 2004 gross alpha activity greater than or equal to 15 pCi/L.
Maximum CY 2004 gross beta activity greater than or equal to 50 pCi/L.

Table B.10 Concentration trends for the principal contaminants detected at CY 2004 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime

CY 2004 Sampling Location[1]	Hydro. Unit[2]		Contaminant Type and Long-Term Trend[3] (○ = indeterminate, [= increasing, – = decreasing)							
			Inorganics[4]		VOCs[5]				Radioactivity[6]	
	AQT	AQF	NO3	U	Ethenes	Ethanes	Methanes	Petrol.	Alpha	Beta
55-1A	●		○	.	.	.	.	.	.	.
55-2B	●		[	.	[, –	–	.	.	.	.
55-6A	●		.	.	.	.	.	.	.	.
56-2A	●		.	.	–	.	.	.	.	.
56-2B	●		.	.	[	.	.	.	.	.
59-1B	●		NA	.	NA	NA	NA	NA	NA	NA
9201-1K-22SU	.	.	.	.	○	.	○	.	.	.
9201-3C-4SP	.	.	.	.	○	.	○	.	.	.
GHK2.51ESW	.	.	.	.	.	.	.	.	.	.
GHK2.51WSW	.	.	.	.	.	.	.	.	.	.
GW-108	●		–	.	○	.	○	.	○	[
GW-151		●	.	.	[	.	[	.	.	.
GW-153		●	.	.	.	.	–	.	.	.
GW-154		●	.	○	.	.	.	.	[	–
GW-169		●	.	NA	.	.	.	.	.	.
GW-170		●	.	NA	.	.	–	.	.	.
GW-171		●	NA	NA	.	.	.	.	NA	NA
GW-172		●	NA	NA	.	.	.	.	NA	NA
GW-193		●	.	.	.	.	.	–	.	.
GW-204	●		.	–	.	.	.	.	○	.
GW-207	●		.	.	.	.	.	.	.	.
GW-208	●		.	.	.	.	.	.	.	.
GW-219		●	.	○	.	.	.	.	○	○
GW-220		●	.	.	[	.	[	.	.	.
GW-222		●	.	○	○	.	.	.	○	.
GW-223		●	.	[	–	.	.	.	[	.
GW-230		●	NA	NA	○	.	.	.	NA	NA
GW-232		●	.	NA	.	.	.	.	.	.
GW-251		●	–	.	○	.	○	.	.	.
GW-281	●		NA	NA	.	.	.	.	NA	NA
GW-380		●	.	.	.	.	.	.	.	.
GW-381		●	.	.	○	.	–	.	.	.
GW-382		●	.	.	–	.	–	.	.	.
GW-383	●		.	.	[	.	.	.	.	.
GW-605		●	.	○	○, [	.	○	.	○	.
GW-606		●	.	.	○	.	–	.	.	.
GW-620		●	.	.	–	.	.	.	.	.
GW-633	●		–	.	○, [	.	○	○, [	.	–
GW-658	●		NA	NA	.	○	.	○	NA	NA

Table B.10 (continued)

CY 2004 Sampling Location[1]	Hydro. Unit[2]		Contaminant Type and Long-Term Trend[3] (○ = indeterminate, [= increasing, – = decreasing)							
			Inorganics[4]		VOCs[5]				Radioactivity[6]	
	AQT	AQF	NO3	U	Ethenes	Ethanes	Methanes	Petrol.	Alpha	Beta
GW-691		●	.	.	○	.	.	.	.	.
GW-692		●	.	.	○	.	○	.	.	.
GW-698		●	○	.	○	.	○	.	.	.
GW-722-06		●	.	.	.	.	.	.	.	.
GW-722-10		●	.	.	.	.	.	.	.	.
GW-722-14		●	.	.	–	.	–	.	.	.
GW-722-17		●	.	.	–	.	–	.	.	.
GW-722-20		●	.	.	–	.	–	.	.	.
GW-722-22		●	.	.	–	.	–	.	.	.
GW-722-26		●	.	.	.	.	.	○	.	.
GW-722-30		●	.	.	.	.	.	.	.	Q
GW-722-32		●	.	.	.	.	.	.	.	.
GW-722-33		●	.	.	.	.	.	.	.	.
GW-733		●	.	.	.	.	–	.	.	.
GW-735		●	.	.	.	.	.	.	.	.
GW-744	●		.	.	.	.	.	.	.	.
GW-747	●		.	.	.	.	.	.	.	.
GW-750	●		.	.	.	.	.	.	.	.
GW-760	●		NA	.	NA	NA	NA	NA	NA	NA
GW-762	●		.	.	[	○	.	.	.	.
GW-763	●		.	.	○	.	.	.	.	.
GW-765	●		NA	.	NA	NA	NA	NA	NA	NA
GW-769	●		.	.	[	.	[	.	.	.
GW-770	●		.	.	.	.	[	.	.	.
GW-775	●		NA	.	NA	NA	NA	NA	NA	NA
GW-782	●		.	.	○	○	.	.	○	.
GW-783	●		NA	.	NA	NA	NA	NA	NA	NA
GW-791	●		.	.	○	.	.	.	.	.
GW-802	●		NA	NA	.	.	.	.	NA	NA
GW-816	●		.	.	.	.	.	.	.	.
GW-818		●	.	.	.	.	.	.	.	.
GW-832		●	.	.	○	.	–,○	.	.	.
NPR07.0SW	.	.	.	.	.	.	.	.	.	.
NPR12.0SW	.	.	.	.	.	.	.	.	.	.
NPR23.0SW	.	.	.	.	.	.	.	.	.	.
OF 51	.	.	.	.	○	.	○	.	.	.
OF 200	.	.	NA	○	NA	NA	NA	NA	NA	NA

Table B.10 (continued)

CY 2004 Sampling Location[1]	Hydro. Unit[2]		Contaminant Type and Long-Term Trend[3] (○ = indeterminate, [= increasing, − = decreasing)							
			Inorganics[4]		VOCs[5]				Radioactivity[6]	
	AQT	AQF	NO3	U	Ethenes	Ethanes	Methanes	Petrol.	Alpha	Beta
SCR7.1SP	.	.	NA	NA	.	.	.	.	NA	NA
SCR7.8SP	.	.	NA	NA	.	.	.	.	NA	NA
SPR14.0SP	.	.	.	.	.	.	.	.	.	.
STATION 17	.	.	NA	.	NA	NA	NA	NA	NA	NA
STATION 8	.	.	NA	.	NA	NA	NA	NA	.	.

Notes:

1 The exit pathway/perimeter monitoring locations are in bold typeface.

2 Hydrostratigraphic Unit

AQF - Monitored interval in the formations comprising the aquifer
AQT - Monitored interval in the formations comprising the aquitard

3 Trend types were interpreted from data tables or plots of concentration changes over time.

. - Not a contaminant (criteria defined below, in notes 4, 5, and 6).
NA - Not analyzed
Q - Elevated concentration, unsupported by other samples from the location (suspect data)
○ - Indeterminate trend: insufficient data, fairly stable trend, affected by sampling methods or highly fluctuating with no clear upward or downward trend.
− - Generally decreasing trend.
[- Generally increasing tend.

4 CY 2004 nitrate (NO3) concentration greater than or equal to 10 mg/L.
Total uranium (U) concentration greater than or equal to 0.03 mg/L.

5 Summed CY 2004 concentration of a solvent group (see below) greater than or equal to 5 µg/L.

Ethenes = Summed chloroethenes (PCE, TCE, 12DCE, 11DCE, 11DCE, vinyl chloride)
Ethanes = Summed chloroethanes (111TCA, 11DCA, chloroethane)
Methanes = Summed chloromethanes (carbon tetrachloride, chloroform, methylene chloride)
Petrol. = Summed petroleum hydrocarbons (benzene, ethylbenzene, toluene, and total xylene)

Note that individual compounds have different long-term concentration trends at wells GW-605, GW-633, and GW-832.

6 Maximum CY 2004 gross alpha activity greater than or equal to 15 pCi/L.
Maximum CY 2004 gross beta activity greater than or equal to 50 pCi/L.

Table B.11 Concentration trends for contaminants detected at CY 2004 sampling locations in the Chestnut Ridge Hydrogeologic Regime

CY 2004 Sampling Location[1]	Contaminant Type and Long-Term Trend[2] (○ = indeterminate, [= increasing, − = decreasing)					
	VOCs[3]				Radioactivity[4]	
	Ethenes	Ethanes	Methanes	Freons	Alpha	Beta
1090	NA	NA	NA	.	.	.
GW-141	.	.	.	.	.	.
GW-143	.	.	.	.	.	.
GW-144	.	.	.	.	.	.
GW-145	.	.	.	.	.	.
GW-156	NA	NA	NA	NA	NA	NA
GW-159	NA	NA	NA	NA	NA	NA
GW-173	○	.	.	○	.	.
GW-175	−	−	.	○	.	.
GW-176	○	−	.	.	.	.
GW-177	[	−, ○	.	.	.	.
GW-178	○	−, [	.	.	.	.
GW-179	−	−	.	○	.	.
GW-203	NA	NA	NA	NA	.	.
GW-205	NA	NA	NA	NA	.	○
GW-217	.	.	.	.	.	.
GW-221	NA	NA	NA	NA	.	.
GW-231	.	.	.	.	.	.
GW-300	.	.	.	.	.	.
GW-301	.	.	.	.	.	.
GW-305	○	○	.	.	.	.
GW-322	○	−, [	.	○	.	.
GW-513	.	.	.	.	.	.
GW-521	.	.	.	.	.	.
GW-522	.	.	.	.	.	.
GW-540	.	.	.	.	.	.
GW-542	.	.	.	.	.	.
GW-543	.	.	.	.	.	.
GW-544	.	.	[	.	.	.
GW-557	.	.	.	.	.	.
GW-560	.	.	.	.	.	.
GW-562	.	.	.	.	.	.
GW-564	.	.	.	.	.	.
GW-610	.	.	.	.	.	.
GW-611	.	.	.	.	.	.
GW-612	−	−	.	○	.	.
GW-679	.	.	.	.	.	.
GW-680	.	.	.	.	.	.
GW-709	.	.	.	.	.	.

Table B.11 (continued)

CY 2004 Sampling Location[1]	Contaminant Type and Long-Term Trend[2] (○ = indeterminate, [= increasing, − = decreasing)					
	VOCs[3]				Radioactivity[4]	
	Ethenes	Ethanes	Methanes	Freons	Alpha	Beta
GW-731	NA	NA	NA	NA	NA	NA
GW-732	NA	NA	NA	NA	NA	NA
GW-742	.	.	.	.	.	.
GW-743	.	.	.	.	.	.
GW-757	.	.	.	.	.	.
GW-796	.	○	.	.	.	.
GW-797	.	.	.	.	.	.
GW-798	[	[	○	○	.	.
GW-799	.	.	.	.	.	.
GW-801	.	.	.	.	.	.
GW-827	.	.	.	.	.	.
GW-831	.	.	.	.	.	.
MCK 2.0	.	.	.	.	.	.
MCK 2.05	.	.	.	.	.	.
S17	.	.	.	.	.	.
SCR1.25SP	.	.	.	NA	.	.
SCR1.5SW	.	.	.	.	.	.
SCR2.1SP	.	.	.	.	.	.
SCR2.2SP	.	.	.	.	.	.
SCR3.5SP	.	.	.	NA	.	.
SCR3.5SW	.	.	.	.	.	.
SCR4.3SP	.	.	.	.	.	.

Notes:

1 The exit pathway/perimeter monitoring locations are in bold typeface.

2 Trend types were interpreted from data tables or plots of concentration changes over time.

. - Not a contaminant (criteria defined below, in notes 3 and 4).
NA - Not analyzed
○ - Indeterminate trend: fairly stable trend or insufficient data.
− - Generally decreasing trend.
[- Generally increasing tend.

Table B.11 (continued)

Notes: **(continued)**

3 Summed CY 2004 concentration of a solvent group (see below) greater than 0 µg/L (excluding trace levels of common laboratory reagents).

Ethenes = Summed chloroethenes (PCE, TCE, 12DCE, 11DCE, 11DCE, vinyl chloride)
Ethanes = Summed chloroethanes (111TCA, 11DCA, chloroethane)
Methanes = Summed chloromethanes (carbon tetrachloride, chloroform, methylene chloride)
Freons = Summed chlorofluorocarbons (1,1,2-trichloro-1,2,2-trifluoroethane and trichlorofluoromethane)

Note that individual compounds have different long-term concentration trends at wells GW-177, GW-178, and GW-322: the primary compounds (PCE and 111TCE) are decreasing or indeterminate and degradation products (11DCE and 11DCA) are increasing.

4 Maximum CY 2004 gross alpha activity greater than or equal to 15 pCi/L.
Maximum CY 2004 gross beta activity greater than or equal to 50 pCi/L.

APPENDIX C

MONITORING WELL CONSTRUCTION DETAILS

EXPLANATION

Hydrogeologic Regime:

BC	-	Bear Creek Hydrogeologic Regime
CR	-	Chestnut Ridge Hydrogeologic Regime
EF	-	Upper East Fork Poplar Creek Hydrogeologic Regime

Location:

AGLLWSF	-	Above Grade Low Level Waste Storage Facility
B8110	-	Building 81-10
B9103	-	Building 9103
B9201-2	-	Building 9201-2
B9202	-	Building 9202
BG	-	Bear Creek Burial Grounds WMA
CDLVI	-	Construction/Demolition Landfill VI
CDLVII	-	Construction/Demolition Landfill VII
CPT	-	Coal Pile Trench
CRBAWP	-	Chestnut Ridge Borrow Area Waste Pile (former site)
CRSDB	-	Chestnut Ridge Sediment Disposal Basin
CRSP	-	Chestnut Ridge Security Pits
EMWMF	-	Environmental Management Waste Management Facility
EXP	-	Exit Pathway Monitoring Location: Maynardville Limestone Picket (-A, -B, -C, -I, -J, and -W) Along Scarboro Road in the gap through Pine Ridge (-SR) East of Scarboro Road in Union Valley (-UV)
FCAP	-	Filled Coal Ash Pond
FF	-	Fuel Facility (Building 9754-2)
FTF	-	Fire Training Facility
GRID	-	Comprehensive Groundwater Monitoring Plan Grid Location
KHQ	-	Kerr Hollow Quarry
LII	-	Industrial Landfill II
LIV	-	Industrial Landfill IV
LV	-	Industrial Landfill V
NHP	-	New Hope Pond
OLF	-	Oil Landfarm WMA
RG	-	Rust Garage Area
RS	-	Rust Spoil Area
S2	-	S-2 Site
S3	-	S-3 Site
SPI	-	Spoil Area I
T0134	-	Tank 0134-U
T2331	-	Tank 2331-U, near Building 9201-1
UNCS	-	United Nuclear Corporation Site
UOV	-	Uranium Oxide Vault

EXPLANATION (continued)

General Information:

Depth	-	Feet below ground surface (rounded to nearest 0.1 ft)
Coordinates	-	Y-12 grid system (rounded to nearest foot)
Measuring Point	-	Top of well casing (TOC) or top of Well Wizard™ (TOWW)
Elevation	-	Feet above mean sea level (rounded to nearest 0.01 ft)
Tag Depth	-	Depth to the bottom of the well (feet below the TOC), taken from the CY 2003 comprehensive well inspection program
.	-	Not Applicable or not available

Geologic Information (regarding the monitored interval):

Hydrostratigraphic Unit:		
AQF	-	Aquifer (Maynardville Limestone and Knox Group)
AQT	-	Aquitard (other formations of the Conasauga Group)
Geologic Formation:		
Och	-	Chickamauga Group, undifferentiated
OCk	-	Knox Group, undifferentiated
Cc	-	Conasauga Group, undifferentiated
Cm	-	Maryville Limestone
Cn	-	Nolichucky Shale
Cmn	-	Maynardville Limestone
Cpv	-	Pumpkin Valley Shale
Crg	-	Rogersville Shale
Crt	-	Rutledge Limestone
Cr	-	Rome Formation
Aquifer Zone:		
BDR	-	Bedrock interval (monitored interval top is in fresh rock)
WT	-	Water table interval (monitored interval top is above fresh rock)
Depth	-	Feet below ground surface (rounded to nearest 0.1 ft)

Conductor (Surface) Casing and Well Casing:

Depth	-	Feet below ground surface (rounded to nearest 0.1 ft)
Diameter	-	Outside or inside dimensions, in inches
PVC40	-	Polyvinyl chloride, schedule 40
SS304	-	Stainless steel, schedule 304
STL	-	Carbon steel
STL/gal	-	Galvanized steel
SF25/SJ55	-	Steel; American Petroleum Institute Grade

EXPLANATION (continued)

Monitored Interval:

Top	-	Depth to top of filter pack or open-hole (feet below ground surface)
Bottom	-	Depth to bottom of filter pack or open-hole (feet below ground surface)
Screen Material:		
PVC/sl	-	PVC/slotted
PVC/sw	-	PVC, spiral wound
SS/ppk	-	Stainless steel prepack screen, spiral wound
SS/sl	-	Stainless steel, slotted
SS/sw	-	Stainless steel, spiral wound
Slot Size	-	size of screen openings, in inches

NOTE:

Data compiled from the *Updated Subsurface Data Base for Bear Creek Valley, Chestnut Ridge, and parts of Bethel Valley on the U.S. Department of Energy Oak Ridge Reservation* (BWXT 2003d).

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number Hydrogeologic Regime Functional Area	1090 CR UNCS	55-1A EF GRIDB2	55-2B EF GRIDB3	55-6A EF B9103	56-2A EF GRIDC3	56-2B EF GRIDC3	59-1B EF B9202	GW-008 BC OLF	GW-046 BC BG	GW-052 BC BG
General Information										
Date Installed	1982	09/09/83	.	.	.	.	09/11/83	09/21/83	10/27/83	11/02/83
Total Depth Drilled	96.7	19.3	27.6	12.9	15.1	38.8	36.9	25.5	20.5	19.5
East Coordinate	53,853	55,014	55,199	55,907	56,229	56,226	59,885	47,596	43,284	43,478
North Coordinate	28,718	30,470	30,085	30,667	29,881	29,884	29,835	29,783	29,562	29,052
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,104.48	986.91	977.42	989.29	963.53	962.28	945.94	965.39	921.17	905.70
Ground Surface Elevation	1,101.58	986.20	976.17	986.82	962.52	962.21	945.07	962.11	918.13	903.40
Tag Depth-(TOC)	98.02	19.22	27.69	12.77	15.03	38.63	36.80	26.69	23.85	22.04
Geologic Information										
Hydrostratigraphic Unit	AQF	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQF
Geologic Formation	OCk	Cn	Cn	Cm	Cn	Cn	Cn	Cn	Cn	Cmn
Aquifer Zone	WT	WT	WT	WT	WT	WT	WT	WT	WT	WT
Weathered Rock-Depth	.	5.0	10.0	.	.	.	.	0.6	7.7	.
Fresh Rock-Depth	.	.	.	.	.	.	.	.	.	.
Conductor Casing										
Casing Depth	.	.	.	.	.	.	.	.	.	.
Outside Diameter	.	.	.	.	.	.	.	.	.	.
Inside Diameter	.	.	.	.	.	.	.	.	.	.
Casing Material	.	.	.	.	.	.	.	.	.	.
Well Casing										
Borehole Depth	96.7	19.3	27.6	12.9	15.1	38.8	36.9	25.5	20.5	19.5
Borehole Diameter	8	6	6	6	6	6	6	4.5	6	6
Casing Depth	.	14.3	22.6	7.9	10.1	33.8	31.9	15.7	8.1	13.3
Outside Diameter	6.5	4.5	4.5	4.5	4.5	4.5	4.5	2.37	2.37	2.37
Inside Diameter	.	4	4	4	4	4	4	2	2	2
Casing Material	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	SS304	SS304	SS304
Monitored Interval										
Top-Depth	.	11.3	19.6	4.9	7.1	30.8	28.9	13.0	5.0	4.0
Midpoint-Depth	.	15.3	23.6	8.9	11.1	34.8	32.9	19.3	12.7	11.8
Pump Intake-Depth	84.8	16.3	25.0	9.5	12.0	35.8	33.6	17.7	12.0	17.2
Bottom of Screen-Depth	.	19.3	27.6	12.9	15.1	38.8	36.9	20.7	18.1	18.3
Bottom-Depth	96.7	19.3	27.6	12.9	15.1	38.8	36.9	25.5	20.3	19.5
Top-Elevation	.	974.90	956.57	981.92	955.42	931.41	916.17	949.11	913.13	899.40
Midpoint-Elevation	.	970.90	952.57	977.92	951.42	927.41	912.17	942.86	905.48	891.65
Pump Intake-Elevation	1016.78	969.91	951.22	977.29	950.53	926.45	911.44	944.39	906.17	886.20
Bottom-Elevation	1004.88	966.90	948.57	973.92	947.42	923.41	908.17	936.61	897.83	883.90
Screen Length	.	5	5	5	5	5	5	5	10	5
Screen Material	PVC/sl	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw
Slot Size	.	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	.	.	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number Hydrogeologic Regime Functional Area	GW-056 BC EXP-A	GW-071 BC BG	GW-077 BC BG	GW-078 BC BG	GW-079 BC BG	GW-080 BC BG	GW-082 BC BG	GW-085 BC OLF	GW-098 BC OLF	GW-100 BC S3
General Information										
Date Installed	03/27/84	03/25/84	03/29/84	03/30/84	03/23/84	03/24/84	03/17/84	03/22/84	09/21/84	09/12/84
Total Depth Drilled	55.2	220.6	100.5	21.1	65.0	30.0	35.0	62.0	104.0	20.7
East Coordinate	41,382	44,191	41,234	41,209	41,616	41,621	42,090	49,058	46,959	50,957
North Coordinate	28,708	29,495	29,729	29,730	30,630	30,622	30,434	30,003	29,452	29,759
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	891.67	928.90	919.30	918.10	981.20	981.00	964.00	983.57	945.95	987.40
Ground Surface Elevation	886.80	925.40	914.70	914.50	977.20	977.10	960.52	979.80	942.40	984.60
Tag Depth-(TOC)	59.21	218.40	104.10	23.40	64.70	33.00	38.45	62.34	105.65	17.87
Geologic Information										
Hydrostratigraphic Unit	AQF	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQF
Geologic Formation	Cmn	Cn	Cn	Cn	Crg	Crg	Cm	Cn	Cn	Cmn
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	WT	BDR	BDR	BDR	WT
Weathered Rock-Depth	.	5.5	7.0	6.5	4.0	3.5	7.0	2.0	1.0	14.0
Fresh Rock-Depth	6.4	16.0	13.0	8.5	26.5	23.5	23.0	40.0	7.5	.
Conductor Casing										
Casing Depth	32.0	16.0	35.0	.	.	.	25.0	.	20.0	0.3
Outside Diameter	4.5	10.63	4.5	.	.	.	6.5	.	10.63	7
Inside Diameter	4	10	4	.	.	.	.	.	10	.
Casing Material	PVC40	PVC40	STL	.	.	.	STL	.	PVC40	STL/gal
Well Casing										
Borehole Depth	55.2	220.6	100.5	21.1	65.0	30.0	35.0	62.0	104.0	20.7
Borehole Diameter	4	8.75	3.88	6.5	6.5	6.5	4	4	9	6.5
Casing Depth	53.2	198.4	90.3	16.1	59.9	24.7	29.4	53.8	82.4	10.2
Outside Diameter	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	4.5	2.37
Inside Diameter	2	2	2	2	2	2	2	2	4	2
Casing Material	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	PVC
Monitored Interval										
Top-Depth	50.4	195.1	87.4	11.7	49.9	20.8	24.1	48.4	76.6	3.8
Midpoint-Depth	52.8	207.1	93.9	16.4	57.4	25.3	29.3	53.6	90.3	12.3
Pump Intake-Depth	47.1	.	.	.	61.8	.	31.5	51.2	96.4	.
Bottom of Screen-Depth	55.2	219.0	100.3	21.1	64.9	29.7	34.4	58.8	103.4	14.2
Bottom-Depth	55.2	219.0	100.3	21.1	64.9	29.7	34.4	58.8	104.0	20.7
Top-Elevation	836.40	730.30	827.30	902.80	927.30	956.30	936.42	931.40	865.80	980.80
Midpoint-Elevation	834.00	718.35	820.85	898.10	919.80	951.85	931.27	926.20	852.10	972.35
Pump Intake-Elevation	839.67	.	.	.	915.40	.	929.00	928.57	845.95	.
Bottom-Elevation	831.60	706.40	814.40	893.40	912.30	947.40	926.12	921.00	838.40	963.90
Screen Length	2	20.6	10	5	5	5	5	5	21	4
Screen Material	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	PVC/sw
Slot Size	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	.	.	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number Hydrogeologic Regime Functional Area	GW-101 BC S3	GW-108 EF S3	GW-115 BC S3	GW-133 BC S3	GW-134 BC S3	GW-135 BC S3	GW-141 CR LIV	GW-143 CR KHQ	GW-144 CR KHQ	GW-145 CR KHQ
General Information										
Date Installed	09/12/84	09/26/84	11/01/84	03/25/90	03/12/90	03/14/90	09/04/87	10/24/85	10/24/85	10/14/85
Total Depth Drilled	17.5	58.6	53.0	599.0	842.0	1275.0	156.0	253.0	195.0	110.0
East Coordinate	51,844	53,207	52,685	52,637	52,533	53,053	52,463	63,522	63,502	63,266
North Coordinate	30,241	30,070	31,073	30,659	29,741	28,731	28,755	24,257	24,255	24,441
Measuring Point	TOWW	TOWW	TOWW	TOC	TOC	TOC	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,008.00	999.00	1,055.01	1,025.86	1,005.63	1,177.78	1,186.23	913.98	913.54	840.24
Ground Surface Elevation	1,005.10	995.80	1,051.92	1,022.60	1,002.50	1,175.40	1,183.45	911.04	910.48	837.29
Tag Depth-(TOC)	19.18	58.30	54.49	602.26	845.13	1277.38	158.81	252.70	194.34	113.49
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cn	Cn	Cm	Crt	Cm	Cn	OCk	OCk	Ock/Och	OCk
Aquifer Zone	WT	BDR	WT	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	14.0	4.0	20.0	.	.	.	.	.	.	.
Fresh Rock-Depth	17.5	.	.	.	.	.	57.0	18.0	40.0	12.0
Conductor Casing										
Casing Depth	2.7	20.7	.	20.0	30.0	55.0	65.0	20.0	40.0	12.0
Outside Diameter	7	10.63	.	10.75	10.75	10.75	10.75	10.63	12.5	12.5
Inside Diameter	.	10	.	.	.	.	10	9.87	11.75	11.75
Casing Material	STL/gal	PVC40	.	SF25	SF25	SF25	SF25	PVC40	PVC40	PVC40
Well Casing										
Borehole Depth	17.5	58.6	53.0	55.0	35.0	80.0	156.0	205.0	195.0	110.0
Borehole Diameter	6.5	9	.	9.87	9.87	9.87	10	10	11	11
Casing Depth	12.3	46.7	42.0	55.0	35.0	80.0	144.5	205.0	150.0	88.5
Outside Diameter	2.37	4.5	2.37	4.5	4.5	4.5	4.5	6.62	4.5	4.5
Inside Diameter	2	4	.	.	.	.	4	6.12	4	4
Casing Material	PVC	PVC40	SS304	SF25	SF25	SF25	SS304	SF25	PVC40	PVC40
Monitored Interval										
Top-Depth	10.1	41.0	37.6	55.0	35.0	80.0	141.0	205.0	148.0	86.0
Midpoint-Depth	13.8	49.8	45.3	327.0	438.5	677.5	148.5	229.0	171.5	98.0
Pump Intake-Depth	15.7	49.8	46.9	.	.	.	147.7	226.1	170.9	100.0
Bottom of Screen-Depth	16.3	55.7	52.0	.	.	.	155.2	.	190.0	108.5
Bottom-Depth	17.5	58.6	53.0	599.0	842.0	1275.0	156.0	253.0	195.0	110.0
Top-Elevation	995.00	954.80	1014.32	967.60	967.50	1095.40	1042.45	706.04	762.48	751.29
Midpoint-Elevation	991.30	946.00	1006.62	695.60	564.00	497.90	1034.95	682.04	738.98	739.29
Pump Intake-Elevation	989.40	946.00	1005.01	.	.	.	1035.73	684.98	739.54	737.24
Bottom-Elevation	987.60	937.20	998.92	423.60	160.50	-99.60	1027.45	658.04	715.48	727.29
Screen Length	4	9	10	.	.	.	10.7	.	40	20
Screen Material	PVC/sw	PVC/sl	SS/sw	.	.	.	SS/sw	.	PVC/sw	PVC/sw
Slot Size	0.01	0.01	0.01	.	.	.	0.01	.	0.01	0.01
Open-Hole Length	.	.	.	544	807	1195	.	48	.	.
Open-Hole Diameter	.	.	.	3.7	3.7	3.7	.	6	.	.

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Well Number Hydrogeologic Regime Functional Area	GW-151 EF NHP	GW-153 EF NHP	GW-154 EF NHP	GW-156 CR CRSDB	GW-159 CR CRSDB	GW-169 EF EXP-UV	GW-170 EF EXP-UV	GW-171 EF EXP-UV	GW-172 EF EXP-UV	GW-173 CR CRSP
General Information										
Date Installed	08/14/85	10/31/85	07/30/85	10/18/85	10/18/85	09/16/86	04/01/86	02/26/86	05/05/86	08/15/85
Total Depth Drilled	96.5	60.0	11.2	157.6	157.0	34.8	156.9	31.2	133.9	165.0
East Coordinate	64,232	63,728	63,346	64,020	63,496	66,854	66,843	69,654	69,579	59,472
North Coordinate	28,958	28,613	28,987	27,626	27,764	28,545	28,545	28,403	28,358	28,271
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	916.17	921.68	911.70	1,049.28	1,051.38	932.12	932.64	920.72	926.69	1,115.00
Ground Surface Elevation	913.06	918.53	908.60	1,046.94	1,048.79	929.95	930.70	918.55	922.85	1,112.97
Tag Depth-(TOC)	99.63	60.84	13.35	157.65	155.87	36.23	156.16	32.64	137.50	167.34
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cmn	Cmn	Cmn	OCk	OCk	Cmn	Cmn	Cmn	Cmn	OCk
Aquifer Zone	BDR	BDR	WT	BDR	BDR	WT	BDR	WT	BDR	BDR
Weathered Rock-Depth	.	.	11.2	84.0	.	.	.	.	15.0	73.0
Fresh Rock-Depth	12.0	14.0	.	93.0	100.0	.	30.0	.	19.0	105.0
Conductor Casing										
Casing Depth	12.0	29.0	.	94.0	123.0	.	30.0	.	35.0	73.1
Outside Diameter	12.5	10.63	.	10.75	10.75	.	8.63	.	8.63	10.75
Inside Diameter	11.75	9.88	.	10	10	.	.	.	.	10
Casing Material	PVC40	PVC40	.	SF25	SF25	.	PVC40	.	SF25	SF25
Well Casing										
Borehole Depth	96.5	60.0	11.2	157.0	157.0	42.0	104.0	31.2	105.0	165.0
Borehole Diameter	11	11	8	8.5	8.5	8	6.62	8	6.62	10
Casing Depth	86.0	49.5	5.7	147.0	147.0	29.7	104.0	26.8	105.0	155.0
Outside Diameter	4.5	4.5	4.5	4.5	4.5	2.37	4.38	2.37	4.38	4.5
Inside Diameter	4	4	4	4	4	2	4	2	4	4
Casing Material	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	STL	PVC40	STL	SS304
Monitored Interval										
Top-Depth	85.0	45.0	4.7	145.0	145.0	28.7	104.0	25.8	105.0	154.0
Midpoint-Depth	90.8	52.5	8.0	151.3	151.0	31.8	130.5	28.5	119.4	159.5
Pump Intake-Depth	90.8	52.9	8.4	150.7	148.4	.	124.1	.	123.2	163.0
Bottom of Screen-Depth	96.0	59.5	10.7	157.0	157.0	34.7	.	31.2	.	165.0
Bottom-Depth	96.5	60.0	11.2	157.6	157.0	34.8	156.9	31.2	133.8	165.0
Top-Elevation	828.06	873.53	903.90	901.94	903.79	901.25	826.70	892.75	817.85	958.97
Midpoint-Elevation	822.31	866.03	900.65	895.64	897.79	898.20	800.25	890.05	803.45	953.47
Pump Intake-Elevation	822.27	865.68	900.20	896.28	900.38	.	806.64	.	799.69	950.00
Bottom-Elevation	816.56	858.53	897.40	889.34	891.79	895.15	773.80	887.35	789.05	947.97
Screen Length	10	10	5	10	10	5	.	4.4	.	10
Screen Material	PVC/sw	PVC/sw	PVC/sw	PVC/sw	PVC/sw	PVC/sl	.	PVC/sl	.	SS/sw
Slot Size	0.01	0.01	0.01	0.01	0.01	0.01	.	0.01	.	0.01
Open-Hole Length	.	.	.	.	.	.	52.9	.	28.8	.
Open-Hole Diameter	.	.	.	.	.	.	3.88	.	3.63	.

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Well Number Hydrogeologic Regime Functional Area	GW-175 CR CRSP	GW-176 CR CRSP	GW-177 CR CRSP	GW-178 CR CRSP	GW-179 CR CRSP	GW-193 EF T2331	GW-203 CR UNCS	GW-204 EF T0134	GW-205 CR UNCS	GW-207 EF EXP-SR
General Information										
Date Installed	06/22/88	08/27/85	10/24/85	08/20/87	12/03/85	08/04/89	10/24/85	08/30/89	10/25/85	09/25/85
Total Depth Drilled	166.7	145.0	145.0	133.0	117.0	18.5	156.0	17.5	164.0	109.6
East Coordinate	58,686	58,450	57,497	57,808	58,569	59,536	54,190	57,411	54,008	64,023
North Coordinate	28,677	28,294	28,483	28,552	28,522	29,344	28,356	29,956	28,363	31,596
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOC
Measuring Point Elevation	1,084.00	1,125.30	1,158.20	1,143.49	1,128.00	934.17	1,105.45	958.74	1,104.14	899.40
Ground Surface Elevation	1,081.89	1,122.13	1,155.52	1,141.06	1,124.33	931.11	1,102.34	955.47	1,101.46	894.38
Tag Depth-(TOC)	169.49	147.33	150.69	134.68	122.50	21.17	157.61	20.23	165.13	114.73
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQT	AQF	AQT
Geologic Formation	OCk	OCk	OCk	OCk	OCk	Cmn	OCk	Cc	OCk	Cr
Aquifer Zone	BDR	BDR	BDR	BDR	WT	WT	BDR	WT	BDR	BDR
Weathered Rock-Depth	46.0	.	62.0	37.0	.	2.5	86.0	10.0	100.0	.
Fresh Rock-Depth	98.5	84.0	98.0	95.0	.	.	93.0	.	146.0	.
Conductor Casing										
Casing Depth	61.3	88.0	82.0	89.0	76.0	5.0	94.0	.	154.0	17.0
Outside Diameter	10.75	10.75	10.75	10.75	10.75	9.63	10.75	.	10.75	8.63
Inside Diameter	10	10	10	10	10	.	10	.	10	.
Casing Material	.	SF25	SF25	SF25	SF25	STL	SF25	.	SF25	PVC40
Well Casing										
Borehole Depth	166.7	145.0	145.0	133.0	117.0	18.5	156.0	17.5	164.0	100.0
Borehole Diameter	9.5	10	8	10	8	8	8.5	6	10	7.87
Casing Depth	150.6	135.0	133.0	122.0	107.0	8.2	146.0	7.3	154.0	100.0
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.38
Inside Diameter	4	4	4	4	4	4	4	4	4	4
Casing Material	SS304	SS304	PVC40	SS304	SS304	SS304	PVC40	SS304	PVC40	PVC40
Monitored Interval										
Top-Depth	148.3	134.0	130.0	117.5	106.0	5.5	144.0	6.5	152.0	100.0
Midpoint-Depth	157.5	139.5	137.5	125.3	111.5	12.0	150.0	11.9	158.0	104.8
Pump Intake-Depth	162.7	138.8	.	127.6	115.8	13.9	146.9	11.7	147.3	104.5
Bottom of Screen-Depth	166.4	145.0	143.0	132.0	117.0	18.5	156.0	17.3	164.0	.
Bottom-Depth	166.7	145.0	145.0	133.0	117.0	18.5	156.0	17.3	164.0	109.6
Top-Elevation	933.59	988.13	1025.52	1023.56	1018.33	925.61	958.34	948.97	949.46	794.38
Midpoint-Elevation	924.39	982.63	1018.02	1015.81	1012.83	919.14	952.34	943.57	943.46	789.58
Pump Intake-Elevation	919.19	983.30	.	1013.49	1008.50	917.17	955.45	943.74	954.14	789.90
Bottom-Elevation	915.19	977.13	1010.52	1008.06	1007.33	912.66	946.34	938.17	937.46	784.78
Screen Length	15.8	10	10	10	10	10.3	10	10	10	.
Screen Material	SS/sw	SS/sw	PVC/sl	SS/sw	SS/sw	SS/sw	PVC/sl	SS/sw	PVC/sl	.
Slot Size	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	.
Open-Hole Length	.	.	.	.	.	.	.	.	.	9.6
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	3.88

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Well Number Hydrogeologic Regime Functional Area	GW-208 EF EXP-SR	GW-217 CR LIV	GW-219 EF UOV	GW-220 EF NHP	GW-221 CR UNCS	GW-222 EF NHP	GW-223 EF NHP	GW-225 BC OLF	GW-226 BC OLF	GW-229 BC OLF
General Information										
Date Installed	05/14/86	08/13/87	07/30/87	08/22/85	10/24/85	08/24/85	08/21/85	10/08/85	10/14/85	10/30/85
Total Depth Drilled	412.8	180.0	11.3	45.2	158.0	25.0	90.5	200.0	55.0	55.0
East Coordinate	64,008	53,020	58,929	64,225	54,389	63,324	63,311	47,461	47,473	47,017
North Coordinate	31,613	28,758	29,163	28,949	28,359	28,954	28,938	29,155	29,156	29,256
Measuring Point	TOC	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	898.05	1,177.03	935.64	915.64	1,106.16	911.82	911.62	943.11	943.40	949.00
Ground Surface Elevation	894.55	1,174.29	931.27	912.74	1,103.36	908.82	908.97	940.21	940.56	945.71
Tag Depth-(TOC)	416.62	179.13	15.59	49.00	159.34	28.55	93.57	203.30	58.47	51.45
Geologic Information										
Hydrostratigraphic Unit	AQT	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cr	OCk	Cmn	Cmn	OCk	Cmn	Cmn	Cmn	Cmn	Cmn
Aquifer Zone	BDR	BDR	WT	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	.	55.0	.	.	36.0	.	.	.	.	.
Fresh Rock-Depth	12.0	75.0	.	11.0	90.0	10.0	10.0	25.0	26.0	30.0
Conductor Casing										
Casing Depth	24.0	81.7	.	13.0	92.0	11.0	11.0	32.0	30.0	37.0
Outside Diameter	8.63	10.75	.	12.5	6.63	12.5	12.5	10.75	10.75	10.75
Inside Diameter	.	10	.	11.75	.	11.75	11.75	10	10	10
Casing Material	PVC40	SF25	.	PVC40	SF25	PVC40	PVC40	STL	STL	STL
Well Casing										
Borehole Depth	404.0	180.0	11.3	45.2	158.0	25.0	90.5	150.0	45.0	40.0
Borehole Diameter	6.62	10	10	11	6	11	11	10	10	10
Casing Depth	404.0	166.8	5.7	34.7	148.0	19.5	80.0	150.0	45.0	40.0
Outside Diameter	4.38	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Inside Diameter	4	4	4	4	4	4	4	4	4	4
Casing Material	STL	SS304	SS304	PVC40	PVC40	PVC40	PVC40	STL	STL	STL
Monitored Interval										
Top-Depth	404.0	165.2	4.3	31.0	146.0	18.0	79.0	150.0	45.0	40.0
Midpoint-Depth	408.4	172.6	7.8	38.1	152.0	21.5	84.8	175.0	50.0	47.5
Pump Intake-Depth	407.0	172.1	8.9	41.1	149.2	23.0	84.4	190.1	49.8	44.7
Bottom of Screen-Depth	.	177.4	11.3	44.7	158.0	24.5	90.0	.	.	.
Bottom-Depth	412.8	180.0	11.3	45.2	158.0	25.0	90.5	200.0	55.0	55.0
Top-Elevation	490.55	1009.09	926.97	881.74	957.36	890.82	829.97	790.21	895.56	905.71
Midpoint-Elevation	486.15	1001.69	923.47	874.64	951.36	887.32	824.22	765.21	890.56	898.21
Pump Intake-Elevation	487.55	1002.23	922.33	871.64	954.16	885.82	824.62	750.11	890.77	901.00
Bottom-Elevation	481.75	994.29	919.97	867.54	945.36	883.82	818.47	740.21	885.56	890.71
Screen Length	.	10.6	5.6	10	10	5	10	.	.	.
Screen Material	.	SS/sw	SS/sw	PVC/sw	PVC/sw	PVC/sw	PVC/sw	.	.	.
Slot Size	.	0.01	0.01	0.01	0.01	0.01	0.01	.	.	.
Open-Hole Length	8.8	.	.	.	.	.	.	50	10	15
Open-Hole Diameter	3.63	.	.	.	.	.	.	4	4	4

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Well Number Hydrogeologic Regime Functional Area	GW-230 EF EXP-UV	GW-231 CR KHQ	GW-232 EF EXP-UV	GW-236 BC S3	GW-237 BC BG	GW-246 BC S3	GW-251 EF S2	GW-257 BC BG	GW-276 BC S3	GW-281 EF FF
General Information										
Date Installed	05/12/86	10/02/85	03/27/86	10/16/85	11/01/85	03/11/86	04/08/86	03/03/87	07/15/86	08/20/86
Total Depth Drilled	406.4	35.0	411.7	18.5	13.7	76.0	51.0	33.7	18.5	17.5
East Coordinate	69,617	63,410	66,863	50,453	44,125	52,098	53,843	43,230	52,557	61,907
North Coordinate	28,388	24,725	28,546	29,712	29,244	29,992	29,467	30,148	29,926	29,771
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOC
Measuring Point Elevation	923.11	849.67	931.39	983.21	921.02	1,009.19	1,003.80	961.68	1,001.57	946.10
Ground Surface Elevation	919.57	846.90	929.52	980.39	918.16	1,006.07	1,001.60	959.21	998.70	946.53
Tag Depth-(TOC)	409.48	37.70	412.88	21.14	17.26	76.50	50.04	36.63	21.34	14.85
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQT	AQF	AQT	AQT	AQT
Geologic Formation	Cmn	OCk	Cmn	Cmn	Cmn	Cn	Cmn	Cm	Cn	Cn
Aquifer Zone	BDR	BDR	BDR	WT	WT	WT	BDR	WT	WT	WT
Weathered Rock-Depth	19.0	.	.	9.0	9.0	26.0	32.5	.	18.5	17.5
Fresh Rock-Depth	38.0	10.5	.	18.5	.	.	.	33.7	.	.
Conductor Casing										
Casing Depth	31.0	11.0	33.0	.	.	27.0	.	.	.	.
Outside Diameter	8.63	10.63	8.63	.	.	12.5	.	.	.	.
Inside Diameter	.	10	.	.	.	12	.	.	.	.
Casing Material	STL	PVC40	PVC40	.	.	PVC40	.	.	.	.
Well Casing										
Borehole Depth	341.0	35.0	401.0	18.5	13.7	76.0	51.0	33.7	18.5	17.5
Borehole Diameter	5.5	11	6.62	8	8	11	8.25	9	8	6
Casing Depth	341.0	24.5	401.0	13.0	7.5	46.5	37.5	23.0	13.0	5.0
Outside Diameter	4.38	4.5	4.38	4.5	2.37	6.5	4.5	4.5	4.5	4.5
Inside Diameter	4	4	4	.	.	6	4	4	4	4
Casing Material	STL	PVC40	STL	PVC40	SS304	PVC40	PVC40	SS304	SS304	SS304
Monitored Interval										
Top-Depth	341.0	22.8	401.0	10.0	6.5	34.2	35.0	19.0	11.3	4.0
Midpoint-Depth	373.7	28.9	406.4	14.3	10.1	55.1	43.0	26.4	14.9	9.5
Pump Intake-Depth	383.5	28.7	404.1	15.7	13.6	59.4	42.8	33.0	14.1	.
Bottom of Screen-Depth	.	34.5	.	18.0	12.5	74.6	47.1	33.7	18.3	15.0
Bottom-Depth	406.4	35.0	411.7	18.5	13.7	76.0	51.0	33.7	18.5	15.0
Top-Elevation	578.57	824.10	528.52	970.39	911.66	971.87	966.60	940.21	987.40	942.53
Midpoint-Elevation	545.87	818.00	523.17	966.14	908.06	950.97	958.60	932.86	983.80	937.03
Pump Intake-Elevation	536.11	818.17	525.39	964.71	904.52	946.69	958.80	926.18	984.57	.
Bottom-Elevation	513.17	811.90	517.82	961.89	904.46	930.07	950.60	925.51	980.20	931.53
Screen Length	.	10	.	5	5	28.1	9.6	10.7	5.3	10
Screen Material	.	PVC/sw	.	PVC/sw	SS/sw	PVC/sw	PVC/sl	SS/sw	SS/sw	SS/sl
Slot Size	.	0.01	.	0.01	0.01	0.03	0.01	0.01	0.01	0.01
Open-Hole Length	65.4	.	10.7	.	.	.	.	.	.	.
Open-Hole Diameter	3.63	.	3.88	.	.	.	.	.	.	.

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Well Number Hydrogeologic Regime Functional Area	GW-300 CR CRBAWP	GW-301 CR CRBAWP	GW-305 CR LIV	GW-311 BC RS	GW-315 BC SPI	GW-322 CR CRSP	GW-363 BC EMWMF	GW-380 EF NHP	GW-381 EF NHP	GW-382 EF NHP
General Information										
Date Installed	07/17/87	07/02/87	08/25/87	07/15/87	09/25/87	09/02/87	03/16/88	08/19/88	04/25/88	04/11/88
Total Depth Drilled	147.0	182.0	179.6	40.3	104.0	193.0	75.0	15.5	60.4	173.0
East Coordinate	62,041	61,964	52,962	50,126	52,268	58,912	46,872	62,938	62,948	62,956
North Coordinate	27,487	27,662	28,548	29,267	29,455	28,241	29,961	28,714	28,715	28,716
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOC	TOC	TOC
Measuring Point Elevation	1,073.12	1,086.55	1,183.72	999.52	1,047.45	1,134.25	957.91	913.55	913.36	913.17
Ground Surface Elevation	1,070.69	1,083.94	1,181.07	996.43	1,044.84	1,131.81	955.41	913.66	913.44	913.16
Tag Depth-(TOC)	149.24	165.23	181.06	43.64	105.98	191.99	77.27	15.80	61.01	173.20
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQT	AQF	AQF	AQF
Geologic Formation	OCk	OCk	OCk	Cmn	Cmn	OCk	Cn	Cmn	Cmn	Cmn
Aquifer Zone	BDR	BDR	BDR	WT	BDR	BDR	BDR	WT	BDR	BDR
Weathered Rock-Depth	102.0	94.0	53.0	40.3	54.0	49.0	9.0	15.5	13.5	12.7
Fresh Rock-Depth	106.0	136.0	84.0	.	71.0	120.0	21.0	.	26.0	17.0
Conductor Casing										
Casing Depth	115.0	105.0	64.0	.	84.4	61.0	36.0	.	17.3	12.7
Outside Diameter	10.75	10.75	10.75	.	10.75	10.75	10.75	.	10.75	10.75
Inside Diameter	10	10	10	.	10	10	10	.	10	10
Casing Material	SF25	SF25	SF25	.	SF25	SF25	STL	.	STL	STL
Well Casing										
Borehole Depth	147.0	163.5	179.6	40.3	104.0	135.0	50.0	15.5	49.3	125.0
Borehole Diameter	10	10	10	10	10	10	9.5	10	9.5	9.5
Casing Depth	134.8	151.0	168.9	29.7	93.3	128.0	48.3	4.8	47.8	123.2
Outside Diameter	4.5	4.5	4.5	4.5	4.5	7	6.62	4.5	6.62	6.62
Inside Diameter	4	4	4	4	4	.	.	.	.	.
Casing Material	SS304	SS304	SS304	SS304	SS304	STL	SF25	SS304	SF25	SF25
Monitored Interval										
Top-Depth	132.0	148.5	165.3	25.6	90.0	128.0	50.0	2.8	49.3	125.0
Midpoint-Depth	139.5	156.0	172.5	33.0	97.0	160.5	62.5	9.2	54.9	149.0
Pump Intake-Depth	141.6	157.4	173.4	31.9	97.4	182.3	62.5	12.6	55.5	.
Bottom of Screen-Depth	145.4	161.0	179.6	40.3	103.3	.	.	15.2	.	.
Bottom-Depth	147.0	163.5	179.6	40.3	104.0	193.0	75.0	15.5	60.4	173.0
Top-Elevation	938.69	935.44	1015.77	970.83	954.84	1003.81	905.41	910.86	864.14	788.16
Midpoint-Elevation	931.19	927.94	1008.62	963.48	947.84	971.31	892.91	904.51	858.59	764.16
Pump Intake-Elevation	929.12	926.55	1007.62	964.52	947.45	949.48	892.91	901.05	857.96	.
Bottom-Elevation	923.69	920.44	1001.47	956.13	940.84	938.81	880.41	898.16	853.04	740.16
Screen Length	10.6	10	10.7	10.6	10	.	.	10.4	.	.
Screen Material	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	.	.	SS/sw	.	.
Slot Size	0.01	0.01	0.01	0.01	0.01	.	.	0.01	.	.
Open-Hole Length	.	.	.	.	.	65	25	.	11.1	48
Open-Hole Diameter	.	.	.	.	.	6	6	.	6.1	6.13

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number Hydrogeologic Regime Functional Area	GW-383 EF NHP	GW-513 CR FCAP	GW-521 CR LIV	GW-522 CR LIV	GW-526 BC S3	GW-537 BC OLF	GW-540 CR LII	GW-542 CR CDLVI	GW-543 CR CDLVI	GW-544 CR CDLVI
General Information										
Date Installed	04/04/88	03/30/88	09/14/88	09/20/88	06/13/88	09/14/88	06/02/89	05/18/89	06/02/89	05/30/89
Total Depth Drilled	24.1	125.3	136.0	195.5	123.0	24.5	171.5	77.5	94.0	110.0
East Coordinate	63,522	57,332	52,040	52,612	50,708	49,539	52,371	51,642	51,458	51,820
North Coordinate	29,201	27,607	28,541	28,377	30,033	30,057	27,489	27,466	27,072	26,963
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	908.77	1,001.41	1,182.88	1,175.48	998.25	976.65	1,072.31	1,051.81	1,024.01	1,045.19
Ground Surface Elevation	906.00	998.99	1,179.46	1,172.04	995.34	974.49	1,069.38	1,049.03	1,021.19	1,042.53
Tag Depth-(TOC)	26.54	127.53	136.70	197.10	123.80	27.35	173.83	79.09	96.24	111.80
Geologic Information										
Hydrostratigraphic Unit	AQT	AQF	AQF	AQF	AQT	AQT	AQF	AQF	AQF	AQF
Geologic Formation	Cn	OCk	OCk	OCk	Cn	Cn	OCk	OCk	OCk	OCk
Aquifer Zone	WT	BDR	BDR	BDR	BDR	WT	BDR	WT	BDR	BDR
Weathered Rock-Depth	11.5	67.0	.	85.0	3.5	14.9	110.0	.	16.0	47.0
Fresh Rock-Depth	.	97.0	54.0	130.0	23.6	.	150.0	.	37.0	52.5
Conductor Casing										
Casing Depth	5.0	98.0	60.5	90.0	23.6	.	154.0	.	29.3	54.5
Outside Diameter	10.75	10.75	10.75	10.75	10.75	.	10.75	.	10.75	10.75
Inside Diameter	10	10	10	10	10	.	10	.	10	10
Casing Material	STL	STL	STL	STL	STL	.	STL	.	STL	STL
Well Casing										
Borehole Depth	24.1	125.3	136.0	195.5	101.0	24.5	171.5	76.5	93.6	109.3
Borehole Diameter	8.75	9.5	9.5	9.5	9.5	8.75	9.25	9.25	9.25	9.25
Casing Depth	18.1	114.8	124.9	184.6	99.7	8.0	161.2	60.8	78.0	93.4
Outside Diameter	4.5	4.5	4.5	4.5	6.62	4.5	4.5	4.5	4.5	4.5
Inside Diameter	4	4	4	4	.	4	4	4	4	4
Casing Material	SS304	SS304	SS304	SS304	SF25	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	16.6	111.0	123.2	183.0	101.0	4.8	158.5	59.0	76.2	91.0
Midpoint-Depth	20.1	118.2	129.6	189.2	112.0	14.1	165.0	67.8	84.9	100.2
Pump Intake-Depth	20.5	120.1	129.0	187.6	112.1	22.8	166.1	68.7	85.6	100.8
Bottom of Screen-Depth	23.1	124.8	135.2	195.0	.	23.0	171.5	76.5	93.6	109.3
Bottom-Depth	23.6	125.3	136.0	195.3	123.0	23.3	171.5	76.5	93.6	109.3
Top-Elevation	889.40	887.99	1056.26	989.04	894.34	969.69	910.88	990.03	944.99	951.53
Midpoint-Elevation	885.90	880.84	1049.86	982.89	883.34	960.44	904.38	981.28	936.29	942.38
Pump Intake-Elevation	885.47	878.91	1050.48	984.48	883.25	951.65	903.31	980.31	935.61	941.69
Bottom-Elevation	882.40	873.69	1043.46	976.74	872.34	951.19	897.88	972.53	927.59	933.23
Screen Length	5	10	10.3	10.4	.	15	10.3	15.7	15.6	15.9
Screen Material	SS/sw	SS/sw	SS/sw	SS/sw	.	SS/sw	SS/sl	SS/sl	SS/sl	SS/sl
Slot Size	0.01	0.01	0.01	0.01	.	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	.	.	.	.	22	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	6.1	.	.	.	.	.

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Well Number Hydrogeologic Regime Functional Area	GW-557 CR LV	GW-560 CR CDLVII	GW-562 CR CDLVII	GW-564 CR CDLVII	GW-605 EF EXP-I	GW-606 EF EXP-I	GW-610 CR CRSP	GW-611 CR CRSP	GW-612 CR CRSP	GW-615 BC S3
General Information										
Date Installed	12/02/88	12/30/88	01/13/89	01/27/89	03/19/91	03/20/91	01/02/90	01/19/90	11/01/89	02/13/90
Total Depth Drilled	139.0	117.0	133.0	88.0	40.5	175.0	117.4	121.6	254.0	245.0
East Coordinate	59,520	60,743	61,640	59,865	62,002	61,951	59,472	58,059	58,504	52,224
North Coordinate	26,450	25,692	26,276	25,873	28,707	28,708	28,549	28,856	28,371	30,009
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,081.36	949.05	934.69	938.07	919.06	919.59	1,059.44	1,048.38	1,131.03	1,017.55
Ground Surface Elevation	1,078.63	945.76	931.86	935.12	916.97	916.98	1,056.78	1,045.43	1,128.65	1,014.17
Tag Depth-(TOC)	136.07	82.90	61.24	78.74	42.00	174.36	120.21	120.26	256.28	246.84
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQT
Geologic Formation	OCk	OCk	OCk	OCk	Cmn	Cmn	OCk	OCk	OCk	Cn
Aquifer Zone	WT	WT	WT	WT	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	113.8	92.0	.	.	.	.	39.0	30.0	78.0	15.0
Fresh Rock-Depth	134.0	.	52.0	72.0	9.5	10.8	50.0	63.8	125.0	40.0
Conductor Casing										
Casing Depth	85.0	.	.	.	9.5	64.7	84.0	75.0	136.9	84.5
Outside Diameter	10.75	.	.	.	11.75	7	10.75	10.75	11.75	11.75
Inside Diameter	10	.	.	.	11	6.4	10	10	11	11
Casing Material	STL	.	.	.	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55
Well Casing										
Borehole Depth	138.0	117.0	60.0	81.0	40.5	175.0	117.4	121.6	235.0	222.5
Borehole Diameter	9.5	9.5	9.5	9.5	10.6	9.63	9.5	9.5	10.63	10.63
Casing Depth	115.8	49.0	38.0	55.3	29.7	161.0	107.1	107.0	230.6	221.2
Outside Diameter	4.5	4.5	4.5	4.5	4.25	4.25	4.5	4.5	7	7
Inside Diameter	4	4	4	4	4	4	4.25	4.25	6.54	6.54
Casing Material	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SF25	SF25
Monitored Interval										
Top-Depth	112.9	45.2	36.0	52.0	28.2	155.0	105.1	101.5	230.6	222.5
Midpoint-Depth	125.5	57.1	48.0	66.5	34.1	163.0	111.3	111.6	242.3	233.8
Pump Intake-Depth	123.6	59.4	48.2	65.5	33.9	166.4	112.3	112.0	247.6	68.6
Bottom of Screen-Depth	135.8	69.0	58.0	75.3	39.7	171.0	117.4	117.0	.	.
Bottom-Depth	138.0	69.0	60.0	81.0	39.9	171.0	117.4	121.6	254.0	245.0
Top-Elevation	965.73	900.56	895.86	883.12	888.77	761.98	951.68	943.93	898.05	791.67
Midpoint-Elevation	953.18	888.66	883.86	868.62	882.92	753.98	945.53	933.88	886.35	780.42
Pump Intake-Elevation	955.06	886.35	883.69	869.57	883.06	750.59	944.44	933.38	881.03	945.55
Bottom-Elevation	940.63	876.76	871.86	854.12	877.07	745.98	939.38	923.83	874.65	769.17
Screen Length	20	20	20	20	10	10	10.3	10	.	.
Screen Material	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/ppk	SS/sw	SS/sw	.	.
Slot Size	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	.	.
Open-Hole Length	.	.	.	.	.	.	.	.	23.4	22.5
Open-Hole Diameter	.	.	.	.	.	.	.	.	6.25	6.25

Well Number	GW-620	GW-627	GW-633	GW-639	GW-653	GW-658	GW-679	GW-680	GW-683	GW-684
Hydrogeologic Regime	EF	BC	EF	BC	BC	EF	CR	CR	BC	BC
Functional Area	FTF	BG	RG	EMWMF	BG	FF	FCAP	FCAP	EXP-A	EXP-A
General Information										
Date Installed	03/27/90	12/11/89	05/03/90	06/15/90	08/10/90	08/31/90	10/27/90	10/15/90	12/03/90	10/09/90
Total Depth Drilled	75.0	270.0	15.0	125.5	39.0	19.1	132.0	120.0	197.5	129.6
East Coordinate	52,895	42,774	53,100	45,260	42,317	62,146	56,766	57,935	41,552	41,354
North Coordinate	29,565	29,505	30,145	29,626	29,660	29,638	27,267	27,224	28,282	28,525
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOC	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,015.57	943.51	996.43	940.95	931.84	944.81	1,026.90	1,001.50	972.23	898.83
Ground Surface Elevation	1,012.84	940.39	996.66	937.98	928.85	942.04	1,024.20	999.80	969.45	895.53
Tag Depth-(TOC)	77.91	270.96	15.15	129.64	41.53	20.64	134.28	122.24	199.83	132.21
Geologic Information										
Hydrostratigraphic Unit	AQF	AQT	AQT	AQT	AQT	AQT	AQF	AQF	AQF	AQF
Geologic Formation	Cmn	Cn	Cn	Cn	Cn	Cn	OCk	OCk	OCk	Cmn
Aquifer Zone	WT	BDR	WT	BDR	WT	WT	BDR	BDR	BDR	BDR
Weathered Rock-Depth	41.0	3.0	8.5	3.0	3.5	1.5	69.8	40.6	22.0	.
Fresh Rock-Depth	70.0	43.0	.	20.0	35.0	.	105.0	73.0	26.0	9.5
Conductor Casing										
Casing Depth	42.5	47.5	.	31.0	.	3.5	95.0	56.0	82.0	87.0
Outside Diameter	10.75	11.75	.	11.75	.	10.75	8	8	11.75	11.75
Inside Diameter	10	11	.	11	.	10	.	.	11	11
Casing Material	SJ55	SJ55	.	SJ55	.	SJ55	STL	STL	SJ55	SJ55
Well Casing										
Borehole Depth	75.0	254.0	15.0	95.5	39.0	19.1	132.0	120.0	197.5	129.6
Borehole Diameter	9.5	10.63	10.5	10	9.5	9.5	8	8	10.63	10.5
Casing Depth	64.2	252.7	5.0	94.5	29.0	8.8	122.0	110.0	146.0	113.8
Outside Diameter	4.5	7	4.5	7	4.5	4.5	2.37	2.37	4.5	4.5
Inside Diameter	4.25	6.54	4	6.54	4.25	4.25	2	2	4.25	4.25
Casing Material	SS304	SF25	PVC	SF25	SS304	SS304	PVC40	PVC40	SS304	SS304
Monitored Interval										
Top-Depth	61.7	254.0	3.5	95.5	26.3	6.9	117.0	107.0	133.9	106.4
Midpoint-Depth	68.4	262.0	9.3	110.5	32.7	13.0	124.5	113.5	165.4	118.0
Pump Intake-Depth	70.3	255.9	12.2	.	33.5	13.8	126.3	115.3	171.2	119.7
Bottom of Screen-Depth	75.0	.	15.0	.	39.0	18.8	132.0	120.0	196.8	128.4
Bottom-Depth	75.0	270.0	15.0	125.5	39.0	19.1	132.0	120.0	196.8	129.6
Top-Elevation	951.14	686.39	993.16	842.48	902.55	935.14	907.20	892.80	835.55	789.13
Midpoint-Elevation	944.49	678.39	987.41	827.48	896.20	929.04	899.70	886.30	804.10	777.53
Pump Intake-Elevation	942.57	684.51	984.43	.	895.34	928.21	897.90	884.50	798.23	775.83
Bottom-Elevation	937.84	670.39	981.66	812.48	889.85	922.94	892.20	879.80	772.65	765.93
Screen Length	10.8	.	10	.	10	10	10	10	50.8	14.6
Screen Material	SS/sw	.	PVC/sl	.	SS/sw	SS/sw	PVC/sl	PVC/sl	SS/ppk	SS/ppk
Slot Size	0.01	.	0.01	.	0.01	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	.	16	.	30	.	.	.	.	.	.
Open-Hole Diameter	.	6.25	.	6.25	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number	GW-691	GW-692	GW-695	GW-698	GW-703	GW-704	GW-706	GW-709	GW-712	GW-713
Hydrogeologic Regime	EF	EF	BC	EF	BC	BC	BC	CR	BC	BC
Functional Area	CPT	CPT	EXP-B	B8110	EXP-B	EXP-B	EXP-B	LII	EXP-W	EXP-W
General Information										
Date Installed	10/24/90	10/25/90	02/21/91	11/02/90	12/07/90	12/20/90	01/27/91	04/05/91	06/20/91	01/13/92
Total Depth Drilled	20.0	53.0	62.6	75.0	182.0	256.0	182.5	80.6	457.5	315.2
East Coordinate	55,983	56,001	44,868	56,804	44,931	44,935	44,944	52,372	36,507	36,434
North Coordinate	29,794	29,653	28,845	29,277	28,806	28,845	28,946	25,344	28,233	28,236
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	968.59	964.38	939.54	970.09	954.69	944.73	929.47	906.81	877.89	881.43
Ground Surface Elevation	968.09	964.55	937.22	970.09	951.80	941.99	925.78	903.84	873.61	877.83
Tag Depth-(TOC)	20.39	53.05	65.28	74.88	185.29	258.65	185.79	83.52	460.53	318.39
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cmn	Cmn	OCk	Cmn	Cmn	Cmn	Cmn	OCk	OCk	Cmn
Aquifer Zone	WT	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	20.0	23.0	6.0	42.0	7.0	16.0	17.0	39.0	12.0	26.8
Fresh Rock-Depth	.	.	18.0	.	10.0	23.0	27.0	43.0	66.0	63.8
Conductor Casing										
Casing Depth	.	25.0	22.5	42.0	.	21.0	40.3	50.0	44.8	80.2
Outside Diameter	.	10.5	11.75	10.5	.	11.75	11.75	11.75	11.75	.
Inside Diameter	.	10	11	10	.	11	11	11	11	.
Casing Material	.	PVC40	SJ55	PVC40	.	SJ55	SJ55	SJ55	SJ55	SJ55
Well Casing										
Borehole Depth	20.0	53.0	62.6	75.0	135.0	246.0	157.0	80.6	441.5	305.0
Borehole Diameter	12	8.5	9.88	8.5	10.63	10.63	10.6	10.6	10.6	10.6
Casing Depth	10.0	43.0	52.4	65.0	132.8	243.5	155.1	70.4	440.2	303.7
Outside Diameter	4.5	4.5	4.5	4.5	7	7	7	4.25	7	7
Inside Diameter	4.25	4.25	4.25	4.25	6.54	6.54	6.54	4	6.54	6.54
Casing Material	SS304	SS304	SS304	SS304	SF25	SF25	SF25	SS304	SF25	SF25
Monitored Interval										
Top-Depth	8.0	41.0	50.6	63.0	133.8	244.5	156.1	68.7	441.5	305.0
Midpoint-Depth	14.0	47.0	56.6	69.0	157.9	250.3	169.3	74.7	449.5	310.1
Pump Intake-Depth	14.5	48.2	57.7	71.0	158.5	250.2	174.8	75.5	446.2	307.4
Bottom of Screen-Depth	20.0	53.0	62.4	75.0	.	.	.	80.4	.	.
Bottom-Depth	20.0	53.0	62.6	75.0	182.0	256.0	182.5	80.6	457.5	315.2
Top-Elevation	960.09	923.55	886.62	907.09	818.00	697.49	769.68	835.14	432.11	572.83
Midpoint-Elevation	954.09	917.55	880.62	901.09	793.90	691.74	756.48	829.19	424.11	567.73
Pump Intake-Elevation	953.59	916.38	879.54	899.09	793.29	691.83	750.97	828.31	427.39	570.43
Bottom-Elevation	948.09	911.55	874.62	895.09	769.80	685.99	743.28	823.24	416.11	562.63
Screen Length	10	10	10	10	.	.	.	10	.	.
Screen Material	SS/sw	SS/sw	SS/sw	SS/sw	.	.	.	SS/sw	.	.
Slot Size	0.01	0.01	0.01	0.01	.	.	.	0.01	.	.
Open-Hole Length	.	.	.	.	48.2	11.5	26.4	.	16	10.2
Open-Hole Diameter	.	.	.	.	6.25	6.5	6.25	.	6.25	6.25

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number	GW-714	GW-715	GW-722	GW-724	GW-725	GW-731	GW-732	GW-733	GW-735	GW-738
Hydrogeologic Regime	BC	BC	EF	BC	BC	CR	CR	EF	EF	BC
Functional Area	EXP-W	EXP-W	EXP-J	EXP-C	EXP-C	CRSDB	CRSDB	EXP-J	EXP-J	EXP-C
General Information										
Date Installed	01/24/92	01/29/92	08/09/91	08/12/91	08/27/91	09/12/91	09/11/91	10/02/91	10/30/91	11/21/91
Total Depth Drilled	145.0	44.6	644.3	301.6	142.5	180.4	190.6	256.5	83.0	90.1
East Coordinate	36,435	36,453	64,926	48,995	48,989	63,863	64,268	65,067	64,872	49,026
North Coordinate	28,422	28,425	28,532	29,198	29,405	27,464	27,717	28,447	28,867	29,150
Measuring Point	TOWW	TOWW	TOC	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	875.88	874.92	953.71	979.27	961.05	1,049.38	1,064.29	959.84	924.46	983.31
Ground Surface Elevation	872.30	872.17	951.04	976.62	958.26	1,045.75	1,060.65	955.69	921.34	980.36
Tag Depth-(TOC)	146.90	45.96	642.68	293.60	145.42	178.53	192.84	259.93	81.81	91.78
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQT	AQF
Geologic Formation	Cmn	Cmn	Cmn	Cmn	Cmn	OCk	OCk	Cmn	Cn	Cmn
Aquifer Zone	BDR	WT	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	27.0	34.0	54.0	33.5	14.0	95.4	85.0	42.5	19.0	12.0
Fresh Rock-Depth	35.0	.	73.0	40.0	17.5	129.4	96.0	47.1	77.5	15.1
Conductor Casing										
Casing Depth	40.5	.	56.2	40.0	21.0	122.0	100.7	51.8	25.5	16.5
Outside Diameter	11.75	.	10.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75
Inside Diameter	11	.	10	11	11	11	11	11	11	11
Casing Material	SJ55	.	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55
Well Casing										
Borehole Depth	115.1	44.6	75.0	289.6	132.5	175.4	189.5	240.1	83.0	90.1
Borehole Diameter	10.6	10.6	6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Casing Depth	113.8	33.1	74.5	288.3	131.2	165.2	179.3	238.8	67.9	67.3
Outside Diameter	7	4.25	4.5	7	7	4.5	4.5	7	4.5	4.5
Inside Diameter	6.54	4	4	6.54	6.54	4.25	4.25	6.54	4.25	4.25
Casing Material	SF25	SS304	SJ55	SF25	SF25	SS304	SS304	SF25	SS304	SS304
Monitored Interval										
Top-Depth	115.1	32.0	74.5	289.6	132.5	164.0	178.3	240.1	67.5	63.5
Midpoint-Depth	130.1	38.0	359.4	295.6	137.5	171.4	184.2	248.3	73.4	75.8
Pump Intake-Depth	138.4	37.3	.	294.4	137.1	169.9	184.4	248.9	73.6	78.6
Bottom of Screen-Depth	.	43.1	.	.	.	175.2	189.3	.	77.9	87.3
Bottom-Depth	145.0	44.0	644.3	301.6	142.5	178.7	190.0	256.5	79.2	88.0
Top-Elevation	757.20	840.17	876.54	687.02	825.76	881.75	882.35	715.59	853.84	916.86
Midpoint-Elevation	742.25	834.17	591.64	681.02	820.76	874.40	876.50	707.39	847.99	904.61
Pump Intake-Elevation	733.88	834.92	.	682.25	821.13	875.88	876.29	706.84	847.76	901.81
Bottom-Elevation	727.30	828.17	306.74	675.02	815.76	867.05	870.65	699.19	842.14	892.36
Screen Length	.	10	.	.	.	10	10	.	10	20
Screen Material	.	SS/sw	.	.	.	SS/sw	SS/sw	.	SS/sw	SS/sw
Slot Size	.	0.01	.	.	.	0.01	0.01	.	0.01	0.01
Open-Hole Length	29.9	.	569.8	12	10	.	.	16.4	.	.
Open-Hole Diameter	6.25	.	3.5	6.25	6.25	.	.	6.25	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number Hydrogeologic Regime Functional Area	GW-740 BC EXP-C	GW-742 CR CRSP	GW-743 CR CRSP	GW-744 EF GRIDK1	GW-747 EF GRIDK2	GW-750 EF EXP-J	GW-757 CR LII	GW-760 EF GRIDG2	GW-762 EF GRIDJ3	GW-763 EF GRIDJ3
General Information										
Date Installed	12/20/91	12/05/91	12/13/91	01/08/92	01/28/92	02/06/92	04/24/92	05/01/92	05/15/92	05/13/92
Total Depth Drilled	190.0	420.0	161.1	69.5	79.9	72.8	166.5	60.1	60.2	17.0
East Coordinate	49,055	58,908	58,908	64,324	64,570	64,835	53,303	60,207	63,193	63,220
North Coordinate	29,027	28,038	28,056	30,282	29,730	28,975	25,410	30,160	29,115	29,117
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,020.25	1,100.97	1,100.36	907.43	920.96	919.03	961.64	970.02	915.56	915.03
Ground Surface Elevation	1,016.95	1,097.83	1,098.72	905.05	918.33	915.96	958.65	966.51	911.85	911.38
Tag Depth-(TOC)	192.67	422.03	162.56	69.28	82.33	75.49	168.54	63.30	62.04	20.41
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQT	AQT	AQT	AQF	AQT	AQT	AQT
Geologic Formation	Cmn	OCk	OCk	Cpv	Cm	Cn	OCk	Cm	Cn	Cn
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	WT
Weathered Rock-Depth	38.1	68.0	49.0	9.6	10.5	18.5	29.5	4.0	12.0	17.0
Fresh Rock-Depth	45.1	96.0	87.5	14.6	12.0	24.8	48.0	12.5	14.5	.
Conductor Casing										
Casing Depth	46.9	92.0	82.9	27.6	23.8	21.7	46.8	15.4	19.4	.
Outside Diameter	11.75	11.75	11.75	10.75	10.75	11.75	10.75	10.75	11.75	.
Inside Diameter	11	11	11.25	10	10	11	10.25	10	11	.
Casing Material	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	.
Well Casing										
Borehole Depth	165.6	350.0	161.1	69.5	79.9	72.8	166.5	60.1	60.2	17.0
Borehole Diameter	10.6	10.6	10.6	9.87	9.87	10.6	9.62	9.87	9.87	8
Casing Depth	164.3	348.7	150.2	57.0	69.2	62.4	135.5	49.7	48.2	5.2
Outside Diameter	7	7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Inside Diameter	6.54	6.54	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Casing Material	SF25	SF25	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	165.6	350.0	150.1	55.0	67.4	61.2	134.0	48.3	46.4	4.0
Midpoint-Depth	177.8	385.0	155.6	62.3	73.5	67.0	150.3	54.2	52.6	10.0
Pump Intake-Depth	183.7	408.9	156.4	65.1	75.4	67.6	155.0	54.5	.	11.8
Bottom of Screen-Depth	.	.	160.2	66.9	79.1	72.3	165.5	59.6	58.1	15.2
Bottom-Depth	190.0	420.0	161.1	69.5	79.6	72.7	166.5	60.1	58.7	16.0
Top-Elevation	851.35	747.83	948.62	850.05	850.93	854.76	824.65	918.21	865.45	907.38
Midpoint-Elevation	839.15	712.83	943.12	842.80	844.83	849.01	808.40	912.31	859.30	901.38
Pump Intake-Elevation	833.25	688.97	942.36	839.93	842.96	848.33	803.64	912.02	.	899.63
Bottom-Elevation	826.95	677.83	937.62	835.55	838.73	843.26	792.15	906.41	853.15	895.38
Screen Length	.	.	10	9.9	9.9	9.9	30	9.9	9.9	10
Screen Material	.	.	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw
Slot Size	.	.	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	24.4	70	.	.	.	.	.	.	.	.
Open-Hole Diameter	6.25	6.25	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number Hydrogeologic Regime Functional Area	GW-765 EF GRIDE1	GW-769 EF GRIDG3	GW-770 EF GRIDG3	GW-775 EF GRIDH3	GW-782 EF GRIDE3	GW-783 EF GRIDE3	GW-791 EF GRIDD2	GW-795 BC AGLLWSF	GW-796 CR LV	GW-797 CR LV
General Information										
Date Installed	05/13/92	06/04/92	06/04/92	07/16/92	08/12/92	08/13/92	09/21/92	10/13/92	03/04/93	03/16/93
Total Depth Drilled	32.5	61.4	20.0	60.5	36.0	16.3	70.6	20.1	139.7	134.1
East Coordinate	58,482	60,230	60,255	61,278	58,099	58,113	57,423	45,630	58,206	58,550
North Coordinate	31,026	29,510	29,505	29,272	29,719	29,734	30,483	29,287	27,924	27,447
Measuring Point	TOWW	TOWW	TOWW	TOC	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,008.54	944.43	944.72	931.35	947.73	948.49	992.13	926.18	1,052.62	1,060.00
Ground Surface Elevation	1,005.53	941.53	941.67	931.48	944.48	945.81	988.51	922.92	1,048.80	1,056.10
Tag Depth-(TOC)	35.05	62.73	21.68	55.98	38.23	17.98	72.45	22.61	139.82	135.71
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQF	AQF
Geologic Formation	Crg	Cn	Cn	Cn	Cn	Cn	Cm	Cn	OCk	OCk
Aquifer Zone	WT	BDR	WT	BDR	BDR	WT	BDR	WT	BDR	BDR
Weathered Rock-Depth	24.5	14.2	12.0	.	1.0	1.0	14.7	5.0	102.0	67.1
Fresh Rock-Depth	.	.	16.5	16.7	7.5	8.5	26.0	12.0	103.0	89.0
Conductor Casing										
Casing Depth	.	17.2	.	16.7	.	.	31.5	.	107.6	95.0
Outside Diameter	.	11.75	.	11.75	.	.	10.75	.	10.75	10.75
Inside Diameter	.	11	.	11	.	.	10	.	10	10
Casing Material	.	SJ55	.	SJ55	.	.	SJ55	.	SJ55	SJ55
Well Casing										
Borehole Depth	32.5	61.4	20.0	60.5	36.0	16.3	70.6	20.1	139.7	134.1
Borehole Diameter	9.87	10.62	10.62	10.62	9.87	9.87	9.87	9.87	9.5	9.5
Casing Depth	21.2	49.4	8.5	46.3	25.0	4.2	59.0	9.8	126.5	123.5
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Inside Diameter	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Casing Material	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	19.9	48.2	7.5	45.0	23.8	3.6	57.5	7.5	122.9	118.0
Midpoint-Depth	26.2	54.3	13.3	50.7	29.9	10.0	64.1	13.8	129.7	126.1
Pump Intake-Depth	27.0	54.9	13.6	51.1	29.8	10.3	63.8	14.2	131.2	128.1
Bottom of Screen-Depth	31.5	59.3	18.4	56.2	34.9	13.9	68.9	19.7	136.4	133.4
Bottom-Depth	32.4	60.3	19.0	56.4	35.9	16.3	70.6	20.1	136.5	134.1
Top-Elevation	985.63	893.33	934.17	886.48	920.68	942.21	931.01	915.42	925.90	938.1
Midpoint-Elevation	979.38	887.28	928.42	880.78	914.63	935.86	924.46	909.12	919.10	930.05
Pump Intake-Elevation	978.54	886.63	928.02	880.35	914.73	935.49	924.73	908.68	917.62	928
Bottom-Elevation	973.13	881.23	922.67	875.08	908.58	929.51	917.91	902.82	912.30	922
Screen Length	10.3	9.9	9.9	9.9	9.9	9.7	9.9	9.9	9.9	9.9
Screen Material	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw
Slot Size	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	.	.	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number	GW-798	GW-799	GW-801	GW-802	GW-816	GW-818	GW-827	GW-831	GW-832	GW-916
Hydrogeologic Regime	CR	CR	CR	EF	EF	EF	CR	CR	EF	BC
Functional Area	CDLVII	LV	LV	FF	EXP-SR	B9201-2	CDLVI	FCAP	NHP	EMWMF
General Information										
Date Installed	03/18/93	03/25/93	07/01/93	06/25/93	06/02/94	.	01/24/95	07/30/96	05/09/96	01/29/01
Total Depth Drilled	135.5	92.0	188.9	26.5	16.1	20.4	135.0	200.0	11.9	36.0
East Coordinate	60,310	59,961	58,780	62,217	64,031	60,140	51,826	56,593	64,134	48,276
North Coordinate	27,265	26,746	26,808	29,655	31,582	29,119	27,721	26,654	29,142	31,186
Measuring Point	TOWW	TOWW	TOWW	TOC	TOWW	TOC	TOWW	TOWW	TOC	TOWW
Measuring Point Elevation	1,006.00	981.29	1,097.16	941.83	898.42	927.93	1,051.60	1,091.29	906.18	1,002.85
Ground Surface Elevation	1,002.42	978.10	1,093.82	942.30	894.56	928.18	1,048.13	1,088.04	906.83	.
Tag Depth-(TOC)	134.00	97.58	190.92	25.42	17.99	11.71	137.22	198.06	10.36	.
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQT	AQT	AQF	AQF	AQF	AQF	AQT
Geologic Formation	OCk	OCk	OCk	Cn	Cr	Cmn	OCk	OCk	Cmn	Cc
Aquifer Zone	BDR	BDR	BDR	WT	WT	WT	BDR	BDR	WT	WT
Weathered Rock-Depth	94.4	60.8	112.5	10.0	.	.	.	134.8	.	10.0
Fresh Rock-Depth	95.8	62.8	113.4	15.0	.	.	40.5	140.8	.	15.0
Conductor Casing										
Casing Depth	99.7	65.0	115.4	.	.	.	43.4	138.3	.	.
Outside Diameter	10.75	10.75	10.75	.	.	.	10.75	10.75	.	.
Inside Diameter	10	10	10	.	.	.	10	10	.	.
Casing Material	SJ55	SJ55	SJ55	.	.	.	STL	STL	.	.
Well Casing										
Borehole Depth	135.5	92.0	188.9	26.5	15.8	.	135.0	200.0	11.9	.
Borehole Diameter	9.5	9.5	9.87	10.62	10	.	9.87	9.87	12	.
Casing Depth	124.5	81.0	178.1	15.5	4.2	.	124.1	183.2	5.9	.
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.63	.
Inside Diameter	4.25	4.25	4.25	4	4.25	.	4.25	4.25	6	.
Casing Material	SS304	SS304	SS304	PVC40	SS304	PVC	SS304	SS	PVC	.
Monitored Interval										
Top-Depth	122.0	78.7	175.8	13.3	2.9	.	122.1	182.0	4.0	13.0
Midpoint-Depth	128.7	85.4	182.4	19.9	9.4	.	128.5	190.8	7.9	24.5
Pump Intake-Depth	125.9	84.8	177.7	.	11.1	10.3	128.7	188.8	.	.
Bottom of Screen-Depth	134.4	90.9	188.0	25.5	13.6	.	134.1	193.6	10.9	35.0
Bottom-Depth	135.4	92.0	188.9	26.5	15.8	.	134.8	199.6	11.8	36.0
Top-Elevation	880.42	899.4	918.02	929	891.66	.	926.03	906.04	902.83	.
Midpoint-Elevation	873.72	892.75	911.47	922.4	885.21	.	919.68	897.24	898.93	.
Pump Intake-Elevation	876.5	893.29	916.16	.	883.42	917.93	919.4	899.29	.	975.35
Bottom-Elevation	867.02	886.1	904.92	915.8	878.76	.	913.33	888.44	895.03	.
Screen Length	9.9	9.9	9.9	10	9.4	.	10	10.4	5	20
Screen Material	SS/sw	SS/sw	SS/sw	PVC/sl	SS/sw	.	SS/sw	SS/sw	PVC/sl	SS/sw
Slot Size	0.01	0.01	0.01	0.01	0.01	.	0.01	0.01	0.02	0.01
Open-Hole Length	.	.	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, 2004

Well Number Hydrogeologic Regime Functional Area	GW-917 BC EMWMF	GW-918 BC EMWMF	GW-920 BC EMWMF	GW-921 BC EMWMF	GW-922 BC EMWMF	GW-923 BC EMWMF	GW-924 BC EMWMF	GW-925 BC EMWMF	GW-926 BC EMWMF	GW-927 BC EMWMF
General Information										
Date Installed	01/22/01	02/02/01	01/16/01	01/31/01	01/17/01	02/01/01	01/29/01	02/05/01	02/01/01	02/01/01
Total Depth Drilled	51.0	75.0	55.0	50.0	46.0	102.0	54.0	170.0	145.0	172.0
East Coordinate	47,914	47,549	47,375	47,139	47,147	48,184	46,300	47,128	46,290	47,906
North Coordinate	30,463	31,672	30,193	30,350	30,024	30,822	30,185	30,349	30,185	30,463
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	997.10	1,067.96	967.43	971.29	956.91	1,016.73	968.90	971.14	968.94	997.19
Ground Surface Elevation	.	.	.	.	.	.	.	.	.	.
Tag Depth-(TOC)	.	.	.	.	.	.	.	.	.	.
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT
Geologic Formation	Cc	Cc	Cc	Cc	Cc	Cc	Cc	Cc	Cc	Cc
Aquifer Zone	WT	WT	BDR	BDR	BDR	WT	WT	BDR	BDR	BDR
Weathered Rock-Depth	21.0	.	.	.	10.0	.	21.8	.	15.0	25.0
Fresh Rock-Depth	27.0	30.0	12.0	13.0	13.0	62.0	22.0	15.0	18.0	30.0
Conductor Casing										
Casing Depth	.	.	.	.	.	.	.	.	.	.
Outside Diameter	.	.	.	.	.	.	.	.	.	.
Inside Diameter	.	.	.	.	.	.	.	.	.	.
Casing Material	.	.	.	.	.	.	.	.	.	.
Well Casing										
Borehole Depth	.	.	.	.	.	.	.	.	.	.
Borehole Diameter	.	.	.	.	.	.	.	.	.	.
Casing Depth	20.0	20.0	24.0	18.0	25.0	40.0	23.0	97.0	113.0	60.0
Outside Diameter	2.37	.	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
Inside Diameter	2.07	.	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07
Casing Material	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	18.0	18.0	22.0	16.0	23.0	36.0	21.0	92.0	103.0	57.0
Midpoint-Depth	34.5	25.5	38.5	33.0	34.5	55.5	37.5	120.0	124.0	74.5
Pump Intake-Depth	.	.	.	.	.	.	.	.	.	.
Bottom of Screen-Depth	50.0	30.0	54.0	48.0	45.0	70.0	53.0	147.0	143.0	90.0
Bottom-Depth	51.0	33.0	55.0	50.0	46.0	75.0	54.0	148.0	145.0	92.0
Top-Elevation	.	.	.	.	.	.	.	.	.	.
Midpoint-Elevation	.	.	.	.	.	.	.	.	.	.
Pump Intake-Elevation	959.6	1039.46	925.93	935.29	919.41	958.23	928.4	848.14	841.94	919.69
Bottom-Elevation	.	.	.	.	.	.	.	.	.	.
Screen Length	30	10	30	30	20	30	30	50	30	30
Screen Material	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw	SS/sw
Slot Size	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	.	.	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	.

APPENDIX D

CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME

EXPLANATION

Sampling Point:

BCK	-	Bear Creek Kilometer
GW	-	Monitoring Well
NT	-	Northern Tributary (Bear Creek)
SS	-	South Side (of Bear Creek, spring sampling station)

Location:

AGLLWSF	-	Above Grade Low Level Waste Storage Facility
BG	-	Bear Creek Burial Grounds
EMWMF	-	Environmental Management Waste Management Facility
EXP	-	Exit Pathway Monitoring Location: Maynardville Limestone Picket (-A, -B, -C, -W) Spring or Surface Water Location (-SW)
OLF	-	Oil Landfarm
RS	-	Rust Spoil Area
S3	-	S-3 Site
SPI	-	Spoil Area I

Monitoring Program:

BJC	-	managed by Bechtel Jacobs Company LLC
GWPP	-	managed by Y-12 Groundwater Protection Program

Sample Type:

Dup	-	Field Duplicate Sample
Conv	-	Collected using the conventional sampling method (purge three well volumes)
Conv-F	-	Filtered sample collected using the conventional sampling method

Units:

ft	-	feet (elevations are above mean sea level and depths are below grade)
µg/L	-	micrograms per liter
mg/L	-	milligrams per liter
mV	-	millivolts
µmho/cm	-	micromhos per centimeter
NTU	-	Nephelometric Turbidity Units
pCi/L	-	picoCuries per liter
ppm	-	parts per million

Only the analytes that were detected above the program reporting limits in at least one sample are included in this appendix. Additionally, results that are below the reporting limits are replaced with missing values (e.g., " < ") to emphasize the detected results. The following sections describe the reporting limits and data qualifiers for each sub-appendix. A comprehensive list of the GWPP analytes, analytical methods, and reporting limits is provided in Appendix B, Table B.5.

EXPLANATION (continued)

D.1 Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals:

Results for all of the field measurements, miscellaneous analytes, and major ions are included in this appendix. The reporting limits for the major ions are shown in the following summary.

Analyte	Reporting Limit (mg/L)		Analyte	Reporting Limit (mg/L)	
	GWPP	BJC		GWPP	BJC
Cations			**Anions**		
Calcium	0.2	0.25	Alkalinity - HCO3	1.0	NA
Magnesium	0.2	0.05	Alkalinity - CO3	1.0	NA
Potassium	2.0	0.25	Chloride	0.2	0.1
Sodium	0.2	0.25	Fluoride	0.1	0.05
			Nitrate (as Nitrogen)	0.028	0.1
			Sulfate	0.25	0.1

The major ion results for the August sample from GW-135-11 and September sample from GW-237 are qualitative because the ion charge balance error exceeds 20%. Suspected causes of the unacceptable charge balance errors are high chloride (7,480 mg/L) at GW-135-11 and low bicarbonate alkalinity (21.2 mg/L) at GW-237. These results are inconsistent with historical measurements and are flagged with a “Q” qualifier.

The Y-12 GWPP sampling and analysis plan (SAP) for CY 2004 (BWXT 2003a) specifies reporting limits for trace metals that are appropriate for DOE Order monitoring. The laboratories subcontracted by monitoring programs managed by BJC may use reporting limits (sometimes reporting estimated values) that are lower than the GWPP reporting limits for the metals. To retain the highest quality data for DOE Order monitoring purposes and to standardize reporting limits for trace metal results obtained from all sources, the GWPP reporting limits were given precedence over the BJC reporting limits (BJC 2003 and 2004a) shown below. The trace metals shown in bold typeface below were detected in at least one groundwater or surface water sample collected during CY 2004 and are presented in Appendix D.1.

Analyte	Reporting Limit (mg/L)		Analyte	Reporting Limit (mg/L)	
	GWPP	BJC		GWPP	BJC
Aluminum	0.2	0.05*	**Lithium**	0.01	0.01
Antimony (PMS)	0.0025	.	**Manganese**	0.005	0.005
Antimony	.	0.006	**Mercury (CVAA)**	0.0002	0.0002
Arsenic (PMS)	0.005	.	**Molybdenum**	0.05	0.01*
Arsenic	.	0.005	**Nickel (PMS)**	0.005	.
Barium	0.004	0.005	**Nickel**	.	0.01
Beryllium	0.001	0.001	**Selenium (PMS)**	0.01	.
Boron	0.1	0.01*	**Selenium**	.	0.005
Cadmium (PMS)	0.0025	.	Silver	0.02	0.005*
Cadmium	.	0.001	**Strontium**	0.005	0.005
Chromium (PMS)	0.005	.	**Thallium (PMS)**	0.0005	.
Chromium	.	0.005	Thallium	.	0.002
Cobalt	0.02	0.005*	Thorium	0.2	.
Copper	0.02	0.005*	**Uranium (PMS)**	0.0005	.
Iron	0.05	0.01	**Uranium (KPA)**	.	0.004
Lead (PMS)	0.0005	.	**Vanadium**	0.02	0.01*
Lead	.	0.003	**Zinc**	0.05	0.01*

Note: * - the GWPP reporting limit was used instead of the BJC reporting limit; “.” - not specified.

EXPLANATION (continued)

Metals analyses were performed using the inductively coupled plasma (ICP) spectroscopy method (SW846-6010B) unless otherwise noted.

- CVAA - Cold Vapor Atomic Absorption (EPA-7470)
- KPA - Kinetic Phosphorescent Analysis (ASTM-D5174-M)
- PMS - Plasma Mass Spectroscopy (EPA-200.8)

Groundwater samples collected the following wells for metals analysis by the ICP method during CY 2004 were diluted before analysis to obtain an optimum matrix. The detected results are valid, but some metals may be present at concentrations below the elevated reporting limits.

Sampling Location	Date Sampled	Dilution Factor	Sampling Location	Date Sampled	Dilution Factor
GW-135-03	08/21/04	10	GW-246	03/10/04	20
GW-135-06	08/21/04	10	GW-246	08/19/04	10
GW-135-11	08/21/04	10	GW-615	03/10/04	20
GW-135-23	08/22/04	2	GW-615	08/19/04	10
GW-135-26	08/22/04	2			

The following symbols and data qualifiers are used in Appendix D.1:

- . - Not analyzed or not applicable
- < - Analyzed but not detected at the project reporting level
- Q - Result is inconsistent with historical measurements for the location
- R - Result does not meet data quality objectives (charge balance error exceeds +/- 20%)

D.2 Volatile Organic Compounds:

The Y-12 GWPP reporting limits for volatile organic compounds (Table B.5) and those used for monitoring programs managed by BJC are contract-required quantitation limits. Results below the quantitation limit and above the instrument detection limit are reported as estimated quantities. Therefore, non-detected results are assumed to equal zero for all compounds.

As summarized below, 26 compounds were detected (of the 55 compounds requested) in the CY 2004 groundwater and surface water samples collected in the Bear Creek Regime. Results for these compounds are grouped by similar chemical composition (e.g., chloroethenes) in Appendix D.2.

Compound	No. Detected	Maximum (µg/L)	Compound	No. Detected	Maximum (µg/L)
Trichloroethene	57	1,700	trans-1,2-Dichloroethene	7	34
cis-1,2-Dichloroethene	49	4,900	Carbon tetrachloride	7	12
Tetrachloroethene	46	2,100	Total Xylene	5	13
1,1-Dichloroethene	29	110	Acetone	5	7 J
1,1-Dichloroethane	26	2,000	Methylene chloride	4	21
Benzene	19	1,100	Chlorobenzene	4	14
Chloroform	16	39	1,4-Dichlorobenzene	4	4 J
Vinyl chloride	14	610	Dichlorodifluoromethane	2	10
1,1,2-Trichloro-1,2,2-trifluoroethane	12	190	1,2-Dichloroethane	2	6
Chloroethane	11	32	Trichlorofluoromethane	2	6
Toluene	10	18	1,2-Dichloropropane	2	2 J
Ethylbenzene	10	11	Acrylonitrile	1	31
1,1,1-Trichloroethane	9	240	Carbon disulfide	1	2 J
Styrene	9	11			

The following symbols and data qualifiers are used in Appendix D.2.

. - Not analyzed
< - Analyzed but not detected (also false-positive results for data provided by the WRRP)
J - Positively identified, estimated concentration below the contract-required quantitation limit; also one result that exceeds instrument calibration (trichloroethene at well GW-225).

EXPLANATION (continued)

D.3 Radiological Analytes:

Reporting limits for radiological analytes are sample-specific and analyte-specific minimum detectable activities that are reported with each result. Quarterly monitoring at the EMWMF during CY 2004 includes analyses for 21 isotopes with low detection limits. The following summary shows the primary radiological analytes relevant to DOE Order monitoring collected during CY 2004 in the Bear Creek Regime.

Analyte	No. of Results	No. Detected	Analyte	No. of Results	No. Detected
Gross Alpha	134	41	Technetium-99	159	34
Gross Beta	148	87	Uranium-234*	138	137
Americium-241	80	11	Uranium-235*	138	93
Neptunium-237	80	6	Uranium-236	68	28
Total Radium Alpha	10	10	Uranium-238	138	125
Strontium-89/90*	80	24			

Note: * = Reported by BJC laboratories are reported in Appendix D.3 as equivalent GWPP analytes: Sr-90 = Sr-89/90; U-233/234 = U-234; U-235/236 = U-235.

All of the results for gross alpha and gross beta are presented in the first four pages of Appendix D.3, followed by results for the isotopes shown above (pages D.3-5 through D.3-24).

The additional isotopic data obtained for sampling locations at the EMWMF are summarized below.

Analyte	No. of Results	No. Detected	Analyte	No. of Results	No. Detected
Actinium-227	70	4	Protactinium-234m	70	63
Carbon-14	70	2	Radium-226	70	30
Cesium-137	70	0	Radium-228	70	51
Chlorine-36	70	5	Thorium-228	70	13
Curium-248	70	23	Thorium-230	70	69
Iodine-129	70	21	Thorium-232	70	52
Plutonium-239/240	70	15	Tritium	70	8

Results for the isotopes that exceed the MDA (shown above as detected) are presented after the primary isotopic data, on pages D.3-25 and D.3-26.

The following notes and qualifiers apply to Appendix D.3:

Activity	-	Result in picoCuries per liter (pCi/L)
Error	-	Counting error (two standard deviations)
MDA	-	Minimum detectable activity
Q	-	Inconsistent with historical measurements for the location
R	-	Result does not meet data quality objectives: exceeds the MDA but is less than the error

EXPLANATION (continued)

Additional Analyte Not Presented in Appendix D tables:

The Y-12 GWPP requested biological testing to assess microbial activity in groundwater at well GW-056 during CY 2004. The following results are qualitative bacterial counts that are estimates based on the appearance of the sample after an eight- to ten-day growth period.

Sampling Location	Date Sampled	Results (colony forming units per milliliter)			
		Heterotropic aerobic	Iron-Related	Slime Forming	Sulfate-Reducing
GW-056	04/07/04	500,000	<100	50,000	<1,000

The presence of these bacteria, along with the elevated chromium and nickel concentrations in the sample (see Appendix D.1), suggest microbiological induced corrosion of the stainless steel well screen at this well.

As shown below, one semivolatile organic compound (Di-n-butyl phthalate) was detected at very low levels in nine samples from six locations at the Environmental Management Waste Management Facility.

Sampling Location	Date Sampled	Di-n-butyl phthalate (µg/L)	Sampling Location	Date Sampled	Di-n-butyl phthalate (µg/L)
EMW-VWEIR	12/02/04	0.8 J	GW-921	11/04/04	0.7 J
EMWNT-03A	09/02/04	0.5 J	GW-925	09/01/04	0.6 J
EMWNT-05	03/09/04	0.8 J	NT-04	03/09/04	0.7 J
EMWNT-05	09/02/04	1	NT-04	12/02/04	1
EMWNT-05	12/02/04	0.6 J			

These results may be analytical artifacts and not representative of actual groundwater conditions.

APPENDIX D.1

FIELD MEASUREMENTS, MISCELLANEOUS ANALYTES, MAJOR IONS, AND TRACE METALS

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	BCK-00.63		BCK-03.30		BCK-04.55		BCK-07.87	
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW	
Date Sampled	01/27/04	07/20/04	03/02/04	09/14/04	01/27/04	07/20/04	03/02/04	09/14/04
Program	GWPP	GWPP	BJC	BJC	GWPP	GWPP	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	9:10	8:40	12:05	8:15	8:45	9:00	13:00	9:00
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	243	364	208	296	382	416	229	447
Dissolved Oxygen (ppm)	5.33	4.02	6.03	9.26	4.97	3.34	4.97	9.34
Oxidation/Reduction (mV)	209	194	78	48	185	176	83	117
Temperature (degrees C)	7.2	19.1	12.4	18	7.9	19.4	11.6	17.5
Turbidity (NTU)	.	.	20	5	.	.	48	4
pH	6.8	7.47	8.07	7.92	6.76	7.59	8.1	7.9
Miscellaneous Analytes								
Dissolved Solids (mg/L)	120	239	149	199	131	247	205	324
Suspended Solids (mg/L)	<	2	12.4	19.2	2	3	29.3	<
Turbidity (NTU)	6.36	7.44	.	.	6.42	8.6	.	.
Major Ions (mg/L)								
Calcium	25.6	49.3	31.9	48.3	29.6	53.6	31.8	72.2
Magnesium	7.26	13.2	8.21	13	8.24	13.1	6.52	15.9
Potassium	<	2.08	1.31	2.01	<	2.2	1.96	2.68
Sodium	3.24	4.65	4.52	5.67	3.69	6.19	4.67	10.2
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	80.2	181	109	161	95.2	172	93.7	205
Chloride	4.95	5.87	8.8	7.7	5.74	9.36	11.4	15.7
Fluoride	<	0.119	0.12	<	<	0.156	0.15	0.2
Nitrate as N	1.13	1.88	3	1.7	1.6	4.43	4.4	7.6
Sulfate	12.9	24.5	10	12.6	10	14	16.4	21.2
Charge balance error (%)	-1.9	-7.7	-6.7	-0.5	-1.5	-2.9	-9.2	-1
Trace Metals (mg/L)								
Aluminum	0.515	0.494	0.712	<	0.525	0.691	1.47	<
Arsenic (PMS)	<	<	.	.	<	<	.	.
Barium	0.0413	0.067	0.0574	0.0726	0.047	0.0761	0.0599	0.0959
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	0.109
Cadmium (PMS)	<	<	.	.	<	<	.	.
Cadmium	.	.	<	<	.	.	<	<
Chromium (PMS)	<	<	.	.	<	<	.	.
Chromium	.	.	<	<	.	.	<	<
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.403	0.386	0.79	0.219	0.349	0.52	1.82	0.127
Lead (PMS)	0.00141	<	.	.	<	<	.	.
Lead	.	.	<	<	.	.	<	<
Lithium	<	<	<	<	<	<	0.0171	0.0158
Manganese	0.0306	0.046	0.0525	0.143	0.0286	0.0859	0.0776	0.0187
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	.	<	<	<	.
Nickel (PMS)	<	<	.	.	<	<	.	.
Nickel	.	.	<	<	.	.	<	<
Selenium (PMS)	<	<	.	.	<	<	.	.
Strontium	0.0622	0.138	0.0702	0.0936	0.0597	0.111	0.0788	0.161
Thallium (PMS)	<	<	.	.	<	<	.	.
Uranium (PMS)	0.00787	0.0144	.	.	0.0155	0.0303	.	.
Uranium (KPA)	.	.	0.022	0.0176	.	.	0.0461	0.0567
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	BCK-09.20		BCK-09.47		BCK-11.54		BCK-11.84	
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW	
Date Sampled	03/01/04	09/13/04	03/01/04	09/13/04	03/01/04	09/13/04	03/01/04	09/13/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	12:15	13:25	12:00	13:45	12:45	12:50	13:15	12:20
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	298	447	316	507	385	940	520	1,190
Dissolved Oxygen (ppm)	6.35	8.67	6.01	7.69	6.19	7.91	7.71	8.48
Oxidation/Reduction (mV)	65	110	100	118	60	94	102	109
Temperature (degrees C)	12.8	18.6	12.4	21	12.8	22.3	12.1	20.7
Turbidity (NTU)	5.1	4	4.9	11	4	14	4.1	3
pH	8.14	8.04	8.06	8.04	8.26	8.06	8.18	7.92
Miscellaneous Analytes								
Dissolved Solids (mg/L)	221	271	250	379	344	709	525	966
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	52.3	71.5	53.9	75.3	69	121	96.4	165
Magnesium	12.7	15.8	10.7	13.1	13.3	22.5	13.3	22.1
Potassium	1.43	2.63	1.55	3	1.7	4.13	2.1	5.39
Sodium	6.92	10.5	7.97	12.4	12.1	28.3	18.5	37.2
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	156	204	145	202	136	207	158	258
Chloride	13.8	17.8	16.5	23.2	24.3	41.9	39.3	57.4
Fluoride	0.21	0.2	0.24	0.26	0.34	0.53	0.46	0.61
Nitrate as N	8.1	8.6	10.5	14.5	24	49.5	36.8	67.5
Sulfate	15.2	22.1	17.7	23.8	20.9	34.6	28.2	41
Charge balance error (%)	-5	-2.5	-6.4	-6.7	-4.4	-2	-5.2	-2.8
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.075	0.0982	0.0802	0.105	0.13	0.216	0.166	0.246
Beryllium	<	<	<	<	<	<	<	<
Boron	<	0.119	0.113	0.348	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	<	<	<	<	0.0012	<	0.0023	<
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.169	0.2	0.219	0.216	0.197	<	0.148	<
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	0.0176	0.0166	0.0299	0.0452	<	<	0.0135	<
Manganese	0.0236	0.0198	0.0475	0.0513	0.262	0.0077	0.505	0.0417
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	.	<	.	<	.	<	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	0.0108	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.116	0.158	0.139	0.195	0.193	0.377	0.286	0.471
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	0.0655	0.0588	0.0959	0.12	0.0747	0.145	0.112	0.187
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	BCK-12.34				BCK-12.47			
Functional Area	EXP-SW				EXP-SW			
Date Sampled	01/12/04	06/02/04	07/26/04	11/02/04	01/12/04	06/02/04	07/26/04	11/02/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	13:19	14:19	14:19	8:20	13:32	14:38	14:38	8:40
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	.	.	.	.	.	.	.	.
Dissolved Oxygen (ppm)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	.	.	.	.	.	.	.	.
Temperature (degrees C)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	.	.	.	.	.	.	.	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	153	199	172	173 J	.	.	.	.
Magnesium	19.9	21.7	23.4	21.3	.	.	.	.
Potassium	3.79	3.59	4.83	4.99	.	.	.	.
Sodium	33.7	42	36.5	32.2	.	.	.	.
Alkalinity as CO3	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	0.286	<	<	<	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.268	0.262	0.311	0.253	.	.	.	.
Beryllium	<	<	<	<	.	.	.	.
Boron	<	<	<	<	.	.	.	.
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	0.0094	0.0044	0.0068	0.0055	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	.	.	.	.
Cobalt	<	<	<	<	.	.	.	.
Copper	<	<	<	<	.	.	.	.
Iron	0.191	0.151	0.124	0.157	.	.	.	.
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	.	.	.	.
Lithium	<	<	<	<	.	.	.	.
Manganese	2.16	0.835	1.04	1.1	.	.	.	.
Mercury (CVAA)	<	<	<	<	.	.	.	.
Molybdenum	<	<	.	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	0.0401	0.0186	0.027	0.023	.	.	.	.
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.425	0.452	0.487	0.464	.	.	.	.
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	0.136	0.281	0.171	0.202	0.513	0.628	0.577	0.501
Vanadium	<	<	<	<	.	.	.	.
Zinc	<	<	<	<	.	.	.	.

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	EMWNT-03A		EMWNT-03A		EMWNT-05				
Functional Area	EXP-SW		EXP-SW		EXP-SW				
Date Sampled	03/09/04	06/08/04	09/02/04	12/02/04	03/09/04		06/08/04	09/02/04	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type						Dup			Dup
Field Measurements									
Time Sampled	13:30	12:30	10:30	10:15	12:45	12:45	12:00	9:30	9:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	62	148	301	67	87	.	200	255	.
Dissolved Oxygen (ppm)	5.01	6.7	7.6	14.55	5.44	.	7.29	8.01	.
Oxidation/Reduction (mV)	-46	37	18	54	-41	.	-50	-76	.
Temperature (degrees C)	10.4	20.3	22.3	8.3	10.9	.	19.9	20.7	.
Turbidity (NTU)	20	37	18	10	13	.	16	10	.
pH	8.69	7.95	7.84	7.62	8.89	.	7.72	7.91	.
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	6.72	22.2	49.7	8.16	9.81	9.88	27.5	36	35.3
Magnesium	2.19	5.14	9.85	2.62	3.5	3.5	8.15	9.98	9.83
Potassium	1.36	2.05	2.55	1.48	1.66	1.66	2.43	2.96	2.58
Sodium	2.1	3.91	5.43	1.8	2.32	2.3	5.41	6.7	6.57
Alkalinity as CO3	.	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)									
Aluminum	0.527	1.47	2.37	0.512	0.337	0.295	0.261	<	<
Arsenic (PMS)	.	.	.	.	.	.	.	.	.
Barium	0.0361	0.0816	0.153	0.037	0.0331	0.0327	0.07	0.071	0.0695
Beryllium	.	.	.	.	.	.	.	.	.
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.	.
Cadmium	.	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	0.0077	<	<
Cobalt	.	.	.	.	.	.	.	.	.
Copper	.	.	.	.	.	.	.	.	.
Iron	1.52	7.36	4.83	0.897	0.939	0.907	2.59	3.08	3.18
Lead (PMS)	.	.	.	.	.	.	.	.	.
Lead	<	<	0.0054	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.	.
Manganese	0.412	2	1.57	0.301	0.226	0.228	1.27	1.49	1.48
Mercury (CVAA)	<	<	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.	.
Strontium	0.0237	0.0638	0.12	0.0262	0.0306	0.0305	0.0841	0.101	0.0985
Thallium (PMS)	.	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	<	0.0551	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	EMWNT-05	EMW-VWEIR		GW-008		GW-046		GW-052	
Functional Area	EXP-SW	EXP-SW		OLF		BG		BG	
Date Sampled	12/02/04	03/09/04	12/02/04	01/07/04	07/07/04	01/06/04	07/08/04	03/04/04	08/16/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type									
Field Measurements									
Time Sampled	9:35	9:10	8:20	10:25	13:40	13:45	13:45	9:00	9:45
Measuring Point Elev. (ft)	.	.	.	965.39	965.39	921.17	921.17	905.70	905.70
Depth to Water (ft)	.	.	.	14.37	15.28	2.76	2.97	13.79	17.72
Groundwater Elevation (ft)	.	.	.	951.02	950.11	918.41	918.20	891.91	887.98
Conductivity (μmho/cm)	81	201	107	240	291	373	249	370	542
Dissolved Oxygen (ppm)	15.03	4.24	14.49	0.47	1.7	7.18	0.81	1.17	0.79
Oxidation/Reduction (mV)	37	95	181	106	104	30	207	227	201
Temperature (degrees C)	7.9	10.6	8.7	13	23.5	12.1	18	11.9	15.1
Turbidity (NTU)	123	620	482	10	38	10	6	.	.
pH	7.74	8.62	8.5	5.05	5.29	5.86	4.97	6.38	6.57
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	.	95	.	158	.	212	351
Suspended Solids (mg/L)	.	.	.	<	.	5	.	3	9
Turbidity (NTU)	.	.	.	.	.	.	.	4.59	3.91
Major Ions (mg/L)									
Calcium	8.62	20.1	10.5	10.2	9.08	25.4	27.7	51.1	83.3
Magnesium	3.54	7.4	3.87	6.17	5.63	5.73	6.2	8.47	13.7
Potassium	1.9	6.25	2.7	1.21	1.07	2.88	2.99	<	<
Sodium	1.83	2.42	1.17	2.53	2.37	6.68	7.42	6.11	7
Alkalinity as CO3	.	.	.	<	<	<	<	<	<
Alkalinity as HCO3	.	.	.	59.6	44.4	62.2	53.9	143	241
Chloride	.	.	.	6.7	6.7	29.5	37.8	10.7	11.4
Fluoride	.	.	.	<	<	<	<	0.137	0.128
Nitrate as N	.	.	.	<	.	0.96	.	2.94	2.9
Sulfate	.	.	.	1.7	1.1	4.7	6	20.6	24
Charge balance error (%)	.	.	.	-9.6	-2.2	-3.2	0.7	-4	-2.3
Trace Metals (mg/L)									
Aluminum	0.383	18.1	8.98	<	<	<	<	0.438	0.25
Arsenic (PMS)	.	.	.	.	.	.	.	<	0.00913
Barium	0.0379	0.174	0.0859	0.0849	0.0758	0.19	0.219	0.0638	0.0653
Beryllium	.	.	.	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	<	<
Cadmium	.	.	.	<	<	<	<	.	.
Chromium (PMS)	.	.	.	.	.	.	.	0.0208	<
Chromium	<	0.0215	0.0121	<	<	<	0.0603	.	.
Cobalt	.	.	.	0.0212	<	<	<	<	<
Copper	.	.	.	<	<	<	<	<	<
Iron	0.624	20.6	12.9	3.05	1.65	1.33	0.425	0.371	0.157
Lead (PMS)	.	.	.	.	.	.	.	0.00212	0.00115
Lead	<	0.0147	0.0093	<	<	0.0034	<	.	.
Lithium	.	.	.	<	<	0.242	0.312	<	<
Manganese	0.148	0.315	0.214	1.94	1.07	0.929	0.84	0.00853	<
Mercury (CVAA)	<	<	<	<	<	0.00023	.	<	<
Molybdenum	.	.	.	.	.	.	.	<	<
Nickel (PMS)	.	.	.	.	.	.	.	<	0.00675
Nickel	<	0.0186	0.0107	0.0218	0.0201	0.0181	0.0229	.	.
Selenium (PMS)	.	.	.	.	.	.	.	<	<
Strontium	0.0272	0.0626	0.0286	0.0258	0.0219	0.0873	0.0981	0.101	0.117
Thallium (PMS)	.	.	.	.	.	.	.	<	<
Uranium (PMS)	.	.	.	.	.	.	.	0.0262	0.0467
Uranium (KPA)	.	.	.	<	<	<	<	.	.
Vanadium	<	0.028	<	<	<	<	<	<	<
Zinc	<	0.105	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point		GW-056	GW-071		GW-077		GW-078		GW-079	
Functional Area		EXP-A	BG		BG		BG		BG	
Date Sampled		04/27/04	03/01/04	08/05/04	02/17/04	08/12/04	02/17/04	08/12/04	02/17/04	08/12/04
Program		GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Field Measurements										
Time Sampled		8:30	0.41	10:40	0.56	9:45	13:10	8:38	9:50	13:40
Measuring Point Elev. (ft)		891.49	928.90	928.90	919.30	919.30	918.10	918.10	981.20	981.20
Depth to Water (ft)		7.34	7.40	7.88	5.09	10.60	3.88	9.40	16.95	22.46
Groundwater Elevation (ft)		884.15	921.50	921.02	914.21	908.70	914.22	908.70	964.25	958.74
Conductivity (μmho/cm)		543	2,070	1,960	711	336	502	372	360	287
Dissolved Oxygen (ppm)		3.14	-0.04	1.04	0.81	0.61	5	2.04	0.3	0.42
Oxidation/Reduction (mV)		52	-662	-488	-8	4	146	208	-139	-149
Temperature (degrees C)		12	14.1	15.7	11.6	16.3	13.6	16.4	12.5	16.8
Turbidity (NTU)		.	.	.	16	16	11	26	15	18
pH		6.97	11.23	10.7	7.63	7.23	7.58	7.14	7.56	7.47
Miscellaneous Analytes										
Dissolved Solids (mg/L)		.	952	877	211	185	238	235	161	196
Suspended Solids (mg/L)		.	<	<	<	5.7	<	<	5.3	8.7
Turbidity (NTU)		.	0.479	1.13	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium		91.7	1.56	1.4	.	.	.	.	.	.
Magnesium		19.5	<	<	.	.	.	.	.	.
Potassium		<	2.18	2.43	.	.	.	.	.	.
Sodium		43.9	379	401	.	.	.	.	.	.
Alkalinity as CO3		.	728	758	.	.	.	.	.	.
Alkalinity as HCO3		.	2	24	.	.	.	.	.	.
Chloride		.	37.5	39.8	.	.	.	.	.	.
Fluoride		.	5.78	5.94	.	.	.	.	.	.
Nitrate as N		.	<	<	.	.	.	.	.	.
Sulfate		.	9.71	11.5	.	.	.	.	.	.
Charge balance error	(%)	.	-3.6	-0.6	.	.	.	.	.	.
Trace Metals (mg/L)										
Aluminum		1.26	1.06	0.958	.	.	.	.	.	.
Arsenic	(PMS)	<	0.009	<	.	.	.	.	.	.
Barium		0.0932	0.065	0.0727	.	.	.	.	.	.
Beryllium		<	<	<	.	.	.	.	.	.
Boron		<	0.777	0.847	.	.	.	.	.	.
Cadmium	(PMS)	0.0152 Q	<	<	.	.	.	.	.	.
Cadmium		.	.	.	.	.	.	.	.	.
Chromium	(PMS)	0.714	<	<	.	.	.	.	.	.
Chromium		.	.	.	.	.	.	.	.	.
Cobalt		<	<	<	.	.	.	.	.	.
Copper		0.0269	<	<	.	.	.	.	.	.
Iron		5.03	<	<	.	.	.	.	.	.
Lead	(PMS)	0.0157	0.00188	0.000823	.	.	.	.	.	.
Lead		.	.	.	.	.	.	.	.	.
Lithium		<	0.112	0.13	.	.	.	.	.	.
Manganese		0.523	<	<	.	.	.	.	.	.
Mercury	(CVAA)	<	<	<	.	.	.	.	.	.
Molybdenum		<	<	<	.	.	.	.	.	.
Nickel	(PMS)	0.361	<	<	.	.	.	.	.	.
Nickel		.	.	.	.	.	.	.	.	.
Selenium	(PMS)	<	<	<	.	.	.	.	.	.
Strontium		0.15	0.189	0.205	.	.	.	.	.	.
Thallium	(PMS)	<	<	<	.	.	.	.	.	.
Uranium	(PMS)	0.00322	<	<	.	.	.	.	.	.
Uranium	(KPA)	.	.	.	<	<	<	<	<	<
Vanadium		<	<	<	.	.	.	.	.	.
Zinc		0.0924	<	<	.	.	.	.	.	.

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-080				GW-082			GW-085	
Functional Area	BG				BG			OLF	
Date Sampled	02/17/04		08/12/04		03/01/04	08/05/04		02/23/04	
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup		Dup			Dup		Dup
Field Measurements									
Time Sampled	9:58	.	12:56	.	8:35	9:10	9:10	8:40	8:40
Measuring Point Elev. (ft)	981.00	.	981.00	.	964.00	964.00	964.00	983.57	983.57
Depth to Water (ft)	20.12	.	24.10	.	20.65	21.22	21.22	12.67	12.67
Groundwater Elevation (ft)	960.88	.	956.90	.	943.35	942.78	942.78	970.90	970.90
Conductivity (μmho/cm)	154	.	186	.	853	926	926	1,384	1,384
Dissolved Oxygen (ppm)	1.9	.	8.9	.	0.52	0.69	0.69	0.72	0.72
Oxidation/Reduction (mV)	-35	.	-56	.	83	5	5	265	265
Temperature (degrees C)	14	.	16.9	.	11.6	18.9	18.9	15.3	15.3
Turbidity (NTU)	91	.	19	.	.	.	.	.	.
pH	6.58	.	6.68	.	6.99	6.97	6.97	6.82	6.82
Miscellaneous Analytes									
Dissolved Solids (mg/L)	110	109	116	110	584	667	642	925	920
Suspended Solids (mg/L)	177 R	16.5 R	14.5	14.6	10	<	<	19	19
Turbidity (NTU)	.	.	.	.	11.9	2.52	2.64	9.28	11.1
Major Ions (mg/L)									
Calcium	.	.	.	.	140	147	151	224	237
Magnesium	.	.	.	.	16.6	17.6	17.7	15.3	16
Potassium	.	.	.	.	<	2.02	<	2.08	2.33
Sodium	.	.	.	.	8.2	8.73	8.76	11.4	11.9
Alkalinity as CO3	.	.	.	.	<	<	<	<	<
Alkalinity as HCO3	.	.	.	.	288	313	323	202	202
Chloride	.	.	.	.	88.4	106	99	8.75	8.71
Fluoride	.	.	.	.	0.112	<	<	<	<
Nitrate as N	.	.	.	.	<	<	<	120	120
Sulfate	.	.	.	.	6.55	6.43	6.44	6.91	6.93
Charge balance error (%)	.	.	.	.	1.9	-0.9	-0.1	0	2.7
Trace Metals (mg/L)									
Aluminum	.	.	.	.	<	<	<	0.592	1.16
Arsenic (PMS)	.	.	.	.	<	<	<	<	<
Barium	.	.	.	.	0.793	0.83	0.864	0.627	0.653
Beryllium	.	.	.	.	<	<	<	<	<
Boron	.	.	.	.	11.8	13.8	15	<	<
Cadmium (PMS)	.	.	.	.	<	<	<	<	<
Cadmium	.	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	0.0601	0.0156	0.022	<	<
Chromium	.	.	.	.	.	.	.	.	.
Cobalt	.	.	.	.	<	<	<	<	<
Copper	.	.	.	.	<	0.0231	<	<	<
Iron	.	.	.	.	3.69	0.777	1.13	0.366	0.736
Lead (PMS)	.	.	.	.	0.0156	0.00448	0.00702	0.00212	0.00211
Lead	.	.	.	.	.	.	.	.	.
Lithium	.	.	.	.	0.0348	0.0287	0.13	0.0196	0.0204
Manganese	.	.	.	.	0.645	0.863	0.912	0.0178	0.0262
Mercury (CVAA)	.	.	.	.	<	<	<	<	<
Molybdenum	.	.	.	.	<	<	<	<	<
Nickel (PMS)	.	.	.	.	0.175	0.0365	0.0321	0.0108	0.00906
Nickel	.	.	.	.	.	.	.	.	.
Selenium (PMS)	.	.	.	.	<	<	<	<	<
Strontium	.	.	.	.	0.267	0.281	0.285	0.538	0.559
Thallium (PMS)	.	.	.	.	<	<	<	<	<
Uranium (PMS)	.	.	.	.	<	<	<	<	<
Uranium (KPA)	<	<	<	<	.	.	.	.	.
Vanadium	.	.	.	.	<	<	<	<	<
Zinc	.	.	.	.	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-085	GW-098		GW-100			GW-101		GW-115
Functional Area	OLF	OLF		S3			S3		S3
Date Sampled	08/03/04	02/19/04	08/03/04	03/04/04	08/17/04		03/08/04	08/18/04	01/06/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC
Sample Type						Dup			
Field Measurements									
Time Sampled	9:40	8:10	8:30	10:20	10:20	10:20	9:15	9:40	10:15
Measuring Point Elev. (ft)	983.57	945.95	945.95	987.40	987.40	987.40	1,008.00	1,008.00	1,055.01
Depth to Water (ft)	13.93	10.46	14.54	5.13	6.05	6.05	8.45	9.60	7.95
Groundwater Elevation (ft)	969.64	935.49	931.41	982.27	981.35	981.35	999.55	998.40	1,047.06
Conductivity (μmho/cm)	1,126	1,370	1,446	1,778	2,020	2,020	1,250	993	1,162
Dissolved Oxygen (ppm)	0.95	3.96	2.06	1.19	1.18	1.18	0.16	0.17	0.45
Oxidation/Reduction (mV)	176	159	101	249	205	205	86	162	-47
Temperature (degrees C)	17.1	14.2	16.6	13.9	19.3	19.3	13.9	21.1	13
Turbidity (NTU)	.	.	.	.	.	.	.	.	18
pH	6.72	6.51	6.48	6.73	6.63	6.63	6.96	6.84	7.2
Miscellaneous Analytes									
Dissolved Solids (mg/L)	859	745	799	1,160	2,020	1,500	919	1,000	391
Suspended Solids (mg/L)	5	22	8	9	6	6	72	<	<
Turbidity (NTU)	2.77	2.9	1.16	3.15	4.76	4.7	18.2	21.7	.
Major Ions (mg/L)									
Calcium	171	235	226	320	318	311	208	173	95.6
Magnesium	11.5	28	28.3	24	23.4	23	34	27.8	16.6
Potassium	<	4.76	4.99	2.94	2.88	3.22	3	2.76	2.19
Sodium	9.71	28.6	29.2	6.89	7.02	7.01	18.7	17.1	12.2
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	207	424	548	232	240	240	416	439	265
Chloride	6.26	107	108	310	314	319	18	16.1	38.9
Fluoride	<	<	<	<	<	<	0.225	0.257	<
Nitrate as N	70.7	<	<	54.3	51.3	52	61	84.2	<
Sulfate	5.94	25	24.6	19.5	19.4	19.6	56.5	13.6	15.7
Charge balance error (%)	2.1	12.3	1.7	1.8	1.3	-0.2	-1.1	-13.9	<
Trace Metals (mg/L)									
Aluminum	0.537	0.785	<	0.426	0.524	0.312	1.88	1.06	<
Arsenic (PMS)	<	0.00789	<	<	<	<	<	<	.
Barium	0.471	0.704	0.697	0.736	0.742	0.73	0.695	0.707	0.215
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	0.19	0.198	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	<	<	<	.
Cadmium	.	.	.	.	.	.	.	.	<
Chromium (PMS)	<	<	<	0.0471	0.0214	0.0231	<	<	.
Chromium	.	.	.	.	.	.	.	.	<
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	0.33	0.218	0.136	0.378	0.395	0.18	3.47	2.06	0.719
Lead (PMS)	0.000917	0.00888	0.00701	0.00347	0.00349	0.00241	0.00209	0.000756	.
Lead	.	.	.	.	.	.	.	.	<
Lithium	0.0169	0.0403	0.0362	0.0184	0.0186	0.0192	<	<	0.0221
Manganese	0.0138	0.914	0.881	0.124	0.13	0.0791	2.98	3.82	0.797
Mercury (CVAA)	<	<	<	<	<	<	0.000957	0.000264	<
Molybdenum	<	<	<	<	<	<	<	<	.
Nickel (PMS)	<	0.0564	0.0416	0.0599	0.0105	0.0116	0.00593	<	.
Nickel	.	.	.	.	.	.	.	.	<
Selenium (PMS)	<	0.0297	<	<	<	<	<	<	.
Strontium	0.407	0.993	1.04	0.585	0.578	0.574	0.911	0.752	0.163
Thallium (PMS)	<	<	<	<	<	<	<	<	.
Uranium (PMS)	<	0.00186	0.00156	<	0.00138	0.00162	0.0032	0.00367	.
Uranium (KPA)	.	.	.	.	.	.	.	.	<
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-133-01	GW-133-05	GW-133-08	GW-133-10	GW-133-14	GW-133-17	GW-133-21	
Functional Area	S3	S3	S3	S3	S3	S3	S3	
Date Sampled	08/23/04	08/23/04	08/23/04	08/24/04	08/26/04	08/26/04	08/26/04	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type								Dup
Field Measurements								
Time Sampled	14:47	16:17	17:30	15:20	10:55	13:40	15:20	15:20
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	1,373	989	837	1,013	1,169	904	456	456
Dissolved Oxygen (ppm)	5.8	8.2	7.2	7.2	6	7.4	6.4	6.4
Oxidation/Reduction (mV)	.	.	.	.	.	.	.	.
Temperature (degrees C)	25.1	24.9	23.7	23.7	20.7	21.4	21.8	21.8
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	8.5	8.9	8.9	8.7	8.4	8.9	7.9	7.9
Miscellaneous Analytes								
Dissolved Solids (mg/L)	1,190	664	551	717	746	672	355	333
Suspended Solids (mg/L)	27	7	<	15	<	7	<	<
Turbidity (NTU)	396	66.8	11.3	20.7	7.01	53.5	2.19	9.1
Major Ions (mg/L)								
Calcium	1.67	0.947	1.04	1.14	1.14	1.53	26.2	25.9
Magnesium	0.515	0.239	0.314	0.355	0.307	0.664	12.8	12.7
Potassium	2.13	<	<	2.27	<	2.33	3.19	3.45
Sodium	380	277	229	286	310	236	66.4	65
Alkalinity as CO3	<	36.8	44.2	31.4	22	27.4	<	<
Alkalinity as HCO3	815	538	443	562	663	496	266	264
Chloride	7.71	1.8	1.49	1.58	2.67	1.62	0.87	0.9
Fluoride	4.91	2.16	0.905	2.78	3.12	2.98	<	<
Nitrate as N	<	<	<	<	<	<	<	<
Sulfate	0.75	2.03	1.22	3.28	0.67	0.7	0.52	0.58
Charge balance error (%)	-0.2	1.7	0.9	1.9	-1.4	-1.1	-0.2	-0.6
Trace Metals (mg/L)								
Aluminum	2.02	1.45	1.08	2.11	<	2.78	<	0.973
Arsenic (PMS)	<	<	<	<	<	<	<	<
Barium	0.0559	0.0645	0.0539	0.0698	0.0908	0.127	0.853	0.844
Beryllium	<	<	<	<	<	<	<	<
Boron	0.201	0.232	0.175	0.206	0.189	0.287	0.101	0.102
Cadmium (PMS)	<	<	<	<	<	<	<	<
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	0.0323	0.0262	0.0298	0.0333	0.0257	0.0361	0.0258	0.0339
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	1.29	0.634	0.837	0.7	0.0984	2.07	0.211	0.925
Lead (PMS)	0.000928	<	<	<	<	0.000828	<	<
Lead	.	.	.	.	.	.	.	.
Lithium	0.0822	0.0539	0.0454	0.0616	0.0749	0.0603	0.0285	0.0294
Manganese	0.0146	0.00758	0.00753	0.00578	<	0.0206	0.016	0.0234
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	0.223	<	<	<
Nickel (PMS)	0.0059	<	<	0.00678	<	<	<	0.00625
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	<	<	<
Strontium	0.09	0.0557	0.0555	0.0777	0.0989	0.0908	1.66	1.62
Thallium (PMS)	0.000504	<	<	<	<	<	<	<
Uranium (PMS)	<	<	<	<	<	<	<	<
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	0.17	<	0.0693	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-133-24	GW-134-05	GW-134-11	GW-134-15		GW-134-18	GW-134-21	GW-134-25
Functional Area	S3	S3	S3	S3		S3	S3	S3
Date Sampled	08/26/04	08/08/04	08/08/04	08/09/04		08/10/04	08/10/04	08/10/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type					Dup			
Field Measurements								
Time Sampled	16:15	16:50	18:35	15:45	15:45	14:00	15:22	16:28
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	421	10,700	7,470	7,450	7,450	8,720	5,780	1,380
Dissolved Oxygen (ppm)	6.2	4	3.6	6.8	6.8	6.6	6.6	7.6
Oxidation/Reduction (mV)	.	.	.	.	.	.	.	.
Temperature (degrees C)	24.7	22.2	25.7	25.9	25.9	23.9	24.9	25.8
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	7.8	7.2	7.6	7.6	7.6	7.6	7.7	8.9
Miscellaneous Analytes								
Dissolved Solids (mg/L)	299	8,510	6,330	6,460	7,270	4,880	6,370	929
Suspended Solids (mg/L)	7	22	7	<	<	<	<	<
Turbidity (NTU)	5.24	2.02	1.88	2.27	2.33	0.861	0.881	1.08
Major Ions (mg/L)								
Calcium	37.9	66.4	27.8	28.5	28.5	40.3	15.7	1.57
Magnesium	8.19	22.3	8.42	8.37	8.46	10.7	4.11	0.345
Potassium	2.38	14.7	10.4	10.3	10.4	14.5	10.4	2.83
Sodium	44.9	2,830	1,860	1,870	1,880	2,110	1,410	370
Alkalinity as CO3	<	<	<	<	<	<	<	59.8
Alkalinity as HCO3	223	1,130	893	896	892	336	615	712
Chloride	2.92	1,380	95.2	97.3	95.7	14.8	76.4	6.34
Fluoride	0.231	2.1	3.09	3.02	3.04	1.52	1.81	7.22
Nitrate as N	<	860	877	887	887	1,340	733	<
Sulfate	1.58	11.6	33.5	31.1	31.2	13.1	19.4	14.1
Charge balance error (%)	-0.1	2.1	-0.5	-0.6	-0.3	-4.1	-3.5	0
Trace Metals (mg/L)								
Aluminum	0.215	<	<	<	<	<	<	<
Arsenic (PMS)	<	0.0143	<	<	<	<	<	<
Barium	0.555	2.84	0.909	0.907	0.904	2.35	0.821	0.0552
Beryllium	<	<	<	<	<	<	<	<
Boron	<	0.605	0.54	0.53	0.531	0.593	0.873	1.64
Cadmium (PMS)	<	<	<	<	<	<	<	<
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	0.0389	<	<	<	<	<	<	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.506	0.161	0.054	0.096	0.0923	<	<	0.0791
Lead (PMS)	<	<	<	0.000834	0.00119	<	<	0.000599
Lead	.	.	.	.	.	.	.	.
Lithium	0.022	1.32	0.883	0.895	0.91	1.24	0.87	0.231
Manganese	0.0279	0.017	0.0109	0.0107	0.0108	0.00917	<	<
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	0.0557	<
Nickel (PMS)	0.012	<	<	<	<	<	<	<
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	0.0661	<	<	<	<	<	<
Strontium	0.465	8.65	3.29	3.35	3.36	4.99	2.04	0.138
Thallium (PMS)	<	0.000606	<	<	<	<	<	<
Uranium (PMS)	<	0.00274	0.00248	0.00277	0.00301	0.00224	0.0023	0.00078
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	0.0544	0.226	0.324	0.236	0.356	0.0658	<	0.253

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-134-29	GW-134-33	GW-134-35	GW-134-36	GW-135-03	GW-135-06	GW-135-11	GW-135-15
Functional Area	S3	S3	S3	S3	S3	S3	S3	S3
Date Sampled	08/11/04	08/11/04	08/11/04	08/11/04	08/21/04	08/21/04	08/21/04	08/21/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type								
Field Measurements								
Time Sampled	13:28	14:13	14:55	15:35	11:00	14:15	17:55	19:55
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	700	1,155	1,604	1,082	60,300	9,100	3,086	583
Dissolved Oxygen (ppm)	8	8.1	7	6.8	4.3	6.1	9	8.6
Oxidation/Reduction (mV)	.	.	.	.	.	.	.	.
Temperature (degrees C)	24.9	23.5	23.5	24.9	18.4	21.2	24.1	20.3
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	8.7	7.2	7	7.2	6.4	6.8	6.87	7.7
Miscellaneous Analytes								
Dissolved Solids (mg/L)	478	929	1,540	982	45,000	7,380	3,100	243
Suspended Solids (mg/L)	<	<	<	2	3	2	<	4
Turbidity (NTU)	0.884	0.562	0.963	5.02	14.1	327	12.9	11.6
Major Ions (mg/L)								
Calcium	2.54	187	237	183	1,660	469	460	44.5
Magnesium	0.632	27.9	53.4	18.6	755	147	162	22
Potassium	2.19	8.96	5.25	13.1	110	<	<	<
Sodium	173	13.6	13.2	13.8	14,400	1,750	172	3.46
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	384	259	241	267	265	344	165	213
Chloride	1.9	16.6	24.4	14.6	25,300	1,540	7,480 Q	2.44
Fluoride	0.838	<	<	<	0.432	0.768	0.797	1.14
Nitrate as N	<	91.4	160	81.8	<	<	<	<
Sulfate	5.08	13.8	16.3	12.2	2,800	2990	2750	11
Charge balance error (%)	-0.8	0	-1	-1	-0.2	-0.5	-72.2 R	-4.9
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	1.07	0.0964	<	<
Barium	0.0524	0.281	0.531	0.153	0.0947	<	<	0.188
Beryllium	<	<	<	<	<	<	<	<
Boron	1.41	<	<	<	3.29	2.52	1.51	<
Cadmium (PMS)	<	<	<	<	<	<	<	<
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	<	<	<	0.011	0.0734	0.021	0.0134	0.0171
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.0543	0.0605	0.223	0.612	0.796	0.697	<	0.269
Lead (PMS)	<	<	0.00161	<	0.00233	0.00104	0.000561	0.000601
Lead	.	.	.	.	.	.	.	.
Lithium	0.116	0.0236	0.0159	0.0376	12.8	1.49	0.235	<
Manganese	<	0.114	0.0598	0.173	0.328	0.0571	<	0.0366
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	<	<	0.00535	0.00873	0.049	0.0139	0.00951	<
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	4.9	0.424	<	<
Strontium	0.185	0.798	1.14	0.754	38.8	5.18	7.73	0.567
Thallium (PMS)	<	<	<	<	<	<	<	<
Uranium (PMS)	<	<	<	<	<	<	<	<
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	0.196	0.107	0.121	0.0702	<	<	<	0.282

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-135-19	GW-135-23	GW-135-26	GW-135-30	GW-135-34	GW-135-39		GW-225	
Functional Area	S3	S3	S3	S3	S3	S3		OLF	
Date Sampled	08/22/04	08/22/04	08/22/04	08/22/04	08/22/04	08/22/04		02/17/04	07/29/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type							Dup		
Field Measurements									
Time Sampled	8:50	10:37	12:05	14:50	16:20	17:55	17:55	10:10	9:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	943.11	943.11
Depth to Water (ft)	.	.	.	.	.	.	.	7.70	16.74
Groundwater Elevation (ft)	.	.	.	.	.	.	.	935.41	926.37
Conductivity (μmho/cm)	346	3,150	2,702	357	332	310	320	1,056	1,073
Dissolved Oxygen (ppm)	10.1	8.4	9.2	9.8	9.3	10	10	-0.04	0.6
Oxidation/Reduction (mV)	.	.	.	.	.	.	.	220	95
Temperature (degrees C)	17.4	17.8	20.5	21.2	23	21.3	21.3	12.3	15.5
Turbidity (NTU)	.	.	.	.	.	.	.	.	.
pH	7.5	7.2	7.1	7.8	7.6	7.5	7.5	7.24	7.42
Miscellaneous Analytes									
Dissolved Solids (mg/L)	192	3,390	2,940	188	187	178	183	566	581
Suspended Solids (mg/L)	<	2	6	<	<	<	<	<	<
Turbidity (NTU)	2.27	11.4	57.4	1.51	1.14	0.612	0.614	1.22	0.517
Major Ions (mg/L)									
Calcium	43.1	528	522	40.6	39.3	39.1	37.3	111	107
Magnesium	20.6	229	176	23.8	22	22.7	21.3	47.8	46.7
Potassium	<	67.6	25.1	<	<	<	<	2.75	2.85
Sodium	0.898	77.5	5.18	0.493	0.527	0.76	0.715	25	24.1
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	183	208	188	188	191	182	185	218	220
Chloride	2.42	3.48	2.18	1.12	1.49	1.75	1.87	62.2	72.3
Fluoride	0.364	1.93	1.92	0.208	<	<	<	0.412	0.48
Nitrate as N	<	<	<	0.0606	0.167	0.245	0.246	34.2	37.6
Sulfate	14.8	2,190	1,850	4.01	3.31	1.62	1.64	49.4	53.1
Charge balance error (%)	-2.1	0.3	-1.3	1.5	-1.9	1.5	-2.1	5.1	0.2
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	<	<	<	<	<
Barium	0.282	0.0154	0.0138	0.843	0.82	0.0571	0.0505	0.176	0.166
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	2.66	1.15	<	<	<	<	0.122	0.13
Cadmium (PMS)	<	<	<	<	<	<	<	<	<
Cadmium	.	.	.	.	.	.	.	.	.
Chromium (PMS)	0.0157	0.025	0.0217	0.0312	0.0284	0.0314	0.0166	<	<
Chromium	.	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	0.175	1.26	4.76	0.0965	<	<	<	0.254	0.0834
Lead (PMS)	<	<	<	0.000672	<	0.000579	0.000885	<	<
Lead	.	.	.	.	.	.	.	.	.
Lithium	<	0.515	0.278	<	<	<	<	0.0204	0.0207
Manganese	0.00618	0.0306	0.0501	<	<	<	<	0.0057	0.00582
Mercury (CVAA)	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<
Nickel (PMS)	<	0.00733	0.00692	<	<	<	<	0.00527	<
Nickel	.	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	<	<	<	<
Strontium	0.0992	8.8	7.92	0.0445	0.0204	0.0131	0.0115	1.75	1.93
Thallium (PMS)	<	<	<	<	<	<	<	<	<
Uranium (PMS)	0.00119	<	<	0.000699	0.000889	<	<	0.00271	0.00292
Uranium (KPA)	.	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	0.11	0.122	<	0.0921	0.101	0.287	0.0784	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-226		GW-229					
Functional Area	OLF		OLF					
Date Sampled	02/17/04	07/28/04	02/11/04	02/12/04		07/28/04	07/29/04	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type				Conv	Conv-F		Conv	Conv-F
Field Measurements								
Time Sampled	9:10	9:55	9:40	8:27	.	8:30	8:30	.
Measuring Point Elev. (ft)	943.40	943.40	949.00	949.00	.	949.00	949.00	.
Depth to Water (ft)	7.93	16.59	14.68	14.93	.	25.31	25.66	.
Groundwater Elevation (ft)	935.47	926.81	934.32	934.07	.	923.69	923.34	.
Conductivity (μmho/cm)	1,168	1,082	1,492	1,364	.	1,738	1,667	.
Dissolved Oxygen (ppm)	0.01	0.32	-0.04	0.55	.	1.21	0.43	.
Oxidation/Reduction (mV)	178	10	-75	-56	.	-85	-48	.
Temperature (degrees C)	10.7	17.2	14.3	14.1	.	15.6	16.1	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	6.74	6.97	6.61	6.57	.	6.71	6.4	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	646	601	846	738	.	941	911	.
Suspended Solids (mg/L)	7	3	16	9	.	22	25	.
Turbidity (NTU)	42.8	31.6	200	94.4	.	162	22.4	.
Major Ions (mg/L)								
Calcium	150	117	174	164	157	185	178	178
Magnesium	45.9	40.2	33.6	30.6	29.9	35	33.3	34
Potassium	3.12	2.94	12.4	11.2	11	13.1	12.7	13.1
Sodium	26.5	24.6	72.1	55.5	54.3	82.4	76.4	78
Alkalinity as CO3	<	<	<	<	.	<	<	.
Alkalinity as HCO3	354	297	558	532	.	595	570	.
Chloride	77.7	68.4	129	92.3	.	152	151	.
Fluoride	0.105	<	0.156	0.16	.	0.142	0.14	.
Nitrate as N	32.3	20.9	<	<	.	<	<	.
Sulfate	30.3	32.3	15.6	10.7	.	16.6	19.4	.
Charge balance error (%)	1.2	1.3	-0.7	-0.2	.	-1.5	-2.5	.
Trace Metals (mg/L)								
Aluminum	0.555	<	<	0.311	<	<	<	<
Arsenic (PMS)	<	<	0.0139	0.013	0.0124	0.00754	0.00751	0.00958
Barium	0.229	0.165	1.31	1.24	1.22	1.41	1.32	1.35
Beryllium	<	<	<	<	<	<	<	<
Boron	0.176	0.15	3.46	2.48	2.43	4.02	3.64	3.73
Cadmium (PMS)	<	<	<	<	<	<	<	<
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	<	<	<	<	<	<	<	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	4.17	2.99	25.2	29.6	29	25.6	27.3	25.5
Lead (PMS)	0.000537	<	<	<	0.00214	<	<	<
Lead	.	.	.	.	.	.	.	.
Lithium	0.0186	0.0174	0.127	0.125	0.122	0.127	0.13	0.134
Manganese	0.924	0.329	6.68	9.44	9.24	6.47	7.06	7.08
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	0.0132	<	0.05	0.0301	0.0305	0.0671	0.0427	0.0412
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	0.0197	0.0186	0.0172	<	<	<
Strontium	0.733	0.583	0.537	0.467	0.458	0.564	0.525	0.537
Thallium (PMS)	<	<	<	<	<	0.000855	<	<
Uranium (PMS)	0.0125	0.00694	0.182	0.131	0.135	0.206	0.208	0.22
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-236			GW-237		GW-246		GW-257	
Functional Area	S3			BG		S3		BG	
Date Sampled	03/08/04		08/18/04	03/03/04	09/20/04	03/10/04	08/19/04	03/03/04	08/16/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup							
Field Measurements									
Time Sampled	10:40	10:40	8:30	8:30	9:30	10:05	10:10	9:25	8:30
Measuring Point Elev. (ft)	983.21	983.21	983.21	921.02	921.02	1,009.19	1,009.19	961.68	961.68
Depth to Water (ft)	9.08	9.08	11.68	10.63	11.24	12.64	14.04	27.34	28.91
Groundwater Elevation (ft)	974.13	974.13	971.53	910.39	909.78	996.55	995.15	934.34	932.77
Conductivity (μmho/cm)	964	964	799	226	250	17,760	19,700	294	29 R
Dissolved Oxygen (ppm)	0.83	0.83	0.37	2.16	1.2	1.56	0.94	0.49	0.5
Oxidation/Reduction (mV)	243	243	273	209	211	310	350	213	206
Temperature (degrees C)	12.4	12.4	17.1	11.6	17.6	16	18	15.8	16.4
Turbidity (NTU)	.	.	.	.	.	.	.	.	.
pH	5.57	5.57	5.16	6.09	6.21	4.69	4.63	6.33	6.32
Miscellaneous Analytes									
Dissolved Solids (mg/L)	584	606	538	115	135	17,700	19,100	169	187
Suspended Solids (mg/L)	<	<	<	1	24	<	2	<	<
Turbidity (NTU)	0.324	0.32	0.673	1.98	19.4	0.552	0.261	0.191	0.203
Major Ions (mg/L)									
Calcium	118	117	87.2	38.2	44.8	2,840	2,840	41.4	43.2
Magnesium	15.6	15.5	11.6	1.86	1.96	624	617	3.61	3.67
Potassium	3.7	3.92	3.2	<	<	<	34.1	<	<
Sodium	21.6	21.6	19.7	2.59	2.53	526	459	7.87	8.67
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	65.2	61	44.1	90.2	21.2 Q	<	41.8	125	130
Chloride	25	25.6	23.5	1.74	1.46	301	296	1.72	1.62
Fluoride	0.388	0.408	0.299	<	<	31.6	3.67	0.118	0.122
Nitrate as N	63.5	61.7	42.5	0.129	0.233	2,980	2,850	0.253	0.267
Sulfate	83	89	84	8.18	8.07	18.3	20	9.54	9.07
Charge balance error (%)	-0.5	-0.4	-0.7	3.4	58.8 R	-1.7	0	-1.2	-0.4
Trace Metals (mg/L)									
Aluminum	0.596	0.552	0.488	0.298	<	85.8	67.8	<	<
Arsenic (PMS)	<	<	<	<	<	<	<	<	<
Barium	0.102	0.103	0.0841	0.0578	0.0586	5.06	10.8	0.0975	0.104
Beryllium	0.00124	0.00128	0.00105	<	<	0.0418	0.0348	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	0.00254	0.0026	<	<	<	0.49	0.37	<	<
Cadmium	.	.	.	.	.	.	.	.	.
Chromium (PMS)	<	<	<	<	0.0322	<	<	<	<
Chromium	.	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	0.639	0.494	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	<	<	<	0.076	0.0583	<	<	<	<
Lead (PMS)	<	<	<	<	<	0.00104	0.000951	<	<
Lead	.	.	.	.	.	.	.	.	.
Lithium	<	<	<	<	<	0.706	0.714	<	<
Manganese	2.34	2.35	1.84	<	<	129	103	<	<
Mercury (CVAA)	<	<	<	<	<	0.00226	0.00156	<	<
Molybdenum	<	<	<	<	<	<	<	<	<
Nickel (PMS)	0.0228	0.0233	0.0174	<	<	6.36	4.18	<	<
Nickel	.	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	0.0434	<	<	<
Strontium	0.273	0.272	0.202	0.0602	0.0658	10.6	11.1	0.067	0.0689
Thallium (PMS)	<	<	<	<	<	0.000542	0.000599	<	<
Uranium (PMS)	0.00979	0.0101	0.0116	<	<	0.595	0.591	<	<
Uranium (KPA)	.	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-276		GW-311		GW-315		GW-363	
Functional Area	S3		RS		SPI		EMWMF	
Date Sampled	01/06/04	07/08/04	02/18/04	08/02/04	02/18/04	08/02/04	03/15/04	06/08/04
Program	BJC	BJC	GWPP	GWPP	GWPP	GWPP	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	14:20	9:25	9:15	8:45	10:20	9:07	9:40	9:40
Measuring Point Elev. (ft)	1,001.57	1,001.57	999.52	999.52	1,047.45	1,047.45	958.71	958.71
Depth to Water (ft)	5.27	5.56	31.22	38.75	52.90	58.01	4.25	4.90
Groundwater Elevation (ft)	996.30	996.01	968.30	960.77	994.55	989.44	954.46	953.81
Conductivity (μmho/cm)	1,803	1,009	495	547	793	801	658	723
Dissolved Oxygen (ppm)	6.13	0.79	3.7	1.84	0.1	1.61	2.05	1.03
Oxidation/Reduction (mV)	187	325	295	198	278	173	125	175
Temperature (degrees C)	14.7	23.9	13	16.1	13.8	16	13.5	20.6
Turbidity (NTU)	26	6	.	.	.	.	35	12
pH	4.21	4.25	6.94	6.99	7.08	6.9	9.02	9.08
Miscellaneous Analytes								
Dissolved Solids (mg/L)	822	.	264	311	450	477	.	.
Suspended Solids (mg/L)	6	.	<	<	<	<	.	.
Turbidity (NTU)	.	.	0.225	0.252	0.238	0.261	.	.
Major Ions (mg/L)								
Calcium	54	54.2	89.2	98.8	131	129	2.26	2.01
Magnesium	9.61	10.1	6.03	7.22	16.2	15.7	0.823	0.81
Potassium	9.3	9.93	<	<	3.75	3.79	2.13	1.84
Sodium	93.3	94.6	3.36	4.06	7.67	8.53	97.9	107
Alkalinity as CO3	<	<	<	<	<	<	.	.
Alkalinity as HCO3	<	2.5	229	272	278	292	.	.
Chloride	167	182	2.32	1.6	13.1	14.8	.	.
Fluoride	1.3	2.2	<	<	<	<	.	.
Nitrate as N	32	30.6	0.398	0.282	6.24	6.51	.	.
Sulfate	53.6	63.2	3.59	3	77.9	67.5	.	.
Charge balance error (%)	-2.1	-5	3.5	1.2	1.9	0.4	.	.
Trace Metals (mg/L)								
Aluminum	4.38	4.47	<	<	<	<	<	<
Arsenic (PMS)	.	.	<	<	<	<	.	.
Barium	0.135	0.137	0.0208	0.0237	0.0649	0.0648	0.0769	0.0666
Beryllium	0.0047	0.0048	<	<	<	<	.	.
Boron	<	<	<	<	<	<	0.321	0.312
Cadmium (PMS)	.	.	<	<	<	<	.	.
Cadmium	0.0181	0.018	.	.	.	.	.	.
Chromium (PMS)	.	.	<	<	<	<	.	.
Chromium	0.0321	0.0425	.	.	.	.	<	<
Cobalt	0.0842	0.0901	<	<	<	<	.	.
Copper	<	<	<	<	<	<	.	.
Iron	0.263	0.166	<	<	<	<	<	0.0623
Lead (PMS)	.	.	<	<	<	<	.	.
Lead	<	<	.	.	.	.	<	<
Lithium	0.0212	0.0216	<	<	<	<	.	.
Manganese	3.49	3.74	<	<	0.0628	0.0586	<	<
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	.	.	<	<	<	<	.	.
Nickel (PMS)	.	.	<	<	0.00633	<	.	.
Nickel	0.22	0.247	.	.	.	.	<	<
Selenium (PMS)	.	.	<	<	<	<	.	.
Strontium	0.129	0.137	0.0792	0.0868	0.217	0.214	0.0963	0.0816
Thallium (PMS)	.	.	<	<	<	<	.	.
Uranium (PMS)	.	.	<	0.000566	0.00256	0.00212	.	.
Uranium (KPA)	0.613	0.86	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	0.0599	0.0775	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-363		GW-526		GW-537		GW-615	
Functional Area	EMWMF		S3		OLF		S3	
Date Sampled	09/08/04	11/18/04	02/17/04	08/16/04	02/23/04	08/03/04	03/10/04	08/19/04
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP
Sample Type								
Field Measurements								
Time Sampled	9:40	10:00	14:35	9:20	9:35	10:25	8:40	9:05
Measuring Point Elev. (ft)	958.71	958.71	998.25	998.25	976.65	976.65	1,017.55	1,017.55
Depth to Water (ft)	4.94	4.41	13.20	13.47	5.72	6.60	11.97	12.98
Groundwater Elevation (ft)	953.77	954.30	985.05	984.78	970.93	970.05	1,005.58	1,004.57
Conductivity (μmho/cm)	1,027	655	5,660	6,970	4,470	5,080	36,900	62,900
Dissolved Oxygen (ppm)	0.93	0.89	0.59	0.77	0.56	0.49	1.67	0.97
Oxidation/Reduction (mV)	186	186	82	196	272	203	113	73
Temperature (degrees C)	20.5	17.2	10.3	17	13.3	15.5	14.1	19.4
Turbidity (NTU)	15	7	8	16	.	.	.	.
pH	8.52	9.02	8.44	8	6.76	6.51	6.18	6.06
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	1,990	7,500	3,600	4,000	63,600	65,900
Suspended Solids (mg/L)	.	.	6.6	5.7	<	<	3	3
Turbidity (NTU)	.	.	.	.	0.274	0.148	4.21	1.61
Major Ions (mg/L)								
Calcium	2.14	2.34	180	166	835	817	9,920	9,610
Magnesium	0.777	0.867	59.8	61.1	62.1	61.2	2,430	2,460
Potassium	1.88	1.84	18.6	23.4	3.41	3.28	117	125
Sodium	115	107	1,700	1,550	39.9	39.8	2,400	2,430
Alkalinity as CO3	.	.	<	<	<	<	<	<
Alkalinity as HCO3	.	.	66.3	43.1	311	308	260	281
Chloride	.	.	27.1	29.9	32	28.1	113	111
Fluoride	.	.	<	<	<	<	<	0.107
Nitrate as N	.	.	1,310	1,150	566	539	11,000	11,000
Sulfate	.	.	2.8	4.6	4.43	6.5	<	<
Charge balance error (%)	.	.	-4	-1.6	1	2.2	0.5	-0.2
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic (PMS)	.	.	.	.	<	<	0.0209	<
Barium	0.0662	0.0725	15.9	15.2	2	1.98	378	401
Beryllium	.	.	<	<	<	<	<	<
Boron	0.33	0.325	0.218	0.218	<	<	<	<
Cadmium (PMS)	.	.	.	.	<	<	0.0201	0.0215
Cadmium	.	.	<	<	.	.	.	.
Chromium (PMS)	.	.	.	.	<	<	<	<
Chromium	<	<	<	<	.	.	.	.
Cobalt	.	.	<	<	<	<	<	<
Copper	.	.	<	<	<	<	<	<
Iron	0.0552	<	<	0.13	<	<	4.44	4.5
Lead (PMS)	.	.	.	.	<	<	0.000745	0.000639
Lead	<	<	<	<	.	.	.	.
Lithium	.	.	1.1	0.742	0.0374	0.0381	1.03	1.17
Manganese	<	<	0.0325	0.0319	<	<	23.3	22.8
Mercury (CVAA)	<	<	.	.	<	<	<	<
Molybdenum	.	.	<	.	<	<	<	<
Nickel (PMS)	.	.	.	.	0.0311	0.0071	0.228	0.22
Nickel	<	<	<	<	.	.	.	.
Selenium (PMS)	.	.	.	.	<	<	0.0905	<
Strontium	0.0883	0.0958	19.6	19.8	2.28	2.25	302	303
Thallium (PMS)	.	.	.	.	<	<	0.000701	0.00088
Uranium (PMS)	.	.	.	.	0.00127	0.00141	1.18	1.22
Uranium (KPA)	.	.	<	<	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-627		GW-639				GW-653	
Functional Area	BG		EMWMF				BG	
Date Sampled	02/25/04	08/04/04	03/10/04	06/08/04	09/14/04	11/11/04	02/25/04	08/04/04
Program	GWPP	GWPP	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type								
Field Measurements								
Time Sampled	9:45	10:10	9:40	9:35	9:06	9:35	8:40	8:45
Measuring Point Elev. (ft)	943.51	943.51	940.70	940.70	940.70	940.70	931.84	931.84
Depth to Water (ft)	23.48	24.70	9.98	11.55	11.70	11.05	21.58	24.08
Groundwater Elevation (ft)	920.03	918.81	930.72	929.15	929.00	929.65	910.26	907.76
Conductivity (μmho/cm)	1,305	1,339	1,434	1,749	1,818	1,236	36	61
Dissolved Oxygen (ppm)	0	0.97	0.71	0.99	2.89	0.86	7.52	2.63
Oxidation/Reduction (mV)	-123	-178	164	154	145	191	376	245
Temperature (degrees C)	12.8	16.1	9.6	19	17.8	15	13	14.2
Turbidity (NTU)	.	.	11	12	25	10	.	.
pH	9.17	9.13	9.38	9.14	9.27	9.23	5.05	5.21
Miscellaneous Analytes								
Dissolved Solids (mg/L)	726	744	.	.	.	.	38	32
Suspended Solids (mg/L)	<	<	.	.	.	.	<	<
Turbidity (NTU)	0.412	0.636	.	.	.	.	0.462	0.669
Major Ions (mg/L)								
Calcium	1.25	1.27	1.26	1.21	1.26	1.18	2.02	2.13
Magnesium	0.24	0.249	0.438	0.442	0.446	0.416	1.09	1.14
Potassium	<	<	2.89	2.86	3.16	2.83	<	<
Sodium	306	302	196	205	198	195	2.1	2.21
Alkalinity as CO3	88.8	93.2	.	.	.	.	<	<
Alkalinity as HCO3	459	481	.	.	.	.	12.4	13.6
Chloride	55.2	57.3	.	.	.	.	1.08	1.02
Fluoride	4.59	4.7	.	.	.	.	<	<
Nitrate as N	<	<	.	.	.	.	<	<
Sulfate	7.74	6.31	.	.	.	.	2.42	1.51
Charge balance error (%)	1.8	-1	.	.	.	.	-6.1	-4.7
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	.	.	.	.	<	<
Barium	0.0466	0.0464	0.0817	0.0752	0.0815	0.0778	0.0339	0.0349
Beryllium	<	<	.	.	.	.	<	<
Boron	0.499	0.496	0.612	0.584	0.604	0.583	<	<
Cadmium (PMS)	<	<	.	.	.	.	<	<
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	<	<	.	.	.	.	<	0.0102
Chromium	.	.	<	<	<	<	.	.
Cobalt	<	<	.	.	.	.	<	<
Copper	<	<	.	.	.	.	<	<
Iron	0.138	0.0904	0.0975	0.154	0.125	0.0933	<	0.0547
Lead (PMS)	<	0.000591	.	.	.	.	<	<
Lead	.	.	<	<	<	<	.	.
Lithium	0.0907	0.092	.	.	.	.	<	<
Manganese	0.0133	0.0125	<	<	<	<	<	<
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	.	.	.	.	<	<
Nickel (PMS)	<	<	.	.	.	.	<	<
Nickel	.	.	<	<	<	<	.	.
Selenium (PMS)	<	<	.	.	.	.	<	<
Strontium	0.088	0.0866	0.132	0.115	0.132	0.124	0.0177	0.0187
Thallium (PMS)	<	<	.	.	.	.	<	<
Uranium (PMS)	<	<	.	.	.	.	<	<
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-683		GW-684		GW-695		GW-703	
Functional Area	EXP-A		EXP-A		EXP-B		EXP-B	
Date Sampled	02/19/04	08/16/04	02/19/04	08/16/04	02/03/04	07/21/04	02/03/04	07/21/04
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP
Sample Type								
Field Measurements								
Time Sampled	15:15	9:00	9:45	13:30	10:20	10:15	9:15	9:20
Measuring Point Elev. (ft)	972.23	972.23	898.83	898.83	939.54	939.54	954.69	954.69
Depth to Water (ft)	88.40	88.98	15.15	15.69	26.05	29.66	40.93	43.58
Groundwater Elevation (ft)	883.83	883.25	883.68	883.14	913.49	909.88	913.76	911.11
Conductivity (μmho/cm)	447	761	649	819	535	537	716	722
Dissolved Oxygen (ppm)	10.65	3.1	1.12	0.47	3.4	1.81	0.09	0.98
Oxidation/Reduction (mV)	187	198	184	142	166	202	172	206
Temperature (degrees C)	14.1	14.7	12.3	16	10.1	15.3	11.7	14.7
Turbidity (NTU)	140	11	45	19	.	.	.	.
pH	7.52	7.63	7.48	7.42	7.6	7.51	7.46	7.31
Miscellaneous Analytes								
Dissolved Solids (mg/L)	245	245	298	306	276	302	381	425
Suspended Solids (mg/L)	46.4	13.7	38.2	<	3	<	<	<
Turbidity (NTU)	.	.	.	.	4.82	0.408	2.93	3.23
Major Ions (mg/L)								
Calcium	42	45.1	56.6	58.7	59.1	58.3	78.1	79.8
Magnesium	18.9	22.6	15.5	18.2	24.7	23.8	32.3	31.9
Potassium	1.18	0.856	4.46	5.28	<	2.31	4.1	4.07
Sodium	1.92	1.42	4.94	5.83	6.82	6.6	13	13.4
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	173	191	223	201	187	203	220	212
Chloride	3.3	2.7	10	6.1	14.4	12.7	24.6	23.8
Fluoride	<	<	0.11	0.15	0.108	0.118	0.173	0.174
Nitrate as N	0.87	0.8	1.7	1.7	11.6	9.49	20.2	19.1
Sulfate	14.3	19.3	10.8	5.1	12.5	11.2	27.9	26.5
Charge balance error (%)	-1.9	-1.9	-7	4.2	0.4	-1.1	0.7	3.3
Trace Metals (mg/L)								
Aluminum	1.29	<	0.927	<	0.23	<	<	<
Arsenic (PMS)	.	.	.	.	<	<	<	<
Barium	0.118	0.135	0.0853	0.0886	0.0466	0.0451	0.101	0.0996
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	<	<	<	<
Cadmium	<	<	<	<	.	.	.	.
Chromium (PMS)	.	.	.	.	<	<	<	<
Chromium	0.0112	<	0.0299	<	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	2.9	0.145	2.11	<	0.485	<	0.785	0.408
Lead (PMS)	.	.	.	.	0.000832	<	<	<
Lead	0.0058	<	0.0044	<	.	.	.	.
Lithium	<	<	0.0253	0.0336	<	<	0.0198	0.0202
Manganese	0.0906	<	0.075	0.0543	<	<	0.0157	<
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	.	<	.	<	<	<	<
Nickel (PMS)	.	.	.	.	<	<	0.00547	0.00644
Nickel	0.0118	<	0.0509	<	.	.	.	.
Selenium (PMS)	.	.	.	.	<	<	<	<
Strontium	0.109	0.158	0.139	0.147	0.0941	0.0943	0.272	0.276
Thallium (PMS)	.	.	.	.	<	<	0.000588	<
Uranium (PMS)	.	.	.	.	0.00969	0.00969	0.00765	0.00763
Uranium (KPA)	0.0114	0.0116	0.02	0.0208	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-704		GW-706		GW-712		GW-713		
Functional Area	EXP-B		EXP-B		EXP-W		EXP-W		
Date Sampled	02/04/04	07/22/04	02/04/04	07/22/04	01/06/04	07/07/04	01/05/04	07/07/04	
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC
Sample Type									Dup
Field Measurements									
Time Sampled	8:40	9:05	9:55	10:20	10:00	8:45	10:35	8:55	.
Measuring Point Elev. (ft)	944.73	944.73	929.47	929.47	877.89	877.89	881.43	881.43	.
Depth to Water (ft)	31.10	35.65	12.65	17.76	32.86	34.26	37.62	37.47	.
Groundwater Elevation (ft)	913.63	909.08	916.82	911.71	845.03	843.63	843.81	843.96	.
Conductivity (μmho/cm)	660	1,105	838	2,480	701	477	830	1,007	.
Dissolved Oxygen (ppm)	0.98	0.43	0	1.1	1.89	0.96	0.62	1.05	.
Oxidation/Reduction (mV)	211	-282	195	72	-23	170	-158	-110	.
Temperature (degrees C)	11.9	14.4	12.6	15.2	11.8	17.4	11	18	.
Turbidity (NTU)	.	.	.	.	15	50	17	9	.
pH	7.46	8.74	7.63	7.14	7.82	7.83	6.69	7.7	.
Miscellaneous Analytes									
Dissolved Solids (mg/L)	349	175	481	553	320	.	352	.	.
Suspended Solids (mg/L)	<	<	<	<	<	.	<	.	.
Turbidity (NTU)	5.45	3.24	1.86	3.53	.	.	.	.	.
Major Ions (mg/L)									
Calcium	76.3	6.65	105	101	54.8	50.3	60.2	59.6	59.2
Magnesium	26.8	26.1	21.8	19.9	32.4	31.9	32.1	31.9	31.6
Potassium	2.68	11	7.33	6.33	2.15	2.08	2.7	2.66	2.63
Sodium	12.6	13.9	19.5	17.7	7.28	7.26	11.9	12.1	12
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	204	105	206	210	189	168	186	175	183
Chloride	21.8	25.5	41	31.9	8.3	10	14.5	15.3	15
Fluoride	0.182	0.166	0.276	0.27	0.26	0.4	0.35	0.54	0.53
Nitrate as N	17.4	0.0429	27.4	24.2	<	<	<	<	<
Sulfate	21.3	19.7	26.1	22.1	76.5	79	91.2	95.4	96.1
Charge balance error (%)	1.9	1.8	1.8	2.1	1.3	1.8	1.5	2	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	.	.	.	.	.
Barium	0.126	0.0215	0.153	0.146	0.0355	0.0357	0.0432	0.0455	0.0459
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	.	.	.	.	.
Cadmium	.	.	.	.	<	<	<	<	<
Chromium (PMS)	<	<	<	<	.	.	.	.	.
Chromium	.	.	.	.	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	0.628	0.421	0.482	1.17	0.197	0.541	<	1.52	1.51
Lead (PMS)	<	0.000827	<	<	.	.	.	.	.
Lead	.	.	.	.	<	<	<	<	<
Lithium	0.013	0.025	0.0175	0.0128	<	<	0.0139	0.0142	0.0143
Manganese	0.00825	0.0264	0.0123	0.00511	0.107	0.0896	0.137	0.127	0.125
Mercury (CVAA)	<	<	<	<	<	.	<	.	.
Molybdenum	<	<	<	<	.	.	.	.	.
Nickel (PMS)	<	0.00531	0.00606	<	.	.	.	.	.
Nickel	.	.	.	.	<	<	<	<	<
Selenium (PMS)	<	<	<	<	.	.	.	.	.
Strontium	0.264	0.0287	0.361	0.306	0.635	0.625	1.26	1.27	1.26
Thallium (PMS)	<	0.00071	<	<	.	.	.	.	.
Uranium (PMS)	0.0194	0.000724	0.0724	0.0773	.	.	.	.	.
Uranium (KPA)	.	.	.	.	<	<	<	<	<
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	**GW-714**		**GW-715**		**GW-724**		**GW-725**		
Functional Area	**EXP-W**		**EXP-W**		**EXP-C**		**EXP-C**		
Date Sampled	**01/05/04**	**07/07/04**	**01/05/04**		**02/10/04**	**07/27/04**	**02/11/04**		**07/27/04**
Program	**BJC**	**BJC**	**BJC**	**BJC**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**
Sample Type				**Dup**				**Dup**	
Field Measurements									
Time Sampled	14:08	14:25	14:22	.	10:55	9:50	10:40	10:40	10:50
Measuring Point Elev. (ft)	875.88	875.88	874.92	.	979.27	979.27	961.05	961.05	961.05
Depth to Water (ft)	28.86	29.49	23.95	.	24.61	31.67	6.78	6.78	12.26
Groundwater Elevation (ft)	847.02	846.39	850.97	.	954.66	947.60	954.27	954.27	948.79
Conductivity (μmho/cm)	689	490	169	.	929	882	1,303	1,303	1,050
Dissolved Oxygen (ppm)	1.58	6.11	5.2	.	0.99	0.68	0	0	0.67
Oxidation/Reduction (mV)	226	78	94	.	72	-33	105	105	81
Temperature (degrees C)	11.9	25.1	13.3	.	13.5	15	12.9	12.9	15.9
Turbidity (NTU)	38	3	11	.	.	.	.	.	.
pH	7.62	7.32	5.16	.	7.35	7.19	7.16	7.16	6.8
Miscellaneous Analytes									
Dissolved Solids (mg/L)	272	.	249	242	490	501	754	761	598
Suspended Solids (mg/L)	<	.	<	<	5	<	<	<	<
Turbidity (NTU)	.	.	.	.	9.8	1.02	6.18	6.87	1.65
Major Ions (mg/L)									
Calcium	60.6	59.7	65.5	66.7	94.6	93.2	173	178	145
Magnesium	24.4	24.2	8.25	8.45	40.9	40.3	39.1	40.9	22.6
Potassium	1.43	1.42	1.64	1.48	2.49	2.54	3.19	3.35	3.22
Sodium	5.65	5.82	17.5	17.9	30.7	30.6	28.3	30	25.8
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	187	182	192	194	228	221	276	272	319
Chloride	10.9	11.6	25	24.9	83.1	83.6	96	100	57.8
Fluoride	0.28	0.47	<	<	0.228	0.219	0.106	0.105	0.25
Nitrate as N	1.1	0.78	0.67	0.67	22.7	19.5	56	54.1	13.8
Sulfate	45.2	49	14	13.8	30.8	30.5	38.4	37.8	38.8
Charge balance error (%)	2.2	1.9	-1.3	.	1.7	3	0.5	2.7	2.4
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	<	<
Arsenic (PMS)	.	.	.	.	<	<	<	<	<
Barium	0.0789	0.0823	0.0611	0.0623	0.187	0.177	0.31	0.325	0.212
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	<	<	<	<	<
Cadmium	<	<	<	<	.	.	.	.	.
Chromium (PMS)	.	.	.	.	<	<	<	<	<
Chromium	<	<	0.0369	0.0384	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	<	0.913	<	<	4.29	0.386	0.75	0.794	0.742
Lead (PMS)	.	.	.	.	<	<	<	<	<
Lead	<	<	<	<	.	.	.	.	.
Lithium	<	<	<	<	0.0196	0.019	<	<	<
Manganese	<	<	<	<	0.0596	0.00984	0.123	0.128	0.741
Mercury (CVAA)	<	.	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	<	<	<	<	<
Nickel (PMS)	.	.	.	.	<	<	0.00731	0.00738	<
Nickel	<	<	0.011	0.0129	.	.	.	.	.
Selenium (PMS)	.	.	.	.	<	<	<	<	<
Strontium	0.286	0.294	0.0653	0.0665	1.28	1.23	0.936	0.98	0.383
Thallium (PMS)	.	.	.	.	<	0.00059	<	<	0.000846
Uranium (PMS)	.	.	.	.	0.000605	0.000667	0.00378	0.00377	0.012
Uranium (KPA)	<	<	<	<	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	<	0.0688	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-738			GW-740		GW-795		GW-916	
Functional Area	EXP-C			EXP-C		AGLLWSF		EMWMF	
Date Sampled	02/09/04	07/26/04		02/09/04	07/26/04	02/12/04	08/17/04	03/08/04	06/02/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC
Sample Type			Dup						
Field Measurements									
Time Sampled	10:35	10:25	10:25	9:45	9:25	10:50	9:10	15:15	14:42
Measuring Point Elev. (ft)	983.08	983.08	983.08	1,019.63	1,019.63	926.18	926.18	1,002.85	1,002.85
Depth to Water (ft)	23.85	30.56	30.56	65.03	72.87	3.81	7.05	4.48	5.37
Groundwater Elevation (ft)	959.23	952.52	952.52	954.60	946.76	922.37	919.13	998.37	997.48
Conductivity (μmho/cm)	756	812	812	583	556	470	498	508	369
Dissolved Oxygen (ppm)	1.13	1.22	1.22	2.04	1.29	0.34	0.92	2.32	2.52
Oxidation/Reduction (mV)	184	179	179	171	200	87	0	8	30
Temperature (degrees C)	11.9	16.6	16.6	12.3	14.9	10.9	16.1	14.7	15.9
Turbidity (NTU)	.	.	.	.	.	.	.	16	16
pH	7.07	6.69	6.69	7.24	7.35	7.4	7	7.61	7.57
Miscellaneous Analytes									
Dissolved Solids (mg/L)	438	510	519	300	333	259	287	.	.
Suspended Solids (mg/L)	<	<	<	<	<	<	<	.	.
Turbidity (NTU)	0.572	0.268	0.252	1.13	0.278	0.617	0.282	.	.
Major Ions (mg/L)									
Calcium	114	125	126	68.9	63.3	85.7	86.8	36.4	35.9
Magnesium	27.2	21.9	22.3	32.9	31.2	4.56	3.74	5.64	6.06
Potassium	2.3	2.48	2.62	<	<	<	<	3.72	3.74
Sodium	7.06	7.78	7.99	1.96	1.86	2.35	2.02	24.5	25.4
Alkalinity as CO3	<	<	<	<	<	<	<	.	.
Alkalinity as HCO3	322	328	330	264	255	204	224	.	.
Chloride	14.7	13.7	13.8	6.6	6.41	5.38	4.4	.	.
Fluoride	<	<	<	0.194	0.193	<	<	.	.
Nitrate as N	7.53	9	9.11	2.17	2	<	<	.	.
Sulfate	24.8	29	29.4	12.5	11.8	19.3	17.4	.	.
Charge balance error (%)	2.4	1.4	1.7	2.8	1.1	1.3	-2.4	.	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	0.592	0.478
Arsenic (PMS)	<	<	<	<	<	<	<	.	.
Barium	0.0513	0.0583	0.0599	0.0919	0.0878	0.0668	0.0664	0.166	0.154
Beryllium	<	<	<	<	<	<	<	.	.
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	<	<	.	.
Cadmium	.	.	.	.	.	.	.	.	.
Chromium (PMS)	<	<	<	<	<	<	<	.	.
Chromium	.	.	.	.	.	.	.	<	<
Cobalt	<	<	<	<	<	<	<	.	.
Copper	<	<	<	<	<	<	<	.	.
Iron	0.0601	<	<	0.531	0.0534	<	0.112	0.888	0.531
Lead (PMS)	<	<	<	0.000773	<	<	<	.	.
Lead	.	.	.	.	.	.	.	<	<
Lithium	<	<	<	0.0158	0.0154	<	<	.	.
Manganese	<	<	<	<	<	0.0293	0.295	0.114	0.084
Mercury (CVAA)	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	.	.
Nickel (PMS)	<	0.00812	<	<	<	<	<	.	.
Nickel	.	.	.	.	.	.	.	<	<
Selenium (PMS)	<	<	<	<	<	<	<	.	.
Strontium	0.116	0.135	0.138	0.0566	0.0542	0.157	0.149	0.968	0.824
Thallium (PMS)	<	<	<	0.000598	<	<	<	.	.
Uranium (PMS)	0.00264	0.00258	0.00228	<	<	<	0.000601	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-916		GW-917				GW-918	
Functional Area	EMWMF		EMWMF				EMWMF	
Date Sampled	09/13/04	11/10/04	03/09/04	06/03/04	09/07/04	11/04/04	03/15/04	06/02/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	10:35	9:45	10:15	9:25	15:25	13:20	14:35	9:20
Measuring Point Elev. (ft)	1,002.85	1,002.85	997.10	997.10	997.10	997.10	1,067.96	1,067.96
Depth to Water (ft)	5.70	5.19	19.60	21.52	22.69	22.97	5.44	5.50
Groundwater Elevation (ft)	997.15	997.66	977.50	975.58	974.41	974.13	1,062.52	1,062.46
Conductivity (μmho/cm)	367	507	531	549	350	550	146	154
Dissolved Oxygen (ppm)	3.81	1.98	1.79	0.77	2.89	1.98	6.3	4.75
Oxidation/Reduction (mV)	92	-14	115	56	123	123	224	295
Temperature (degrees C)	16.3	17.3	15.5	16.8	22.6	165	14.6	16
Turbidity (NTU)	12	8	35	20	10	15	26	50
pH	6.79	7.67	7.18	7.15	6.72	7.45	6.3	6.2
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	40.1	43.1	58.9	56.5	62.1	64.8	9.81	8.77
Magnesium	6.15	6.67	8.6	8.18	7.6	8.31	3.94	4.08
Potassium	4.01	4.09	1.38	1.38	1.63	1.36	1.87	1.93
Sodium	24.7	29.6	7.49	8.11	8.66	9.76	3.95	3.81
Alkalinity as CO3	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	0.349	<	<	0.295 Q	0.903
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.166	0.137	0.154	0.173	0.16	0.179	0.118	0.114
Beryllium	.	.	.	.	.	.	.	.
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	<	<
Cobalt	.	.	.	.	.	.	.	.
Copper	.	.	.	.	.	.	.	.
Iron	0.131	0.169	0.146	1.03	0.42	0.276	0.218 Q	0.781
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	0.0819	0.102	0.0179	0.0604	0.0527	0.0407	0.0058 Q	0.0185
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	1.11	1.26	0.143	0.102	0.116	0.133	0.0464	0.0363
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-918		GW-920				GW-921	
Functional Area	EMWMF		EMWMF				EMWMF	
Date Sampled	09/09/04	11/10/04	03/11/04	06/01/04	09/02/04	11/09/04	03/08/04	06/01/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	13:30	14:30	14:45	13:40	14:15	13:55	9:55	10:05
Measuring Point Elev. (ft)	1,067.96	1,067.96	967.43	967.43	967.43	967.43	971.29	971.29
Depth to Water (ft)	5.50	5.65	6.77	8.78	9.20	7.42	6.30	7.27
Groundwater Elevation (ft)	1,062.46	1,062.31	960.66	958.65	958.23	960.01	964.99	964.02
Conductivity (μmho/cm)	106	1,467	998	443	331	451	524	505
Dissolved Oxygen (ppm)	6.58	5.17	2.45	2.15	2.17	1.79	1.65	2.3
Oxidation/Reduction (mV)	263	225	-33	-47	36	-52	-33	-61
Temperature (degrees C)	15.5	16.3	15.1	24.3	16.9	17.1	15	17.7
Turbidity (NTU)	10	10	15	10	37	50	18	15
pH	5.8	6.56	7.37	7.53	5.89	7.66	7.51	7.5
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	9.74	10.7	51.8	49.8	51.7	53.1	39	38.6
Magnesium	4.15	4.36	8.04	8.33	8.19	8.21	12	12.2
Potassium	1.97	2.04	1.62	1.75	1.67	1.7	2.95	2.79
Sodium	4.15	4.52	5.62	5.4	5.82	5.68	17.4	16.9
Alkalinity as CO3	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	0.232	0.436	<	<	<	<	<	<
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.11	0.12	0.245	0.252	0.244	0.255	0.262	0.261
Beryllium	.	.	.	.	.	.	.	.
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	<	<
Cobalt	.	.	.	.	.	.	.	.
Copper	.	.	.	.	.	.	.	.
Iron	0.233	0.434	0.176	0.268	0.136	0.161	0.104	0.121
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	0.0054	0.0112	0.0398	0.054	0.0419	0.0426	0.0099	0.0105
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.0452	0.0483	0.401	0.362	0.407	0.413	1.19	1.03
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-921		GW-922				GW-923	
Functional Area	EMWMF		EMWMF				EMWMF	
Date Sampled	09/02/04	11/04/04	03/10/04	06/02/04	09/09/04	11/15/04	03/15/04	11/15/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	9:05	9:25	14:04	13:35	9:25	9:40	9:50	13:50
Measuring Point Elev. (ft)	971.29	971.29	956.91	956.91	956.91	956.91	1,016.73	1,016.73
Depth to Water (ft)	7.90	7.25	5.03	5.24	5.02	4.98	30.35	32.77
Groundwater Elevation (ft)	963.39	964.04	951.88	951.67	951.89	951.93	986.38	983.96
Conductivity (μmho/cm)	365	517	450	438	327	444	457	652
Dissolved Oxygen (ppm)	1.79	2.6	0.91	0.68	1.74	1.76	3.18	5.27
Oxidation/Reduction (mV)	101	-7	-11	-34	-2	-52	243	141
Temperature (degrees C)	17.9	16.9	14.6	18.7	15.4	16.5	14.2	16.5
Turbidity (NTU)	20	5	17	7	2	10	48	23
pH	6.77	7.72	7.55	7.53	6.41	7.33	7.06	7.52
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	43.2	42.6	40.2	36.7	42.1	43.6	60	65.3
Magnesium	12.7	12.4	9.96	10.4	9.37	9.73	9.71	10.9
Potassium	2.94	3	3.29	3.41	2.96	3.19	1.97	2.12
Sodium	20.2	18.2	9.62	8.49	8.55	8.77	8.64	9.81
Alkalinity as CO3	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	0.286	<	<	2.98	2.59
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.268	0.275	0.697	0.709	0.685	0.685	0.142	0.135
Beryllium	.	.	.	.	.	.	.	.
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	0.0202	0.0088
Cobalt	.	.	.	.	.	.	.	.
Copper	.	.	.	.	.	.	.	.
Iron	0.11	0.128	0.319	0.362	0.246	0.282	2.82	2.45
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	0.0035	<
Lithium	.	.	.	.	.	.	.	.
Manganese	0.0099	0.0095	0.0125	0.0202	0.0269	0.0305	0.0775	0.0707
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	0.0164	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	1.22	1.27	0.859	0.673	0.769	0.771	0.106	0.105
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-924							
Functional Area	EMWMF							
Date Sampled	03/11/04		06/07/04		09/07/04		11/17/04	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup		Dup		Dup
Field Measurements								
Time Sampled	9:22	.	9:50	.	9:10	.	9:23	.
Measuring Point Elev. (ft)	968.90	.	968.90	.	968.90	.	968.90	.
Depth to Water (ft)	8.90	.	10.55	.	11.87	.	9.20	.
Groundwater Elevation (ft)	960.00	.	958.35	.	957.03	.	959.70	.
Conductivity (μmho/cm)	314	.	441	.	332	.	419	.
Dissolved Oxygen (ppm)	1.48	.	1.95	.	0.92	.	2.18	.
Oxidation/Reduction (mV)	185	.	23	.	87	.	142	.
Temperature (degrees C)	15.3	.	16.4	.	16.4	.	16.8	.
Turbidity (NTU)	30	.	17	.	20	.	9	.
pH	7.32	.	7.46	.	6.33	.	7.51	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	53.2	53.5	52.8	52.2	56.1	55.7	51.2	51.2
Magnesium	4.79	4.85	4.83	4.67	4.92	4.87	4.56	4.54
Potassium	0.973	0.957	0.943	0.889	0.934	0.973	1.05	1.01
Sodium	5.91	5.97	5.61	5.6	5.68	5.62	5.37	5.35
Alkalinity as CO3	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.253	0.26	0.282	0.269	0.27	0.266	0.243	0.243
Beryllium	.	.	.	.	.	.	.	.
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	<	<
Cobalt	.	.	.	.	.	.	.	.
Copper	.	.	.	.	.	.	.	.
Iron	0.0958	0.0846	0.112	0.153	0.0717	0.0683	0.0757	0.0687
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	0.0313	0.032	0.0573	0.0517	0.0488	0.0481	0.0414	0.0416
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.105	0.107	0.0887	0.0865	0.103	0.102	0.098	0.0971
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-925				GW-926			
Functional Area	EMWMF				EMWMF			
Date Sampled	03/09/04	06/01/04	09/01/04	11/08/04	03/11/04	06/07/04	09/07/04	11/17/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	14:50	10:25	10:00	9:10	9:35	9:55	9:25	9:30
Measuring Point Elev. (ft)	971.14	971.14	971.14	971.14	968.94	968.94	968.94	968.94
Depth to Water (ft)	4.15	5.03	5.38	5.12	7.33	9.55	10.19	8.30
Groundwater Elevation (ft)	966.99	966.11	965.76	966.02	961.61	959.39	958.75	960.64
Conductivity (μmho/cm)	1,157	1,227	1,295	803	590	656	625	638
Dissolved Oxygen (ppm)	0.46	0.85	0.55	0.49	2.43	0.39	1.25	0.54
Oxidation/Reduction (mV)	-23	-50	120	8	134	-11	25	-77
Temperature (degrees C)	14.5	18.3	22.5	18.2	12	17.4	20.3	17.3
Turbidity (NTU)	60	7	140	100	25	11	15	10
pH	9.36	8.72	8.45	8.79	7.56	7.67	7.6	7.53
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	3.1	2.41	2.51	2.69	44.7	42.8	46.5	45
Magnesium	1.25	1.17	1.03	1.14	9.81	9.98	10.4	10
Potassium	2.32	2.24	2.01	2.12	2.06	2.1	2.04	2.04
Sodium	134	118	141	129	9.38	9.28	9.25	9.37
Alkalinity as CO3	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	0.382	0.323	0.482	0.28	<	<	<	<
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.101	0.0985	0.0966	0.097	0.208	0.199	0.206	0.209
Beryllium	.	.	.	.	.	.	.	.
Boron	0.19	0.192	0.194	0.193	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	<	<
Cobalt	.	.	.	.	.	.	.	.
Copper	.	.	.	.	.	.	.	.
Iron	0.274	0.246	0.257	0.206	0.2	0.0834	0.328	0.189
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	0.0036	0.0041	0.0046	0.0032	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	0.0106	0.0107	0.0099	0.0088	0.0091	0.0159	0.0231	0.0154
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	0.0102	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.192	0.148	0.175	0.183	0.564	0.505	0.577	0.576
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-927				NT-01				
Functional Area	EMWMF				EXP-SW				
Date Sampled	03/09/04	06/03/04	09/07/04	11/16/04	01/12/04	01/27/04	06/02/04	07/20/04	
Program	BJC	BJC	BJC	BJC	BJC	GWPP	BJC	GWPP	GWPP
Sample Type									Dup
Field Measurements									
Time Sampled	11:30	14:40	16:25	12:15	13:25	10:10	14:33	10:10	10:10
Measuring Point Elev. (ft)	997.19	997.19	997.19	997.19	.	.	.	.	.
Depth to Water (ft)	16.73	18.68	19.86	19.40	.	.	.	.	.
Groundwater Elevation (ft)	980.46	978.51	977.33	977.79	.	.	.	.	.
Conductivity (μmho/cm)	354	484	344	485	.	704	.	2,020	2,020
Dissolved Oxygen (ppm)	1.15	1.9	1.05	2.13	.	5.41	.	3.12	3.12
Oxidation/Reduction (mV)	-22	22	30	-17	.	214	.	182	182
Temperature (degrees C)	16.4	17.8	18.3	16.5	.	5.5	.	20.4	20.4
Turbidity (NTU)	19	25	37	30	.	.	.	.	.
pH	7.55	7.45	6.54	7.66	.	6.77	.	6.84	6.84
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	.	.	.	429	.	1,600	1,660
Suspended Solids (mg/L)	.	.	.	.	.	2	.	2	2
Turbidity (NTU)	.	.	.	.	.	6.45	.	2.5	2.64
Major Ions (mg/L)									
Calcium	56.1	56.6	60.2	59.8	164	87	382	281	265
Magnesium	5.72	5.63	5.94	5.93	22.4	13.8	43.6	40.3	38.2
Potassium	0.955	0.863	0.969	0.882	3.46	2.14	5.14	5.19	5.04
Sodium	7.14	6.91	7.02	7.26	20.8	11.9	39.1	37.7	35.9
Alkalinity as CO3	.	.	.	.	.	<	.	<	<
Alkalinity as HCO3	.	.	.	.	.	88.8	.	225	205
Chloride	.	.	.	.	.	9.83	.	26.5	25.2
Fluoride	.	.	.	.	.	0.423	.	1.16	1.17
Nitrate as N	.	.	.	.	.	52.8	.	183	188
Sulfate	.	.	.	.	.	14.6	.	20.3	19.8
Charge balance error (%)	.	.	.	.	.	-0.8	.	0.8	-1.8
Trace Metals (mg/L)									
Aluminum	<	<	<	<	1.17	0.73	0.359	0.622	0.565
Arsenic (PMS)	.	.	.	.	.	<	.	<	<
Barium	0.196	0.189	0.195	0.2	0.435	0.213	0.852	0.668	0.638
Beryllium	.	.	.	.	<	<	<	<	<
Boron	<	<	<	<	<	<	<	0.17	0.162
Cadmium (PMS)	.	.	.	.	.	0.00715	.	0.0258	0.0251
Cadmium	.	.	.	.	0.02	.	0.0296	.	.
Chromium (PMS)	.	.	.	.	.	<	.	<	<
Chromium	<	<	<	<	<	.	<	.	.
Cobalt	.	.	.	.	<	<	<	<	<
Copper	.	.	.	.	<	<	<	<	<
Iron	0.196	0.194	0.122	0.149	0.529	0.496	0.0728	0.185	0.157
Lead (PMS)	.	.	.	.	.	<	.	<	<
Lead	<	<	<	<	<	.	<	.	.
Lithium	.	.	.	.	<	<	<	<	<
Manganese	0.0199	0.0202	0.019	0.0209	4.36	1.87	5.97	5.41	5.14
Mercury (CVAA)	<	<	<	<	<	<	<	<	<
Molybdenum	.	.	.	.	<	<	<	<	<
Nickel (PMS)	.	.	.	.	.	0.0347	.	0.109	0.11
Nickel	<	<	<	<	0.0853	.	0.121	.	.
Selenium (PMS)	.	.	.	.	.	<	.	<	<
Strontium	0.0995	0.0878	0.0989	0.101	0.459	0.266	0.902	0.824	0.787
Thallium (PMS)	.	.	.	.	.	<	.	<	<
Uranium (PMS)	.	.	.	.	.	0.00575	.	0.0315	0.0301
Uranium (KPA)	.	.	.	.	0.012	.	0.026	.	.
Vanadium	<	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	NT-01		NT-03		NT-04			
Functional Area	EXP-SW		EXP-SW		EXP-SW			
Date Sampled	07/26/04	11/02/04	03/01/04	09/13/04	03/09/04	06/08/04	09/02/04	12/02/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	14:33	8:50	12:55	12:40	9:45	11:30	8:30	8:55
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	.	.	93	401	554	600	522	431
Dissolved Oxygen (ppm)	.	.	5.2	7.46	2.39	6.1	7.34	14.84
Oxidation/Reduction (mV)	.	.	62	86	-11	20	100	8
Temperature (degrees C)	.	.	15.5	23.8	8.7	20.9	21.2	7.8
Turbidity (NTU)	.	.	14	8	3	11	7	1
pH	.	.	8.55	8.28	8.17	7.38	7.44	7.69
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	241	228 J	15	62.5	95.3	86.3	91.9	78.6
Magnesium	33.6	30.8	3.9	12.5	16.7	14.9	15.8	14.3
Potassium	6.34	5.86	1.39	2.14	2.32	1.92	2.62	2.43
Sodium	34.2	28.5	2.62	5.68	9.65	9.02	9.98	5.67
Alkalinity as CO3	.	.	<	<	.	.	.	.
Alkalinity as HCO3	.	.	39.4	165	.	.	.	.
Chloride	.	.	1.5	2.5	.	.	.	.
Fluoride	.	.	0.24	1.1	.	.	.	.
Nitrate as N	.	.	<	<	.	.	.	.
Sulfate	.	.	18.4	75.7	.	.	.	.
Charge balance error (%)	.	.	-0.4	-5.9	.	.	.	.
Trace Metals (mg/L)								
Aluminum	0.424	0.446	0.419	0.202	<	0.218	<	<
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.724	0.524	0.0288	0.0512	0.143	0.143	0.164	0.136
Beryllium	<	<	<	<	.	.	.	.
Boron	0.153	0.165	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Cadmium	0.0262	0.0204	<	<	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	.	.	.	.
Copper	<	<	<	<	.	.	.	.
Iron	0.0931	<	0.783	0.249	1.4	0.785	0.421	1.17
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	<	<	<	<	.	.	.	.
Manganese	5.06	4.04	0.203	0.022	0.83	0.601	0.392	0.627
Mercury (CVAA)	<	<	.	.	<	<	<	<
Molybdenum	.	.	<	.	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	0.102	0.0842	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.715	0.653	0.0562	0.278	0.268	0.255	0.261	0.214
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	0.0266	0.0225	.	.	.	.	.	.
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point		NT-07		NT-08		S07		SS-1	
Functional Area		EXP-SW		EXP-SW		EXP-SW		EXP-SW	
Date Sampled		03/02/04	09/14/04	03/02/04	09/14/04	03/01/04	09/13/04	01/27/04	07/20/04
Program		BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type									
Field Measurements									
Time Sampled		9:00	9:40	8:40	9:20	13:30	12:00	9:55	9:45
Measuring Point Elev. (ft)		.	.	.	.	.	.	.	.
Depth to Water (ft)		.	.	.	.	.	.	.	.
Groundwater Elevation (ft)		.	.	.	.	.	.	.	.
Conductivity (μmho/cm)		174	423	242	315	250	1,260	1,061	1,251
Dissolved Oxygen (ppm)		5.7	9.45	5.01	9.42	6.06	8.55	4.21	3.1
Oxidation/Reduction (mV)		89	116	109	122	79	136	191	185
Temperature (degrees C)		11.5	18.8	12.2	17.6	12.1	20.3	9.1	18.4
Turbidity (NTU)		26	10	39	4	8.2	6	.	.
pH		8.09	8	7.96	8.1	8.37	7.28	7.15	7.15
Miscellaneous Analytes									
Dissolved Solids (mg/L)		146	266	109	225	.	.	657	748
Suspended Solids (mg/L)		12.9	<	23.2	<	.	.	6	24
Turbidity (NTU)		.	.	.	.	.	.	1.27	2.73
Major Ions (mg/L)									
Calcium		28.2	76.5	23.4	59.6	43.1	189	168	192
Magnesium		4.45	11.9	3.11	5.73	5.8	20.3	17.7	19.3
Potassium		2.25	3.13	2.15	2.63	1.2	3.1	3.56	4.37
Sodium		1.66	8.03	1.59	5.04	3.76	14.2	29.8	36.5
Alkalinity as CO3		<	<	<	<	<	<	<	<
Alkalinity as HCO3		96	191	83.4	166	50.6	154	324	420
Chloride		4.6	33.7	2.7	10.8	3.1	8.8	90.2	121
Fluoride		<	0.11	0.16	0.13	<	0.11	0.235	0.254
Nitrate as N		0.11	<	0.11	0.035	27.9	130	12.1	13.7
Sulfate		15	9.4	10.1	8.1	11.2	8.6	45.4	44.4
Charge balance error	(%)	-10.9	2.5	-12	-0.9	-8.2	-4	1.7	-3.2
Trace Metals (mg/L)									
Aluminum		0.78	<	0.896	<	0.387	<	0.263	1.24
Arsenic	(PMS)	.	.	.	.	.	.	<	<
Barium		0.0337	0.0598	0.0494	0.0875	0.132	0.477	0.09	0.112
Beryllium		<	<	<	<	<	<	<	<
Boron		<	0.497	0.302	1.03	<	<	<	<
Cadmium	(PMS)	.	.	.	.	.	.	<	<
Cadmium		<	<	<	<	<	<	.	.
Chromium	(PMS)	.	.	.	.	.	.	<	<
Chromium		<	<	<	<	<	0.0474 Q	.	.
Cobalt		<	<	<	<	<	<	<	<
Copper		<	<	<	<	<	<	<	<
Iron		1.51	0.0604	1.52	0.342	0.537	0.337	0.226	1.31
Lead	(PMS)	.	.	.	.	.	.	0.00157	0.00337
Lead		<	<	<	<	<	<	.	.
Lithium		0.0218	0.0688	0.133	0.127	<	<	<	<
Manganese		0.0924	0.0186	0.169	0.175	0.0944	0.0921	0.0716	0.319
Mercury	(CVAA)	.	.	.	.	.	.	<	<
Molybdenum		<	.	<	.	<	.	<	<
Nickel	(PMS)	.	.	.	.	.	.	0.0062	0.00527
Nickel		<	<	<	<	<	0.0212 Q	.	.
Selenium	(PMS)	.	.	.	.	.	.	<	<
Strontium		0.0611	0.167	0.0575	0.142	0.141	0.588	0.504	0.546
Thallium	(PMS)	.	.	.	.	.	.	<	<
Uranium	(PMS)	.	.	.	.	.	.	0.0247	0.0274
Uranium	(KPA)	0.00992	0.0137	0.354	0.201	<	<	.	.
Vanadium		<	<	<	<	<	<	<	<
Zinc		<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	SS-4		SS-5			SS-6		SS-6.6
Functional Area	EXP-SW		EXP-SW			EXP-SW		EXP-SW
Date Sampled	01/27/04	07/20/04	01/27/04		07/20/04	03/02/04	07/07/04	03/02/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC
Sample Type				Dup				
Field Measurements								
Time Sampled	9:40	9:25	9:25	9:25	9:15	12:50	13:15	12:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	465	705	408	408	568	188	279	308
Dissolved Oxygen (ppm)	4.32	1.86	3.53	3.53	2.85	4.39	10.32	10.57
Oxidation/Reduction (mV)	208	195	209	209	185	72	130	74
Temperature (degrees C)	8.3	17.3	10.2	10.2	15.2	12.1	17	13.6
Turbidity (NTU)	.	.	.	.	.	12	89	6
pH	6.89	7.02	6.61	6.61	7.01	7.85	6.5	7.67
Miscellaneous Analytes								
Dissolved Solids (mg/L)	251	470	194	192	341	117	.	204
Suspended Solids (mg/L)	12	2	<	2	<	<	.	13.1
Turbidity (NTU)	6.92	2.86	5.42	5.32	5.97	.	.	.
Major Ions (mg/L)								
Calcium	59.7	94.6	47.1	44.5	71.6	23.7	44.1	46.3
Magnesium	13.7	17.4	15	15	17.8	12.9	17.6	12.8
Potassium	<	2.68	<	<	<	0.609	0.957	0.979
Sodium	9.76	15.6	4.69	4.56	9.35	1.87	3.13	3.85
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	139	233	147	147	216	114	154	203
Chloride	17.9	22	8.63	8.77	16.6	4.8	4.6	9
Fluoride	0.197	0.346	<	<	0.186	<	0.1	<
Nitrate as N	12	17.1	2.79	2.77	9.22	0.15	0.5	0.38
Sulfate	18.4	21	11.3	11.1	15.7	5.4	10.1	9.6
Charge balance error (%)	0	-0.4	2.3	0.5	-3	-4	4.8	-12.1
Trace Metals (mg/L)								
Aluminum	0.848	0.219	0.538	0.657	0.457	0.238	0.262	0.445
Arsenic (PMS)	<	<	<	<	<	.	.	.
Barium	0.105	0.137	0.062	0.0618	0.0913	0.0526	0.0797	0.0474
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	.	.	.
Cadmium	.	.	.	.	.	<	<	<
Chromium (PMS)	<	<	<	<	<	.	.	.
Chromium	.	.	.	.	.	<	<	<
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.73	0.267	0.267	0.354	0.296	0.215	0.216	0.535
Lead (PMS)	0.000737	<	0.00102	<	<	.	.	.
Lead	.	.	.	.	.	<	<	<
Lithium	<	<	<	<	<	<	<	<
Manganese	0.245	0.0498	0.00925	0.00963	0.00826	0.0088	0.0291	0.0179
Mercury (CVAA)	<	<	<	<	<	<	.	<
Molybdenum	<	<	<	<	<	<	.	<
Nickel (PMS)	0.00552	<	<	<	<	.	.	.
Nickel	.	.	.	.	.	<	<	<
Selenium (PMS)	<	<	<	<	<	.	.	.
Strontium	0.146	0.239	0.0752	0.0745	0.146	0.0309	0.0628	0.0602
Thallium (PMS)	<	<	<	<	<	.	.	.
Uranium (PMS)	0.0361	0.0693	0.0152	0.0142	0.0421	.	.	.
Uranium (KPA)	.	.	.	.	.	<	<	<
Vanadium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX D.2

VOLATILE ORGANIC COMPOUNDS

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	BCK-00.63		BCK-04.55		BCK-09.20		BCK-09.47		BCK-11.54	
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW		EXP-SW	
Date Sampled	01/27/04	07/20/04	01/27/04	07/20/04	03/01/04	09/13/04	03/01/04	09/13/04	03/01/04	09/13/04
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	1 J	<	3 J	<	<	<
Trichloroethene	<	<	<	<	1 J	<	2 J	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	6	<	14	4 J	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	1 J	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	.	.	.	.	.	.
Dichlorodifluoromethane	<	<	<	<	.	.	.	.	.	.
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	.	.	.	.	.	.
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	.	.	.	.	.	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	BCK-11.84		EMWNT-03A				EMWNT-05		
Functional Area	EXP-SW		EXP-SW				EXP-SW		
Date Sampled	03/01/04	09/13/04	03/09/04	06/08/04	09/02/04	12/02/04	03/09/04		06/08/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup	
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	<	<	.	.	.	.	.	.	.
1,1-Dichloroethene	<	<	.	.	.	.	.	.	.
Vinyl chloride	<	<	.	.	.	.	.	.	.
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	.	.	.	.	.	.	.
1,2-Dichloroethane	<	<	.	.	.	.	.	.	.
1,1-Dichloroethane	<	<	.	.	.	.	.	.	.
Chloroethane	<	<	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	.	.	.	.	.	.	.
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	.	.	.	.	.	.	.
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	.	.	.	.	.	.	.
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)									
Acetone	<	<	<	2 J	<	<	<	<	<
Acrylonitrile	.	.	.	.	.	.	.	.	.
Carbon disulfide	<	<	.	.	.	.	.	.	.
Chlorobenzene	<	<	.	.	.	<	.	.	.
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.
1,2-Dichloropropane	<	<	.	.	.	.	.	.	.

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	EMWNT-05			EMW-VWEIR		GW-008		GW-046	
Functional Area	EXP-SW			EXP-SW		OLF		BG	
Date Sampled	09/02/04		12/02/04	03/09/04	12/02/04	01/07/04	07/07/04	01/06/04	07/08/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup							
Chloroethenes (μg/L)									
Tetrachloroethene	<	<	<	<	<	24	11	1,500	2,100
Trichloroethene	<	<	<	<	<	14	8	1,400	1,700
cis-1,2-Dichloroethene	.	.	.	.	.	24	22	3,900	4,900
trans-1,2-Dichloroethene	.	.	.	.	.	<	<	27	34
1,1-Dichloroethene	.	.	.	.	.	7	6	95	110
Vinyl chloride	.	.	.	.	.	<	<	490	610
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	.	.	.	.	.	<	<	68	77
1,2-Dichloroethane	.	.	.	.	.	<	<	6	5
1,1-Dichloroethane	.	.	.	.	.	13	12	230	290
Chloroethane	.	.	.	.	.	<	<	10	13
Chloromethanes (μg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	8	9
Methylene chloride	.	.	.	.	.	<	<	<	<
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	<	<	<	1 J	1 J	53	63
Ethylbenzene	.	.	.	.	.	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	8	4 J
Styrene	.	.	.	.	.	<	<	<	<
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	<	<	75 J	81
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.
Miscellaneous (μg/L)									
Acetone	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	.	.	.	<	<	<	<
Chlorobenzene	.	.	<	.	<	<	<	<	<
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.
1,2-Dichloropropane	.	.	.	.	.	2 J	2 J	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	**GW-052**		**GW-071**		**GW-077**		**GW-078**		**GW-079**	
Functional Area	**BG**		**BG**		**BG**		**BG**		**BG**	
Date Sampled	**03/04/04**	**08/16/04**	**03/01/04**	**08/05/04**	**02/17/04**	**08/12/04**	**02/17/04**	**08/12/04**	**02/17/04**	**08/12/04**
Program	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	330	540	<	<	<	<	<	<
Trichloroethene	<	<	64	74	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	24	31	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	6	5 J	<	<	<	<	<	<
1,1-Dichloroethene	<	<	41	74	<	<	<	<	<	<
Vinyl chloride	<	<	2 J	3	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	22	240	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	1,900	2,000	<	<	<	<	<	<
Chloroethane	<	<	17	18	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	3 J	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	820	1,100	<	<	<	<	<	<
Ethylbenzene	<	<	4 J	3 J	<	<	<	<	<	<
Toluene	<	<	12	18	<	<	<	<	<	<
Total Xylene	<	<	12	13	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	47	190	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	.	.	.	.	.	.
Dichlorodifluoromethane	<	<	2 J	10	.	.	.	.	.	.
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	.	.	.	.	.	.
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	.	.	.	.	.	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-080				GW-082			GW-085		
Functional Area	BG				BG			OLF		
Date Sampled	02/17/04		08/12/04		03/01/04	08/05/04		02/23/04		08/03/04
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup		Dup			Dup		Dup	
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	520	560	610	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	1 J	1 J	<	<	<
Vinyl chloride	<	<	<	<	120	110	110	<	<	<
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	32	44	52	<	<	<
Chloroethane	<	<	<	<	32	29	28	<	<	<
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	1 J	2 J	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	<	<	<	<	<	<
Trichlorofluoromethane	.	.	.	.	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	.	.	<	<	<	<	<	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	.	.	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-098		GW-100			GW-101		GW-115	GW-133-01
Functional Area	OLF		S3			S3		S3	S3
Date Sampled	02/19/04	08/03/04	03/04/04	08/17/04		03/08/04	08/18/04	01/06/04	08/23/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	GWPP
Sample Type					Dup				
Chloroethenes (μg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	13	5	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	4 J	4 J	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	6	2 J	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	2 J	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	<	<	<	<	<	<	1 J
Ethylbenzene	<	<	<	<	<	<	<	<	1 J
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	1 J
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	.	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	.	<
Miscellaneous (μg/L)									
Acetone	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	<	<	<	.	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	.	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-133-05	GW-133-08	GW-133-10	GW-133-14	GW-133-17	GW-133-21		GW-133-24
Functional Area	S3	S3	S3	S3	S3	S3		S3
Date Sampled	08/23/04	08/23/04	08/24/04	08/26/04	08/26/04	08/26/04		08/26/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type							Dup	
Chloroethenes (μg/L)								
Tetrachloroethene	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)								
Benzene	<	<	<	4 J	<	<	<	<
Ethylbenzene	<	<	<	2 J	<	<	<	<
Toluene	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<
Styrene	<	<	<	1 J	<	<	<	1 J
Chlorofluorocarbons (μg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<
Miscellaneous (μg/L)								
Acetone	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-134-05	GW-134-11	GW-134-15		GW-134-18	GW-134-21	GW-134-25	GW-134-29
Functional Area	S3	S3	S3		S3	S3	S3	S3
Date Sampled	08/08/04	08/08/04	08/09/04		08/10/04	08/10/04	08/10/04	08/11/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type				Dup				
Chloroethenes (μg/L)								
Tetrachloroethene	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)								
Benzene	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	1 J
Chlorofluorocarbons (μg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<
Miscellaneous (μg/L)								
Acetone	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-134-33	GW-134-35	GW-134-36	GW-135-03	GW-135-06	GW-135-11	GW-135-15	GW-135-19
Functional Area	**S3**	**S3**	**S3**	**S3**	**S3**	**S3**	**S3**	**S3**
Date Sampled	**08/11/04**	**08/11/04**	**08/11/04**	**08/21/04**	**08/21/04**	**08/21/04**	**08/21/04**	**08/22/04**
Program	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**
Sample Type								
Chloroethenes (μg/L)								
Tetrachloroethene	8	15	2 J	<	1 J	<	<	<
Trichloroethene	4 J	16	<	<	<	<	<	<
cis-1,2-Dichloroethene	5 J	10	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	2 J	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	1 J	2 J	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)								
Benzene	<	<	<	15	22	26	<	<
Ethylbenzene	<	<	<	2 J	2 J	1 J	1 J	<
Toluene	<	<	<	<	<	2 J	<	<
Total Xylene	<	<	<	<	<	<	<	<
Styrene	<	<	<	3 J	<	1 J	2 J	<
Chlorofluorocarbons (μg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	<	3 J	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<
Miscellaneous (μg/L)								
Acetone	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-135-23	GW-135-26	GW-135-30	GW-135-34	GW-135-39		GW-225	
Functional Area	S3	S3	S3	S3	S3		OLF	
Date Sampled	08/22/04	08/22/04	08/22/04	08/22/04	08/22/04		02/17/04	07/29/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type						Dup		
Chloroethenes (µg/L)								
Tetrachloroethene	<	<	<	<	<	<	2 J	1 J
Trichloroethene	<	<	<	<	<	<	220	240
cis-1,2-Dichloroethene	<	<	<	<	<	<	2 J	3 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	3 J	3 J
Vinyl chloride	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)								
Carbon tetrachloride	<	<	<	<	<	<	5 J	4 J
Chloroform	<	<	<	<	<	<	2 J	2 J
Methylene chloride	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)								
Benzene	19	6	<	<	<	<	<	<
Ethylbenzene	4 J	11	<	<	<	<	<	<
Toluene	2 J	6	<	<	<	<	<	<
Total Xylene	<	5	<	<	<	<	<	<
Styrene	2 J	11	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)								
Acetone	<	<	<	<	<	<	<	<
Acrylonitrile	<	31	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-226		GW-229				GW-236		
Functional Area	OLF		OLF				S3		
Date Sampled	02/17/04	07/28/04	02/11/04	02/12/04	07/28/04	07/29/04	03/08/04	03/08/04	08/18/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type				Conv		Conv		Dup	
Chloroethenes (μg/L)									
Tetrachloroethene	1 J	1 J	<	<	1 J	1 J	1 J	1 J	2 J
Trichloroethene	210	130	6	3 J	10	16	<	<	<
cis-1,2-Dichloroethene	6	3 J	130	67	140	280	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	1 J	<	<	<
1,1-Dichloroethene	2 J	<	13	6	24	41	<	<	<
Vinyl chloride	<	<	42	23	31	18	<	<	<
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	<	<	<	<	1 J	6	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	7	4 J	9	8	1 J	1 J	1 J
Chloroethane	<	<	2 J	1 J	<	2 J	<	<	<
Chloromethanes (μg/L)									
Carbon tetrachloride	3 J	<	<	<	<	<	<	<	<
Chloroform	2 J	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	7	9	7	8	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	6	2 J	15	44	<	<	<
Trichlorofluoromethane	<	<	6	3 J	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (μg/L)									
Acetone	<	<	<	<	3 J	7 J	<	<	<
Acrylonitrile	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	13	14	14	11	<	<	<
1,4-Dichlorobenzene	<	<	3 J	3 J	4 J	3 J	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-237		GW-246		GW-257		GW-276		GW-311	
Functional Area	BG		S3		BG		S3		RS	
Date Sampled	03/03/04	09/20/04	03/10/04	08/19/04	03/03/04	08/16/04	01/06/04	07/08/04	02/18/04	08/02/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	GWPP	GWPP
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	120	88	200	210	10	10	1 J	<
Trichloroethene	<	<	2 J	1 J	<	<	<	<	5	4 J
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	4 J	3 J	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	39	30	<	<	<	<	<	<
Methylene chloride	<	<	21	14	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	100	41	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	.	.	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	.	.	<	<
Miscellaneous (μg/L)										
Acetone	<	<	4 J	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	<	<	.	.	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	.	.	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-315		GW-363				GW-526		GW-537	
Functional Area	SPI		EMWMF				S3		OLF	
Date Sampled	02/18/04	08/02/04	03/15/04	06/08/04	09/08/04	11/18/04	02/17/04	08/16/04	02/23/04	08/03/04
Program	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	8	8	<	<	<	<	<	<	<	<
Trichloroethene	4 J	3 J	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	1 J	<	.	.	.	.	<	<	<	<
trans-1,2-Dichloroethene	<	<	.	.	.	.	<	<	<	<
1,1-Dichloroethene	<	<	.	.	.	.	<	<	<	<
Vinyl chloride	<	<	.	.	.	.	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	.	.	.	.	<	<	<	<
1,2-Dichloroethane	<	<	.	.	.	.	<	<	<	<
1,1-Dichloroethane	<	<	.	.	.	.	<	<	<	<
Chloroethane	<	<	.	.	.	.	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	2 J	2 J
Methylene chloride	<	<	.	.	.	.	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	.	.	.	.	<	<	<	<
Toluene	<	<	<	0.2 J	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	.	.	.	.	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	2 J	<	.	.	.	.	.	.	<	<
Trichlorofluoromethane	<	<	.	.	.	.	.	.	<	<
Dichlorodifluoromethane	<	<	.	.	.	.	.	.	<	<
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	.	.	.	.	.	.	<	<
Carbon disulfide	<	<	.	.	.	.	<	<	<	<
Chlorobenzene	<	<	.	.	.	.	<	<	<	<
1,4-Dichlorobenzene	<	<	.	.	.	.	.	.	<	<
1,2-Dichloropropane	<	<	.	.	.	.	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-615		GW-627		GW-639				GW-653	
Functional Area	S3		BG		EMWMF				BG	
Date Sampled	03/10/04	08/19/04	02/25/04	08/04/04	03/10/04	06/08/04	09/14/04	11/11/04	02/25/04	08/04/04
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	700	830	<	<	<	<	4 J	2 J
Trichloroethene	<	<	230	220	<	<	<	<	2 J	<
cis-1,2-Dichloroethene	<	<	17	21	.	.	.	.	45	34
trans-1,2-Dichloroethene	<	<	3 J	3 J	.	.	.	.	<	<
1,1-Dichloroethene	<	<	28	34	.	.	.	.	1 J	<
Vinyl chloride	<	<	29	28	.	.	.	.	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	.	.	.	.	<	<
1,2-Dichloroethane	<	<	<	<	.	.	.	.	<	<
1,1-Dichloroethane	<	<	96	100	.	.	.	.	3 J	2 J
Chloroethane	<	<	1 J	<	.	.	.	.	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	7	6	<	<	.	.	.	.	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	.	.	.	.	<	<
Toluene	<	<	<	<	<	<	0.1 J	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	.	.	.	.	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	.	.	.	<	<
Trichlorofluoromethane	<	<	<	<	.	.	.	.	<	<
Dichlorodifluoromethane	<	<	<	<	.	.	.	.	<	<
Miscellaneous (μg/L)										
Acetone	2 J	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	.	.	.	.	<	<
Carbon disulfide	2 J	<	<	<	.	.	.	.	<	<
Chlorobenzene	<	<	<	<	.	.	.	.	<	<
1,4-Dichlorobenzene	<	<	<	<	.	.	.	.	<	<
1,2-Dichloropropane	<	<	<	<	.	.	.	.	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-683		GW-684		GW-695		GW-703		GW-704	
Functional Area	EXP-A		EXP-A		EXP-B		EXP-B		EXP-B	
Date Sampled	02/19/04	08/16/04	02/19/04	08/16/04	02/03/04	07/21/04	02/03/04	07/21/04	02/04/04	07/22/04
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	5	5 J	14	12	18	37
cis-1,2-Dichloroethene	<	<	<	<	2 J	1 J	5 J	4 J	2 J	2 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	4 J
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	<	<	<	<	<	<
Trichlorofluoromethane	.	.	.	.	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	.	.	<	<	<	<	<	<
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	.	.	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-706		GW-712		GW-713			GW-714	
Functional Area	**EXP-B**		**EXP-W**		**EXP-W**			**EXP-W**	
Date Sampled	**02/04/04**	**07/22/04**	**01/06/04**	**07/07/04**	**01/05/04**	**07/07/04**		**01/05/04**	**07/07/04**
Program	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**
Sample Type							**Dup**		
Chloroethenes (μg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	10	6	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	7	3 J	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	.	.	.	.	.	.	.
Dichlorodifluoromethane	<	<	.	.	.	.	.	.	.
Miscellaneous (μg/L)									
Acetone	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	.	.	.	.	.	.	.
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	.	.	.	.	.	.	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-715		GW-724		GW-725			GW-738		
Functional Area	EXP-W		EXP-C		EXP-C			EXP-C		
Date Sampled	01/05/04		02/10/04	07/27/04	02/11/04		07/27/04	02/09/04	07/26/04	
Program	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup				Dup				Dup
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	4 J	4 J	1 J	1 J	<	<	<	<
Trichloroethene	<	<	96	77	310	340	7	25	20	19
cis-1,2-Dichloroethene	<	<	3 J	2 J	4 J	4 J	<	1 J	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	8	8	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	<	<	<	<	4 J	3 J	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	1 J	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	2 J	<	12	12	<	<	<	<
Chloroform	<	<	<	<	3 J	3 J	<	<	3 J	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	.	.	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-740		GW-795		GW-916				GW-917	
Functional Area	EXP-C		AGLLWSF		EMWMF				EMWMF	
Date Sampled	02/09/04	07/26/04	02/12/04	08/17/04	03/08/04	06/02/04	09/13/04	11/10/04	03/09/04	06/03/04
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	50	45	<	<	<	<	0.2 J	<	<	<
cis-1,2-Dichloroethene	3 J	2 J	<	<	.	.	.	.	.	.
trans-1,2-Dichloroethene	<	<	<	<	.	.	.	.	.	.
1,1-Dichloroethene	<	1 J	<	<	.	.	.	.	.	.
Vinyl chloride	<	<	<	<	.	.	.	.	.	.
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	.	.	.	.	.	.
1,2-Dichloroethane	<	<	<	<	.	.	.	.	.	.
1,1-Dichloroethane	<	<	<	<	.	.	.	.	.	.
Chloroethane	<	<	<	<	.	.	.	.	.	.
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	.	.	.	.	.	.
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	.	.	.	.	.	.
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	.	.	.	.	.	.
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	.	.	.	.	.	.
Dichlorodifluoromethane	<	<	<	<	.	.	.	.	.	.
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	<	.	.	.	.	.	.
Carbon disulfide	<	<	<	<	.	.	.	.	.	.
Chlorobenzene	<	<	<	<	.	.	.	.	.	.
1,4-Dichlorobenzene	<	<	<	<	.	.	.	.	.	.
1,2-Dichloropropane	<	<	<	<	.	.	.	.	.	.

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-917		GW-918				GW-920			
Functional Area	EMWMF		EMWMF				EMWMF			
Date Sampled	09/07/04	11/04/04	03/15/04	06/02/04	09/09/04	11/10/04	03/11/04	06/01/04	09/02/04	11/09/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	0.4 J	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethene	.	.	.	.	.	.	.	.	.	.
Vinyl chloride	.	.	.	.	.	.	.	.	.	.
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	.	.	.	.	.	.	.	.	.	.
1,2-Dichloroethane	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethane	.	.	.	.	.	.	.	.	.	.
Chloroethane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	.	.	.	.	.	.	.	.	.	.
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	.	.	.	.	.	.	.	.	.	.
Toluene	<	<	<	<	0.3 J	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	.	.	.	.	.	.	.	.	.	.
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	.	.	.	.	.	.	.	.
Chlorobenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.	.
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	**GW-921**				**GW-922**				**GW-923**	
Functional Area	**EMWMF**				**EMWMF**				**EMWMF**	
Date Sampled	**03/08/04**	**06/01/04**	**09/02/04**	**11/04/04**	**03/10/04**	**06/02/04**	**09/09/04**	**11/15/04**	**03/15/04**	**11/15/04**
Program	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	0.1 J	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethene	.	.	.	.	.	.	.	.	.	.
Vinyl chloride	.	.	.	.	.	.	.	.	.	.
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	.	.	.	.	.	.	.	.	.	.
1,2-Dichloroethane	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethane	.	.	.	.	.	.	.	.	.	.
Chloroethane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	.	.	.	.	.	.	.	.	.	.
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	.	.	.	.	.	.	.	.	.	.
Toluene	<	<	<	<	<	<	0.1 J	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	.	.	.	.	.	.	.	.	.	.
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	.	.	.	.	.	.	.	.
Chlorobenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.	.
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-924								GW-925	
Functional Area	EMWMF								EMWMF	
Date Sampled	03/11/04		06/07/04		09/07/04		11/17/04		03/09/04	06/01/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup		Dup		Dup		
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethene	.	.	.	.	.	.	.	.	.	.
Vinyl chloride	.	.	.	.	.	.	.	.	.	.
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	.	.	.	.	.	.	.	.	.	.
1,2-Dichloroethane	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethane	.	.	.	.	.	.	.	.	.	.
Chloroethane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	0.1 J	<	<	<	<	<	<	<	<	<
Methylene chloride	.	.	.	.	.	.	.	.	.	.
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	.	.	.	.	.	.	.	.	.	.
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	.	.	.	.	.	.	.	.	.	.
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	.	.	.	.	.	.	.	.
Chlorobenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.	.
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-925		GW-926				GW-927			
Functional Area	EMWMF		EMWMF				EMWMF			
Date Sampled	09/01/04	11/08/04	03/11/04	06/07/04	09/07/04	11/17/04	03/09/04	06/03/04	09/07/04	11/16/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	0.1 J	<	<	<	<	<	<
Trichloroethene	0.2 J	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethene	.	.	.	.	.	.	.	.	.	.
Vinyl chloride	.	.	.	.	.	.	.	.	.	.
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	.	.	.	.	.	.	.	.	.	.
1,2-Dichloroethane	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethane	.	.	.	.	.	.	.	.	.	.
Chloroethane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	.	.	.	.	.	.	.	.	.	.
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	.	.	.	.	.	.	.	.	.	.
Toluene	<	<	<	0.2 J	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	.	.	.	.	.	.	.	.	.	.
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	.	.	.	.	.	.	.	.
Chlorobenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.	.
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	NT-01			NT-03		NT-04			
Functional Area	EXP-SW			EXP-SW		EXP-SW			
Date Sampled	01/27/04	07/20/04		03/01/04	09/13/04	03/09/04	06/08/04	09/02/04	12/02/04
Program	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type			Dup						
Chloroethenes (μg/L)									
Tetrachloroethene	12	25	24	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	.	.	.	.
trans-1,2-Dichloroethene	<	<	<	<	<	.	.	.	.
1,1-Dichloroethene	<	<	<	<	<	.	.	.	.
Vinyl chloride	<	<	<	<	<	.	.	.	.
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	.	.	.	.
1,2-Dichloroethane	<	<	<	<	<	.	.	.	.
1,1-Dichloroethane	<	<	<	<	<	.	.	.	.
Chloroethane	<	<	<	<	<	.	.	.	.
Chloromethanes (μg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	.	.	.	.
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	.	.	.	.
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	.	.	.	.
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	.	.	.	.	.	.
Dichlorodifluoromethane	<	<	<	.	.	.	.	.	.
Miscellaneous (μg/L)									
Acetone	<	<	<	<	<	<	<	<	<
Acrylonitrile	<	<	<	.	.	.	.	.	.
Carbon disulfide	<	<	<	<	<	.	.	.	.
Chlorobenzene	<	<	<	<	<	.	.	.	<
1,4-Dichlorobenzene	<	<	<	.	.	.	.	.	.
1,2-Dichloropropane	<	<	<	<	<	.	.	.	.

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	NT-07		NT-08		SS-1		SS-4	
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW	
Date Sampled	03/02/04	09/14/04	03/02/04	09/14/04	01/27/04	07/20/04	01/27/04	07/20/04
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP
Sample Type								
Chloroethenes (µg/L)								
Tetrachloroethene	22	2 J	8	1 J	<	<	<	<
Trichloroethene	17	3 J	5 J	1 J	<	<	3 J	6
cis-1,2-Dichloroethene	58	17	46	9	<	<	<	4 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<
1,1-Dichloroethene	3 J	<	1 J	<	<	<	<	<
Vinyl chloride	4	<	<	<	<	<	<	<
Chloroethanes (µg/L)								
1,1,1-Trichloroethane	1 J	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	7	2 J	3 J	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	1 J	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)								
Benzene	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	<	<	<	<
Trichlorofluoromethane	.	.	.	.	<	<	<	<
Dichlorodifluoromethane	.	.	.	.	<	<	<	<
Miscellaneous (µg/L)								
Acetone	<	<	<	<	<	<	<	<
Acrylonitrile	.	.	.	.	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	.	.	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	SS-5			SS-6	SS-6.6
Functional Area	EXP-SW			EXP-SW	EXP-SW
Date Sampled	01/27/04		07/20/04	07/07/04	03/02/04
Program	GWPP	GWPP	GWPP	BJC	BJC
Sample Type		Dup			
Chloroethenes (µg/L)					
Tetrachloroethene	<	<	<	<	<
Trichloroethene	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<
Vinyl chloride	<	<	<	<	<
Chloroethanes (µg/L)					
1,1,1-Trichloroethane	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<
Chloroethane	<	<	<	<	<
Chloromethanes (µg/L)					
Carbon tetrachloride	<	<	<	<	<
Chloroform	<	<	<	<	<
Methylene chloride	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)					
Benzene	<	<	<	<	<
Ethylbenzene	<	<	<	<	<
Toluene	<	<	<	<	<
Total Xylene	<	<	<	<	<
Styrene	<	<	<	<	<
Chlorofluorocarbons (µg/L)					
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.
Trichlorofluoromethane	<	<	<	.	.
Dichlorodifluoromethane	<	<	<	.	.
Miscellaneous (µg/L)					
Acetone	<	<	<	<	<
Acrylonitrile	<	<	<	.	.
Carbon disulfide	<	<	<	<	<
Chlorobenzene	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	.	.
1,2-Dichloropropane	<	<	<	<	<

APPENDIX D.3

RADIOLOGICAL ANALYTES

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Activity	Error	MDA	Activity	Error	MDA
BCK-00.63	EXP-SW	01/27/04	GWPP	5.9	3.2	3.9	11	5.3	7.7
BCK-00.63	EXP-SW	07/20/04	GWPP	<MDA	.	6.1	7.3	4.3	6.5
BCK-03.30	EXP-SW	03/02/04	BJC	.			10.99	1.32	1.71
BCK-03.30	EXP-SW	09/14/04	BJC	.			9.09	1.93	2.79
BCK-04.55	EXP-SW	01/27/04	GWPP	4.8	2.8	3.3	8.9	4.8	7
BCK-04.55	EXP-SW	07/20/04	GWPP	13	5.5	6.2	21	6.6	9.1
BCK-07.87	EXP-SW	03/02/04	BJC	.			16.84	1.44	1.63
BCK-07.87	EXP-SW	09/14/04	BJC	.			36.43	2.56	2.42
BCK-09.20	EXP-SW	03/01/04	BJC	.			28.8	1.96	1.93
BCK-09.20	EXP-SW	09/13/04	BJC	.			37.42	2.77	2.36
BCK-09.47	EXP-SW	03/01/04	BJC	.			34.68	2.26	2.21
BCK-09.47	EXP-SW	09/13/04	BJC	.			61.07	3.08	2.33
BCK-11.54	EXP-SW	03/01/04	BJC	.			54.93	2.62	2.19
BCK-11.54	EXP-SW	09/13/04	BJC	.			147.82	6.89	4.74
BCK-11.84	EXP-SW	03/01/04	BJC	.			78.06	3.77	2.9
BCK-11.84	EXP-SW	09/13/04	BJC	.			186.06	5.4	2.71
GW-008	OLF	01/07/04	BJC	<MDA	.	0.72	1.89	1.03	1.67
GW-008	OLF	07/07/04	BJC	<MDA	.	18.27	<MDA	.	39.22
GW-046	BG	01/06/04	BJC	0.93	0.56	0.8	<MDA	.	1.92
GW-046	BG	07/08/04	BJC	<MDA	.	3.04	5.42	2.24	3.47
GW-052	BG	03/04/04	GWPP	17	5	3.1	17	5.2	6.8
GW-052	BG	08/16/04	GWPP	16	5.6	4.2	18	6.9	10
GW-071	BG	03/01/04	GWPP	<MDA	.	14	<MDA	.	31
GW-071	BG	08/05/04	GWPP	<MDA	.	20	<MDA	.	16
GW-082	BG	03/01/04	GWPP	<MDA	.	4	<MDA	.	17
GW-082	BG	08/05/04	GWPP	<MDA	.	8.8	7.9	5.1	7.7
GW-082 Dup	BG	08/05/04	GWPP	<MDA	.	9.5	<MDA	.	9.5
GW-085	OLF	02/23/04	GWPP	<MDA	.	5.4	120	11	9.8
GW-085 Dup	OLF	02/23/04	GWPP	<MDA	.	5.2	100	9.3	7.5
GW-085	OLF	08/03/04	GWPP	<MDA	.	7	80	11	11
GW-098	OLF	02/19/04	GWPP	<MDA	.	6.5	<MDA	.	8.1
GW-098	OLF	08/03/04	GWPP	<MDA	.	16	<MDA	.	20
GW-100	S3	03/04/04	GWPP	<MDA	.	14	<MDA	.	25
GW-100	S3	08/17/04	GWPP	<MDA	.	17	<MDA	.	19
GW-100 Dup	S3	08/17/04	GWPP	<MDA	.	13	<MDA	.	19
GW-101	S3	03/08/04	GWPP	<MDA	.	10	<MDA	.	14
GW-101	S3	08/18/04	GWPP	<MDA	.	9.2	<MDA	.	11
GW-115	S3	01/06/04	BJC	<MDA	.	1.2	3.08	1.24	1.94
GW-133-01	S3	08/23/04	GWPP	<MDA	.	17	<MDA	.	14
GW-133-05	S3	08/23/04	GWPP	<MDA	.	12	<MDA	.	14
GW-133-08	S3	08/23/04	GWPP	<MDA	.	15	<MDA	.	23
GW-133-10	S3	08/24/04	GWPP	<MDA	.	14	<MDA	.	16
GW-133-14	S3	08/26/04	GWPP	<MDA	.	15	<MDA	.	11
GW-133-17	S3	08/26/04	GWPP	<MDA	.	15	<MDA	.	13
GW-133-21	S3	08/26/04	GWPP	<MDA	.	6.3	<MDA	.	6.9
GW-133-21 Dup	S3	08/26/04	GWPP	<MDA	.	5.9	<MDA	.	8
GW-133-24	S3	08/26/04	GWPP	<MDA	.	7	<MDA	.	6.7
GW-134-05	S3	08/08/04	GWPP	<MDA	.	96	<MDA	.	180
GW-134-11	S3	08/08/04	GWPP	<MDA	.	69	<MDA	.	100

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Activity	Error	MDA	Activity	Error	MDA
GW-134-15	S3	08/09/04	GWPP	<MDA	.	63	<MDA	.	82
GW-134-15 Dup	S3	08/09/04	GWPP	<MDA	.	73	<MDA	.	70
GW-134-18	S3	08/10/04	GWPP	<MDA	.	90	<MDA	.	180
GW-134-21	S3	08/10/04	GWPP	<MDA	.	51	<MDA	.	93
GW-134-25	S3	08/10/04	GWPP	<MDA	.	9.7	<MDA	.	13
GW-134-29	S3	08/11/04	GWPP	<MDA	.	5.6	<MDA	.	6.8
GW-134-33	S3	08/11/04	GWPP	<MDA	.	8.7	130	15	13
GW-134-35	S3	08/11/04	GWPP	<MDA	.	6.8	220	13	7
GW-134-36	S3	08/11/04	GWPP	<MDA	.	7.8	130	11	8.3
GW-135-03	S3	08/21/04	GWPP	<MDA	.	500	<MDA	.	880
GW-135-06	S3	08/21/04	GWPP	<MDA	.	63	<MDA	.	150
GW-135-11	S3	08/21/04	GWPP	<MDA	.	28	<MDA	.	67
GW-135-15	S3	08/21/04	GWPP	<MDA	.	3.3	<MDA	.	7.7
GW-135-19	S3	08/22/04	GWPP	4.3	2.9	3.8	<MDA	.	9
GW-135-23	S3	08/22/04	GWPP	<MDA	.	27	<MDA	.	63
GW-135-26	S3	08/22/04	GWPP	<MDA	.	19	<MDA	.	36
GW-135-30	S3	08/22/04	GWPP	<MDA	.	4.2	<MDA	.	6.4
GW-135-34	S3	08/22/04	GWPP	<MDA	.	4.3	<MDA	.	6.9
GW-135-39	S3	08/22/04	GWPP	<MDA	.	3	<MDA	.	7.1
GW-135-39 Dup	S3	08/22/04	GWPP	<MDA	.	3	<MDA	.	8
GW-225	OLF	02/17/04	GWPP	<MDA	.	6	12	6	9
GW-225	OLF	07/29/04	GWPP	<MDA	.	4.6	<MDA	.	7.2
GW-226	OLF	02/17/04	GWPP	<MDA	.	5.1	20	6.3	8.7
GW-226	OLF	07/28/04	GWPP	<MDA	.	4.1	8.5	4.5	6.7
GW-229	OLF	02/11/04	GWPP	83	14	4.5	57	7.9	7.9
GW-229 Conv	OLF	02/12/04	GWPP	65	12	4.8	33	6.4	7.3
GW-229	OLF	07/28/04	GWPP	71	17	12	53	14	18
GW-229 Conv	OLF	07/29/04	GWPP	87	19	6.7	47	11	12
GW-236	S3	03/08/04	GWPP	<MDA	.	6.4	73	12	12
GW-236 Dup	S3	03/08/04	GWPP	<MDA	.	6.6	64	13	15
GW-236	S3	08/18/04	GWPP	<MDA	.	4.9	52	8.5	9.5
GW-237	BG	03/03/04	GWPP	<MDA	.	3.7	<MDA	.	8.9
GW-237	BG	09/20/04	GWPP	<MDA	.	5	<MDA	.	8.5
GW-246	S3	03/10/04	GWPP	430	190	170	24000	770	240
GW-246	S3	08/19/04	GWPP	<MDA	.	180	9800	480	210
GW-257	BG	03/03/04	GWPP	<MDA	.	3.1	<MDA	.	6.9
GW-257	BG	08/16/04	GWPP	<MDA	.	3.4	<MDA	.	8.1
GW-276	S3	01/06/04	BJC	343.33	15.97	2.52	280.45	10.69	7.58
GW-276	S3	07/08/04	BJC	291.88	14.4	6.12	324.68	10.39	6.13
GW-311	RS	02/18/04	GWPP	<MDA	.	3.9	<MDA	.	10
GW-311	RS	08/02/04	GWPP	<MDA	.	7.1	<MDA	.	8.2
GW-315	SPI	02/18/04	GWPP	<MDA	.	4.2	13	6.5	9.7
GW-315	SPI	08/02/04	GWPP	<MDA	.	9.4	30	6.1	6.7
GW-526	S3	02/17/04	BJC	54.11	15	12.73	<MDA	.	39.76
GW-526	S3	08/16/04	BJC	<MDA	.	29.27	<MDA	.	39.76
GW-537	OLF	02/23/04	GWPP	<MDA	.	16	390	25	15
GW-537	OLF	08/03/04	GWPP	<MDA	.	74	400	64	61
GW-615	S3	03/10/04	GWPP	<MDA	.	550	988	395	480
GW-615	S3	08/19/04	GWPP	<MDA	.	630	<MDA	.	670

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Activity	Error	MDA	Activity	Error	MDA
GW-627	BG	02/25/04	GWPP	<MDA	.	5.2	<MDA	.	7.3
GW-627	BG	08/04/04	GWPP	<MDA	.	16	22	9.7	14
GW-653	BG	02/25/04	GWPP	<MDA	.	2.9	<MDA	.	7.2
GW-653	BG	08/04/04	GWPP	<MDA	.	4.4	<MDA	.	7.9
GW-683	EXP-A	02/19/04	BJC	14.54	2.25	1.85	16.02	2.13	2.71
GW-683	EXP-A	08/16/04	BJC	7.9	1.46	1.22	7.67	1.56	2.26
GW-684	EXP-A	02/19/04	BJC	14.45	2.08	1.87	18.4	2.34	3.12
GW-684	EXP-A	08/16/04	BJC	8.72	1.36	0.8	19.39	1.71	1.91
GW-695	EXP-B	02/03/04	GWPP	3.8	2.6	3.1	39	6.8	7.6
GW-695	EXP-B	07/21/04	GWPP	<MDA	.	6.8	30	6.7	8.3
GW-703	EXP-B	02/03/04	GWPP	5.5	3.1	3	54	7.5	7
GW-703	EXP-B	07/21/04	GWPP	<MDA	.	6.7	49	7.8	8.3
GW-704	EXP-B	02/04/04	GWPP	11	4.1	2.5	52	7.9	7.8
GW-704	EXP-B	07/22/04	GWPP	<MDA	.	6	<MDA	.	9.5
GW-706	EXP-B	02/04/04	GWPP	37	8.8	4.7	98	9.2	6.5
GW-706	EXP-B	07/22/04	GWPP	20	7.2	7.6	81	9.5	8.4
GW-712	EXP-W	01/06/04	BJC	0.87	0.41	0.14	4.1	1.14	1.72
GW-712	EXP-W	07/07/04	BJC	<MDA	.	3.1	<MDA	.	4.49
GW-713	EXP-W	01/05/04	BJC	<MDA	.	1.02	2.74	1.35	2.13
GW-713	EXP-W	07/07/04	BJC	1.86	1.22	1.59	5.29	3.07	4.95
GW-713 Dup	EXP-W	07/07/04	BJC	3.41	1.2	0.3	5.19	2.51	4.01
GW-714	EXP-W	01/05/04	BJC	2.6	1.15	1.5	5.24	1.4	2.01
GW-714	EXP-W	07/07/04	BJC	1.95	1.23	1.81	<MDA	.	3.79
GW-715	EXP-W	01/05/04	BJC	1.73	0.87	1.06	2.43	1.36	2.17
GW-715 Dup	EXP-W	01/05/04	BJC	<MDA	.	1.42	<MDA	.	2.21
GW-724	EXP-C	02/10/04	GWPP	<MDA	.	3.5	35	5.9	5.9
GW-724	EXP-C	07/27/04	GWPP	<MDA	.	4	19	5.9	7.9
GW-725	EXP-C	02/11/04	GWPP	<MDA	.	5.2	34	8.9	10
GW-725 Dup	EXP-C	02/11/04	GWPP	<MDA	.	6.9	24	8.7	12
GW-725	EXP-C	07/27/04	GWPP	4.7	3.3	4	11	5.2	7.7
GW-738	EXP-C	02/09/04	GWPP	<MDA	.	3.8	25	5.2	5.4
GW-738	EXP-C	07/26/04	GWPP	<MDA	.	4.2	20	6.2	8.3
GW-738 Dup	EXP-C	07/26/04	GWPP	<MDA	.	4.6	24	6.8	8.8
GW-740	EXP-C	02/09/04	GWPP	<MDA	.	3.1	13	5.3	7.4
GW-740	EXP-C	07/26/04	GWPP	<MDA	.	5.5	<MDA	.	8.7
GW-795	AGLLWSF	02/12/04	GWPP	<MDA	.	2.8	<MDA	.	7.6
GW-795	AGLLWSF	08/17/04	GWPP	<MDA	.	3.7	<MDA	.	8.1
NT-01	EXP-SW	01/27/04	GWPP	3.9	2.7	3.3	170	11	5.9
NT-01	EXP-SW	07/20/04	GWPP	17	8.3	7.3	600	30	16
NT-01 Dup	EXP-SW	07/20/04	GWPP	15	8.9	9	635	34	19
SS-1	EXP-SW	01/27/04	GWPP	<MDA	.	9.2	29	6.9	8.5
SS-1	EXP-SW	07/20/04	GWPP	14	9	11	47	14	16
SS-4	EXP-SW	01/27/04	GWPP	24	5.6	3.8	48	6.8	5.9
SS-4	EXP-SW	07/20/04	GWPP	29	9.9	10	51	7.2	7.1
SS-5	EXP-SW	01/27/04	GWPP	7.3	3.3	3.2	17	6.5	9.1
SS-5 Dup	EXP-SW	01/27/04	GWPP	7	3.1	3.1	16	5.4	7.3
SS-5	EXP-SW	07/20/04	GWPP	17	7.4	8.9	29	7.1	9.1
SS-6	EXP-SW	03/02/04	BJC	.			1.9	0.98	1.57
SS-6	EXP-SW	07/07/04	BJC	3.33	0.99	0.94	5.66	1.46	2.15
SS-6.6	EXP-SW	03/02/04	BJC	.			8.71	1.71	2.43

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	BCK-03.30						BCK-07.87					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	03/02/04			09/14/04			03/02/04			09/14/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	10.99	1.32	1.71	9.09	1.93	2.79	16.84	1.44	1.63	36.43	2.56	2.42
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	13.39	3.91	6.24	8.83	3.79	6.18	15.61	3.95	6.24	37.58	4.3	6.18
Uranium-234	4.11	1.61	0.36	3.93	1.25	0.21	5.26	1.83	0.68	11.42	3.26	0.61
Uranium-235	0.49 R	0.57	0.44	0.67	0.51	0.26	<MDA	.	0.72	2.41	1.34	0.75
Uranium-236	0.44 R	0.51	0.4	0.43	0.39	0.23	<MDA	.	0.65	0.87	0.73	0.39
Uranium-238	6.71	2.16	0.61	5.44	1.53	0.36	15.47	3.7	0.34	19.13	4.78	0.36

Sampling Point	BCK-09.20						BCK-09.47					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	03/01/04			09/13/04			03/01/04			09/13/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	28.8	1.96	1.93	37.42	2.77	2.36	34.68	2.26	2.21	61.07	3.08	2.33
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	35.32	4.18	6.03	41.98	4.37	6.18	44.16	4.33	6.03	66.31	4.75	6.18
Uranium-234	6.47	2.03	0.72	11.55	2.61	0.52	9.16	2.54	0.56	19.56	4.51	0.7
Uranium-235	<MDA	.	0.79	1.23	0.74	0.6	0.75	0.68	0.4	2.42	1.39	0.5
Uranium-236	0.53	0.53	0.36	0.71	0.51	0.24	0.54	0.54	0.36	1.81	1.14	0.77
Uranium-238	16.66	3.83	0.92	18.21	3.67	0.48	23.34	4.93	0.33	38.99	7.57	0.69

Sampling Point	BCK-11.54						BCK-11.84					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	03/01/04			09/13/04			03/01/04			09/13/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	54.93	2.62	2.19	147.82	6.89	4.74	78.06	3.77	2.9	186.06	5.4	2.71
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	90.53	5.03	6.03	212.09	6.57	6.18	141.32	5.7	6.03	284.95	7.31	6.18
Uranium-234	9.69	2.62	0.83	28.97	6.29	1.11	24.17	6.87	1.5	36.72	7.38	1.24
Uranium-235	0.97	0.79	0.79	2.64	1.56	1.13	<MDA	.	1.84	4.61	2.05	1.18
Uranium-236	0.74	0.65	0.71	2.34	1.4	1.13	<MDA	.	2.34	3.32	1.62	0.82
Uranium-238	17	3.87	0.91	47.77	9.28	0.91	34.78	8.83	2.25	66.65	12.02	1.23

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	EMW-VWEIR						EMWNT-03A					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	03/09/04			12/02/04			03/09/04			06/08/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.14	<MDA	.	0.13	<MDA	.	0.14	<MDA	.	0.2
Neptunium-237	<MDA	.	0.29	<MDA	.	0.15	<MDA	.	0.23	<MDA	.	0.18
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	1.01	1.26	0.62	0.99	1.24	0.57	0.9	1.15	0.58	0.92
Technetium-99	<MDA	.	6.35	5.55	2.01	3.25	<MDA	.	6.32	<MDA	.	6.19
Uranium-234	0.57	0.27	0.15	1.55	0.47	0.16	0.39	0.24	0.26	0.93	0.4	0.1
Uranium-235	0.35	0.22	0.3	0.4	0.23	0.26	0.33	0.22	0.29	0.32	0.23	0.23
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.39	0.22	0.19	0.8	0.32	0.12	0.24	0.18	0.19	0.39	0.25	0.17

Sampling Point	EMWNT-03A						EMWNT-05					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	09/02/04			12/02/04			03/09/04					
Program	BJC			BJC			BJC					
Sample Type										Dup		
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.23	<MDA	.	0.23	<MDA	.	0.21	<MDA	.	0.17
Neptunium-237	<MDA	.	0.17	<MDA	.	0.15	<MDA	.	0.17	<MDA	.	0.15
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	1.2	<MDA	.	1.12	1.11	0.52	0.81	<MDA	.	0.89
Technetium-99	<MDA	.	6.08	<MDA	.	3.26	<MDA	.	6.33	<MDA	.	6.33
Uranium-234	1.12	0.56	0.34	0.49	0.25	0.14	0.22	0.17	0.2	0.24	0.18	0.2
Uranium-235	0.53	0.41	0.53	0.26	0.2	0.25	<MDA	.	0.26	<MDA	.	0.36
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	2.46	0.87	0.17	0.2	0.16	0.08	0.19	0.16	0.18	<MDA	.	0.16

Sampling Point	EMWNT-05											
Functional Area	EXP-SW											
Date Sampled	06/08/04			09/02/04						12/02/04		
Program	BJC			BJC						BJC		
Sample Type							Dup					
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.18	<MDA	.	0.16	<MDA	.	0.16	<MDA	.	0.13
Neptunium-237	<MDA	.	0.3	<MDA	.	0.28	<MDA	.	0.24	<MDA	.	0.09
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	1.03	1.58	0.62	0.96	<MDA	.	1.08	<MDA	.	1.02
Technetium-99	<MDA	.	6.19	<MDA	.	6.08	<MDA	.	6.08	<MDA	.	3.24
Uranium-234	0.56	0.29	0.09	1.49	0.65	0.33	1.7	0.71	0.35	0.65	0.3	0.19
Uranium-235	0.29	0.22	0.22	0.57	0.4	0.38	1.21	0.63	0.4	0.36	0.23	0.26
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.31	0.21	0.09	0.91	0.49	0.16	1.49	0.66	0.38	0.16	0.14	0.16

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-008			GW-046						GW-052		
Functional Area	OLF			BG						BG		
Date Sampled	01/07/04			01/06/04			07/08/04			03/04/04		
Program	BJC			BJC			BJC			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	0.72	0.93	0.56	0.8	<MDA	.	3.04	17	5	3.1
Gross Beta	1.89	1.03	1.67	<MDA	.	1.92	5.42	2.24	3.47	17	5.2	6.8
Americium-241	0.11	0.08	0.09	<MDA	.	0.11	.	.	.	.	.	.
Neptunium-237	<MDA	.	0.04	<MDA	.	0.05	.	.	.	.	.	.
Total Radium Alpha	0.37	0.18	0.21	0.56	0.14	0.08	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.77	<MDA	.	0.78	.	.	.	.	.	.
Technetium-99	<MDA	.	6.3	<MDA	.	6.18	<MDA	.	6.2	19	7.6	13
Uranium-234	0.61	0.37	0.24	0.49	0.33	0.27	0.83	0.47	0.28	4.9	0.8	0.16
Uranium-235	0.32	0.29	0.17	<MDA	.	0.29	0.22 R	0.26	0.2	0.31	0.19	0.15
Uranium-236	<MDA	.	0.15	<MDA	.	0.15	<MDA	.	0.43	<MDA	.	0.1
Uranium-238	<MDA	.	0.28	<MDA	.	0.3	0.41	0.32	0.28	9	1.2	0.15

Sampling Point	GW-052			GW-100								
Functional Area	BG			S3								
Date Sampled	08/16/04			03/04/04			08/17/04					
Program	GWPP			GWPP			GWPP					
Sample Type										Dup		
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	16	5.6	4.2	<MDA	.	14	<MDA	.	17	<MDA	.	13
Gross Beta	18	6.9	10	<MDA	.	25	<MDA	.	19	<MDA	.	19
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	19	7.3	13	<MDA	.	13	<MDA	.	13	<MDA	.	13
Uranium-234	8.4	1.1	0.16	0.61	0.25	0.17	0.62	0.26	0.19	0.86	0.32	0.26
Uranium-235	0.55	0.24	0.15	<MDA	.	0.12	<MDA	.	0.15	<MDA	.	0.16
Uranium-236	<MDA	.	0.097	<MDA	.	0.12	<MDA	.	0.11	<MDA	.	0.12
Uranium-238	15	1.8	0.14	0.45	0.21	0.15	0.44	0.22	0.18	0.42	0.26	0.25

Sampling Point	GW-101						GW-115			GW-133-01		
Functional Area	S3						S3			S3		
Date Sampled	03/08/04			08/18/04			01/06/04			08/23/04		
Program	GWPP			GWPP			BJC			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	10	<MDA	.	9.2	<MDA	.	1.2	<MDA	.	17
Gross Beta	<MDA	.	14	<MDA	.	11	3.08	1.24	1.94	<MDA	.	14
Americium-241	.	.	.	.	.	.	0.07	0.06	0.04	.	.	.
Neptunium-237	.	.	.	.	.	.	<MDA	.	0.11	.	.	.
Total Radium Alpha	.	.	.	.	.	.	0.83	0.16	0.13	.	.	.
Strontium-89/90	.	.	.	.	.	.	<MDA	.	0.63	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	6.18	<MDA	.	13
Uranium-234	3.7	0.7	0.15	2.2	0.48	0.24	0.35	0.27	0.13	.	.	.
Uranium-235	0.18	0.15	0.15	<MDA	.	0.12	0.18 R	0.21	0.17	.	.	.
Uranium-236	<MDA	.	0.11	<MDA	.	0.081	<MDA	.	0.25	.	.	.
Uranium-238	1.7	0.44	0.17	0.74	0.29	0.4	<MDA	.	0.27	.	.	.

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-133-05			GW-133-08			GW-133-10			GW-133-14		
Functional Area	S3			S3			S3			S3		
Date Sampled	08/23/04			08/23/04			08/24/04			08/26/04		
Program	GWPP			GWPP			GWPP			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	12	<MDA	.	15	<MDA	.	14	<MDA	.	15
Gross Beta	<MDA	.	14	<MDA	.	23	<MDA	.	16	<MDA	.	11
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	13	40	8.6	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-133-17			GW-133-21						GW-133-24		
Functional Area	S3			S3						S3		
Date Sampled	08/26/04			08/26/04						08/26/04		
Program	GWPP			GWPP						GWPP		
Sample Type							Dup					
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	15	<MDA	.	6.3	<MDA	.	5.9	<MDA	.	7
Gross Beta	<MDA	.	13	<MDA	.	6.9	<MDA	.	8	<MDA	.	6.7
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	13	<MDA	.	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-134-05			GW-134-11			GW-134-15					
Functional Area	S3			S3			S3					
Date Sampled	08/08/04			08/08/04			08/09/04					
Program	GWPP			GWPP			GWPP					
Sample Type										Dup		
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	96	<MDA	.	69	<MDA	.	63	<MDA	.	73
Gross Beta	<MDA	.	180	<MDA	.	100	<MDA	.	82	<MDA	.	70
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	13	<MDA	.	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-134-18			GW-134-21			GW-134-25			GW-134-29		
Functional Area	S3			S3			S3			S3		
Date Sampled	08/10/04			08/10/04			08/10/04			08/11/04		
Program	GWPP			GWPP			GWPP			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	90	<MDA	.	51	<MDA	.	9.7	<MDA	.	5.6
Gross Beta	<MDA	.	180	<MDA	.	93	<MDA	.	13	<MDA	.	6.8
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	13	<MDA	.	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-134-33			GW-134-35			GW-134-36			GW-135-03		
Functional Area	S3			S3			S3			S3		
Date Sampled	08/11/04			08/11/04			08/11/04			08/21/04		
Program	GWPP			GWPP			GWPP			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	8.7	<MDA	.	6.8	<MDA	.	7.8	<MDA	.	500
Gross Beta	130	15	13	220	13	7	130	11	8.3	<MDA	.	880
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	270	11	13	370	12	13	230	11	13	<MDA	.	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-135-06			GW-135-11			GW-135-15			GW-135-19		
Functional Area	S3			S3			S3			S3		
Date Sampled	08/21/04			08/21/04			08/21/04			08/22/04		
Program	GWPP			GWPP			GWPP			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	63	<MDA	.	28	<MDA	.	3.3	4.3	2.9	3.8
Gross Beta	<MDA	.	150	<MDA	.	67	<MDA	.	7.7	<MDA	.	9
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	13	<MDA	.	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-135-23			GW-135-26			GW-135-30			GW-135-34		
Functional Area	S3			S3			S3			S3		
Date Sampled	08/22/04			08/22/04			08/22/04			08/22/04		
Program	GWPP			GWPP			GWPP			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	27	<MDA	.	19	<MDA	.	4.2	<MDA	.	4.3
Gross Beta	<MDA	.	63	<MDA	.	36	<MDA	.	6.4	<MDA	.	6.9
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	13	<MDA	.	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-135-39						GW-229					
Functional Area	S3						OLF					
Date Sampled	08/22/04						02/11/04			02/12/04		
Program	GWPP						GWPP			GWPP		
Sample Type				Dup								
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	3	<MDA	.	3	83	14	4.5	65	12	4.8
Gross Beta	<MDA	.	7.1	<MDA	.	8	57	7.9	7.9	33	6.4	7.3
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	<MDA	.	13	<MDA	.	13
Uranium-234	.	.	.	.	.	.	25	2.7	0.16	19	2.1	0.075
Uranium-235	.	.	.	.	.	.	1.4	0.42	0.13	0.93	0.31	0.086
Uranium-236	.	.	.	.	.	.	0.36	0.18	0.12	0.33	0.16	0.075
Uranium-238	.	.	.	.	.	.	53	5.2	0.14	39	3.8	0.079

Sampling Point	GW-229						GW-236					
Functional Area	OLF						S3					
Date Sampled	07/28/04			07/29/04			03/08/04					
Program	GWPP			GWPP			GWPP					
Sample Type										Dup		
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	71	17	12	87	19	6.7	<MDA	.	6.4	<MDA	.	6.6
Gross Beta	53	14	18	47	11	12	73	12	12	64	13	15
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	13	<MDA	.	13	88	8.9	13	100	9.1	13
Uranium-234	25	2.7	0.13	34	3.6	0.16	1.9	0.48	0.13	1.9	0.45	0.17
Uranium-235	1.2	0.36	0.098	1.7	0.47	0.15	<MDA	.	0.14	<MDA	.	0.14
Uranium-236	0.41	0.19	0.075	0.45	0.22	0.12	<MDA	.	0.099	<MDA	.	0.092
Uranium-238	52	5.1	0.099	67	6.7	0.15	4.1	0.75	0.11	3.9	0.68	0.15

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-236			GW-246						GW-276		
Functional Area	S3			S3						S3		
Date Sampled	08/18/04			03/10/04			08/19/04			01/06/04		
Program	GWPP			GWPP			GWPP			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	4.9	430	190	170	<MDA	.	180	343.33	15.97	2.52
Gross Beta	52	8.5	9.5	24000	770	240	9800	480	210	280.45	10.69	7.58
Americium-241	.	.	.	.	.	.	.	.	.	0.14	0.1	0.09
Neptunium-237	.	.	.	.	.	.	.	.	.	8.17	0.96	0.04
Total Radium Alpha	.	.	.	.	.	.	.	.	.	1.43	0.21	0.12
Strontium-89/90	.	.	.	.	.	.	.	.	.	1.69	0.5	0.76
Technetium-99	79	8.3	13	33000	100	13	26000	290	13	339.49	7.82	6.18
Uranium-234	1.8	0.49	0.2	87	8	0.083	79	10	2.8	111.8	25.28	3.84
Uranium-235	<MDA	.	0.19	4.5	0.75	0.1	4.8	2.2	1.4	8.3	5.71	5.28
Uranium-236	<MDA	.	0.12	2.6	0.53	0.078	<MDA	.	1.1	9.43	5.65	2.13
Uranium-238	3.6	0.72	0.2	210	19	0.082	190	21	1.7	234.8	45.65	5.74

Sampling Point	GW-276			GW-363								
Functional Area	S3			EMWMF								
Date Sampled	07/08/04			03/15/04			06/08/04			09/08/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	291.88	14.4	6.12	.	.	.	.	.	.	.	.	.
Gross Beta	324.68	10.39	6.13	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.2	<MDA	.	0.12	<MDA	.	0.08	<MDA	.	0.18
Neptunium-237	10.59	1.81	0.33	0.09	0.06	0.07	<MDA	.	0.15	<MDA	.	0.11
Total Radium Alpha	0.38	0.14	0.19	.	.	.	.	.	.	.	.	.
Strontium-89/90	2.36	0.71	1.06	<MDA	.	0.44	<MDA	.	0.48	<MDA	.	0.45
Technetium-99	326.4	7.7	6.19	<MDA	.	3.23	<MDA	.	2.51	<MDA	.	2.79
Uranium-234	111.6	29.87	7.14	0.15	0.07	0.05	0.45	0.19	0.12	0.65	0.22	0.1
Uranium-235	11.1	8.79	7.52	0.06	0.04	0.04	0.27	0.16	0.17	0.44	0.19	0.1
Uranium-236	8.51	7.29	6.75	.	.	.	.	.	.	.	.	.
Uranium-238	215	47.43	6.07	0.08	0.05	0.04	0.22	0.13	0.1	0.37	0.16	0.04

Sampling Point	GW-363			GW-526						GW-615		
Functional Area	EMWMF			S3						S3		
Date Sampled	11/18/04			02/17/04			08/16/04			03/10/04		
Program	BJC			BJC			BJC			GWPP		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	54.11	15	12.73	<MDA	.	29.27	<MDA	.	550
Gross Beta	.	.	.	<MDA	.	39.76	<MDA	.	39.76	988	395	480
Americium-241	<MDA	.	0.16	.	.	.	.	.	.	.	.	.
Neptunium-237	<MDA	.	0.35	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.92	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	3.32	<MDA	.	6.17	<MDA	.	6.17	41	7.9	13
Uranium-234	0.8	0.31	0.19	1.17	0.58	0.56	0.57	0.35	0.14	120	10	0.093
Uranium-235	0.54	0.27	0.24	0.53	0.41	0.42	<MDA	.	0.17	6.2	0.87	0.085
Uranium-236	.	.	.	<MDA	.	0.38	<MDA	.	0.15	2.6	0.51	0.063
Uranium-238	0.23	0.17	0.19	0.63	0.41	0.4	0.3	0.26	0.24	290	25	0.077

Sampling Point	GW-615			GW-639								
Functional Area	S3			EMWMF								
Date Sampled	08/19/04			03/10/04			06/08/04			09/14/04		
Program	GWPP			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	630	.	.	.	.	.	.	.	.	.
Gross Beta	<MDA	.	670	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	<MDA	.	0.16	<MDA	.	0.06	<MDA	.	0.15
Neptunium-237	.	.	.	<MDA	.	0.05	<MDA	.	0.13	<MDA	.	0.04
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	0.72	0.33	0.51	0.78	0.25	0.38	0.44	0.24	0.39
Technetium-99	38	7.5	13	<MDA	.	3.23	<MDA	.	2.51	<MDA	.	2.79
Uranium-234	150	17	1.4	0.42	0.13	0.07	0.73	0.25	0.05	0.91	0.29	0.1
Uranium-235	8.4	3	1.8	0.14	0.07	0.1	0.35	0.17	0.16	0.41	0.2	0.12
Uranium-236	2.2	1.3	1	.	.	.	.	.	.	.	.	.
Uranium-238	390	38	1.2	0.17	0.08	0.06	0.25	0.14	0.05	0.29	0.16	0.12

Sampling Point	GW-639			GW-683						GW-684		
Functional Area	EMWMF			EXP-A						EXP-A		
Date Sampled	11/11/04			02/19/04			08/16/04			02/19/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	14.54	2.25	1.85	7.9	1.46	1.22	14.45	2.08	1.87
Gross Beta	.	.	.	16.02	2.13	2.71	7.67	1.56	2.26	18.4	2.34	3.12
Americium-241	<MDA	.	0.19	.	.	.	.	.	.	.	.	.
Neptunium-237	<MDA	.	0.15	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.88	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	3.32	<MDA	.	6.01	<MDA	.	6.17	10.5	3.64	5.87
Uranium-234	1.28	0.43	0.14	2.52	0.79	0.25	3.35	1.01	0.37	3.42	1.02	0.38
Uranium-235	0.57	0.29	0.25	0.17 R	0.2	0.15	0.55	0.4	0.32	<MDA	.	0.18
Uranium-236	.	.	.	0.20 R	0.21	0.14	<MDA	.	0.29	<MDA	.	0.36
Uranium-238	0.52	0.26	0.13	3.35	0.94	0.21	3.86	1.09	0.3	6.62	1.59	0.25

Sampling Point	GW-684			GW-704						GW-706		
Functional Area	EXP-A			EXP-B						EXP-B		
Date Sampled	08/16/04			02/04/04			07/22/04			02/04/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	8.72	1.36	0.8	.	.	.	.	.	.	.	.	.
Gross Beta	19.39	1.71	1.91	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	11.03	3.83	6.17	.	.	.	.	.	.	.	.	.
Uranium-234	5.33	1.4	0.52	5.26	1.36	0.38	0.88	0.46	0.49	14.02	4.4	1.39
Uranium-235	0.6	0.43	0.2	<MDA	.	0.36	<MDA	.	0.34	1.58	1.44	0.86
Uranium-236	0.33	0.31	0.31	<MDA	.	0.39	<MDA	.	0.34	<MDA	.	1.32
Uranium-238	5.85	1.48	0.37	7.29	1.71	0.38	0.38	0.28	0.3	25.25	6.46	1.18

Sampling Point	GW-706			GW-712						GW-713		
Functional Area	EXP-B			EXP-W						EXP-W		
Date Sampled	07/22/04			01/06/04			07/07/04			01/05/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	0.87	0.41	0.14	<MDA	.	3.1	<MDA	.	1.02
Gross Beta	.	.	.	4.1	1.14	1.72	<MDA	.	4.49	2.74	1.35	2.13
Americium-241	.	.	.	0.08	0.07	0.08	.	.	.	0.14	0.09	0.04
Neptunium-237	.	.	.	<MDA	.	0.11	.	.	.	<MDA	.	0.15
Total Radium Alpha	.	.	.	0.65	0.17	0.18	.	.	.	0.5	0.17	0.2
Strontium-89/90	.	.	.	<MDA	.	0.75	.	.	.	<MDA	.	0.62
Technetium-99	.	.	.	<MDA	.	6.18	<MDA	.	6.16	<MDA	.	6.03
Uranium-234	16.47	3.72	0.76	0.55	0.34	0.32	1.26	0.56	0.32	0.72	0.46	0.62
Uranium-235	2.27	1.24	0.84	<MDA	.	0.37	<MDA	.	0.31	<MDA	.	0.34
Uranium-236	1.25	0.85	0.38	<MDA	.	0.23	<MDA	.	0.16	<MDA	.	0.31
Uranium-238	27.57	5.42	0.87	<MDA	.	0.25	0.51	0.35	0.32	0.44	0.32	0.28

Sampling Point	GW-713						GW-714					
Functional Area	EXP-W						EXP-W					
Date Sampled	07/07/04						01/05/04			07/07/04		
Program	BJC						BJC			BJC		
Sample Type				Dup								
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	1.86	1.22	1.59	3.41	1.2	0.3	2.6	1.15	1.5	1.95	1.23	1.81
Gross Beta	5.29	3.07	4.95	5.19	2.51	4.01	5.24	1.4	2.01	<MDA	.	3.79
Americium-241	.	.	.	.	.	.	<MDA	.	0.04	.	.	.
Neptunium-237	.	.	.	.	.	.	<MDA	.	0.14	.	.	.
Total Radium Alpha	.	.	.	.	.	.	0.69	0.21	0.25	.	.	.
Strontium-89/90	.	.	.	.	.	.	<MDA	.	0.59	.	.	.
Technetium-99	<MDA	.	6.16	<MDA	.	6.16	6.62	3.66	6.03	<MDA	.	6.16
Uranium-234	1.63	0.66	0.26	1.56	0.65	0.27	1.79	0.65	0.22	2.42	0.85	0.45
Uranium-235	<MDA	.	0.19	0.35	0.33	0.33	0.44	0.35	0.39	<MDA	.	0.39
Uranium-236	0.44	0.34	0.17	0.31	0.29	0.3	<MDA	.	0.25	0.38	0.32	0.17
Uranium-238	0.39	0.3	0.15	<MDA	.	0.27	1.44	0.58	0.22	1.26	0.58	0.27

Sampling Point	GW-715						GW-916					
Functional Area	EXP-W						EMWMF					
Date Sampled	01/05/04						03/08/04			06/02/04		
Program	BJC						BJC			BJC		
Sample Type				Dup								
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	1.73	0.87	1.06	<MDA	.	1.42	.	.	.	.	.	.
Gross Beta	2.43	1.36	2.17	<MDA	.	2.21	.	.	.	.	.	.
Americium-241	<MDA	.	0.1	<MDA	.	0.11	<MDA	.	0.1	<MDA	.	0.15
Neptunium-237	<MDA	.	0.16	<MDA	.	0.15	<MDA	.	0.1	<MDA	.	0.15
Total Radium Alpha	1.57	0.27	0.14	0.46	0.2	0.27	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.68	<MDA	.	0.68	0.64	0.28	0.45	<MDA	.	0.43
Technetium-99	<MDA	.	6.03	6.62	3.66	6.03	<MDA	.	3.24	<MDA	.	2.52
Uranium-234	0.93	0.46	0.3	0.91	0.48	0.33	0.22	0.09	0.07	0.5	0.19	0.08
Uranium-235	0.42	0.34	0.29	<MDA	.	0.32	<MDA	.	0.1	0.35	0.17	0.2
Uranium-236	0.17 R	0.2	0.15	<MDA	.	0.17	.	.	.	.	.	.
Uranium-238	1.22	0.54	0.33	1.14	0.54	0.25	0.15	0.07	0.04	0.27	0.14	0.08

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-916						GW-917					
Functional Area	EMWMF						EMWMF					
Date Sampled	09/13/04			11/10/04			03/09/04			06/03/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.27	<MDA	.	0.15	0.07	0.07	0.07	0.17	0.11	0.09
Neptunium-237	<MDA	.	0.12	<MDA	.	0.28	<MDA	.	0.09	<MDA	.	0.22
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.4	<MDA	.	0.81	<MDA	.	0.43	<MDA	.	0.43
Technetium-99	<MDA	.	2.79	<MDA	.	3.32	<MDA	.	3.23	<MDA	.	2.51
Uranium-234	0.39	0.17	0.15	0.58	0.28	0.14	0.21	0.08	0.06	0.39	0.18	0.13
Uranium-235	0.36	0.16	0.24	0.21	0.17	0.19	<MDA	.	0.09	0.28	0.16	0.16
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	<MDA	.	0.17	<MDA	.	0.14	0.17	0.07	0.06	0.23	0.13	0.04

Sampling Point	GW-917						GW-918					
Functional Area	EMWMF						EMWMF					
Date Sampled	09/07/04			11/04/04			03/15/04			06/02/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.1	<MDA	.	0.19	<MDA	.	0.12	<MDA	.	0.12
Neptunium-237	0.19	0.13	0.13	<MDA	.	0.16	<MDA	.	0.05	<MDA	.	0.26
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.44	<MDA	.	0.9	0.64	0.27	0.41	<MDA	.	0.4
Technetium-99	<MDA	.	2.79	<MDA	.	3.32	<MDA	.	3.24	<MDA	.	2.52
Uranium-234	0.51	0.2	0.11	0.49	0.25	0.15	0.19	0.08	0.04	0.38	0.16	0.13
Uranium-235	0.35	0.17	0.21	0.42	0.24	0.18	0.06	0.04	0.04	0.23	0.13	0.19
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.34	0.16	0.09	0.42	0.22	0.08	0.06	0.04	0.03	<MDA	.	0.14

Sampling Point	GW-918						GW-920					
Functional Area	EMWMF						EMWMF					
Date Sampled	09/09/04			11/10/04			03/11/04			06/01/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.13	<MDA	.	0.18	0.07	0.06	0.03	<MDA	.	0.11
Neptunium-237	<MDA	.	0.11	<MDA	.	0.25	<MDA	.	0.07	<MDA	.	0.46
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.5	<MDA	.	0.82	0.68	0.29	0.45	0.5	0.24	0.37
Technetium-99	<MDA	.	2.8	<MDA	.	3.35	<MDA	.	3.23	<MDA	.	2.51
Uranium-234	0.61	0.21	0.1	0.87	0.38	0.16	0.14	0.07	0.07	0.48	0.2	0.15
Uranium-235	0.52	0.19	0.14	0.33	0.24	0.22	0.12	0.06	0.08	<MDA	.	0.25
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.23	0.13	0.14	0.42	0.25	0.09	<MDA	.	0.06	<MDA	.	0.14

Sampling Point	GW-920						GW-921					
Functional Area	EMWMF						EMWMF					
Date Sampled	09/02/04			11/09/04			03/08/04			06/01/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	0.2	0.14	0.18	<MDA	.	0.23	0.08	0.07	0.04	<MDA	.	0.1
Neptunium-237	<MDA	.	0.09	<MDA	.	0.13	<MDA	.	0.08	<MDA	.	0.45
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	0.75	0.27	0.42	<MDA	.	0.77	0.64	0.3	0.47	0.37	0.23	0.37
Technetium-99	<MDA	.	2.79	<MDA	.	3.32	<MDA	.	3.23	<MDA	.	2.51
Uranium-234	0.65	0.21	0.1	0.93	0.36	0.08	0.38	0.12	0.07	0.26	0.14	0.15
Uranium-235	0.23	0.12	0.13	0.82	0.35	0.18	0.17	0.08	0.06	0.3	0.15	0.16
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.13	0.09	0.07	0.54	0.26	0.13	0.11	0.06	0.04	0.26	0.13	0.09

Sampling Point	GW-921						GW-922					
Functional Area	EMWMF						EMWMF					
Date Sampled	09/02/04			11/04/04			03/10/04			06/02/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.22	<MDA	.	0.21	<MDA	.	0.13	<MDA	.	0.15
Neptunium-237	<MDA	.	0.13	<MDA	.	0.2	<MDA	.	0.06	<MDA	.	0.15
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.46	<MDA	.	0.72	0.45	0.27	0.43	<MDA	.	0.44
Technetium-99	<MDA	.	2.79	<MDA	.	3.32	<MDA	.	3.23	<MDA	.	2.51
Uranium-234	0.54	0.19	0.07	0.37	0.21	0.13	0.14	0.06	0.05	0.33	0.16	0.13
Uranium-235	0.4	0.16	0.13	0.54	0.28	0.24	0.1	0.06	0.04	0.28	0.15	0.14
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.34	0.15	0.1	0.26	0.18	0.08	0.06	0.04	0.02	0.18	0.11	0.1

Sampling Point	GW-922						GW-923					
Functional Area	EMWMF						EMWMF					
Date Sampled	09/09/04			11/15/04			03/15/04			11/16/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.25	<MDA	.	0.27	<MDA	.	0.1	<MDA	.	0.17
Neptunium-237	<MDA	.	0.12	0.18	0.17	0.17	<MDA	.	0.05	<MDA	.	0.19
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	0.57	0.26	0.41	<MDA	.	0.91	0.87	0.31	0.46	<MDA	.	0.87
Technetium-99	<MDA	.	2.79	<MDA	.	3.32	<MDA	.	3.24	<MDA	.	3.33
Uranium-234	0.67	0.22	0.14	0.64	0.3	0.17	0.57	0.15	0.05	0.74	0.31	0.17
Uranium-235	0.42	0.18	0.15	0.25	0.19	0.2	0.11	0.06	0.09	0.49	0.26	0.24
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.28	0.14	0.1	0.27	0.19	0.14	0.45	0.13	0.06	0.32	0.2	0.17

Sampling Point	GW-924											
Functional Area	EMWMF											
Date Sampled	03/11/04						06/07/04					
Program	BJC						BJC					
Sample Type				Dup						Dup		
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.09	<MDA	.	0.13	0.08	0.06	0.03	<MDA	.	0.07
Neptunium-237	<MDA	.	0.04	<MDA	.	0.04	<MDA	.	0.2	<MDA	.	0.13
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	0.49	0.27	0.43	<MDA	.	0.51	0.48	0.24	0.39	<MDA	.	0.43
Technetium-99	<MDA	.	3.23	<MDA	.	3.23	<MDA	.	2.51	<MDA	.	2.51
Uranium-234	0.14	0.07	0.05	0.25	0.1	0.07	0.36	0.15	0.04	0.78	0.25	0.1
Uranium-235	<MDA	.	0.09	0.14	0.07	0.09	0.28	0.14	0.14	0.28	0.15	0.1
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.09	0.05	0.05	0.11	0.06	0.06	0.16	0.1	0.04	0.36	0.16	0.08

Sampling Point	GW-924											
Functional Area	EMWMF											
Date Sampled	09/07/04						11/17/04					
Program	BJC						BJC					
Sample Type				Dup						Dup		
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.15	<MDA	.	0.09	<MDA	.	0.15	<MDA	.	0.2
Neptunium-237	<MDA	.	0.16	<MDA	.	0.13	0.14 R	0.16	0.12	<MDA	.	0.26
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.44	<MDA	.	0.45	<MDA	.	0.84	<MDA	.	0.92
Technetium-99	<MDA	.	2.79	<MDA	.	2.79	<MDA	.	3.32	<MDA	.	3.32
Uranium-234	0.46	0.18	0.13	0.42	0.18	0.17	0.84	0.35	0.15	1.01	0.55	0.31
Uranium-235	0.53	0.2	0.09	0.28	0.14	0.19	0.29	0.21	0.27	0.79	0.52	0.58
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.29	0.14	0.11	0.18	0.11	0.08	0.24	0.18	0.14	0.47	0.36	0.18

Sampling Point	GW-925											
Functional Area	EMWMF											
Date Sampled	03/09/04			06/01/04			09/01/04			11/08/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.11	<MDA	.	0.11	0.17	0.11	0.13	<MDA	.	0.27
Neptunium-237	<MDA	.	0.02	<MDA	.	0.16	<MDA	.	0.18	<MDA	.	0.16
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.42	<MDA	.	0.42	<MDA	.	0.48	<MDA	.	0.82
Technetium-99	<MDA	.	3.43	<MDA	.	2.69	<MDA	.	2.83	<MDA	.	3.72
Uranium-234	0.46	0.14	0.09	0.51	0.2	0.11	0.75	0.23	0.18	1.69	0.79	0.44
Uranium-235	0.06	0.05	0.06	<MDA	.	0.25	<MDA	.	0.25	1.07	0.67	0.71
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.22	0.09	0.06	0.33	0.16	0.13	0.18	0.11	0.12	0.57	0.44	0.22

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-926											
Functional Area	EMWMF											
Date Sampled	03/11/04			06/07/04			09/07/04			11/17/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.09	0.08	0.06	0.06	<MDA	.	0.18	<MDA	.	0.15
Neptunium-237	<MDA	.	0.06	<MDA	.	0.1	<MDA	.	0.09	<MDA	.	0.23
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	0.41	0.25	0.39	<MDA	.	0.4	<MDA	.	0.47	<MDA	.	0.88
Technetium-99	<MDA	.	3.23	<MDA	.	2.51	<MDA	.	2.79	<MDA	.	3.32
Uranium-234	0.22	0.08	0.05	0.75	0.25	0.12	0.49	0.17	0.07	0.66	0.3	0.18
Uranium-235	0.07	0.04	0.04	0.4	0.18	0.11	0.31	0.14	0.12	0.32	0.22	0.19
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.06	0.04	0.04	0.33	0.16	0.09	0.25	0.12	0.1	0.26	0.19	0.18

Sampling Point	GW-927											
Functional Area	EMWMF											
Date Sampled	03/09/04			06/03/04			09/07/04			11/16/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.13	<MDA	.	0.08	<MDA	.	0.18	<MDA	.	0.21
Neptunium-237	<MDA	.	0.02	<MDA	.	0.17	<MDA	.	0.04	<MDA	.	0.3
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.53	<MDA	.	0.53	0.4	0.25	0.4	<MDA	.	0.81
Technetium-99	<MDA	.	3.23	<MDA	.	2.51	<MDA	.	2.79	<MDA	.	3.32
Uranium-234	0.15	0.07	0.07	0.43	0.17	0.1	0.5	0.18	0.09	1.53	0.65	0.36
Uranium-235	0.06	0.04	0.06	0.2	0.13	0.16	0.2	0.12	0.14	1.19	0.6	0.52
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.11	0.05	0.02	0.15	0.09	0.04	0.21	0.12	0.09	0.88	0.48	0.32

Sampling Point	NT-03						NT-04					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	03/01/04			09/13/04			03/09/04			06/08/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	.	.	.	<MDA	.	0.22	<MDA	.	0.19
Neptunium-237	.	.	.	.	.	.	<MDA	.	0.08	0.23	0.21	0.12
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	1.49	0.55	0.84	<MDA	.	1.01
Technetium-99	<MDA	.	6.04	<MDA	.	6.19	<MDA	.	6.32	<MDA	.	6.19
Uranium-234	.	.	.	.	.	.	1.45	0.47	0.21	1.1	0.42	0.09
Uranium-235	.	.	.	.	.	.	0.4	0.24	0.26	<MDA	.	0.38
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	2.04	0.58	0.2	1.25	0.45	0.15

Sampling Point	NT-04						NT-07					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	09/02/04			12/02/04			03/02/04			09/14/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<MDA	.	0.13	<MDA	.	0.2	.	.	.	.	.	.
Neptunium-237	<MDA	.	0.19	<MDA	.	0.18	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	1.17	<MDA	.	0.8	.	.	.	.	.	.
Technetium-99	<MDA	.	6.09	<MDA	.	3.24	.	.	.	.	.	.
Uranium-234	1.78	0.72	0.38	1.34	0.47	0.2	2.5	1.26	0.89	5.38	2.5	1.2
Uranium-235	0.83	0.51	0.65	<MDA	.	0.29	<MDA	.	0.46	1.91	1.59	0.86
Uranium-236	.	.	.	.	.	.	<MDA	.	0.41	<MDA	.	1.55
Uranium-238	1.78	0.72	0.34	1.35	0.47	0.15	4.11	1.65	0.89	6.65	2.8	1.19

Sampling Point	NT-08						SS-4					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	03/02/04			09/14/04			01/27/04					
Program	BJC			BJC			BJC					
Sample Type										Dup		
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	14.61	4.35	1.34	14.67	2.88	0.28	7.23	2.27	0.61	8.79	2.5	0.8
Uranium-235	1.84	1.33	1.15	1.39	0.67	0.2	0.49 R	0.57	0.44	<MDA	.	0.69
Uranium-236	1.65	1.2	1.04	1.37	0.64	0.3	<MDA	.	0.4	0.40 R	0.47	0.36
Uranium-238	101.6	22.09	1.12	50.83	8.36	0.27	14.43	3.6	0.61	13.47	3.32	0.79

Sampling Point	SS-4						SS-5					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	07/20/04						01/27/04			07/20/04		
Program	BJC						BJC			BJC		
Sample Type				Dup								
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	.	.	.	.	.	.	8.85	3.88	6.33	36.29	4.36	6.35
Uranium-234	14.58	3.51	0.36	14.48	3.4	0.58	2.7	0.85	0.27	7.9	2.06	0.55
Uranium-235	0.8	0.75	0.76	0.93	0.77	0.42	<MDA	.	0.28	1.24	0.77	0.31
Uranium-236	<MDA	.	0.69	0.83	0.69	0.38	0.16 R	0.19	0.15	0.71	0.55	0.27
Uranium-238	28.75	5.73	0.62	25.88	5.17	0.58	4.41	1.16	0.23	14	3.05	0.25

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	SS-6						SS-6.6		
Functional Area	EXP-SW						EXP-SW		
Date Sampled	03/02/04			07/07/04			03/02/04		
Program	BJC			BJC			BJC		
Sample Type									
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	.	.	.	3.33	0.99	0.94	.	.	.
Gross Beta	1.9	0.98	1.57	5.66	1.46	2.15	8.71	1.71	2.43
Americium-241	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.
Technetium-99	<MDA	.	6.18	<MDA	.	6.19	<MDA	.	6.21
Uranium-234	<MDA	.	0.33	1.21	0.56	0.3	2.42	1.79	2.29
Uranium-235	<MDA	.	0.17	0.33	0.31	0.32	<MDA	.	1.94
Uranium-236	<MDA	.	0.15	0.42	0.33	0.29	<MDA	.	1.57
Uranium-238	0.42	0.31	0.33	1.72	0.68	0.26	<MDA	.	2.2

Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L) Activity	Error	MDA
EMW-VWEIR	12/02/04	Curium-248	0.24	0.18	0.14
EMW-VWEIR	03/09/04	Protactinium-234m	0.39	0.22	0.19
EMW-VWEIR	12/02/04	Protactinium-234m	0.8	0.32	0.12
EMW-VWEIR	03/09/04	Radium-226	0.44	0.19	0.09
EMW-VWEIR	03/09/04	Radium-228	1.77	0.44	0.64
EMW-VWEIR	12/02/04	Radium-228	2.42	0.42	0.57
EMW-VWEIR	03/09/04	Thorium-228	0.69	0.29	0.07
EMW-VWEIR	12/02/04	Thorium-228	0.28	0.2	0.21
EMW-VWEIR	03/09/04	Thorium-230	0.73	0.3	0.12
EMW-VWEIR	12/02/04	Thorium-230	0.76	0.33	0.21
EMW-VWEIR	03/09/04	Thorium-232	0.83	0.33	0.14
EMW-VWEIR	12/02/04	Thorium-232	0.38	0.23	0.18
EMW-VWEIR	03/09/04	Tritium	361.77	151.8	246.93
EMWNT-03A	03/09/04	Actinium-227	0.12	0.12	0.08
EMWNT-03A	06/08/04	Curium-248	0.25	0.17	0.08
EMWNT-03A	06/08/04	Iodine-129	0.63	0.29	0.43
EMWNT-03A	03/09/04	Protactinium-234m	0.24	0.18	0.19
EMWNT-03A	06/08/04	Protactinium-234m	0.39	0.25	0.17
EMWNT-03A	09/02/04	Protactinium-234m	2.46	0.87	0.17
EMWNT-03A	12/02/04	Protactinium-234m	0.2	0.16	0.08
EMWNT-03A	03/09/04	Radium-226	0.05	0.05	0.03
EMWNT-03A	06/08/04	Radium-226	0.17	0.1	0.07
EMWNT-03A	09/02/04	Radium-226	0.53	0.23	0.13
EMWNT-03A	03/09/04	Radium-228	0.64	0.3	0.47
EMWNT-03A	06/08/04	Radium-228	0.77	0.29	0.45
EMWNT-03A	09/02/04	Radium-228	1.37	0.54	0.85
EMWNT-03A	12/02/04	Radium-228	1.48	0.42	0.64
EMWNT-03A	03/09/04	Thorium-228	0.14	0.13	0.13
EMWNT-03A	09/02/04	Thorium-228	0.27	0.22	0.26
EMWNT-03A	03/09/04	Thorium-230	0.26	0.18	0.08
EMWNT-03A	06/08/04	Thorium-230	0.76	0.4	0.29
EMWNT-03A	09/02/04	Thorium-230	0.81	0.38	0.17
EMWNT-03A	12/02/04	Thorium-230	0.28	0.18	0.13
EMWNT-03A	09/02/04	Thorium-232	0.44	0.27	0.17
EMWNT-03A	12/02/04	Thorium-232	0.19	0.15	0.15
EMWNT-03A	03/09/04	Tritium	539.81	154.4	245.63
EMWNT-05	09/02/04	Chlorine-36	12.4	3.87	5.11
EMWNT-05 Dup	09/02/04	Chlorine-36	45.78	5.82	5
EMWNT-05	09/02/04	Curium-248	0.17	0.14	0.08
EMWNT-05 Dup	03/09/04	Iodine-129	0.82	0.35	0.24
EMWNT-05	06/08/04	Iodine-129	0.82	0.21	0.44
EMWNT-05	12/02/04	Iodine-129	1.52	0.76	0.54
EMWNT-05 Dup	03/09/04	Plutonium-239/240	0.3	0.23	0.21
EMWNT-05	03/09/04	Protactinium-234m	0.19	0.16	0.18
EMWNT-05	06/08/04	Protactinium-234m	0.31	0.21	0.09
EMWNT-05	09/02/04	Protactinium-234m	0.91	0.49	0.16
EMWNT-05 Dup	09/02/04	Protactinium-234m	1.49	0.66	0.38
EMWNT-05	06/08/04	Radium-226	0.08	0.06	0.03
EMWNT-05	09/02/04	Radium-226	0.23	0.16	0.22
EMWNT-05	03/09/04	Radium-228	0.5	0.23	0.36
EMWNT-05 Dup	03/09/04	Radium-228	0.65	0.23	0.34
EMWNT-05	09/02/04	Radium-228	0.77	0.46	0.73
EMWNT-05 Dup	09/02/04	Radium-228	0.92	0.43	0.67
EMWNT-05 Dup	09/02/04	Thorium-228	0.18	0.17	0.16
EMWNT-05	03/09/04	Thorium-230	0.32	0.21	0.14
EMWNT-05 Dup	03/09/04	Thorium-230	0.34	0.21	0.15
EMWNT-05	06/08/04	Thorium-230	0.75	0.34	0.25

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Sampling Point	Date Sampled	Isotope	Result (pCi/L) Activity	Error	MDA
EMWNT-05	09/02/04	Thorium-230	0.68	0.32	0.09
EMWNT-05 Dup	09/02/04	Thorium-230	1.21 Q	0.46	0.1
EMWNT-05	12/02/04	Thorium-230	0.68	0.36	0.28
EMWNT-05	03/09/04	Thorium-232	0.26	0.18	0.16
EMWNT-05	06/08/04	Thorium-232	0.21	0.17	0.21
EMWNT-05	09/02/04	Thorium-232	0.2	0.17	0.09
EMWNT-05 Dup	09/02/04	Thorium-232	0.17	0.16	0.16
EMWNT-05	03/09/04	Tritium	1997.34	180.89	247.87
GW-363	03/15/04	Curium-248	0.1	0.08	0.09
GW-363	09/08/04	Curium-248	0.09	0.07	0.04
GW-363	06/08/04	Iodine-129	1.72	0.82	1.29
GW-363	03/15/04	Plutonium-239/240	0.05	0.04	0.02
GW-363	11/18/04	Plutonium-239/240	0.17	0.14	0.08
GW-363	03/15/04	Protactinium-234m	0.08	0.05	0.04
GW-363	06/08/04	Protactinium-234m	0.22	0.13	0.1
GW-363	09/08/04	Protactinium-234m	0.37	0.16	0.04
GW-363	11/18/04	Protactinium-234m	0.23	0.17	0.19
GW-363	06/08/04	Radium-226	0.12	0.08	0.08
GW-363	03/15/04	Radium-228	2.94	0.34	0.39
GW-363	06/08/04	Radium-228	0.49	0.2	0.3
GW-363	09/08/04	Radium-228	0.5	0.3	0.48
GW-363	11/18/04	Radium-228	1.51	0.31	0.44
GW-363	03/15/04	Thorium-230	0.2	0.1	0.1
GW-363	06/08/04	Thorium-230	0.9	0.27	0.12
GW-363	09/08/04	Thorium-230	0.5	0.2	0.1
GW-363	11/18/04	Thorium-230	1.02	0.44	0.23
GW-363	03/15/04	Thorium-232	0.18	0.09	0.07
GW-363	06/08/04	Thorium-232	0.37	0.16	0.11
GW-363	09/08/04	Thorium-232	0.19	0.12	0.1
GW-363	11/18/04	Thorium-232	0.25	0.21	0.23
GW-639	03/10/04	Actinium-227	0.09	0.06	0.08
GW-639	03/10/04	Curium-248	0.12	0.08	0.04
GW-639	09/14/04	Curium-248	0.2	0.12	0.04
GW-639	03/10/04	Iodine-129	3.12	0.77	0.54
GW-639	06/08/04	Iodine-129	14.89	1.52	1.06
GW-639	11/11/04	Plutonium-239/240	0.29	0.19	0.15
GW-639	03/10/04	Protactinium-234m	0.17	0.08	0.06
GW-639	06/08/04	Protactinium-234m	0.25	0.14	0.05
GW-639	09/14/04	Protactinium-234m	0.29	0.16	0.12
GW-639	11/11/04	Protactinium-234m	0.52	0.26	0.13
GW-639	11/11/04	Radium-226	0.23	0.13	0.12
GW-639	03/10/04	Radium-228	0.71	0.28	0.44
GW-639	11/11/04	Radium-228	0.72	0.29	0.45
GW-639	03/10/04	Thorium-228	0.13	0.08	0.09
GW-639	03/10/04	Thorium-230	0.31	0.12	0.09
GW-639	06/08/04	Thorium-230	0.8	0.26	0.12
GW-639	09/14/04	Thorium-230	0.34	0.16	0.13
GW-639	11/11/04	Thorium-230	0.45	0.29	0.11
GW-639	03/10/04	Thorium-232	0.19	0.09	0.08
GW-639	06/08/04	Thorium-232	0.14	0.1	0.13
GW-916	03/08/04	Carbon-14	48.68	4.22	5.87
GW-916	06/02/04	Chlorine-36	10.49	2.09	2.14
GW-916	09/13/04	Curium-248	0.16	0.13	0.12
GW-916	03/08/04	Iodine-129	10.42	1.18	0.6
GW-916	06/02/04	Iodine-129	1.81	0.64	1.3
GW-916	03/08/04	Protactinium-234m	0.15	0.07	0.04
GW-916	06/02/04	Protactinium-234m	0.27	0.14	0.08

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Sampling Point	Date Sampled	Isotope	Result (pCi/L) Activity	Error	MDA
GW-916	06/02/04	Radium-226	0.06	0.04	0.06
GW-916	03/08/04	Radium-228	0.63	0.24	0.37
GW-916	11/10/04	Radium-228	1.25	0.37	0.57
GW-916	03/08/04	Thorium-230	0.16	0.07	0.05
GW-916	06/02/04	Thorium-230	0.69	0.24	0.09
GW-916	11/10/04	Thorium-230	0.83	0.39	0.28
GW-916	03/08/04	Thorium-232	0.08	0.05	0.04
GW-916	06/02/04	Thorium-232	0.35	0.16	0.04
GW-917	03/09/04	Actinium-227	0.06	0.05	0.05
GW-917	06/03/04	Curium-248	0.09	0.08	0.08
GW-917	06/03/04	Iodine-129	1.71	0.75	1.3
GW-917	11/04/04	Plutonium-239/240	0.36	0.23	0.18
GW-917	03/09/04	Protactinium-234m	0.17	0.07	0.06
GW-917	06/03/04	Protactinium-234m	0.23	0.13	0.04
GW-917	09/07/04	Protactinium-234m	0.34	0.16	0.09
GW-917	11/04/04	Protactinium-234m	0.42	0.22	0.08
GW-917	06/03/04	Radium-226	0.16	0.07	0.06
GW-917	09/07/04	Radium-226	0.11	0.08	0.08
GW-917	03/09/04	Radium-228	0.47	0.23	0.37
GW-917	06/03/04	Radium-228	0.64	0.17	0.25
GW-917	09/07/04	Radium-228	0.58	0.26	0.41
GW-917	03/09/04	Thorium-230	0.33	0.12	0.05
GW-917	06/03/04	Thorium-230	1.08	0.33	0.14
GW-917	09/07/04	Thorium-230	0.6	0.19	0.09
GW-917	11/04/04	Thorium-230	0.59	0.3	0.15
GW-917	03/09/04	Thorium-232	0.12	0.07	0.05
GW-917	06/03/04	Thorium-232	0.41	0.19	0.05
GW-917	09/07/04	Thorium-232	0.19	0.1	0.07
GW-917	11/04/04	Thorium-232	0.16	0.15	0.15
GW-918	06/02/04	Curium-248	0.12	0.08	0.04
GW-918	09/09/04	Curium-248	0.25	0.15	0.06
GW-918	11/10/04	Curium-248	0.15	0.14	0.14
GW-918	06/02/04	Iodine-129	1.98	0.77	0.78
GW-918	11/10/04	Plutonium-239/240	0.35	0.22	0.09
GW-918	03/15/04	Protactinium-234m	0.06	0.04	0.03
GW-918	09/09/04	Protactinium-234m	0.23	0.13	0.14
GW-918	11/10/04	Protactinium-234m	0.42	0.25	0.09
GW-918	06/02/04	Radium-226	0.16	0.07	0.06
GW-918	11/10/04	Radium-226	0.11	0.09	0.08
GW-918	06/02/04	Radium-228	0.86	0.21	0.3
GW-918	09/09/04	Radium-228	1.38	0.32	0.45
GW-918	11/10/04	Radium-228	1.43	0.33	0.49
GW-918	06/02/04	Thorium-228	0.15	0.11	0.14
GW-918	03/15/04	Thorium-230	0.23	0.1	0.09
GW-918	06/02/04	Thorium-230	0.8	0.27	0.13
GW-918	09/09/04	Thorium-230	0.57	0.2	0.11
GW-918	11/10/04	Thorium-230	0.76	0.38	0.28
GW-918	03/15/04	Thorium-232	0.12	0.07	0.05
GW-918	06/02/04	Thorium-232	0.41	0.18	0.11
GW-918	03/15/04	Tritium	719.38	157.64	245.5
GW-920	03/11/04	Chlorine-36	1.85	0.98	1.5
GW-920	03/11/04	Curium-248	0.13	0.08	0.03
GW-920	06/01/04	Curium-248	0.12	0.09	0.1
GW-920	03/11/04	Plutonium-239/240	0.07	0.06	0.05
GW-920	11/09/04	Plutonium-239/240	0.22	0.18	0.2
GW-920	09/02/04	Protactinium-234m	0.13	0.09	0.07
GW-920	11/09/04	Protactinium-234m	0.54	0.26	0.13

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Sampling Point	Date Sampled	Isotope	Result (pCi/L) Activity	Error	MDA
GW-920	06/01/04	Radium-226	0.06	0.04	0.06
GW-920	09/02/04	Radium-226	0.13	0.09	0.11
GW-920	03/11/04	Radium-228	0.91	0.26	0.39
GW-920	06/01/04	Radium-228	0.67	0.18	0.26
GW-920	11/09/04	Radium-228	0.69	0.28	0.44
GW-920	03/11/04	Thorium-230	0.3	0.11	0.04
GW-920	06/01/04	Thorium-230	0.49	0.2	0.16
GW-920	09/02/04	Thorium-230	0.98	0.29	0.15
GW-920	11/09/04	Thorium-230	1.14	0.5	0.33
GW-920	06/01/04	Thorium-232	0.3	0.16	0.15
GW-920	09/02/04	Thorium-232	0.29	0.14	0.09
GW-920	11/09/04	Thorium-232	0.35	0.27	0.32
GW-920	03/11/04	Tritium	904.76	161.88	247.02
GW-921	03/08/04	Iodine-129	7.8	1.08	0.65
GW-921	06/01/04	Iodine-129	1.69	0.61	1.33
GW-921	03/08/04	Protactinium-234m	0.11	0.06	0.04
GW-921	06/01/04	Protactinium-234m	0.26	0.13	0.09
GW-921	09/02/04	Protactinium-234m	0.34	0.15	0.1
GW-921	11/04/04	Protactinium-234m	0.26	0.18	0.08
GW-921	03/08/04	Radium-226	0.14	0.09	0.08
GW-921	11/04/04	Radium-226	0.25	0.15	0.14
GW-921	06/01/04	Radium-228	0.52	0.16	0.24
GW-921	03/08/04	Thorium-230	0.29	0.12	0.07
GW-921	06/01/04	Thorium-230	0.81	0.28	0.15
GW-921	09/02/04	Thorium-230	0.81	0.27	0.12
GW-921	11/04/04	Thorium-230	0.68	0.37	0.2
GW-921	03/08/04	Thorium-232	0.13	0.07	0.06
GW-921	06/01/04	Thorium-232	0.36	0.18	0.13
GW-921	09/02/04	Thorium-232	0.22	0.13	0.12
GW-921	11/04/04	Thorium-232	0.24	0.22	0.23
GW-921	03/08/04	Tritium	725.77	159.04	247.69
GW-922	03/10/04	Curium-248	0.07	0.06	0.04
GW-922	06/02/04	Curium-248	0.09	0.07	0.04
GW-922	06/02/04	Iodine-129	1.44	0.74	1.29
GW-922	03/10/04	Protactinium-234m	0.06	0.04	0.02
GW-922	06/02/04	Protactinium-234m	0.18	0.11	0.1
GW-922	09/09/04	Protactinium-234m	0.28	0.14	0.1
GW-922	11/15/04	Protactinium-234m	0.27	0.19	0.14
GW-922	03/10/04	Radium-226	0.2	0.12	0.13
GW-922	06/02/04	Radium-226	0.12	0.06	0.08
GW-922	03/10/04	Radium-228	1.19	0.25	0.34
GW-922	06/02/04	Radium-228	0.39	0.19	0.31
GW-922	11/15/04	Radium-228	1.07	0.35	0.53
GW-922	03/10/04	Thorium-230	0.18 Q	0.09	0.08
GW-922	06/02/04	Thorium-230	0.58	0.21	0.13
GW-922	09/09/04	Thorium-230	1.95	0.74	0.38
GW-922	11/15/04	Thorium-230	0.45	0.29	0.37
GW-922	03/10/04	Thorium-232	0.08	0.06	0.06
GW-922	06/02/04	Thorium-232	0.41	0.17	0.11
GW-922	09/09/04	Thorium-232	1.1 Q	0.54	0.45
GW-923	11/16/04	Curium-248	0.32	0.2	0.21
GW-923	03/15/04	Protactinium-234m	0.45	0.13	0.06
GW-923	11/16/04	Protactinium-234m	0.32	0.2	0.17
GW-923	03/15/04	Radium-226	0.48	0.2	0.1
GW-923	11/16/04	Radium-226	0.09	0.08	0.08
GW-923	03/15/04	Radium-228	0.53	0.26	0.41
GW-923	11/16/04	Radium-228	0.61	0.33	0.53

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Sampling Point	Date Sampled	Isotope	Result (pCi/L) Activity	Error	MDA
GW-923	03/15/04	Thorium-228	0.26	0.11	0.08
GW-923	11/16/04	Thorium-228	0.27	0.22	0.22
GW-923	03/15/04	Thorium-230	0.58	0.17	0.06
GW-923	11/16/04	Thorium-230	0.77	0.39	0.28
GW-923	03/15/04	Thorium-232	0.53	0.16	0.05
GW-923	11/16/04	Thorium-232	0.26	0.22	0.24
GW-924 Dup	03/11/04	Chlorine-36	4.23	1.06	1.36
GW-924 Dup	11/17/04	Curium-248	0.14	0.13	0.13
GW-924	06/07/04	Iodine-129	3.37	0.74	0.7
GW-924	03/11/04	Plutonium-239/240	0.3	0.11	0.07
GW-924 Dup	09/07/04	Plutonium-239/240	0.5	0.22	0.13
GW-924	11/17/04	Plutonium-239/240	0.29	0.19	0.08
GW-924 Dup	11/17/04	Plutonium-239/240	0.26	0.18	0.08
GW-924	03/11/04	Protactinium-234m	0.09	0.05	0.05
GW-924 Dup	03/11/04	Protactinium-234m	0.11	0.06	0.06
GW-924	06/07/04	Protactinium-234m	0.16	0.1	0.04
GW-924 Dup	06/07/04	Protactinium-234m	0.36	0.16	0.08
GW-924	09/07/04	Protactinium-234m	0.29	0.14	0.11
GW-924 Dup	09/07/04	Protactinium-234m	0.18	0.11	0.08
GW-924	11/17/04	Protactinium-234m	0.24	0.18	0.14
GW-924 Dup	11/17/04	Protactinium-234m	0.47	0.36	0.18
GW-924	06/07/04	Radium-226	0.08	0.05	0.05
GW-924 Dup	06/07/04	Radium-226	0.09	0.06	0.07
GW-924	03/11/04	Radium-228	0.36	0.22	0.35
GW-924 Dup	03/11/04	Radium-228	0.47	0.2	0.32
GW-924	06/07/04	Radium-228	0.48	0.17	0.27
GW-924 Dup	06/07/04	Radium-228	0.47	0.22	0.35
GW-924 Dup	09/07/04	Radium-228	0.89	0.3	0.46
GW-924 Dup	11/17/04	Radium-228	0.58	0.29	0.47
GW-924 Dup	06/07/04	Thorium-228	0.14	0.1	0.12
GW-924 Dup	11/17/04	Thorium-228	0.47	0.29	0.28
GW-924	03/11/04	Thorium-230	0.22 Q	0.09	0.06
GW-924 Dup	03/11/04	Thorium-230	0.16 Q	0.09	0.08
GW-924	06/07/04	Thorium-230	0.78	0.25	0.04
GW-924 Dup	06/07/04	Thorium-230	0.59	0.22	0.13
GW-924	09/07/04	Thorium-230	0.61	0.22	0.1
GW-924 Dup	09/07/04	Thorium-230	0.35	0.18	0.2
GW-924	11/17/04	Thorium-230	0.83	0.39	0.31
GW-924 Dup	11/17/04	Thorium-230	0.52	0.29	0.22
GW-924 Dup	03/11/04	Thorium-232	0.11	0.07	0.05
GW-924	06/07/04	Thorium-232	0.48	0.19	0.09
GW-924 Dup	06/07/04	Thorium-232	0.38	0.16	0.04
GW-924	09/07/04	Thorium-232	0.13	0.1	0.1
GW-924 Dup	09/07/04	Thorium-232	0.19	0.12	0.12
GW-924	11/17/04	Thorium-232	0.33	0.23	0.17
GW-925	03/09/04	Carbon-14	11.33	6.71	11.08
GW-925	06/01/04	Curium-248	0.18	0.11	0.04
GW-925	09/01/04	Curium-248	0.18	0.11	0.08
GW-925	11/08/04	Curium-248	0.23	0.18	0.09
GW-925	06/01/04	Iodine-129	1.7	0.68	1.3
GW-925	11/08/04	Plutonium-239/240	0.25	0.18	0.18
GW-925	03/09/04	Protactinium-234m	0.22	0.09	0.06
GW-925	06/01/04	Protactinium-234m	0.33	0.16	0.13
GW-925	09/01/04	Protactinium-234m	0.18	0.11	0.12
GW-925	11/08/04	Protactinium-234m	0.57	0.44	0.22
GW-925	03/09/04	Radium-226	0.15	0.11	0.1
GW-925	06/01/04	Radium-226	0.19	0.1	0.08

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L) Activity	Error	MDA
GW-925	03/09/04	Radium-228	0.74	0.28	0.44
GW-925	09/01/04	Radium-228	0.57	0.27	0.43
GW-925	11/08/04	Radium-228	1.21	0.36	0.55
GW-925	03/09/04	Thorium-228	0.11	0.07	0.05
GW-925	03/09/04	Thorium-230	0.2	0.1	0.07
GW-925	06/01/04	Thorium-230	0.84	0.27	0.11
GW-925	09/01/04	Thorium-230	0.59	0.23	0.21
GW-925	11/08/04	Thorium-230	0.8	0.37	0.17
GW-925	03/09/04	Thorium-232	0.08	0.06	0.07
GW-925	06/01/04	Thorium-232	0.49	0.2	0.09
GW-925	09/01/04	Thorium-232	0.23	0.13	0.12
GW-925	11/08/04	Thorium-232	0.28	0.21	0.2
GW-926	06/07/04	Iodine-129	1.73	0.67	1.29
GW-926	11/17/04	Plutonium-239/240	0.16	0.14	0.08
GW-926	03/11/04	Protactinium-234m	0.06	0.04	0.04
GW-926	06/07/04	Protactinium-234m	0.33	0.16	0.09
GW-926	09/07/04	Protactinium-234m	0.25	0.12	0.1
GW-926	11/17/04	Protactinium-234m	0.26	0.19	0.18
GW-926	06/07/04	Radium-226	0.08	0.05	0.04
GW-926	03/11/04	Radium-228	0.95	0.21	0.28
GW-926	06/07/04	Radium-228	0.3	0.17	0.28
GW-926	11/17/04	Radium-228	0.61	0.22	0.35
GW-926	03/11/04	Thorium-230	0.21	0.1	0.09
GW-926	06/07/04	Thorium-230	0.71	0.23	0.13
GW-926	09/07/04	Thorium-230	0.42	0.18	0.11
GW-926	11/17/04	Thorium-230	0.62	0.35	0.23
GW-926	03/11/04	Thorium-232	0.15	0.08	0.06
GW-926	06/07/04	Thorium-232	0.33	0.15	0.04
GW-926	09/07/04	Thorium-232	0.13	0.1	0.09
GW-927	03/09/04	Actinium-227	0.06	0.04	0.02
GW-927	11/16/04	Curium-248	0.15	0.14	0.08
GW-927	03/09/04	Iodine-129	0.67	0.56	0.59
GW-927	06/03/04	Iodine-129	1.68	0.71	1.29
GW-927	11/16/04	Plutonium-239/240	0.27	0.2	0.17
GW-927	03/09/04	Protactinium-234m	0.11	0.05	0.02
GW-927	06/03/04	Protactinium-234m	0.15	0.09	0.04
GW-927	09/07/04	Protactinium-234m	0.21	0.12	0.09
GW-927	11/16/04	Protactinium-234m	0.88	0.48	0.32
GW-927	03/09/04	Radium-226	0.1	0.08	0.08
GW-927	06/03/04	Radium-226	0.06	0.04	0.05
GW-927	11/16/04	Radium-226	0.09	0.07	0.04
GW-927	03/09/04	Radium-228	0.42	0.21	0.33
GW-927	06/03/04	Radium-228	0.37	0.2	0.33
GW-927	09/07/04	Radium-228	1.12	0.26	0.38
GW-927	03/09/04	Thorium-230	0.25	0.1	0.04
GW-927	06/03/04	Thorium-230	0.99	0.29	0.17
GW-927	09/07/04	Thorium-230	0.31	0.15	0.11
GW-927	11/16/04	Thorium-230	0.67	0.39	0.31
GW-927	03/09/04	Thorium-232	0.11	0.06	0.05
GW-927	06/03/04	Thorium-232	0.55	0.2	0.12
GW-927	11/16/04	Thorium-232	0.35	0.27	0.28
NT-04	03/09/04	Curium-248	0.15	0.14	0.08
NT-04	06/08/04	Iodine-129	0.95	0.3	0.26
NT-04	09/02/04	Iodine-129	22.31	1.49	0.59
NT-04	03/09/04	Protactinium-234m	2.04	0.58	0.2
NT-04	06/08/04	Protactinium-234m	1.25	0.45	0.15
NT-04	09/02/04	Protactinium-234m	1.78	0.72	0.34
NT-04	12/02/04	Protactinium-234m	1.35	0.47	0.15

APPENDIX D.3: CY 2004 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L)		
			Activity	Error	MDA
NT-04	03/09/04	Radium-226	0.15	0.08	0.03
NT-04	03/09/04	Radium-228	0.5	0.22	0.35
NT-04	06/08/04	Radium-228	0.51	0.27	0.43
NT-04	12/02/04	Radium-228	1.39 Q	0.39	0.58
NT-04	06/08/04	Thorium-228	0.32	0.24	0.31
NT-04	03/09/04	Thorium-230	0.49	0.24	0.07
NT-04	06/08/04	Thorium-230	0.49	0.28	0.22
NT-04	09/02/04	Thorium-230	0.5	0.31	0.23
NT-04	12/02/04	Thorium-230	1.03	0.41	0.22
NT-04	03/09/04	Thorium-232	0.23	0.16	0.12
NT-04	09/02/04	Thorium-232	0.47	0.3	0.12
NT-04	03/09/04	Tritium	725.77	159.04	247.69
NT-04	06/08/04	Tritium	355.02	148.97	242.32

APPENDIX E

CY 2004 MONITORING DATA FOR THE
UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME

EXPLANATION

Sampling Point:

GHK	-	Gum Hollow Branch Kilometer (surface water sampling location)
GW	-	Groundwater monitoring well; Westbay well GW-722 (also locations beginning with numbers [e.g., 55-1A])
NPR	-	North of Pine Ridge near the Scarboro Community (surface water sampling location)
OF	-	Storm drain outfall (surface water sampling location)
SCR	-	Spring sampling location in Union Valley
STATION	-	Surface water sampling location in Upper East Fork Poplar Creek

Location:

B8110	-	Building 81-10
B9103	-	Building 9103
B9201-2	-	Building 9201-2
B9202	-	Building 9202
CPT	-	Coal Pile Trench
EXP-I	-	Exit Pathway Picket I
EXP-J	-	Exit Pathway Picket J
EXP-SR	-	Along Scarboro Road in the gap through Pine Ridge
EXP-SW	-	Surface water or spring sampling station
EXP-UV	-	East of the Oak Ridge Reservation boundary in Union Valley
FF	-	Fuel Facility (Building 9754-2)
FTF	-	Fire Training Facility
GRID	-	Comprehensive Groundwater Monitoring Plan Grid Location
NHP	-	New Hope Pond
RG	-	Rust Garage Area
S2	-	S-2 Site
S3	-	S-3 Site
T0134	-	Tank 0134-U
T2331	-	Tank 2331-U
UOV	-	Uranium Oxide Vault

Monitoring Program:

BJC	-	managed by Bechtel Jacobs Company LLC
GWPP	-	managed by the Y-12 Groundwater Protection Program

Sample Type:

Dup	-	Field Duplicate Sample
Conv	-	Collected using the conventional sampling method (purge three well volumes)
Conv-F	-	Filtered sample, collected using the conventional sampling method

EXPLANATION (continued)

Units:

ft	-	feet (elevations are above mean sea level and depths are below grade)
cfu	-	colony forming units per milliliter (bacterial activity)
µg/L	-	micrograms per liter
mg/L	-	milligrams per liter
mV	-	millivolts
µmho/cm	-	micromhos per centimeter
NTU	-	nephelometric turbidity units
pCi/L	-	picoCuries per liter
ppm	-	parts per million

Only analytes detected above reporting limits in at least one sample are included in this appendix. Additionally, results that are below the reporting limits are replaced with missing values (e.g., " < ") to emphasize the detected results. The following sections describe the analytes, reporting limits, and data qualifiers for each subappendix. A comprehensive list of the GWPP analytes, analytical methods, and reporting limits is provided in Appendix B, Table B.5.

E.1 Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals:

Results for all of the field measurements, miscellaneous analytes, and major ions are included in this appendix. The reporting limits for the major ions are shown in the following summary.

Analyte	Reporting Limit (mg/L)		Analyte	Reporting Limit (mg/L)	
	GWPP	BJC		GWPP	BJC
Cations			**Anions**		
Calcium	0.2	0.25	Alkalinity - HCO3	1.0	NA
Magnesium	0.2	0.05	Alkalinity - CO3	1.0	NA
Potassium	2.0	0.25	Chloride	0.2	0.1
Sodium	0.2	0.25	Fluoride	0.1	0.05
			Nitrate (as Nitrogen)	0.028	0.1
			Sulfate	0.25	0.1

Microbial activity was evaluated at eight monitoring wells during April 2004. These results are qualitative bacterial counts (heterotropic aerobic, iron related, slime forming, and sulfate reducing bacteria) that are estimates based on the appearance of the sample after an eight- to ten-day growth period.

EXPLANATION (continued)

The major ion results for the following samples are qualitative because the ion charge balance (relative percent difference [RPD]) exceeds 20%.

Sampling Point	Date Sampled	Charge Balance Error (%)	Suspected Source of Error
GW-169	02/09/04	86	Low bicarbonate
GW-170	02/09/04	-56.7	High pH, high bicarbonate
GW-170	10/25/04	-30.7	High pH
GW-620	10/21/04	24.3	High calcium (and unknown)

The Y-12 GWPP SAP (BWXT 2003a) specifies reporting limits for trace metals that are appropriate for DOE Order monitoring. The laboratories subcontracted for the monitoring programs managed by BJC may use reporting limits (sometimes reporting estimated values) that are lower than the GWPP reporting limits for the metals. To retain the highest quality data for DOE Order monitoring purposes and to standardize reporting limits for trace metal results obtained from all sources, the GWPP reporting limits were given precedence over the BJC reporting limits (BJC 2003a and 2004) shown below. The trace metals shown in bold typeface below were detected in at least one sample collected during CY 2004 and are presented in Appendix E.1.

Analyte	Reporting Limit (mg/L)		Analyte	Reporting Limit (mg/L)	
	GWPP	BJC		GWPP	BJC
Aluminum	0.2	0.05*	**Lithium**	0.01	0.01
Antimony (PMS)	0.0025	.	**Manganese**	0.005	0.005
Antimony	.	0.006	**Mercury (CVAA)**	0.0002	0.0002
Arsenic (PMS)	0.005	.	**Molybdenum**	0.05	.*
Arsenic	.	0.005	**Nickel (PMS)**	0.005	.
Barium	0.004	0.005	**Nickel**	.	0.01
Beryllium	0.001	0.001	**Selenium (PMS)**	0.01	.
Boron	0.1	0.01*	Selenium	.	0.005
Cadmium (PMS)	0.0025	.	Silver	0.02	0.005*
Cadmium	.	0.001	**Strontium**	0.005	0.005
Chromium (PMS)	0.01	.	**Thallium (PMS)**	0.0005	.
Chromium	.	0.005	**Thallium**	.	0.002
Cobalt	0.02	0.005*	Thorium	0.2	.
Copper	0.02	0.005*	**Uranium (PMS)**	0.0005	.
Iron	0.05	0.01*	**Uranium (KPA)**	.	0.004
Lead (PMS)	0.0005	.	Vanadium	0.02	0.01*
Lead	.	0.003	**Zinc**	0.05	0.01*
Note: * - the GWPP reporting limit was used instead of the BJC reporting limit; "." - not specified.					

All metals analyses were performed using the inductively coupled plasma (ICP) spectroscopy method (SW846-6010B) unless otherwise noted.

CVAA - Cold Vapor Atomic Absorption (EPA-7470)
KPA - Kinetic Phosphorescent Analysis (ASTM-D5174-M)
PMS - Plasma Mass Spectroscopy (EPA-200.8)

EXPLANATION (continued)

Groundwater samples collected from wells GW-108 and GW-633 for metals analysis by the ICP method during CY 2004 were diluted (dilution factors of 6X and 2X, respectively) before analysis to obtain an optimum matrix. The detected results are valid, but some metals may be present at concentrations below the elevated reporting limits.

The following symbols and qualifiers are used in Appendix E.1:

.	-	Not analyzed or not applicable
<	-	Analyzed but not detected at the project reporting level
[ ]	-	Calculated value for total uranium (GW-108) from isotopic activity by the laboratory.
Q	-	Result is inconsistent with historical measurements.
R	-	Result does not meet data quality objectives (charge balance errors).

E.2 Volatile Organic Compounds:

The Y-12 GWPP reporting limits for volatile organic compounds (Table B.5) and those used for monitoring programs managed by BJC are contract-required quantitation limits. Results below the quantitation limit and above the instrument detection limit are reported as estimated quantities. Therefore, non-detected results are assumed to equal zero for all compounds.

As summarized below, 31 compounds were detected (of the 55 compounds requested) in the CY 2004 groundwater samples collected in the East Fork Regime. Results for these compounds are grouped by similar chemical composition (e.g., chloroethenes) in Appendix E.2.

Compound	No. Detected	Maximum (µg/L)	Compound	No. Detected	Maximum (µg/L)
Tetrachloroethene	100	3,100	Styrene	7	5
Trichloroethene	79	440	Carbon disulfide	6	5
Chloroform	73	780	Methylene chloride	5	51
cis-1,2-Dichloroethene	61	930	Bromoform	4	5
Carbon tetrachloride	57	1,600	Chloromethane	3	21
1,1-Dichloroethene	21	70	Chloroethane	2	45
Benzene	17	7,900	Bromomethane	2	24
Vinyl chloride	14	21	Dichlorodifluoromethane	2	14
trans-1,2-Dichloroethene	14	12	Bromodichloromethane	2	2
1,1,2-Trichloro-1,2,2-trifluoroethane	11	500	Chlorobenzene	2	1 J
Acetone	11	51	1,2-Dichloroethane	1	690
Ethylbenzene	10	1,100	4-Methyl-2-pentanone	1	150
1,1-Dichloroethane	10	170	2-Butanone	1	26
Toluene	9	4,200	1,2-Dichloropropane	1	15
1,1,1-Trichloroethane	8	10	Trichlorofluoromethane	1	1 J
Total Xylene	7	8,300			

Also presented in Appendix E.2 are results for volatile organic gases (ethane, ethylene, and methane) as natural attenuation indicators for groundwater samples collected from seven wells in the eastern Y-12 area of the East Fork Regime during CY 2004.

EXPLANATION (continued)

The following symbols and data qualifiers are used in Appendix E.2.

.	-	Not analyzed or not applicable
<	-	Analyzed but not detected (also false-positive results for data provided by BJC)
J	-	Positively identified, estimated concentration below the contract-required quantitation limit
Q	-	Inconsistent with historical measurements for the location (tetrachloroethene at GW-691)

E.3 Radiological Analytes:

Reporting limits for radiological analytes are sample-specific and analyte-specific minimum detectable activities that are reported with each result. The following summary shows the radiological analytes reported for at least one groundwater sample collected during CY 2004 in the East Fork Regime.

Analyte	No. of Results	No. Detected	Analyte	No. of Results	No. Detected
Gross Alpha	183	76	Uranium-234	16	15
Gross Beta	183	74	Uranium-235	16	9
Technetium-99	14	2	Uranium-236	14	5
			Uranium-238	16	13
Note: Uranium-233/234, reported by BJC laboratories, is shown as uranium-234 in the appendix.					

Results for gross alpha and gross beta are presented in the first three pages of Appendix E.3, followed by the results for the isotopes.

The following notes apply to Appendix E.3:

Result	-	Activity in picoCuries per liter (pCi/L)
Error	-	Counting error (two standard deviations)
MDA	-	Minimum detectable activity
Q	-	Elevated activity unsupported by historical results for the sampling location
R	-	Result does not meet data quality objectives: exceeds the MDA but is less than the error

APPENDIX E.1

FIELD MEASUREMENTS, MISCELLANEOUS ANALYTES, MAJOR IONS, AND TRACE METALS

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	55-1A		55-2B		55-6A		56-2A	
Functional Area	GRIDB2		GRIDB3		B9103		GRIDC3	
Date Sampled	06/08/04	11/16/04	06/10/04	11/29/04	06/07/04	11/16/04	06/09/04	11/18/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type								
Field Measurements								
Time Sampled	9:35	9:40	10:10	10:05	10:00	8:35	10:05	9:10
Measuring Point Elev. (ft)	986.67	986.67	977.42	977.42	989.04	989.04	963.30	963.30
Depth to Water (ft)	10.90	10.79	7.84	7.40	10.39	8.23	9.80	8.74
Groundwater Elevation (ft)	975.77	975.88	969.58	970.02	978.65	980.81	953.50	954.56
Conductivity (μmho/cm)	1,189	1,203	2,330	2,210	409	595	666	681
Dissolved Oxygen (ppm)	1.13	0.24	0.87	3.69	2.07	5.35	1	-0.02
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	164	184	194	202	187	187	84	147
Temperature (degrees C)	18.9	16.9	19.2	19	16.7	15.8	17.7	18.8
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	7.47	7.45	6.29	6.29	6.59	6.76	7.2	7.12
Miscellaneous Analytes								
Dissolved Solids (mg/L)	861	917	1930	1,640	255	362	411	370
Suspended Solids (mg/L)	3	<	<	<	<	<	<	<
Turbidity (NTU)	7.81	0.859	0.705	0.662	0.264	0.158	8.8	0.469
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	155	172	335	346	57	104	103	107
Magnesium	18.5	18.1	29.9	29	10	16.6	7.3	7.17
Potassium	2.39	2.67	3.16	3.29	<	<	2.45	2.59
Sodium	27.1	25.9	10.9	10.8	4.24	4.33	7.88	7.87
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	167	175	154	147	167	286	206	204
Chloride	170	174	13.9	13.3	3.91	1.34	32.6	33.9
Fluoride	<	<	<	<	0.132	0.269	<	<
Nitrate as N	12.1	6.5	222	225	0.775	1.88	0.44	0.468
Sulfate	67.5	86.6	20.8	22.7	34.8	29	59	57.4
Charge balance error (%)	0.4	2.7	-0.1	0.9	-5.2	1.8	-1.2	0.6
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	<	<	<	<
Barium	0.118	0.106	0.938	0.944	0.0833	0.152	0.118	0.115
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	0.102	0.106
Cadmium (PMS)	<	<	<	<	<	<	<	<
Chromium (PMS)	0.0792	0.0165	<	<	<	<	0.0652	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	1.09	0.25	<	<	<	<	2.12	0.067
Lead (PMS)	<	<	<	<	0.00466	0.00406	<	<
Lead	.	.	.	.	.	.	.	.
Lithium	0.0294	0.0304	0.0199	0.0191	<	<	0.0122	0.0124
Manganese	0.31	0.661	0.778	0.794	<	<	0.0159	<
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	0.55	0.282	0.00889	0.00928	<	0.00875	0.0209	0.00841
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	0.0131	<	<	<	<	<
Strontium	0.295	0.297	1.13	1.1	0.101	0.173	0.229	0.219
Thallium (PMS)	<	<	<	<	<	<	<	<
Thallium	.	.	.	.	.	.	.	.
Uranium (PMS)	<	0.000986	<	<	<	0.00737	<	<
Uranium (KPA)	.	.	.	.	.	.	.	.
Zinc	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	56-2B			59-1B	9201-1K-22SU		9201-3C-4SP	
Functional Area	GRIDC3			B9202	EXP-SW		EXP-SW	
Date Sampled	06/09/04	11/18/04		04/28/04	06/22/04	10/27/04	05/18/04	10/27/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup					
Field Measurements								
Time Sampled	10:55	10:10	10:10	9:05	10:30	11:15	8:40	10:45
Measuring Point Elev. (ft)	962.28	962.28	962.28	945.69	.	.	.	.
Depth to Water (ft)	8.17	8.08	8.08	4.73	.		.	
Groundwater Elevation (ft)	954.11	954.20	954.20	940.96	.	.	.	.
Conductivity (μmho/cm)	657	696	696	548	378	414	522	542
Dissolved Oxygen (ppm)	1.63	0.45	0.45	1.69	3.25	2.87	2.53	4.34
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	152	158	158	65	204	220	151	220
Temperature (degrees C)	19.5	17.4	17.4	16.9	21	20.6	23.2	21.7
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	7.42	7.35	7.35	6.93	7.09	6.94	7.65	7.47
Miscellaneous Analytes								
Dissolved Solids (mg/L)	433	400	416	.	242	289	274	233
Suspended Solids (mg/L)	<	<	<	.	88	<	<	6
Turbidity (NTU)	0.233	0.12	0.128	.	41.4	0.435	3.04	5.59
Heterotropic Aerobic Bact. (cfu)	.	.	.	100	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	5,000	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	100 J	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	1,000	.	.	.	.
Major Ions (mg/L)								
Calcium	93	100	100	96	55.3	52.9	51.6	50.8
Magnesium	14.3	14	13.9	4.45	11.2	11.4	10.7	10.8
Potassium	2.7	2.83	2.96	<	4.01	2.25	2.48	2.52
Sodium	11	11.3	11.5	8.25	8.75	38.6	29.4	9.03
Alkalinity as CO3	<	<	<	.	<	<	<	<
Alkalinity as HCO3	196	186	187	.	139	142	118	141
Chloride	14.6	14.5	13.8	.	14.8	44.3	37.1	14
Fluoride	<	<	<	.	0.818	1	0.797	0.976
Nitrate as N	1	1	1.6	.	0.556	0.395	0.239	0.398
Sulfate	102	102	109	.	25.3	47.1	42	25.4
Charge balance error (%)	-1.2	2.5	1.5	.	4.5	1.6	5.0	0.8
Trace Metals (mg/L)								
Aluminum	<	<	<	4.62	6.23	<	1.68	<
Antimony (PMS)	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	0.00521	<	<	<
Barium	0.0638	0.0591	0.0596	0.174	0.211	0.0348	0.0787	0.0576
Beryllium	<	<	<	<	<	<	<	<
Boron	0.123	0.123	0.124	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	<	<	<
Chromium (PMS)	<	<	<	0.0335	<	<	<	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	3.23	13.3	0.107	0.918	0.147
Lead (PMS)	<	<	<	0.00472	0.00622	<	0.016	0.000803
Lead	.	.	.	.	.	.	.	.
Lithium	0.0179	0.0168	0.016	<	<	<	<	<
Manganese	<	<	<	0.145	3.41	<	0.0969	0.0173
Mercury (CVAA)	<	<	<	<	0.000221	<	<	<
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	<	<	<	0.143	0.00758	<	<	<
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	0.0139	<	<	<	<	<	<	<
Strontium	0.345	0.324	0.329	0.196	0.155	0.144	0.136	0.146
Thallium (PMS)	<	<	<	<	0.00247	<	<	<
Thallium	.	.	.	.	.	.	.	.
Uranium (PMS)	<	<	<	0.000789	0.00364	0.00128	0.000847	0.00314
Uranium (KPA)	.	.	.	.	.	.	.	.
Zinc	<	<	<	<	0.11	<	0.0786	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GHK2.51ESW		GHK2.51WSW			GW-108		GW-151	
Functional Area	EXP-SW		EXP-SW			S3		NHP	
Date Sampled	04/13/04	12/01/04	04/13/04	12/01/04		01/07/04	07/08/04	02/12/04	08/10/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC
Sample Type					Dup				
Field Measurements									
Time Sampled	8:30	9:25	8:40	9:35	9:35	0.56	9:10	0.39	10:30
Measuring Point Elev. (ft)	.	.	.	.	.	999.00	999.00	916.17	916.17
Depth to Water (ft)						7.75	6.65	15.24	15.92
Groundwater Elevation (ft)	.	.	.	.	.	991.25	992.35	900.93	900.25
Conductivity (μmho/cm)	311	256	66	99	99	76,500	91,700	994	501
Dissolved Oxygen (ppm)	3.94	3.44	5.25	4.87	4.87	0.59	0.41	1.08	0.45
Iron (++)	.	.	.	.	.	.	.	<	0.01
Manganese (++)	.	.	.	.	.	.	.	0.1	0.1
Oxidation/Reduction (mV)	129	202	121	188	188	96	301	190	76
Temperature (degrees C)	11.5	10.5	10.9	10.9	10.9	12.7	20.2	13.7	17.1
Turbidity (NTU)	.	.	.	.	.	17	8	2	13
pH	6.66	6.58	6.47	6.61	6.61	5.65	5.38	7.27	7.22
Miscellaneous Analytes									
Dissolved Solids (mg/L)	177	141	65	51	48	71,700	.	304	285
Suspended Solids (mg/L)	10	6	53	17	18	18	.	<	<
Turbidity (NTU)	25.8	15.8	28	15.2	15.6	.	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	55.5	46.3	5.82	5.47	5.16	10,600	10,300	54.3	57
Magnesium	3.11	2.22	2.04	1.82	1.67	1,080	1,080	27.5	26.6
Potassium	<	<	2.34	2.33	2.12	27.3	29.5	2.07	2.92
Sodium	0.704	0.565	0.935	0.853	0.821	532	544	6.68	7.18
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	138	122	19.4	21	25.8	370	650	241	226
Chloride	0.72	0.93	0.75	0.87	0.82	172	174	16.5	18.2
Fluoride	<	<	<	<	<	<	<	<	0.1
Nitrate as N	0.0678	0.0791	0.0384	0.0294	<	8,940	9,520	0.95	0.88
Sulfate	5.27	4.54	8.55	8.46	8.41	6.1	<	20.3	21
Charge balance error (%)	2.7	-0.9	-2.7	-9.0	-19.1	-0.7	-5.3	-4.1	-0.9
Trace Metals (mg/L)									
Aluminum	2.83	1.37	2.37	1.2	0.789	<	<	<	<
Antimony (PMS)	<	<	<	<	<	.	.	.	.
Arsenic (PMS)	<	<	<	<	<	.	.	.	.
Barium	0.031	0.0243	0.0437	0.0353	0.0322	87.2	87.5	0.181	0.179
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	.	.	.	.
Chromium (PMS)	<	<	<	<	<	.	.	.	.
Chromium	.	.	.	.	.	<	<	<	<
Cobalt	<	<	<	<	<	0.136	0.141	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	1.69	0.75	1.62	0.903	0.582	<	<	<	<
Lead (PMS)	0.00117	0.000506	0.0019	0.000559	0.000623	.	.	.	.
Lead	.	.	.	.	.	<	<	<	<
Lithium	<	<	<	<	<	<	<	<	<
Manganese	0.0888	0.0353	0.0855	0.0388	0.0359	144	146	<	<
Mercury (CVAA)	<	<	<	<	<	<	<	.	.
Molybdenum	<	<	<	<	<	.	.	<	.
Nickel (PMS)	<	<	<	<	<	.	.	.	.
Nickel	.	.	.	.	.	0.167	0.175	<	<
Selenium (PMS)	<	<	<	<	<	.	.	.	.
Strontium	0.0792	0.0662	0.0189	0.0172	0.0163	31.2	30.5	0.548	0.536
Thallium (PMS)	<	<	<	<	<	.	.	.	.
Thallium	.	.	.	.	.	<	<	<	<
Uranium (PMS)	<	<	<	<	<	.	.	.	.
Uranium (KPA)	.	.	.	.	.	[0.0144]	[0.0197]	<	<
Zinc	<	<	<	<	<	<	<	<	<

Sampling Point	GW-153			GW-154		GW-169			
Functional Area	NHP			NHP		EXP-UV			
Date Sampled	05/20/04	11/01/04		02/18/04	08/11/04	02/09/04	04/20/04	08/09/04	10/25/04
Program	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type			Dup						
Field Measurements									
Time Sampled	0.36	10:20	0.43	10:17	13:55	10:45	13:25	8:40	9:20
Measuring Point Elev. (ft)	921.68	921.68	921.68	911.70	911.70	932.12	932.12	932.12	932.12
Depth to Water (ft)	20.61	20.43	20.43	8.82	9.65	24.13	29.77	31.72	30.00
Groundwater Elevation (ft)	901.07	901.25	901.25	902.88	902.05	907.99	902.35	900.40	902.12
Conductivity (μmho/cm)	417	434	434	965	717	341	328	339	384
Dissolved Oxygen (ppm)	1.54	1.96	1.96	6.1	4.25	6.49	4.57	3.96	4.89
Iron (++)	.	.	.	<	0.23	0.02	<	<	.
Manganese (++)	.	.	.	<	0.4	<	<	0.8	.
Oxidation/Reduction (mV)	148	172	172	184	89	177	174	213	267
Temperature (degrees C)	15.2	16.6	16.6	12.5	24.3	12.6	15.7	15.1	15.2
Turbidity (NTU)	.	.	.	19	64	35	23	3	8
pH	7.61	7.16	7.16	7.32	6.9	6.89	6.61	6.73	6.84
Miscellaneous Analytes									
Dissolved Solids (mg/L)	230	271	242	461	491	318	116	175	198
Suspended Solids (mg/L)	<	2	2	<	44.5	11.6	<	<	<
Turbidity (NTU)	1.22	4.48	4.48	.	.	.	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	43.4	47	47	121	116	39	39	61.2	54
Magnesium	17.9	18.1	18	20	20	2	2	3.13	2.96
Potassium	<	2.29	2.34	6.27	7.46	2.05	2.03	2.45	2.69
Sodium	8.45	10.7	10.7	8.86	9.03	0.907 J	0.963	1.1	1.38
Alkalinity as CO3	<	<	<	.	.	<	<	<	<
Alkalinity as HCO3	172	173	173	.	.	< Q	112	158	142
Chloride	13	15.1	15.1	.	.	1.2	1.2	1.4	1.3
Fluoride	0.159	0.188	0.186	.	.	<	<	<	<
Nitrate as N	0.827	1.33	1	.	.	1	1	0.82	0.79
Sulfate	11.7	16	15.7	.	.	3.7	3.5	4.5	4.1
Charge balance error (%)	-1.4	0.4	0.7	.	.	86 R	-3.4	1.1	0.8
Trace Metals (mg/L)									
Aluminum	<	<	<	<	0.737	0.366	<	0.217	0.754
Antimony (PMS)	<	<	<	.	.	.	.	.	.
Arsenic (PMS)	<	<	<	.	.	.	.	.	.
Barium	0.0411	0.0447	0.0448	0.0743	0.16	0.0228	0.0225	0.0283	0.0302
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	0.127	<	<	<	<
Cadmium (PMS)	<	<	<	.	.	.	.	.	.
Chromium (PMS)	<	<	<	.	.	.	.	.	.
Chromium	.	.	.	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	<	0.137	0.157	0.111	1.12	0.474	0.171	0.224	0.594
Lead (PMS)	<	0.00117	0.00123	.	.	.	.	.	.
Lead	.	.	.	<	0.0074	<	<	<	<
Lithium	<	<	<	<	0.0103	<	<	<	<
Manganese	<	0.00746	0.00657	0.303	2.26	0.0162	<	0.0064	0.0223
Mercury (CVAA)	<	<	<	.	.	.	.	.	.
Molybdenum	<	<	<	<	.	<	<	.	.
Nickel (PMS)	<	<	<	.	.	.	.	.	.
Nickel	.	.	.	<	<	<	<	<	<
Selenium (PMS)	<	<	<	.	.	.	.	.	.
Strontium	0.137	0.14	0.139	0.416	0.434	0.0521	0.0501	0.0729	0.0709
Thallium (PMS)	<	<	<	.	.	.	.	.	.
Thallium	.	.	.	<	0.002	<	<	<	<
Uranium (PMS)	0.00143	0.00228	0.00244	.	.	.	.	.	.
Uranium (KPA)	.	.	.	0.477	0.61	.	.	.	.
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-170							
Functional Area	EXP-UV							
Date Sampled	02/09/04		04/20/04		08/09/04		10/25/04	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup		Dup		Dup
Field Measurements								
Time Sampled	9:50	.	9:35	.	10:05	.	14:15	.
Measuring Point Elev. (ft)	932.64	.	932.64	.	932.64	.	932.64	.
Depth to Water (ft)	33.62	.	35.20	.	36.12	.	35.09	.
Groundwater Elevation (ft)	899.02	.	897.44	.	896.52	.	897.55	.
Conductivity (μmho/cm)	1,547	.	2,240	.	1,242	.	1,689	.
Dissolved Oxygen (ppm)	0.41	.	9.31	.	0.45	.	0.47	.
Iron (++)	0.01	.	0.24	.	0.42	.	.	.
Manganese (++)	0.4	.	<	.	0.2	.	.	.
Oxidation/Reduction (mV)	-38	.	36	.	104	.	-80	.
Temperature (degrees C)	11.6	.	14.2	.	15.4	.	16.3	.
Turbidity (NTU)	31	.	11	.	24	.	22	.
pH	12.16	.	11.74	.	11.81	.	11.97	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	218	226	122	227	248	277	289	302
Suspended Solids (mg/L)	14.6	8.5	7.9	6.7	<	<	<	<
Turbidity (NTU)	.	.	.	.	.	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	74.6	70.1	86.1	86.9	109	106	93.2	95.6
Magnesium	1.74	1.74	1.5	1.84	0.829	0.807	0.71	0.874
Potassium	10.3	9.69	8.69	8.62	8.17	7.9	7.53	7.6
Sodium	5.99 J	5.62 J	5.49	5.44	5.5	5.39	5.73	5.85
Alkalinity as CO3	52.3	28.3	34.8	31.6	16.4	24.6	<	<
Alkalinity as HCO3	<	<	<	<	<	<	<	<
Chloride	8.8	9	8.8	8.5	8.2	7.4	9	8.7
Fluoride	0.11	<	<	<	0.1	0.1	0.1	<
Nitrate as N	0.16	0.17	0.16	0.16	0.16	0.16	0.22	0.22
Sulfate	5.3	5.4	5.1	5	4.3	3.9	5.2	5.1
Charge balance error (%)	-56.7 R	.	-14.7	.	-8.9	.	-30.7 R	.
Trace Metals (mg/L)								
Aluminum	0.292	0.301	0.258	0.306	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Barium	0.0502	0.0468	0.0564	0.0583	0.0672	0.0665	0.0669	0.0685
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.	.	.
Chromium	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.92	0.918	0.647	0.717	0.4	0.606	0.276	0.281
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	0.0059	<	0.0032	0.0182	<	<
Lithium	<	<	0.0285	0.0272	0.0268	0.026	0.0227	0.0229
Manganese	0.0081	0.0078	0.0053	0.0059	<	<	<	<
Mercury (CVAA)	.	.	.	.	.	.	.	.
Molybdenum	<	<	<	<	.	.	.	.
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.211	0.195	0.221	0.223	0.262	0.257	0.26	0.266
Thallium (PMS)	.	.	.	.	.	.	.	.
Thallium	<	<	<	<	<	<	<	<
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	.	.	.	.	.	.	.	.
Zinc	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-171		GW-172		GW-193		GW-204		
Functional Area	**EXP-UV**		**EXP-UV**		**T2331**		**T0134**		
Date Sampled	**02/10/04**	**08/09/04**	**02/09/04**	**08/09/04**	**01/08/04**	**07/13/04**	**05/03/04**	**10/25/04**	
Program	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**GWPP**	**GWPP**	**GWPP**
Sample Type									**Dup**
Field Measurements									
Time Sampled	13:03	13:52	14:25	15:15	13:10	9:00	10:40	9:25	9:25
Measuring Point Elev. (ft)	920.72	920.72	926.69	926.69	934.17	934.17	958.57	958.57	958.57
Depth to Water (ft)	2.65	5.71	11.53	15.50	8.94	8.97	8.74	9.03	9.03
Groundwater Elevation (ft)	918.07	.	915.16	911.19	925.23	925.20	949.83	949.54	949.54
Conductivity (μmho/cm)	425	331	860	1,183	642	1,146	300	336	336
Dissolved Oxygen (ppm)	1.84	1.79	0.61	1.48	1.67	1.72	2.23	2.9	2.9
Iron (++)	1.31	1.75	<	0.03	.	.	.	.	.
Manganese (++)	3.5	4.5	0.5	0.4	.	.	.	.	.
Oxidation/Reduction (mV)	-22	-13	-85	-124	135	-172	32	204	204
Temperature (degrees C)	16.1	19.6	14.6	23.6	10.6	24.5	21.7	20.2	20.2
Turbidity (NTU)	110	21	22	17	31	8	.	.	.
pH	6.4	6.21	7.22	7.32	7.09	7.23	7.28	7.4	7.4
Miscellaneous Analytes									
Dissolved Solids (mg/L)	204	171	219	373	389	.	194	213	212
Suspended Solids (mg/L)	175	32.9	<	<	5.5	.	10	3	3
Turbidity (NTU)	.	.	.	.	.	.	14.9	1.79	1.06
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	.	.	.	.	97.9	74.9	49.5	48	47.6
Magnesium	.	.	.	.	18.4	20.1	8.05	7.68	7.52
Potassium	.	.	.	.	5.26	7.48	2.1	2.61	2.38
Sodium	.	.	.	.	7.15	4.14	3.11	2.95	2.88
Alkalinity as CO3	.	.	.	.	<	.	<	<	<
Alkalinity as HCO3	.	.	.	.	306	.	123	111	111
Chloride	.	.	.	.	3.8	.	2.11	1.82	1.88
Fluoride	.	.	.	.	0.27	.	0.489	0.635	0.616
Nitrate as N	.	.	.	.	0.065	.	0.578	0.398	0.391
Sulfate	.	.	.	.	64.1	.	31.4	30.3	30.5
Charge balance error (%)	.	.	.	.	-5.1	.	1.3	4.2	3.5
Trace Metals (mg/L)									
Aluminum	.	.	.	.	<	<	0.541	<	<
Antimony (PMS)	.	.	.	.	.	.	<	0.00268	0.00313
Arsenic (PMS)	.	.	.	.	.	.	<	0.00517	0.00508
Barium	.	.	.	.	0.105	0.0888	0.0804	0.0763	0.0739
Beryllium	.	.	.	.	<	<	<	<	<
Boron	.	.	.	.	<	0.114	<	<	<
Cadmium (PMS)	.	.	.	.	.	.	<	<	<
Chromium (PMS)	.	.	.	.	.	.	<	<	<
Chromium	.	.	.	.	<	<	.	.	.
Cobalt	.	.	.	.	<	<	<	<	<
Copper	.	.	.	.	<	<	<	<	<
Iron	.	.	.	.	1.58	0.0508	0.359	0.137	0.0964
Lead (PMS)	.	.	.	.	.	.	0.00179	0.000799	<
Lead	.	.	.	.	<	<	.	.	.
Lithium	.	.	.	.	<	<	0.0879	0.138	0.134
Manganese	.	.	.	.	1.74	0.679	0.107	0.0494	0.0366
Mercury (CVAA)	.	.	.	.	<	.	<	<	<
Molybdenum	.	.	.	.	.	.	<	<	<
Nickel (PMS)	.	.	.	.	.	.	<	<	<
Nickel	.	.	.	.	<	<	.	.	.
Selenium (PMS)	.	.	.	.	.	.	<	<	<
Strontium	.	.	.	.	0.349	0.377	0.122	0.111	0.109
Thallium (PMS)	.	.	.	.	.	.	<	<	<
Thallium	.	.	.	.	<	<	.	.	.
Uranium (PMS)	.	.	.	.	.	.	0.0434	0.052	0.058
Uranium (KPA)	.	.	.	.	0.00574	<	.	.	.
Zinc	.	.	.	.	<	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-207		GW-208		GW-219		GW-220	
Functional Area	EXP-SR		EXP-SR		UOV		NHP	
Date Sampled	05/25/04	11/09/04	05/25/04	11/09/04	04/26/04	11/11/04	05/27/04	11/15/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type								
Field Measurements								
Time Sampled	9:15	8:46	8:30	8:35	10:10	8:50	9:45	10:50
Measuring Point Elev. (ft)	899.40	899.40	898.05	898.05	935.64	935.64	916.47	916.47
Depth to Water (ft)	0.00	0.00	0.00	0.00	10.16	10.37	16.42	16.24
Groundwater Elevation (ft)	899.40	899.40	898.05	898.05	925.48	925.27	900.05	900.23
Conductivity (μmho/cm)	675	646	678	690	621	720	500	536
Dissolved Oxygen (ppm)	1.39	0.25	3	3.69	0.57	2.31	1.37	0.99
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	-90	-69	-96	-83	-84	163	136	135
Temperature (degrees C)	16	15.8	16.1	15.2	15	16.5	15.8	15.9
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	7.29	7.31	7.29	7.29	6.78	6.93	7.48	7.42
Miscellaneous Analytes								
Dissolved Solids (mg/L)	402	361	455	432	348	387	295	281
Suspended Solids (mg/L)	<	<	2	<	<	<	5	4
Turbidity (NTU)	1.57	2.72	5.84	9.38	1.97	0.748	5.19	2.93
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	1,000	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	5,000	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	1,000	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	1,000	.	.	.
Major Ions (mg/L)								
Calcium	63.6	63	80.5	84.3	99.6	115	59.2	63.2
Magnesium	42.7	40	26.7	26.4	10.3	12.3	26.7	25.2
Potassium	3.09	3.11	2.92	2.9	2.78	4.02	2.49	2.45
Sodium	11.4	10.9	16.5	16.4	16	19.5	5.44	5.06
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	300	281	220	231	252	330	235	234
Chloride	1.48	1.11	1.88	1.59	22.2	9.01	15	15.2
Fluoride	0.207	0.193	0.321	0.289	<	<	<	<
Nitrate as N	<	<	<	<	<	<	0.77	0.8
Sulfate	83.3	63.9	121	123	31.6	28	16.3	16
Charge balance error (%)	-3.5	0.0	0.1	-0.5	2.0	1.8	-0.6	0.1
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	0.395	0.25
Antimony (PMS)	<	<	<	0.00328	<	<	<	<
Arsenic (PMS)	<	<	<	<	<	<	<	<
Barium	0.0456	0.0471	0.0408	0.0415	0.0607	0.0804	0.11	0.105
Beryllium	<	<	<	<	<	<	<	<
Boron	0.145	0.136	0.24	0.242	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	<	<	<
Chromium (PMS)	<	<	<	<	<	<	<	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.243	0.235	0.687	0.794	0.442	0.073	0.251	0.173
Lead (PMS)	<	<	0.000866	<	<	<	<	<
Lead	.	.	.	.	.	.	.	.
Lithium	0.0334	0.0327	0.0325	0.0318	<	<	<	<
Manganese	0.0107	0.0111	0.0158	0.0161	2.08	0.0303	0.00853	0.00861
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	<	<	<	<	0.088	0.0229	<	<
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	<	<	<
Strontium	0.624	0.577	1.59	1.56	0.168	0.209	0.451	0.421
Thallium (PMS)	<	<	<	<	<	<	<	<
Thallium	.	.	.	.	.	.	.	.
Uranium (PMS)	<	<	<	0.0011	0.338	0.525	<	<
Uranium (KPA)	.	.	.	.	.	.	.	.
Zinc	<	<	0.737	0.831	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-222			GW-223		GW-230		GW-232	
Functional Area	NHP			NHP		EXP-UV		EXP-UV	
Date Sampled	06/10/04		11/30/04	02/18/04	08/10/04	02/10/04	08/09/04	02/09/04	04/20/04
Program	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup							
Field Measurements									
Time Sampled	8:55	8:55	9:50	13:20	9:10	14:15	14:20	13:00	14:35
Measuring Point Elev. (ft)	911.82	911.82	911.82	911.62	911.62	923.11	923.11	931.39	931.39
Depth to Water (ft)	10.00	10.00	8.63	9.33	10.12	10.59	13.50	33.32	34.66
Groundwater Elevation (ft)	901.82	901.82	903.19	902.29	901.50	912.52	909.61	898.07	896.73
Conductivity (μmho/cm)	763	763	619	722	609	1,307	975	1,174	1,214
Dissolved Oxygen (ppm)	0.88	0.88	0.12	0.96	0.59	0.18	0.46	0.4	0.79
Iron (++)	.	.	.	0.15	0.18	2.95	3.04	0.01	<
Manganese (++)	.	.	.	0.5	0.1	0.7	0.3	<	<
Oxidation/Reduction (mV)	-85	-85	-132	-19	-39	-70	-102	-139	-150
Temperature (degrees C)	16.8	16.8	18	16.6	18.5	13.7	20.5	12.2	15.9
Turbidity (NTU)	.	.	.	28	11	11	21	2	30
pH	7.1	7.1	7.08	7	6.88	6.82	6.81	9.94	9.71
Miscellaneous Analytes									
Dissolved Solids (mg/L)	451	459	329	361	378	601	649	506	490
Suspended Solids (mg/L)	4	4	7	<	<	11.7	<	<	<
Turbidity (NTU)	35.1	35.8	67.9	.	.	.	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	102	102	85.9	95.8	91.2 J	.	.	1.32	1.4
Magnesium	15.3	14.7	13.6	12.6	12.6	.	.	0.911	1.04
Potassium	3.9	3.68	3.75	2.24	2.65	.	.	3.11	3.26
Sodium	23.5	23.1	15.1	12.2	12.6	.	.	190 J	199
Alkalinity as CO3	<	<	<	<	<	.	.	235	191
Alkalinity as HCO3	368	352	240	290	240	.	.	229	259
Chloride	24.3	25.8	13	26.3	34	.	.	18	10.5
Fluoride	0.245	0.246	0.284	0.11	0.16	.	.	1.6	0.78
Nitrate as N	0.0723	0.0768	0.052	<	<	.	.	<	<
Sulfate	17.5	18.5	39.9	37.5	35.7	.	.	0.31	0.43
Charge balance error (%)	-6.0	-4.9	1.2	-6.7	-2.4	.	.	-8.0	-2.7
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	.	.	<	<
Antimony (PMS)	<	<	<	.	.	.	.	.	.
Arsenic (PMS)	<	<	<	.	.	.	.	.	.
Barium	0.219	0.207	0.202	0.294	0.274	.	.	0.015	0.0174
Beryllium	<	<	<	<	<	.	.	<	<
Boron	<	<	<	<	<	.	.	1.22	1.34
Cadmium (PMS)	<	<	<	.	.	.	.	.	.
Chromium (PMS)	<	<	<	.	.	.	.	.	.
Chromium	.	.	.	<	<	.	.	<	<
Cobalt	<	<	<	<	<	.	.	<	<
Copper	<	<	<	<	<	.	.	<	<
Iron	2.43	2.28	5.15	0.356	<	.	.	0.0562	<
Lead (PMS)	<	<	<	.	.	.	.	.	.
Lead	.	.	.	<	<	.	.	0.0032	<
Lithium	<	<	<	<	<	.	.	<	0.172
Manganese	0.8	0.72	0.815	0.628	0.613	.	.	<	<
Mercury (CVAA)	<	<	<	.	.	.	.	.	.
Molybdenum	<	<	<	<	.	.	.	<	<
Nickel (PMS)	<	<	<	.	.	.	.	.	.
Nickel	.	.	.	<	<	.	.	<	<
Selenium (PMS)	0.0129	0.0133	<	.	.	.	.	.	.
Strontium	0.314	0.3	0.266	0.263	0.25	.	.	0.383	0.431
Thallium (PMS)	<	<	<	.	.	.	.	.	.
Thallium	.	.	.	<	<	.	.	<	<
Uranium (PMS)	0.0777	0.0747	0.0654	.	.	.	.	.	.
Uranium (KPA)	.	.	.	0.0412	0.0465	.	.	.	.
Zinc	<	<	<	<	<	.	.	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-232		GW-251			GW-281	GW-380		
Functional Area	EXP-UV		S2			FF	NHP		
Date Sampled	08/09/04	10/25/04	04/29/04		10/21/04	05/10/04	02/18/04	04/29/04	08/11/04
Program	BJC	BJC	GWPP	GWPP	GWPP	BJC	BJC	GWPP	BJC
Sample Type				Dup					
Field Measurements									
Time Sampled	9:30	10:25	10:15	10:15	10:05	14:12	9:10	10:05	12:50
Measuring Point Elev. (ft)	931.39	931.39	1,003.80	1,003.80	1,003.80	946.10	913.75	913.75	913.75
Depth to Water (ft)	35.47	34.94	17.39	17.39	14.19	6.00	9.73	10.06	10.92
Groundwater Elevation (ft)	895.92	896.45	986.41	986.41	989.61	940.10	904.02	903.69	902.83
Conductivity (μmho/cm)	1,736	1,276	927	927	939	734	642	459	411
Dissolved Oxygen (ppm)	0.91	0.97	1.68	1.68	0.43	2.91	5.67	0.58	2.61
Iron (++)	0.01	.	.	.	.	.	0.01	.	0.66
Manganese (++)	0.2	.	.	.	.	.	<	.	0.6
Oxidation/Reduction (mV)	-93	-93	163	163	206	107	196	116	-41
Temperature (degrees C)	16.8	15.9	15.3	15.3	16	18.3	12.8	14.4	21
Turbidity (NTU)	19	18	.	.	.	50	33	.	109
pH	9.6	9.87	6.2	6.2	6.58	6.7	6.9	6.77	6.43
Miscellaneous Analytes									
Dissolved Solids (mg/L)	540	544	665	671	643	.	244	.	253
Suspended Solids (mg/L)	<	<	<	<	<	.	<	.	12.5
Turbidity (NTU)	.	.	1.61	1.66	3.64	.	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	500,000	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	100 J	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	1,000	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	<100	.
Major Ions (mg/L)									
Calcium	<	1.35	111	113	111	.	43.4	45.2	39.4
Magnesium	1.1	0.992	14.2	14.4	18.7	.	18.3	18.6	15.1
Potassium	4.02	4.95	3.4	3.44	3.21	.	1.3	<	1.15
Sodium	214	190	14.5	14.5	13.3	.	27.6	19.9	13.3
Alkalinity as CO3	170	179	<	<	<	.	<	.	<
Alkalinity as HCO3	274	259	169	168	191	.	198	.	145
Chloride	11.2	10.6	7.66	7.52	6.21	.	38.9	.	32.7
Fluoride	2.3	2.1	0.873	0.902	1.45	.	0.12	.	0.2
Nitrate as N	<	<	61.9	63.8	51.5	.	0.91	.	1.5
Sulfate	1.5	<	18.8	18.3	16.4	.	7.7	.	20.3
Charge balance error (%)	0.6	-3.9	-6.5	-6.3	-2.2	.	-3.7	.	-6.7
Trace Metals (mg/L)									
Aluminum	<	<	<	<	0.365	.	<	<	<
Antimony (PMS)	.	.	<	<	<	.	.	<	.
Arsenic (PMS)	.	.	<	<	<	.	.	<	.
Barium	0.0172	0.0159	0.111	0.112	0.0874	.	0.0326	0.0306	0.0332
Beryllium	<	<	<	<	<	.	<	<	<
Boron	1.43	1.22	<	<	<	.	<	<	<
Cadmium (PMS)	.	.	0.103	0.102	0.0818	.	.	<	.
Chromium (PMS)	.	.	<	<	<	.	.	0.0446	.
Chromium	<	<	.	.	.	.	0.0229	.	0.983
Cobalt	<	<	<	<	<	.	<	<	0.0297
Copper	<	<	0.23	0.227	0.154	.	<	<	<
Iron	0.0588	0.0664	0.094	0.077	0.232	.	0.0961	0.198	20
Lead (PMS)	.	.	<	<	0.00102	.	.	<	.
Lead	<	<	.	.	.	.	<	.	<
Lithium	0.191	0.154	<	<	<	.	<	<	<
Manganese	<	<	3.91	3.92	2.31	.	<	0.031	0.532
Mercury (CVAA)	.	.	<	<	<	.	.	<	.
Molybdenum	.	.	<	<	<	.	<	<	.
Nickel (PMS)	.	.	0.0294	0.03	0.0151	.	.	0.217	.
Nickel	<	<	.	.	.	.	0.0937	.	2.32
Selenium (PMS)	.	.	<	<	<	.	.	<	.
Strontium	0.444	0.405	0.25	0.252	0.173	.	0.0516	0.0499	0.0451
Thallium (PMS)	.	.	0.00176	0.00173	0.00222	.	.	<	.
Thallium	<	<	.	.	.	.	<	.	<
Uranium (PMS)	.	.	0.00333	0.00342	0.00583	.	.	0.00174	.
Uranium (KPA)	.	.	.	.	.	.	<	.	<
Zinc	<	<	0.0512	0.0518	<	.	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-381		GW-382		GW-383		GW-605	
Functional Area	NHP		NHP		NHP		EXP-I	
Date Sampled	05/19/04	11/02/04	02/11/04	08/11/04	05/20/04	11/03/04	01/07/04	
Program	GWPP	GWPP	BJC	BJC	GWPP	GWPP	BJC	BJC
Sample Type								Dup
Field Measurements								
Time Sampled	10:10	8:45	13:25	9:45	10:10	9:05	14:05	.
Measuring Point Elev. (ft)	913.36	913.36	913.17	913.17	908.77	908.77	919.06	.
Depth to Water (ft)	10.71	10.74	10.54	11.57	9.44	9.22	11.04	.
Groundwater Elevation (ft)	902.65	902.62	902.63	901.60	899.33	899.55	908.02	.
Conductivity (μmho/cm)	726	774	683	664	676	683	860	.
Dissolved Oxygen (ppm)	1.73	0.85	10.28	0.89	1.09	0.1	2.26	.
Iron (++)	.	.	0.01	0.06	.	.	.	.
Manganese (++)	.	.	0.1	2.2	.	.	.	.
Oxidation/Reduction (mV)	-187	-149	84	182	-13	-92	28	.
Temperature (degrees C)	17.4	19.6	14.1	21.9	16.7	18.8	14.4	.
Turbidity (NTU)	.	.	29	33	.	.	24	.
pH	7.41	7.25	7.19	6.98	7.12	7.11	7.39	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	360	362	413	427	355	336	366	357
Suspended Solids (mg/L)	8	20	<	<	4	<	8.7	11.5
Turbidity (NTU)	76.8	202	.	.	7.01	8.91	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	85.1	92.7	81.3	83.5	98.1	96	87	87.4
Magnesium	23.3	24.2	24.3	24	11.9	11.4	20.4	20.6
Potassium	2.03	2.29	4.06	4.74	2.71	2.89	3.02	3.3
Sodium	20.1	18.1	17.5	20.1	11.8	12.4	16.7	17
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	252	283	283	263	248	243	267	277
Chloride	78.2	64	66.5	75.3	45.6	40	32.9	33.8
Fluoride	<	<	0.1	0.15	<	<	<	<
Nitrate as N	<	<	0.44	0.19	<	<	0	0.29
Sulfate	0.26	0.37	5.3	4.9	17.4	17.6	29.9	30.1
Charge balance error (%)	-1.1	0.0	-5.2	-2.5	-1.1	0.0	-0.6	.
Trace Metals (mg/L)								
Aluminum	0.244	<	<	<	<	<	0.73	0.67
Antimony (PMS)	<	<	.	.	<	<	.	.
Arsenic (PMS)	<	<	.	.	<	<	.	.
Barium	0.218	0.31	0.561	0.551	0.627	0.612	0.0595	0.0611
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	.	.	<	<	.	.
Chromium (PMS)	<	<	.	.	0.0117	<	.	.
Chromium	.	.	<	<	.	.	0.0082	0.0094
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	6.47	13	1.4	2.19	1.52	1.27	1.22	1.07
Lead (PMS)	0.00814	<	.	.	<	<	.	.
Lead	.	.	<	<	.	.	<	<
Lithium	<	<	<	<	0.0152	0.0149	<	<
Manganese	0.286	0.521	0.0324	0.0325	0.252	0.139	0.352	0.317
Mercury (CVAA)	<	<	.	.	<	<	<	<
Molybdenum	<	<	<	.	<	<	.	.
Nickel (PMS)	<	<	.	.	<	<	.	.
Nickel	.	.	<	<	.	.	0.0173	0.0177
Selenium (PMS)	<	<	.	.	<	<	.	.
Strontium	0.158	0.183	0.301	0.306	0.44	0.418	0.168	0.171
Thallium (PMS)	<	<	.	.	<	<	.	.
Thallium	.	.	<	<	.	.	<	<
Uranium (PMS)	<	<	.	.	<	<	.	.
Uranium (KPA)	.	.	<	<	.	.	0.098	0.101
Zinc	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-605		GW-606		GW-620		GW-633		GW-658
Functional Area	EXP-I		EXP-I		FTF		RG		FF
Date Sampled	07/12/04		01/07/04	07/12/04	04/29/04	10/21/04	05/05/04	10/26/04	05/10/04
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP	BJC
Sample Type		Dup							
Field Measurements									
Time Sampled	14:25	.	10:25	9:30	9:10	8:20	9:00	9:30	10:55
Measuring Point Elev. (ft)	919.06	.	919.59	919.59	1,015.57	1,015.57	996.43	996.43	945.08
Depth to Water (ft)	10.67	.	13.23	13.70	24.88	43.69	2.58	2.58	11.73
Groundwater Elevation (ft)	908.39	.	906.36	905.89	990.69	971.88	993.85	993.85	933.35
Conductivity (μmho/cm)	1,471	.	1,085	1,286	615	1,193	9,060	8,800	626
Dissolved Oxygen (ppm)	2.07	.	3.36	3.57	1.37	0.56	1.55	0.88	0.76
Iron (++)	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	110	.	102	155	13	145	162	273	-40
Temperature (degrees C)	27.4	.	10.6	22.6	15.3	15.9	16.4	21.6	25
Turbidity (NTU)	9	.	18	9	.	.	.	.	34
pH	7.06	.	7.55	7.43	10.9	11.12	5.3	5.53	6.14
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	430	.	98	156	7,350	7,010	.
Suspended Solids (mg/L)	.	.	<	.	<	<	<	<	.
Turbidity (NTU)	.	.	.	.	0.819	1.77	0.62	0.556	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	92.8	92.6	72.8	75	16.3	56.3	1,540	1,600	.
Magnesium	22.5	22.4	44.4	43.4	<	<	151	160	.
Potassium	3.06	3.02	3.65	3.76	20.6	18.1	7.91	10.1	.
Sodium	23.9	23.8	7.69	7.8	2.69	2.57	83.5	95.9	.
Alkalinity as CO3	<	<	<	<	23.6	22.8	<	<	.
Alkalinity as HCO3	272	261	287	271	<	<	306	259	.
Chloride	63.5	60.6	22.5	21.9	1.81	2.25	48.5	52.6	.
Fluoride	<	0.11	0.16	0.25	0.121	0.134	<	<	.
Nitrate as N	0.29	0.32	9.6	8.4	1.32	1.27	1,280	1270	.
Sulfate	31.9	30.9	52	60	5.78	6.08	1.56	1.16	.
Charge balance error (%)	-2.0	.	-2.8	-1.0	-2.7	24.3 R	-3.0	0.0	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	0.448	1.08	<	<	.
Antimony (PMS)	.	.	.	.	<	<	<	<	.
Arsenic (PMS)	.	.	.	.	<	<	<	<	.
Barium	0.0619	0.062	0.187	0.192	0.016	0.027	7.04	7.3	.
Beryllium	<	<	<	<	<	<	<	<	.
Boron	0.131	0.118	<	<	<	<	<	<	.
Cadmium (PMS)	.	.	.	.	<	<	<	<	.
Chromium (PMS)	.	.	.	.	0.0111	<	<	<	.
Chromium	0.0215	0.009	<	0.0188	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<	.
Copper	<	<	<	<	<	<	<	<	.
Iron	0.489	0.398	<	0.0809	<	0.0565	<	<	.
Lead (PMS)	.	.	.	.	<	<	<	<	.
Lead	<	<	<	<	.	.	.	.	.
Lithium	<	<	<	<	0.0247	0.0243	0.156	0.153	.
Manganese	0.374	0.36	0.0091	0.0101	<	<	3.28	5.42	.
Mercury (CVAA)	.	.	<	.	<	<	<	<	.
Molybdenum	.	.	.	.	<	<	<	<	.
Nickel (PMS)	.	.	.	.	<	<	0.253	0.24	.
Nickel	0.0346	0.0319	<	<	.	.	.	.	.
Selenium (PMS)	.	.	.	.	<	<	<	<	.
Strontium	0.187	0.187	0.49	0.516	0.26	0.422	3.82	3.89	.
Thallium (PMS)	.	.	.	.	<	<	<	<	.
Thallium	<	<	<	<	.	.	.	.	.
Uranium (PMS)	.	.	.	.	<	<	0.000928	0.00147	.
Uranium (KPA)	0.158	0.158	0.00536	0.00647	.	.	.	.	.
Zinc	<	<	<	<	<	<	<	<	.

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-691		GW-692			GW-698		
Functional Area	CPT		CPT			B8110		
Date Sampled	06/09/04	11/17/04	06/08/04		11/17/04	05/18/04	05/19/04	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type				F			Conv	Conv-F
Field Measurements								
Time Sampled	8:50	9:50	11:05	.	8:20	8:10	8:51	.
Measuring Point Elev. (ft)	968.59	968.59	964.38	.	964.38	970.29	970.29	.
Depth to Water (ft)	12.23	11.97	9.29	.	9.04	35.69	35.82	.
Groundwater Elevation (ft)	956.36	956.62	955.09	.	955.34	934.60	934.47	.
Conductivity (μmho/cm)	2,250	2,930	751	.	943	1,807	1,066	.
Dissolved Oxygen (ppm)	0.15	0.04	1.03	.	0	0.77	0.96	.
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	206	157	161	.	185	145	147	.
Temperature (degrees C)	18.1	18.8	20.3	.	19	17.4	18	.
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	6.31	6.56	7.28	.	7.01	6.89	6.96	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	1,980	1,960	570	.	628	1,070	617	.
Suspended Solids (mg/L)	<	<	227	.	39	<	47	.
Turbidity (NTU)	0.235	0.672	432	.	113	1.28	65.8	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	428	455	97.5	95.5	135	214	129	126
Magnesium	67.8	69.4	24.5	23.2	28.8	68.5	34.6	33
Potassium	7.79	8.76	6.65	4.66	5.11	3.55	3.31	2.38
Sodium	9.38	10.4	12.8	12.7	19.3	23.6	21.3	20.5
Alkalinity as CO3	<	<	<	.	<	<	<	.
Alkalinity as HCO3	274	242	214	.	238	272	260	.
Chloride	11.6	12.9	14.3	.	15.6	18.9	28.9	.
Fluoride	<	<	0.863	.	0.836	<	<	.
Nitrate as N	0	1	<	.	0.242	131	35	.
Sulfate	1,090	1,080	144	.	216	63.4	75	.
Charge balance error (%)	-1.7	2.3	-0.8	.	1.6	2.3	1.1	.
Trace Metals (mg/L)								
Aluminum	<	<	8.13	<	2.59	<	3.94	<
Antimony (PMS)	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	0.0083	<	<	<	<	<
Barium	0.0173	0.0188	0.124	0.0603	0.0988	0.199	0.153	0.111
Beryllium	<	<	0.00077	<	<	<	<	<
Boron	0.291	0.339	<	<	0.109	<	<	<
Cadmium (PMS)	<	<	<	<	<	<	<	<
Chromium (PMS)	<	<	0.0181	<	<	<	<	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	0.0226	0.0287	<	<	<	<	<	<
Copper	<	<	0.0244	<	<	<	<	<
Iron	<	0.0529	14.4	<	4.11	0.0732	3.69	<
Lead (PMS)	<	<	0.0249	<	0.00583	<	0.00348	<
Lead	.	.	.	.	.	.	.	.
Lithium	<	<	0.0253	0.0142	0.0182	<	<	<
Manganese	9.69	9.48	0.188	<	1.11	0.0634	0.844	0.0751
Mercury (CVAA)	<	<	0.00521 Q	<	0.00157	<	0.00763	0.00186
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	0.0349	0.0334	0.0172	<	0.00559	<	<	<
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	<	<	<
Strontium	0.754	0.755	0.318	0.293	0.351	0.62	0.314	0.304
Thallium (PMS)	<	<	0.000505	0.00255	<	<	<	<
Thallium	.	.	.	.	.	.	.	.
Uranium (PMS)	0.00083	0.00092	0.000966	<	0.000658	0.00112	0.00438	0.00402
Uranium (KPA)	.	.	.	.	.	.	.	.
Zinc	<	<	0.224	<	0.0613	<	0.0606	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-698			GW-722-06				GW-722-10	
Functional Area	B8110			EXP-J				EXP-J	
Date Sampled	11/02/04	11/03/04		02/22/04	06/14/04	08/07/04	10/25/04	02/22/04	06/17/04
Program	GWPP	GWPP	GWPP	GWPP	BJC	GWPP	BJC	GWPP	BJC
Sample Type		Conv	Conv-F						
Field Measurements									
Time Sampled	10:10	10:33	.	8:45	9:00	8:45	9:30	12:35	9:45
Measuring Point Elev. (ft)	970.29	970.29	.	.	.	.	.	.	.
Depth to Water (ft)	31.95	32.67	.	.	.	.	.	.	.
Groundwater Elevation (ft)	938.34	937.62	.	.	.	.	.	.	.
Conductivity (μmho/cm)	1,679	1,212	.	880	381	715	421	781	1,031
Dissolved Oxygen (ppm)	0.88	0.32	.	10.9	3.12	11	9.21	9.5	9.07
Iron (++)	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	107	168	.	.	144	.	113	.	72
Temperature (degrees C)	18.7	17.3	.	3.5	25.3	14.8	17.6	13.8	25.6
Turbidity (NTU)	.	.	.	.	9	.	4	.	4
pH	6.91	6.94	.	7.8	8.08	7.5	7.42	7.9	7.77
Miscellaneous Analytes									
Dissolved Solids (mg/L)	1,010	649	.	523	578	580	547	429	457
Suspended Solids (mg/L)	3	3	.	<	<	2	<	<	<
Turbidity (NTU)	2.79	3.7	.	1.83	.	1.29 J	.	1.06	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	193	153	149	18.2	18	17.2	18.2	28.3	29.3
Magnesium	63.5	41.9	41	13.5	12.5	12.2	12.5	20.9	20.4
Potassium	3.24	2.73	2.68	5.05	6.5	4.67	7.85	3.72	5.01
Sodium	21.5	17.1	17	174	151	161	162	113	104
Alkalinity as CO3	<	<	.	<	<	<	<	<	<
Alkalinity as HCO3	278	268	.	250	253	266	275	214	225
Chloride	17.9	16.6	.	112	102	106	112	86.9	79.5
Fluoride	<	<	.	1.13	1.1	1.07	1.1	0.929	0.94
Nitrate as N	118	55.9	.	<	<	<	<	<	0.027
Sulfate	63.1	59.8	.	55	52.9	54.7	56	51.8	52.6
Charge balance error (%)	0.2	3.6	.	1.9	-2.4	-2.8	-3.6	1.8	-0.6
Trace Metals (mg/L)									
Aluminum	0.216	0.505	<	<	<	<	0.326	0.285	<
Antimony (PMS)	<	<	<	<	.	<	.	<	.
Arsenic (PMS)	<	<	<	<	.	<	.	<	.
Barium	0.183	0.131	0.127	0.0343	0.0352	0.0341	0.0396	0.0569	0.0564
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	0.737	0.717	0.698	0.721	0.452	0.443
Cadmium (PMS)	<	<	<	<	.	<	.	<	.
Chromium (PMS)	<	0.0492	<	<	.	<	.	<	.
Chromium	.	.	.	.	0.042	.	<	.	<
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	0.182	0.355	<	0.13	0.241	0.154	0.322	0.287	0.173
Lead (PMS)	<	<	<	<	.	<	.	<	.
Lead	.	.	.	.	<	.	<	.	<
Lithium	<	<	<	0.126	0.146	0.12	0.151	0.0874	0.109
Manganese	0.131	0.189	0.124	0.00559	0.0087	0.00535	0.0079	<	<
Mercury (CVAA)	0.000496	0.00168	0.000969	<	.	<	.	<	.
Molybdenum	<	<	<	<	.	<	.	<	.
Nickel (PMS)	<	<	<	<	.	<	.	<	.
Nickel	.	.	.	.	0.0207	.	<	.	<
Selenium (PMS)	<	<	<	<	.	<	.	<	.
Strontium	0.563	0.378	0.376	4.07	3.81	3.8	3.93	3.08	3.04
Thallium (PMS)	<	<	<	<	.	<	.	<	.
Thallium	.	.	.	.	<	.	<	.	<
Uranium (PMS)	0.00144	0.00281	0.00233	<	.	<	.	<	.
Uranium (KPA)	.	.	.	.	<	.	<	.	<
Zinc	<	<	<	<	<	0.0783	0.071	0.0877	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-722-10		GW-722-14				GW-722-17	
Functional Area	EXP-J		EXP-J				EXP-J	
Date Sampled	08/07/04	10/27/04	02/23/04	06/24/04	08/07/04	10/28/04	02/23/04	06/28/04
Program	GWPP	BJC	GWPP	BJC	GWPP	BJC	GWPP	BJC
Sample Type								
Field Measurements								
Time Sampled	13:00	9:40	17:16	13:25	18:05	9:00	18:20	8:15
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	648	714	487	522	441	655	502	984
Dissolved Oxygen (ppm)	8.8	12.29	9.2	6.08	10	18.19	11.6	9.18
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	.	112	.	168	.	183	.	178
Temperature (degrees C)	20.7	17.8	15.8	21.1	21.3	18.9	12.3	18.9
Turbidity (NTU)	.	4	.	8	.	2	.	4
pH	7.5	7.71	7.8	7.8	7.4	7.58	7.6	7.41
Miscellaneous Analytes								
Dissolved Solids (mg/L)	485	426	295	311	311	322	301	327
Suspended Solids (mg/L)	<	<	5	<	<	<	4	<
Turbidity (NTU)	1.66	.	3.63	.	1.28	.	1.12	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	25.9	26	56.4	56.4	57.9	54.4	45.3	44.6
Magnesium	19.2	18.1	27.2	28.3	28.4	27.2	26.8	26.7
Potassium	3.46	4.32	<	2.26	<	2.13	2.04	2.71
Sodium	107	94.1	17.3	15.9	17	15.7	32.2	33.7
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	228	248	253	283	265	277	206	241
Chloride	82.6	82.4	12.4	12.3	10.2	10.9	31.4	29.9
Fluoride	0.965	0.88	0.273	0.24	0.206	0.22	0.609	0.52
Nitrate as N	<	0.047	0.495	0.48	0.454	0.9	0.187	0.17
Sulfate	55.1	52.2	18.4	18.5	17	18.2	32.7	29.8
Charge balance error (%)	-3.0	-9.3	-0.3	-4.4	-0.1	-5.1	1.6	-3.0
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	<	.	<	.	<	.	<	.
Arsenic (PMS)	<	.	<	.	<	.	<	.
Barium	0.0524	0.0508	0.103	0.113	0.109	0.111	0.0969	0.108
Beryllium	<	<	<	<	<	<	<	<
Boron	0.429	0.389	0.135	0.127	0.131	0.115	0.149	0.153
Cadmium (PMS)	<	.	<	.	<	.	<	.
Chromium (PMS)	<	.	<	.	<	.	<	.
Chromium	.	<	.	<	.	<	.	<
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.26	0.276	0.131	<	<	<	<	<
Lead (PMS)	<	.	<	.	<	.	<	.
Lead	.	<	.	<	.	<	.	<
Lithium	0.0851	0.0913	0.0168	0.0201	0.0181	0.0192	0.027	0.0341
Manganese	<	<	<	<	<	<	<	<
Mercury (CVAA)	<	.	<	.	<	.	<	.
Molybdenum	<	.	<	.	<	.	<	.
Nickel (PMS)	<	.	<	.	<	.	<	.
Nickel	.	<	.	<	.	<	.	<
Selenium (PMS)	<	.	<	.	<	.	<	.
Strontium	2.98	2.77	0.72	0.715	0.749	0.704	1.03	1.06
Thallium (PMS)	<	.	<	.	<	.	<	.
Thallium	.	<	.	<	.	<	.	<
Uranium (PMS)	<	.	<	.	<	.	<	.
Uranium (KPA)	.	<	.	<	.	<	.	<
Zinc	<	<	0.229	<	<	<	0.0578	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-722-17		GW-722-20				GW-722-22	
Functional Area	EXP-J		EXP-J				EXP-J	
Date Sampled	08/07/04	10/28/04	02/23/04	06/24/04	08/07/04	10/27/04	02/23/04	
Program	GWPP	BJC	GWPP	BJC	GWPP	BJC	GWPP	GWPP
Sample Type								Dup
Field Measurements								
Time Sampled	19:10	9:50	16:10	10:00	17:00	12:30	15:05	15:05
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	450	537	469	475	413	487	470	470
Dissolved Oxygen (ppm)	8.2	18.1	9.2	7.11	9.2	12.33	11.3	11.3
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	.	130	.	170	.	121	.	.
Temperature (degrees C)	21.2	18.7	13.4	19.8	21.6	20.1	15.2	15.2
Turbidity (NTU)	.	4	.	6	.	4	.	.
pH	7.8	7.59	7.7	7.56	7.6	7.64	7.5	7.5
Miscellaneous Analytes								
Dissolved Solids (mg/L)	354	326	281	295	301	282	272	294
Suspended Solids (mg/L)	8	<	7	<	8	<	<	<
Turbidity (NTU)	3.49	.	3.9	.	3.52	.	0.975	0.801
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	48.3	45.2	54.4	49.1	49.9	49.3	55.2	55
Magnesium	26.9	26.5	29.6	28.3	27.9	27.9	27.5	28.9
Potassium	<	2.52	<	1.79	<	2.01	<	<
Sodium	32.4	31.5	16.9	14.7	15.5	15	14.8	15.4
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	217	207	226	264	242	257	249	247
Chloride	33.4	32.8	12.8	12.3	10.2	10.9	7.2	7.04
Fluoride	0.627	0.6	0.442	0.39	0.334	0.38	0.286	0.299
Nitrate as N	0.143	0.24	0.436	0.52	0.409	0	0	0
Sulfate	31.6	32.8	24.8	23.5	22.2	23.7	18.1	18.1
Charge balance error (%)	0.4	0.7	3.8	-6.1	-1.6	-4.6	0.5	2.1
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	<	.	<	.	<	.	<	<
Arsenic (PMS)	<	.	<	.	<	.	<	<
Barium	0.101	0.103	0.08	0.0779	0.078	0.0853	0.0926	0.0978
Beryllium	<	<	<	<	<	<	<	<
Boron	0.148	0.134	0.113	<	0.102	<	0.121	0.121
Cadmium (PMS)	<	.	<	.	<	.	<	<
Chromium (PMS)	<	.	<	.	<	.	<	<
Chromium	.	<	.	<	.	<	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	0.393	<	0.0728	0.0537	0.229	0.153
Lead (PMS)	<	.	0.000742	.	<	.	0.000612	<
Lead	.	<	.	<	.	<	.	.
Lithium	0.0283	0.0317	0.016	0.0181	0.0158	0.018	0.0157	0.0162
Manganese	<	<	<	<	<	<	<	<
Mercury (CVAA)	<	.	<	.	<	.	<	<
Molybdenum	<	.	<	.	<	.	<	<
Nickel (PMS)	<	.	<	.	<	.	<	<
Nickel	.	<	.	<	.	<	.	.
Selenium (PMS)	<	.	<	.	<	.	<	<
Strontium	1.08	1.04	0.724	0.67	0.676	0.656	0.694	0.709
Thallium (PMS)	<	.	<	.	<	.	<	<
Thallium	.	<	.	<	.	<	.	.
Uranium (PMS)	<	.	<	.	<	.	<	<
Uranium (KPA)	.	<	.	<	.	<	.	.
Zinc	<	<	0.21	<	<	<	0.177	0.0515

Sampling Point	GW-722-22				GW-722-26			
Functional Area	EXP-J				EXP-J			
Date Sampled	06/24/04	08/07/04		10/27/04	02/22/04	06/16/04		08/07/04
Program	BJC	GWPP	GWPP	BJC	GWPP	BJC	BJC	GWPP
Sample Type			Dup				Dup	
Field Measurements								
Time Sampled	8:50	15:50	15:50	11:55	10:20	8:50	.	10:20
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	553	425	425	518	375	757	.	329
Dissolved Oxygen (ppm)	6.06	9.6	9.6	8.78	8.6	7.01	.	7.2
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	183	.	.	124	.	-15	.	.
Temperature (degrees C)	18.2	20.2	20.2	20.6	9.9	23.2	.	19.5
Turbidity (NTU)	4	.	.	3	.	13	.	.
pH	8.16	7.5	7.5	7.47	7.4	7.28	.	7.2
Miscellaneous Analytes								
Dissolved Solids (mg/L)	302	300	306	300	202	226	235	228
Suspended Solids (mg/L)	<	2	<	<	2	<	<	<
Turbidity (NTU)	.	0.78	0.871	.	6.92	.	.	2.04 J
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	55.2	54.2	57.5	53.4	54	50.9	52.3	55.1
Magnesium	28.6	27.5	27.9	27.9	20.1	19.9	20.1	19.9
Potassium	1.94	<	<	1.8	2.17	2.42	2.27	2.05
Sodium	13.8	13.9	14.2	13.8	2.64	2.63	2.65	2.48
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	275	260	259	275	201	208	212	214
Chloride	8.2	6.88	6.42	7	3.57	3.4	3.4	3.81
Fluoride	0.27	0.261	0.263	0.29	1.09	1.1	1.1	1.05
Nitrate as N	0	0.285	0.306	0.24	<	<	<	<
Sulfate	18.7	18	18	18.9	0.3	0.47	0.3	1.84
Charge balance error (%)	-3.4	-2.0	0.1	-4.4	3.9	0.4	.	0.8
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	<	<	.	<	.	.	<
Arsenic (PMS)	.	<	<	.	<	.	.	<
Barium	0.0973	0.0881	0.0866	0.0905	0.204	0.198	0.195	0.203
Beryllium	<	<	<	<	<	<	<	<
Boron	0.104	0.112	0.113	0.1	<	<	<	<
Cadmium (PMS)	.	<	<	.	<	.	.	<
Chromium (PMS)	.	<	<	.	<	.	.	<
Chromium	<	.	.	<	.	<	<	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	0.0739	0.0966	0.0651	0.56	0.408	0.212	0.367
Lead (PMS)	.	<	<	.	<	.	.	<
Lead	<	.	.	<	.	<	<	.
Lithium	0.0185	0.0161	0.0158	0.018	<	<	<	<
Manganese	<	<	<	<	0.117	0.115	0.0881	0.116
Mercury (CVAA)	.	<	<	.	<	.	.	<
Molybdenum	.	<	<	.	<	.	.	<
Nickel (PMS)	.	<	<	.	<	.	.	<
Nickel	<	.	.	<	.	<	<	.
Selenium (PMS)	.	<	<	.	<	.	.	<
Strontium	0.668	0.672	0.694	0.666	1.22	1.19	1.12	1.16
Thallium (PMS)	.	<	<	.	<	.	.	<
Thallium	<	.	.	<	.	<	<	.
Uranium (PMS)	.	<	<	.	<	.	.	<
Uranium (KPA)	<	.	.	<	.	<	<	.
Zinc	<	0.0747	0.156	<	0.295	<	0.0558	0.0921

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-722-26		GW-722-30				GW-722-32	
Functional Area	EXP-J		EXP-J				EXP-J	
Date Sampled	10/26/04		02/22/04	06/14/04	08/07/04	10/25/04	02/22/04	06/16/04
Program	BJC	BJC	GWPP	BJC	GWPP	BJC	GWPP	BJC
Sample Type		Dup						
Field Measurements								
Time Sampled	8:50	.	9:30	13:10	9:40	13:00	10:49	13:10
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	433	.	283	372	254	310	382	564
Dissolved Oxygen (ppm)	12.13	.	9	5.71	7.9	8.49	9.8	7.09
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	-102	.	.	89	.	121	.	141
Temperature (degrees C)	16.9	.	8.8	27.1	19.3	18.1	12.7	24.1
Turbidity (NTU)	7	.	.	10	.	4	.	7
pH	7.81	.	7.7	7.83	7.2	7.64	7.2	7.65
Miscellaneous Analytes								
Dissolved Solids (mg/L)	255	273	162	189	189	201	218	253
Suspended Solids (mg/L)	6	<	2	<	<	6.2	2	5.5
Turbidity (NTU)	.	.	2.32	.	0.819 J	.	7.83	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	51.9	52.2	40.1	38	41.2	39.7	67.6	69.5
Magnesium	20.1	20.2	15.4	14.2	14.6	15	9.77	10.7
Potassium	2.28	2.3	<	1.68	<	1.66	<	2.12
Sodium	2.71	2.65	0.774	0.863	0.882	1.18	2.76	3.09
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	237	235	145	144	156	161	193	210
Chloride	3.5	3.7	2.52	3.3	2.48	2.7	3.41	3.3
Fluoride	1.1	1.1	0.174	0.2	0.161	0.18	<	<
Nitrate as N	<	<	0.0474	0.033	0.18	<	0.682	0.79
Sulfate	1.3	0.63	9.99	10	9.34	10.3	10.7	11.1
Charge balance error (%)	-5.4	.	1.7	-0.8	-1.6	-3.1	0.8	-0.4
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	0.825	<
Antimony (PMS)	.	.	<	.	<	.	<	.
Arsenic (PMS)	.	.	<	.	<	.	<	.
Barium	0.199	0.199	0.0491	0.0446	0.0489	0.0501	0.029	0.0349
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	<	.	<	.	<	.
Chromium (PMS)	.	.	<	.	<	.	0.0102	.
Chromium	<	<	.	0.0301	.	<	.	<
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.177	0.148	0.0938	0.156	0.111	0.0836	0.621	0.144
Lead (PMS)	.	.	<	.	<	.	0.00103	.
Lead	<	<	.	<	.	<	.	<
Lithium	<	<	<	<	<	<	<	<
Manganese	0.087	0.0846	<	0.0055	<	0.005	0.0106	0.0052
Mercury (CVAA)	.	.	<	.	<	.	<	.
Molybdenum	.	.	<	.	<	.	<	.
Nickel (PMS)	.	.	0.00764	.	<	.	0.00546	.
Nickel	<	<	.	0.0154	.	<	.	<
Selenium (PMS)	.	.	<	.	<	.	<	.
Strontium	1.14	1.14	0.0937	0.0806	0.1	0.0835	0.0658	0.076
Thallium (PMS)	.	.	<	.	<	.	<	.
Thallium	<	<	.	<	.	<	.	<
Uranium (PMS)	.	.	<	.	<	.	<	.
Uranium (KPA)	<	<	.	<	.	<	.	<
Zinc	0.118	<	0.149	0.0506	0.165	<	0.0563	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-722-32		GW-722-33				GW-733	
Functional Area	EXP-J		EXP-J				EXP-J	
Date Sampled	08/07/04	10/26/04	02/22/04	06/17/04	08/07/04	10/27/04	01/08/04	07/08/04
Program	GWPP	BJC	GWPP	BJC	GWPP	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	11:05	12:55	11:25	8:50	11:35	8:50	9:50	13:10
Measuring Point Elev. (ft)	.	.	.	.	.	.	959.84	959.84
Depth to Water (ft)	.	.	.	.	.	.	58.44	58.68
Groundwater Elevation (ft)	.	.	.	.	.	.	901.40	901.16
Conductivity (μmho/cm)	376	167	404	441	392	645	336	672
Dissolved Oxygen (ppm)	8.8	12.61	9.9	6.52	8.3	10.93	2.44	1.76
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	.	148	.	154	.	181	190	148
Temperature (degrees C)	24.8	19.4	11.8	24.7	24.5	17.2	9.8	24.3
Turbidity (NTU)	.	4	.	6	.	5	12	9
pH	6.8	7.29	7.5	8.31	7	7.17	7.57	7.72
Miscellaneous Analytes								
Dissolved Solids (mg/L)	303	263	196	253	291	253	178	.
Suspended Solids (mg/L)	4	<	<	<	<	<	<	.
Turbidity (NTU)	4.44	.	2.71	.	0.793	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	80.6	70.5	66	70.2	78.1	71	43.8	41.7
Magnesium	11.7	10.7	9.26	10.9	11.4	10.6	17.8	17.9
Potassium	<	2.29	<	2.04	<	2.09	1.81	1.81
Sodium	3.09	3.18	2.69	3.06	3	3.18	2.68	2.73
Alkalinity as CO3	<	<	<	<	<	<	<	.
Alkalinity as HCO3	235	225	195	209	238	239	173	.
Chloride	3.41	3.4	3.33	3.5	3.45	3.4	10.4	.
Fluoride	<	<	<	<	<	<	0.17	.
Nitrate as N	0.798	0.76	0.648	0.75	0.773	0.79	0.48	.
Sulfate	12.6	11.2	10.8	11.2	11.4	11.3	8.3	.
Charge balance error (%)	0.1	-3.0	-1.1	0.2	-1.8	-5.7	-2.0	.
Trace Metals (mg/L)								
Aluminum	0.632	<	0.355	<	<	<	<	<
Antimony (PMS)	<	.	<	.	<	.	.	.
Arsenic (PMS)	<	.	<	.	<	.	.	.
Barium	0.0354	0.0339	0.0262	0.0306	0.0306	0.0309	0.0258	0.0267
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	.	<	.	<	.	.	.
Chromium (PMS)	<	.	0.0104	.	<	.	.	.
Chromium	.	0.0052	.	0.005	.	<	<	0.006
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.628	0.236	0.467	<	0.154	0.07	0.0604	<
Lead (PMS)	0.00117	.	0.00107	.	0.000833	.	.	.
Lead	.	<	.	<	.	<	<	<
Lithium	<	<	<	<	<	<	<	<
Manganese	0.0132	0.005	0.00995	<	<	<	<	<
Mercury (CVAA)	<	.	<	.	<	.	<	.
Molybdenum	<	.	<	.	<	.	.	.
Nickel (PMS)	<	.	0.00575	.	<	.	.	.
Nickel	.	<	.	<	.	<	<	0.0141
Selenium (PMS)	<	.	<	.	<	.	.	.
Strontium	0.0843	0.0765	0.0639	0.0685	0.077	0.0704	0.102	0.102
Thallium (PMS)	<	.	<	.	<	.	.	.
Thallium	.	<	.	<	.	<	<	<
Uranium (PMS)	<	.	<	.	<	.	.	.
Uranium (KPA)	.	<	.	<	.	<	<	<
Zinc	0.179	<	0.221	<	0.159	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-735			GW-744		GW-747		
Functional Area	EXP-J			GRIDK1		GRIDK2		
Date Sampled	05/27/04	11/15/04		05/24/04	11/10/04	05/26/04		11/10/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup				Dup	
Field Measurements								
Time Sampled	8:50	9:40	9:40	9:35	8:50	8:50	8:50	9:50
Measuring Point Elev. (ft)	924.46	924.46	924.46	907.60	907.60	921.14	921.14	921.14
Depth to Water (ft)	23.93	20.58	20.58	6.92	6.09	6.18	6.18	4.62
Groundwater Elevation (ft)	900.53	903.88	903.88	900.68	901.51	914.96	914.96	916.52
Conductivity (μmho/cm)	666	730	730	501	475	415	415	430
Dissolved Oxygen (ppm)	2.41	0.35	0.35	1.97	0.04	1.79	1.79	0.05
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	155	132	132	-263	-274	97	97	-108
Temperature (degrees C)	15.3	14.2	14.2	17.2	17.1	18.7	18.7	17.3
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	7.25	6.9	6.9	7.83	7.65	7.85	7.85	7.35
Miscellaneous Analytes								
Dissolved Solids (mg/L)	404	425	431	287	285	250	252	236
Suspended Solids (mg/L)	<	<	<	<	2	<	<	<
Turbidity (NTU)	0.557	0.209	0.211	0.666	0.388	0.106	0.111	0.616
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	130	139	138	49.7	50.7	46.3	47.6	48.7
Magnesium	9.69	9.63	9.76	11.6	11.6	10.8	10.8	10.8
Potassium	2.22	2.16	2.21	3.48	3.62	<	<	2.14
Sodium	4.08	6.87	6.82	35.3	34.7	27.9	28.2	27.6
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	370	342	342	226	227	210	228	206
Chloride	16.4	14.4	13.8	12.6	11.8	1.81	1.84	1.75
Fluoride	<	<	<	<	<	0.171	0.174	0.157
Nitrate as N	0.0452	0.316	0.305	<	<	<	<	<
Sulfate	20.7	29.8	29.6	12.1	11	15.5	15.3	15.6
Charge balance error (%)	-4.9	1.2	1.1	-0.6	-0.1	-1.9	-4.7	0.8
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	<	<	<	<
Barium	0.331	0.29	0.292	0.255	0.263	0.158	0.159	0.158
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	<	<	<
Chromium (PMS)	<	<	<	<	<	<	<	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	<
Lead (PMS)	<	<	<	<	<	<	<	<
Lead	.	.	.	.	.	.	.	.
Lithium	<	<	<	0.0281	0.0276	0.0156	0.0158	0.0154
Manganese	0.111	<	<	0.0598	0.0465	0.0129	0.0126	0.0138
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	<	<	<	<	<	<	<	<
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	<	<	<
Strontium	0.294	0.272	0.274	1.37	1.32	0.624	0.629	0.606
Thallium (PMS)	<	<	<	<	<	<	<	<
Thallium	.	.	.	.	.	.	.	.
Uranium (PMS)	<	<	<	<	<	<	<	<
Uranium (KPA)	.	.	.	.	.	.	.	.
Zinc	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-750		GW-760	GW-762				GW-763	
Functional Area	EXP-J		GRIDG2	GRIDJ3				GRIDJ3	
Date Sampled	05/26/04	11/05/04	04/27/04	02/11/04		08/05/04		05/17/04	11/01/04
Program	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type					Dup		Dup		
Field Measurements									
Time Sampled	10:35	8:35	10:25	9:15	.	14:00	.	10:15	9:20
Measuring Point Elev. (ft)	919.03	919.03	970.02	915.34	.	915.34	.	915.03	915.03
Depth to Water (ft)	12.74	9.02	11.19	13.25	.	13.70	.	9.72	9.41
Groundwater Elevation (ft)	906.29	910.01	958.83	902.09	.	901.64	.	905.31	905.62
Conductivity (μmho/cm)	505	554	1,056	710	.	601	.	878	900
Dissolved Oxygen (ppm)	1.06	0.69	2.02	0.65	.	0.59	.	1.11	1.5
Iron (++)	.	.	.	0.02	.	<	.	.	.
Manganese (++)	.	.	.	<	.	<	.	.	.
Oxidation/Reduction (mV)	-37	-68	60	176	.	75	.	-130	-121
Temperature (degrees C)	15.7	14.8	18.3	17.8	.	21.8	.	18.4	21.9
Turbidity (NTU)	.	.	.	15	.	16	.	.	.
pH	7.08	7.15	7.32	7.17	.	7.05	.	6.85	6.67
Miscellaneous Analytes									
Dissolved Solids (mg/L)	298	309	.	354	372	391	402	430	389
Suspended Solids (mg/L)	<	<	.	<	<	<	<	40	38
Turbidity (NTU)	0.8	4.18	.	.	.	.	.	272	196
Heterotropic Aerobic Bact. (cfu)	.	.	<100	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	100 J	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	100 J	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	100	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	80	93.5	171	74.2	75.2	82.3	85	110	114
Magnesium	11.5	11.7	18.7	23.8	23.8	23.9	25.2	14.8	15.4
Potassium	4.56	4.32	<	3.27	3.32	3.15	3.36	<	<
Sodium	6.86	4.65	27.1	9.66	9.92	9.29	9.62	18.9	18.2
Alkalinity as CO3	<	<	.	<	<	<	<	<	<
Alkalinity as HCO3	267	262	.	263	264	264	269	268	292
Chloride	4.69	4.46	.	36.2	35.8	37.7	39.2	81.2	70.2
Fluoride	<	<	.	<	<	<	<	0.231	0.267
Nitrate as N	0.0294	<	.	<	0.02	<	0.024	<	<
Sulfate	14.7	24.2	.	15	15	16	16.9	0.28	1.46
Charge balance error (%)	-3.8	0.6	.	-3.3	.	-0.9	.	-0.9	-0.7
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	<	<
Antimony (PMS)	<	<	<	.	.	.	.	<	<
Arsenic (PMS)	<	<	<	.	.	.	.	<	<
Barium	0.723	0.749	0.334	0.496	0.497	0.496	0.525	0.0532	0.0608
Beryllium	<	<	<	<	<	<	<	<	<
Boron	0.106	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	.	.	.	.	<	<
Chromium (PMS)	<	<	0.0614	.	.	.	.	<	<
Chromium	.	.	.	<	<	<	<	.	.
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	0.111	0.337	0.484	<	<	<	<	26.1	24.2
Lead (PMS)	<	<	<	.	.	.	.	<	<
Lead	.	.	.	<	<	<	<	.	.
Lithium	0.0108	<	0.0197	0.0144	0.0145	0.0143	0.0151	<	<
Manganese	0.0527	0.0637	0.0886	0.0497	0.05	0.0497	0.0519	0.755	0.786
Mercury (CVAA)	<	<	<	.	.	.	.	<	<
Molybdenum	<	<	<	<	<	.	.	<	<
Nickel (PMS)	<	<	0.248	.	.	.	.	<	<
Nickel	.	.	.	<	<	<	<	.	.
Selenium (PMS)	<	<	<	.	.	.	.	<	<
Strontium	0.696	0.609	0.321	0.701	0.702	0.696	0.736	0.229	0.256
Thallium (PMS)	<	<	<	.	.	.	.	<	<
Thallium	.	.	.	<	<	<	<	.	.
Uranium (PMS)	<	<	<	.	.	.	.	<	<
Uranium (KPA)	.	.	.	<	<	<	<	.	.
Zinc	<	<	<	<	<	<	<	<	<

Sampling Point	GW-765	GW-769			GW-770			GW-775
Functional Area	GRIDE1	GRIDG3			GRIDG3			GRIDH3
Date Sampled	04/27/04	05/17/04		10/28/04	04/26/04		10/28/04	04/28/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup			Dup		
Field Measurements								
Time Sampled	9:30	9:10	9:10	10:30	8:55	8:55	8:50	11:00
Measuring Point Elev. (ft)	1,008.74	944.43	944.43	944.43	944.72	944.72	944.72	931.35
Depth to Water (ft)	19.45	11.77	11.77	10.92	14.12	14.12	13.55	13.94
Groundwater Elevation (ft)	989.29	932.66	932.66	933.51	930.60	930.60	931.17	917.41
Conductivity (μmho/cm)	622	530	530	544	281	281	376	553
Dissolved Oxygen (ppm)	1.06	2.11	2.11	0.05	2.85	2.85	1.9	0.75
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	82	8	8	63	28	28	215	81
Temperature (degrees C)	16.2	19.6	19.6	21.1	16.8	16.8	21.2	18.6
Turbidity (NTU)	.	.	.	.	.	.	.	.
pH	6.92	7.22	7.22	7.05	6.75	6.75	6.63	7.23
Miscellaneous Analytes								
Dissolved Solids (mg/L)	.	305	306	328	182	180	226	.
Suspended Solids (mg/L)	.	<	<	<	<	<	<	.
Turbidity (NTU)	.	0.207	0.221	0.177	2.14	2.09	0.765	.
Heterotropic Aerobic Bact. (cfu)	1,000	.	.	.	500,000	500,000	.	100
Iron Related Bacteria (cfu)	100 J	.	.	.	5,000	5,000	.	5,000
Slime Forming Bacteria (cfu)	100 J	.	.	.	1,000	1,000	.	1,000
Sulfate Reducing Bacteria (cfu)	<100	.	.	.	100	100	.	1,000
Major Ions (mg/L)								
Calcium	116	83.1	82.2	78	52.5	52	62.6	98.3
Magnesium	12.7	10.1	9.89	9.76	4.16	4.13	4.96	7.87
Potassium	<	2.95	2.87	2.59	<	<	2.33	2.65
Sodium	10.8	7.08	6.95	6.96	6.72	6.69	6.94	5.45
Alkalinity as CO3	.	<	<	<	<	<	<	.
Alkalinity as HCO3	.	226	212	219	135	133	157	.
Chloride	.	16.7	16.8	16.8	3.45	3.47	2.93	.
Fluoride	.	<	<	<	0.229	0.226	0.243	.
Nitrate as N	.	0.206	0.203	0.296	0.763	0.741	0.908	.
Sulfate	.	19.1	19.1	20.4	21.4	21.6	20.8	.
Charge balance error (%)	.	-0.4	1.6	-2.2	-0.8	-0.7	2.1	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	<	<	<	<
Barium	0.153	0.395	0.388	0.375	0.0535	0.053	0.0655	0.201
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium (PMS)	<	<	<	<	<	<	<	<
Chromium (PMS)	<	<	<	<	<	<	0.0244	<
Chromium	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	0.221	0.0568
Lead (PMS)	<	<	<	<	<	<	<	<
Lead	.	.	.	.	.	.	.	.
Lithium	0.0169	0.0168	0.0166	0.0129	<	<	<	0.0117
Manganese	0.0209	0.00887	0.00861	0.00745	<	<	0.0069	<
Mercury (CVAA)	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<
Nickel (PMS)	0.0111	<	<	<	0.0164	0.0168	0.03	<
Nickel	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	<	<	<
Strontium	0.174	0.4	0.393	0.378	0.0715	0.0711	0.0847	0.249
Thallium (PMS)	<	<	<	<	<	<	<	<
Thallium	.	.	.	.	.	.	.	.
Uranium (PMS)	<	<	<	<	0.000607	0.000673	0.00152	<
Uranium (KPA)	.	.	.	.	.	.	.	.
Zinc	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-782		GW-783	GW-791		GW-802	GW-816		GW-818
Functional Area	GRIDE3		GRIDE3	GRIDD2		FF	EXP-SR		B9201-2
Date Sampled	05/05/04	10/26/04	04/27/04	05/03/04	10/25/04	05/10/04	05/24/04	11/09/04	02/10/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	GWPP	GWPP	GWPP
Sample Type									
Field Measurements									
Time Sampled	10:20	10:45	11:20	9:15	11:00	15:07	8:25	10:00	9:00
Measuring Point Elev. (ft)	947.73	947.73	948.49	992.13	992.13	941.83	898.42	898.42	927.93
Depth to Water (ft)	9.28	8.45	10.53	23.54	23.85	6.36	12.22	11.96	8.27
Groundwater Elevation (ft)	938.45	939.28	937.96	968.59	968.28	935.47	886.20	886.46	919.66
Conductivity (μmho/cm)	536	559	536	453	478	859	491	556	681
Dissolved Oxygen (ppm)	0.64	0	2.81	0.37	1.84	2.48	1.02	1.44	0.09
Iron (++)	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	110	117	76	-9	170	107	-65	-73	-72
Temperature (degrees C)	16.9	19.2	16.3	16.3	18.8	22.1	16.2	17.2	15.1
Turbidity (NTU)	.	.	.	.	.	38	.	.	.
pH	7.1	6.69	7.03	7.06	7.25	7.19	6.71	6.78	6.71
Miscellaneous Analytes									
Dissolved Solids (mg/L)	294	328	.	272	305	.	245	254	387
Suspended Solids (mg/L)	<	<	.	<	<	.	27	16	9
Turbidity (NTU)	0.377	0.303	.	0.489	0.135	.	157	194	9.95
Heterotropic Aerobic Bact. (cfu)	.	.	500,000	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	100 J	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	50,000	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	100	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	74.7	75	85.6	66.8	69.6	.	53.6	60.1	109
Magnesium	16.5	17.2	5.09	14.1	14.4	.	16.2	18.3	16.7
Potassium	5.7	5.77	<	<	2.04	.	4.13	4.97	3.47
Sodium	8.88	8.71	25.3	7.44	7.49	.	6.3	7.83	4.72
Alkalinity as CO3	<	<	.	<	<	.	<	<	<
Alkalinity as HCO3	242	225	.	218	203	.	194	226	256
Chloride	11.1	11.4	.	8.77	9.75	.	12.4	16.1	6.08
Fluoride	<	<	.	<	<	.	0.135	0.148	0.181
Nitrate as N	0.0361	0.0474	.	<	<	.	<	<	<
Sulfate	15.5	14.9	.	11.8	12.2	.	7.02	10.6	76.3
Charge balance error (%)	1.3	5.1	.	-0.3	4.7	.	0.1	-2.2	1.6
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	.	<	<	0.747
Antimony (PMS)	<	<	<	<	<	.	<	<	<
Arsenic (PMS)	<	<	<	<	<	.	<	<	<
Barium	0.471	0.493	0.114	0.255	0.255	.	0.122	0.103	0.181
Beryllium	<	<	<	<	<	.	<	<	<
Boron	0.136	0.137	<	<	<	.	<	<	<
Cadmium (PMS)	<	<	<	<	<	.	<	<	<
Chromium (PMS)	<	<	0.19	<	<	.	<	<	<
Chromium	.	.	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	.	<	<	<
Copper	<	<	<	<	<	.	<	<	<
Iron	<	<	1.44	0.0841	<	.	17.1	17.8	9.85
Lead (PMS)	<	<	<	<	<	.	<	<	0.000519
Lead	.	.	.	.	.	.	.	.	.
Lithium	0.0223	0.02	<	0.0142	0.0136	.	<	<	<
Manganese	<	0.0519	0.0224	0.0155	0.0143	.	2.6	3.87	1.26
Mercury (CVAA)	<	<	<	<	<	.	<	<	<
Molybdenum	<	<	<	<	<	.	<	<	<
Nickel (PMS)	<	<	0.402	<	<	.	<	<	0.00504
Nickel	.	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	.	<	<	<
Strontium	1.27	1.3	0.172	0.431	0.421	.	0.0806	0.0835	0.251
Thallium (PMS)	<	<	<	<	<	.	<	<	<
Thallium	.	.	.	.	.	.	.	.	.
Uranium (PMS)	0.000699	0.000811	0.00104	<	<	.	<	<	0.000877
Uranium (KPA)	.	.	.	.	.	.	.	.	.
Zinc	<	<	<	<	<	.	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-832		NPR07.0SW		NPR12.0SW		NPR23.0SW		
Functional Area	NHP		EXP-SW		EXP-SW		EXP-SW		
Date Sampled	02/18/04	08/16/04	04/13/04	12/01/04	04/13/04	12/01/04	04/13/04		12/01/04
Program	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type								Dup	
Field Measurements									
Time Sampled	14:50	14:20	9:45	10:35	9:20	10:20	9:00	9:00	10:00
Measuring Point Elev. (ft)	906.18	906.18	.	.	.	.	.	.	.
Depth to Water (ft)	7.13	7.00							
Groundwater Elevation (ft)	899.05	899.18	.	.	.	.	.	.	.
Conductivity (µmho/cm)	587	352	73	53	58	55	51	51	69
Dissolved Oxygen (ppm)	5.41	6.03	4.97	4.57	4.91	4.68	4.38	4.38	4.97
Iron (++)	0.01	<	.	.	.	.	.	.	.
Manganese (++)	<	<	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	136	105	147	179	158	210	141	141	205
Temperature (degrees C)	12.4	21.2	11	11.8	11.2	12.9	11	11	11.4
Turbidity (NTU)	18	25	.	.	.	.	.	.	.
pH	7.28	7.49	6.39	5.82	6.49	5.79	6.59	6.59	6.6
Miscellaneous Analytes									
Dissolved Solids (mg/L)	243	280	46	42	50	42	47	46	41
Suspended Solids (mg/L)	<	7	17	<	18	8	37	35	12
Turbidity (NTU)	.	.	10.4	4.18	8.25	4.16	16.1	16.3	10
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	66.3	49.6	3.47	2.72	3.89	3.06	3.08	3.17	2.85
Magnesium	11.3	11.8	2.23	1.86	2.12	1.69	1.77	1.83	1.65
Potassium	2.22	1.89	2.75	2.63	2.57	2.59	2.24	2.4	2.47
Sodium	7.77	8.31	1.2	1.08	1.44	1.2	0.984	1.02	0.972
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	210	136	9.4	14.6	18.3	15.3	9.56	10.9	16.6
Chloride	9.7	10.8	0.96	1.13	0.92	1.09	0.76	0.76	0.9
Fluoride	0.14	0.31	<	<	<	<	<	<	<
Nitrate as N	1.5	1.4	<	<	<	<	<	<	<
Sulfate	20.9	29.9	10.9	11	9.62	10	8.28	8.28	8.48
Charge balance error (%)	-4.0	1.2	4.1	-15.5	-8.7	-13.9	1.9	0.4	-16.4
Trace Metals (mg/L)									
Aluminum	<	<	1.04	0.407	0.905	0.343	1.01	1.02	0.619
Antimony (PMS)	.	.	<	<	<	<	<	<	<
Arsenic (PMS)	.	.	<	<	<	<	<	<	<
Barium	0.0546	0.0472	0.0414	0.0353	0.0387	0.0327	0.0384	0.0394	0.0335
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium (PMS)	.	.	<	<	<	<	<	<	<
Chromium (PMS)	.	.	<	<	<	<	<	<	<
Chromium	<	<	.	.	.	.	.	.	.
Cobalt	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	0.139	0.164	0.795	0.244	0.709	0.216	0.772	0.717	0.49
Lead (PMS)	.	.	0.000561	<	0.000583	<	0.000989	0.000948	<
Lead	<	<	.	.	.	.	.	.	.
Lithium	0.0208	0.0354	<	<	<	<	<	<	<
Manganese	<	0.017	0.0576	0.0187	0.0316	0.0128	0.0493	0.0477	0.0259
Mercury (CVAA)	.	.	<	<	<	<	<	<	<
Molybdenum	<	.	<	<	<	<	<	<	<
Nickel (PMS)	.	.	<	<	<	<	<	<	<
Nickel	<	<	.	.	.	.	.	.	.
Selenium (PMS)	.	.	<	<	<	<	<	<	<
Strontium	0.131	0.109	0.0212	0.0174	0.0189	0.0163	0.0142	0.0149	0.0135
Thallium (PMS)	.	.	<	<	<	<	<	<	<
Thallium	<	<	.	.	.	.	.	.	.
Uranium (PMS)	.	.	<	<	<	<	<	<	<
Uranium (KPA)	0.00944	0.00624	.	.	.	.	.	.	.
Zinc	<	<	<	<	<	<	<	<	<

Sampling Point	OF 51		OF 200				SPR14.0SP	SR7.1SP	
Functional Area	EXP-SW		EXP-SW				EXP-SW	EXP-SW	
Date Sampled	03/15/04	08/18/04	02/12/04	03/15/04	07/27/04	08/18/04	02/19/04	02/02/04	07/19/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	BJC	BJC
Sample Type									
Field Measurements									
Time Sampled	14:10	13:50	13:45	13:40	14:00	14:25	9:10	14:15	14:15
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.
Depth to Water (ft)							.		
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	354	324	307	316	361	318	94	367	351
Dissolved Oxygen (ppm)	8.57	8.37	8.76	9.42	7.29	6.95	4.12	6.53	9.67
Iron (++)	.	.	.	.	.	.	.	0.01	0.01
Manganese (++)	.	.	.	.	.	.	.	0.2	0.3
Oxidation/Reduction (mV)	84	83	97	111	106	70	116	173	107
Temperature (degrees C)	14.6	21.9	16.1	19.1	26.1	27.1	8.6	9.4	21.1
Turbidity (NTU)	2	10	2.1	1	3	8	.	1.7	8
pH	7.95	7.86	8.04	8.08	7.99	8.04	6.24	7.71	7.44
Miscellaneous Analytes									
Dissolved Solids (mg/L)	243	269	225	171	283	256	49	259	238
Suspended Solids (mg/L)	<	<	5.8	<	<	<	<	6.3	18
Turbidity (NTU)	.	.	.	.	.	.	8.02	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	50.5	48.8	44.1	46.8	59.3	47.5	5.46	.	.
Magnesium	21.6	16.7	10.6	10.6	13.1	11.5	2.26	.	.
Potassium	1.72	1.85	1.75	3.04	3.04	2.65	2.4	.	.
Sodium	6.59	7.62	9.82	9.51	10.1	9.21	1.91	.	.
Alkalinity as CO3	<	<	.	.	.	.	<	.	.
Alkalinity as HCO3	199	156	.	.	.	.	25.9	.	.
Chloride	8.9	9.2	.	.	.	.	1.06	.	.
Fluoride	0.13	0.28	.	.	.	.	<	.	.
Nitrate as N	3.5	3.6	.	.	.	.	0.0316	.	.
Sulfate	17.7	28.5	.	.	.	.	4.87	.	.
Charge balance error (%)	-2.4	-0.7	.	.	.	.	-3.8	.	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	0.324	.	.
Antimony (PMS)	.	.	.	.	.	.	<	.	.
Arsenic (PMS)	.	.	.	.	.	.	<	.	.
Barium	0.0667	0.061	0.0475	0.0472	0.0615	0.0526	0.0535	.	.
Beryllium	<	<	<	<	<	<	<	.	.
Boron	<	<	0.357	0.406	0.463	<	<	.	.
Cadmium (PMS)	.	.	.	.	.	.	<	.	.
Chromium (PMS)	.	.	.	.	.	.	<	.	.
Chromium	<	<	<	<	<	<	.	.	.
Cobalt	<	<	<	<	<	<	<	.	.
Copper	0.0219	<	<	<	<	<	<	.	.
Iron	0.125	0.063	0.57	0.126	0.139	0.184	4.14	.	.
Lead (PMS)	.	.	.	.	.	.	<	.	.
Lead	<	<	<	<	<	<	.	.	.
Lithium	0.0108	0.0207	0.189	0.135	0.188	0.0214	<	.	.
Manganese	0.0179	0.0132	0.0684	0.0504	0.0456	0.0422	0.629	.	.
Mercury (CVAA)	.	.	.	.	.	.	<	.	.
Molybdenum	<	.	<	<	.	.	<	.	.
Nickel (PMS)	.	.	.	.	.	.	<	.	.
Nickel	<	<	<	<	<	<	.	.	.
Selenium (PMS)	.	.	.	.	.	.	<	.	.
Strontium	0.0865	0.115	0.118	0.127	0.154	0.131	0.0318	.	.
Thallium (PMS)	.	.	.	.	.	.	<	.	.
Thallium	<	<	<	<	<	<	.	.	.
Uranium (PMS)	.	.	.	.	.	.	<	.	.
Uranium (KPA)	0.00883	0.00714	0.055	0.0354	0.0266	0.0131	.	.	.
Zinc	<	<	<	<	<	0.071	<	.	.

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	SR7.8SP		STATION 17			
Functional Area	EXP-SW		EXP-SW			
Date Sampled	02/02/04	07/19/04	02/12/04	03/15/04	07/27/04	08/18/04
Program	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type						
Field Measurements						
Time Sampled	14:30	14:35	12:50	14:30	13:30	13:30
Measuring Point Elev. (ft)	.	.	.	.	.	.
Depth to Water (ft)						
Groundwater Elevation (ft)	.	.	.	.	.	.
Conductivity (μmho/cm)	305	434	296	272	315	274
Dissolved Oxygen (ppm)	7.07	11.39	8.31	12.66	8.33	7.6
Iron (++)	0.02	0.03	.	.	.	.
Manganese (++)	0.2	0.4	.	.	.	.
Oxidation/Reduction (mV)	194	75	129	79	169	92
Temperature (degrees C)	11.2	18.6	11.2	13.8	22.7	24.3
Turbidity (NTU)	1.4	12	4	3	3.8	14
pH	7.97	7.59	8.4	8.24	8.3	7.85
Miscellaneous Analytes						
Dissolved Solids (mg/L)	193	235	156	187	245	234
Suspended Solids (mg/L)	<	<	<	<	<	6.6
Turbidity (NTU)	.	.	.	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.	.	.
Major Ions (mg/L)						
Calcium	.	.	38.1	41.8	44.7	38.6
Magnesium	.	.	11.1	11.3	11.1	10.6
Potassium	.	.	1.68	2.13	1.97	2.25
Sodium	.	.	8.77	8.43	9.22	8.42
Alkalinity as CO3	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.
Chloride	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.
Trace Metals (mg/L)						
Aluminum	.	.	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.
Barium	.	.	0.0415	0.041	0.0444	0.0394
Beryllium	.	.	<	<	<	<
Boron	.	.	<	0.115	<	<
Cadmium (PMS)	.	.	.	.	.	.
Chromium (PMS)	.	.	.	.	.	.
Chromium	.	.	<	<	<	<
Cobalt	.	.	<	<	<	<
Copper	.	.	<	<	<	<
Iron	.	.	0.207	0.143	0.121	0.172
Lead (PMS)	.	.	.	.	.	.
Lead	.	.	<	<	<	<
Lithium	.	.	0.0422	0.0382	0.0452	0.0117
Manganese	.	.	0.0433	0.0301	0.0481	0.0478
Mercury (CVAA)	.	.	.	.	.	.
Molybdenum	.	.	<	<	.	.
Nickel (PMS)	.	.	.	.	.	.
Nickel	.	.	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.
Strontium	.	.	0.105	0.109	0.114	0.106
Thallium (PMS)	.	.	.	.	.	.
Thallium	.	.	<	<	<	<
Uranium (PMS)	.	.	.	.	.	.
Uranium (KPA)	.	.	0.0155	0.0118	0.00764	<
Zinc	.	.	<	<	<	<

APPENDIX E.1: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	STATION 8			
Functional Area	EXP-SW			
Date Sampled	02/12/04	03/15/04	07/27/04	08/18/04
Program	BJC	BJC	BJC	BJC
Sample Type				
Field Measurements				
Time Sampled	13:15	13:55	13:50	14:10
Measuring Point Elev. (ft)	.	.	.	.
Depth to Water (ft)				
Groundwater Elevation (ft)	.	.	.	.
Conductivity (μmho/cm)	257	257	288	258
Dissolved Oxygen (ppm)	8.01	12.44	8.57	8.71
Iron (++)	.	.	.	.
Manganese (++)	.	.	.	.
Oxidation/Reduction (mV)	103	78	110	69
Temperature (degrees C)	11.1	14.1	22.2	21.6
Turbidity (NTU)	3.8	4	11	15
pH	8.18	8.19	8.14	8.08
Miscellaneous Analytes				
Dissolved Solids (mg/L)	182	161	234	198
Suspended Solids (mg/L)	<	<	<	6.5
Turbidity (NTU)	.	.	.	.
Heterotropic Aerobic Bact. (cfu)	.	.	.	.
Iron Related Bacteria (cfu)	.	.	.	.
Slime Forming Bacteria (cfu)	.	.	.	.
Sulfate Reducing Bacteria (cfu)	.	.	.	.
Major Ions (mg/L)				
Calcium	37.5	40.6	43.7	35.8
Magnesium	10.6	10.5	11.3	10.9
Potassium	1.82	2.02	2.11	2.06
Sodium	7.9	8	8.48	7.59
Alkalinity as CO3	.	.	.	.
Alkalinity as HCO3	.	.	.	.
Chloride	.	.	.	.
Fluoride	.	.	.	.
Nitrate as N	.	.	.	.
Sulfate	.	.	.	.
Charge balance error (%)	.	.	.	.
Trace Metals (mg/L)				
Aluminum	<	<	<	<
Antimony (PMS)	.	.	.	.
Arsenic (PMS)	.	.	.	.
Barium	0.0383	0.0376	0.0456	0.0297
Beryllium	<	<	<	<
Boron	0.116	0.131	0.129	<
Cadmium (PMS)	.	.	.	.
Chromium (PMS)	.	.	.	.
Chromium	<	<	<	<
Cobalt	<	<	<	<
Copper	<	<	<	<
Iron	0.197	0.18	0.179	0.243
Lead (PMS)	.	.	.	.
Lead	<	<	0.0053	<
Lithium	0.0555	0.0431	0.0544	0.0104
Manganese	0.0525	0.0468	0.112	0.0786
Mercury (CVAA)	.	.	.	.
Molybdenum	<	<	.	.
Nickel (PMS)	.	.	.	.
Nickel	<	<	<	<
Selenium (PMS)	.	.	.	.
Strontium	0.11	0.112	0.12	0.106
Thallium (PMS)	.	.	.	.
Thallium	<	<	<	<
Uranium (PMS)	.	.	.	.
Uranium (KPA)	0.017	0.0122	0.00731	<
Zinc	<	<	<	<

APPENDIX E.2

VOLATILE ORGANIC COMPOUNDS

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	55-1A		55-2B		55-6A		56-2A	
Functional Area	GRIDB2		GRIDB3		B9103		GRIDC3	
Date Sampled	06/08/04	11/16/04	06/10/04	11/29/04	06/07/04	11/16/04	06/09/04	11/18/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type								
Chloroethenes (μg/L)								
Tetrachloroethene	<	<	670	630	<	<	10	13
Trichloroethene	<	<	250	230	<	<	2 J	3 J
cis-1,2-Dichloroethene	<	<	930	850	<	<	1 J	3 J
trans-1,2-Dichloroethene	<	<	12	12	<	<	<	<
1,1-Dichloroethene	<	<	26	26	<	<	<	<
Vinyl chloride	<	<	21	21	<	<	<	<
Chloroethanes (μg/L)								
1,1,1-Trichloroethane	<	<	4 J	4 J	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	19	18	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)								
Benzene	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	500	470	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	10	14	<	<	<	<
Miscellaneous (μg/L)								
1,2-Dichloropropane	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)								
Ethane	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	56-2B			9201-1K-22SU		9201-3C-4SP		GHK2.51ESW	
Functional Area	GRIDC3			EXP-SW		EXP-SW		EXP-SW	
Date Sampled	06/09/04	11/18/04		06/22/04	10/27/04	05/18/04	10/27/04	04/13/04	12/01/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup						
Chloroethenes (μg/L)									
Tetrachloroethene	770	1,400	1,400	7	<	<	11	<	<
Trichloroethene	61	85	84	1 J	<	<	3 J	<	<
cis-1,2-Dichloroethene	98	140	140	7	<	<	10	<	<
trans-1,2-Dichloroethene	2 J	2 J	2 J	<	<	<	<	<	<
1,1-Dichloroethene	2 J	2 J	2 J	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	21	3 J	9	42	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	3 J	<	2 J	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (μg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	2 J	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GHK2.51WSW			GW-108		GW-151		GW-153		
Functional Area	**EXP-SW**			**S3**		**NHP**		**NHP**		
Date Sampled	**04/13/04**	**12/01/04**		**01/07/04**	**07/08/04**	**02/12/04**	**08/10/04**	**05/20/04**	**11/01/04**	
Program	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**	**BJC**	**GWPP**	**GWPP**	**GWPP**
Sample Type			**Dup**							**Dup**
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	3 J	3 J	740	740	3 J	2 J	2 J
Trichloroethene	<	<	<	4 J	3 J	120	140	<	<	2 J
cis-1,2-Dichloroethene	<	<	<	<	<	58	62	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	2 J	2 J	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	1,600	1,400	83	46	46
Chloroform	<	<	<	34	31	80	77	5 J	5 J	5 J
Methylene chloride	<	<	<	<	51	<	<	<	<	<
Chloromethane	<	<	<	21	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	1 J	1 J	<	<	<	<	2 J
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	.	.	<	<	<
Trichlorofluoromethane	<	<	<	.	.	.	.	<	<	<
Dichlorodifluoromethane	<	<	<	.	.	.	.	<	<	<
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	10	18	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	3 J	5	<	<	<	<	<
Bromomethane	<	<	<	24	8 J	<	<	<	<	<
Carbon disulfide	<	<	<	1 J	<	<	5	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	.	.	.	.	.	<	<	.	.	.
Ethylene	.	.	.	.	.	<	<	.	.	.
Methane	.	.	.	.	.	52	65	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-154		GW-169				GW-170			
Functional Area	NHP		EXP-UV				EXP-UV			
Date Sampled	02/18/04	08/11/04	02/09/04	04/20/04	08/09/04	10/25/04	02/09/04		04/20/04	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup		Dup
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	1 J	1 J	2 J	2 J	2 J	2 J	2 J	2 J
Trichloroethene	<	<	<	<	<	<	2 J	2 J	2 J	2 J
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	4 J	4 J	4 J	3 J
Chloroform	<	<	<	<	<	<	3 J	3 J	3 J	3 J
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	3 J	3 J	3 J	3 J
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	2 J	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	<	<	.	.	.	.	.	.	.	.
Ethylene	<	<	.	.	.	.	.	.	.	.
Methane	9	16	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-170				GW-171		GW-172		GW-193	
Functional Area	EXP-UV				EXP-UV		EXP-UV		T2331	
Date Sampled	08/09/04		10/25/04		02/10/04	08/09/04	02/09/04	08/09/04	01/08/04	07/13/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup						
Chloroethenes (μg/L)										
Tetrachloroethene	2 J	2 J	2 J	2 J	<	<	<	<	<	<
Trichloroethene	2 J	2 J	2 J	2 J	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	4 J	3 J	5 J	5 J	<	<	<	<	<	<
Chloroform	3 J	3 J	3 J	3 J	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	3 J	4 J	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	2 J	2 J	2 J	2 J	<	<	<	<	<	9
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	<	<
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	3 J	4 J	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	3 J	<	1 J	<	<	<	<	<	<	3 J
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-204			GW-207		GW-208		GW-219	
Functional Area	T0134			EXP-SR		EXP-SR		UOV	
Date Sampled	05/03/04	10/25/04		05/25/04	11/09/04	05/25/04	11/09/04	04/26/04	11/11/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup						
Chloroethenes (μg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (μg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

Sampling Point	GW-220		GW-222			GW-223		GW-230	
Functional Area	NHP		NHP			NHP		EXP-UV	
Date Sampled	05/27/04	11/15/04	06/10/04		11/30/04	02/18/04	08/10/04	02/10/04	08/09/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC
Sample Type				Dup					
Chloroethenes (µg/L)									
Tetrachloroethene	320	480	2 J	3 J	5	13	18	<	<
Trichloroethene	100	100	<	<	2 J	6	9	<	<
cis-1,2-Dichloroethene	39	43	2 J	2 J	5	41	39	6	5 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	1 J	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	2	<	2	2	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	920	1,100	<	<	<	<	<	<	<
Chloroform	75	72	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	.	.	.	.
Trichlorofluoromethane	<	1 J	<	<	<	.	.	.	.
Dichlorodifluoromethane	<	<	<	<	<	.	.	.	.
Miscellaneous (µg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	1 J	1 J
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	<	<	.	.
Ethylene	.	.	.	.	.	<	<	.	.
Methane	.	.	.	.	.	140	65	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-232				GW-251			GW-281	GW-380	
Functional Area	**EXP-UV**				**S2**			**FF**	**NHP**	
Date Sampled	**02/09/04**	**04/20/04**	**08/09/04**	**10/25/04**	**04/29/04**		**10/21/04**	**05/10/04**	**02/18/04**	**08/11/04**
Program	**BJC**	**BJC**	**BJC**	**BJC**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**
Sample Type						**Dup**				
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	280	280	140	<	<	<
Trichloroethene	<	<	<	<	120	130	49	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	9	10	4 J	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	4 J	4 J	<	<	<	<
Chloroform	<	<	<	<	11	11	9	<	<	3 J
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	<	<	<	.	.	.
Trichlorofluoromethane	.	.	.	.	<	<	<	.	.	.
Dichlorodifluoromethane	.	.	.	.	<	<	<	.	.	.
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	2 J	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	.	.	.	.	.	.	.	.	<	<
Ethylene	.	.	.	.	.	.	.	.	<	<
Methane	.	.	.	.	.	.	.	.	<	<

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-381		GW-382		GW-383		GW-605			
Functional Area	**NHP**		**NHP**		**NHP**		**EXP-I**			
Date Sampled	**05/19/04**	**11/02/04**	**02/11/04**	**08/11/04**	**05/20/04**	**11/03/04**	**01/07/04**		**07/12/04**	
Program	**GWPP**	**GWPP**	**BJC**	**BJC**	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**	**BJC**
Sample Type								**Dup**		**Dup**
Chloroethenes (μg/L)										
Tetrachloroethene	6	4 J	26	11	380	440	45	43	15	26
Trichloroethene	1 J	<	4 J	2 J	160	180	44	45	21	28
cis-1,2-Dichloroethene	3 J	8	8	7	140	190	66	64	41	46
trans-1,2-Dichloroethene	<	<	<	<	1 J	2 J	<	<	<	<
1,1-Dichloroethene	<	<	<	<	2 J	4 J	<	<	<	<
Vinyl chloride	<	1 J	<	<	2 J	3	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	260	52	930	620	<	<	24	23	11	15
Chloroform	780	87	200	170	<	<	11	10	5	6
Methylene chloride	29	4 J	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	.	.	<	<	<	<	<	<
Trichlorofluoromethane	<	<	.	.	<	<	.	.	.	.
Dichlorodifluoromethane	<	<	.	.	<	<	.	.	.	.
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	3 J	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	.	.	<	<	.	.	.	.	.	.
Ethylene	.	.	<	<	.	.	.	.	.	.
Methane	.	.	1,100	600	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-606		GW-620		GW-633		GW-658	GW-691	
Functional Area	EXP-I		FTF		RG		FF	CPT	
Date Sampled	01/07/04	07/12/04	04/29/04	10/21/04	05/05/04	10/26/04	05/10/04	06/09/04	11/17/04
Program	BJC	BJC	GWPP	GWPP	GWPP	GWPP	BJC	GWPP	GWPP
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	6	5	2 J	6	240	200 J	<	1,300 Q	980
Trichloroethene	<	<	<	2 J	8	4 J	<	10	8
cis-1,2-Dichloroethene	<	<	<	2 J	14	14	<	9	7
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	3 J	2 J	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	690	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	69	72	<	<	<	<	<	<	<
Chloroform	130	120	<	<	18	13	<	<	<
Methylene chloride	<	<	<	<	28	17	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	1,300	870	7,900	<	<
Ethylbenzene	<	<	<	<	<	1 J	1,100	<	<
Toluene	<	<	<	<	3 J	<	4,200	<	<
Total Xylene	<	<	<	<	140	48	8,300	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	.	<	<
Trichlorofluoromethane	.	.	<	<	<	<	.	<	<
Dichlorodifluoromethane	.	.	<	<	<	<	.	<	<
Miscellaneous (µg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	15	<	<
2-Butanone	<	<	<	<	<	<	26	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	150	<	<
Acetone	<	<	<	<	<	<	51	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	3 J	3 J	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-692		GW-698				GW-722-06			
Functional Area	CPT		B8110				EXP-J			
Date Sampled	06/08/04	11/17/04	05/18/04	05/19/04	11/02/04	11/03/04	02/22/04	06/14/04	08/07/04	10/25/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	GWPP	BJC
Sample Type				Conv		Conv				
Chloroethenes (µg/L)										
Tetrachloroethene	4 J	8	120	120	120	150	<	<	<	<
Trichloroethene	1 J	2 J	300	130	440	200	<	<	<	<
cis-1,2-Dichloroethene	5	12	14	33	38	64	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	7	<	6	<	<	<	<	<
Chloroform	12	8	13	3 J	14	5	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	2 J	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	7	40	12	29	<	.	<	.
Trichlorofluoromethane	<	<	<	<	<	<	<	.	<	.
Dichlorodifluoromethane	<	<	<	<	<	<	<	.	<	.
Miscellaneous (µg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-722-10				GW-722-14				GW-722-17	
Functional Area	EXP-J				EXP-J				EXP-J	
Date Sampled	02/22/04	06/17/04	08/07/04	10/27/04	02/23/04	06/24/04	08/07/04	10/28/04	02/23/04	06/28/04
Program	GWPP	BJC	GWPP	BJC	GWPP	BJC	GWPP	BJC	GWPP	BJC
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	1 J	<	2 J	4 J	6	5	4 J	6	6
Trichloroethene	<	<	<	<	1 J	2 J	<	2 J	1 J	1 J
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	49	49	54	22	77	26
Chloroform	<	<	<	<	5	6	5	5	12	10
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	2 J	<	2 J	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	1 J	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	<	.	<	.	<	.	<	.
Trichlorofluoromethane	<	.	<	.	<	.	<	.	<	.
Dichlorodifluoromethane	<	.	<	.	<	.	<	.	<	.
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	3 J	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-722-17		GW-722-20				GW-722-22		
Functional Area	EXP-J		EXP-J				EXP-J		
Date Sampled	08/07/04	10/28/04	02/23/04	06/24/04	08/07/04	10/27/04	02/23/04		06/24/04
Program	GWPP	BJC	GWPP	BJC	GWPP	BJC	GWPP	GWPP	BJC
Sample Type								Dup	
Chloroethenes (µg/L)									
Tetrachloroethene	9	5	14	20	17	12	4 J	9	8
Trichloroethene	2 J	2 J	2 J	4 J	3 J	3 J	<	2 J	3 J
cis-1,2-Dichloroethene	<	<	<	2 J	1 J	2 J	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	92	22	120	88	160	48	22	61	38
Chloroform	13	9	19	21	18	18	3 J	4 J	5
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	<	.	<	.	<	<	.
Trichlorofluoromethane	<	.	<	.	<	.	<	<	.
Dichlorodifluoromethane	<	.	<	.	<	.	<	<	.
Miscellaneous (µg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	3 J	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-722-22			GW-722-26					
Functional Area	EXP-J			EXP-J					
Date Sampled	08/07/04		10/27/04	02/22/04	06/16/04		08/07/04	10/26/04	
Program	GWPP	GWPP	BJC	GWPP	BJC	BJC	GWPP	BJC	BJC
Sample Type		Dup				Dup			Dup
Chloroethenes (µg/L)									
Tetrachloroethene	6	9	12	2 J	<	<	<	<	<
Trichloroethene	1 J	1 J	3 J	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	21	47	27	<	<	<	<	<	<
Chloroform	3 J	4 J	4 J	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	1 J	<	<	1 J	<
Ethylbenzene	<	<	<	3 J	4 J	3 J	2 J	4 J	4 J
Toluene	<	<	<	2 J	4 J	3 J	2 J	4 J	3 J
Total Xylene	<	<	<	<	2 J	1 J	<	2 J	2 J
Styrene	<	<	<	5 J	2 J	2 J	3 J	2 J	2 J
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	.	<	.	.	<	.	.
Trichlorofluoromethane	<	<	.	<	.	.	<	.	.
Dichlorodifluoromethane	<	<	.	<	.	.	<	.	.
Miscellaneous (µg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-722-30				GW-722-32				GW-722-33	
Functional Area	EXP-J				EXP-J				EXP-J	
Date Sampled	02/22/04	06/14/04	08/07/04	10/25/04	02/22/04	06/16/04	08/07/04	10/26/04	02/22/04	06/17/04
Program	GWPP	BJC	GWPP	BJC	GWPP	BJC	GWPP	BJC	GWPP	BJC
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	<	.	<	.	<	.	<	.
Trichlorofluoromethane	<	.	<	.	<	.	<	.	<	.
Dichlorodifluoromethane	<	.	<	.	<	.	<	.	<	.
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	3 J	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-722-33		GW-733		GW-735			GW-744	
Functional Area	EXP-J		EXP-J		EXP-J			GRIDK1	
Date Sampled	08/07/04	10/27/04	01/08/04	07/08/04	05/27/04	11/15/04		05/24/04	11/10/04
Program	GWPP	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type							Dup		
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	8	7	<	<	<	<	<
Chloroform	<	<	1 J	1 J	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	<	<	<	<	<	<	<
Trichlorofluoromethane	<	.	.	.	<	<	<	<	<
Dichlorodifluoromethane	<	.	.	.	<	<	<	<	<
Miscellaneous (µg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-747			GW-750		GW-762			
Functional Area	GRIDK2			EXP-J		GRIDJ3			
Date Sampled	05/26/04		11/10/04	05/26/04	11/05/04	02/11/04		08/05/04	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC
Sample Type		Dup					Dup		Dup
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	3,100	2,200	2,400	2,300
Trichloroethene	<	<	<	<	<	130	130	130	150
cis-1,2-Dichloroethene	<	<	<	<	<	66	67	55	59
trans-1,2-Dichloroethene	<	<	<	<	<	4 J	3 J	3 J	3 J
1,1-Dichloroethene	<	<	<	<	<	69	70	51	56
Vinyl chloride	<	<	<	<	<	7	7	5	5
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	5	5	4 J	5 J
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	18	19	13	15
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	.	.	.	.
Dichlorodifluoromethane	<	<	<	<	<	.	.	.	.
Miscellaneous (µg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	<	<	<	<
Ethylene	.	.	.	.	.	<	<	<	<
Methane	.	.	.	.	.	18	17	21	17

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-763		GW-769			GW-770		
Functional Area	GRIDJ3		GRIDG3			GRIDG3		
Date Sampled	05/17/04	11/01/04	05/17/04		10/28/04	04/26/04		10/28/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type				Dup			Dup	
Chloroethenes (µg/L)								
Tetrachloroethene	1 J	30	11	10	16	<	<	<
Trichloroethene	<	8	2 J	2 J	3 J	<	<	<
cis-1,2-Dichloroethene	7	140	2 J	2 J	3 J	<	<	<
trans-1,2-Dichloroethene	<	2 J	<	<	<	<	<	<
1,1-Dichloroethene	<	6	2 J	<	2 J	<	<	<
Vinyl chloride	<	9	<	<	<	<	<	<
Chloroethanes (µg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	2 J	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)								
Carbon tetrachloride	<	<	60	66	100	14	16	12
Chloroform	<	<	3 J	3 J	4 J	3 J	1 J	2 J
Methylene chloride	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)								
Benzene	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	<	9	2 J	2 J	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)								
1,2-Dichloropropane	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<
Acetone	<	14	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)								
Ethane	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-782		GW-791		GW-802	GW-816		GW-818	GW-832	
Functional Area	**GRIDE3**		**GRIDD2**		**FF**	**EXP-SR**		**B9201-2**	**NHP**	
Date Sampled	**05/05/04**	**10/26/04**	**05/03/04**	**10/25/04**	**05/10/04**	**05/24/04**	**11/09/04**	**02/10/04**	**02/18/04**	**08/16/04**
Program	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	160	130	400	500	<	<	<	<	6	5 J
Trichloroethene	49	40	<	4 J	<	<	<	<	<	<
cis-1,2-Dichloroethene	13	17	<	1 J	<	<	<	<	<	<
trans-1,2-Dichloroethene	1 J	1 J	<	<	<	<	<	<	<	<
1,1-Dichloroethene	59	56	<	<	<	<	<	<	<	<
Vinyl chloride	<	3	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	9	10	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	170	150	<	<	<	<	<	<	<	<
Chloroethane	19	45	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	10	7
Chloroform	<	<	<	<	<	<	<	<	3 J	4 J
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	<	<	<	.	.
Trichlorofluoromethane	<	<	<	<	.	<	<	<	.	.
Dichlorodifluoromethane	<	<	<	<	.	<	<	<	.	.
Miscellaneous (μg/L)										
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)										
Ethane	.	.	.	.	.	.	.	.	<	<
Ethylene	.	.	.	.	.	.	.	.	<	<
Methane	.	.	.	.	.	.	.	.	<	<

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	NPR07.0SW		NPR12.0SW		NPR23.0SW			OF 51	
Functional Area	EXP-SW		EXP-SW		EXP-SW			EXP-SW	
Date Sampled	04/13/04	12/01/04	04/13/04	12/01/04	04/13/04		12/01/04	03/15/04	08/18/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC
Sample Type						Dup			
Chloroethenes (μg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	10	13
Trichloroethene	<	<	<	<	<	<	<	4 J	5
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	4 J	6
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	1 J	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (μg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	3 J	6
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (μg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	.	.
Dichlorodifluoromethane	<	<	<	<	<	<	<	.	.
Miscellaneous (μg/L)									
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	1 J
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Natural Attenuation (μg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	SPR14.0SP	SR7.1SP		SR7.8SP	
Functional Area	EXP-SW	EXP-SW		EXP-SW	
Date Sampled	02/19/04	02/02/04	07/19/04	02/02/04	07/19/04
Program	GWPP	BJC	BJC	BJC	BJC
Sample Type					
Chloroethenes (µg/L)					
Tetrachloroethene	<	<	<	<	<
Trichloroethene	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<
Vinyl chloride	<	<	<	<	<
Chloroethanes (µg/L)					
1,1,1-Trichloroethane	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<
Chloroethane	<	<	<	<	<
Chloromethanes (µg/L)					
Carbon tetrachloride	<	<	<	<	<
Chloroform	<	<	<	<	<
Methylene chloride	<	<	<	<	<
Chloromethane	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)					
Benzene	<	<	<	<	<
Ethylbenzene	<	<	<	<	<
Toluene	<	<	<	<	<
Total Xylene	<	<	<	<	<
Styrene	<	<	<	<	<
Chlorofluorocarbons (µg/L)					
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	.	.	.
Trichlorofluoromethane	<	.	.	.	.
Dichlorodifluoromethane	<	.	.	.	.
Miscellaneous (µg/L)					
1,2-Dichloropropane	<	<	<	<	<
2-Butanone	<	<	<	<	<
4-Methyl-2-pentanone	<	<	<	<	<
Acetone	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<
Bromoform	<	<	<	<	<
Bromomethane	<	<	<	<	<
Carbon disulfide	<	<	<	<	<
Chlorobenzene	<	<	<	<	<
Natural Attenuation (µg/L)					
Ethane	.	.	.	.	.
Ethylene	.	.	.	.	.
Methane	.	.	.	.	.

APPENDIX E.3

RADIOLOGICAL ANALYTES

APPENDIX E.3: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Activity	Error	MDA	Activity	Error	MDA
55-1A	GRIDB2	06/08/04	GWPP	<MDA	.	15	19	12	19
55-1A	GRIDB2	11/16/04	GWPP	<MDA	.	7.4	<MDA	.	14
55-2B	GRIDB3	06/10/04	GWPP	<MDA	.	34	<MDA	.	42
55-2B	GRIDB3	11/29/04	GWPP	<MDA	.	11	20.00	12	18
55-6A	B9103	06/07/04	GWPP	<MDA	.	5.9	<MDA	.	7.1
55-6A	B9103	11/16/04	GWPP	5.5	3.9	4.7	<MDA	.	7.5
56-2A	GRIDC3	06/09/04	GWPP	<MDA	.	9.5	<MDA	.	12
56-2A	GRIDC3	11/18/04	GWPP	<MDA	.	4.5	<MDA	.	7.7
56-2B	GRIDC3	06/09/04	GWPP	<MDA	.	7.4	<MDA	.	6.4
56-2B	GRIDC3	11/18/04	GWPP	<MDA	.	3.7	<MDA	.	8.3
56-2B Dup	GRIDC3	11/18/04	GWPP	<MDA	.	5.5	<MDA	.	7.6
9201-1K-22SU	EXP-SW	06/22/04	GWPP	4.4	2.5	2.1	<MDA	.	8
9201-1K-22SU	EXP-SW	10/27/04	GWPP	<MDA	.	3.5	<MDA	.	6.4
9201-3C-4SP	EXP-SW	05/18/04	GWPP	<MDA	.	2	<MDA	.	6.6
9201-3C-4SP	EXP-SW	10/27/04	GWPP	<MDA	.	3.7	<MDA	.	5.7
GHK2.51ESW	EXP-SW	04/13/04	GWPP	<MDA	.	3.5	<MDA	.	7.6
GHK2.51ESW	EXP-SW	12/01/04	GWPP	<MDA	.	2.7	<MDA	.	8.1
GHK2.51WSW	EXP-SW	04/13/04	GWPP	<MDA	.	2.9	<MDA	.	7.6
GHK2.51WSW	EXP-SW	12/01/04	GWPP	<MDA	.	2.9	<MDA	.	8.5
GHK2.51WSW Dup	EXP-SW	12/01/04	GWPP	<MDA	.	2.5	<MDA	.	5.6
GW-108	S3	01/07/04	BJC	551.02	153.05	170.56	12,612.67	452.99	309.54
GW-108	S3	07/08/04	BJC	137.25	74.35	99.71	12,100.94	377.49	222.21
GW-151	NHP	02/12/04	BJC	2.25	0.85	0.88	3.68	1.98	3.2
GW-151	NHP	08/10/04	BJC	<MDA	.	5.67	<MDA	.	13.29
GW-153	NHP	05/20/04	GWPP	<MDA	.	4.4	<MDA	.	7.8
GW-153	NHP	11/01/04	GWPP	<MDA	.	2.7	10	5.5	8.3
GW-153 Dup	NHP	11/01/04	GWPP	2.7	2.1	2.5	<MDA	.	6.3
GW-154	NHP	02/18/04	BJC	620.78	14.08	2.14	106.56	4.46	3.19
GW-154	NHP	08/11/04	BJC	698.14	21.5	3.65	288.53	10.07	6.64
GW-169	EXP-UV	02/09/04	BJC	<MDA	.	0.98	2	1	2
GW-169	EXP-UV	04/20/04	BJC	0.75	0.5	0.75	3	1	2
GW-169	EXP-UV	08/09/04	BJC	2.11	0.93	1.17	5	1	2
GW-169	EXP-UV	10/25/04	BJC	2.72	1.03	1.16	2.87	1.56	2.5
GW-170	EXP-UV	02/09/04	BJC	1.86	0.65	0.16	8.74	1.64	2.28
GW-170 Dup	EXP-UV	02/09/04	BJC	<MDA	.	1.27	10.66	1.58	2.07
GW-170	EXP-UV	04/20/04	BJC	1.14	0.73	1.07	9.93	1.54	2.11
GW-170 Dup	EXP-UV	04/20/04	BJC	<MDA	.	0.84	10.73	1.33	1.67
GW-170	EXP-UV	08/09/04	BJC	<MDA	.	2.08	7.08	1.78	2.58
GW-170 Dup	EXP-UV	08/09/04	BJC	4.08	1.5	1.75	12.55	2.06	2.67
GW-170	EXP-UV	10/25/04	BJC	<MDA	.	1.38	7.55	1.64	2.33
GW-170 Dup	EXP-UV	10/25/04	BJC	1.35	0.67	0.73	4.63	1.57	2.41
GW-193	T2331	01/08/04	BJC	4.81	1.35	1.31	5.88	1.94	3.01
GW-193	T2331	07/13/04	BJC	<MDA	.	1.96	5.34	1.99	3.12
GW-204	T0134	05/03/04	GWPP	21	5.7	4.9	9.5	4.7	6.9
GW-204	T0134	10/25/04	GWPP	37	7	4.4	16	6.6	9.4
GW-204 Dup	T0134	10/25/04	GWPP	33	6.5	4	14	5.7	8.2
GW-207	EXP-SR	05/25/04	GWPP	<MDA	.	4	<MDA	.	8
GW-207	EXP-SR	11/09/04	GWPP	<MDA	.	5.9	<MDA	.	10

APPENDIX E.3: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Activity	Error	MDA	Activity	Error	MDA
GW-208	EXP-SR	05/25/04	GWPP	<MDA	.	3.3	<MDA	.	8.3
GW-208	EXP-SR	11/09/04	GWPP	<MDA	.	4.3	<MDA	.	8.3
GW-219	UOV	04/26/04	GWPP	79	15	9.2	82	9	8.4
GW-219	UOV	11/11/04	GWPP	110	16	5.4	97	9.8	8.4
GW-220	NHP	05/27/04	GWPP	<MDA	.	3	<MDA	.	6.9
GW-220	NHP	11/15/04	GWPP	<MDA	.	2.6	<MDA	.	6.6
GW-222	NHP	06/10/04	GWPP	18	7.7	8.4	15	7.6	11
GW-222 Dup	NHP	06/10/04	GWPP	18	7.3	7.6	16	5.9	8.1
GW-222	NHP	11/30/04	GWPP	30	6.6	3.2	26	6.1	7.4
GW-223	NHP	02/18/04	BJC	24.05	2.64	1.44	10.25	1.8	2.47
GW-223	NHP	08/10/04	BJC	20.95	3.03	1.93	17.92	3.02	4.15
GW-232	EXP-UV	02/09/04	BJC	<MDA	.	1.73	<MDA	.	3.49
GW-232	EXP-UV	04/20/04	BJC	<MDA	.	1.41	<MDA	.	2.75
GW-232	EXP-UV	08/09/04	BJC	<MDA	.	4.23	<MDA	.	4.41
GW-232	EXP-UV	10/25/04	BJC	4.31	2.67	3.89	<MDA	.	4.77
GW-251	S2	04/29/04	GWPP	<MDA	.	11	<MDA	.	8.6
GW-251 Dup	S2	04/29/04	GWPP	7.5	3.7	4.6	<MDA	.	8.2
GW-251	S2	10/21/04	GWPP	8	4.5	3.8	<MDA	.	6.3
GW-380	NHP	02/18/04	BJC	3.09	1.03	1.25	3.91	1.4	2.2
GW-380	NHP	08/11/04	BJC	2.07	1.15	1.63	<MDA	.	3.52
GW-381	NHP	05/19/04	GWPP	<MDA	.	6.1	<MDA	.	7.6
GW-381	NHP	11/02/04	GWPP	<MDA	.	5.2	<MDA	.	8.7
GW-382	NHP	02/11/04	BJC	2.1	1.33	1.98	3.99	2.33	3.79
GW-382	NHP	08/11/04	BJC	4.39	1.9	2.25	<MDA	.	5.9
GW-383	NHP	05/20/04	GWPP	8.8	4.3	3.2	<MDA	.	10
GW-383	NHP	11/03/04	GWPP	<MDA	.	3.9	<MDA	.	6
GW-605	EXP-I	01/07/04	BJC	93.14	4.78	1.3	24.27	2.07	2.32
GW-605 Dup	EXP-I	01/07/04	BJC	85.89	4.51	1.06	24.75	2.06	2.27
GW-605	EXP-I	07/12/04	BJC	87.66	5.93	1.91	44.86	3.51	3.59
GW-605 Dup	EXP-I	07/12/04	BJC	78.07	6.43	2.79	42.64	4.29	4.99
GW-606	EXP-I	01/07/04	BJC	7.84	1.8	1.97	7.3	1.88	2.82
GW-606	EXP-I	07/12/04	BJC	9.57	2.11	1.98	4.49	2.25	3.6
GW-620	FTF	04/29/04	GWPP	<MDA	.	4.3	12	5.8	8.6
GW-620	FTF	10/21/04	GWPP	<MDA	.	3.9	14	5.5	7.9
GW-633	RG	05/05/04	GWPP	<MDA	.	65	2,600	160	120
GW-633	RG	10/26/04	GWPP	<MDA	.	73	2,400	140	80
GW-691	CPT	06/09/04	GWPP	<MDA	.	20	<MDA	.	14
GW-691	CPT	11/17/04	GWPP	<MDA	.	13	<MDA	.	21
GW-692	CPT	06/08/04	GWPP	15 Q	6.6	7.1	16	7.1	10
GW-692	CPT	11/17/04	GWPP	7.6	4	3.2	<MDA	.	8
GW-698	B8110	05/18/04	GWPP	<MDA	.	12	<MDA	.	26
GW-698 Conv	B8110	05/19/04	GWPP	5.5	4	4.1	<MDA	.	16
GW-698	B8110	11/02/04	GWPP	<MDA	.	11	<MDA	.	11
GW-698 Conv	B8110	11/03/04	GWPP	<MDA	.	6.4	5.7	3.8	5.7
GW-722-06	EXP-J	02/22/04	GWPP	<MDA	.	5.9	<MDA	.	6.1
GW-722-06	EXP-J	06/14/04	BJC	<MDA	.	2.95	61.36 Q	4.12	3.9
GW-722-06	EXP-J	08/07/04	GWPP	<MDA	.	9.1	<MDA	.	7.7
GW-722-06	EXP-J	10/25/04	BJC	7.13	2.9	3.54	10.3	3.39	5.17

APPENDIX E.3: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Activity	Error	MDA	Activity	Error	MDA
GW-722-10	EXP-J	02/22/04	GWPP	<MDA	.	3.7	<MDA	.	5.8
GW-722-10	EXP-J	06/17/04	BJC	<MDA	.	2.87	4.54	2.52	4.07
GW-722-10	EXP-J	08/07/04	GWPP	<MDA	.	7	<MDA	.	7.1
GW-722-10	EXP-J	10/27/04	BJC	<MDA	.	3.22	<MDA	.	4.26
GW-722-14	EXP-J	02/23/04	GWPP	<MDA	.	2.9	<MDA	.	8.2
GW-722-14	EXP-J	06/24/04	BJC	1.55	0.97	1.39	9.74	1.83	2.5
GW-722-14	EXP-J	08/07/04	GWPP	<MDA	.	6.1	<MDA	.	8.4
GW-722-14	EXP-J	10/28/04	BJC	5.17	1.98	2.59	5.01	2.67	4.3
GW-722-17	EXP-J	02/23/04	GWPP	<MDA	.	4.4	<MDA	.	6.8
GW-722-17	EXP-J	06/28/04	BJC	2.61	1.55	2.23	9.69	2.62	3.9
GW-722-17	EXP-J	08/07/04	GWPP	<MDA	.	7.7	<MDA	.	8.7
GW-722-17	EXP-J	10/28/04	BJC	<MDA	.	2.35	<MDA	.	4.01
GW-722-20	EXP-J	02/23/04	GWPP	<MDA	.	3.5	<MDA	.	8.8
GW-722-20	EXP-J	06/24/04	BJC	<MDA	.	1.56	3.87	1.66	2.62
GW-722-20	EXP-J	08/07/04	GWPP	<MDA	.	6.9	<MDA	.	7.2
GW-722-20	EXP-J	10/27/04	BJC	1.71	0.93	1.31	<MDA	.	2.12
GW-722-22	EXP-J	02/23/04	GWPP	<MDA	.	2.6	<MDA	.	7.3
GW-722-22 Dup	EXP-J	02/23/04	GWPP	<MDA	.	4.3	<MDA	.	7.7
GW-722-22	EXP-J	06/24/04	BJC	2.49	1.44	2.1	<MDA	.	3.81
GW-722-22	EXP-J	08/07/04	GWPP	<MDA	.	6.1	<MDA	.	6.9
GW-722-22 Dup	EXP-J	08/07/04	GWPP	<MDA	.	6.9	<MDA	.	6.5
GW-722-22	EXP-J	10/27/04	BJC	1.61	0.71	0.85	8.85	1.39	1.86
GW-722-26	EXP-J	02/22/04	GWPP	3.1	2.3	2.5	<MDA	.	8
GW-722-26	EXP-J	06/16/04	BJC	3.66	2.18	3.19	8.65	3.9	6.17
GW-722-26 Dup	EXP-J	06/16/04	BJC	<MDA	.	2.42	5.19	3.15	5.13
GW-722-26	EXP-J	08/07/04	GWPP	<MDA	.	5	<MDA	.	8.6
GW-722-26	EXP-J	10/26/04	BJC	2.26	0.87	0.91	10.1	1.62	2.1
GW-722-26 Dup	EXP-J	10/26/04	BJC	3.14	0.96	0.74	57.8 Q	2.91	2.25
GW-722-30	EXP-J	02/22/04	GWPP	<MDA	.	2.3	<MDA	.	6
GW-722-30	EXP-J	06/14/04	BJC	<MDA	.	1.88	17.02	2.55	3.45
GW-722-30	EXP-J	08/07/04	GWPP	<MDA	.	4.6	<MDA	.	7.9
GW-722-30	EXP-J	10/25/04	BJC	<MDA	.	1.79	159 Q	4.69	2.46
GW-722-32	EXP-J	02/22/04	GWPP	<MDA	.	4.1	<MDA	.	7.6
GW-722-32	EXP-J	06/16/04	BJC	1.56	0.76	0.89	<MDA	.	3.37
GW-722-32	EXP-J	08/07/04	GWPP	<MDA	.	5.8	<MDA	.	7.2
GW-722-32	EXP-J	10/26/04	BJC	1.25	0.74	0.98	21.4 Q	2.13	2.45
GW-722-33	EXP-J	02/22/04	GWPP	<MDA	.	3.2	<MDA	.	7.3
GW-722-33	EXP-J	06/17/04	BJC	<MDA	.	1.79	4.76	2.42	3.87
GW-722-33	EXP-J	08/07/04	GWPP	<MDA	.	7	<MDA	.	8.5
GW-722-33	EXP-J	10/27/04	BJC	2.49	1.4	2.02	16.3	2.7	3.66
GW-733	EXP-J	01/08/04	BJC	1.16	0.64	0.89	<MDA	.	1.78
GW-733	EXP-J	07/08/04	BJC	1.64	0.72	0.95	3.44	1.18	1.81
GW-735	EXP-J	05/27/04	GWPP	2.1	1.7	0.94	<MDA	.	6.8
GW-735	EXP-J	11/15/04	GWPP	<MDA	.	5.7	<MDA	.	8.6
GW-735 Dup	EXP-J	11/15/04	GWPP	<MDA	.	4.2	<MDA	.	9.2
GW-744	GRIDK1	05/24/04	GWPP	<MDA	.	3.8	<MDA	.	7.7
GW-744	GRIDK1	11/10/04	GWPP	<MDA	.	3.1	<MDA	.	7.9
GW-747	GRIDK2	05/26/04	GWPP	<MDA	.	2.9	<MDA	.	7.2
GW-747 Dup	GRIDK2	05/26/04	GWPP	<MDA	.	3.8	<MDA	.	8.9
GW-747	GRIDK2	11/10/04	GWPP	<MDA	.	3.1	<MDA	.	9.2

APPENDIX E.3: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Activity	Error	MDA	Activity	Error	MDA
GW-750	EXP-J	05/26/04	GWPP	<MDA	.	4.4	<MDA	.	6.5
GW-750	EXP-J	11/05/04	GWPP	<MDA	.	3.9	<MDA	.	8.7
GW-762	GRIDJ3	02/11/04	BJC	1.82	0.86	0.99	<MDA	.	3.25
GW-762 Dup	GRIDJ3	02/11/04	BJC	1.54	0.92	1.28	<MDA	.	3.43
GW-762	GRIDJ3	08/05/04	BJC	<MDA	.	1.27	4.91	1.24	1.82
GW-762 Dup	GRIDJ3	08/05/04	BJC	2.91	1.42	1.59	23.07	4.23	5.86
GW-763	GRIDJ3	05/17/04	GWPP	<MDA	.	6.9	<MDA	.	6.8
GW-763	GRIDJ3	11/01/04	GWPP	<MDA	.	3	<MDA	.	7.2
GW-769	GRIDG3	05/17/04	GWPP	<MDA	.	3.4	<MDA	.	6.2
GW-769 Dup	GRIDG3	05/17/04	GWPP	<MDA	.	3.1	<MDA	.	6.9
GW-769	GRIDG3	10/28/04	GWPP	<MDA	.	4.6	<MDA	.	7
GW-770	GRIDG3	04/26/04	GWPP	<MDA	.	5.7	<MDA	.	7.5
GW-770 Dup	GRIDG3	04/26/04	GWPP	<MDA	.	5.8	<MDA	.	9.1
GW-770	GRIDG3	10/28/04	GWPP	<MDA	.	3.9	<MDA	.	8
GW-782	GRIDE3	05/05/04	GWPP	17	7	8.1	<MDA	.	8
GW-782	GRIDE3	10/26/04	GWPP	20	5.3	3.4	7.7	4.6	7
GW-791	GRIDD2	05/03/04	GWPP	<MDA	.	6.8	<MDA	.	7.4
GW-791	GRIDD2	10/25/04	GWPP	<MDA	.	3.7	<MDA	.	7.1
GW-816	EXP-SR	05/24/04	GWPP	2	1.7	1.1	<MDA	.	11
GW-816	EXP-SR	11/09/04	GWPP	<MDA	.	5.3	<MDA	.	8.5
GW-818	B9201-2	02/10/04	GWPP	<MDA	.	2.8	<MDA	.	7.4
GW-832	NHP	02/18/04	BJC	5.97	1.27	1.38	6.23	1.25	1.79
GW-832	NHP	08/16/04	BJC	5.15	1.54	1.72	9.81	1.99	2.88
NPR07.0SW	EXP-SW	04/13/04	GWPP	<MDA	.	3.5	<MDA	.	5.8
NPR07.0SW	EXP-SW	12/01/04	GWPP	<MDA	.	1.9	<MDA	.	8.9
NPR12.0SW	EXP-SW	04/13/04	GWPP	<MDA	.	3.2	<MDA	.	7.8
NPR12.0SW	EXP-SW	12/01/04	GWPP	<MDA	.	2.4	<MDA	.	6.7
NPR23.0SW	EXP-SW	04/13/04	GWPP	4.4	2.4	2.5	<MDA	.	6.8
NPR23.0SW Dup	EXP-SW	04/13/04	GWPP	<MDA	.	2.3	<MDA	.	7.6
NPR23.0SW	EXP-SW	12/01/04	GWPP	<MDA	.	1.7	<MDA	.	5.7
OF 51	EXP-SW	03/15/04	BJC	4.22	1.12	1.09	<MDA	.	2.3
OF 51	EXP-SW	08/18/04	BJC	3.95	1.12	1.29	4.37	1.24	1.86
SPR14.0SP	EXP-SW	02/19/04	GWPP	2.6	1.8	1.9	<MDA	.	6.2
STATION 8	EXP-SW	02/12/04	BJC	12.99	1.82	0.74	8.43	1.78	2.51
STATION 8	EXP-SW	03/15/04	BJC	4.84	1.14	1.17	3.82	1.33	2.07
STATION 8	EXP-SW	07/27/04	BJC	6.64	1.92	1.9	8.19	2.22	3.23
STATION 8	EXP-SW	08/18/04	BJC	3.53	0.96	1.06	3.79	1.24	1.91

APPENDIX E.3: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-108						GW-151					
Functional Area	S3						NHP					
Date Sampled	01/07/04			07/08/04			02/12/04			08/10/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	551.02	153.05	170.56	137.25	74.35	99.71	2.25	0.85	0.88	<MDA	.	5.67
Gross Beta	12,612.67	452.99	309.54	12,100.94	377.49	222.21	3.68	1.98	3.2	<MDA	.	13.29
Technetium-99	27,087.53	139.63	31.84	30,004.76	65.23	6.09	.	.	.	.	.	.
Uranium-234	.	.	.	.	.	.	1.13	0.55	0.35	0.6	0.46	0.52
Uranium-235	.	.	.	.	.	.	<MDA	.	0.39	<MDA	.	0.25
Uranium-236	.	.	.	.	.	.	<MDA	.	0.17	0.25 R	0.29	0.22
Uranium-238	.	.	.	.	.	.	<MDA	.	0.35	<MDA	.	0.34

Sampling Point	GW-154						GW-193					
Functional Area	NHP						T2331					
Date Sampled	02/18/04			08/11/04			01/08/04			07/13/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	620.78	14.08	2.14	698.14	21.5	3.65	4.81	1.35	1.31	<MDA	.	1.96
Gross Beta	106.56	4.46	3.19	288.53	10.07	6.64	5.88	1.94	3.01	5.34	1.99	3.12
Technetium-99	.	.	.	.	.	.	<MDA	.	6.21	<MDA	.	6.09
Uranium-234	568.5	108.8	9.58	336.2	53.4	1.96	.	.	.	.	.	.
Uranium-235	32.2	16.2	8.36	16.52	5.51	1.71	.	.	.	.	.	.
Uranium-236	17.29	11.14	8.79	9.87	3.91	1.53	.	.	.	.	.	.
Uranium-238	140.9	36.71	7.9	202.5	33.61	1.61	.	.	.	.	.	.

Sampling Point	GW-222									GW-223		
Functional Area	NHP									NHP		
Date Sampled	06/10/04						11/30/04			02/18/04		
Program	GWPP						GWPP			BJC		
Sample Type				Dup								
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	18	7.7	8.4	18	7.3	7.6	30	6.6	3.2	24.05	2.64	1.44
Gross Beta	15	7.6	11	16	5.9	8.1	26	6.1	7.4	10.25	1.8	2.47
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	8.2	1.1	0.15	8.2	1.2	0.18	7.6	1.1	0.12	6.76	2.18	0.62
Uranium-235	0.79	0.3	0.14	0.66	0.29	0.19	0.58	0.26	0.11	<MDA	.	0.76
Uranium-236	.	.	.	.	.	.	0.11	0.097	0.064	0.59 R	0.6	0.4
Uranium-238	23	2.5	0.13	24	2.7	0.17	21	2.4	0.13	14.49	3.61	0.8

APPENDIX E.3: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-223			GW-605								
Functional Area	NHP			EXP-I								
Date Sampled	08/10/04			01/07/04						07/12/04		
Program	BJC			BJC						BJC		
Sample Type							Dup					
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	20.95	3.03	1.93	93.14	4.78	1.3	85.89	4.51	1.06	87.66	5.93	1.91
Gross Beta	17.92	3.02	4.15	24.27	2.07	2.32	24.75	2.06	2.27	44.86	3.51	3.59
Technetium-99	.	.	.	<MDA	.	6.3	<MDA	.	6.3	<MDA	.	6.11
Uranium-234	7.34	1.75	0.34	.	.	.	.	.	.	.	.	.
Uranium-235	0.47	0.39	0.21	.	.	.	.	.	.	.	.	.
Uranium-236	<MDA	.	0.19	.	.	.	.	.	.	.	.	.
Uranium-238	15.84	3.09	0.17	.	.	.	.	.	.	.	.	.

Sampling Point	GW-605			GW-606						GW-691		
Functional Area	EXP-I			EXP-I						CPT		
Date Sampled	07/12/04			01/07/04			07/12/04			06/09/04		
Program	BJC			BJC			BJC			GWPP		
Sample Type	Dup											
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	78.07	6.43	2.79	7.84	1.8	1.97	9.57	2.11	1.98	<MDA	.	20
Gross Beta	42.64	4.29	4.99	7.3	1.88	2.82	4.49	2.25	3.6	<MDA	.	14
Technetium-99	<MDA	.	6.11	<MDA	.	6.3	<MDA	.	6.11	<MDA	.	13
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-691			GW-733						GW-832		
Functional Area	CPT			EXP-J						NHP		
Date Sampled	11/17/04			01/08/04			07/08/04			02/18/04		
Program	GWPP			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	13	1.16	0.64	0.89	1.64	0.72	0.95	5.97	1.27	1.38
Gross Beta	<MDA	.	21	<MDA	.	1.78	3.44	1.18	1.81	6.23	1.25	1.79
Technetium-99	<MDA	.	13	<MDA	.	6.21	<MDA	.	6.09	.	.	.
Uranium-234	.	.	.	.	.	.	.	.	.	1.33	0.59	0.36
Uranium-235	.	.	.	.	.	.	.	.	.	<MDA	.	0.31
Uranium-236	.	.	.	.	.	.	.	.	.	<MDA	.	0.16
Uranium-238	.	.	.	.	.	.	.	.	.	3.45	1.03	0.29

APPENDIX E.3: CY 2004 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-832			SPR14.0SP			STATION 8					
Functional Area	NHP			EXP-SW			EXP-SW					
Date Sampled	08/16/04			02/19/04			02/12/04			03/15/04		
Program	BJC			GWPP			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	5.15	1.54	1.72	2.6	1.8	1.9	12.99	1.82	0.74	4.84	1.14	1.17
Gross Beta	9.81	1.99	2.88	<MDA	.	6.2	8.43	1.78	2.51	3.82	1.33	2.07
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	2.22	0.74	0.34	<MDA	.	0.12	2.23	0.9	0.59	1.47	0.59	0.27
Uranium-235	<MDA	.	0.28	<MDA	.	0.14	0.43	0.41	0.42	<MDA	.	0.28
Uranium-236	<MDA	.	0.36	<MDA	.	0.11	0.32 R	0.33	0.22	<MDA	.	0.25
Uranium-238	1.68	0.63	0.32	<MDA	.	0.12	5.37	1.53	0.51	3.79	1.05	0.34

Sampling Point	STATION 8					
Functional Area	EXP-SW					
Date Sampled	07/27/04			08/18/04		
Program	BJC			BJC		
Sample Type						
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	6.64	1.92	1.9	3.53	0.96	1.06
Gross Beta	8.19	2.22	3.23	3.79	1.24	1.91
Technetium-99	.	.	.	.	.	.
Uranium-234	2.58	0.84	0.35	1.93	0.75	0.42
Uranium-235	0.39	0.33	0.18	0.37	0.34	0.2
Uranium-236	0.3	0.27	0.16	0.6	0.41	0.18
Uranium-238	2.43	0.8	0.25	1.61	0.67	0.28

APPENDIX F

CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME

EXPLANATION

Sampling Point:

GW	-	Groundwater monitoring well (also 1090)
MCK	-	McCoy Branch Kilometer
S17	-	Surface water station in SCR5
SCR	-	South Chestnut Ridge (tributary prefix for spring and surface water sampling locations)

Location:

CDLVI	-	Construction/Demolition Landfill VI
CDLVII	-	Construction/Demolition Landfill VII
CRBAWP	-	Former Chestnut Ridge Borrow Area Waste Pile
CRSDB	-	Chestnut Ridge Sediment Disposal Basin
CRSP	-	Chestnut Ridge Security Pits
EXP-SW	-	Exit Pathway (spring or surface water sampling location)
FCAP	-	Filled Coal Ash Pond
KHQ	-	Kerr Hollow Quarry
LII	-	Industrial Landfill II
LIV	-	Industrial Landfill IV
LV	-	Industrial Landfill V
UNCS	-	United Nuclear Corporation Site

Monitoring Program:

BJC	-	monitoring program managed by Bechtel Jacobs Company LLC
GWPP	-	managed by the Y-12 Groundwater Protection Program

Sample Type:

Dup	-	Field Duplicate Sample
Conv	-	Collected using the conventional sampling method (purge three well volumes)
Conv-F	-	Filtered sample (metals analyses), collected using the conventional sampling method
F	-	Filtered sample (metals analyses)

Units:

ft	-	feet (elevations are above mean sea level and depths are below grade)
µg/L	-	micrograms per liter
mg/L	-	milligrams per liter
mV	-	millivolts
µmho/cm	-	micromhos per centimeter
NTU	-	Nephelometric Turbidity Units
pCi/L	-	picoCuries per liter
ppm	-	parts per million
RPD	-	relative percent difference (charge balance for major ions)

EXPLANATION (continued)

Only analytes detected above the program reporting limits in at least one sample are presented in this appendix. Additionally, results that are below the reporting limits are replaced with values (e.g., "<") to emphasize the detected results. The following sections describe the reporting limits and data qualifiers for each subsection of the appendix. A comprehensive list of the Y-12 GWPP analytes, analytical methods, and reporting limits is provided in Appendix B, Table B.5.

F.1 Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals:

Results for all of the field measurements, miscellaneous analytes, and major ions are included in this appendix. The reporting limits for the major ions and miscellaneous analytes are shown in the following summary.

Analyte	Reporting Limit (mg/L)		Analyte	Reporting Limit (mg/L)	
	GWPP	BJC		GWPP	BJC
Cations			**Anions**		
Calcium	0.2	0.25	Alkalinity - CO3	1.0	NA
Magnesium	0.2	0.05	Alkalinity - HCO3	1.0	NA
Potassium	2.0	0.25	Chloride	0.2	0.1
Sodium	0.2	0.25	Fluoride	0.1	0.05
			Nitrate (as Nitrogen)	0.028	0.1
			Sulfate	0.25	0.1
Miscellaneous					
Dissolved Solids	1	2.5			
Suspended Solids	1	2.5	Turbidity	NA	NA

Note that the ion charge balance error (percent difference) does not exceeds 20% for any samples collected during CY 2004 in the Chestnut Ridge Regime.

The Y-12 GWPP SAP (BWXT 2003a) specifies reporting limits for trace metals that are appropriate for DOE Order monitoring. Some of the laboratories used for the monitoring programs managed by BJC report metals results (often as estimated values) that are lower than the GWPP reporting limits for the metals. To retain the highest quality data for DOE Order monitoring purposes and to standardize reporting limits for trace metal results obtained from all sources, the GWPP reporting limits were given precedence over the BJC reporting limits (BJC 2003a and 2004) shown below. Results for the trace metals shown in bold typeface below are presented in Appendix F.1 because the metal was detected at a level above the associated reporting limit in at least one groundwater or surface water sample.

EXPLANATION (continued)

Trace Metal	Reporting Limit (mg/L)		Trace Metal	Reporting Limit (mg/L)	
	GWPP	BJC		GWPP	BJC
Aluminum	0.2	0.05*	**Lithium**	0.01	0.01
Antimony (PMS)	0.0025	.	**Manganese**	0.005	0.005
Antimony	.	0.006	Mercury (CVAA)	0.0002	0.0002
Arsenic (PMS)	0.005	.	Molybdenum	0.05	.*
Arsenic	.	0.005	**Nickel (PMS)**	0.005	.
Barium	0.004	0.005	**Nickel**	.	0.01
Beryllium	0.001	0.001	**Selenium (PMS)**	0.01	.
Boron	0.1	0.01*	Selenium	.	0.005
Cadmium (PMS)	0.0025	.	Silver	0.02	0.005*
Cadmium	.	0.001	**Strontium**	0.005	0.005
Chromium (PMS)	0.01	.	**Thallium (PMS)**	0.0005	.
Chromium	.	0.005	Thallium	.	0.002
Cobalt	0.02	0.005*	Thorium	0.2	.
Copper	0.02	0.005*	**Uranium (PMS)**	0.0005	.
Iron	0.05	0.01*	**Uranium (KPA)**	.	0.004
Lead (PMS)	0.0005	.	Vanadium	0.02	0.01*
Lead	.	0.003	**Zinc**	0.05	0.01*

Note: * - the GWPP reporting limit was used instead of the BJC reporting limit; "." - not specified.

Metals analyses were performed using the inductively coupled plasma spectroscopy method (SW846-6010B) unless otherwise noted:

CVAA - Cold Vapor Atomic Absorption (SW846-7470)
KPA - Kinetic Phosphorescent Analysis (ASTM-D5174-M)
PMS - Plasma Mass Spectroscopy (EPA-200.8)

The following symbols and data qualifiers are used in Appendix F.1:

. - Not analyzed or not applicable
< - Analyzed but not detected at the project reporting level
J - Positively identified; estimated concentration (miscellaneous and anion results for landfills)
Q - Inconsistent with historical measurements for a sampling location (e.g., high metals concentrations and suspended solids in the August sample from MCK 2.05)
R - Unusable result that does not meet data quality objectives: (e.g., duplicate manganese results for MCK 2.05 in August that differ by an order of magnitude or more).

EXPLANATION (continued)

F.2 Volatile Organic Compounds:

The reporting limits for volatile organic compounds shown in Table B.5 and those used for monitoring programs managed by BJC are contract-required quantitation limits. Results below the quantitation limit and above the instrument detection limit are reported as estimated quantities. Therefore, non-detected results are assumed to equal zero for all compounds.

Fifteen of the 55 compounds requested were detected in the CY 2004 groundwater samples collected in the Chestnut Ridge. Results for the following compounds (shown in order of most often detected) were detected in at least one sample.

Compound	No. Detected	Maximum (µg/L)	Compound	No. Detected	Maximum (µg/L)
1,1,1-Trichloroethane	26	51	Chloroform	2	16 Q
1,1-Dichloroethane	22	110	Acetone	2	9.5 J
1,1-Dichloroethene	22	93	Chloromethane	2	4.1
Tetrachloroethene	17	15	Trichloroethene	2	0.52 J
Trichlorofluoromethane	12	38	Toluene	2	0.27 J
1,1,2-Trichloro-1,2,2-trifluoroethane	6	5	1,2-Dichloroethane	1	2 J
cis-1,2-Dichloroethene	4	6	Bromodichloromethane	1	0.21 J
Carbon disulfide	3	0.64 J			

All of the results for these compounds are presented in Appendix F.2.

The following symbols and data qualifiers are used in Appendix F.2:

. - Not analyzed
< - Analyzed but not detected at the project reporting level (also false-positive results for data provided by BJC)
J - Positively identified; estimated concentration
Q - Inconsistent with historical measurements for a sampling location (e.g., high chloroform concentration in the January sample from GW-544 [16 µg/L]; confirmed in July [15 µg/L])

EXPLANATION (continued)

F.3 Radiological Analytes

Reporting limits for radiological analytes are sample-specific and analyte-specific minimum detectable activities that are reported with each result. The following summary shows the radiological analytes reported for at least one groundwater sample collected during CY 2004 in the Chestnut Ridge Regime.

Analyte	No. of Results	No. Detected	Analyte	No. of Results	No. Detected
Gross Alpha	135	36	Technetium-99	2	0
Gross Beta	135	44	Uranium-233/234	8	8
Cesium-137	2	0	Uranium-235	8	1
Cobalt-60	2	0	Uranium-236	8	2
Potassium-40	2	0	Uranium-238	8	4
Strontium-90	8	0			

Results for gross alpha and gross beta are presented in the first three pages of Appendix F.3, followed by results for the isotopes. The following notes apply to this appendix:

Result - Activity in picoCuries per liter (pCi/L)
Error - Counting error (two standard deviations)
MDA - Minimum detectable activity

Data Qualifiers:
Q - Inconsistent with historical measurements for a sampling location (e.g., gross alpha activity reported for the August sample from GW-221: 13.31 pCi/L).

APPENDIX F.1

FIELD MEASUREMENTS, MISCELLANEOUS ANALYTES, MAJOR IONS, AND TRACE METALS

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	1090		GW-141		GW-143		GW-144	
Functional Area	UNCS		LIV		KHQ		KHQ	
Date Sampled	02/24/04	08/04/04	01/22/04	07/15/04	04/12/04	10/12/04	04/12/04	10/12/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	9:30	11:10	9:55	9:05	13:50	13:55	9:25	10:10
Measuring Point Elev. (ft)	1,104.48	1,104.48	1,186.23	1,186.23	913.98	913.98	913.54	913.54
Depth to Water (ft)	47.30	55.65	95.74	95.94	80.18	81.18	80.58	81.26
Groundwater Elevation (ft)	1,057.18	1,048.83	1,090.49	1,090.29	833.80	832.80	832.96	832.28
Conductivity (μmho/cm)	712	541	538	775	668	475	486	337
Dissolved Oxygen (ppm)	1.3	1.05	6.37	5.45	1.95	2.1	5.4	4.3
Oxidation/Reduction (mV)	194	155	205	172	-70	-82	212	209
Temperature (degrees C)	15.5	17.7	13.7	20.9	12.9	19.5	13.7	16.3
Turbidity (NTU)	7	3	6	9	18	2	18	2
pH	7.07	6.96	6.94	7.29	7.23	8.13	7.37	7.74
Miscellaneous Analytes								
Dissolved Solids (mg/L)	317	289	220	210	120	261	231	206
Suspended Solids (mg/L)	<	<	2.8 J	<	6.6	<	6.6	13.6
Turbidity (NTU)	.	.	5.9	2.1	.	.	.	.
Major Ions (mg/L)								
Calcium	57.7	58.6	41	44	31.3	32.2	49.4	56.8
Magnesium	33.5	35.2	25	27	25.7	26.6	14.8	17.8
Potassium	1.01	0.819	<	0.69 J	18	16.1	1.79	1.54
Sodium	9.2	8.05	1.2 J	<	18.9	18.9	2.91	1.06
Alkalinity as CO3	<	<	<	<	.	.	.	.
Alkalinity as HCO3	314	242	200	220	.	.	.	.
Chloride	19.3	15.9	2.6 J	1.4 J	.	.	.	.
Fluoride	<	<	0.17 J	<	.	.	.	.
Nitrate as N	0.78	1.7	0.47 J	0.34 J	.	.	.	.
Sulfate	3.8	3.5	2.4 J	2 J	.	.	.	.
Charge Balance Error (%)	-6.9	6.1	-0.1	-0.8	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Arsenic	<	<	<	<	<	<	<	<
Barium	0.0306	0.0277	0.015	0.016	0.0472	0.0492	0.0414	0.0471
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	0.796	0.847	<	<
Chromium	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	0.13	<	0.438	0.867	0.0949	0.0693
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	<	<	.	.	0.292	0.297	0.0232	0.0249
Manganese	<	<	<	<	0.0096	0.0123	0.0248	<
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.0271	0.0259	0.015	0.015	2.93	3.05	0.162	0.105
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-145		GW-156				GW-159	
Functional Area	KHQ		CRSDB				CRSDB	
Date Sampled	04/13/04	10/12/04	04/13/04		10/14/04		04/14/04	10/13/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type				Dup		Dup		
Field Measurements								
Time Sampled	9:30	8:50	14:00	.	9:10	.	14:05	14:10
Measuring Point Elev. (ft)	840.24	840.24	1,049.28	.	1,049.28	.	1,051.38	1,051.38
Depth to Water (ft)	5.39	7.50	142.05	.	143.60	.	116.92	117.85
Groundwater Elevation (ft)	834.85	832.74	907.23	.	905.68	.	934.46	933.53
Conductivity (μmho/cm)	733	501	862	.	672	.	522	395
Dissolved Oxygen (ppm)	2.96	3.03	5.37	.	4.78	.	3.64	2.02
Oxidation/Reduction (mV)	203	232	181	.	226	.	177	167
Temperature (degrees C)	11.6	17.1	12.3	.	15.4	.	13	16.3
Turbidity (NTU)	4	4	3	.	15	.	7	7
pH	7.35	7.6	7	.	7.28	.	7.52	7.82
Miscellaneous Analytes								
Dissolved Solids (mg/L)	318	296	403	390	397	378	249	203
Suspended Solids (mg/L)	5.4	<	5.8	<	<	<	<	<
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	43.4	45	63	64.5	69	69.7	41.1	39.2
Magnesium	36.1	37.1	39.8	40.5	42.7	43.2	26.9	25
Potassium	10.8	10.9	24.9	25.4	19.6	19.2	1.52	1.37
Sodium	3.65	3.66	5.28	5.26	4.77	4.67	0.453	0.439
Alkalinity as CO3	.	.	.	.	.	.	.	.
Alkalinity as HCO3	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge Balance Error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Arsenic	<	<	<	<	<	<	<	<
Barium	0.0866	0.0901	0.0406	0.042	0.0377	0.0378	0.0161	0.0136
Beryllium	<	<	<	<	<	<	<	<
Boron	0.234	0.237	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	0.0645
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	<	0.109	<	<	<	<	<	<
Manganese	<	<	<	<	<	<	<	<
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	6.94	6.84	0.0281	0.0289	0.0274	0.0276	0.0245	0.0238
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	0.0108	0.0116	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-173			GW-175		GW-176		GW-177	
Functional Area	CRSP			CRSP		CRSP		CRSP	
Date Sampled	05/06/04		10/04/04	05/06/04	10/06/04	05/10/04	10/07/04	01/12/04	07/13/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC
Sample Type		Dup							
Field Measurements									
Time Sampled	9:05	9:05	9:25	10:40	9:05	8:55	8:50	10:50	9:00
Measuring Point Elev. (ft)	1,115.00	1,115.00	1,115.00	1,084.00	1,084.00	1,125.30	1,125.30	1,158.20	1,158.20
Depth to Water (ft)	143.36	143.36	142.38	118.46	119.74	116.18	116.26	117.41	118.74
Groundwater Elevation (ft)	971.64	971.64	972.62	965.54	964.26	1,009.12	1,009.04	1,040.79	1,039.46
Conductivity (μmho/cm)	414	414	488	543	586	512	605	832	424
Dissolved Oxygen (ppm)	2.97	2.97	6.21	3.5	2.63	2.09	3.75	4.38	2.24
Oxidation/Reduction (mV)	174	174	202	130	207	129	208	133	203
Temperature (degrees C)	14.9	14.9	14.7	16.6	13.9	15.5	15.2	10.4	21.1
Turbidity (NTU)	.	.	.	.	.	.	.	11	2
pH	7.22	7.22	7.28	7.61	7.4	6.88	6.95	7.4	7.24
Miscellaneous Analytes									
Dissolved Solids (mg/L)	218	220	212	298	287	346	284	219	254
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<	<
Turbidity (NTU)	0.166	0.169	0.161	0.196	0.377	1.72	0.696	.	.
Major Ions (mg/L)									
Calcium	43.1	42.7	44.3	59.4	58.1	55.9	59	44.5	45
Magnesium	24.8	26	27	36.4	35.3	33.5	36.8	27.1	27.7
Potassium	<	<	2.01	<	<	<	<	2.42	2.45
Sodium	1.27	1.29	1.3	0.704	0.728	0.767	0.765	1.08 J	0.957
Alkalinity as CO3	<	<	<	<	<	<	<	.	.
Alkalinity as HCO3	216	208	201	300	287	260	287	.	.
Chloride	1.54	1.51	1.44	2.04	1.83	1.98	1.99	.	.
Fluoride	<	<	<	<	<	<	<	.	.
Nitrate as N	0.931	0.962	0.874	0.298	0.253	0.47	0.501	.	.
Sulfate	6.49	6.52	6.47	0.68	0.71	1.8	1.59	.	.
Charge Balance Error (%)	-3.6	-0.9	3.2	-0.8	0.1	2.3	1.2	.	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	<	<
Antimony (PMS)	<	<	<	<	<	<	<	.	.
Arsenic (PMS)	<	<	<	<	<	<	<	.	.
Arsenic	.	.	.	.	.	.	.	<	<
Barium	0.0122	0.0125	0.0131	0.0366	0.0367	0.0209	0.0209	0.0193	0.0201
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	0.147	0.175	<	<
Chromium	.	.	.	.	.	.	.	0.0074	0.006
Copper	<	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	0.0913	<	<	<
Lead (PMS)	<	<	<	<	0.000774	<	<	.	.
Lead	.	.	.	.	.	.	.	<	<
Lithium	<	<	<	<	<	<	<	<	<
Manganese	<	<	<	<	0.0122	<	<	<	<
Nickel (PMS)	<	<	<	<	<	<	<	.	.
Nickel	.	.	.	.	.	.	.	<	<
Selenium (PMS)	<	<	<	<	<	<	<	.	.
Strontium	0.0176	0.0183	0.0188	0.018	0.0176	0.0203	0.0218	0.0172	0.0172
Thallium (PMS)	<	<	<	<	<	<	<	.	.
Uranium (PMS)	<	<	<	<	<	<	<	.	.
Uranium (KPA)	.	.	.	.	.	.	.	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-178		GW-179			GW-203		GW-205	
Functional Area	**CRSP**		**CRSP**			**UNCS**		**UNCS**	
Date Sampled	**05/10/04**	**10/06/04**	**05/11/04**	**10/07/04**		**02/25/04**	**08/03/04**	**02/24/04**	**08/03/04**
Program	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**	**BJC**
Sample Type					**Dup**				
Field Measurements									
Time Sampled	10:00	10:15	9:15	9:40	9:40	9:40	10:45	13:00	14:05
Measuring Point Elev. (ft)	1,143.49	1,143.49	1,128.00	1,128.00	1,128.00	1,105.45	1,105.45	1,104.14	1,104.14
Depth to Water (ft)	91.54	92.92	116.30	115.77	115.77	72.47	75.12	70.32	73.56
Groundwater Elevation (ft)	1,051.95	1,050.57	1,011.70	1,012.23	1,012.23	1,032.98	1,030.33	1,033.82	1,030.58
Conductivity (μmho/cm)	468	492	528	540	540	443	307	490	352
Dissolved Oxygen (ppm)	1.75	0.54	2.88	4.06	4.06	5.63	3.82	3	2.45
Oxidation/Reduction (mV)	107	210	137	220	220	143	126	56	40
Temperature (degrees C)	14.6	14.7	19.3	14.1	14.1	12.3	19.4	14.5	21
Turbidity (NTU)	.	.	.	.	.	15	5	15	6
pH	7.47	7.48	7.27	6.97	6.97	7.69	7.52	9.75	9.47
Miscellaneous Analytes									
Dissolved Solids (mg/L)	397	257	270	285	286	137	178	184	247
Suspended Solids (mg/L)	<	<	<	<	<	<	15	<	<
Turbidity (NTU)	5.01	4.09	1.59	2.08	1.93	.	.	.	.
Major Ions (mg/L)									
Calcium	52.4	53.2	59.8	58.5	58.2	28.9 J	33.2	2.98	<
Magnesium	29.8	32.2	33.3	34.2	33.5	17.5	18.1	11.4	12.5
Potassium	<	<	4.76	2.8	2.79	0.734	0.849	70.6	67.6
Sodium	0.999	1.01	0.928	0.967	1.08	0.435	0.457	10.5	9.68
Alkalinity as CO3	<	<	<	<	<	<	<	91.5	72.5
Alkalinity as HCO3	258	254	286	273	273	154	131	70.3	78
Chloride	2.46	2.31	1.59	1.61	1.64	1.4	1.2	2.4	2.5
Fluoride	<	<	<	<	<	<	<	<	<
Nitrate as N	0.138	0.172	0.542	0.52	0.526	0.71	0.95	0.055	0.053
Sulfate	1.27	1.13	1.46	1.52	1.53	0.91	0.72	3.2	3.3
Charge Balance Error (%)	-1.5	1.6	0.5	2.4	1.8	-4.4	7.6	-1.2	<
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	0.417	<	<
Antimony (PMS)	<	0.00251	<	<	<	.	.	.	.
Arsenic (PMS)	<	<	<	<	<	.	.	.	.
Arsenic	.	.	.	.	.	<	<	<	<
Barium	0.0149	0.0155	0.0174	0.0181	0.018	0.0098	0.0097	<	<
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Chromium	.	.	.	.	.	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	<	<	<	0.0979	0.0962	<	0.366	<	<
Lead (PMS)	0.000665	<	0.00106	<	0.000881	.	.	.	.
Lead	.	.	.	.	.	<	<	<	<
Lithium	<	<	<	<	<	<	<	0.125	0.139
Manganese	0.00801	<	<	<	<	<	0.0101	<	<
Nickel (PMS)	<	<	<	<	<	.	.	.	.
Nickel	.	.	.	.	.	<	<	<	<
Selenium (PMS)	<	<	<	<	<	.	.	.	.
Strontium	0.0236	0.0234	0.0288	0.0266	0.0257	0.0112	0.0132	<	<
Thallium (PMS)	<	<	<	<	<	.	.	.	.
Uranium (PMS)	<	<	<	<	<	.	.	.	.
Uranium (KPA)	.	.	.	.	.	<	<	<	<
Zinc	0.101	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-217		GW-221		GW-231			
Functional Area	**LIV**		**UNCS**		**KHQ**			
Date Sampled	**01/14/04**	**07/14/04**	**02/25/04**	**08/04/04**	**04/08/04**		**10/11/04**	
Program	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**
Sample Type						**Dup**		**Dup**
Field Measurements								
Time Sampled	13:15	9:30	12:55	14:35	9:40	.	14:00	.
Measuring Point Elev. (ft)	1,177.03	1,177.03	1,106.16	1,106.16	849.67	.	849.67	.
Depth to Water (ft)	109.24	111.58	72.29	75.68	14.65	.	16.30	.
Groundwater Elevation (ft)	1,067.79	1,065.45	1,033.87	1,030.48	835.02	.	833.37	.
Conductivity (μmho/cm)	434	675	423	299	376	.	403	.
Dissolved Oxygen (ppm)	5.65	5.29	6.29	3.81	1.65	.	0.83	.
Oxidation/Reduction (mV)	129	243	137	113	207	.	85	.
Temperature (degrees C)	14.2	17.9	15.6	19.4	11.9	.	17.1	.
Turbidity (NTU)	12	3	10	2	14	.	5	.
pH	7.65	7.54	7.64	7.3	7.27	.	7.47	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	180	190	153	170	128	451	206	201
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<
Turbidity (NTU)	<	0.11	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	37	37	31.8 J	36.2	31.5	31.1	47.9	48.1
Magnesium	22	22	20.5	22.1	15.9	15.8	25.1	25
Potassium	1.6 J	1.6 J	0.959	0.981	2.53	2.29	2.7	2.46
Sodium	4.5 J	5.5	0.505	0.666	0.905	0.879	1.02	1.02
Alkalinity as CO3	<	<	<	<	.	.	.	.
Alkalinity as HCO3	180	170	174	162	.	.	.	.
Chloride	2.8 J	1.9 J	1.3	1.6	.	.	.	.
Fluoride	0.15 J	<	<	<	.	.	.	.
Nitrate as N	0.45 J	0.35 J	0.38	0.5	.	.	.	.
Sulfate	6.8	6.8	1.3	1.2	.	.	.	.
Charge Balance Error (%)	0.4	4.2	-3.6	4.8	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Arsenic	<	<	<	<	<	<	<	<
Barium	0.033	0.031	0.0083	0.0088	0.0451	0.0444	0.0941	0.0946
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	<
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	<	<	<	<	<	<
Manganese	<	<	<	<	<	<	0.017	0.017
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.017	0.017	0.0112	0.0123	0.028	0.0275	0.046	0.046
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-300		GW-301				GW-305	
Functional Area	CRBAWP		CRBAWP				LIV	
Date Sampled	04/19/04	10/12/04	01/12/04		07/12/04		01/14/04	05/03/04
Program	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type				Dup		Dup		
Field Measurements								
Time Sampled	8:35	8:50	13:20	.	13:55	.	10:20	13:05
Measuring Point Elev. (ft)	1,073.12	1,073.12	1,086.55	.	1,086.55	.	1,183.72	1,183.72
Depth to Water (ft)	105.02	115.68	131.81	.	134.04	.	121.05	121.78
Groundwater Elevation (ft)	968.10	957.44	954.74	.	952.51	.	1,062.67	1,061.94
Conductivity (μmho/cm)	296	319	725	.	400	.	489	600
Dissolved Oxygen (ppm)	2.89	4.34	655	.	5.18	.	4.65	4.45
Oxidation/Reduction (mV)	21	205	85	.	135	.	153	210
Temperature (degrees C)	13.8	14.3	13.3	.	17.5	.	9.9	12.7
Turbidity (NTU)	.	.	18	.	8	.	14	18
pH	7.11	7.3	7.87	.	7.53	.	7.2	7.53
Miscellaneous Analytes								
Dissolved Solids (mg/L)	143	154	183	179	217	208	210	170
Suspended Solids (mg/L)	2	<	<	<	<	<	<	<
Turbidity (NTU)	9.28	1.23	.	.	.	.	<	0.12
Major Ions (mg/L)								
Calcium	27.4	32.4	39.9	39.4	44.6	43.4	43	41
Magnesium	17.6	19.3	25.7	25.3	27.9	27.4	22	21
Potassium	<	<	0.735	0.79	1.15	0.835	0.88 J	0.79 J
Sodium	0.614	0.782	0.877 J	0.929 J	0.833	0.785	<	1.6 J
Alkalinity as CO3	<	<	.	.	.	.	<	<
Alkalinity as HCO3	134	156	.	.	.	.	190	160
Chloride	1.04	0.9	.	.	.	.	13	4.3
Fluoride	<	<	.	.	.	.	0.17 J	<
Nitrate as N	0.124	0.136	.	.	.	.	0.56	0.4 J
Sulfate	4.37	3.47	.	.	.	.	3.8 J	4.8 J
Charge Balance Error (%)	0.6	0.2	.	.	.	.	-3.8	5.7
Trace Metals (mg/L)								
Aluminum	0.868	<	<	<	<	<	<	<
Antimony (PMS)	<	0.00271	.	.	.	.	.	.
Arsenic (PMS)	<	<	.	.	.	.	.	.
Arsenic	.	.	<	<	<	<	<	<
Barium	0.0211	0.0214	0.0236	0.0226	0.0196	0.0203	0.014	0.014
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	.	.	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.463	0.0782	<	<	<	<	<	<
Lead (PMS)	0.00194	0.000507	.	.	.	.	.	.
Lead	.	.	<	<	<	<	<	<
Lithium	<	<	<	<	<	<	.	.
Manganese	0.00614	<	<	<	<	<	<	<
Nickel (PMS)	<	<	.	.	.	.	.	.
Nickel	.	.	<	<	<	<	0.62	0.53
Selenium (PMS)	<	<	.	.	.	.	.	.
Strontium	0.0203	0.0218	0.0232	0.0227	0.023	0.0231	0.028	0.027
Thallium (PMS)	0.000642	0.000547	.	.	.	.	.	.
Uranium (PMS)	<	0.000554	.	.	.	.	.	.
Uranium (KPA)	.	.	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-305		GW-322		GW-513			GW-521	
Functional Area	**LIV**		**CRSP**		**FCAP**			**LIV**	
Date Sampled	**07/14/04**	**10/26/04**	**05/13/04**	**10/11/04**	**04/20/04**		**10/13/04**	**01/14/04**	**07/14/04**
Program	**BJC**	**BJC**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**
Sample Type						**Dup**			
Field Measurements									
Time Sampled	12:30	10:00	9:15	8:15	9:20	9:20	8:50	10:05	9:10
Measuring Point Elev. (ft)	1,183.72	1,183.72	1,134.25	1,134.25	1,001.41	1,001.41	1,001.41	1,182.88	1,182.88
Depth to Water (ft)	122.92	123.37	151.22	154.78	16.13	16.13	25.96	82.23	84.42
Groundwater Elevation (ft)	1,060.80	1,060.35	983.03	979.47	985.28	985.28	975.45	1,100.65	1,098.46
Conductivity (μmho/cm)	669	534	542	528	363	363	382	536	287
Dissolved Oxygen (ppm)	4.78	4.64	1.91	2.8	2.46	2.46	2.14	12.76	4.32
Oxidation/Reduction (mV)	163	232	100	218	41	41	212	174	199
Temperature (degrees C)	23.2	15.1	16.4	15.5	14.3	14.3	15.5	13.9	16.3
Turbidity (NTU)	7	<	.	.	.	.	.	11	4
pH	7.92	7.82	7.32	7.21	7.47	7.47	7.96	8.05	8.1
Miscellaneous Analytes									
Dissolved Solids (mg/L)	220	190	275	282	190	187	184	140	140
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<	7.2
Turbidity (NTU)	0.24	0.09 J	0.327	0.253	4.11	4.18	2.03	0.98	8
Major Ions (mg/L)									
Calcium	50	42	56.9	56.7	42.6	41.2	38.8	24	27
Magnesium	22	22	34.6	35.4	23.1	22.9	23.2	21	21
Potassium	1.1 J	0.64 J	<	<	<	<	<	0.46 J	1.1 J
Sodium	1.1 J	<	0.704	0.716	0.42	0.418	0.449	1.1 J	3.9 J
Alkalinity as CO3	<	<	<	<	<	<	<	5	6
Alkalinity as HCO3	190	180	286	282	191	195	189	140	140
Chloride	14	8.3	1.95	1.94	0.76	0.73	0.71	2.5 J	1.2 J
Fluoride	<	<	<	<	<	<	<	<	<
Nitrate as N	0.44 J	0.34 J	0.386	0.373	0.0836	0.0723	0.0655	0.41 J	0.24 J
Sulfate	6	1.6 J	1.12	1.28	1.32	1.3	1.27	2.7 J	2.5 J
Charge Balance Error (%)	0.4	0.4	-0.9	0.3	2.2	0.1	0.5	-1.2	4
Trace Metals (mg/L)									
Aluminum	<	<	<	<	0.221	0.255	<	<	0.32
Antimony (PMS)	.	.	<	<	<	<	<	.	.
Arsenic (PMS)	.	.	<	<	<	<	<	.	.
Arsenic	<	<	.	.	.	.	.	<	<
Barium	0.019	0.013	0.0155	0.0158	0.00818	0.00783	0.00811	<	<
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Chromium	<	<	.	.	.	.	.	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	<	<	<	<	0.164	0.182	<	<	0.68
Lead (PMS)	.	.	<	<	<	<	0.0015	.	.
Lead	<	<	.	.	.	.	.	<	<
Lithium	.	.	<	<	<	<	<	.	.
Manganese	<	<	<	<	<	<	<	<	0.017
Nickel (PMS)	.	.	<	<	<	<	<	.	.
Nickel	0.9	0.45	.	.	.	.	.	<	<
Selenium (PMS)	.	.	<	<	<	<	<	.	.
Strontium	0.041	0.025	0.0199	0.02	0.0242	0.0239	0.024	<	<
Thallium (PMS)	.	.	<	<	<	<	<	.	.
Uranium (PMS)	.	.	<	<	<	<	<	.	.
Uranium (KPA)	<	<	.	.	.	.	.	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-522		GW-540		GW-542		GW-543	
Functional Area	LIV		LII		CDLVI		CDLVI	
Date Sampled	01/14/04	07/14/04	01/22/04	07/21/04	01/15/04	07/21/04	01/21/04	07/21/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	12:25	10:50	12:45	9:20	12:05	9:40	10:00	11:00
Measuring Point Elev. (ft)	1,175.48	1,175.48	1,072.31	1,072.31	1,051.81	1,051.81	1,024.01	1,024.01
Depth to Water (ft)	93.97	103.76	82.89	83.60	70.13	70.44	63.71	65.04
Groundwater Elevation (ft)	1,081.51	1,071.72	989.42	988.71	981.68	981.37	960.30	958.97
Conductivity (μmho/cm)	759	350	518	828	281	147	637	380
Dissolved Oxygen (ppm)	15.39	5.01	0.33	1.73	7.19	5.11	6.26	5.3
Oxidation/Reduction (mV)	274	228	147	151	206	277	211	239
Temperature (degrees C)	14.8	17.6	14	17.2	15.3	15.9	11.5	19.3
Turbidity (NTU)	9	2	10	10	20	4	7	2
pH	7.35	7.39	7.51	7.7	6.62	6.07	7.18	6.92
Miscellaneous Analytes								
Dissolved Solids (mg/L)	190	180	240	230	120	92	260	240
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<
Turbidity (NTU)	<	0.64	0.1	<	0.72	0.3	0.08 J	0.16
Major Ions (mg/L)								
Calcium	44	38	45	43	25	20	50	53
Magnesium	27	24	29	30	11	9.2	29	31
Potassium	0.65 J	0.75 J	0.95 J	1.6 J	1.3 J	2.2 J	0.51 J	0.62 J
Sodium	<	<	6	11	<	1.4 J	3.6 J	1.2 J
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	200	170	240	240	110	91	240	230
Chloride	2.8 J	1.4 J	2.8 J	1.6 J	2.4 J	0.96 J	2.9 J	1.9 J
Fluoride	0.15 J	<	0.16 J	<	0.17 J	<	0.16 J	<
Nitrate as N	0.57	0.41 J	0.21 J	0.02 J	0.41 J	0.28 J	0.38 J	0.21 J
Sulfate	4 J	2.9 J	5.8	5.6	3 J	2.2 J	13	8.2
Charge Balance Error (%)	2.6	4.9	-1	1.7	-4	-1	-1.3	4.2
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Arsenic	<	<	<	<	<	<	<	<
Barium	0.012	0.01	0.013	0.012	0.015	0.013	0.013	<
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	1.2	<	<	<	<
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	<	<	<	<	<	<	<	<
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.017	0.015	0.033	0.03	0.02	0.017	0.034	0.029
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-544		GW-557				GW-560	
Functional Area	CDLVI		LV				CDLVII	
Date Sampled	01/21/04	07/21/04	01/13/04		07/20/04		01/21/04	07/19/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type				Dup		Dup		
Field Measurements								
Time Sampled	12:35	10:55	10:10	.	9:30	.	9:50	12:50
Measuring Point Elev. (ft)	1,045.19	1,045.19	1,081.36	.	1,081.36	.	949.05	949.05
Depth to Water (ft)	54.25	58.72	119.27	.	121.51	.	38.12	41.45
Groundwater Elevation (ft)	990.94	986.47	962.09	.	959.85	.	910.93	907.60
Conductivity (μmho/cm)	698	1,004	604	.	649	.	321	741
Dissolved Oxygen (ppm)	2.99	4.84	8.85	.	7.34	.	5.03	4.26
Oxidation/Reduction (mV)	184	175	113	.	174	.	194	152
Temperature (degrees C)	10.2	18.7	13.6	.	17.8	.	12.5	19.9
Turbidity (NTU)	9	8	9	.	14	.	5	2
pH	7.52	7.4	7.38	.	7.39	.	7.22	7.27
Miscellaneous Analytes								
Dissolved Solids (mg/L)	290	310	200	200	170	160	190	170
Suspended Solids (mg/L)	<	<	1.4 J	<	<	<	12	<
Turbidity (NTU)	<	<	0.53	0.82	0.75	0.87	8.9	0.34
Major Ions (mg/L)								
Calcium	55	59	39	38	36	35	40	39
Magnesium	32	34	22	22	21	21	16	17
Potassium	0.75 J	1.4 J	0.55 J	0.55 J	1.2 J	1.1 J	0.53 J	1 J
Sodium	4 J	5.4	1.9 J	<	<	<	<	<
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	230	230	170	170	170	170	160	160
Chloride	9.6	10	2.6 J	2.5 J	1.8 J	1.8 J	2.3 J	2.1 J
Fluoride	0.15 J	<	0.15 J	0.17 J	<	<	0.18 J	0.15 J
Nitrate as N	0.66	0.47 J	0.63	0.65	0.54	0.56	0.31 J	0.31 J
Sulfate	28	42	2.4 J	2.4 J	2.4 J	2.4 J	2.9 J	2.7 J
Charge Balance Error (%)	0.6	1.9	3.8	.	0.3	.	-0.4	0.4
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Arsenic	<	<	<	<	<	<	<	<
Barium	0.013	0.013	0.011	0.011	0.01	<	0.26	0.23
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	<
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	<	<	<	<	<	<	0.011	<
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.032	0.031	0.018	0.018	0.017	0.016	0.029	0.026
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-562		GW-564				GW-610	
Functional Area	CDLVII		CDLVII				CRSP	
Date Sampled	01/21/04	07/19/04	01/20/04		07/19/04		04/22/04	10/20/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type				Dup		Dup		
Field Measurements								
Time Sampled	12:30	13:10	13:15	.	9:05	.	8:30	9:20
Measuring Point Elev. (ft)	934.69	934.69	938.07	.	938.07	.	1,059.44	1,059.44
Depth to Water (ft)	4.55	4.95	10.34	.	10.31	.	81.57	81.94
Groundwater Elevation (ft)	930.14	929.74	927.73	.	927.76	.	977.87	977.50
Conductivity (μmho/cm)	747	747	557	.	572	.	269	415
Dissolved Oxygen (ppm)	4.09	2.91	6.7	.	5.96	.	1.65	1.79
Oxidation/Reduction (mV)	186	124	186	.	196	.	-43	210
Temperature (degrees C)	9.8	21.1	14.8	.	18.5	.	14.2	15.5
Turbidity (NTU)	7	9	18	.	12	.	.	.
pH	7.55	7.39	7.07	.	7.08	.	8.92	8.21
Miscellaneous Analytes								
Dissolved Solids (mg/L)	210	200	140	150	150	160	177	231
Suspended Solids (mg/L)	7	2.4 J	<	<	<	<	<	<
Turbidity (NTU)	14	8.9	0.19	0.19	0.1	0.13	0.349	0.123
Major Ions (mg/L)								
Calcium	41	41	37	35	35	34	28.1	41.3
Magnesium	24	24	16	15	16	16	29.6	28.4
Potassium	<	<	0.96 J	0.96 J	1.2 J	0.99 J	<	<
Sodium	1.5 J	1.7 J	<	<	<	<	1.06	0.881
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	200	200	140	94	140	140	195	224
Chloride	2.8 J	2.7 J	2.5 J	2.4 J	2 J	2.1 J	2.02	2.18
Fluoride	0.17 J	0.14 J	0.16 J	0.17 J	0.13 J	0.13 J	<	<
Nitrate as N	0.37 J	0.34 J	0.55	0.49 J	0.54	0.48 J	0.666	0.712
Sulfate	2.5 J	2.4 J	3.3 J	3.4 J	2.6 J	2.6 J	1.08	1.02
Charge Balance Error (%)	-0.9	-0.7	3.3	.	2.3	.	-1.9	-1.9
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	.	.	.	.	.	<	<
Arsenic (PMS)	.	.	.	.	.	.	<	<
Arsenic	<	<	<	<	<	<	.	.
Barium	0.013	0.012	0.015	0.015	0.013	0.013	0.0915	0.0813
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	.	.
Copper	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	<
Lead (PMS)	.	.	.	.	.	.	<	<
Lead	<	<	<	<	<	<	.	.
Lithium	.	.	.	.	.	.	<	<
Manganese	<	<	<	<	<	<	<	<
Nickel (PMS)	.	.	.	.	.	.	<	<
Nickel	<	<	<	<	<	<	.	.
Selenium (PMS)	.	.	.	.	.	.	<	<
Strontium	0.024	0.021	0.024	0.023	0.022	0.021	0.0192	0.0183
Thallium (PMS)	.	.	.	.	.	.	<	<
Uranium (PMS)	.	.	.	.	.	.	<	<
Uranium (KPA)	<	<	<	<	<	<	.	.
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-611			GW-612					
Functional Area	**CRSP**			**CRSP**					
Date Sampled	**04/22/04**	**10/20/04**		**05/11/04**	**05/12/04**		**10/04/04**	**10/05/04**	
Program	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**
Sample Type			**Dup**		**Conv**	**Conv-F**		**Conv**	**Conv-F**
Field Measurements									
Time Sampled	9:35	10:25	10:25	10:55	16:25	.	10:45	14:36	.
Measuring Point Elev. (ft)	1,048.38	1,048.38	1,048.38	1,131.03	1,131.03	.	1,131.03	1,131.03	.
Depth to Water (ft)	98.48	102.42	102.42	122.02	122.03	.	123.04	123.17	.
Groundwater Elevation (ft)	949.90	945.96	945.96	1,009.01	1,009.00	.	1,007.99	1,007.86	.
Conductivity (μmho/cm)	556	567	567	422	453	.	496	492	.
Dissolved Oxygen (ppm)	3.1	2.89	2.89	2.89	3.54	.	2.49	3.86	.
Oxidation/Reduction (mV)	41	210	210	61	59	.	170	143	.
Temperature (degrees C)	14.7	14.8	14.8	16.5	17.1	.	16.4	15.6	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.
pH	7.26	8.14	8.14	7.62	7.44	.	7.63	7.33	.
Miscellaneous Analytes									
Dissolved Solids (mg/L)	289	311	313	221	245	.	227	257	.
Suspended Solids (mg/L)	<	<	<	3	<	.	8	<	.
Turbidity (NTU)	0.292	0.205	0.211	9.8	1.26	.	68.3	1.6	.
Major Ions (mg/L)									
Calcium	64.3	62.1	59.8	39.3	49.7	49.9	41.7	53.2	50.3
Magnesium	36.4	36.5	35.9	31.9	30.6	31.4	33	31.9	30.7
Potassium	<	<	<	<	<	<	<	<	<
Sodium	2.08	3.55	3.41	0.59	0.638	0.621	0.686	0.642	0.639
Alkalinity as CO3	<	<	<	<	<	.	<	<	.
Alkalinity as HCO3	284	276	275	226	246	.	230	243	.
Chloride	1.07	1.19	1.18	1.64	2.07	.	2.04	2.09	.
Fluoride	<	<	<	<	<	.	<	<	.
Nitrate as N	4.13	4.05	4.07	0.117	0.431	.	<	0.377	.
Sulfate	1.34	2.07	2.1	2.5	2.86	.	2.9	2.63	.
Charge Balance Error (%)	2.1	3.1	1.8	-0.1	-0.4	.	1.2	3	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	<	<
Antimony (PMS)	<	<	<	<	<	<	<	<	<
Arsenic (PMS)	<	<	<	<	<	<	<	<	<
Arsenic	.	.	.	.	.	.	.	.	.
Barium	0.0157	0.0158	0.0154	0.0167	0.0171	0.0172	0.0223	0.0175	0.0166
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	0.144	0.338	0.349	0.282	0.319	0.309
Chromium	.	.	.	.	.	.	.	.	.
Copper	<	<	<	<	<	<	<	<	<
Iron	<	<	<	1.23	0.134	<	5.55	0.206	<
Lead (PMS)	<	<	<	0.00227	<	<	0.00172	0.00189	<
Lead	.	.	.	.	.	.	.	.	.
Lithium	<	<	<	<	<	<	<	<	<
Manganese	<	<	<	0.0387	<	<	0.202	0.0157	0.0138
Nickel (PMS)	<	<	<	<	<	<	<	<	<
Nickel	.	.	.	.	.	.	.	.	.
Selenium (PMS)	<	<	<	<	<	<	<	<	<
Strontium	0.0232	0.0184	0.0185	0.0196	0.0164	0.0168	0.0197	0.0171	0.0164
Thallium (PMS)	<	<	<	<	<	<	<	<	<
Uranium (PMS)	<	<	<	<	0.00061	0.000614	<	0.000923	0.00103
Uranium (KPA)	.	.	.	.	.	.	.	.	.
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-679		GW-680			GW-709		GW-731	
Functional Area	FCAP		FCAP			LII		CRSDB	
Date Sampled	04/19/04	10/12/04	06/07/04		10/13/04	01/20/04	07/22/04	04/14/04	10/13/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC
Sample Type				F					
Field Measurements									
Time Sampled	9:50	10:00	8:25	.	10:00	13:15	9:40	10:05	9:05
Measuring Point Elev. (ft)	1,026.90	1,026.90	1,001.50	.	1,001.50	906.81	906.81	1,049.29	1,049.29
Depth to Water (ft)	42.44	52.87	26.43	.	28.53	26.88	29.69	124.02	125.00
Groundwater Elevation (ft)	984.46	974.03	975.07	.	972.97	879.93	877.12	925.27	924.29
Conductivity (μmho/cm)	331	315	320	.	328	460	288	364	267
Dissolved Oxygen (ppm)	2.64	0.97	1.68	.	2.58	6.57	2.42	6.35	4.79
Oxidation/Reduction (mV)	7	186	183	.	201	100	67	207	218
Temperature (degrees C)	13.8	15.5	14.2	.	14.2	9.7	20	12	16
Turbidity (NTU)	.	.	.	.	.	6	6	6	25
pH	9.24	9.27	7.63	.	7.54	8.85	7.86	7.8	8.05
Miscellaneous Analytes									
Dissolved Solids (mg/L)	164	203	168	.	170	180	190	184	156
Suspended Solids (mg/L)	12	<	4	.	<	<	<	8.2	<
Turbidity (NTU)	7.44	0.45	20.5	.	6.71	0.1	0.77	.	.
Major Ions (mg/L)									
Calcium	5.76	4.08	33.2	33.4	35	28	27	31.3	32.3
Magnesium	10.6	10.5	20.1	19.9	19.8	27	29	17.9	19.2
Potassium	42.9	43.9	<	<	<	1 J	1.2 J	1.5	1.03
Sodium	18.9	19.3	0.41	0.409	0.442	3 J	3.3 J	0.8	0.551
Alkalinity as CO3	48	31	<	.	<	7	<	.	.
Alkalinity as HCO3	89	117	183	.	163	160	180	.	.
Chloride	0.82	0.83	0.71	.	0.73	3.7	3.3	.	.
Fluoride	<	<	<	.	<	0.16 J	<	.	.
Nitrate as N	0.26	0.201	0.0655	.	0.061	<	0.04 J	.	.
Sulfate	3.16	2.86	0.92	.	1	8.2	9.4	.	.
Charge Balance Error (%)	3.6	-0.7	-5.3	.	1.4	2	0.2	.	.
Trace Metals (mg/L)									
Aluminum	0.506	<	1.44	<	0.425	<	<	0.416	<
Antimony (PMS)	<	0.00325	<	<	0.00316	.	.	.	.
Arsenic (PMS)	<	<	0.00633	0.00641	<	.	.	.	.
Arsenic	.	.	.	.	.	<	<	<	<
Barium	0.0183	0.0132	0.0209	0.0186	0.019	0.5	0.51	0.011	0.0086
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Chromium	.	.	.	.	.	<	<	<	<
Copper	<	<	<	<	<	0.022	<	<	<
Iron	0.256	<	0.849	<	0.224	<	<	0.394	<
Lead (PMS)	0.000764	0.00066	0.000897	<	0.000936	.	.	.	.
Lead	.	.	.	.	.	<	<	<	<
Lithium	0.114	0.11	<	<	<	.	.	<	<
Manganese	0.0063	<	0.0114	<	<	<	<	0.0185	<
Nickel (PMS)	<	<	<	<	<	.	.	.	.
Nickel	.	.	.	.	.	<	<	<	<
Selenium (PMS)	<	<	0.013	0.0144	<	.	.	.	.
Strontium	0.192	0.0922	0.0167	0.0164	0.0163	0.04	0.037	0.0248	0.0165
Thallium (PMS)	0.000567	0.00057	<	<	<	.	.	.	.
Uranium (PMS)	0.000546	0.000712	<	<	<	.	.	.	.
Uranium (KPA)	.	.	.	.	.	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-732		GW-742		GW-743		GW-757	
Functional Area	CRSDB		CRSP		CRSP		LII	
Date Sampled	04/08/04	10/14/04	04/21/04	10/18/04	04/21/04	10/18/04	01/20/04	07/22/04
Program	BJC	BJC	GWPP	GWPP	GWPP	GWPP	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	13:20	13:50	8:50	8:55	9:45	9:55	10:30	10:10
Measuring Point Elev. (ft)	1,064.29	1,064.29	1,100.97	1,100.97	1,100.36	1,100.36	961.64	961.64
Depth to Water (ft)	160.30	157.97	122.74	132.91	115.65	132.30	83.22	84.67
Groundwater Elevation (ft)	903.99	906.32	978.23	968.06	984.71	968.06	878.42	876.97
Conductivity (μmho/cm)	462	279	296	329	265	339	441	597
Dissolved Oxygen (ppm)	5.36	6.68	1.3	0.29	3.41	5.61	9.21	1.27
Oxidation/Reduction (mV)	183	203	-233	-236	-11	33	168	95
Temperature (degrees C)	15.6	15.4	14.6	14.6	14.7	14.5	9.1	19.2
Turbidity (NTU)	17	10	.	.	.	.	9	9
pH	7.49	8.44	7.69	7.89	7.34	7.46	10.4	10.01
Miscellaneous Analytes								
Dissolved Solids (mg/L)	176	151	152	166	139	181	150	160
Suspended Solids (mg/L)	<	<	<	<	<	<	3.2 J	<
Turbidity (NTU)	.	.	16.6	17.2	0.466	0.136	0.83	0.54
Major Ions (mg/L)								
Calcium	37.4	30.1	27	25.8	27	33.7	2.9	2.5
Magnesium	24	19.9	22.8	21.8	17.4	20.7	2.4	2.2
Potassium	1.9	1.16	<	<	<	<	18	19
Sodium	0.759	0.533	0.738	0.691	1.59	2.1	43	44
Alkalinity as CO3	.	.	<	<	<	<	130	67
Alkalinity as HCO3	.	.	155	152	130	164	<	41
Chloride	.	.	0.73	0.73	1.76	2.01	2.7 J	1.6 J
Fluoride	.	.	<	<	<	<	1.7	1.8
Nitrate as N	.	.	<	<	0.233	0.52	0.38 J	0.27 J
Sulfate	.	.	10.8	10.9	5.38	4.26	17	17
Charge Balance Error (%)	.	.	-1.3	-2.7	1.3	0.2	-11.9	-1.2
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Antimony (PMS)	.	.	<	<	<	<	.	.
Arsenic (PMS)	.	.	<	<	<	<	.	.
Arsenic	<	<	.	.	.	.	<	<
Barium	0.0145	0.0076	0.107	0.108	0.0102	0.0124	0.061	0.056
Beryllium	<	<	<	<	0.00106	<	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	.	.	.	.	<	<
Copper	<	<	<	<	<	<	<	<
Iron	<	<	2.69	2.46	<	<	<	<
Lead (PMS)	.	.	<	<	<	<	.	.
Lead	<	<	.	.	.	.	<	<
Lithium	<	<	<	<	<	<	.	.
Manganese	<	<	0.0636	0.044	<	<	<	<
Nickel (PMS)	.	.	<	<	<	<	.	.
Nickel	<	<	.	.	.	.	<	<
Selenium (PMS)	.	.	<	<	<	<	.	.
Strontium	0.0188	0.0112	0.0145	0.0145	0.0207	0.0241	0.15	0.13
Thallium (PMS)	.	.	<	<	<	<	.	.
Uranium (PMS)	.	.	<	<	<	<	.	.
Uranium (KPA)	<	<	.	.	.	.	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-796		GW-797		GW-798			
Functional Area	LV		LV		CDLVII			
Date Sampled	01/13/04	07/20/04	01/15/04	07/15/04	01/12/04	01/20/04	01/28/04	07/20/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	12:25	12:55	9:50	11:05	11:05	10:30	13:30	10:30
Measuring Point Elev. (ft)	1,052.62	1,052.62	1,060.00	1,060.00	1,006.00	1,006.00	1,006.00	1,006.00
Depth to Water (ft)	76.44	78.28	73.70	73.95	73.68	73.54	73.59	74.8
Groundwater Elevation (ft)	976.18	974.34	986.30	986.05	932.32	932.46	932.41	931.20
Conductivity (μmho/cm)	452	462	822	429	328	503	502	274
Dissolved Oxygen (ppm)	8.32	6.94	10.51	3.62	10.14	5.93	6.76	4.58
Oxidation/Reduction (mV)	100	139	243	168	44	181	195	187
Temperature (degrees C)	15.5	19.6	11.8	20.3	15.6	14.5	13.5	18.2
Turbidity (NTU)	12	6	12	2	11	17	7	2
pH	8.03	6.35	6.51	7.53	7.07	7.54	7.68	7.45
Miscellaneous Analytes								
Dissolved Solids (mg/L)	150	120	230	270	139	130	.	140
Suspended Solids (mg/L)	4.6	<	<	<	<	<	.	<
Turbidity (NTU)	3	0.75	0.36	0.83	.	<	<	<
Major Ions (mg/L)								
Calcium	26	24	47	47	28.2	30	.	29
Magnesium	15	15	26	28	15.9	16	.	17
Potassium	<	0.71 J	1.1 J	1.5 J	1.36	1.4 J	.	1.4 J
Sodium	<	<	3.4 J	4.9 J	0.662 J	<	.	<
Alkalinity as CO3	<	<	<	<	.	<	.	<
Alkalinity as HCO3	120	120	170	180	.	130	.	130
Chloride	2.5 J	2 J	5.6	6	.	2.2 J	.	1.5 J
Fluoride	0.15 J	<	0.16 J	<	.	0.19 J	.	<
Nitrate as N	0.22 J	0.23 J	1.1	1.4	.	0.84	0.74	0.68
Sulfate	1.6 J	1.8 J	41	45	.	3 J	.	2.6 J
Charge Balance Error (%)	0.1	-1.2	1.8	1	.	1	.	2.5
Trace Metals (mg/L)								
Aluminum	0.24	<	<	<	<	<		<
Antimony (PMS)	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.
Arsenic	<	<	<	<	<	<	.	<
Barium	<	<	<	0.011	0.0103	0.011	.	<
Beryllium	<	<	<	<	<	<	.	<
Boron	<	<	<	<	<	<	.	<
Chromium	<	<	<	<	<	<	.	<
Copper	<	<	<	<	<	<	.	<
Iron	0.14	<	<	<	<	<	.	<
Lead (PMS)	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	<	.	<
Lithium	.	.	.	.	<	.	.	.
Manganese	<	<	<	<	<	<	.	<
Nickel (PMS)	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	.	<
Selenium (PMS)	.	.	.	.	.	.	.	.
Strontium	0.014	0.012	0.028	0.029	0.0169	0.018	.	0.017
Thallium (PMS)	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.
Uranium (KPA)	<	<	<	<	<	<	.	<
Zinc	<	<	<	<	<	<	.	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-799		GW-801		GW-827			GW-831	
Functional Area	LV		LV		CDLVI			FCAP	
Date Sampled	01/15/04	07/19/04	01/13/04	07/15/04	01/15/04	02/12/04	07/20/04	01/13/04	07/12/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type									
Field Measurements									
Time Sampled	12:55	9:10	10:15	9:20	9:45	14:10	13:00	13:25	9:35
Measuring Point Elev. (ft)	981.29	981.29	1,097.16	1,097.16	1,051.60	1,051.60	1,051.60	1,091.29	1,091.29
Depth to Water (ft)	14.06	15.97	108.74	110.18	40.01	37.50	39.58	127.71	127.10
Groundwater Elevation (ft)	967.23	965.32	988.42	986.98	1,011.59	1,014.10	1,012.02	963.58	964.19
Conductivity (μmho/cm)	556	296	328	281	403	402	303	462	381
Dissolved Oxygen (ppm)	9.25	2.61	9.12	5.68	11.96	5.96	2.28	1.03	1.79
Oxidation/Reduction (mV)	164	171	179	211	208	114	190	92	178
Temperature (degrees C)	14.5	18.2	14	16.3	13.7	14.1	15.9	14.2	19.1
Turbidity (NTU)	27	3	14	5	15	9	3	16	5
pH	6.55	8.01	7.82	7.6	7.42	7.72	7.47	8.54	8.34
Miscellaneous Analytes									
Dissolved Solids (mg/L)	140	160	170	150	130	.	150	139	188
Suspended Solids (mg/L)	1.2 J	<	1.2 J	<	<	.	<	<	<
Turbidity (NTU)	0.92	1.4	0.4	0.09 J	0.4	.	0.11	.	.
Major Ions (mg/L)									
Calcium	33	32	33	31	34	.	32	36.1	34.5
Magnesium	17	17	19	18	19	.	19	26.5	26.1
Potassium	<	0.76 J	<	0.5 J	0.8 J	.	1.1 J	1.63	3.32
Sodium	<	<	<	<	<	.	<	0.52	0.863
Alkalinity as CO3	<	2.5 J	<	<	<	.	<	.	.
Alkalinity as HCO3	140	140	150	140	150	.	150	.	.
Chloride	2.7 J	2 J	2.4 J	1.3 J	2.1 J	.	1.5 J	.	.
Fluoride	0.23 J	0.18 J	0.15 J	<	0.16 J	.	<	.	.
Nitrate as N	1.1	1	0.23 J	0.09 J	0.25 J	.	0.22 J	.	.
Sulfate	3.7 J	3.6 J	3.5 J	3 J	2.1 J	.	2.1 J	.	.
Charge Balance Error (%)	0.1	-0.8	0.7	2.3	2.4	.	1.4	.	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<		<	<	<
Antimony (PMS)	.	.	.	.	.	.	.	.	.
Arsenic (PMS)	.	.	.	.	.	.	.	.	.
Arsenic	<	<	<	<	<	.	<	<	<
Barium	<	<	<	<	<	.	<	0.0195	0.0189
Beryllium	<	<	<	<	<	.	<	<	<
Boron	<	<	<	<	<	.	<	<	<
Chromium	0.036	0.049	<	<	<	.	<	<	0.0392
Copper	<	<	<	<	<	.	<	<	<
Iron	<	<	<	<	<	.	<	0.106	0.415
Lead (PMS)	.	.	.	.	.	.	.	.	.
Lead	<	<	<	<	<	.	<	<	0.0049
Lithium	.	.	.	.	.	.	.	<	<
Manganese	<	<	<	<	<	.	<	0.0103	0.0143
Nickel (PMS)	.	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	.	<	<	<
Selenium (PMS)	.	.	.	.	.	.	.	.	.
Strontium	0.021	0.021	0.016	0.016	0.018	.	0.017	0.0265	0.0253
Thallium (PMS)	.	.	.	.	.	.	.	.	.
Uranium (PMS)	.	.	.	.	.	.	.	.	.
Uranium (KPA)	<	<	<	<	<	.	<	<	<
Zinc	<	<	<	<	<	.	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	MCK 2.0		MCK 2.05				S17	
Functional Area	EXP-SW		EXP-SW				EXP-SW	
Date Sampled	02/18/04	08/16/04	02/18/04		08/16/04		01/29/04	07/19/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type				Dup		Dup		
Field Measurements								
Time Sampled	14:35	14:10	14:30	.	14:30	14:30	10:45	10:05
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)								
Conductivity (μmho/cm)	403	325	431	.	284	.	323	351
Dissolved Oxygen (ppm)	12.4	9.28	5.73	.	9.62	.	5.72	4.12
Oxidation/Reduction (mV)	78	71	2	.	84	.	222	193
Temperature (degrees C)	12.8	19.9	13	.	18.2	.	7.4	19.8
Turbidity (NTU)	1	100	3	.	78	.	.	.
pH	8.17	6.36	7.71	.	6.84	.	7.14	7.35
Miscellaneous Analytes								
Dissolved Solids (mg/L)	255	236	229	204	214	220	172	199
Suspended Solids (mg/L)	<	11.9	<	<	866 Q	589 Q	<	4
Turbidity (NTU)	.	.	.	.	.	.	3.56	12.1
Major Ions (mg/L)								
Calcium	40.3	45	42.8	44.1	57.7	42.7	38.1	43.1
Magnesium	12.9	14.4	14.3	14.7	17.2	14.5	14.9	16.2
Potassium	4.53	5.01	4.96	4.95	5.72	4.79	<	<
Sodium	1.96	2.08	2.18	2.21	1.76	2.03	0.88	0.944
Alkalinity as CO3	<	<	<	<	<	<	<	<
Alkalinity as HCO3	178	157	144	151	157	152	143	170
Chloride	1.7	1.6	1.7	1.7	2.2	1.8	1.85	1.94
Fluoride	<	0.11	<	<	0.11	0.12	<	<
Nitrate as N	.	.	.	.	.	.	2.99	1.96
Sulfate	36	32.2	36.6	37.3	16.6	30.6	6.21	5.2
Charge Balance Error (%)	-14.2	-2.8	-2.1	.	12	.	-1.4	-2.4
Trace Metals (mg/L)								
Aluminum	<	1.26	<	<	1.91 Q	0.252	0.276	0.543
Antimony (PMS)	.	.	.	.	.	.	<	<
Arsenic (PMS)	.	.	.	.	.	.	<	<
Arsenic	0.0116	0.0477	0.0392	0.0388	7.18 Q	1.19 Q	.	.
Barium	0.0599	0.138	0.0875	0.0904	2.48 Q	0.445 Q	0.0533	0.0616
Beryllium	<	<	<	<	<	<	<	<
Boron	0.206	0.21	0.225	0.231	0.194	0.198	<	<
Chromium	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.129	3.52	0.952	0.961	245 Q	32.5 Q	0.14	0.407
Lead (PMS)	.	.	.	.	.	.	<	<
Lead	<	<	<	<	<	<	.	.
Lithium	0.0745	0.0807	0.0816	0.0834	0.0679	0.0746	<	<
Manganese	0.129	2.38	1.35	1.38	107 R	8.68 R	0.0122	0.0239
Nickel (PMS)	.	.	.	.	.	.	<	<
Nickel	<	<	<	<	0.0833 Q	<	<	<
Selenium (PMS)	.	.	.	.	.	.	<	<
Strontium	0.738	0.823	0.82	0.837	1.27	0.826	0.0544	0.059
Thallium (PMS)	.	.	.	.	.	.	<	<
Uranium (PMS)	.	.	.	.	.	.	0.000862	0.000939
Uranium (KPA)	<	<	<	<	<	<	.	.
Zinc	<	0.0795	<	<	0.233 Q	0.0509	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	SCR1.25SP		SCR1.5SW			SCR2.1SP		SCR2.2SP	
Functional Area	EXP-SW		EXP-SW			EXP-SW		EXP-SW	
Date Sampled	03/11/04	08/17/04	01/29/04	07/19/04		01/29/04	07/19/04	01/29/04	07/19/04
Program	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type					Dup				
Field Measurements									
Time Sampled	13:50	8:45	8:55	8:45	8:45	9:15	9:20	9:30	9:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)									
Conductivity (μmho/cm)	315	283	208	289	289	202	308	317	370
Dissolved Oxygen (ppm)	9.72	11.27	6.28	5.45	5.45	5.79	4.43	5.23	3.44
Oxidation/Reduction (mV)	89	132	239	224	224	235	201	237	194
Temperature (degrees C)	14.1	16.2	6.2	16.2	16.2	6.7	16.7	11.1	15.9
Turbidity (NTU)	3	7	.	.	.	.	.	.	.
pH	8.31	7.9	6.96	7.6	7.6	6.86	7.05	6.78	6.95
Miscellaneous Analytes									
Dissolved Solids (mg/L)	122	191	113	172	174	99	175	174	213
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<	<
Turbidity (NTU)	.	.	2.21	5.26	5.24	1.96	4.68	2.69	3.98
Major Ions (mg/L)									
Calcium	25.2	39.8	26	36.7	36.7	22.8	37	48.3	51.5
Magnesium	10.2	17.2	10.6	15	14.8	9.52	14.3	8.36	12.1
Potassium	0.813	1.12	<	<	<	<	<	<	<
Sodium	1.05	1.52	1.06	1.26	1.25	2.09	2.04	1.76	1.89
Alkalinity as CO3	<	<	<	<	<	<	<	<	<
Alkalinity as HCO3	122	166	102	168	154	90.2	159	143	182
Chloride	1.8	2.5	1.85	2.11	2.05	3.21	3.05	2.77	2.68
Fluoride	<	<	<	<	<	<	<	<	<
Nitrate as N	0.098	0.13	0.0926	0.131	0.126	0.178	0.23	1.27	0.854
Sulfate	6.4	6.5	6.91	6.17	6.03	7.13	6.09	8.76	7.44
Charge Balance Error (%)	-9.8	-0.5	-0.6	-6.5	-2.6	-1	-4.5	-0.5	-3.7
Trace Metals (mg/L)									
Aluminum	<	0.486	<	0.339	0.367	<	0.293	<	0.257
Antimony (PMS)	.	.	<	<	<	<	<	<	<
Arsenic (PMS)	.	.	<	<	<	<	<	<	<
Arsenic	<	<	.	.	.	.	.	.	.
Barium	0.0383	0.065	0.0341	0.0495	0.049	0.0219	0.039	0.0254	0.0374
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<
Iron	0.0968	0.659	0.0655	0.256	0.258	<	0.158	0.0757	0.132
Lead (PMS)	.	.	<	<	<	<	<	<	<
Lead	<	<	.	.	.	.	.	.	.
Lithium	<	<	<	<	<	<	<	<	<
Manganese	0.0126	0.0817	<	0.00643	0.00606	<	0.00886	<	<
Nickel (PMS)	.	.	<	0.00558	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<
Selenium (PMS)	.	.	<	<	<	<	<	<	<
Strontium	0.029	0.0468	0.0332	0.0489	0.0484	0.0311	0.0482	0.0631	0.0686
Thallium (PMS)	.	.	<	<	<	<	<	<	<
Uranium (PMS)	.	.	<	0.00106	0.000993	0.00164	0.00295	0.000668	0.000851
Uranium (KPA)	<	<	.	.	.	.	.	.	.
Zinc	<	<	0.168	<	<	<	<	<	<

APPENDIX F.1: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	SCR3.5SP		SCR3.5SW			SCR4.3SP	
Functional Area	EXP-SW		EXP-SW			EXP-SW	
Date Sampled	03/11/04	08/17/04	01/29/04		07/19/04	01/13/04	07/22/04
Program	BJC	BJC	GWPP	GWPP	GWPP	BJC	BJC
Sample Type				Dup			
Field Measurements							
Time Sampled	14:30	8:10	9:45	9:45	9:45	11:46	11:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.
Groundwater Elevation (ft)							
Conductivity (μmho/cm)	214	311	291	291	367	313	239
Dissolved Oxygen (ppm)	10.97	10.93	5.37	5.37	5.16	5.83	6.4
Oxidation/Reduction (mV)	68	135	238	238	198	191	164
Temperature (degrees C)	14.2	16.5	6.6	6.6	16.6	12.3	19.2
Turbidity (NTU)	2	1	.	.	.	21	30
pH	8.92	7.13	7.06	7.06	7.49	6.94	6.55
Miscellaneous Analytes							
Dissolved Solids (mg/L)	157	209	168	166	217	140	160
Suspended Solids (mg/L)	<	<	2	<	<	<	11
Turbidity (NTU)	.	.	1.24	1.15	1.49	2.6	42
Major Ions (mg/L)							
Calcium	33	45	38.6	40.1	44.5	30	32
Magnesium	9.72	14.8	11.9	11.9	16.4	11	9.1
Potassium	1.55	2.14	<	<	2.42	<	2.2 J
Sodium	0.949	1.39	1.08	1.1	1.18	<	1.1 J
Alkalinity as CO3	<	<	<	<	<	<	<
Alkalinity as HCO3	122	175	131	130	186	99	100
Chloride	1.5	1.9	1.6	1.6	1.28	2.8 J	4.3
Fluoride	<	0.13	<	<	0.116	0.17 J	0.17 J
Nitrate as N	0.43	0.26	0.459	0.454	0.291	1.4	0.77
Sulfate	12.2	14.2	15.6	15.5	14.4	8.3	12
Charge Balance Error (%)	-4.6	-3.9	-1.2	0.5	-5.1	1.3	0.3
Trace Metals (mg/L)							
Aluminum	<	<	0.291	0.245	<	<	<
Antimony (PMS)	.	.	<	<	<	.	.
Arsenic (PMS)	.	.	<	<	<	.	.
Arsenic	<	<	.	.	.	<	<
Barium	0.0585	0.0717	0.0644	0.064	0.0876	0.079	0.078
Beryllium	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<
Iron	0.116	0.567	0.433	0.268	0.0769	<	<
Lead (PMS)	.	.	<	<	<	.	.
Lead	<	<	.	.	.	<	<
Lithium	0.0123	0.0234	0.015	0.015	0.0267	.	.
Manganese	0.0185	0.0753	0.047	0.041	0.0348	<	0.011
Nickel (PMS)	.	.	<	<	<	.	.
Nickel	<	<	<	<	<	<	<
Selenium (PMS)	.	.	<	<	<	.	.
Strontium	0.177	0.304	0.232	0.232	0.374	0.065	0.079
Thallium (PMS)	.	.	<	<	<	.	.
Uranium (PMS)	.	.	0.000601	<	0.000524	.	.
Uranium (KPA)	<	<	.	.	.	<	<
Zinc	<	<	<	<	<	<	<

APPENDIX F.2

VOLATILE ORGANIC COMPOUNDS

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-141		GW-143		GW-144		GW-145		GW-173	
Functional Area	**LIV**		**KHQ**		**KHQ**		**KHQ**		**CRSP**	
Date Sampled	**01/22/04**	**07/15/04**	**04/12/04**	**10/12/04**	**04/12/04**	**10/12/04**	**04/13/04**	**10/12/04**	**05/06/04**	
Program	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**GWPP**	**GWPP**
Sample Type										**Dup**
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	15	4 J
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	<	<	<	<	<	<	3 J	2 J
Trichlorofluoromethane	<	<	.	.	.	.	.	.	3 J	3 J
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	0.64 J	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-173	GW-175		GW-176		GW-177		GW-178		GW-179
Functional Area	CRSP	CRSP		CRSP		CRSP		CRSP		CRSP
Date Sampled	10/04/04	05/06/04	10/06/04	05/10/04	10/07/04	01/12/04	07/13/04	05/10/04	10/06/04	05/11/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	GWPP	GWPP	GWPP
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	4 J	14	10	2 J	2 J	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	21	22	5 J	3 J	2 J	3 J	13
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	2 J	2 J	25	21	8	5	6	8	11
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	50	47	15	9	11	12	21
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	3 J	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	3 J	16	13	<	<	.	.	<	<	<
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-179		GW-217		GW-231				GW-300	
Functional Area	**CRSP**		**LIV**		**KHQ**				**CRBAWP**	
Date Sampled	**10/07/04**		**01/14/04**	**07/14/04**	**04/08/04**		**10/11/04**		**04/19/04**	**10/12/04**
Program	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**BJC**	**GWPP**	**GWPP**
Sample Type		**Dup**				**Dup**		**Dup**		
Chloroethenes (μg/L)										
Tetrachloroethene	1 J	<	0.47 Q	<	<	<	<	<	<	<
Trichloroethene	<	<	0.41 Q	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	0.49 Q	<	<	<	<	<	<	<
1,1-Dichloroethene	24	26	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	21	22	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	36	37	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	.	.	<	<	<	<	<	<
Trichlorofluoromethane	11	12	<	<	.	.	.	.	<	<
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-301				GW-305				GW-322	
Functional Area	CRBAWP				LIV				CRSP	
Date Sampled	01/12/04		07/12/04		01/14/04	05/03/04	07/14/04	10/26/04	05/13/04	10/11/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type		Dup		Dup						
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	6	6
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	4.8	4.4	4.2	4.6	77	93
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	16	21	15	18	47	51
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	16	17	14	17	96	110
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	.	.	.	5	5
Trichlorofluoromethane	.	.	.	.	<	<	<	<	34	38
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	1.1 J	4.1	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-513			GW-521		GW-522		GW-540		GW-542
Functional Area	FCAP			LIV		LIV		LII		CDLVI
Date Sampled	04/20/04		10/13/04	01/14/04	07/14/04	01/14/04	07/14/04	01/22/04	07/21/04	01/15/04
Program	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup								
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	3.4 J
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-542	GW-543		GW-544		GW-557				GW-560
Functional Area	CDLVI	CDLVI		CDLVI		LV				CDLVII
Date Sampled	07/21/04	01/21/04	07/21/04	01/21/04	07/21/04	01/13/04		07/20/04		01/21/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type							Dup		Dup	
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	0.21 J	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	16 Q	15	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	0.25 J	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-560	GW-562		GW-564				GW-610		GW-611
Functional Area	CDLVII	CDLVII		CDLVII				CRSP		CRSP
Date Sampled	07/19/04	01/21/04	07/19/04	01/20/04		07/19/04		04/22/04	10/20/04	04/22/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP
Sample Type					Dup		Dup			
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-611		GW-612				GW-679		GW-680	
Functional Area	CRSP		CRSP				FCAP		FCAP	
Date Sampled	10/20/04		05/11/04	05/12/04	10/04/04	10/05/04	04/19/04	10/12/04	06/07/04	10/13/04
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup		Conv		Conv				
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	5	6	2 J	5 J	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	25	43	41	50	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	16	44	21	40	<	<	<	<
1,2-Dichloroethane	<	<	<	<	2 J	<	<	<	<	<
1,1-Dichloroethane	<	<	45	67	71	72	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	2 J	<	<	<	<
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-709		GW-742		GW-743		GW-757		GW-796	
Functional Area	**LII**		**CRSP**		**CRSP**		**LII**		**LV**	
Date Sampled	**01/20/04**	**07/22/04**	**04/21/04**	**10/18/04**	**04/21/04**	**10/18/04**	**01/20/04**	**07/22/04**	**01/13/04**	**07/20/04**
Program	**BJC**	**BJC**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**	**BJC**	**BJC**
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	0.77 J	0.57 J
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	<	<	<	<	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<	<
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	0.27 J	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-797		GW-798			GW-799		GW-801		GW-827
Functional Area	LV		CDLVII			LV		LV		CDLVI
Date Sampled	01/15/04	07/15/04	01/12/04	01/20/04	07/20/04	01/15/04	07/19/04	01/13/04	07/15/04	01/15/04
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Chloroethenes (μg/L)										
Tetrachloroethene	<	<	6	4.6	3.4	<	<	<	<	<
Trichloroethene	<	<	<	0.52 J	0.37 J	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	6	4.2	3.2	<	<	<	<	<
1,1-Dichloroethene	<	<	4 J	2.8	1.9	<	<	<	<	<
Chloroethanes (μg/L)										
1,1,1-Trichloroethane	<	<	2 J	1.7	1.3	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	2 J	1.8	1.2	<	<	<	<	<
Chlorofluorocarbons (μg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	2 J	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	.	9	5.6	<	<	<	<	<
Miscellaneous (μg/L)										
Acetone	<	<	<	<	<	9.5 J	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	0.33 J	<	<	<	<	<	<	0.25 J	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-827		GW-831		S17		SCR1.25SP	
Functional Area	CDLVI		FCAP		EXP-SW		EXP-SW	
Date Sampled	02/12/04	07/20/04	01/13/04	07/12/04	01/29/04	07/19/04	03/11/04	08/17/04
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	BJC	BJC
Sample Type								
Chloroethenes (μg/L)								
Tetrachloroethene	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<
Chloroethanes (μg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<
Chlorofluorocarbons (μg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	<	<	<	<	.	.
Trichlorofluoromethane	<	<	.	.	<	<	.	.
Miscellaneous (μg/L)								
Acetone	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	**SCR1.5SW**			**SCR2.1SP**		**SCR2.2SP**		**SCR3.5SP**	
Functional Area	**EXP-SW**			**EXP-SW**		**EXP-SW**		**EXP-SW**	
Date Sampled	**01/29/04**	**07/19/04**	**07/19/04**	**01/29/04**	**07/19/04**	**01/29/04**	**07/19/04**	**03/11/04**	**08/17/04**
Program	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**
Sample Type			**Dup**						
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	.	.
Miscellaneous (µg/L)									
Acetone	<	<	<	<	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	SCR3.5SW			SCR4.3SP	
Functional Area	**EXP-SW**			**EXP-SW**	
Date Sampled	**01/29/04**		**07/19/04**	**01/13/04**	**07/22/04**
Program	**GWPP**	**GWPP**	**GWPP**	**BJC**	**BJC**
Sample Type		**Dup**			
Chloroethenes (μg/L)					
Tetrachloroethene	<	<	<	<	<
Trichloroethene	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<
Chloroethanes (μg/L)					
1,1,1-Trichloroethane	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<
Chlorofluorocarbons (μg/L)					
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	.	.
Trichlorofluoromethane	<	<	<	<	<
Miscellaneous (μg/L)					
Acetone	<	<	<	<	<
Bromodichloromethane	<	<	<	<	<
Carbon disulfide	<	<	<	<	<
Chloroform	<	<	<	<	<
Chloromethane	<	<	<	<	<
Toluene	<	<	<	<	<

APPENDIX F.3

RADIOLOGICAL ANALYTES

APPENDIX F.3: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Result	Error	MDA	Result	Error	MDA
1090	UNCS	02/24/04	BJC	<MDA	.	1.39	<MDA	.	2.23
1090	UNCS	08/04/04	BJC	2.19	0.99	1.15	3.51	1.53	2.37
GW-141	LIV	01/22/04	BJC	<MDA	.	2.1	2	1.2	1.9
GW-141	LIV	07/15/04	BJC	<MDA	.	1.8	<MDA	.	2
GW-143	KHQ	04/12/04	BJC	2.03	1.2	1.79	17.29	1.93	2.38
GW-143	KHQ	10/12/04	BJC	3.28	1.4	1.84	20.81	2.15	2.49
GW-144	KHQ	04/12/04	BJC	2.38	0.85	0.97	<MDA	.	2.36
GW-144	KHQ	10/12/04	BJC	3.45	1.08	1.09	<MDA	.	2.36
GW-145	KHQ	04/13/04	BJC	12.12	2.08	2.09	15.41	2.2	2.95
GW-145	KHQ	10/12/04	BJC	9.55	1.81	1.59	15.61	1.88	2.25
GW-173	CRSP	05/06/04	GWPP	<MDA	.	5.4	<MDA	.	9.4
GW-173 Dup	CRSP	05/06/04	GWPP	<MDA	.	5.4	<MDA	.	9.5
GW-173	CRSP	10/04/04	GWPP	<MDA	.	7.5	<MDA	.	8.4
GW-175	CRSP	05/06/04	GWPP	<MDA	.	7.4	<MDA	.	11
GW-175	CRSP	10/06/04	GWPP	<MDA	.	8	<MDA	.	8.2
GW-176	CRSP	05/10/04	GWPP	<MDA	.	4.9	<MDA	.	7.8
GW-176	CRSP	10/07/04	GWPP	<MDA	.	8.5	<MDA	.	8.3
GW-177	CRSP	01/12/04	BJC	3.88	0.94	0.64	2.33	1.28	2.05
GW-177	CRSP	07/13/04	BJC	2.96	1.17	1.54	3.14	1.4	2.21
GW-178	CRSP	05/10/04	GWPP	<MDA	.	2.2	<MDA	.	7.9
GW-178	CRSP	10/06/04	GWPP	<MDA	.	7.9	<MDA	.	8.8
GW-179	CRSP	05/11/04	GWPP	<MDA	.	5.3	<MDA	.	7.9
GW-179	CRSP	10/07/04	GWPP	<MDA	.	8.9	<MDA	.	10
GW-179 Dup	CRSP	10/07/04	GWPP	<MDA	.	9.9	<MDA	.	7.5
GW-203	UNCS	02/25/04	BJC	4.43	1.42	1.83	4.65	1.56	2.36
GW-203	UNCS	08/03/04	BJC	<MDA	.	1.44	3.17	1.59	2.51
GW-205	UNCS	02/24/04	BJC	1.94	0.71	0.81	43.19	2.03	1.48
GW-205	UNCS	08/03/04	BJC	1.23	0.77	0.95	60.83	3.28	2.56
GW-217	LIV	01/14/04	BJC	<MDA	.	1.6	1.8	1.1	1.8
GW-217	LIV	07/14/04	BJC	<MDA	.	1.7	<MDA	.	2.2
GW-221	UNCS	02/25/04	BJC	<MDA	.	1.86	3.06	1.49	2.36
GW-221	UNCS	08/04/04	BJC	13.31 Q	1.87	1.16	12.3	1.87	2.48
GW-231	KHQ	04/08/04	BJC	<MDA	.	0.93	4.87	1.39	2.02
GW-231 Dup	KHQ	04/08/04	BJC	<MDA	.	0.95	3.14	1.43	2.24
GW-231	KHQ	10/11/04	BJC	2.46	0.9	0.91	3.82	1.41	2.15
GW-231 Dup	KHQ	10/11/04	BJC	1.77	0.94	1.31	6.72	1.47	2.05
GW-300	CRBAWP	04/19/04	GWPP	3.2	2.2	2.5	<MDA	.	7.6
GW-300	CRBAWP	10/12/04	GWPP	<MDA	.	2.8	<MDA	.	8
GW-301	CRBAWP	01/12/04	BJC	0.98	0.64	0.92	2.76	1.21	1.92
GW-301 Dup	CRBAWP	01/12/04	BJC	<MDA	.	0.88	<MDA	.	1.69
GW-301	CRBAWP	07/12/04	BJC	<MDA	.	1.29	6.4	1.64	2.42
GW-301 Dup	CRBAWP	07/12/04	BJC	<MDA	.	1.34	2.81	1.36	2.16
GW-305	LIV	01/14/04	BJC	<MDA	.	2	2.1	1.2	1.9
GW-305	LIV	05/03/04	BJC	2.5	1.8	2.5	<MDA	.	1.8
GW-305	LIV	07/14/04	BJC	<MDA	.	2	<MDA	.	2.7
GW-305	LIV	10/26/04	BJC	<MDA	.	2.3	<MDA	.	2.6
GW-322	CRSP	05/13/04	GWPP	<MDA	.	4.8	<MDA	.	6.3
GW-322	CRSP	10/11/04	GWPP	4.4	2.7	2.4	<MDA	.	6.5
GW-513	FCAP	04/20/04	GWPP	<MDA	.	4.4	<MDA	.	9.6
GW-513 Dup	FCAP	04/20/04	GWPP	<MDA	.	3.4	<MDA	.	7.4
GW-513	FCAP	10/13/04	GWPP	<MDA	.	2.7	<MDA	.	9.8

APPENDIX F.3: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L) Result	Gross Alpha Error	Gross Alpha MDA	Gross Beta (pCi/L) Result	Gross Beta Error	Gross Beta MDA
GW-521	LIV	01/14/04	BJC	<MDA	.	1.9	<MDA	.	2.1
GW-521	LIV	07/14/04	BJC	<MDA	.	1.5	<MDA	.	2.1
GW-522	LIV	01/14/04	BJC	<MDA	.	2	<MDA	.	1.8
GW-522	LIV	07/14/04	BJC	<MDA	.	1.8	<MDA	.	2.4
GW-540	LII	01/22/04	BJC	<MDA	.	2.2	4.4	1.4	2
GW-540	LII	07/21/04	BJC	<MDA	.	3.4	<MDA	.	2.1
GW-542	CDLVI	01/15/04	BJC	<MDA	.	1.3	2.4	1.1	1.7
GW-542	CDLVI	07/21/04	BJC	<MDA	.	1.4	19 Q	1.7	1.3
GW-543	CDLVI	01/21/04	BJC	<MDA	.	2.6	<MDA	.	2.3
GW-543	CDLVI	07/21/04	BJC	<MDA	.	3.3	<MDA	.	3.3
GW-544	CDLVI	01/21/04	BJC	<MDA	.	2.3	<MDA	.	2.5
GW-544	CDLVI	07/21/04	BJC	4	2.7	3.8	4.4	1.8	2.6
GW-557	LV	01/13/04	BJC	<MDA	.	2.6	<MDA	.	2.1
GW-557 Dup	LV	01/13/04	BJC	<MDA	.	2	<MDA	.	2
GW-557	LV	07/20/04	BJC	<MDA	.	1.9	<MDA	.	2.1
GW-557 Dup	LV	07/20/04	BJC	<MDA	.	1.1	<MDA	.	1.9
GW-560	CDLVII	01/21/04	BJC	<MDA	.	1.5	<MDA	.	1.8
GW-560	CDLVII	07/19/04	BJC	<MDA	.	1.7	<MDA	.	2
GW-562	CDLVII	01/21/04	BJC	<MDA	.	2	<MDA	.	1.9
GW-562	CDLVII	07/19/04	BJC	<MDA	.	3.6	<MDA	.	2.4
GW-564	CDLVII	01/20/04	BJC	<MDA	.	1.7	<MDA	.	1.9
GW-564 Dup	CDLVII	01/20/04	BJC	<MDA	.	1.7	<MDA	.	2
GW-564	CDLVII	07/19/04	BJC	<MDA	.	0.87	<MDA	.	1.7
GW-564 Dup	CDLVII	07/19/04	BJC	<MDA	.	1.1	<MDA	.	1.6
GW-610	CRSP	04/22/04	GWPP	<MDA	.	4.5	<MDA	.	6
GW-610	CRSP	10/20/04	GWPP	<MDA	.	2.8	<MDA	.	6.1
GW-611	CRSP	04/22/04	GWPP	<MDA	.	3.7	<MDA	.	5.8
GW-611	CRSP	10/20/04	GWPP	<MDA	.	4.6	<MDA	.	6.2
GW-611 Dup	CRSP	10/20/04	GWPP	<MDA	.	4.3	<MDA	.	6.1
GW-612	CRSP	05/11/04	GWPP	<MDA	.	3.1	<MDA	.	7.5
GW-612 Conv	CRSP	05/12/04	GWPP	2.2	1.9	2.1	<MDA	.	9
GW-612	CRSP	10/04/04	GWPP	<MDA	.	7.3	<MDA	.	7.2
GW-612 Conv	CRSP	10/05/04	GWPP	<MDA	.	7.5	<MDA	.	7.4
GW-679	FCAP	04/19/04	GWPP	<MDA	.	3.4	35	6.8	7.6
GW-679	FCAP	10/12/04	GWPP	<MDA	.	4.4	30	6.4	7.5
GW-680	FCAP	06/07/04	GWPP	<MDA	.	5.1	<MDA	.	7.3
GW-680	FCAP	10/13/04	GWPP	<MDA	.	4	<MDA	.	8.4
GW-709	LII	01/20/04	BJC	<MDA	.	1.9	2.2	1.2	1.8
GW-709	LII	07/22/04	BJC	1.9	1.3	1.9	4.1	1.3	2
GW-742	CRSP	04/21/04	GWPP	7.9	3.2	2.8	<MDA	.	8.9
GW-742	CRSP	10/18/04	GWPP	<MDA	.	4.1	<MDA	.	6.3
GW-743	CRSP	04/21/04	GWPP	<MDA	.	3	<MDA	.	5.7
GW-743	CRSP	10/18/04	GWPP	<MDA	.	2.6	<MDA	.	8.5
GW-757	LII	01/20/04	BJC	2.6	1.1	1.2	16.9	1.7	1.9
GW-757	LII	07/22/04	BJC	<MDA	.	1.1	9.1	1.4	1.8
GW-796	LV	01/13/04	BJC	<MDA	.	1.7	<MDA	.	1.9
GW-796	LV	07/20/04	BJC	<MDA	.	1.2	<MDA	.	1.8
GW-797	LV	01/15/04	BJC	<MDA	.	2.3	<MDA	.	2
GW-797	LV	07/15/04	BJC	<MDA	.	1.2	<MDA	.	1.8

APPENDIX F.3: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Radiological Analytes: Gross Alpha and Gross Beta Activity

Sampling Point	Functional Area	Date Sampled	Program	Gross Alpha (pCi/L)			Gross Beta (pCi/L)		
				Result	Error	MDA	Result	Error	MDA
GW-798	CDLVII	01/12/04	BJC	1.5	0.69	0.91	2.29	1.06	1.67
GW-798	CDLVII	01/20/04	BJC	<MDA	.	1.6	<MDA	.	1.8
GW-798	CDLVII	07/20/04	BJC	<MDA	.	0.88	<MDA	.	1.8
GW-799	LV	01/15/04	BJC	<MDA	.	1.4	<MDA	.	1.8
GW-799	LV	07/19/04	BJC	<MDA	.	1.2	<MDA	.	1.7
GW-801	LV	01/13/04	BJC	1.8	1.2	1.6	<MDA	.	1.9
GW-801	LV	07/15/04	BJC	<MDA	.	1	<MDA	.	1.7
GW-827	CDLVI	01/15/04	BJC	<MDA	.	1.8	<MDA	.	1.9
GW-827	CDLVI	07/20/04	BJC	<MDA	.	1.2	<MDA	.	1.8
GW-831	FCAP	01/13/04	BJC	<MDA	.	1.56	<MDA	.	2.31
GW-831	FCAP	07/12/04	BJC	1.8	0.81	1.03	<MDA	.	2.19
MCK 2.0	EXP-SW	02/18/04	BJC	1.6	0.64	0.81	7.7	1.18	1.58
MCK 2.0	EXP-SW	08/16/04	BJC	<MDA	.	1.35	5.22	1.38	2.06
MCK 2.05	EXP-SW	02/18/04	BJC	1.5	0.86	1.3	6.92	1.21	1.69
MCK 2.05 Dup	EXP-SW	02/18/04	BJC	<MDA	.	1.45	5.99	1.37	2.02
MCK 2.05	EXP-SW	08/16/04	BJC	15.2	2.46	2.1	17.53	1.75	2.08
MCK 2.05 Dup	EXP-SW	08/16/04	BJC	6.94	1.69	1.83	10.48	1.62	2.2
S17	EXP-SW	01/29/04	GWPP	<MDA	.	4.2	<MDA	.	8
S17	EXP-SW	07/19/04	GWPP	<MDA	.	5.5	<MDA	.	7.5
SCR1.25SP	EXP-SW	03/11/04	BJC	1.21	0.7	0.9	1.99	1.23	1.97
SCR1.25SP	EXP-SW	08/17/04	BJC	4.43	1.02	0.91	3.85	1.23	1.87
SCR1.5SW	EXP-SW	01/29/04	GWPP	<MDA	.	3.2	<MDA	.	5.3
SCR1.5SW	EXP-SW	07/19/04	GWPP	<MDA	.	4.7	<MDA	.	8
SCR1.5SW Dup	EXP-SW	07/19/04	GWPP	<MDA	.	5.8	<MDA	.	6.8
SCR2.1SP	EXP-SW	01/29/04	GWPP	3.3	2.2	2.8	<MDA	.	5.5
SCR2.1SP	EXP-SW	07/19/04	GWPP	<MDA	.	4.9	<MDA	.	8.3
SCR2.2SP	EXP-SW	01/29/04	GWPP	<MDA	.	3.6	<MDA	.	6.3
SCR2.2SP	EXP-SW	07/19/04	GWPP	<MDA	.	5.4	<MDA	.	7
SCR3.5SP	EXP-SW	03/11/04	BJC	1.88	0.87	1.08	2.27	1.2	1.89
SCR3.5SP	EXP-SW	08/17/04	BJC	2.75	1.12	1.36	5.71	1.84	2.78
SCR3.5SW	EXP-SW	01/29/04	GWPP	<MDA	.	2.8	<MDA	.	7.9
SCR3.5SW Dup	EXP-SW	01/29/04	GWPP	<MDA	.	5.5	<MDA	.	7.8
SCR3.5SW	EXP-SW	07/19/04	GWPP	<MDA	.	4.9	<MDA	.	8.3
SCR4.3SP	EXP-SW	01/13/04	BJC	<MDA	.	1.3	<MDA	.	1.8
SCR4.3SP	EXP-SW	07/22/04	BJC	<MDA	.	1.2	<MDA	.	2.1

APPENDIX F.3: CY 2004 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	1090						GW-203					
Functional Area	UNCS						UNCS					
Date Sampled	02/24/04			08/04/04			02/25/04			08/03/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	<MDA	.	1.39	2.19	0.99	1.15	4.43	1.42	1.83	<MDA	.	1.44
Gross Beta	<MDA	.	2.23	3.51	1.53	2.37	4.65	1.56	2.36	3.17	1.59	2.51
Cesium-137	.	.	.	.	.	.	.	.	.	.	.	.
Cobalt-60	.	.	.	.	.	.	.	.	.	.	.	.
Potassium-40	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.88	<MDA	.	1.06	<MDA	.	0.99	<MDA	.	1
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	0.65	0.43	0.48	1.32	0.57	0.26	0.38	0.31	0.17	1.53	0.64	0.35
Uranium-235	<MDA	.	0.32	0.41	0.34	0.18	<MDA	.	0.36	< CE	0.25	0.19
Uranium-236	0.25	0.25	0.17	<MDA	.	0.28	< CE	0.24	0.19	<MDA	.	0.17
Uranium-238	<MDA	.	0.34	0.63	0.39	0.33	<MDA	.	0.34	0.29	0.26	0.16

Sampling Point	GW-205						GW-221					
Functional Area	UNCS						UNCS					
Date Sampled	02/24/04			08/03/04			02/25/04			08/04/04		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
Gross Alpha	1.94	0.71	0.81	1.23	0.77	0.95	<MDA	.	1.86	13.31 Q	1.87	1.16
Gross Beta	43.19	2.03	1.48	60.83	3.28	2.56	3.06	1.49	2.36	12.3	1.87	2.48
Cesium-137	<MDA	.	7.26	<MDA	.	5.66	.	.	.	.	.	.
Cobalt-60	<MDA	.	7.27	<MDA	.	5.32	.	.	.	.	.	.
Potassium-40	<MDA	.	99.84	<MDA	.	79.93	.	.	.	.	.	.
Strontium-89/90	<MDA	.	0.97	<MDA	.	0.96	<MDA	.	1.04	<MDA	.	0.9
Technetium-99	<MDA	.	6.31	<MDA	.	6.13	.	.	.	.	.	.
Uranium-234	0.6	0.4	0.28	2.46	0.85	0.38	0.48	0.32	0.13	1.43	0.59	0.14
Uranium-235	<MDA	.	0.21	<MDA	.	0.39	< CE	0.21	0.16	<MDA	.	0.18
Uranium-236	<MDA	.	0.37	< CE	0.23	0.17	<MDA	.	0.25	0.35	0.29	0.16
Uranium-238	0.36	0.31	0.28	<MDA	.	0.31	<MDA	.	0.22	0.57	0.36	0.24

APPENDIX G

CY 2004 QUALITY ASSURANCE/QUALITY CONTROL DATA

EXPLANATION

Sampling Point:

BCK	-	Bear Creek Kilometer
GHK	-	Gum Hollow Branch Kilometer
GW	-	Monitoring Well (also locations beginning with a number; e.g., 55-1A)
NPR	-	North of Pine Ridge near the Scarboro Community (surface water sampling location)
NT	-	Northern Tributary to Bear Creek
S17	-	Surface water station
SCR	-	South Chestnut Ridge (tributary prefix for spring or surface water sampling location)
SS	-	Spring (Bear Creek Regime)
D	-	Field Duplicate Sample

Hydrogeologic Regime:

BC	-	Bear Creek Hydrogeologic Regime
CR	-	Chestnut Ridge Hydrogeologic Regime
EF	-	Upper East Fork Poplar Creek Hydrogeologic Regime

Notes:

Appendix G shows the method (laboratory) blank and trip blank samples associated with each groundwater and surface water sample collected under management of the GWPP during CY 2004. Each method and trip blank was analyzed for volatile organic compounds (VOCs) and none were detected in the CY 2004 blank samples.

A field blank sample was collected once during each calendar year quarter at the following wells in the Bear Creek and East Fork Regimes.

Bear Creek Regime			East Fork Regime		
Sample Number	Monitoring Well	Date Sampled	Sample Number	Monitoring Well	Date Sampled
A040080041	GW-071	03/01/04	A041030292	GW-782	05/05/04
A041960147	GW-071	08/05/04	A042730037	GW-782	10/26/04

The field blanks were analyzed for VOCs and none were detected in the samples.

EXPLANATION (continued)

A total of five equipment rinsate samples were collected during CY 2004 in the East Fork Regime: two were collected at Westbay well GW-722 (first and third quarter samples) and one at Westbay wells GW-133, GW-134, and GW-135 (third quarter samples). The rinsate samples were analyzed for the same analytes as the associated groundwater sample (see Appendix E), but only the analytes shown below were detected.

Well/Port	Sample Number	Date Sampled	Analyte	Result	Units
GW-133-24	A041960185	08/26/04	Chromium Nitrate/Nitrite as Nitrogen Turbidity	0.0288 0.0532 0.147	mg/L mg/L NTU
GW-134-36	A041960200	08/11/04	Lead Chromium Dissolved Solids Nitrate/Nitrite as Nitrogen Turbidity	0.00307 0.0149 5 0.0513 0.085	mg/L mg/L mg/L mg/L NTU
GW-135-39	A041960216	08/22/04	Chromium Turbidity	0.0341 0.05	mg/L NTU
GW-722-17	A040080091	02/23/04	Turbidity	0.057	NTU
GW-722-17	A041960239	08/07/04	Dissolved Solids Total Suspended Solids Turbidity	2 2 0.158	mg/L mg/L NTU

APPENDIX G: CY 2004 QUALITY ASSURANCE/QUALITY CONTROL DATA
Correlation with Associated Groundwater and Surface Water Samples

Sampling Point	Hydrogeologic Regime	Date Sampled	Sample Number	Trip Blank Sample Number	Method Blank Sample Number
55-1A	EF	06/08/04	A041030346	A041030355	Q040510255
55-1A	EF	11/16/04	A042730079	A042730087	Q043500012
55-2B	EF	06/10/04	A041030351	A041030357	Q040510255
55-2B	EF	11/29/04	A042730085	A042730090	Q043650002
55-6A	EF	06/07/04	A041030345	A041030077	Q040510255
55-6A	EF	11/16/04	A042730078	A042730087	Q043500012
56-2A	EF	06/09/04	A041030349	A041030356	Q040510255
56-2A	EF	11/18/04	A042730082	A042730089	Q043650007
56-2B	EF	06/09/04	A041030350	A041030356	Q040510255
56-2B	EF	11/18/04	A042730083	A042730089	Q043650007
56-2B D	EF	11/18/04	A042730084	A042730089	Q043650007
9201-1K-22SU	EF	10/27/04	A042730046	A042730057	Q043450123
9201-3C-4SP	EF	10/27/04	A042730045	A042730057	Q043450123
BCK-00.63	BC	01/27/04	A040080047	A040080054	Q040580097
BCK-00.63	BC	07/20/04	A041960153	A041960160	Q042050457
BCK-04.55	BC	01/27/04	A040080048	A040080054	Q040580097
BCK-04.55	BC	07/20/04	A041960154	A041960160	Q042050457
GHK2.51ESW	EF	04/13/04	A041030268	A041030270	Q041240065
GHK2.51ESW	EF	12/01/04	A042730095	A042730098	Q043640162
GHK2.51WSW	EF	04/13/04	A041030269	A041030270	Q041240065
GHK2.51WSW	EF	12/01/04	A042730096	A042730098	Q043640162
GHK2.51WSW D	EF	12/01/04	A042730097	A042730098	Q043640162
GW-052	BC	03/04/04	A040080057	A040080069	Q040900019
GW-052	BC	08/16/04	A041960163	A041960171	Q042610081
GW-071	BC	03/01/04	A040080036	A040080046	Q040900000
GW-071	BC	08/05/04	A041960146	A041960151	Q042470167
GW-082	BC	03/01/04	A040080035	A040080046	Q040900000
GW-082	BC	08/05/04	A041960144	A041960151	Q042470171
GW-082 D	BC	08/05/04	A041960145	A041960151	Q042470171
GW-085	BC	02/23/04	A040080030	A040080044	Q040820010
GW-085 D	BC	02/23/04	A040080031	A040080044	Q040820010
GW-085	BC	08/03/04	A041960140	A041960149	Q042470171
GW-098	BC	02/19/04	A040080029	A040080043	Q040700136
GW-098	BC	08/03/04	A041960139	A041960149	Q042470171
GW-100	BC	03/04/04	A040080058	A040080069	Q040900019
GW-100	BC	08/17/04	A041960165	A041960172	Q042610081
GW-100 D	BC	08/17/04	A041960166	A041960172	Q042610081
GW-101	BC	03/08/04	A040080061	A040080070	Q040900004
GW-101	BC	08/18/04	A041960168	A041960173	Q042610081
GW-133-01	BC	08/23/04	A041960176	A041960186	Q042660016
GW-133-05	BC	08/23/04	A041960177	A041960186	Q042660024
GW-133-08	BC	08/23/04	A041960178	A041960186	Q042660016
GW-133-10	BC	08/24/04	A041960180	A041960187	Q042660024
GW-133-14	BC	08/26/04	A041960181	A041960188	Q042660016
GW-133-17	BC	08/26/04	A041960182	A041960188	Q042660016
GW-133-21	BC	08/26/04	A041960183	A041960188	Q042660016
GW-133-21 D	BC	08/26/04	A041960179	A041960188	Q042660016

APPENDIX G: CY 2004 QUALITY ASSURANCE/QUALITY CONTROL DATA
Correlation with Associated Groundwater and Surface Water Samples

Sampling Point	Hydrogeologic Regime	Date Sampled	Sample Number	Trip Blank Sample Number	Method Blank Sample Number
GW-133-24	BC	08/26/04	A041960184	A041960188	Q042660016
GW-134-05	BC	08/08/04	A041960189	A041960201	Q042520214
GW-134-11	BC	08/08/04	A041960190	A041960201	Q042520214
GW-134-15	BC	08/09/04	A041960191	A041960202	Q042520228
GW-134-15 D	BC	08/09/04	A041960192	A041960202	Q042520228
GW-134-18	BC	08/10/04	A041960193	A041960203	Q042520228
GW-134-21	BC	08/10/04	A041960194	A041960203	Q042520228
GW-134-25	BC	08/10/04	A041960195	A041960203	Q042520228
GW-134-29	BC	08/11/04	A041960196	A041960204	Q042520228
GW-134-33	BC	08/11/04	A041960197	A041960204	Q042520228
GW-134-35	BC	08/11/04	A041960198	A041960204	Q042520228
GW-134-36	BC	08/11/04	A041960199	A041960204	Q042520228
GW-135-03	BC	08/21/04	A041960205	A041960217	Q042660017
GW-135-06	BC	08/21/04	A041960206	A041960217	Q042660017
GW-135-11	BC	08/21/04	A041960207	A041960217	Q042660017
GW-135-15	BC	08/21/04	A041960209	A041960217	Q042660017
GW-135-19	BC	08/22/04	A041960210	A041960218	Q042660017
GW-135-23	BC	08/22/04	A041960211	A041960218	Q042660017
GW-135-26	BC	08/22/04	A041960212	A041960218	Q042660017
GW-135-30	BC	08/22/04	A041960213	A041960218	Q042660017
GW-135-34	BC	08/22/04	A041960214	A041960218	Q042660024
GW-135-39	BC	08/22/04	A041960215	A041960218	Q042660024
GW-135-39 D	BC	08/22/04	A041960208	A041960218	Q042660017
GW-153	EF	11/01/04	A042730054	A042730059	Q043450119
GW-153 D	EF	11/01/04	A042730055	A042730059	Q043450119
GW-173	CR	05/06/04	A041030274	A041030297	Q041400117
GW-173 D	CR	05/06/04	A041030275	A041030297	Q041400117
GW-173	CR	10/04/04	A042730014	A042730024	Q042860183
GW-175	CR	05/06/04	A041030276	A041030297	Q041400117
GW-175	CR	10/06/04	A042730015	A042730026	Q042860183
GW-176	CR	05/10/04	A041030278	A041030298	Q041400116
GW-176	CR	10/07/04	A042730017	A042730027	Q043140000
GW-178	CR	05/10/04	A041030277	A041030298	Q041400116
GW-178	CR	10/06/04	A042730016	A042730026	Q042860183
GW-179	CR	05/11/04	A041030279	A041030299	Q041400116
GW-179	CR	10/07/04	A042730018	A042730027	Q043140000
GW-179 D	CR	10/07/04	A042730019	A042730027	Q043140000
GW-204	EF	05/03/04	A041030289	A041030294	Q041400104
GW-204	EF	10/25/04	A042730034	A042730039	Q043240371
GW-204 D	EF	10/25/04	A042730035	A042730039	Q043240371
GW-207	EF	05/25/04	A041030332	A041030341	Q041670046
GW-207	EF	11/09/04	A042730065	A042730073	Q043490146
GW-208	EF	05/25/04	A041030331	A041030341	Q041670046
GW-208	EF	11/09/04	A042730064	A042730073	Q043490146
GW-219	EF	11/11/04	A042730047	A042730062	Q043490147
GW-220	EF	05/27/04	A041030339	A041030343	Q041690020
GW-220	EF	11/15/04	A042730072	A042730075	Q043490147

APPENDIX G: CY 2004 QUALITY ASSURANCE/QUALITY CONTROL DATA
Correlation with Associated Groundwater and Surface Water Samples

Sampling Point	Hydrogeologic Regime	Date Sampled	Sample Number	Trip Blank Sample Number	Method Blank Sample Number
GW-222	EF	06/10/04	A041030353	A041030357	Q040510255
GW-222 D	EF	06/10/04	A041030354	A041030357	Q040510255
GW-222	EF	11/30/04	A042730086	A042730091	Q043650002
GW-225	BC	02/17/04	A040080016	A040080024	Q040830066
GW-225	BC	07/29/04	A041960129	A041960135	Q042400049
GW-226	BC	02/17/04	A040080015	A040080024	Q040830066
GW-226	BC	07/28/04	A041960128	A041960134	Q042400042
GW-229	BC	02/11/04	A040080012	A040080022	Q040700109
GW-229	BC	02/12/04	A040080013	A040080023	Q040700109
GW-229	BC	07/28/04	A041960009	A041960134	Q042400042
GW-229	BC	07/29/04	A041960010	A041960135	Q042400049
GW-236	BC	03/08/04	A040080059	A040080070	Q040900004
GW-236 D	BC	03/08/04	A040080060	A040080070	Q040900004
GW-236	BC	08/18/04	A041960167	A041960173	Q042610081
GW-237	BC	03/03/04	A040080055	A040080068	Q040900019
GW-237	BC	09/20/04	A041960161	A041960175	Q042670194
GW-246	BC	03/10/04	A040080063	A040080071	Q040900004
GW-246	BC	08/19/04	A041960170	A041960174	Q042610078
GW-251	EF	04/29/04	A041030285	A041030293	Q041400105
GW-251 D	EF	04/29/04	A041030286	A041030293	Q041400105
GW-251	EF	10/21/04	A042730031	A042730038	Q043240371
GW-257	BC	03/03/04	A040080056	A040080068	Q040900019
GW-257	BC	08/16/04	A041960162	A041960171	Q042610081
GW-300	CR	04/19/04	A041030064	A041030073	Q041240071
GW-300	CR	10/12/04	A042730000	A042730009	Q043140000
GW-311	BC	02/18/04	A040080027	A040080042	Q040700136
GW-311	BC	08/02/04	A041960137	A041960148	Q042400049
GW-315	BC	02/18/04	A040080028	A040080042	Q040700136
GW-315	BC	08/02/04	A041960138	A041960148	Q042400049
GW-322	CR	05/13/04	A041030283	A041030301	Q041670007
GW-322	CR	10/11/04	A042730023	A042730028	Q043140000
GW-381	EF	11/02/04	A042730053	A042730060	Q043450119
GW-383	EF	11/03/04	A042730056	A042730061	Q043450119
GW-513	CR	04/20/04	A041030066	A041030074	Q041240071
GW-513 D	CR	04/20/04	A041030067	A041030074	Q041240071
GW-513	CR	10/13/04	A042730002	A042730010	Q043170131
GW-537	BC	02/23/04	A040080032	A040080044	Q040820010
GW-537	BC	08/03/04	A041960141	A041960149	Q042470171
GW-610	CR	04/22/04	A041030071	A041030076	Q041240078
GW-610	CR	10/20/04	A042730006	A042730012	Q043240367
GW-611	CR	04/22/04	A041030072	A041030076	Q041240078
GW-611	CR	10/20/04	A042730007	A042730012	Q043240367
GW-611 D	CR	10/20/04	A042730008	A042730012	Q043240367
GW-612	CR	05/11/04	A041030280	A041030299	Q041400116
GW-612	CR	05/12/04	A041030281	A041030300	Q041670006
GW-612	CR	10/04/04	A042730020	A042730024	Q042860183
GW-612	CR	10/05/04	A042730021	A042730025	Q042860183

APPENDIX G: CY 2004 QUALITY ASSURANCE/QUALITY CONTROL DATA
Correlation with Associated Groundwater and Surface Water Samples

Sampling Point	Hydrogeologic Regime	Date Sampled	Sample Number	Trip Blank Sample Number	Method Blank Sample Number
GW-615	BC	03/10/04	A040080062	A040080071	Q040900004
GW-615	BC	08/19/04	A041960169	A041960174	Q042610078
GW-620	EF	04/29/04	A041030284	A041030293	Q041400105
GW-620	EF	10/21/04	A042730030	A042730038	Q043240371
GW-627	BC	02/25/04	A040080034	A040080045	Q040820010
GW-627	BC	08/04/04	A041960143	A041960150	Q042470171
GW-633	EF	05/05/04	A041030287	A041030295	Q041400117
GW-633	EF	10/26/04	A042730032	A042730040	Q043240371
GW-653	BC	02/25/04	A040080033	A040080045	Q040820010
GW-653	BC	08/04/04	A041960142	A041960150	Q042470171
GW-679	CR	04/19/04	A041030065	A041030073	Q041240071
GW-679	CR	10/12/04	A042730001	A042730009	Q043140000
GW-680	CR	06/07/04	A041490096	A041030077	Q040510255
GW-680	CR	10/13/04	A042730003	A042730010	Q043170131
GW-691	EF	06/09/04	A041030348	A041030356	Q040510255
GW-691	EF	11/17/04	A042730081	A042730088	Q043650007
GW-692	EF	06/08/04	A041030347	A041030355	Q040510255
GW-692	EF	11/17/04	A042730080	A042730088	Q043650007
GW-695	BC	02/03/04	A040080000	A040080018	Q040510255
GW-695	BC	07/21/04	A041960000	A041960130	Q042250000
GW-698	EF	11/02/04	A042730049	A042730060	Q043450119
GW-698	EF	11/03/04	A042730050	A042730061	Q043450119
GW-703	BC	02/03/04	A040080001	A040080018	Q040510255
GW-703	BC	07/21/04	A041960001	A041960130	Q042250000
GW-704	BC	02/04/04	A040080002	A040080019	Q040510255
GW-704	BC	07/22/04	A041960002	A041960131	Q042250000
GW-706	BC	02/04/04	A040080003	A040080019	Q040510255
GW-706	BC	07/22/04	A041960003	A041960131	Q042250000
GW-722-06	EF	02/22/04	A040540056	A040540062	Q040700139
GW-722-06	EF	08/07/04	A041960228	A041960240	Q042520114
GW-722-10	EF	02/22/04	A040540057	A040540062	Q040700139
GW-722-10	EF	08/07/04	A041960233	A041960240	Q042520114
GW-722-14	EF	02/23/04	A040080089	A040080092	Q040820013
GW-722-14	EF	08/07/04	A041960237	A041960240	Q042520214
GW-722-17	EF	02/23/04	A040080090	A040080092	Q040820013
GW-722-17	EF	08/07/04	A041960238	A041960240	Q042520214
GW-722-20	EF	02/23/04	A040080088	A040080092	Q040820013
GW-722-20	EF	08/07/04	A041960235	A041960240	Q042520114
GW-722-22	EF	02/23/04	A040080086	A040080092	Q040820013
GW-722-22 D	EF	02/23/04	A040080087	A040080092	Q040820013
GW-722-22	EF	08/07/04	A041960234	A041960240	Q042520114
GW-722-22 D	EF	08/07/04	A041960236	A041960240	Q042520114
GW-722-26	EF	02/22/04	A040540059	A040540062	Q040700139
GW-722-26	EF	08/07/04	A041960230	A041960240	Q042520114
GW-722-30	EF	02/22/04	A040540058	A040540062	Q040700139
GW-722-30	EF	08/07/04	A041960229	A041960240	Q042520114

APPENDIX G: CY 2004 QUALITY ASSURANCE/QUALITY CONTROL DATA
Correlation with Associated Groundwater and Surface Water Samples

Sampling Point	Hydrogeologic Regime	Date Sampled	Sample Number	Trip Blank Sample Number	Method Blank Sample Number
GW-722-32	EF	02/22/04	A040540060	A040540062	Q040700139
GW-722-32	EF	08/07/04	A041960231	A041960240	Q042520114
GW-722-33	EF	02/22/04	A040540061	A040540062	Q040700139
GW-722-33	EF	08/07/04	A041960232	A041960240	Q042520114
GW-724	BC	02/10/04	A040080006	A040080021	Q040700105
GW-724	BC	07/27/04	A041960007	A041960133	Q042400042
GW-725	BC	02/11/04	A040080007	A040080022	Q040700109
GW-725 D	BC	02/11/04	A040080008	A040080022	Q040700109
GW-725	BC	07/27/04	A041960008	A041960133	Q042400042
GW-735	EF	05/27/04	A041030338	A041030343	Q041690020
GW-735	EF	11/15/04	A042730070	A042730075	Q043490147
GW-735 D	EF	11/15/04	A042730071	A042730075	Q043490147
GW-738	BC	02/09/04	A040080005	A040080020	Q040700105
GW-738	BC	07/26/04	A041960005	A041960132	Q042400054
GW-738 D	BC	07/26/04	A041960006	A041960132	Q042400054
GW-740	BC	02/09/04	A040080004	A040080020	Q040700105
GW-740	BC	07/26/04	A041960004	A041960132	Q042400054
GW-742	CR	04/21/04	A041030069	A041030075	Q041240078
GW-742	CR	10/18/04	A042730004	A042730011	Q043240367
GW-743	CR	04/21/04	A041030070	A041030075	Q041240078
GW-743	CR	10/18/04	A042730005	A042730011	Q043240367
GW-744	EF	05/24/04	A041030334	A041030340	Q041670046
GW-744	EF	11/10/04	A042730067	A042730074	Q043490146
GW-747	EF	05/26/04	A041030335	A041030342	Q041690020
GW-747 D	EF	05/26/04	A041030336	A041030342	Q041690020
GW-747	EF	11/10/04	A042730068	A042730074	Q043490146
GW-750	EF	05/26/04	A041030337	A041030342	Q041690020
GW-750	EF	11/05/04	A042730069	A042730075	Q043490147
GW-763	EF	11/01/04	A042730048	A042730059	Q043450119
GW-769	EF	10/28/04	A042730044	A042730058	Q043450123
GW-770	EF	10/28/04	A042730043	A042730058	Q043450123
GW-782	EF	05/05/04	A041030291	A041030295	Q041400117
GW-782	EF	10/26/04	A042730036	A042730040	Q043290247
GW-791	EF	05/03/04	A041030288	A041030294	Q041400104
GW-791	EF	10/25/04	A042730033	A042730039	Q043240371
GW-795	BC	02/12/04	A040340061	A040080023	Q040700109
GW-795	BC	08/17/04	A041960164	A041960172	Q042610081
GW-816	EF	05/24/04	A041030333	A041030340	Q041670046
GW-816	EF	11/09/04	A042730066	A042730073	Q043490146
GW-818	EF	02/10/04	A040340065	A040080021	Q040700105
NPR07.0SW	EF	04/13/04	A041030264	A041030270	Q041240065
NPR07.0SW	EF	12/01/04	A042730092	A042730098	Q043650002
NPR12.0SW	EF	04/13/04	A041030265	A041030270	Q041240065
NPR12.0SW	EF	12/01/04	A042730093	A042730098	Q043650002
NPR23.0SW	EF	04/13/04	A041030266	A041030270	Q041240065
NPR23.0SW D	EF	04/13/04	A041030267	A041030270	Q041240065
NPR23.0SW	EF	12/01/04	A042730094	A042730098	Q043640162

APPENDIX G: CY 2004 QUALITY ASSURANCE/QUALITY CONTROL DATA
Correlation with Associated Groundwater and Surface Water Samples

Sampling Point	Hydrogeologic Regime	Date Sampled	Sample Number	Trip Blank Sample Number	Method Blank Sample Number
NT-01	BC	01/27/04	A040080053	A040080054	Q040580095
NT-01	BC	07/20/04	A041960158	A041960160	Q042250000
NT-01 D	BC	07/20/04	A041960159	A041960160	Q042250000
S17	CR	01/29/04	A040080077	A040080078	Q040580095
S17	CR	07/19/04	A041960226	A041960227	Q042050457
SCR1.5SW	CR	01/29/04	A040080072	A040080078	Q040580097
SCR1.5SW	CR	07/19/04	A041960221	A041960227	Q042050457
SCR1.5SW D	CR	07/19/04	A041960222	A041960227	Q042050457
SCR2.1SP	CR	01/29/04	A040080073	A040080078	Q040580097
SCR2.1SP	CR	07/19/04	A041960223	A041960227	Q042050457
SCR2.2SP	CR	01/29/04	A040080074	A040080078	Q040580097
SCR2.2SP	CR	07/19/04	A041960224	A041960227	Q042050457
SCR3.5SW	CR	01/29/04	A040080075	A040080078	Q040580097
SCR3.5SW D	CR	01/29/04	A040080076	A040080078	Q040580095
SCR3.5SW	CR	07/19/04	A041960225	A041960227	Q042050457
SPR14.0SP	EF	02/19/04	A040420288	A040080043	Q040700136
SS-1	BC	01/27/04	A040080052	A040080054	Q040580095
SS-1	BC	07/20/04	A041960157	A041960160	Q042250000
SS-4	BC	01/27/04	A040080051	A040080054	Q040580095
SS-4	BC	07/20/04	A041960156	A041960160	Q042250000
SS-5	BC	01/27/04	A040080049	A040080054	Q040580097
SS-5 D	BC	01/27/04	A040080050	A040080054	Q040580097
SS-5	BC	07/20/04	A041960155	A041960160	Q042050457

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