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BWXT Y-12
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Y-12 NATIONAL SECURITY COMPLEX

CALENDAR YEAR 2006 GROUNDWATER MONITORING REPORT, U.S. DEPARTMENT OF ENERGY Y-12 NATIONAL SECURITY COMPLEX, OAK RIDGE, TENNESSEE

September 2007

Prepared by

Elvado Environmental LLC
Under Subcontract No. 4300054638

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

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CONTENTS

Section Page

List of In-Text Tables v
List of Figures vii
List of Tables xi
List of Acronyms and Abbreviations xiii

1.0 INTRODUCTION 1-1

2.0 BACKGROUND INFORMATION 2-1
2.1 TOPOGRAPHY AND BEDROCK GEOLOGY 2-1
2.2 SURFACE WATER DRAINAGE 2-2
2.2.1 Bear Creek 2-2
2.2.2 Upper East Fork Poplar Creek 2-3
2.2.3 Chestnut Ridge 2-3
2.3 GROUNDWATER SYSTEM 2-4
2.3.1 Aquifer 2-4
2.3.1.1 Maynardville Limestone 2-4
2.3.1.2 Knox Group 2-6
2.3.2 Aquitard 2-7
2.4 GROUNDWATER CONTAMINATION 2-8
2.4.1 Bear Creek Regime 2-8
2.4.1.1 S-3 Site 2-9
2.4.1.2 Oil Landfarm WMA 2-9
2.4.1.3 Bear Creek Burial Grounds WMA 2-11
2.4.1.4 Maynardville Limestone Exit Pathway 2-12
2.4.2 East Fork Regime 2-13
2.4.3 Chestnut Ridge Regime 2-14

3.0 CY 2006 MONITORING PROGRAMS 3-1
3.1 SAMPLING LOCATIONS AND FREQUENCY 3-1
3.1.1 Bear Creek Regime 3-2
3.1.2 East Fork Regime 3-3
3.1.3 Chestnut Ridge Regime 3-4
3.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLING 3-5
3.3 SAMPLE COLLECTION AND HANDLING 3-6
3.4 FIELD MEASUREMENTS AND LABORATORY ANALYTES 3-8
3.5 DATA MANAGEMENT AND DQO EVALUATION 3-8
3.6 GROUNDWATER ELEVATION MONITORING 3-9

CONTENTS (continued)

Section Page

4.0 CY 2006 MONITORING DATA 4-1
4.1 SURVEILLANCE MONITORING 4-1
4.1.1 Bear Creek Regime 4-1
4.1.1.1 Aquitard Wells 4-2
4.1.1.2 Aquifer Wells 4-7
4.1.2 East Fork Regime 4-12
4.1.2.1 Aquitard Wells 4-12
4.1.2.2 Aquifer Wells 4-18
4.1.3 Chestnut Ridge Regime 4-24
4.2 EXIT PATHWAY/PERIMETER MONITORING 4-25
4.2.1 Bear Creek Regime 4-26
4.2.1.1 Upper Bear Creek 4-26
4.2.1.2 Middle Bear Creek 4-27
4.2.1.3 Lower Bear Creek 4-28
4.2.2 East Fork Regime 4-29
4.2.2.1 Groundwater 4-30
4.2.2.2 Surface Water 4-31
4.2.3 Chestnut Ridge Regime 4-31
4.2.3.1 Groundwater 4-32
4.2.3.2 Surface Water 4-32

5.0 CONCLUSIONS AND RECOMMENDATIONS 5-1

6.0 REFERENCES 6-1

APPENDICES:

A FIGURES
B TABLES
C MONITORING WELL CONSTRUCTION DETAILS
D CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
D.1 Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals
D.2 Volatile Organic Compounds
D.3 Radiological Analytes
E CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
E.1 Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals
E.2 Volatile Organic Compounds
E.3 Radiological Analytes
F CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
F.1 Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals
F.2 Volatile Organic Compounds
F.3 Radiological Analytes
G CY 2006 QUALITY ASSURANCE/QUALITY CONTROL DATA

List of In-Text Tables

Table — Page

1. CY 2006 sampling locations in the Bear Creek Regime 3-2

2. CY 2006 sampling locations in the East Fork Regime, north of Pine Ridge, and in Union Valley . . 3-3

3. CY 2006 sampling locations in the Chestnut Ridge Regime 3-4

4. QA/QC samples analyzed in CY 2006 for the Y-12 GWPP 3-6

5. Summary of CY 2006 groundwater elevation monitoring in the Bear Creek, East Fork, and Chestnut Ridge regimes 3-9

6. Bear Creek Regime CY 2006: elevated nitrate and uranium concentrations in surveillance monitoring aquitard wells 4-2

7. Bear Creek Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquitard wells 4-4

8. Bear Creek Regime CY 2006: elevated gross alpha activity and gross beta activity in surveillance monitoring aquitard wells 4-6

9. Bear Creek Regime CY 2006: elevated nitrate and uranium concentrations in surveillance monitoring aquifer wells 4-8

10. Bear Creek Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquifer wells 4-10

11. Bear Creek Regime CY 2006: elevated gross alpha activity and gross beta activity in surveillance monitoring aquifer wells 4-11

12. East Fork Regime CY 2006: elevated nitrate and uranium concentrations in surveillance monitoring aquitard wells 4-13

13. East Fork Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquitard wells 4-15

14. East Fork Regime CY 2006: elevated gross alpha activity and gross beta activity in surveillance monitoring aquitard wells 4-17

15. East Fork Regime CY 2006: elevated nitrate and uranium concentrations in surveillance monitoring aquifer wells 4-19

16. East Fork Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquifer wells 4-21

List of In-Text Tables (continued)

Table — Page

17. East Fork Regime CY 2006: elevated gross alpha activity and gross beta activity in surveillance monitoring aquifer wells 4-23

18. Chestnut Ridge Regime CY 2006: maximum VOC concentrations in surveillance monitoring wells 4-24

19. Bear Creek Regime CY 2006: sampling locations used for exit pathway/perimeter monitoring 4-26

20. Upper Bear Creek CY 2006: maximum contaminant concentrations 4-27

21. Middle Bear Creek CY 2006: maximum contaminant concentrations 4-28

22. Lower Bear Creek CY 2006: maximum contaminant concentrations 4-28

23. East Fork Regime CY 2006: sampling locations for exit pathway/perimeter monitoring 4-29

24. East Fork Regime CY 2006: maximum VOC concentrations in exit pathway/perimeter monitoring wells 4-30

25. East Fork Regime CY 2006: maximum contaminant concentrations at the UEFPC exit pathway/perimeter sampling locations 4-31

26. Chestnut Ridge Regime CY 2006: sampling locations used for exit pathway/perimeter monitoring 4-31

List of Figures

Figure		Page
A.1	Hydrogeologic regimes at the Y-12 National Security Complex	A-1
A.2	Topography and bedrock geology at the Y-12 National Security Complex	A-2
A.3	Fill areas and pre-construction drainage features in the Upper East Fork Poplar Creek Hydrogeologic Regime	A-3
A.4	Groundwater elevations in the Bear Creek Hydrogeologic Regime, September 2006	A-4
A.5	Groundwater elevations in the Upper East Fork Poplar Creek Hydrogeologic Regime, September 2006	A-5
A.6	Groundwater elevations in the Chestnut Ridge Hydrogeologic Regime, September 2006	A-6
A.7	Generalized extent of nitrate in groundwater at the Y-12 National Security Complex	A-7
A.8	Generalized extent of volatile organic compounds in groundwater at the Y-12 National Security Complex	A-8
A.9	Generalized extent of gross alpha activity in groundwater at the Y-12 National Security Complex	A-9
A.10	Generalized extent of gross beta activity in groundwater at the Y-12 National Security Complex	A-10
A.11	CY 2006 sampling locations in the Bear Creek Hydrogeologic Regime	A-11
A.12	Components of Maynardville Limestone exit pathway pickets A, B, C, and W	A-12
A.13	CY 2006 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime and in Union Valley	A-13
A.14	CY 2006 surface water sampling locations north of Pine Ridge	A-14
A.15	BarCad® pump system sampling depths in wells GW-954 and GW-956	A-15
A.16	Westbay™ monitoring system sampling port depths in well GW-722	A-16
A.17	CY 2006 sampling locations in the Chestnut Ridge Hydrogeologic Regime	A-17
A.18	Bear Creek Regime CY 2006: nitrate and/or uranium concentration trends in surveillance monitoring aquitard wells GW-246, GW-276, GW-526, and GW-615	A-18

List of Figures (continued)

Figure		Page
A.19	Generalized extent of chloroethenes in groundwater at the Y-12 National Security Complex	A-19
A.20	Generalized extent of chloroethanes in groundwater at the Y-12 National Security Complex	A-20
A.21	Generalized extent of chloromethanes in groundwater at the Y-12 National Security Complex	A-21
A.22	Generalized extent of petroleum hydrocarbons in groundwater at the Y-12 National Security Complex	A-22
A.23	Bear Creek Regime CY 2006: PCE concentration trends in surveillance monitoring aquitard wells GW-046, GW-246, and GW-276	A-23
A.24	Bear Creek Regime CY 2006: gross alpha and/or gross beta activity trends in surveillance monitoring aquitard wells GW-085, GW-276, and GW-537	A-24
A.25	Bear Creek Regime CY 2006: nitrate and/or uranium concentration trends in surveillance monitoring aquifer wells GW-229, GW-695, GW-703, and GW-706	A-25
A.26	Bear Creek Regime CY 2006: selected VOC concentration trends in surveillance monitoring aquifer wells GW-225, GW-229, and GW-704	A-26
A.27	Bear Creek Regime CY 2006: gross alpha and gross beta activity trends in surveillance monitoring aquifer wells GW-229 and GW-706	A-27
A.28	East Fork Regime CY 2006: nitrate concentration trends in surveillance monitoring aquitard wells 55-2B, 55-2C, GW-109, and GW-633	A-28
A.29	East Fork Regime CY 2006: summed VOC concentration trends in surveillance monitoring aquitard wells GW-108, GW-109, GW-656, GW-769, GW-770, and GW-782	A-29
A.30	East Fork Regime CY 2006: gross alpha and/or gross beta activity trends in surveillance monitoring aquitard wells GW-108, GW-204, and GW-633	A-30
A.31	East Fork Regime CY 2006: nitrate and/or uranium concentration trends in surveillance monitoring aquifer wells GW-223, GW-251, and GW-253	A-31
A.32	East Fork Regime CY 2006: VOC concentration trends in surveillance monitoring aquifer wells GW-148, GW-251, and GW-382	A-32

List of Figures (continued)

Figure		Page
A.33	East Fork Regime CY 2006: gross alpha activity trends in surveillance monitoring aquifer wells GW-154, GW-253, and GW-605	A-33
A.34	Chestnut Ridge Regime CY 2006: VOC trends in surveillance monitoring wells GW-305, GW-544, and GW-798	A-34
A.35	East Fork Regime CY 2006: PCE concentration trends in exit pathway monitoring wells GW-151, GW-722-14, and GW-832	A-35
A.36	East Fork Regime CY 2006: CTET concentration trend in exit pathway monitoring well GW-722-17	A-36

List of Tables

Table		Page
B.1	Summary of CY 2006 sampling and analysis plan addenda	B-1
B.2	CY 2006 groundwater and surface water sampling dates in the Bear Creek Hydrogeologic Regime	B-3
B.3	CY 2006 groundwater and surface water sampling dates in the Upper East Fork Poplar Creek Hydrogeologic Regime	B-7
B.4	CY 2006 groundwater and surface water sampling dates in the Chestnut Ridge Hydrogeologic Regime	B-13
B.5	Field measurements and laboratory analytes for CY 2006 groundwater and surface water samples obtained by the Y-12 GWPP	B-17
B.6	Depth-to-water measurements and groundwater elevations in the Bear Creek Hydrogeologic Regime, September 2006	B-21
B.7	Depth-to-water measurements and groundwater elevations in the Upper East Fork Poplar Creek Hydrogeologic Regime, September 2006	B-23
B.8	Depth-to-water measurements and groundwater elevations in the Chestnut Ridge Hydrogeologic Regime, September 2006	B-25
B.9	Concentration trends for the principal contaminants detected at CY 2006 sampling locations in the Bear Creek Hydrogeologic Regime	B-29
B.10	Concentration trends for the principal contaminants detected at CY 2006 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime	B-33
B.11	Concentration trends for contaminants detected at CY 2006 sampling locations in the Chestnut Ridge Hydrogeologic Regime	B-37

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.
BYBY	Boneyard/Burnyard
CAST	Commodore Advanced Sciences Team
CDL	Construction/Demolition Landfill
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
KHQ	Kerr Hollow Quarry
MC	methylene chloride
MCL	maximum contaminant level
MDA	minimum detectable activity
mg/d	million gallons per day
µg/L	micrograms per liter
mg/L	milligrams per liter
MMES	Martin Marietta Energy Systems, Inc.
mrem/yr	millirem 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
OLF	Oil Landfarm
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
TPU	total propagated uncertainty
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
WCPA	Waste Coolant Processing Area
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
14DXA	1,4-dioxane

1.0 INTRODUCTION

This report contains the groundwater and surface water monitoring data that were obtained during calendar year (CY) 2006 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 2006 monitoring data were obtained from wells, springs, 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 directly south of Y-12. Section 2 of this report provides background information pertinent to groundwater and surface water quality monitoring in each hydrogeologic regime, including the topography and bedrock geology, surface water drainage, groundwater system, and extent of groundwater contamination.

The CY 2006 groundwater and surface water monitoring data in this report were obtained from sampling and analysis activities implemented under the Y-12 Groundwater Protection Program (GWPP) managed by BWXT Y-12, L.L.C. (BWXT), and from sampling and analysis activities implemented under several monitoring programs managed by Bechtel Jacobs Company LLC (BJC). Cooperative implementation of the monitoring programs directed by the Y-12 GWPP and BJC (i.e., preparing SAPs, coordinating sample collection, and sharing data) ensures that the CY 2006 monitoring results fulfill requirements of all the applicable monitoring drivers with no duplication of sampling and analysis efforts. Section 3 of this report contains a summary of information regarding the groundwater and surface water sampling and analysis activities implemented under the Y-12 GWPP including sampling locations and frequency; quality assurance (QA)/quality control (QC) sampling; sample collection and handling; field measurements and laboratory analytes; data management and data quality objective (DQO) evaluation; and groundwater elevation monitoring. However, this report does not include equivalent information regarding the groundwater and surface water sampling and analysis activities associated with the monitoring programs implemented by BJC. Such details are deferred to the respective programmatic plans and reports issued by BJC (see Section 3.0).

Collectively, the groundwater and surface water monitoring data obtained during CY 2006 by the Y-12 GWPP and BJC address DOE Order 450.1 (*Environmental Protection Program*) requirements for monitoring 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). Section 4 of this report presents a summary evaluation of the monitoring data with regard to the respective objectives of surveillance monitoring and exit pathway/perimeter monitoring, based on the analytical results for the principal groundwater and surface water contaminants at Y-12: nitrate, uranium, volatile organic compounds (VOCs), gross alpha activity, and gross beta activity. Section 5 of this report summarizes the most pertinent findings regarding the principal contaminants, along with recommendations proposed for ongoing groundwater and surface water quality monitoring performed under the Y-12 GWPP.

Narrative sections of this 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. Appendix C contains construction details for the wells in each regime that were sampled during CY 2006 by either the Y-12 GWPP or BJC. Field measurements recorded during collection of the groundwater and surface water samples and results of laboratory analyses of the samples 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 the 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 (SCR1) 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 (KHQ), 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. 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 (OLF) 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 are less than 100 mg/L near the plume boundaries (Figure A.7).

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 OLF WMA are the Boneyard/Burnyard (BYBY), the Hazardous Chemical Disposal Area (HCDA), the OLF disposal plots, and Sanitary Landfill I. Each of these sites except the BYBY is a known or suspected source of VOCs in the shallow groundwater; the BYBY 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 BYBY 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 OLF. 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 BYBY. Excavated wastes were replaced with uncontaminated soil and the filled area was graded to drain, mulched, and seeded with grass.

Groundwater contaminants at the OLF 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 (Figure A.8); 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 BYBY (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 OLF 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 BYBY. 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 and Figure A.10).

Most trace metal contamination in the Maynardville Limestone occurs in the shallow groundwater near the S-3 Site and the BYBY. 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 BYBY 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 BYBY, 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 (Figure A.7). 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 (Figure A.8). 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, toluene, ethylbenzene (ETB), and total xylene) 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 (WCPA), 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 (Figure A.8). 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 (Figure A.9 and Figure A.10). 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 KHQ. 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 2006 MONITORING PROGRAMS

As noted in Section 1.0, the groundwater and surface water monitoring data included in this report were obtained during CY 2006 from implementation of monitoring programs directed by the Y-12 GWPP and BJC. The Y-12 GWPP implemented monitoring needed to specifically meet requirements of DOE Order 450.1 for surveillance monitoring and exit-pathway/perimeter monitoring (hereafter referenced collectively as DOE Order monitoring). Associated groundwater and surface water sampling and analysis activities were performed in accordance with the Y-12 GWPP sampling and analysis plan (SAP) for CY 2006 (BWXT 2006a), as modified by applicable addenda (Table B.1). The following subsections provide details regarding these sampling and analysis activities, including: the respective network of sampling locations in each hydrogeologic regime; QA/QC sampling; groundwater and surface water sampling methods; field measurements and laboratory analytes; data management protocols and DQO evaluation; and groundwater elevation monitoring.

BJC implemented the following monitoring programs at Y-12 during CY 2006: (1) Resource Conservation and Recovery Act (RCRA) post-closure detection monitoring and RCRA post-closure corrective action monitoring (collectively referenced as RCRA monitoring); (2) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) monitoring in accordance with the applicable record of decision (ROD) or related decision documents (hereafter referenced as CERCLA ROD monitoring);(3) CERCLA baseline monitoring to evaluate pre-remediation water quality; (4) CERCLA detection monitoring at the Environmental Management Waste Management Facility (EMWMF), an operating facility located in the Bear Creek Regime for CERCLA remediation wastes generated on the ORR; and (5) detection monitoring for several nonhazardous solid waste disposal facilities (SWDFs) located in the Chestnut Ridge Regime (referenced as SWDF detection monitoring). Groundwater and surface water sampling and analysis activities associated with these programs were performed in general accordance with the requirements specified in the ORR Water Resources Restoration Program (WRRP) SAP for fiscal years 2006 (BJC 2005) and 2007 (BJC 2006c); the environmental monitoring plan for the EMWMF (Duratek Federal Services [DFS] 2003a); and a SWDF detection monitoring SAP issued by the subcontractor responsible for the operations of the landfills on Chestnut Ridge (DFS 2003b). The following subsections provide general information regarding the monitoring programs implemented by BJC (e.g., sampling locations), but specific details, such as QA/QC sampling information, are deferred to the applicable SAPs and related technical reports issued by BJC.

Cooperative implementation of the monitoring programs directed by the Y-12 GWPP and BJC (i.e., preparing SAPs, coordinating sample collection, and sharing data) ensures that the CY 2006 monitoring results fulfill requirements of all the applicable monitoring drivers (DOE Order, RCRA, CERCLA, and SWDF) with no duplication of sampling and analysis efforts.

3.1 SAMPLING LOCATIONS AND FREQUENCY

This report contains groundwater and surface water quality monitoring data obtained during CY 2006 from 239 sampling locations at Y-12, including 192 monitoring wells (complete construction details for each well are provided in Appendix C), 15 springs, and 32 surface water stations. The following subsections provide details regarding the sampling locations in each hydrogeologic regime and the corresponding sampling frequency for each applicable well, spring, and surface water station.

3.1.1 Bear Creek Regime

As shown below in Table 1, a total of 61 monitoring wells, seven springs, and 19 surface water stations in the Bear Creek Regime were sampled during CY 2006 for the purposes of DOE Order monitoring, RCRA monitoring, and CERCLA-related monitoring. Table B.2 identifies the monitoring program applicable to each well, spring, and surface water station; their locations are shown on Figure A.11.

Table 1. CY 2006 sampling locations in the Bear Creek Regime

Monitoring Driver	Monitoring Wells	Springs	Surface Water Stations
DOE Order	35	3	2
RCRA	6	1	0
CERCLA	20	5	18
Totals:	**61**	**7 ***	**19 ***

Note: * = The total number is less than the sum because separate samples were collected from spring SS-4 and NT-01 for both DOE Order and CERCLA monitoring purposes (see Table B.2).

Samples were collected either annually or semiannually from most of the monitoring locations during CY 2006. Of the 61 monitoring wells sampled during CY 2006, 25 wells were sampled annually, 23 wells were sampled semiannually, and 13 wells were sampled quarterly (Table B.2). Spring and surface water samples were collected annually (two locations), semiannually (15 locations), during three quarters (four locations), and during all four quarters (five locations) of CY 2006 (Table B.2).

Twenty-seven of the wells that were sampled specifically for DOE Order monitoring during CY 2006 are located near waste management facilities in BCV (Table B.2 and Figure A.11), including the primary sources of groundwater contamination in the regime (S-3 Site, OLF WMA, and BCBG WMA). The remaining 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.12). The wells in each Exit Pathway Picket are completed at various depths along strike-normal transects of the Maynardville Limestone (Figure A.12), which is the primary contaminant migration pathway in the Bear Creek Regime.

Springs that were sampled during CY 2006 specifically for DOE Order exit pathway/perimeter monitoring all discharge into Bear Creek (Table B.2 and Figure A.11), and are located southwest (hydraulically downgradient) of the S-3 Site (SS-1), the OLF (SS-4), and the BCBG WMA (SS-5). The surface water stations are located 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).

Groundwater samples were collected from six monitoring wells and one spring to meet RCRA post-closure corrective action monitoring requirements in the Bear Creek Regime during CY 2006 (Table B.2). These wells include point-of-compliance (POC) wells located downgradient of the S-3 Site (GW-276), the OLF (GW-008), and the BCBG WMA (GW-046); three plume boundary wells (GW-712, GW-713, and GW-714) at Exit Pathway Picket W (Figure A.11 and Figure A.12). Spring SS-6 also serves as a plume boundary monitoring location (Figure A.11).

Twenty monitoring wells, five springs, and 18 surface water stations in the Bear Creek Regime were sampled to meet CERCLA monitoring requirements during CY 2006 (Table B.2 and Figure A.11). Thirteen

monitoring wells and five surface water stations were sampled for CERCLA detection monitoring purposes at the EMWMF. Seven monitoring wells, five springs, and 11 surface water stations were sampled for the purposes of CERCLA ROD monitoring. 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 89 monitoring wells, three springs, and eight surface water stations in the East Fork Regime (and surrounding areas) were sampled during CY 2006 to meet the requirements of DOE Order monitoring, RCRA monitoring, and CERCLA monitoring. Table B.3 identifies the monitoring program applicable to each well, spring, and surface water station.

Table 2. CY 2006 sampling locations in the East Fork Regime, north of Pine Ridge, and in Union Valley

Monitoring Driver	Monitoring Wells	Springs	Surface Water Stations
DOE Order	66	1	4
RCRA	5	0	0
CERCLA	19	2	4
Totals:	**89 ***	**3**	**8**

Note: * = The total number is less than the sum because separate samples were collected from well GW-722 for DOE Order (August) and CERCLA (March, June, and December) monitoring purposes (see Table B.3).

All but 12 of the CY 2006 sampling locations lie within the boundaries of the East Fork Regime; six wells and two springs are located in Union Valley east the ORR boundary at Scarboro Road (Figure A.13), and four surface water stations are located in drainage features along the ORR boundary on the north side of Pine Ridge (Figure A.14). Samples were collected either annually or semiannually from most of the CY 2006 sampling locations. Of the 89 monitoring wells sampled during CY 2006, 46 wells were sampled annually, 39 wells were sampled semiannually, three wells were sampled during three quarters, and one well (GW-722) was sampled during each quarter (Table B.3).

Fifty-nine monitoring wells in East Fork Regime, most of which are located within the western and central areas of Y-12 (Figure A.13), were sampled during CY 2006 specifically to meet DOE Order surveillance monitoring requirements (Table B.3). Two of these wells (GW-954 and GW-956), both located within the central Y-12 area, contain BarCad® pump systems that have three (GW-954) or four (GW-956) pumps installed at discrete depth intervals with a polyvinyl chloride riser casing connecting each pump to the surface (Figure A.15).

Seven monitoring wells, one spring, and four surface water locations were sampled to meet DOE Order exit pathway/perimeter monitoring requirements (Table B.3). One of the monitoring wells is located next to UEFPC in the gap through Pine Ridge northeast of Y-12 (Figure A.13). Note that two deeper wells located in the gap through Pine Ridge (GW-207 and GW-208) with a long-term exit pathway monitoring history are no longer monitored because the wells were granted inactive status under the Y-12 GWPP (BWXT 2006b). These wells are not located hydraulically downgradient (along strike) of any confirmed or potential sources of groundwater contamination. The six other exit pathway wells are located between UEFPC and Scarboro Road at the east end of Y-12. One well is equipped with a Westbay™ multi-port sampling apparatus (Westbay well GW-722), with sampling ports set at ten discrete depths intervals in the well (Figure A.16).

Groundwater samples were collected once (in August 2006) from all of the sampling ports and were collected quarterly from five of the sampling ports (ports 14,17, 20, 22, and 33) during CY 2006 (Table B.3). The spring (SP-17) is located in the eastern Y-12 Area (Figure A.13) and the surface water stations are located north of Pine Ridge (Figure A.14). Samples were collected annually from the spring and surface water stations during CY 2006 (Table B.3).

Groundwater samples were collected from five wells to meet RCRA post-closure corrective action monitoring requirements in the East Fork Regime during CY 2006. 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.13).

Nineteen monitoring wells, two springs, and four surface water stations were sampled during CY 2006 specifically to meet CERCLA monitoring requirements (Table B.3). Fourteen monitoring wells, two springs, and the surface water stations were sampled for CERCLA ROD monitoring purposes. Eight of these monitoring wells (GW-151, GW-154, GW-223, GW-380, GW-382, GW-722, GW-762, and GW-832) are located in the eastern Y-12 area (Figure A.13). 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.13). The other six monitoring wells and the springs are located in Union Valley east of the ORR boundary along Scarboro Road (Figure A.13). Sampling locations used for CERCLA baseline monitoring include five monitoring wells located in the western (GW-253 and GW-618) and eastern (GW-281, GW-658, and GW-802) Y-12 areas.

3.1.3 Chestnut Ridge Regime

As shown below in Table 3, a total of 42 monitoring wells, five springs, and five surface water stations in the Chestnut Ridge Regime were sampled during CY 2006 to meet the requirements of DOE Order monitoring, SWDF detection monitoring, RCRA monitoring, and CERCLA monitoring. Table B.4 identifies the monitoring program applicable to each well, spring, and surface water station; their locations are shown on Figure A.17.

Table 3. CY 2006 sampling locations in the Chestnut Ridge Regime

Monitoring Driver	Monitoring Wells	Springs	Surface Water Stations
DOE Order	6	2	3
SWDF	21	1	0
RCRA	11	0	0
CERCLA	4	2	2
Totals:	**42**	**5**	**5**

Groundwater samples were collected semiannually during CY 2006 from most (35 wells) of the monitoring wells. Six wells (GW-175, GW-178, GW-322, GW-514, GW-609, and GW-612) were sampled once and one well (GW-305) was sampled during each quarter of the year (Table B.4). Samples from the springs and surface water stations were collected annually (five locations) and semiannually (five locations) during CY 2006 (Table B.4).

Wells located near the CRSP (GW-175, GW-178, GW-322, GW-514, GW-609, and GW-612) were sampled specifically for DOE Order surveillance monitoring purposes during CY 2006. Sampling locations used for

DOE Order exit-pathway/perimeter monitoring are in the southwestern portion of the regime (springs SCR2.1SP and SCR2.2SP) and along Bethel Valley Road in main channels of drainage features where surface water exits the Chestnut Ridge Regime (surface water sampling stations SCR1.5SW, SCR3.5SW, and S17).

Twenty-one monitoring wells and one spring were sampled during CY 2006 to meet SWDF detection monitoring requirements (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.17). 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 2006 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 to meet RCRA monitoring requirements during CY 2006 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 two plume delineation wells: GW-301 at the former Chestnut Ridge Borrow Area Waste Pile about 3,000 ft east of the site; and GW-831 at the Filled Coal Ash Pond (FCAP) about 2,000 ft southwest of the site (Figure A.17). Note that the SWDF detection monitoring results for five 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 2006, RCRA post-closure detection monitoring included four wells at the Chestnut Ridge Sediment Disposal Basin (CRSDB) and four wells at KHQ (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 KHQ (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 2006. The wells (located at the United Nuclear Corporation Site) and the surface water stations (in McCoy Branch) were sampled for CERCLA ROD monitoring purposes (Figure A.17 and Table B.4). A spring (SCR3.5SP) located along McCoy Branch and a spring (SCR1.25SP) along Dunaway Branch 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 2006. Comparable QA/QC sampling protocols also 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 2006 included 86 trip blanks, 53 method (laboratory) blanks, four field blanks, one equipment rinsate sample, and 21 duplicate groundwater and surface water samples.

Table 4. QA/QC samples analyzed in CY 2006 for the Y-12 GWPP

Sample Type	Total Number of Samples per Quarter of CY 2006				Annual Total
	First	Second	Third	Fourth	
Trip Blank Samples	21	26	24	15	**86**
Method Blank Samples	14	16	14	9	**53**
Field Blank Samples	1	1	1	1	**4**
Equipment Rinsate Samples	0	0	1	0	**1**
Duplicate Samples	5	8	5	3	**21**

The blanks and equipment rinsate samples were prepared and analyzed as specified in the *Quality Assurance Plan for the Analytical Chemistry Organization* (BWXT 2005a). 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-246 (first and third quarters) and GW-220 (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. The equipment rinsate was a sample of the deionized water from the final rinse of the decontaminated portable sampling equipment after sampling was completed at Westbay well GW-722 during the third quarter of CY 2006 (Appendix G).

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 2006.

A total of 21 field duplicate samples were collected during CY 2006 from five wells and one spring in the Bear Creek Regime (Table B.2), 12 wells and one spring in the East Fork Regime (Table B.3), and one well and one spring 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 2006. 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 (BWXT 2002a and BWXT 2004a). 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 2006 (Commodore Advanced Sciences Team [CAST] 2005a).

Unfiltered samples were collected from the monitoring wells, springs, and surface water stations in each hydrogeologic regime during CY 2006. Groundwater samples were collected from most monitoring wells with dedicated bladder pumps (Well Wizard™). However, samples were obtained from one well equipped with a dedicated Westbay ™ multi-port sampling apparatus (well GW-722) and from two wells equipped with multilevel BarCad® pump systems (wells GW-954 and GW-956).

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. To obtain the sample, groundwater is pumped from the well 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.

Groundwater samples were collected from Westbay well 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). Four 250-milliliter non-vented stainless steel sample collection bottles are used to obtain groundwater samples from the sampling ports. The sample collection bottles are lowered to the designated sampling port, the sampling port valve is opened remotely, and the bottles are allowed to fill with groundwater. The filled bottles are retrieved to the surface and the contents are poured into the appropriate laboratory sample bottle(s). The sample collection bottles are 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 is used as a "formation rinse" to obtain field measurements and to condition the sample collection bottle.

Groundwater samples were collected using multilevel BarCad® pump (positive displacement gas drive) systems installed in wells GW-954 and GW-956 in the East Fork Regime. These samples were collected in accordance with written guidance provided by the GWPP incorporating the standard operating procedures provided by the manufacturer (BESST Inc. 2005). The manifold installed at the top of the riser casing for each pump has two fittings: one for gas (nitrogen) pressurization and one for sample collection. A pressure control unit is used by field personnel to regulate the amount of nitrogen gas that displaces groundwater in the riser casing above the BarCad® pump. The displaced groundwater is forced upward through the sample collection tube and discharged at the surface during well purging and sample collection. Releasing the nitrogen pressure permits groundwater to move from the formation and sand pack through the BarCad® unit into the riser casing for subsequent cycles of discharge through the sample collection tube. The system is purged to remove standing water from the riser pipe, to allow fresh formation water to recharge the sand pack interval, and to obtain field measurements. Typical purge rates for BarCad® pump systems are 500-800 milliliters per minute. Field personnel collect groundwater samples from the sample return line after the following conditions are met: (1) at least three purge cycles are performed; (2) the volume of subsequent purge cycles is at least 50% of the initial purge volume; and (3) the total water volume purged exceeds 50% of the sand pack volume.

3.4 FIELD MEASUREMENTS AND LABORATORY ANALYTES

The following discussion pertains to the field measurements and laboratory analytes associated with the CY 2006 groundwater and surface water sampling activities directed by the Y-12 GWPP. Identical or functionally equivalent field measurements and laboratory analyses were performed under the monitoring programs managed by BJC during CY 2006 (BJC 2005, BJC 2006a, DFS 2003a, and DFS 2003b).

Field personnel measured the depth to the static water surface before sampling groundwater in each monitoring well (except wells GW-722, GW-954, and GW-956) and recorded field measurements of pH, temperature, conductivity, dissolved oxygen, and REDOX for each groundwater and surface water sampling location (Table B.5). The depth to the static water level was calculated volumetrically in wells with multilevel BarCad® pumps (GW-954 and GW-956) and was converted from pressure measurements for each sampling port in well GW-722. Additionally, REDOX and dissolved oxygen were not recorded for well GW-722 (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 referenced in the CY 2006 SAP for the Y-12 GWPP (BWXT 2006a). 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 2006 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 following discussion pertains to the data management protocols associated with the CY 2006 groundwater and surface water sampling activities directed by the Y-12 GWPP. Field measurements and results of specified laboratory analyses performed for the samples collected from each well, spring, and surface water station during CY 2006 were provided to the GWPP in electronic files and hardcopy printouts provided by the ACO. Electronic files and hardcopy printouts of the monitoring data obtained under the Y-12 GWPP during the first quarter of CY 2006 were transferred to the GWPP groundwater database management subcontractor, who loaded the electronic files into SAS® data management software and verified the data in accordance with the *Y-12 Groundwater Protection Program Data Management Plan* (BWXT 2003a). Appropriate ACO staff and 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. Beginning with monitoring data from groundwater and surface water sampling performed during the second quarter of CY 2006, personnel in the BWXT Information Technology Department performed all data management functions formerly performed by the GWPP database management subcontractor, using Microsoft Access (instead of SAS®) to maintain the GWPP Analytical Data Management System.

Analytical results and field measurements associated with monitoring programs managed by BJC were extracted from the Project Environmental Measurements System (PEMS) and formatted as SAS® files for presentation in this report. The BJC data management process (CAST 2005b) is similar to the process described above for the Y-12 GWPP.

The CY 2006 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 2003a). 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). Functionally equivalent DQO criteria were employed for the monitoring programs managed by BJC (CAST 2005b). Note that all data obtained to meet RCRA and SWDF monitoring requirements have been similarly evaluated, however the CERCLA monitoring data was evaluated only for the first two quarters of CY 2006. Therefore, some results obtained from July through December 2006 by BJC that are presented in this report may not meet the GWPP DQOs.

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 2006.

Table 5. Summary of CY 2006 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	65	September 11-24, 2006	Table B.6	Figure A.4
East Fork	55	September 11-25, 2006	Table B.7	Figure A.5
Chestnut Ridge	77	September 11-21, 2006	Table B.8	Figure A.6

Field personnel subcontracted by BJC measured the depth to the static water surface in each well in accordance with the operating procedure (CAST 2005a).

4.0 CY 2006 MONITORING DATA

This section presents an overview evaluation of the CY 2006 monitoring data for groundwater and surface water sampling locations that serve the purposes of DOE Order 450.1 monitoring in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime. Separate discussions of the surveillance monitoring and exit pathway/perimeter monitoring data are provided for each hydrogeologic regime, with each discussion focused on the analytical results for the principal groundwater contaminants at Y-12, as defined by: (1) nitrate concentrations above the MCL for drinking water (10 mg/L); (2) total uranium concentrations above the MCL (0.03 mg/L); (3) individual VOC concentrations exceeding applicable MCLs or summed VOC concentrations exceeding 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).

More detailed analysis and interpretation of the CY 2006 monitoring data for the applicable groundwater and surface water sampling locations in each hydrogeologic regime is deferred to the *Y-12 Groundwater Protection Program Groundwater Monitoring Data Compendium* (BWXT 2006c). For each applicable well, spring, and surface water station, the GWPP compendium provides: a complete sampling history, including sampling methods and distinguishing sampling characteristics; an evaluation of hydrologic data (pre-sampling groundwater elevations and available aquifer test data); a discussion of geochemical characteristics of the groundwater or surface water; and a thorough evaluation of the available sampling results for nitrate, uranium, VOCs, gross alpha activity, and gross beta activity, including data summary tables and trend graphs.

In addition to the data evaluation in the GWPP compendium, the following technical reports prepared or issued by BJC provide analysis and interpretation of the CY 2006 monitoring results for the applicable RCRA, CERCLA, and SWDF sampling locations in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime: the *2007 Remediation Effectiveness Report* (DOE 2007), the *Calendar Year 2006 Resource Conservation and Recovery Act Annual Monitoring Report* (BJC 2007), and each semiannual *Groundwater Monitoring Report for the Oak Ridge Reservation Landfills* (BJC 2006b and BJC 2006c).

4.1 SURVEILLANCE MONITORING

Results of groundwater quality monitoring performed during CY 2006 in areas that are, or could be, affected by Y-12 operations are discussed in this section, with separate subsections for surveillance monitoring data obtained from respective networks of sampling locations in the Bear Creek, East Fork, and Chestnut Ridge hydrogeologic regimes.

4.1.1 Bear Creek Regime

The CY 2006 groundwater sampling results for 61 monitoring wells in the Bear Creek Regime serve the requirements of surveillance monitoring (Table B.2). Thirty-nine of these wells are completed in the geologic formations comprising the aquitard in BCV (Nolichucky Shale, Maryville Limestone, Rogersville Shale, Pumpkin Valley Shale, and Rome Formation) and 22 wells are completed in the geologic formations that comprise the aquifer in BCV (Copper Ridge Dolomite and Maynardville Limestone).

4.1.1.1 Aquitard Wells

Elevated concentrations of one or more of the principal groundwater contaminants at Y-12 were reported for the groundwater samples collected during CY 2006 from 21 aquitard wells in the Bear Creek Regime (Table B.9). The presence of these contaminants in the groundwater at these wells is attributable to the transport/migration of the mobile components of the groundwater contaminant plumes emplaced during historical operations of the former S-3 Ponds, the OLF WMA, and the BCBG WMA. These sites are closed former hazardous waste disposal units that are presently regulated under a RCRA post-closure permit. Additionally, the types and concentrations of contaminants detected in the groundwater samples collected from these wells during CY 2006 are generally consistent with the overall extent of nitrate (Figure A.7), total uranium, VOCs (Figure A.8), gross alpha activity (Figure A.9), and gross beta activity (Figure A.10) defined by the available data for the existing network of wells completed in the aquitard formations in BCV west of Y-12.

Nitrate and Uranium

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 2006 from eight aquitard wells in the Bear Creek Regime, listed below in sequence from closest to farthest from the former S-3 Ponds (from north and east [hydraulically upgradient] to south and west [hydraulically downgradient]), which is the source of the nitrate and uranium in the groundwater from each well.

Table 6. Bear Creek Regime CY 2006: elevated nitrate and uranium concentrations in surveillance monitoring aquitard wells

Well Number	Direction - Distance from S-3 Site (Figure A.7)		Total Depth (ft bgs)	Nitrate (mg/L)		Uranium (mg/L)	
				Jan-Mar 2006	Jul-Aug 2006	Jan-Mar 2006	Jul-Aug 2006
GW-615	South	50 ft	245	11,300	NS	1.42	NS
GW-246		50 ft	76	2,810	2,840	1.01	0.445
GW-276	Southeast	200 ft	18.5	23.8	18.6	0.331	0.448
GW-616	Southwest	400 ft	269	275	NS	.	NS
GW-526	West	1,300 ft	123	1,110	555	.	.
GW-829		2,050 ft	114.6	11.4	NS	<	NS
GW-537		2,500 ft	23.3	503	NS	<	NS
GW-085		3,000 ft	58.8	56.6	75.8	.	.
MCL				10		0.03	

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

These sampling results show that the highest concentrations of nitrate occur in the groundwater from wells located directly south of (geologically down-dip) of the former S-3 Ponds (GW-246 and GW-615), reflecting the density-driven vertical (dip-parallel) migration of the highly mineralized acidic wastes disposed at the site. High nitrate levels in the groundwater samples from well GW-526 confirms the substantial westward transport of nitrate via strike-parallel flowpaths (e.g., bedding plane fractures) at depth (>100 ft bgs) in the Nolichucky Shale. Nitrate-contaminated groundwater upwelling from the deeper flowpaths toward discharge features in a northern tributary of Bear Creek (NT-2) bordering the east side of the OLF WMA (Figure A.7), is believed to explain the elevated levels of nitrate in the shallow groundwater from well GW-537. Elevated

nitrate levels in the groundwater from well GW-085 indicate the continued westward transport in the shallow flow system west of NT-2.

As with nitrate, the CY 2006 sampling results for total uranium show the highest concentrations in the groundwater at depth to the south of the former S-3 Ponds. These results also illustrate the much more limited extent of elevated uranium concentrations in the Nolichucky Shale, which generally occur only in the low-pH groundwater within approximately 500 ft of the former S-3 Ponds.

The CY 2006 sampling results for the wells with elevated concentrations of nitrate and/or uranium support the respective long-term concentration trends indicated by historical data (Table B.9), with time-series plots of the nitrate and uranium data (excluding analytical results that do not meet applicable DQOs) for these wells generally showing:

- Decreasing concentration trends for wells GW-276 and GW-829, best illustrated by the nitrate and uranium data for well GW-276 (Figure A.18). The decreasing trends reflect a combination of substantially reduced flux of nitrate and uranium in the groundwater following closure of the former S-3 Ponds in 1984 and installation of a low-permeability cap in 1988, and the long-term cumulative effects of various natural attenuation processes, including discharge of nitrate- and uranium-contaminated groundwater into the northern tributaries of Bear Creek (NT-1 and NT-2).

- Indeterminate concentration trends for wells GW-085, GW-246, GW-537, GW-615, and GW-616. For example, data for well GW-246 (Figure A.18) show little if any change in the nitrate concentrations evident in November 1987 (2,860 mg/L) and August 2006 (2,850 mg/L). This seems unusual in light of the substantially reduced flux of nitrate after the former S-3 Ponds were closed and capped, and is probably a function of the extensive volume (mass) of nitrate emplaced in the Nolichucky Shale beneath the site and the relatively low-permeability of the hydrostratigraphic zone intercepted by the monitored interval in the well.

- Increasing concentrations trends for nitrate in well GW-526 and for uranium in well GW-615 (Figure A.18). Increasing concentrations of nitrate in the groundwater from well GW-526 potentially reflect the continued migration of the mass of the nitrate plume moving westward from the former S-3 Ponds via the strike-parallel groundwater flow/transport pathways in the Nolichucky Shale. The increasing concentrations of uranium indicated by the data for well GW-615 is somewhat conspicuous in light of the indeterminate trend for nitrate, which is far more mobile in groundwater than uranium, and potentially reflects a long-term increase in the relative vertical flux of uranium down-dip of the site.

Volatile Organic Compounds

Groundwater samples collected during CY 2006 from 15 aquitard wells in the Bear Creek Regime contained one or more dissolved VOCs at individual or summed concentrations of 5 µg/L or more (Table B.9). As shown in Table 7, maximum concentrations of PCE, TCE, c12DCE, 11DCE, VC, 111TCA, 11TCA, CTET, MC, and benzene reported for groundwater samples collected from these wells exceed the respective drinking water MCL for each compound. The presence of dissolved VOCs in the groundwater at these wells reflects their transport/migration from the contaminant plumes emplaced during historical operations of the former S-3 Ponds (GW-246 and GW-276), OLF (GW-008 and GW-098), and various waste disposal areas within the BCBG WMA (GW-014, GW-046, GW-068, GW-071, GW-082, GW-257, GW-289, GW-626, GW-627, GW-629, and GW-653).

Table 7. Bear Creek Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquitard wells

Location/ Well Number	Concentration (µg/L)									
	PCE	TCE	c12DCE	11DCE	VC	111TCA	112TCA	CTET	MC	Ben-zene
S-3 Site										
GW-246	160	<	<	<	.	.	.	.	17	.
GW-276	7	.	.	.	.	.	.	.	.	.
OLF										
GW-008	65	18	<	<	.	.	.	.	.	<
GW-098	.	8	<	<	.	.	.	.	.	.
BGBG										
GW-014	5	290	1,500	100	120	.	.	.	.	<
GW-046	1,000	1,500	5,300	120	450	<	11	.	.	28
GW-068	9	70	1,000	110	260	.	.	.	.	47
GW-071*	1,500	200	<	230	13	2,100	.	390	.	2,800
GW-082	.	.	360	<	84	.	.	.	.	<
GW-257	180	.	.	.	.	.	.	.	.	.
GW-289	600	14	<	.	.	.	.	.	.	.
GW-626	940	470	6,600	100	1,500	<	<	.	.	170
GW-627	1,200	340	<	34	38	.	.	.	.	.
GW-629	17,000	3,500	<	280	29	<	6	.	.	6
GW-653	<	<	<	.	.	.	.	.	.	.
MCL	5	5	70	7	2	200	5	5	5	5

Note: "." = Not detected; "<" = Less than MCL; * = 1,4-dioxane was not detected in August 2006

As shown in the preceding data summary, extremely high concentrations of VOCs, especially PCE, were detected in the groundwater sample collected from well GW-629 in June 2006. These results show VOC concentrations that are several orders-of-magnitude higher than indicated by historical data for the well and potentially indicate further migration/transport of dissolved VOCs at depth (>300 ft bgs) in the Nolichucky Shale directly south (down-dip) of BG-A South (Figure A.11). Indeed, the concentration of PCE in the sample (17,000 µg/L) suggests that DNAPL may have migrated into the subsurface near the well at some time after July 1998, when a sample collected from the well contained no PCE and only a trace of TCE (4 µg/L) .

The CY 2006 sampling results summarized in Table 7 are consistent with historical data showing chloroethenes (PCE, TCE, c12DCE, 11DCE, and VC) as the most widespread VOCs in the groundwater from the aquitard in the Bear Creek Regime west of Y-12. In addition to chloroethenes, benzene was detected in samples from eight of the wells, while chloroethanes (111TCA and 112TCA) and chloromethanes (CTET and MC) were detected in samples from four wells and two wells, respectively. Moreover, the widespread distribution of chloroethenes in the groundwater (Figure A.19) generally mirrors the extent of summed VOCs, whereas the distribution of the other types of VOC reflect more limited transport from isolated sources (Figures A.20, A.21, and A.22). For example, benzene is commonly detected only in the groundwater samples from aquitard wells near BG-A South (Figure A.22).

Well GW-071 was selected to be part of an effort by the Y-12 GWPP to evaluate the occurrence in groundwater of 1,4-dioxane (14DXA), a highly mobile VOC commonly used as a chemical stabilizer in commercial 111TCA preparations. Although samples from this well have very high 111TCA concentrations, 14DXA was not detected in the sample collected in August 2006.

The CY 2006 sampling results for the wells listed in Table 7 support the long-term VOC concentration trends indicated by respective historical data (Table B.9), with time-series plots of the VOC data (individual compounds and/or summed concentrations of multiple VOCs) for each well, excluding results that do not meet applicable DQOs, generally showing:

- Decreasing concentration trends for VOCs in groundwater from wells GW-014 and GW-098 at the BCBG WMA and well GW-276 at the former S-3 Ponds, as illustrated by the PCE data for well GW-276 (Figure A.23). The decreasing concentration trends reflect a combination of several factors, primarily the substantially reduced flux of VOCs following closure of the former S-3 Ponds and BCBG WMA, the components of which were closed in 1986-1988 and covered by low-permeability caps in 1989. Along with reduced flux from the respective source areas, the long-term cumulative effects of various natural attenuation processes, including biologically mediated degradation, also explain the decreasing concentrations of VOCs in the groundwater at these wells.

- Indeterminate concentration trends for VOCs in groundwater from wells GW-046, GW-082, GW-257, and GW-653, which are all located hydraulically downgradient of the BCBG WMA. For example, PCE concentrations show wide (seasonal) fluctuations, but results of 1,000 µg/L were reported for the groundwater samples collected from well GW-046 in January 1998 and January 2006 (Figure A.23). Essentially unchanged levels of VOCs shown by nearly 20 years of sampling data for these wells suggest minimal corresponding change in the relative advective flux of VOCs via the low-permeability flowpaths monitored by each well. The indeterminate concentration trends also suggest that the geochemical characteristics of the groundwater from these wells are not especially conducive to biologically-mediated degradation processes that would reduce VOC concentrations over the long term.

- Increasing concentration trends for VOCs in groundwater from well GW-008 at the OLF WMA, well GW-246 at the former S-3 Ponds, and wells GW-626, GW-627, and GW-629 at the BCBG WMA. The increasing concentration trend indicated by the PCE data for well GW-246 (Figure A.23) may be of questionable significance considering the prolonged gap (January 1990 - March 2004) in the sampling history for the well and the relatively low concentrations of PCE (and other VOCs) relative to other contaminants in the groundwater form this well (e.g., nitrate). However, as noted previously, the substantial increase in VOC concentrations indicated by the June 2006 sampling results for well GW-629 potentially indicate further down-dip migration of both dissolved VOCs in the groundwater and DNAPL in the nearby subsurface. Increasing concentrations of VOCs indicated by the sampling results for wells GW-626 and GW-627, which are located approximately 250 ft directly west of well GW-629 (Figure A.11), potentially reflect a corresponding increase in the relative flux of VOCs via the strike-parallel flowpaths in the Nolichucky Shale west of BG-A South.

- A mixture of decreasing, indeterminate, and increasing concentration trends for individual VOCs in groundwater from wells GW-068 and GW-071 (Table B.9), as illustrated by the respective concentrations of PCE and TCE reported for the groundwater samples collected from well GW-071 in March 1991 (400 µg/L and 410 µg/L), March 2002 (320 µg/L and 110 µg/L), and February 2006 (1,400 µg/L and 200 µg/L). Both wells yield groundwater from shallow depths in the Nolichucky Shale directly south (GW-068) and southeast (GW-071) of BG-A South, but it is not clear from the available data if the divergent trends for individual VOCs are significant with respect to the relative advective transport or

flux of dissolved VOCs within the hydrostratigraphic intervals monitored by each well. Also, divergent concentrations trends for some compounds may be at least partially attributable to biotic and/or chemical degradation processes, with decreased levels of parent compounds (111TCA) accompanied by increased levels of related degradation compounds (e.g., 11DCA).

Gross Alpha and Gross Beta Activity

Groundwater samples collected during CY 2006 from ten 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 total propagated uncertainty (TPU). 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.

Table 8. Bear Creek Regime CY 2006: 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 ± TPU	MDA	Activity ± TPU
GW-085	02/08/06	4.9	<MDA	13	52 ± 12
GW-085	08/22/06	6.2	<MDA	13	66 ± 14
GW-246	02/08/06	40	550 ± 130	98	18,000 ± 360
GW-246	08/21/06	43	230 ± 170	67	15,000 ± 240
GW-276	01/04/06	4.34	222 ± 19.56	5.63	251 ± 14.9
GW-276	07/06/06	2.67	197 ± 16.23	2.53	255 ± 13.22
GW-526	03/07/06	41.1	<MDA	40.6	79.8 ± 25.77
GW-526	07/25/06	35.1	<MDA	49.9	80.1 ± 32.22
GW-537	02/15/06	5.1	<MDA	16	370 ± 28
GW-615	02/21/06	54	320 R ± 390	180	790 ± 260
Screening Level		15		50	

Note: "R" = activity exceeds MDA but is less than the TPU

Elevated levels of gross alpha activity and gross beta activity in the groundwater samples from these wells primarily reflect the transport/migration of uranium isotopes and Tc-99, respectively, from the groundwater contaminant plume emplaced during historical operation of the former S-3 Ponds. As with total uranium, the relatively limited extent of elevated gross alpha activity indicated by the CY 2006 sampling results reflects the limited mobility of uranium isotopes beyond the acidic groundwater in the Nolichucky Shale within approximately 500 ft of the site.

As shown by the CY 2006 sampling results summarized in Table 8, gross beta activity remains extremely high (>10,000 pCi/L) in groundwater from the aquitard (Nolichucky Shale) nearest to the former S-3 Ponds, as indicated by the results for well GW-246, and exceeds 300 pCi/L in the shallow groundwater 2,500 ft west of the site, as indicated by the results for well GW-537. Moreover, as with nitrate, the CY 2006 sampling results for well GW-085 show elevated gross beta activity extends approximately 3,000 ft west of the site (Figure A.10). Historical data show that Tc-99 is the primary beta-emitting radionuclide in the groundwater at each of these wells. Considered a "signature" contaminant from the former S-3 Ponds, Tc-99 is believed

to occur as an ion (TcO_4) that, like nitrate, is not readily attenuated in the subsurface and is highly mobile in the groundwater, which largely explains the similar distribution of nitrate and elevated gross beta activity in the aquitard near the site.

The gross alpha and gross beta activity reported for the groundwater samples collected from the above-listed wells during CY 2006 support the long-term trends indicated by historical data for each well (Table B.9). Time-series plots of the gross alpha and/or gross beta activity reported for each applicable well, excluding results that do not meet applicable DQOs, generally show:

- Decreasing levels of gross alpha activity and gross beta activity for well GW-276 at the former S-3 Ponds (Figure A.24), mirroring the concurrently decreasing trends evident for nitrate and uranium (Figure A.18) and PCE (Figure A.23). As with the other contaminants in the groundwater from this well, the decreasing levels of gross alpha and gross beta activity likewise primarily reflect the substantially reduced flux of uranium isotopes and Tc-99, respectively, that occurred after the former S-3 Ponds were closed and capped.

- Indeterminate gross alpha and/or gross beta activity trends for wells GW-085, GW-246, GW-526, GW-537, and GW-615, which together essentially characterize the lateral (GW-085) and vertical (GW-526 and GW-615) extent of radiological contamination in the aquitard (Nolichucky Shale) west of the former S-3 Ponds. Of these wells, GW-085 and GW-537 have uninterrupted sampling histories extending back to January/February 1990, with respective data showing a consistent positive correlation between gross beta activity and nitrate concentrations in the groundwater from each well (Figure A.24), reflecting the common source of nitrate and Tc-99 (the former S-3 Ponds) and their similar relative mobility in groundwater. Additionally, the data for well GW-085 suggest distinctive, long-term fluctuations in gross beta activity (and nitrate concentrations), with the CY 2006 results possibly showing the beginning of a new upward limb of another temporal "pulse" in the level of gross beta activity (and nitrate) in the shallow groundwater from 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 2006 from 16 aquifer wells in the Bear Creek Regime (Table B.9). Nine of these wells are components of two Exit Pathway Pickets in the Bear Creek Regime (Figure A.12): Picket B (GW-694, GW-695, GW-703, GW-704, and GW-706) and Picket C (GW-724, GW-725, GW-738, and GW-740). The remaining wells are located near the eastern end of the regime near the S-3 Site (GW-122), Rust Spoil Area (GW-310), and Spoil Area I (GW-315); near Bear Creek south of the OLF WMA (GW-225, GW-226, and GW-229), and near Bear Creek south of the BCBG WMA (GW-058).

The presence of contaminants in the groundwater from these aquifer wells is attributable to the migration of the mobile components of the groundwater contaminant plumes emplaced during historical operations of the former S-3 Ponds, Rust Spoil Area, the OLF WMA, and the BCBG WMA and intermixing during transport in the Maynardville Limestone. The types and concentrations of contaminants detected in the groundwater samples collected from these wells during CY 2006 are generally consistent with the overall extent of nitrate (Figure A.7), total uranium, VOCs (Figure A.8), gross alpha activity (Figure A.9), and gross beta activity (Figure A.10) defined by the available data for the existing network of wells completed in the Maynardville Limestone (and lower Knox Group) in BCV west of Y-12.

Nitrate and Uranium

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 2006 from 12 of the aquifer wells used for surveillance monitoring in the Bear Creek Regime, listed blow in Table 9 in sequence from closest to farthest from the former S-3 Ponds. These sampling results show that the highest nitrate concentrations in the aquifer (Maynardville Limestone) occur at depth (>100 ft bgs) within approximately 500 ft of the site (e.g., GW-122). Also, the nitrate results for well GW-225, which yields groundwater from about 200 ft bgs in the Maynardville Limestone south of the OLF WMA (Figure A.11), are higher than evident in the samples from wells completed at shallower depths in the Maynardville Limestone much closer to the former S-3 Ponds (e.g., GW-310). Higher nitrate levels in the groundwater from well GW-225 reflects the recharge of nitrate contaminated surface water that occurs hydraulically upgradient (east-northeast) of the well along a major reach of Bear Creek that loses substantial flow to the Maynardville Limestone.

Table 9. Bear Creek Regime CY 2006: 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)	
			Feb-Jun 2006	Aug-Sep 2006	Feb-Jun 2006	Aug-Sep 2006
S-3 Site	GW-122	375 ft Southwest	547	NS	<	NS
Rust Spoil Area	GW-310	1,750 ft Southwest	NS	10.3	NS	<
Exit Pathway Picket C	GW-725	3,000 ft West	NS	12.8	<	<
	GW-738		NS	17.8	NS	<
OLF WMA	GW-226	4,500 ft West	<	34.4	<	<
	GW-225		44.5	45.3	<	<
	GW-229	5,000 ft West	.	NS	0.172	NS
Exit Pathway Picket B	GW-694	7,000 ft West	NS	<	NS	0.0324
	GW-695		NS	10.5	NS	<
	GW-703		NS	18	NS	<
	GW-706		21.2	14.2	0.0629	0.0538
BCBG	GW-058	8,900 ft West	<	NS	0.0314	NS
MCL			10		0.03	

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

As shown in Table 9, elevated concentrations of total uranium were reported only for groundwater samples from wells GW-058, GW-229, and GW-706, which are all located hydraulically downgradient (west) of the BYBY, a former waste management facility located within the eastern section of the OLF WMA approximately 1,200 ft east-northeast of well GW-229 (Figure A.11). Uranium-bearing wastes disposed at the BYBY were below the seasonally high water table. Carbonate dissolved from the limestone bedrock combined with uranyl cations leached from the wastes, which greatly increased their otherwise limited mobility in the neutral pH groundwater typical of the Maynardville Limestone (DOE 1997a). The bulk of these wastes were excavated and removed during CERCLA remedial actions completed in May 2003.

Elevated concentrations of nitrate and/or uranium in the groundwater samples collected during CY 2006 from the aquifer wells in the Bear Creek Regime support the long-term concentration trends indicated by respective

historical data for each well (Table B.9), with time-series plots of the nitrate and uranium data (excluding analytical results that do not meet DQOs) generally showing:

- Decreasing concentration trends for wells GW-058 (uranium), GW-122 (nitrate), GW-225 (nitrate), GW-310 (nitrate), GW-694 (uranium), GW-706 (nitrate and uranium), and GW-738 (nitrate), as illustrated by nitrate and uranium data for well GW-706 (Figure A.25). Decreasing concentrations of nitrate reflect a combination of substantially reduced flux of nitrate in the Maynardville Limestone after the former S-3 Ponds were closed and capped, and the cumulative effectiveness of various natural attenuation processes, including the flow of nitrate-contaminated groundwater into gaining reaches of Bear Creek.

- Indeterminate concentration trends for nitrate in wells GW-225, GW-703, and GW-725, as illustrated by the nitrate results for well GW-703 (Figure A.25). These findings suggest minimal overall change in the relative flux of nitrate within the hydrostratigraphic zones intercepted by the monitored interval in each well, which may indicate that these wells yield contaminated groundwater from flow/transport pathways that are not well connected with the most permeable karst network in the Maynardville Limestone.

- Increasing concentrations trends for nitrate and uranium in wells GW-695 and GW-229, respectively (Figure A.25). Nitrate levels in the groundwater from well GW-695 have slowly increased from 1 mg/L in June 1991 to 10.5 mg/L in August 2006, which slightly exceeds the drinking water MCL. This potentially reflects a concurrent increase in the relative flux of nitrate via the hydrostratigraphic zone intercepted by the monitored interval in the well. As illustrated on Figure A.25, available sampling results for well GW-229 show an order-of-magnitude increase in the concentrations of uranium occurred at some time during the period between sampling events performed in September 1995 (0.014 mg/L) and March 2002 (0.238 mg/L), with subsequent sampling results defining a generally decreasing trend through February 2006 (0.172 mg/L). The decreasing uranium concentrations indicated by the more recent data suggest reduced flux of uranium in response to the removal of uranium-bearing wastes during CERCLA remedial actions at the BYBY.

Volatile Organic Compounds

Groundwater samples collected during CY 2006 from 13 aquifer wells contained individual or summed VOC concentrations of 5 µg/L or more (Table B.9). As shown below in Table 10, the maximum concentrations of PCE, TCE, c12DCE, 11DCE, VC, CTET, and benzene reported for at least one groundwater sample from one or more wells exceed the respective drinking water MCL for each compound. Sampling results for these wells also show that TCE is the primary VOC in the intermingled plume of contaminants in groundwater from the Maynardville Limestone west of Y-12, with input to the plume from multiple confirmed sources, including the Rust Spoil Area, the OLF WMA, and the BCBG WMA (Figure A.9).

Chloroethenes are detected in samples from each of these aquifer monitoring wells and the extent of chloroethenes in groundwater (Figure A.19) generally mirrors that of the summed VOCs. Historical data (CY 2001 to CY 2006) shows that chloromethanes (Figure A.21) and petroleum hydrocarbons Figure A.22) are present in the aquifer immediately south of the OLF.

Table 10. Bear Creek Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquifer wells

Well Number	Concentration (µg/L)						
	PCE	TCE	c12DCE	11DCE	VC	CTET	Benzene
GW-225	<	260	<	<	.	5	.
GW-226	<	250	<	<	.	6	.
GW-229	.	8	380	28	48	.	6
GW-310	<	5	.	.	.	.	.
GW-315	6	.	.	.	.	.	.
GW-695	.	6	<	.	.	.	.
GW-703	.	11	<	.	.	.	.
GW-704	.	28	<	<	.	.	.
GW-706	.	17	<	<	.	.	.
GW-724	<	88	<	.	.	.	.
GW-725	7	10	<	.	.	.	.
GW-738	.	18	.	.	.	.	.
GW-740	<	50	<	.	.	.	.
MCL	5	5	70	7	2	5	5

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

The CY 2006 sampling results summarized in Table 10 are consistent with historical data showing chloroethenes (PCE, TCE, c12DCE, 11DCE, and VC) as the most widespread VOCs in the groundwater from the aquifer in the Bear Creek Regime (Figure A.19). Additionally, these VOC results support the long-term concentration trends indicated by respective historical data (Table B.9), with time-series plots of the VOC data (individual compounds and/or summed concentrations of multiple VOCs) for each well, excluding results that do not meet applicable DQOs, generally showing:

- Variable but generally decreasing concentration trends for VOCs (primarily TCE) in groundwater from wells GW-310, GW-315, GW-703, GW-704, and GW-738, as illustrated by TCE data for well GW-704 (Figure A.26). The decreasing concentration trends reflect a combination of several factors, primarily the substantially reduced flux of VOCs following closure of the principal source areas (e.g., OLF WMA) in BCV west of Y-12, along with the long-term cumulative effects of various natural attenuation processes, including biologically mediated degradation.

- Indeterminate concentration trends for VOCs in groundwater from wells GW-225, GW-226, GW-695, GW-706, GW-724, GW-725, and GW-740, as illustrated by the TCE data for well GW-225 (Figure A.26). The relatively unchanged levels of VOCs in the groundwater from these wells, all of which have sampling histories extending at least to the early 1990s, suggest minimal corresponding change in the relative advective flux of VOCs via the hydrostratigraphic zone intercepted by the monitored interval in each well. Additionally, the continued persistence of TCE in the groundwater from these wells without any concurrent detection of TCE degradation products (e.g., 12DCE isomers) suggest that the geochemical characteristics of the groundwater in these wells are not especially conducive to biologically-mediated degradation processes (reductive dechlorination).

- A mixture of indeterminate and increasing concentration trends for individual VOCs in groundwater from well GW-229, which is clearly distinguished from the other wells listed in Table 10 by the dominant concentrations of TCE degradation products (12DCE, 11DCE, and VC). Also, the concentrations of these compounds have increased over time, as illustrated by the time-series plot of sampling results for 12DCE (Figure A.26). Additionally, the increasing concentrations of 12DCE do not show any clear response to the CERCLA remedial actions at the BYBY, which indicates that this site is not a significant source of the VOCs in the groundwater from the well.

Gross Alpha and Gross Beta Activity

Groundwater samples collected during CY 2006 from 17 aquifer wells used for surveillance monitoring in the Bear Creek Regime contained gross alpha activity and/or gross beta activity above the associated MDA and the corresponding TPU (Table B.9). 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 samples from four of these wells. Elevated gross alpha and gross beta activity in the groundwater at these wells reflect transport/migration of uranium isotopes and Tc-99, which are the principal radiological components of the intermingled contaminant plume in the Maynardville Limestone.

Table 11. Bear Creek Regime CY 2006: 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 ± TPU	MDA	Activity ± TPU
GW-058	06/12/06	2	17 ± 5.5	6.2	<
GW-229	02/16/06	7.9	75 ± 31	29	74 ± 29
GW-695	08/23/06	2.9	15 ± 4.6	5.2	<
GW-706	03/29/06	4.84	25.8 ± 6.37	5.73	69.5 ± 7.64
GW-706	08/01/06	3.29	31.7 ± 4.94	4.53	70.4 ± 5.89
Screening Level		15		50	

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

The CY 2006 monitoring results show that the highest levels of gross alpha and gross beta activity occur in the groundwater from aquifer wells (GW-229 and GW-706) located downgradient (west-southwest) of the former BYBY. These results are consistent with historical data, which show that uranium isotopes and beta-emitting decay products of uranium (e.g., thorium-234) are the principal source of gross alpha and gross beta radioactivity in the groundwater from these wells. Uranium bearing wastes removed from the former BYBY are considered the principal source of the uranium isotopes in the groundwater from each of these wells. However, gross beta activity in the groundwater at well GW-706 is partially attributable to Tc-99, which is a "signature" contaminant from the former S-3 Ponds.

The gross alpha and gross beta activity reported for the groundwater samples collected from the above-listed wells during CY 2006 support the long-term concentration trends indicated by respective historical data (Table B.9). Time-series plots of the gross alpha and/or gross beta activity reported for each applicable well, excluding results that do not meet applicable DQOs, generally show:

- Indeterminate gross alpha and gross beta activity trends for wells GW-058 and GW-706, as illustrated by the sampling results for well GW-706 (Figure A.27). These long-term concentration trends do not exhibit any clear response to the CERCLA remedial actions at the BYBY. The indeterminate long-term trends for gross alpha and gross beta activity in the groundwater from these wells also suggest minimal relative change in the overall flux of uranium isotopes (and Tc-99) via the groundwater flow/transport pathways intercepted by the monitored interval in either well.

- Increasing trends for gross alpha and gross beta activity in groundwater from well GW-229 (Figure A.27), compared to much lower levels indicated by limited historical radiological results for the well. Also, these trends are similar to the long-term trend for total uranium (Figure A.25) and likewise show decreasing levels of gross alpha and gross beta activity between February 2003 (150 pCi/L and 120 pCi/L, respectively) and February 2006 (75 pCi/L and 74 pCi/L, respectively). Decreasing levels of gross alpha activity and gross beta activity indicated by the recent sampling results suggest a corresponding reduction in the relative flux of uranium isotopes following removal of uranium-bearing wastes from the BYBY during CERCLA remedial actions completed in May 2003.

4.1.2 East Fork Regime

The CY 2006 sampling results for 79 monitoring wells in the East Fork Regime meet requirements of surveillance monitoring (Table B.3). Forty-six 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 33 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 the groundwater samples collected during CY 2006 from 39 aquitard monitoring wells in the East Fork Regime (Table B.10). The presence of these contaminants in the groundwater from these wells is attributable to the transport/migration of the mobile components of the groundwater contaminant plumes originating from multiple sources, including the S-2 Site and the S-3 Site (former S-3 Ponds) in the western Y-12 area, the WCPA in the central Y-12 area, and unidentified sources within the eastern Y-12 area. Additionally, the types and concentrations of contaminants detected in the groundwater samples collected from these wells are generally consistent with the overall extent of nitrate (Figure A.7), total uranium, VOCs (Figure A.8), gross alpha activity (Figure A.9), and gross beta activity (Figure A.10) defined by available data for the existing network of wells completed in the aquitard formations within the western, central, and eastern Y-12 areas.

Nitrate and Uranium

As shown in Table 12, elevated concentrations of nitrate (>10 mg/L) were detected in groundwater samples collected during CY 2006 from seven aquitard wells in the western Y-12 Area and four wells in the central Y-12 area, listed below in sequence from closest to farthest from the former S-3 Ponds, which is the source of nitrate in the groundwater from these wells. Elevated levels of nitrate in the groundwater from these wells reflect the substantial transport of nitrate (and other similarly mobile contaminants) eastward from the former S-3 Ponds, the operation of which created a local mound in the water table that enabled migration of contaminants to the east of the hydrologic divide that now separates the UEFPC and Bear Creek watersheds. These sampling results show that nitrate concentrations remain highest in the groundwater within approximately 1,500 ft of the former S-3 Ponds, and illustrate the preferred strike- and dip-parallel

groundwater flow/transport in the water table interval (wells 55-2A, 55-2B, GW-105, GW-106, GW-274, and GW-633), shallow bedrock interval (wells 55-2C, GW-108, and GW-275), and intermediate bedrock interval (GW-109) in the Nolichucky Shale east of the site.

Table 12. East Fork Regime CY 2006: elevated nitrate and uranium concentrations in surveillance monitoring aquitard wells

Well Location/Number/Approx. Distance from S-3 Ponds (ft)			Nitrate (mg/L)		Uranium (mg/L)	
			Jan-May 2006	Jul-Nov 2006	Jan-May 2006	Jul-Nov 2006
Western Y-12 Area	GW-105	500	607	.	<	.
	GW-106	500	693	.	<	.
	GW-633	700	926	.	<	.
	GW-108	800	94,600 Q	7,980	<	<
	GW-109	800	9,100	.	<	.
	GW-274	1,300	2,290	.	<	.
	GW-275	1,300	8,004	.	<	.
Central Y-12 Area	55-2A	3,000	212	159	<	<
	55-2B	3,000	256	253	ND	ND
	55-2C	3,000	228	.	<	.
	GW-204	>5,000	.	<	NS	0.0355
		MCL	10		0.03	

Note: "." = Not sampled; "<" = Concentration less than MCL; Q = Inconsistent with other results for the location; "ND" = Not detected

For the wells with elevated nitrate concentrations, the CY 2006 sampling results are consistent with the concentration trends established by respective historical nitrate data (Table B.10), with time-series plots of the nitrate data (excluding analytical results that do not meet applicable DQOs) for each well generally showing:

- Decreasing concentration trends for wells GW-105, GW-108, GW-274, and GW-633, as clearly illustrated by the nitrate data for well GW-633 (Figure A.28). As noted previously, the decreasing concentrations of nitrate in the Nolichucky Shale downgradient (both east and west) of the former S-3 Ponds reflect a combination of substantially reduced flux of nitrate (and other similarly mobile contaminants) in the groundwater following closure of the site and installation of the low-permeability cap, and the cumulative effectiveness of various natural attenuation processes, including the flow of nitrate-contaminated groundwater to the surface water drainage system in the western and central Y-12 areas.

- Indeterminate concentration trends for wells 55-2A, GW-106, GW-109, and GW-275, as illustrated by the nitrate data for well GW-109 (Figure A.28). The relatively unchanged levels of nitrate in the groundwater from these wells seems unusual considering the former S-3 Ponds have been closed for more than 20 years. The persistently high levels of nitrate in these wells probably reflect both the extensive volume (mass) of nitrate emplaced in the Nolichucky Shale beneath the site and the relatively low-permeability of the groundwater flow/transport pathways intercepted by the monitored interval in each well.

- Increasing nitrate concentration trends for well 55-2B and 55-2C (Figure A.28). For example, nitrate concentrations in the shallow groundwater from well 55-2B increased more than 100% between June 1996 (117 mg/L) and July 2006 (253 mg/L). Increasing concentrations of nitrate in the groundwater from these wells potentially reflect the continued eastward (strike-parallel) movement of the center of mass of the S-3 Ponds contaminant plume in the Nolichucky Shale east of the site (DOE 1998).

As shown in Table 12, elevated concentrations of uranium were reported for the groundwater samples collected during CY 2006 from well GW-204, which is located on the east side of Bldg. 9204-2 and was installed in the pit from which an underground storage tank was excavated and removed in August 1988. The source of the uranium in the groundwater from this well has not been determined. Available data indicate a widely fluctuating, generally decreasing concentration trend for uranium, as illustrated by the sampling results from June 1993 (0.21 mg/L), September 1999 (0.143 mg/L), and November 2006 (0.0355 mg/L). However, the sampling method appears to bias the analytical results for uranium such that the decreasing concentration trend may be an artifact of the change from conventional sampling to low-flow sampling (BWXT 2006c). Considered separately, uranium results obtained with the conventional method show an indeterminate to slightly increasing trend, while uranium results obtained with the low-flow method show an indeterminate to slightly decreasing trend.

Volatile Organic Compounds

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 2006 from 34 aquitard wells in the East Fork Regime (Table B.10). Summarized below in Table 13, these sampling results show maximum concentrations of PCE, TCE, c12DCE, 11DCE, VC, 12DCA, CTET, MC, 1,2-dichloropropane (12DCP), benzene, 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, the WCPA, former petroleum fuel dispensing facilities associated with the Rust Garage Area and the East End Fuel Facility, and other unspecified sources within the industrial areas of Y-12. Moreover, the extremely high concentrations of VOCs detected in samples from some wells suggest the likely presence of DNAPL in the aquitard underlying several areas within Y-12, including south of Bldg. 9201-5, where CY 2006 sampling data for wells 55-3A, 55-3B, and 55-3C show the highest dissolved concentrations of chlorinated hydrocarbons in the East Fork Regime.

Table 13. East Fork Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquitard wells

Y-12 Area/ Well	Maximum Concentration (µg/L)											
	PCE	TCE	c12 DCE	11 DCE	VC	CTET	MC	12DCA	12DCP	Ben-zene	ETB	Tol-uene
Western												
GW-108	<	<	.	<	.	.	47	.	.	<	.	.
GW-109	110	<	.	.	.	.	14	.	.	.	.	.
GW-192	<	5	<	.	.	.	.	.	.	.	.	.
GW-265	29	5	<	.	.	.	.	.	.	.	.	.
GW-269*	24	<	<	160	<	<	.	.	.	.	.	.
GW-274	1,400	11	<	.	.	.	34	.	.	180	.	.
GW-332	940	250	1,200	37	23	<	.	.	.	.	.	.
GW-336	240	260	1,200	63	21	.	.	.	.	.	.	.
GW-337	490	480	1,900	59	19	.	.	.	.	.	.	.
GW-633	260	7	<	<	.	.	22	.	.	2,000	<	.
Central												
55-2A	320	150	470	11	10	.	.	.	.	.	.	.
55-2B	580	220	710	19	17	.	.	.	.	.	.	.
55-2C	460	190	740	22	18	.	.	.	.	.	.	.
55-3A	33,000	1,300	1,300	27	43	.	.	.	<	.	.	.
55-3B	72,000	5,700	1,300	160	320	.	.	.	<	<	.	<
55-3C	23,000	1,600	2,100	34	160	.	.	.	.	.	.	.
56-2A	23	6	<	.	.	.	.	.	.	.	.	.
56-2B	760	47	<	<	.	.	.	.	.	.	.	.
56-2C	970	560	720	14	11	.	.	.	.	.	.	.
56-3A	52	5	<	.	.	.	.	.	.	.	.	.
56-3B	270	20	<	.	.	.	.	.	.	.	.	.
56-3C	570	36	<	.	.	.	.	.	.	.	.	.
56-4A	9	.	.	.	.	.	.	.	.	.	.	.
GW-656	49	2,600	160	190	5	.	.	.	.	.	.	.
GW-769	19	5	<	<	.	130	.	.	.	.	.	.
GW-770	<	.	.	.	.	21	.	.	.	.	.	.
GW-782*	96	43	<	17	.	.	.	.	.	.	.	.
GW-783	9	<	<	<	.	.	.	.	.	.	.	.
GW-791	530	<	.	.	.	.	.	.	.	.	.	.
GW-792	<	.	.	.	.	.	.	.	.	.	.	.
GW-956-1	5	.	.	.	.	.	.	.	.	.	.	.
GW-956-2	5	<	.	.	.	.	.	.	.	.	.	.
Eastern												
GW-383	390	160	200	<	3	.	.	.	.	.	.	.
GW-658	.	.	.	.	.	.	43	690	13	9,500	1,000	3,000
GW-762	2,600	170	<	64	5	.	73	.	.	.	.	.
MCL	5	5	70	7	2	5	5	5	5	5	700	1,000

Note: "." = Not detected; "<" = Less than MCL;
* = 14DXA results: GW-269 = 47 µg/L and GW-782 = 7 µg/L (see Section 4.1.1.1)

As shown in Table 13, chloroethenes (PCE, TCE, c12DCE, 11DCE, and VC) are the most widespread VOCs in the groundwater from the aquitard in the East Fork Regime. In addition to chloroethenes, chloromethanes (CTET and MC) were detected in samples from ten of the wells, while chloroethanes (12DCA) and/or petroleum hydrocarbons (benzene, ETB, and toluene) were detected in samples from four wells. Moreover, the widespread distribution of chloroethenes in the groundwater (Figure A.19) generally mirrors the extent of summed VOCs, whereas the distribution of the other types of VOC reflect transport from isolated sources (Figures A.20, A.21, and A.22). For example, historical data (CY 2001 to CY 2006) show that a dissolved chloroethane plume extends from near the WCPA for nearly 5,000 ft downgradient (along strike) in the aquitard (Figure A.20).

The CY 2006 sampling results for the wells listed in Table 13 support the long-term concentration trends indicated by respective historical VOC data (Table B.10), with time-series plots of the VOC results (individual compounds and/or summed concentrations of multiple VOCs) for each well, excluding results that do not meet applicable DQOs, generally showing:

- Decreasing concentration trends for VOCs in groundwater from wells 55-2C, 56-2A, GW-109, GW-265, GW-336, GW-337, and GW-656, as illustrated by the summed concentrations of VOCs detected in the samples from wells GW-109 and GW-656 (Figure A.29). The decreasing concentration trends reflect a combination of several factors, including source-control actions, such as the RCRA closure of the former S-3 Ponds (wells GW-109 and GW-265) and the WCPA (wells GW-336 and GW-337). In the absence of similar actions at other areas, such as the unknown source(s) of VOCs in the groundwater from wells 55-2C and 56-2A, the decreasing concentrations of VOCs primarily reflect the cumulative effectiveness of various natural attenuation processes, including biologically mediated degradation. Additionally, the decreasing concentrations of VOCs in the groundwater from well 55-2C are concurrent with the clearly increasing concentrations of nitrate in the groundwater from this well (Figure A.28), which is strongly indicative of separate source areas for the VOCs and nitrate.

- Indeterminate concentration trends for VOCs in groundwater from 15 of the wells listed in Table 13, as illustrated by the summed concentrations of VOCs detected in well GW-108 in the western Y-12 area, and well GW-782 in the central Y-12 area (Figure A.29). Widely variable but essentially unchanged levels of VOCs shown by nearly 20 years of sampling data for these wells suggest minimal corresponding changes in the relative advective flux of VOCs via the groundwater flow/transport pathways intercepted by the monitored interval in each well. The indeterminate concentration trends also suggest that the geochemical characteristics of the groundwater in these wells are not especially conducive to biologically-mediated degradation processes that would reduce VOC concentrations over the long term.

- Increasing concentration trends for VOCs in groundwater from well GW-274 in the western Y-12 area and wells 56-3C, GW-769, and GW-770 in the central Y-12 area, as illustrated by the summed concentrations of VOCs detected in wells GW-769 and GW-770 (Figure A.29). These wells yield VOC-contaminated groundwater from shallow depths (<60 ft bgs) in the Nolichucky Shale, and the increasing concentration trends suggest corresponding increases in the relative flux of dissolved VOCs through the hydrostratigrpahic zones intercepted by the monitored interval in each well.

- A mixture of decreasing, indeterminate, and increasing concentration trends for individual VOCs in groundwater from wells GW-332 and GW-633 in the western Y-12 area, wells 55-2B, 55-3C, 56-2C, and GW-783 in the central Y-12 area, and wells GW-383 and GW-762 in the eastern Y-12 area (Table B.10). For example, benzene concentrations in the groundwater from well GW-633 increased substantially

between March 1991 (3 µg/L) and May 2006 (2,000 µg/L), whereas the TCE results for these samples (8 µg/L and 7 µg/L , respectively) suggest little if any significant concentration change. It is not clear from the available data if the divergent trends for individual VOCs are significant with respect to the relative advective transport or flux of dissolved VOCs within the hydrostratigraphic intervals monitored by each well. Also, divergent concentrations trends for some compounds may be at least partially attributable to biotic and/or chemical degradation processes, with decreased levels of parent compounds (111TCA) accompanied by increased levels of related degradation compounds (e.g., 11DCA).

Gross Alpha and Gross Beta Activity

Groundwater samples collected during CY 2006 from 26 aquitard wells in the East Fork Regime contained gross alpha activity and/or gross beta activity above the associated MDA and the corresponding TPU (Appendix E.3). However, as shown in Table 14, elevated gross alpha activity (>15 pCi/L) and/or gross beta activity (>50 pCi/L) was reported for only 11 of these wells. Note that the elevated results for four of these wells are either inconsistent (much higher) with respect to available historical data (55-2A and 55-2B) or were reported for the first sample collected from new wells (GW-954-1 and GW-956-2) with significantly lower results for the subsequent sample. These results (flagged with a "Q" qualifier) were considered likely sampling or analytical artifacts and were excluded from further evaluation.

Table 14. East Fork Regime CY 2006: 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 ± TPU	MDA	Activity ± TPU
Western Y-12 Area					
GW-106	05/09/06	21	<MDA	58	68 ± 56
GW-108	01/05/06	156	244 ± 128	412	16,500 ± 1,009
GW-108	07/31/06	163	<MDA	116	13,300 ± 696
GW-109	05/10/06	120	<MDA	380	6,200 ± 480
GW-274	03/27/06	19	<MDA	56	6,000 ± 130
GW-633	05/10/06	11	<MDA	42	3,300 ± 89
Central Y-12 Area					
55-2A	07/18/06	9	77 Q ± 30	31	<
55-2B	07/18/06	12	44 Q ± 31	32	<MDA
GW-204	11/09/06	1.6	30 ± 4.7	4.1	<
GW-782	11/13/06	2.3	23 ± 4.7	4.8	<MDA
GW-954-1	06/13/06	3.7	15 Q ± 6.1	8.6	<
GW-956-2	06/14/06	2.3	17 Q ± 5.4	4.7	<
Screening Level		15		50	

Note: "<" = Less than the screening level; Q = inconsistent with other results for the location

Groundwater transport/migration of alpha- and beta-emitting radionuclides from the contaminant plume emplaced during historical operations of the former S-3 Ponds accounts for the elevated levels of gross alpha and/or gross beta activity in the groundwater from the each of the above-listed wells in the western Y-12 area. Uranium isotopes (and daughter products) are the primary alpha-emitting radionuclides in the contaminated plume originating from this site and probably account for some of the gross beta activity in the groundwater, 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 Nolichucky Shale east of the site. The elevated levels of gross alpha activity reported for wells GW-204 and GW-782 are indicative of groundwater transport of radiological contaminants (primarily uranium isotopes) from unspecified sources within the central Y-12 area (Figure A.9).

The gross alpha and gross beta activity reported for the groundwater samples collected during CY 2006 from the wells listed in Table 14 support the decreasing or indeterminate concentration trends indicated by historical data for each well (Table B.10). Time-series plots of the gross alpha and/or gross beta activity reported for each applicable well (excluding results that do not meet applicable DQOs) show:

- A slightly decreasing trend for gross beta activity in groundwater from well GW-633 (Figure A.30).

- Indeterminate trends for gross alpha and /or gross beta activity in groundwater from wells GW-106 and GW-108 in the western Y-12 area and wells GW-204 and GW-782 in the central Y-12 area (Table B.10), as illustrated by the gross alpha activity results for wells GW-108 and GW-204 (Figure A.30). Widely variable temporal levels of gross alpha activity in the groundwater from well GW-108 suggest minimal corresponding change in the relative flux of alpha-emitting radionuclides (primarily uranium isotopes) in the groundwater flow system east of the former S-3 Ponds. This is indicative of the relatively limited transport of uranium isotopes beyond the low-pH groundwater nearest the site. The significance of the indeterminate long-term trends indicated by the gross alpha activity data for the other wells is questionable considering the relatively low levels evident in each well and the inherent variability commonly associated with radiological analyses.

- Increasing trends for gross beta activity in groundwater from wells GW-108, GW-109, and GW-274, which together essentially characterize the lateral (GW-274) and vertical (GW-109) extent of elevated gross beta activity (attributable primarily to Tc-99) in the Nolichucky Shale east of the former S-3 Ponds. The increasing levels of gross beta activity, illustrated by the time series plot of the data for well GW-108 (Figure A.30), suggest a corresponding increase in the relative flux of Tc-99 (and possibly other beta-emitting radionnuclides) via the groundwater flow/transport pathwasy intercepted by the monitored interval in each well. Also, the increasing trend for gross beta activity evident for several of these wells, notably wells GW-108 and GW-274, contrasts with the decreasing levels of nitrate in the groundwater from these wells. Considering both contaminants share a common source (the S-3 Ponds), the increasing levels of gross beta activity suggest that the concentrations of Tc-99 in the groundwater remain relatively unaffected by natural attenuation processes that work to reduce nitrate levels in the groundwater.

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 2006 from 24 surveillance monitoring aquifer wells in the East Fork Regime (Table B.10), including five wells located in the western Y-12 area; nine wells located in the central Y-12 area; nine wells in the eastern Y-12 area; and one well in Union Valley east of the ORR boundary.

Nitrate and Uranium

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 2006 from seven aquifer wells in the East Fork

Regime. Elevated concentrations of nitrate and/or uranium in the groundwater from these wells reflect transport/migration from the contaminant plumes emplaced during historical operations of the S-2 Site (GW-251, GW-253, and GW-698), the Oil Skimmer Basin (GW-154 and GW-223), and one or more unspecified sources of uranium in the central or eastern Y-12 area (GW-605 and GW-606). As in previous years, the CY 2006 sampling results show the highest nitrate concentrations in the aquifer (Maynardville Limestone) occur in groundwater immediately downgradient (east) of the S-2 Site, a closed waste disposal facility located in the southwestern section of Y-12, with the data for well GW-698 indicating nitrate concentrations above 100 mg/L in the groundwater at least 2,500 ft downgradient of the site (Figure A.7). Additionally, as shown below, the highest concentrations of uranium were reported for aquifer wells occur in the eastern Y-12 area near the former Oil Skimmer Basin (GW-154) and from an unspecified source believed to be in the Maynardville Limestone hydraulically upgradient (west) of New Hope Pond (GW-605).

Table 15. East Fork Regime CY 2006: elevated nitrate and uranium concentrations in surveillance monitoring aquifer wells

Well Location/Number		Nitrate (mg/L)		Uranium (mg/L)	
		Jan-May 2006	Jul-Oct 2006	Jan-May 2006	Jul-Oct 2006
Western Y-12 Area	GW-251	56.3	NS	<	NS
	GW-253	476	NS	<	NS
Central Y-12 Area	GW-698	122	173	<	<
Eastern Y-12 Area	GW-154	NA	NA	0.415	0.469
	GW-223	.	.	<	0.0379
	GW-605	<	<	0.0853	0.0809
	GW-606	<	12.9	<	<
MCL		10		0.03	

Note: "." = Not detected; "<" = Less than MCL; NS = Not sampled; NA = Not analyzed

The CY 2006 sampling results for the wells with elevated concentrations of nitrate and/or uranium support the respective long-term concentration trends indicated by historical data (Table B.10), with time-series plots of the nitrate and uranium data (excluding analytical results that do not meet applicable DQOs) for these wells generally showing:

- A decreasing concentration trend for nitrate in well GW-251 that is dominated by wide seasonal fluctuations (Figure A.31), with the highest concentrations typically evident during seasonally low-flow conditions (summer and fall). The apparent relationship with seasonal flow conditions suggest that the nitrate concentrations are influenced by local inflow of uncontaminated (or less nitrate-contaminated) seasonal (and episodic) recharge, which indicates that the monitored interval in the well intercepts active groundwater flow/transport pathways. Also, the overall decrease in nitrate levels in the groundwater from this well probably reflects a combination of continued reduced flux of nitrate in the Maynardville Limestone downgradient of the S-2 Site, which was closed in 1951, and the long-term cumulative effectiveness of various natural attenuation processes, including the flow of nitrate-contaminated groundwater into the UEFPC drainage network in the westernmost sections of Y-12.

- Indeterminate concentration trends for nitrate in well GW-253 (Figure A.31) and well GW-698. The relatively unchanged levels of nitrate in the groundwater from these wells suggest minimal long-term change in the overall flux of nitrate via the groundwater flow/transport pathways intercepted by the

monitored interval in each well. Such minimal changes in the relative rate of nitrate flux seem unusual considering the S-2 Site closed more than 50 years ago, especially in light of the high mobility of nitrate in groundwater. This suggests that both wells are completed within low-permeability hydrostratigraphic zones in the Maynardville Limestone that are not well connected to the most permeable (karst) groundwater flowpaths.

- An indeterminate concentration trend for uranium in well GW-154, dominated by conspicuous temporal "peak" concentrations evident in May 1995 (0.66 mg/L), November 1996 (0.47 mg/L), and July 2001 (1.37 mg/L), the latter result corresponding with a sharp spike in the groundwater elevation in the well. This relationship suggests wide temporal changes in the relative advective flux of uranium in the shallow groundwater flow system near this well. Moreover, the uranium results obtained since July 2001 define a decreasing trend through August 2006 (0.469 mg/L), which is generally coincident with full-time operation of a groundwater extraction well (GW-845) located approximately 1,250 ft southeast of well GW-154 (Figure A.13).

- An increasing concentration trend for uranium in well GW-223 (Figure A.31), although a decreasing trend has begun after the historical maximum uranium concentration in August 2004 (0.0465 mg/L). Nevertheless, even the reduced uranium levels indicated by the most recent sampling results reflect concentrations that are several orders-of-magnitude higher than the uranium data for samples collected in the late 1980s and early 1990s. The long-term increase in uranium concentrations undoubtedly reflects a corresponding increase in the relative flux of uranium via the groundwater flowpaths intercepted by the monitored interval in this well, although the suspected source of the uranium, the former Oil Skimmer Basin, was closed along with New Hope Pond in 1988.

- An increasing concentration trend for nitrate in well GW-606, although most of the nitrate concentrations are below the MCL (10 mg/L) and appear to show correlative increases in response to the change from conventional sampling to low flow sampling in August 1997 and to the subsequent redevelopment of the well in June 2002. Considering these relationships, it is unclear from the available data if the apparent increase in nitrate concentrations are significant with respect to the relative flux of nitrate via the groundwater flow/transport pathways intercepted by the monitored interval in the well.

Volatile Organic Compounds

Groundwater samples collected during CY 2006 from 23 aquifer wells 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, c12DCE, VC, CTET, chloroform, and/or MC reported for the groundwater samples from several of these wells exceed the respective drinking water MCL for each compound. The presence of VOCs in the groundwater from these wells reflect transport/migration of the intermingled plume(s) of dissolved VOCs in the Maynardville Limestone (Figure A.8). Historical data (CY 2001 to CY 2006) shows that the VOC plume in the aquifer consists of two types of solvents: chloroethenes (PCE, TCE, c12DCE, and VC) are widespread (Figure A.19) whereas the distribution chloromethanes (CTET, chloroform, and MC) reflect more limited transport from isolated sources (Figure A.21). Additionally, the summed concentrations of chlorinated hydrocarbons (PCE, TCE, c12DCE, CTET, and chloroform) detected in the groundwater samples collected during CY 2006 from aquifer wells GW-169 (2 µg/L), GW-170 (9–13 µg/L), and GW-230 (3 µg/L) are representative of 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).

Note that these sampling results show that CTET concentrations in the groundwater from well GW-170 slightly exceed the drinking water MCL (5 µg/L).

Table 16. East Fork Regime CY 2006: maximum VOC concentrations in surveillance monitoring aquifer wells

Location and Well	Maximum Concentration (µg/L)						
	PCE	TCE	c12DCE	VC	CTET	Chloroform	MC
Western Y-12 Area							
GW-251	300	150	<	<	6	<	.
GW-253	670	590	290	83	34	<	.
GW-618	<	5	<	.	.	.	.
GW-619	19	5	<	.	.	.	.
GW-620	<	<	<	.	.	.	.
Central Y-12 Area							
56-8A	.	.	<	.	.	.	.
GW-686	.	.	<	5	.	.	.
GW-690	45	6	<	.	.	.	.
GW-691	1,300	8	<	.	.	.	.
GW-692	21	<	<	.	.	<	.
GW-698	180	550	<	.	10	<	.
GW-700	62	9	<	.	.	.	.
GW-820	2,600	600	1,100	78	.	.	.
GW-959	.	.	<	33	.	.	.
Eastern Y-12 Area							
GW-148	.	.	<	.	.	.	.
GW-153	<	.	.	.	54	<	.
GW-223	39	16	81	6	.	.	<
GW-240	.	.	.	.	<	<	.
GW-381	<	.	<	<	12	<	.
GW-382	10	<	<	.	600	170	32
GW-605	110	130	190	2	97	<	.
GW-606	6	.	.	.	71	120	.
Union Valley							
GW-170	<	<	.	.	6	<	<
MCL	5	5	70	2	5	80*	5

Note: ". " = Not detected; "<" = Less than the MCL; * = MCL for total trihalomethanes (byproducts of drinking water disinfection with chlorine)

The CY 2006 VOC results for the aquifer wells listed in Table 16 support the long-term concentration trends indicated by respective historical data (Table B.10), with time-series plots of the VOC data (individual compounds and/or summed concentrations of multiple VOCs) for each well, excluding results that do not meet applicable DQOs, generally showing:

- Variable but generally decreasing trends for VOC concentrations in groundwater from wells GW-153, GW-170, GW-223, GW-240, GW-382 , GW-618, GW-619, GW-620, GW-690, and GW-700, as illustrated by the summed VOC concentrations detected in well GW-382 (Figure A.32). The decreasing concentration trends reflect a combination of several factors, including reduced flux of VOCs from the applicable source areas, which include the Fire Training Facility in the western Y-12 area (GW-619 and

GW-620) and several unspecified sources in the central and eastern Y-12 areas, along with the long-term cumulative effects of various natural attenuation processes, including biologically mediated degradation. Additionally, the decreasing concentrations of VOCs in the groundwater from wells GW-153 and GW-240 may be at least partially attributable to the full-time operation of the groundwater extraction well (GW-845) located approximately 600 ft directly east (parallel with geologic strike) of these wells (see Section 2.3.1.1).

- Indeterminate concentration trends for VOCs in groundwater from wells 56-8A, GW-251, GW-686, GW-691, GW-698, GW-820, and GW-959, as illustrated by the summed concentrations of VOCs detected in the groundwater samples from well GW-251 (Figure A.32). Note that the summed VOC concentrations these samples show clearly seasonal fluctuations, with high concentrations typically evident in samples collected during seasonally low flow conditions; as noted previously regarding nitrate levels in the well, this relationship suggests seasonal (and episodic) inflow of uncontaminated recharge via the groundwater flowpaths intercepted by the monitored interval in the well.

- An increasing concentration trend for VOCs in groundwater from well GW-148, which is completed at a very shallow depth (<15 ft bgs) alongside the access road between New Hope Pond between and Lake Reality (Figure A.13). This trend is primarily attributable to increases in the levels of 12DCE, with the concentration evident in January 2006 (26 µg/L) being the highest detected in the well to date (Figure A.32). The increasing trend may reflect increased flux in the shallow groundwater flow system monitored by this well.

- A combination of decreasing, indeterminate, and increasing trends for individual VOCs in groundwater from wells GW-253, GW-381, GW-605, GW-606, and GW-692 (Table B.10). For example, the concentrations of CTET in well GW-381 decreased by 99% between February 1991 (6,800 µg/L) and August 2006 (12 µg/L), whereas the PCE concentrations in these samples (not detected and 3 µg/L, respectively) show minimal corresponding change. In this instance, the divergent concentration trends potentially reflect groundwater transport from separate sources of CTET and PCE. Divergent concentration trends for VOCs in groundwater from the other wells may be at least partially attributable to biologically mediated degradation of the compounds. This may explain, for instance, the data for well GW-253 that show a substantially greater proportional increase in the concentrations of VC between August 1996 (16 µg/L) and October 2005 (87 µg/L) relative to the minor increase in PCE concentrations in these samples (510 µg/L and 570 µg/L, respectively).

Gross Alpha and Gross Beta

Groundwater samples collected during CY 2006 from 27 aquifer wells in the East Fork Regime contained gross alpha activity and/or gross beta activity above the MDA and corresponding TPU (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 S-2 Site (GW-253), the Oil Skimmer Basin (GW-154 and GW-223), and one or more unspecified sources in the central or eastern Y-12 area (GW-605 and GW-606).

Table 17. East Fork Regime CY 2006: 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 ± TPU	MDA	Activity ± TPU
Western Y-12 Area					
GW-253	03/09/06	16.3	28.3 ± 12.65	25.9	<
Eastern Y-12 Area					
GW-154	03/07/06	3.34	528 ± 42.27	7.73	202 ± 14.16
GW-154	08/07/06	3.56	529 ± 39.81	3.12	164 ± 9.51
GW-223	03/06/06	1.07	21.7 ± 3.28	3.23	<
GW-223	08/07/06	2.47	20.2 ± 3.29	3.51	<
GW-605	01/05/06	3.06	82 ± 8.97	5.82	<
GW-605	07/06/06	1.92	70.2 ± 7.43	4.24	<
GW-606	07/06/06	4.26	15.6 ± 3.93	5.43	<
Screening Level		15		50	

Note: "<" = Less than the screening level

The gross alpha and gross beta activity reported for the groundwater samples collected during CY 2006 from the wells listed in Table 17 support the long-term concentration trends indicated by historical data for each well (Table B.10). Time-series plots of the gross alpha and/or gross beta activity reported for each applicable well, excluding results that do not meet applicable DQOs, generally show:

- Widely variable but generally decreasing trends for gross alpha activity in well GW-253 and gross beta activity in well GW-154. Decreasing levels of gross alpha activity indicated by the data for well GW-253 (Figure A.33) probably reflects the similar decrease in the concentrations of uranium isotopes in the groundwater from this well. Conversely, the apparent decrease in gross beta activity indicated by the data for well GW-154 contrasts with the increasing levels of gross alpha activity in the well and may be an artifact of analytical variability.

- Widely variable, indeterminate long-term trends for gross alpha activity in groundwater from wells GW-605 and GW-606, as illustrated by the data for well GW-605 (Figure A.33). These trends suggest minimal relative change in the overall flux of uranium isotopes via the hydrostratigraphic intervals monitored by the wells, which is consistent with the indeterminate long-term concentration trend evident for total uranium in the groundwater from well GW-605.

- Widely variable but increasing levels of gross alpha activity in groundwater from wells GW-154 and GW-223, although the gross alpha activity in the groundwater from the latter well are typically an order of magnitude lower than evident in the shallower groundwater from well GW-154. For example, data for well GW-154 show increasing levels of gross alpha activity beginning in October 1997 (Figure A.33), which suggests that the upward trend may be an artifact of the change to the low-flow sampling method used to collect all subsequent groundwater samples from the well (BWXT 2006c). However, the increasing trend for gross alpha activity in well GW-223 is supported by isotopic analyses of the samples collected from well GW-223 since January 2001, which showing concurrent increases in the concentrations of uranium isotopes (U-234 and U-238) and suggest corresponding increases in their relative flux in the groundwater.

4.1.3 Chestnut Ridge Regime

The CY 2006 groundwater sampling results for 42 wells on Chestnut Ridge meet the requirements 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 and GW-757). Aside from these artifacts, VOCs were the contaminants most frequently detected in the groundwater samples collected during CY 2006, with at least one principal compound detected in samples from 10 wells (Table B.11).

The CRSP are the source of the VOCs in the groundwater at wells GW-175, GW-177, GW-178, 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 (Figure A.8). 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 and 12DCE are the principal compounds in the groundwater near the eastern disposal trench area (Figure A.19 and Figure A.20). 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) are the VOCs detected most frequently in the groundwater samples collected from CRSP monitoring wells during CY 2006, with maximum concentration of PCE and/or 11DCE reported for wells GW-177, GW-322, and GW-612 exceeding the respective drinking water MCL for each compound.

Table 18. Chestnut Ridge Regime CY 2006: maximum VOC concentrations in surveillance monitoring wells

Well	Maximum Concentration (µg/L)							
	PCE	c12DCE	11DCE	111TCA	11DCA	TCFM	CTET	Chloroform
GW-144	.	.	.	.	.	NR	1 J	.
GW-175	7	.	.	.	.	6	.	.
GW-177	.	.	6	6	23	NR	.	.
GW-178	.	.	2	6	8	.	.	.
GW-305	.	.	6.6	17	24	.	2.2 J	.
GW-322*	10	.	71	42	97	36	.	.
GW-544	.	.	.	.	.	.	.	4.8
GW-612*	3 J	.	28	19	57	.	.	.
GW-796	.	.	.	0.5 J	0.28 J	.	.	.
GW-798	4.8	3.3	1.2	1.1	1.6	6.2	.	.
MCL	5	70	7	200	NA	NA	5	NA

Note: ". " = Not detected; J = Estimated value; NR = Not reported; NA = Not applicable;
* 14DXA results: GW-322 = not detected, GW-612 = 40 µg/L (see Section 4.1.1.1)

The presence of dissolved VOCs in the groundwater from wells GW-175, GW-177, GW-178, GW-322, and GW-612 generally defines the relative strike- and dip-parallel extent of groundwater transport of the more mobile components of the VOC plume originating from disposal trenches at the CRSP, with results for wells GW-796 and GW-798 indicative of the lesser degree of groundwater/vapor-phase transport via "quickflow" conduits that cut across geologic strike (see Section 2.4.3). Additionally, the concentrations of the primary components of the plume (PCE and 111TCA) have generally decreased, while the concentrations of 111TCA degradation products (11DCE and/or 11DCA) have increased or remained stable, which suggests active biotic and/or chemical degradation of the 111TCA. Also, the CY 2006 sampling results generally continue the decreasing or indeterminate long-term concentration trends indicated by respective historical VOC data (Table B.11), as illustrated by a time-series plot of VOC data for well GW-798, which appears to decrease following peak concentrations in January 2003 (Figure A.34).

Each of the groundwater samples collected from well GW-305 during CY 2006 contained 11DCE, 11DCA, and 111TCA, with CTET detected in the sample collected in January 2006 (Table 18). The source of the VOCs in the groundwater from the well is unconfirmed. Along with the historical data, the CY 2006 monitoring results continue the concentration trends evident after the sequential detection of 111TCA, 11DCA, and 11DCE beginning in January 1992 (Figure A.34). The data show the arrival of the parent compound (111TCA) followed by the related degradation products (11DCA and 11DCE), with fairly stable 111TCA and 11DCE trends after January 1999 and a steadily increasing trend for 11DCA through CY 2006.

Chloroform was detected in the groundwater samples collected from well GW-544 during CY 2006, which is consistent with historical data for the well, which show a generally decreasing trend following the maximum concentration evident in January 2004 (16 µg/L) (Figure A.34). The presence of chloroform and other trihalomethanes (e.g., bromodichloromethane) in the groundwater samples from this well is most likely related to local recharge of chlorinated water that 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. The reduced levels of chloroform in the groundwater since January 2004 indicates that the source of the chloroform is no longer active.

A trace (1 µg/L) of CTET was detected in one of the groundwater samples collected from well GW-144 during CY 2006. This compound has previously been detected at low levels (<5 µg/L) in 18 groundwater samples collected between September 1990 and April 1997. The well is located on the south side (hydraulically downgradient) of KHQ, and CTET is suspected to have been included in the wastes disposed at the site.

4.2 EXIT PATHWAY/PERIMETER MONITORING

This section describes results of groundwater and surface water quality monitoring performed during CY 2006 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 2006 monitoring results and respective historical data for the monitoring wells, springs, and surface water sampling locations listed (upstream to downstream) in Table 19 meet the requirements of exit pathway/perimeter monitoring in the Bear Creek Regime.

Table 19. Bear Creek Regime CY 2006: 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-12.47	NT-01
GW-713	305.0 - 315.2	SS-4	BCK-12.34	S07 (NT-2)
GW-714	115.1 - 145.0	SS-5	BCK-11.84	EMWNT-03A
		SS-6	BCK-11.54	NT-03
		SS-6.6	BCK-09.47	EMW-VWUNDER (NT-4)
		SS-7	BCK-09.20	NT-04
		SS-8	BCK-07.87	EMWNT-05
			BCK-04.55	EMW-VWEIR (NT-5)
			BCK-03.30	NT-07
				NT-08

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 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 and EMW-VWUNDER), NT-5 (EMWNT-05 and EMW-VWEIR), NT-7 (NT-07), and NT-8 (NT-08). Lower Bear Creek encompasses the monitoring wells listed in Table 19, the surface water sampling locations downstream of BCK-09.20, and springs SS-6, SS-6.6, SS-7, and SS-8 (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, 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 20, monitoring results obtained during CY 2006 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 above the drinking water MCL.

Table 20. Upper Bear Creek CY 2006: maximum contaminant concentrations

Sampling Point	Nitrate (mg/L)	Uranium (mg/L)	PCE (µg/L)	Radioactivity (pCi/)	
				Alpha	Beta
BCK-12.47	NA	**0.509**	NA	NA	NA
SS-1	8.35	0.0287	.	14	30
NT-01	**138**	0.0216	**32**	**16**	**450**
BCK-12.34	**62.7**	**0.261**	**11**	NA	NA
NT-02 (S07)	**95.2**	.	NA	NA	NA
Screening Level	10	0.03	5	15	50

Note: "**.**" = Not detected; 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. Notably, the CY 2006 results for spring SS-1 confirm the decreased contaminant concentrations indicated by sampling results from CY 2005, which was the first year that the maximum concentrations of all principal contaminants did not exceed corresponding screening levels.

4.2.1.2 Middle Bear Creek

Surface water quality in Middle Bear Creek is impacted by contaminants from the former S-3 Ponds (nitrate, uranium, and radioactivity), the former BYBY/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 OLF WMA. This section of the main channel of Bear Creek plays an important role in transferring contaminants from the creek into the groundwater flow system (DOE 1997a).

As shown in Table 21, elevated concentrations (i.e., > screening level) of one or more of the principal contaminants in the Bear Creek Regime were reported for six of the exit pathway sampling locations in Middle Bear Creek, including elevated uranium concentrations at the furthest downstream location (BCK-09.20). 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 the sampling location in NT-8, west of the BCBG WMA (Figure A.11). As noted previously, the former BYBY 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 21. Middle Bear Creek CY 2006: 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	**39**	**0.128**	.	.	.	.	.	NA	**147**
EMWNT-03A	NA	0.004 J	.	.	NA	.	.	1.81	4.82
NT-03	.	NA	.	.	.	.	.	NA	NA
BCK-11.54	**43.4**	**0.142**	.	.	.	.	.	NA	**143**
NT-04	NA	0.0085 J	.	.	NA	NA	NA	NA	NA
EMW-VWUNDER	NA	0.0045	.	.	NA	NA	NA	NA	NA
EMWNT-05	NA	.	.	.	NA	NA	NA	.	3.18
EMW-VWEIR	NA	0.0116	.	.	NA	NA	NA	NA	NA
SS-4	**38.6**	**0.0958**	.	4 J	1 J	.	.	**54**	**177**
NT-07	0.022	0.0174	**20**	**18**	**69**	2 J	1 J	NA	NA
NT-08	0.054	**0.276**	**8**	**6**	**49**	1 J	1 J	NA	NA
BCK-09.47	10.9	**0.0797**	3 J	3 J	17	.	.	NA	**79**
SS-5	1.95	0.0194	.	.	.	.	.	12	**57.3**
BCK-09.20	7.7	**0.0424**	.	.	5 J	.	.	NA	**69.7**
Screening Level	10	0.03	5	5	70	7	2	15	50

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 2006 monitoring results, summarized below in Table 22, which show that uranium exceeds the screening level at BCK-07.87.

Table 22. Lower Bear Creek CY 2006: maximum contaminant concentrations

Sampling Point	Nitrate (mg/L)	Uranium (mg/L)	Summed VOCs (µg/L)	Radioactivity (pCi/L)	
				Gross Alpha	Gross Beta
GW-712	.	.	.	.	5
GW-713	.	.	.	1.83	6.49
GW-714	.	.	.	3.87	6.63
BCK-07.87	**36.2**	**0.053**	NA	NA	**63.5**
SS-6	1.8	0.0112	.	5.55	14.5
SS-6.6	0.8	.	.	NA	11.7
SS-7	0.74	0.015	NA	NA	9.6
SS-8	0.28	.	NA	NA	3.07
BCK-04.55	0.312	0.00112 Q	.	.	.
BCK-03.30	1.5	0.0213	NA	9.26	17.2
Screening Level	10	0.03	MCL or >5 µg/L	15	50

Note: "**.**" = not detected; NA = not analyzed; **BOLD** = Exceeds screening level; "Q" = inconsistent with other data from the station (lower than expected)

The CY 2006 monitoring results for each groundwater and surface water sampling location are generally 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. However, concentrations below corresponding screening levels were reported for contaminants detected in samples from locations in the main channel of Bear Creek downstream of BCK-07.87. Also, sampling results for the exit-pathway monitoring wells do not indicate significant impacts on groundwater quality.

4.2.2 East Fork Regime

The CY 2006 monitoring results and respective historical data for the monitoring wells and surface water sampling locations listed below in Table 23 meet the requirements of exit pathway/perimeter monitoring in the East Fork Regime.

Table 23. East Fork Regime CY 2006: sampling locations for exit pathway/perimeter monitoring

Monitoring Wells				Surface Water and Spring 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-747	67.4 - 79.6	OF 200	GHK2.51WSW
GW-220	31.0 - 45.2	GW-748	14.8 - 27.2	STATION 8	NPR07.0SW
GW-722	75.0 - 644.3	GW-749	4.8 - 16.4	OF 51	NPR12.0SW
GW-733	240.1 - 256.5	GW-816	2.9 - 15.8	STATION 17	NPR23.0SW
GW-744	55.0 - 69.5	GW-832	4.0 - 11.8	SP-17	

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 three of the wells (GW-151, GW-220,

and GW-832) being within 500 ft of the ORR boundary along Scarboro Road (Figure A.13). The spring (SP-17) is located on the north side of UEFPC, about 1,500 ft upstream of NHP (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, four sampling stations (GHK2.51WSW, NPR07.0SW, NPR12.0SW, and NPR23.0SW) located in drainage features along the ORR boundary north of Pine Ridge (Figure A.14) also serve as exit pathway/perimeter monitoring locations.

4.2.2.1 Groundwater

At least one of the groundwater samples collected during CY 2006 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 24, the groundwater samples from each of these wells contained maximum concentrations of PCE, TCE, and/or CTET that exceed respective drinking water MCLs.

Table 24. East Fork Regime CY 2006: maximum VOC concentrations in exit pathway/perimeter monitoring wells

Well	Maximum Concentration (µg/L)				
	PCE	TCE	c12DCE	CTET	Chloroform
GW-151	820	150	73	1,300	78
GW-220	540	120	55	1,100	79
GW-722-22	6	2 J	.	12	3 J
GW-722-20	14	2 J	1 J	130	15
GW-722-17	7	13	.	39	11
GW-722-14	4 J	2 J	.	35	5 J
GW-733	.	.	.	8	.
GW-832	7	1 J	.	9	2 J
MCL	5	5	70	5	NA

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

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 2006 monitoring results continue the long-term concentration trends indicated by respective historical VOC data for these wells (Table B.10), as illustrated by 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.35). The VOC concentration trends evident for some wells, particularly CTET at Westbay well GW-722, suggest a direct response to the long-term operation of groundwater extraction well GW-845 (Figure A.36).

4.2.2.2 Surface Water

Based on maximum concentrations reported for samples collected during CY 2006, summarized below in Table 25 (sampling stations are listed in order from farthest upstream to farthest downstream), 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.

Table 25. East Fork Regime CY 2006: 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	0.0258	NA	NA	NA
STATION 8	NA	0.0151	NA	9.58	8.91
OF 51	3.9	0.00669	**23**	6.32	21.5
STATION 17	NA	0.00742	NA	NA	NA
Screening Level	10	0.03	5	15	50

Note: "**.**" = not detected; NA = not analyzed; **BOLD** = Exceeds screening level

These results show 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 results for OF 200, OF 51, Station 8, and Station 17 continue respective indeterminate long-term concentration trends indicated by historical monitoring results for each sampling location (Table B.10). Principal groundwater contaminant concentrations evident at these locations during CY 2006 reflect the continued impact of legacy Y-12 operations on the quality of surface water in UEFPC upstream of the ORR boundary. Note that mercury is a primary contaminant in the surface water of the East Fork Regime that is monitored by other programs (e.g., NPDES), and results of flow-proportionate sampling performed under these monitoring programs are not addressed in this report. Mercury is rarely detected in groundwater samples because of its low solubility.

4.2.3 Chestnut Ridge Regime

The CY 2006 monitoring results reported for the springs and surface water sampling stations listed below in Table 26 serve as the exit pathway/perimeter monitoring locations in the Chestnut Ridge Regime.

Table 26. Chestnut Ridge Regime CY 2006: 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 2006 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, excluding trace levels (<3 µg/L) of suspected analytical artifacts (acetone and ethyl methacrylate), VOCs were not detected in the groundwater samples collected from the springs. Gross alpha or gross beta activity above the associated MDA was reported for at least one sample from springs SCR1.25SP 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 2006 are located in Dunaway Branch (SCR1.5SW) at the western boundary of the regime; in McCoy Branch immediately downstream of the FCAP (MCK 2.05 and MCK 2.0) and immediately upstream of Rogers Quarry (SCR3.5SW); and in tributary SCR5 downstream of KHQ (S17) near the southeastern boundary of the regime (Figure A.17).

Analytical results for the surface water samples collected from McCoy Branch during CY 2006 indicate contamination immediately 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 2006 exceed background levels, with the highest concentrations reported for samples collected from MCK 2.0 (26.3 mg/L) and MCK 2.05 (19.8 mg/L) in February 2006 (seasonally high flow conditions). The monitoring results obtained during CY 2006 show that the maximum arsenic concentration at both MCK 2.0 (0.0762 mg/L) and MCK 2.05 (0.141 mg/L) are above the drinking water MCL (0.01 mg/L). Notably, arsenic was not detected at surface water station SCR3.5SW, located about 2,000 ft downstream from MCK 2.0. Nevertheless, the elevated arsenic and 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 2006 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. Gross alpha activity and gross beta activity for these samples were below the associated MDAs, except for the very low alpha activity (4.3 ± 3.3 pCi/L) reported for sample collected from station S17 in April 2006. Historical and current waste management operations do not appear to have significantly affected surface-water quality in these drainage features.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The groundwater and surface water quality data obtained during CY 2006 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. This report includes monitoring results for 219 sampling locations: 192 monitoring wells, 15 springs, and 32 surface water stations.

The CY 2006 monitoring results reported for 61 wells (39 aquitard wells and 22 aquifer wells) meet the surveillance monitoring requirements in the Bear Creek Regime. Groundwater samples from 21 of the aquitard wells and 16 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 BYBY/HCDA, and the BCBG WMA. Analytical results for most 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. A notable exception is that VOC concentrations at aquitard well GW-629 (located at the BCBG WMA) are significantly higher (>20,000 µg/L) in June 2006 than in samples collected CY 1997 and CY 1998 (<10 µg/L).

The CY 2006 exit pathway/perimeter monitoring in the Bear Creek Regime is reported for 19 surface water stations along Bear Creek (including seven northern tributaries), seven springs that discharge into Bear Creek, and three aquifer wells at the westernmost Exit Pathway Picket (Picket W). 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 six stations in Bear Creek, sampling stations in four tributaries, and two springs (SS-4 and SS-5). These results are generally 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, BYBY/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 2006 monitoring results indicate elevated total uranium concentrations at Bear Creek sampling station BCK-07.87, which is located near Exit Pathway Picket W. Further downstream, at station BCK-04.55, which is located where the creek turns north at the westernmost extent of the Bear Creek Regime, the CY 2006 concentrations of all principal contaminants were below applicable screening levels.

The CY 2006 monitoring results for applicable surveillance and exit-pathway/perimeter sampling locations in the Bear Creek Regime continue the long-term contaminant concentration trends indicated by historical data for each applicable sampling location. Increasing concentrations are evident for at least one principal contaminant detected in samples from 11 wells and one surface water station, and decreasing or indeterminate (not increasing or decreasing) trends are evident for contaminants detected in samples from 34 wells, 11 surface water stations, and two springs. Monitoring wells with elevated concentrations of more than one principal contaminant commonly have different trends for each contaminant (e.g., increasing nitrate trend and decreasing or indeterminate VOC trend), which reflects different sources and/or transport flowpaths for the different contaminants. 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 but persistent flux.

The CY 2006 monitoring results reported for 46 aquitard wells and 33 aquifer wells (including six wells located in Union Valley east of the ORR boundary along Scarboro Road) meet the requirements of surveillance monitoring in the East Fork Regime. Groundwater samples from 39 of the aquitard wells and 24 of the aquifer wells had elevated concentrations of one or more of the principal contaminants at Y-12. The highest inorganic and radiological 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. Extremely high (>70,000 µg/L) VOC concentrations (indicative of nearby DNAPL) were observed in the groundwater near Building 9201-5, and very high (>1,000 µg/L) VOC concentrations were reported for wells near the S-3 Site, the WCPA, and two former UST locations (Rust Garage and East End Garage). Aquifer wells with the highest contaminant concentrations are located immediately downgradient (east) of the former S-2 Ponds in the western Y-12 area, within the co-mingled VOC plume from multiple sources in the central Y-12 area, and in the eastern Y-12 area near NHP/Lake Reality and Oil Skimmer Basin. 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 2006 monitoring results reported for 15 sampling locations (10 monitoring wells, four surface water stations, and one spring) in the eastern Y-12 Area and four surface water stations located north of Pine Ridge along the border of the ORR meet the requirements of exit-pathway/perimeter monitoring for 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 one of the surface water sampling stations. Sampling results for some of the wells exhibit a direct response (i.e., lower VOC concentrations) 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 (primarily uranium) reflect the continued impact of legacy Y-12 operations on the quality of surface water in UEFPC upstream of the ORR boundary. Note that mercury is a primary concern in the surface water of the East Fork Regime and results of flow-proportionate sampling performed under other monitoring programs are not addressed in this report. Because of low solubility, mercury is rarely detected in groundwater samples and is not considered to be a principal groundwater contaminant.

The CY 2006 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. Increasing concentrations are evident for at least one of the principal contaminants detected in samples from 19 wells, and decreasing or indeterminate (not increasing or decreasing) concentration trends are evident for contaminants detected in samples from 60 wells and one surface water station. Monitoring wells with elevated concentrations of more than one principal contaminant commonly have different trends for each contaminant (e.g., increasing nitrate trend and decreasing or indeterminate VOC trend), which reflects different sources and/or transport flowpaths for the different contaminants. 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.

The CY 2006 sampling results for 42 wells located on Chestnut Ridge meet the requirements of surveillance monitoring in the Chestnut Ridge Regime. Results indicative of legacy contamination associated with former operations at Y-12 were reported for well GW-144 at KHQ, well GW-305 at Industrial Landfill IV, well GW-544 at CDL VI, and seven wells near the CRSP. These wells each yield VOC-contaminated groundwater, with concentrations above applicable drinking water MCLs reported for PCE and 11DCE detected the samples from three 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 2006 sampling results continue the VOC concentration trends indicated by historical data for the wells at the CRSP; are consistent with the recent trends evident since the initial detection of VOCs in well GW-305; and suggest that VOC concentrations in groundwater at well GW-544 and GW-798 have decreased from the historical peaks evident in January 2004 and January 2003, respectively.

The CY 2006 monitoring results reported for five natural springs and five sampling stations located in major drainage features that traverse the southern flank of Chestnut Ridge meet the requirements 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 2006 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.

Based on groundwater and surface water monitoring data obtained in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime during CY 2006, the following actions are recommended:

- Well GW-170 in Union Valley and wells GW-205 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.

The following actions are recommended to improve monitoring efficiency, and could be incorporated into the GWPP SAP for CY 2008:

- Reduce the sampling frequency from semiannually to annually for the following 18 wells: 55-2A, 55-2B, 55-3A, 55-3B, 55-3C, 56-1A, 56-3A, 56-3B, 56-3C, 56-4A, 56-6A, 56-8A, 60-1A, GW-014, GW-265, GW-269, GW-383, and GW-686. All but one of these wells (GW-014) either were omitted from an assessment of the Y-12 GWPP or were given a recommendation to review well status and to evaluate the trends for at least four samples collected after CY 1996 (BWXT 2005b). After completing the monitoring scheduled for CY 2007, the wells listed above will each have at least four samples collected since January 1996.

- Remove spring SS-1 from the exit-pathway monitoring network because the concentrations of principal groundwater contaminants have been below screening levels since CY 2005.

- Evaluate the use of passive diffusion bags for VOC analysis at a few wells, with a control sample from the wells collected using the low-flow sampling method while a bag is in place. It is recommended to test the sampling method in an area that is easily accessible and where VOCs are the only constituent of concern, which could include the CRSP, the aquitard near BCBG, and the East End VOC plume.

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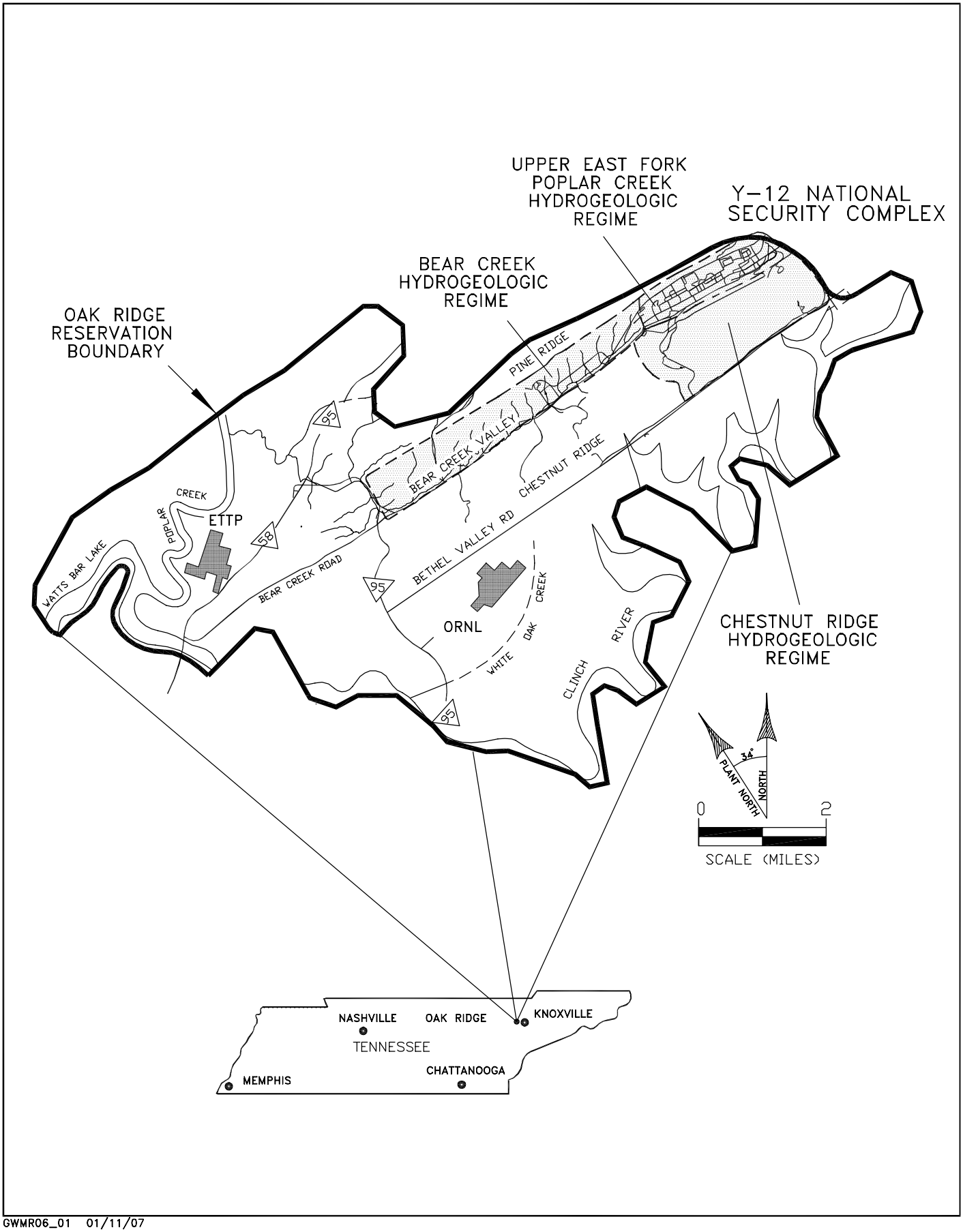
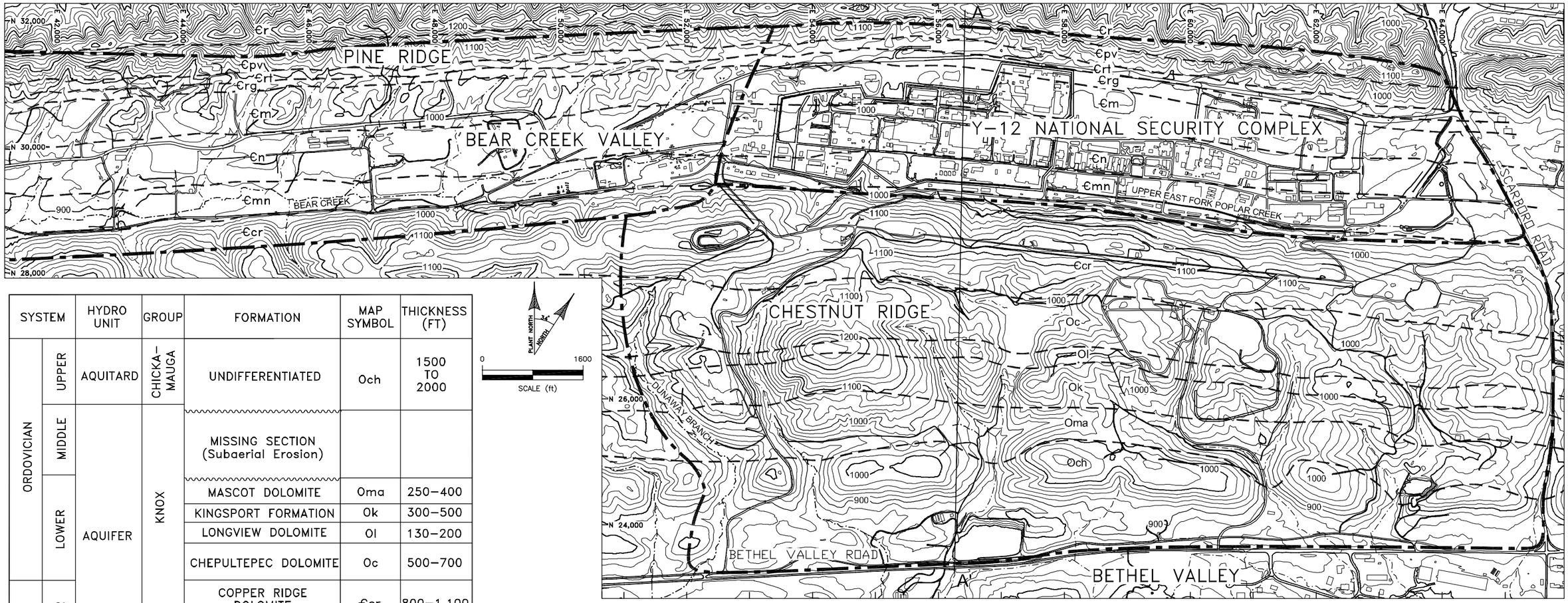
APPENDIX A

FIGURES



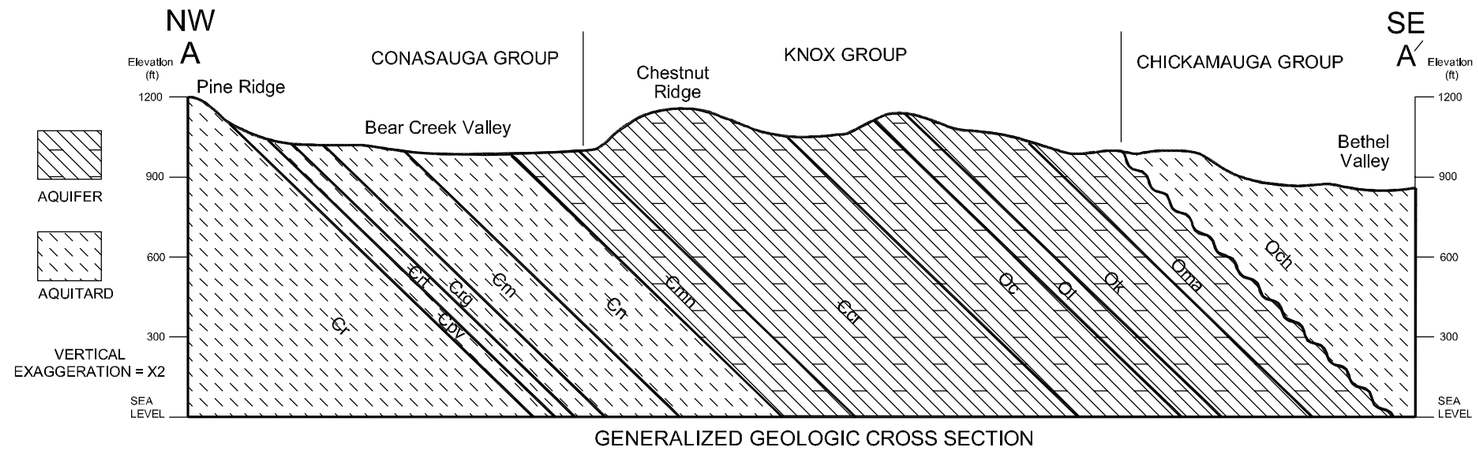
GWMR06_01 01/11/07

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	€cr	800–1,100
			CONASAUGA	MAYNARDVILLE LIMESTONE	€mn	418–450
	MIDDLE	AQUITARD		NOLICHUCKY SHALE	€n	490–590
				MARYVILLE LIMESTONE	€m	346–445
				ROGERSVILLE SHALE	€rg	90–120
				RUTLEDGE LIMESTONE	€rt	90–120
				PUMPKIN VALLEY SHALE	€pv	260–320
	LOWER			ROME	€r	NOT DETERMINED

SOURCES: King and Haas 1987
Hatcher et al. 1992

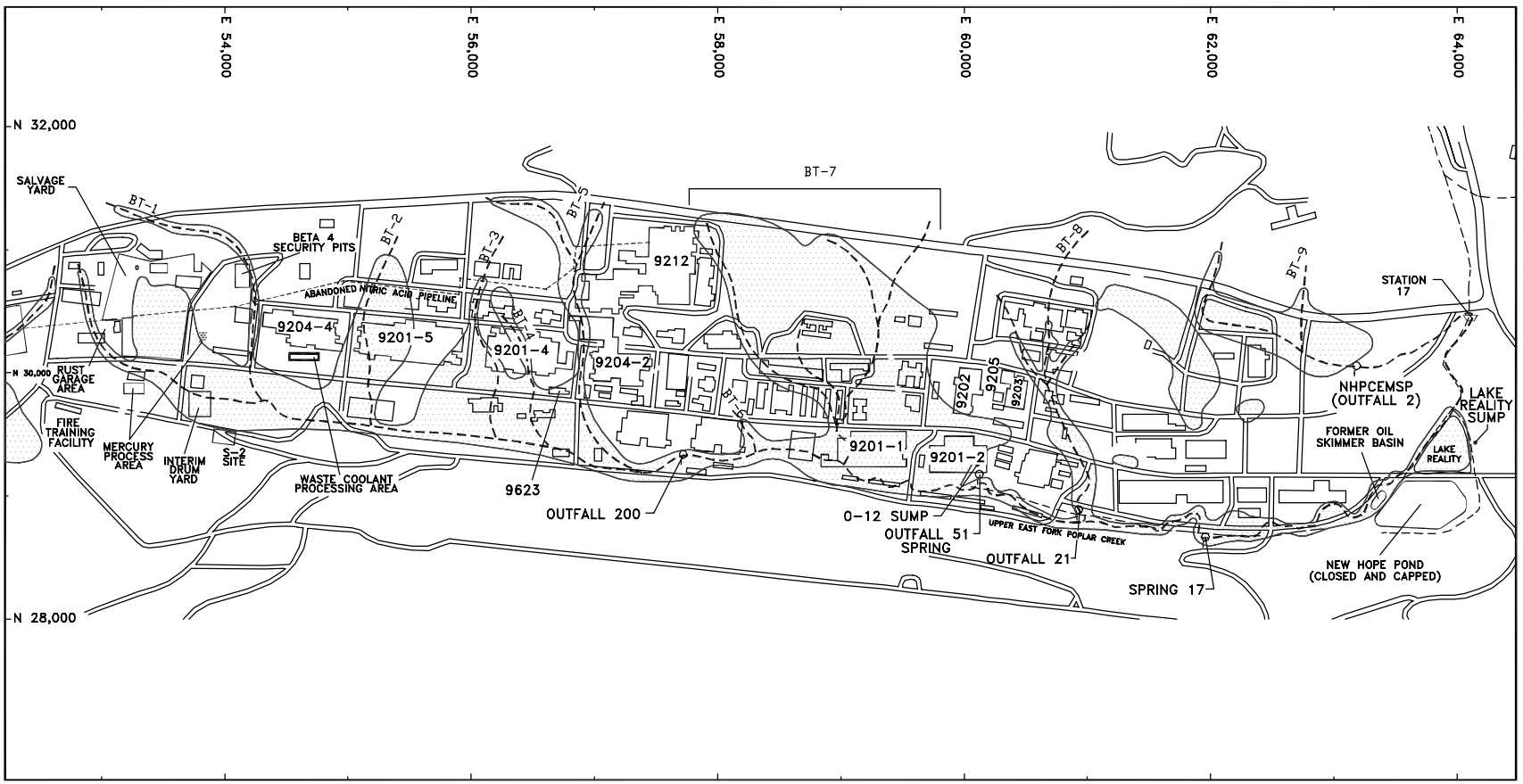


GENERALIZED GEOLOGIC CROSS SECTION

GWMR06_2 01/11/07

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

GWMR06_03 01/11/07



SOURCE: Sutton and Field 1995

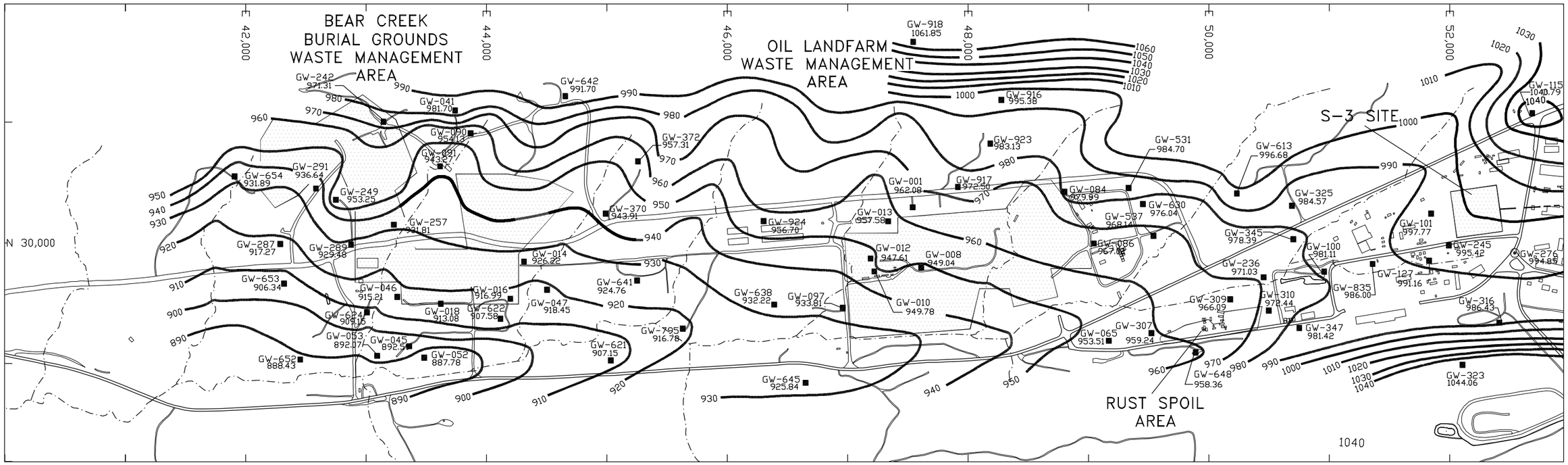
EXPLANATION

- FILL THICKNESS GREATER THAN OR EQUAL TO 5 FT
- BURIED TRIBUTARY (BT–)
- SPRING
- 9623 – BUILDING NUMBER

PLANT NORTH
NORTH
3.4°

0 1400
SCALE (ft)

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



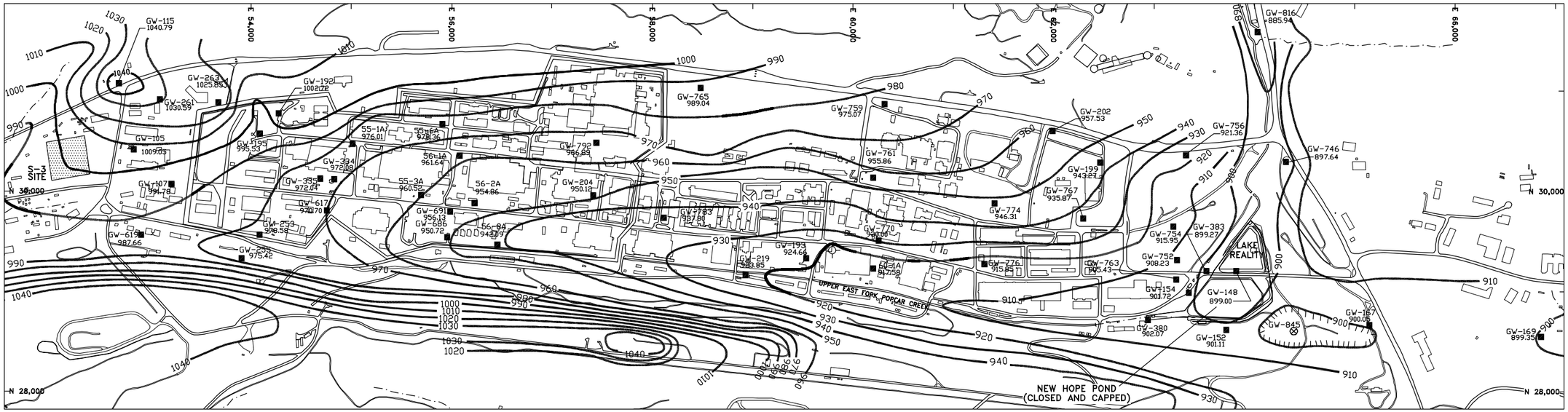
GROUNDWATER ELEVATIONS SEPTEMBER 11-24, 2006

EXPLANATION

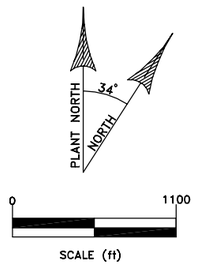
- ■ WATER TABLE INTERVAL MONITORING WELL
- 920 APPROXIMATE WATER-LEVEL ISOPLETH (ft msl)
- SURFACE DRAINAGE FEATURE

GWMR06_08 01/30/07

Fig. A.4. Groundwater elevations in the Bear Creek Hydrogeologic Regime, September 2006



GROUNDWATER ELEVATIONS SEPTEMBER 11-25, 2006

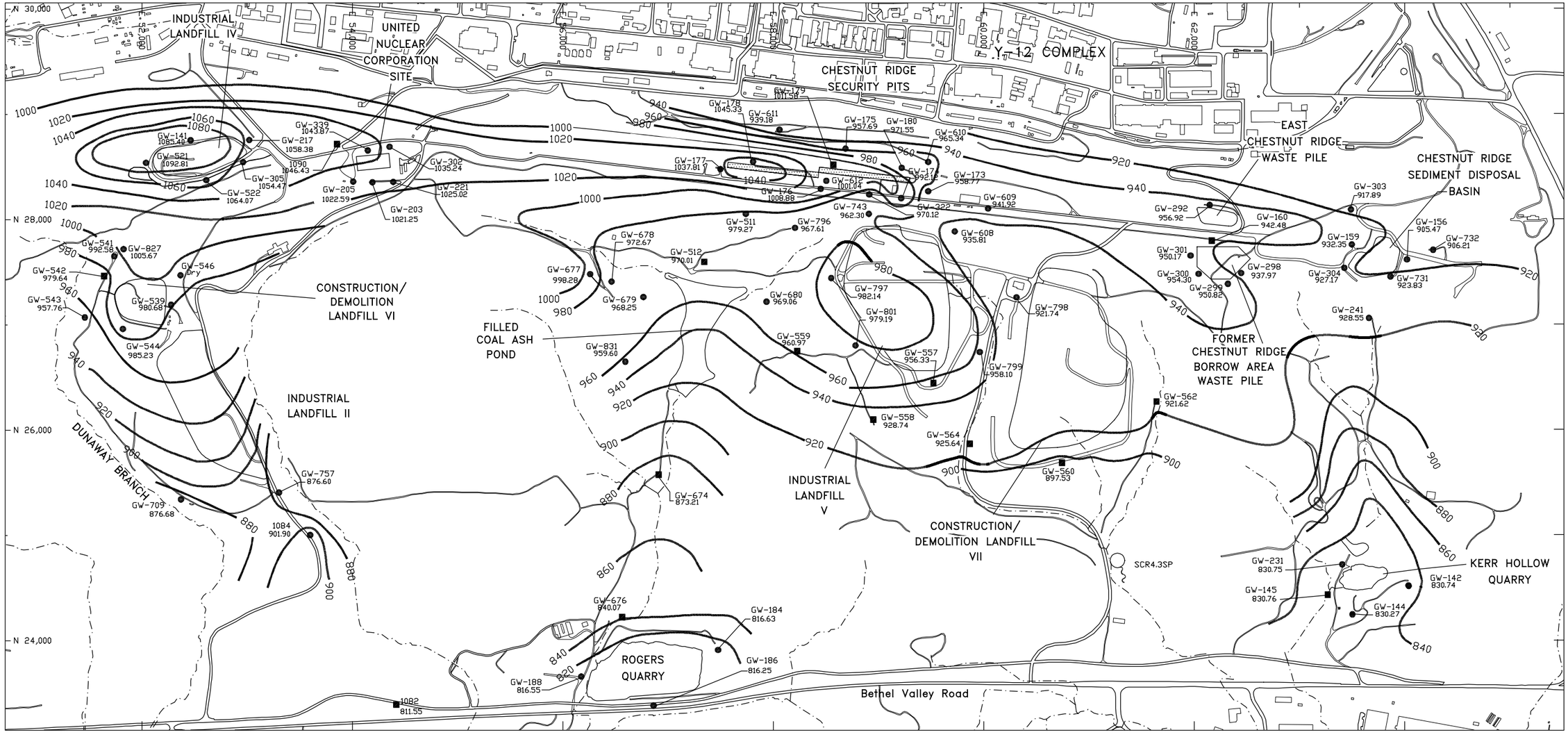


EXPLANATION

- WATER TABLE INTERVAL MONITORING WELL
- 980 — APPROXIMATE WATER-LEVEL ISOPLETH (ft msl)
- SURFACE DRAINAGE FEATURE
- BUILDING 9201-2 SUMP
- GW-845 — EXTRACTION WELL AND APPROXIMATE ZONE OF INFLUENCE

GWMR06_05 01/30/07

Fig. A.5. Groundwater elevations in the Upper East Fork Poplar Creek Hydrogeologic Regime, September 2006.



GROUNDWATER ELEVATIONS SEPTEMBER 11-21, 2006

EXPLANATION

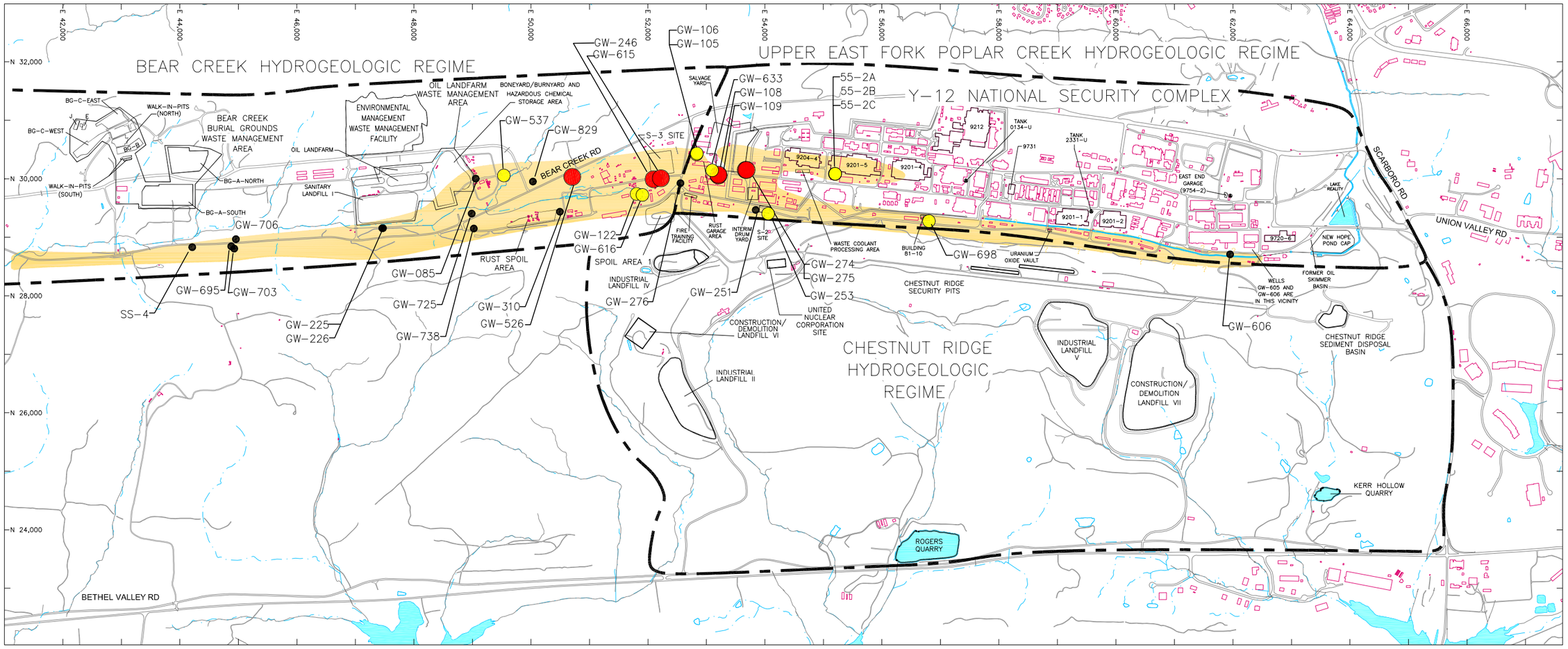
- ■ — WATER TABLE INTERVAL MONITORING WELL
- ● — BEDROCK INTERVAL MONITORING WELL
- 980 — APPROXIMATE WATER-LEVEL ISOPLETH (ft msl)
- — SURFACE DRAINAGE FEATURE
- — SPRING

PLANT NORTH
34°
NORTH

0 1000 ft
SCALE

GWMR06_06 06/28/07

Fig. A.6. Groundwater elevations in the Chestnut Ridge Hydrogeologic Regime, September 2006.



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

EXPLANATION

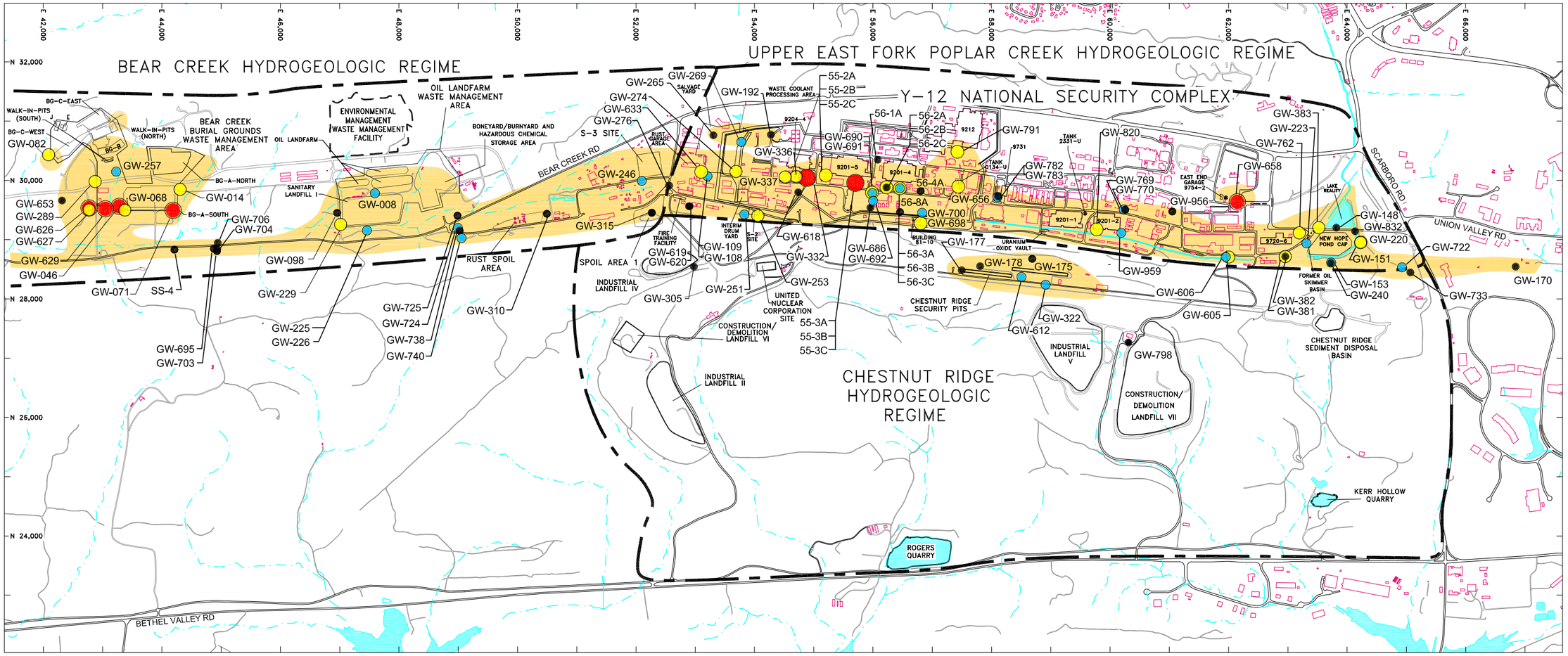
- SURFACE DRAINAGE FEATURE
- BOUNDARY OF SITE
- BOUNDARY OF REGIME
- BUILDINGS
- NITRATE > 10 mg/L (NITRATE AS "N")

MAXIMUM CY2006 NITRATE

- 10-100 mg/L
- 100-1,000 mg/L
- >1,000 mg/L

GWMR06_07.DWG 07/07/07

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

- SURFACE DRAINAGE FEATURE
- BOUNDARY OF SITE
- BOUNDARY OF REGIME
- BUILDINGS
- SUMMED VOCs > 5 ug/L

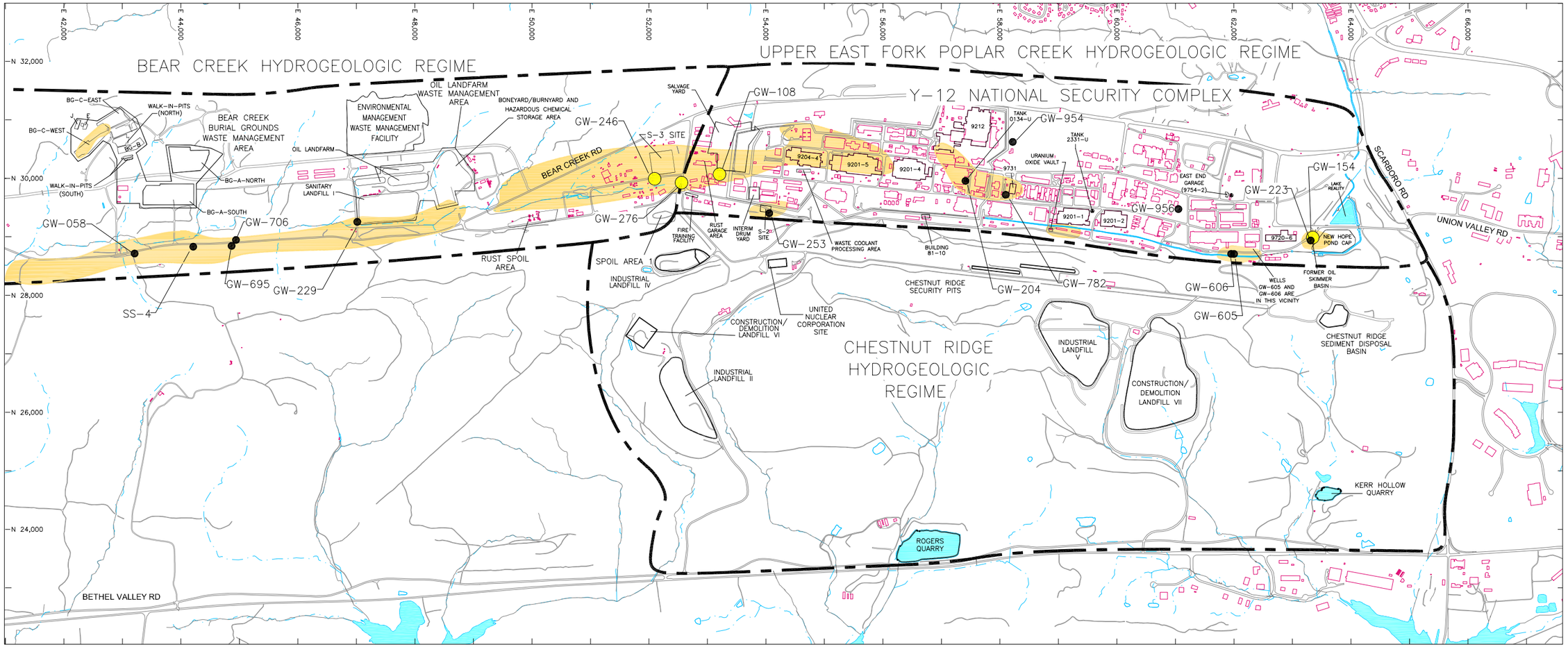
MAXIMUM CY2006 SUMMED VOCs

- 5-50 ug/L
- 50-500 ug/L
- 500-5,000 ug/L
- >5,000 ug/L

PLANT NORTH
MODEL NORTH
0
1800
SCALE (ft)

GWMR06_08 07/13/07

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

EXPLANATION

- SURFACE DRAINAGE FEATURE
- BOUNDARY OF SITE
- BOUNDARY OF REGIME
- BUILDINGS
- GROSS ALPHA > 15 pCi/L

MAXIMUM CY2006 GROSS ALPHA

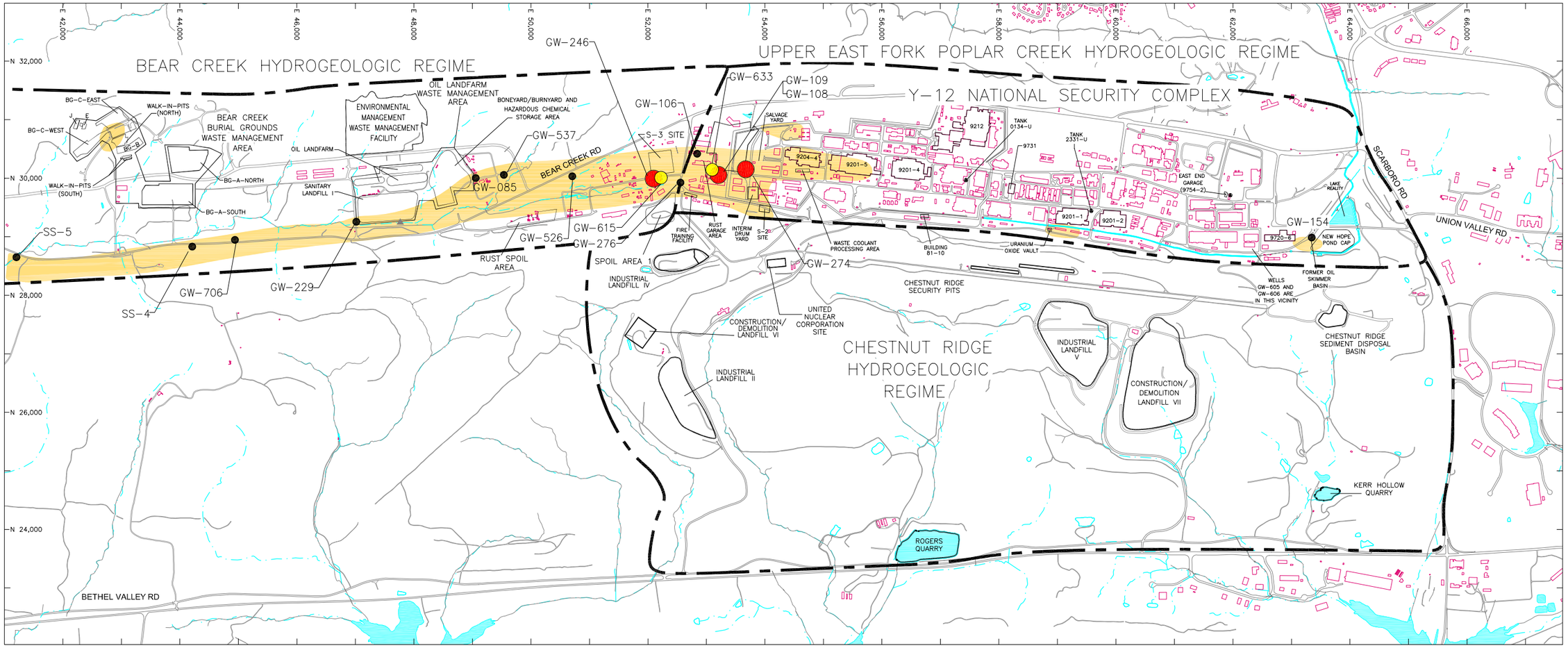
- 15-150 pCi/L
- 150-1,500 pCi/L

PLANT NORTH
34°
MODEL

0 1800
SCALE (ft)

GWMR06_09.DWG 07/07/07

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
- BOUNDARY OF REGIME
- BUILDINGS
- GROSS BETA > 50 pCi/L

MAXIMUM CY2006 GROSS BETA

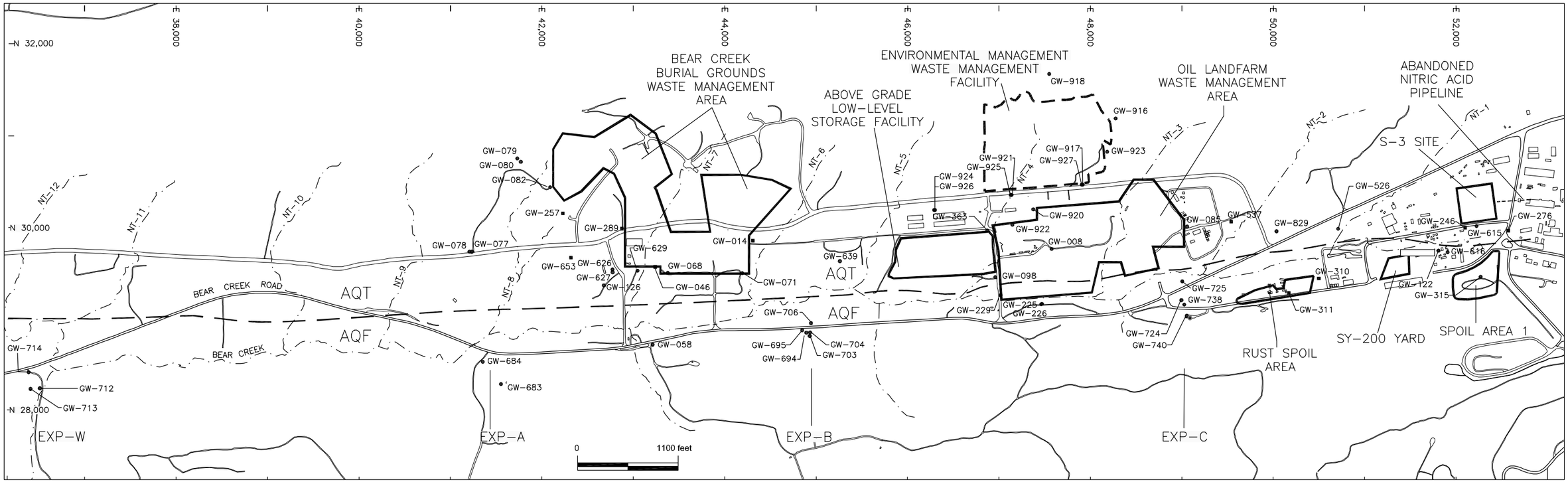
- 50-500 pCi/L
- 500-5,000 pCi/L
- >5,000 pCi/L

PLANT NORTH
34°
NORTH

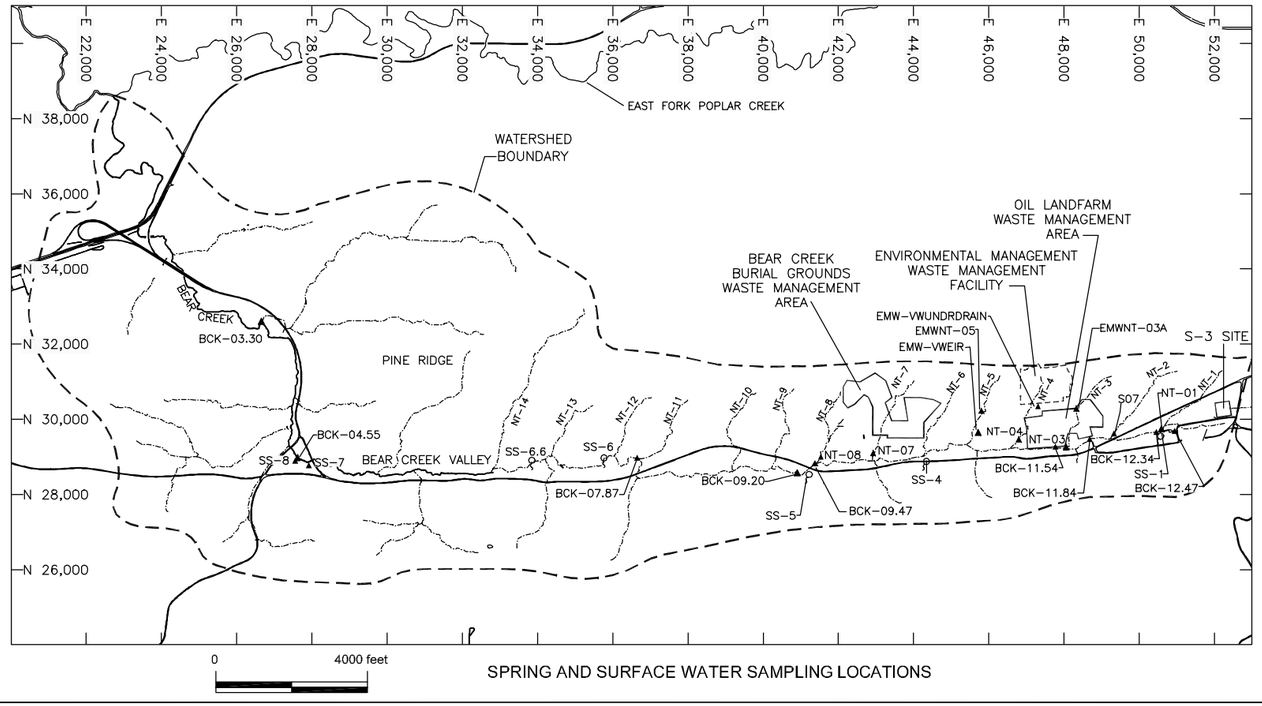
0 1800
SCALE (ft)

GWMR06_10.DWG 07/07/07

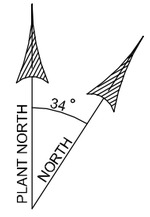
Fig. A.10. Generalized extent of gross beta activity in groundwater at the Y-12 National Security Complex.



MONITORING WELL LOCATIONS



SPRING AND SURFACE WATER SAMPLING LOCATIONS

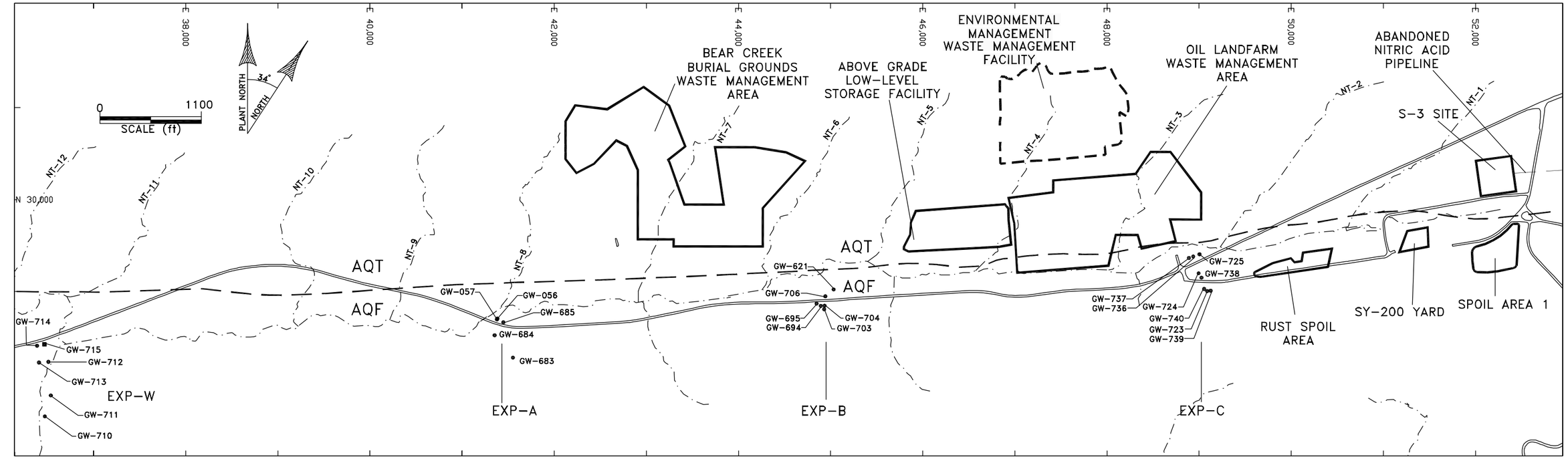


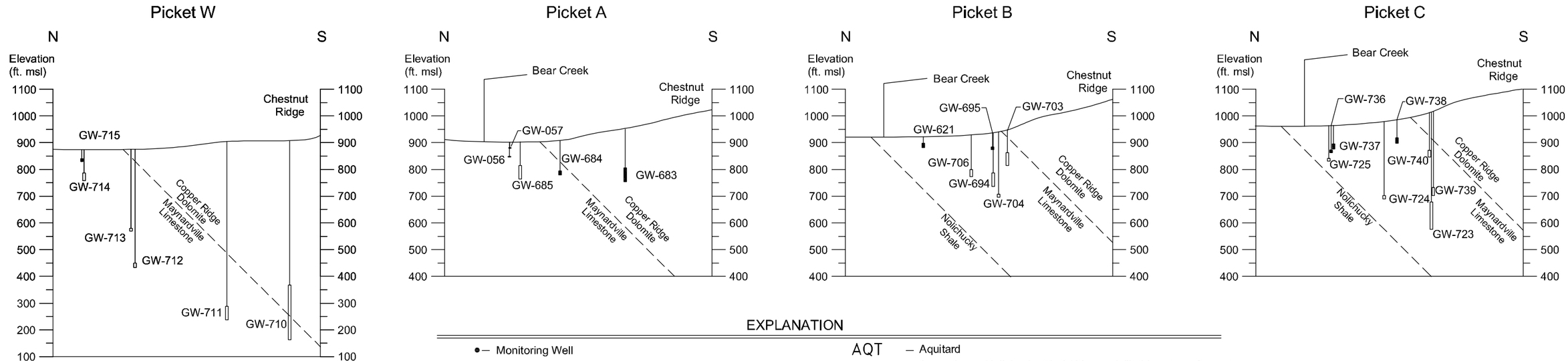
EXPLANATION

- ▪ — Water Table Monitoring Well
- ● — Bedrock Monitoring Well
- ▲ — Surface Water Sampling Station
- ♀ — Spring Sampling Station
- EXP-C — Exit Pathway, Maynardville Limestone Picket
- — · — — Surface Drainage Feature
- NT-5 — North Tributary
- AQT — Aquitard
- — — — Approximate Nolichucky Shale\Maynardville Limestone Contact
- AQF — Aquifer

GWMR06_11 06/28/07

Fig. A.11. CY 2006 sampling locations in the Bear Creek Hydrogeologic Regime.



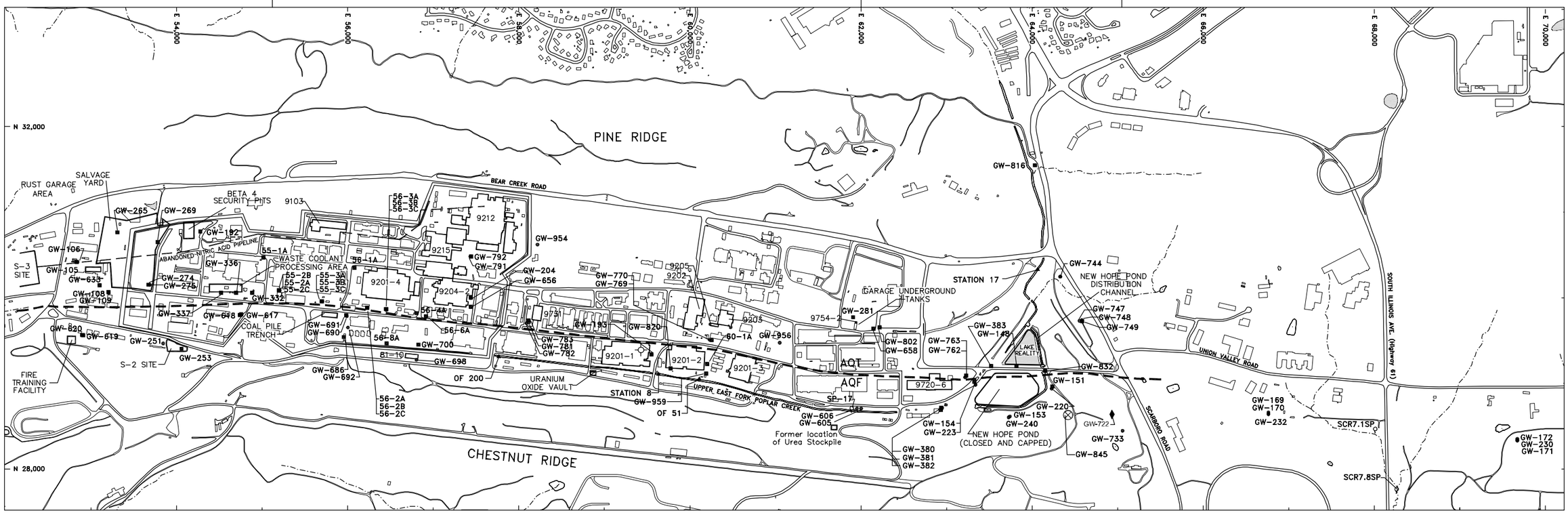


EXPLANATION

- ● — Monitoring Well
- EXP-C — Exit Pathway, Maynardville Limestone Picket
- — Surface Drainage Feature
- NT-5 — North Tributary
- AQT — Aquitard
- — Approximate Nolichucky Shale\Maynardville Limestone Contact
- AQF — Aquifer
- — Screened Well Construction
- — Open-Hole Well Construction

GWMR06_12 02/14/07

Fig. A.12. Components of Maynardville Limestone exit pathway pickets A, B, C, and W.



EXPLANATION

- ▪ – Water Table Monitoring Well
- • – Bedrock Monitoring Well
- ♦ – Westbay Monitoring Well
- ♀ – Spring Sampling Location
- GW-845 ⊗ – Plume Capture Well
- ▲ – Surface Water Sampling Location

AQT – Aquitard

– – – – – – Approximate Nolichucky Shale\Maynardville Limestone Contact

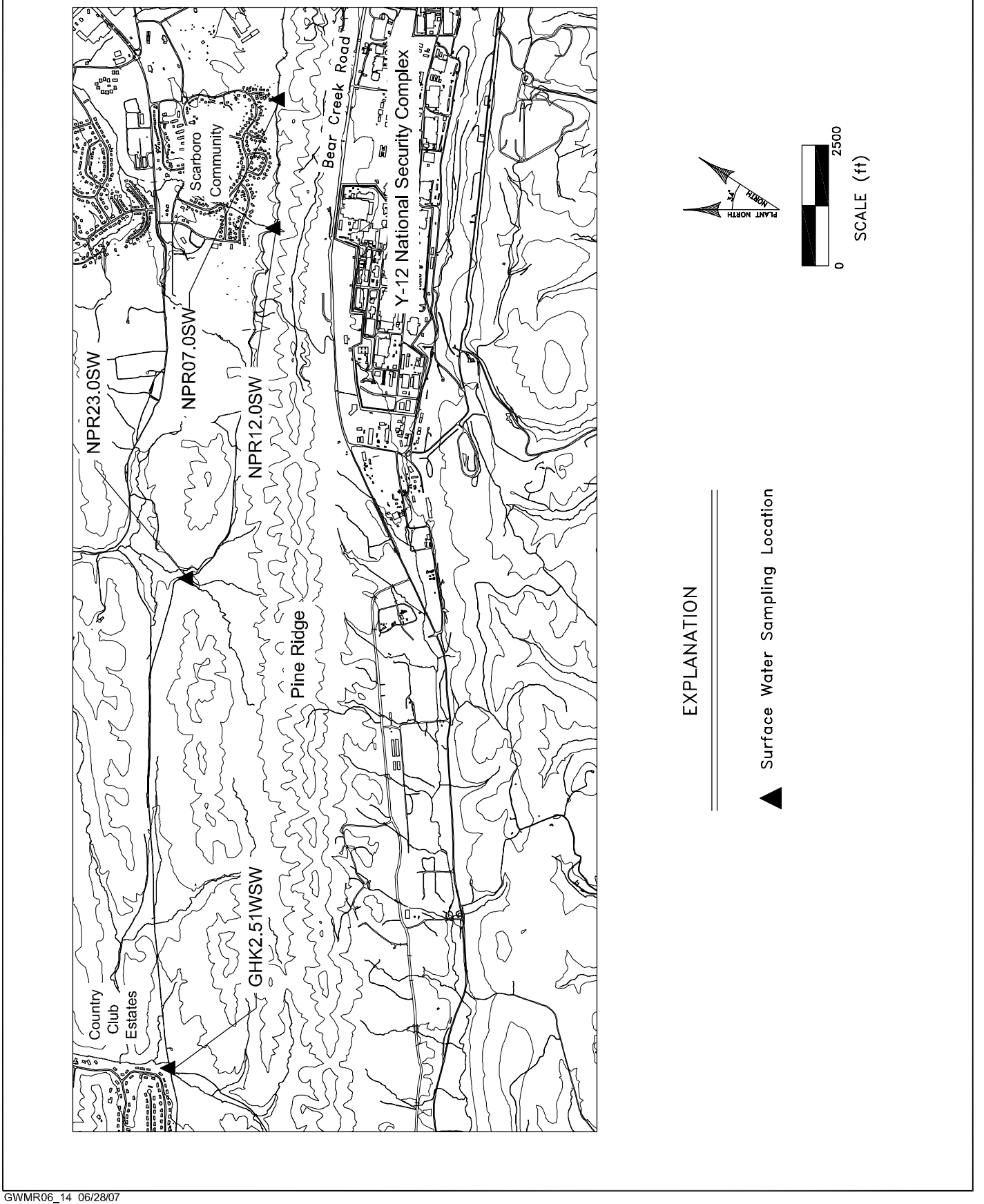
AQF – Aquifer

PLANT NORTH
34°
NORTH

0 1200
SCALE (ft)

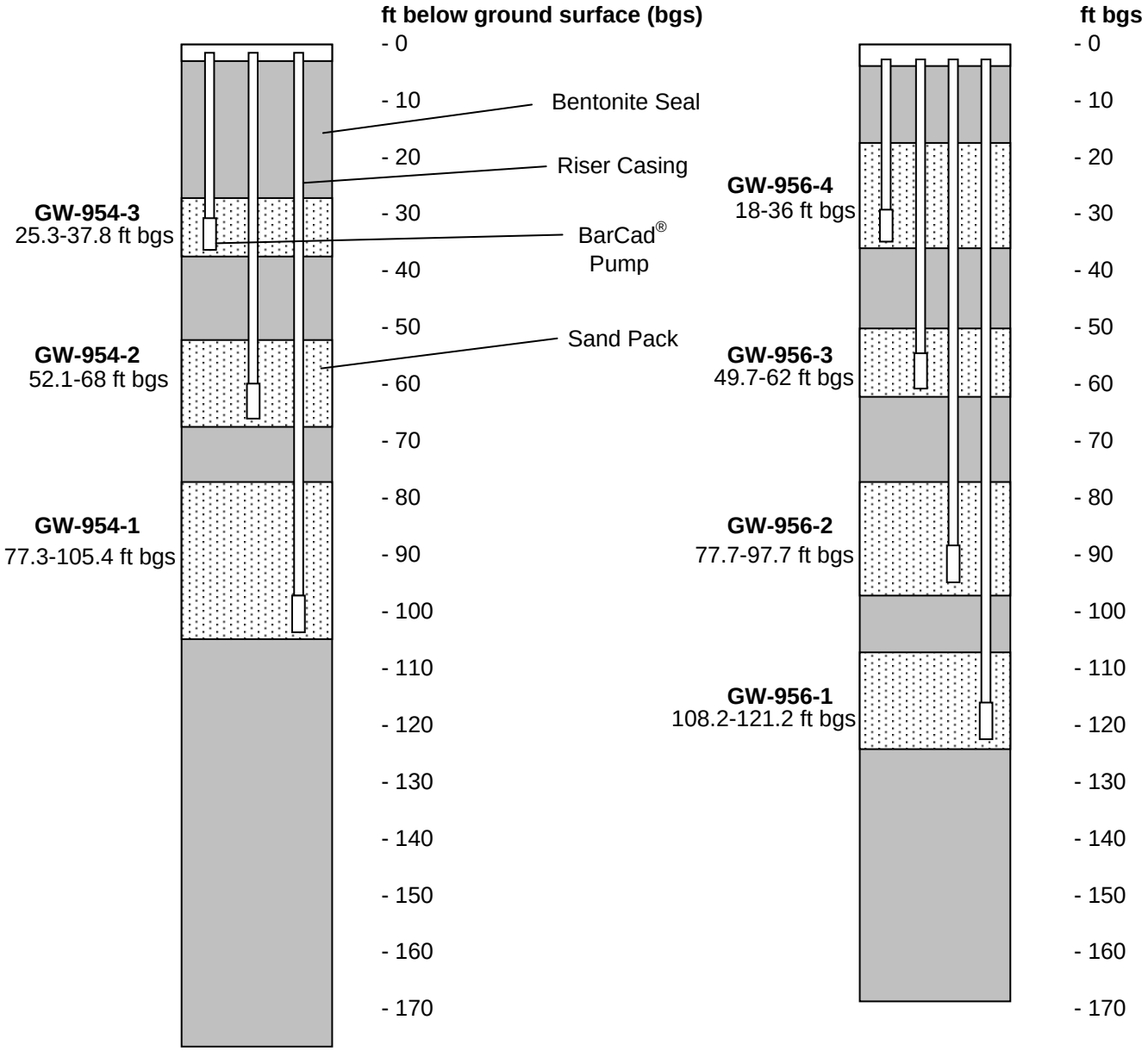
GWMR06_13 06/28/07

Fig. A.13. CY 2006 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime and in Union Valley.



GWMR06_14 06/28/07

Fig. A.14. CY 2006 surface water sampling locations north of Pine Ridge.



GWMR06_15.xls

Fig. A.15. BarCad® pump system sampling depths in wells GW-954 and GW-956.

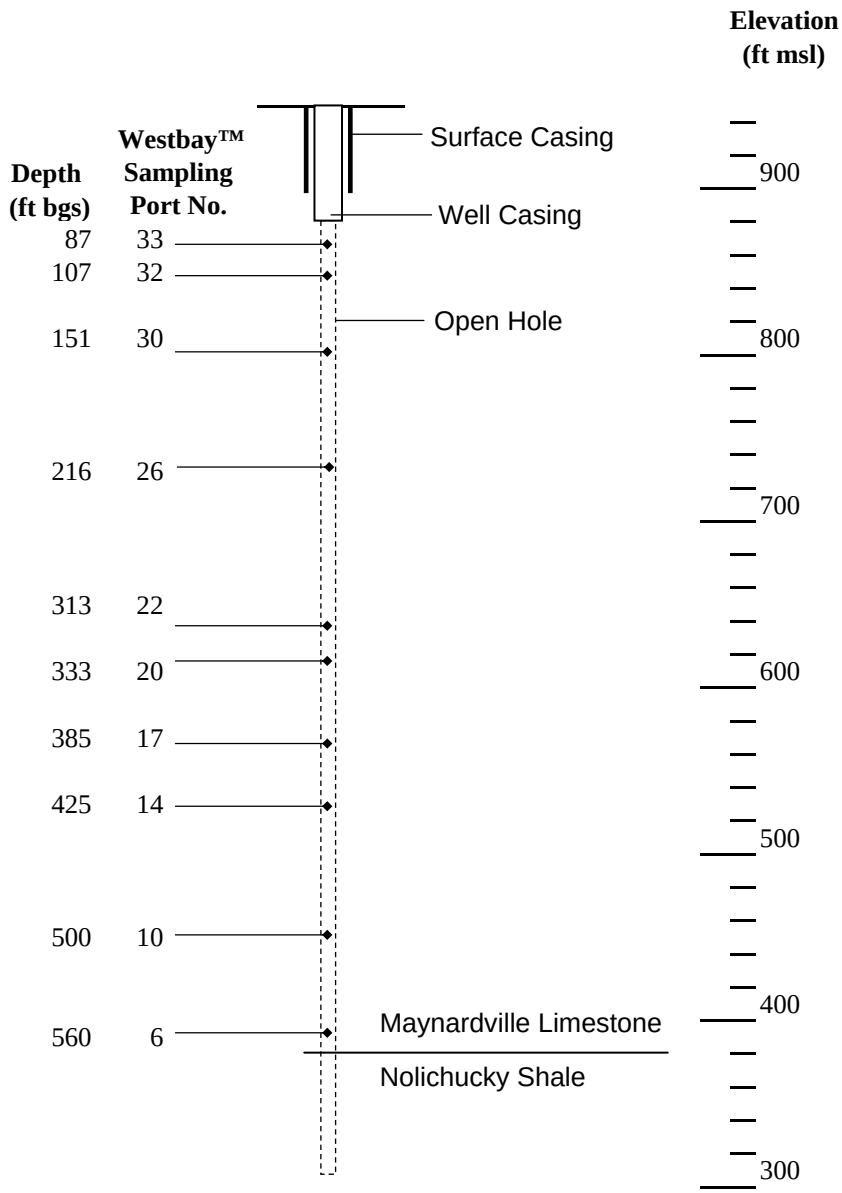


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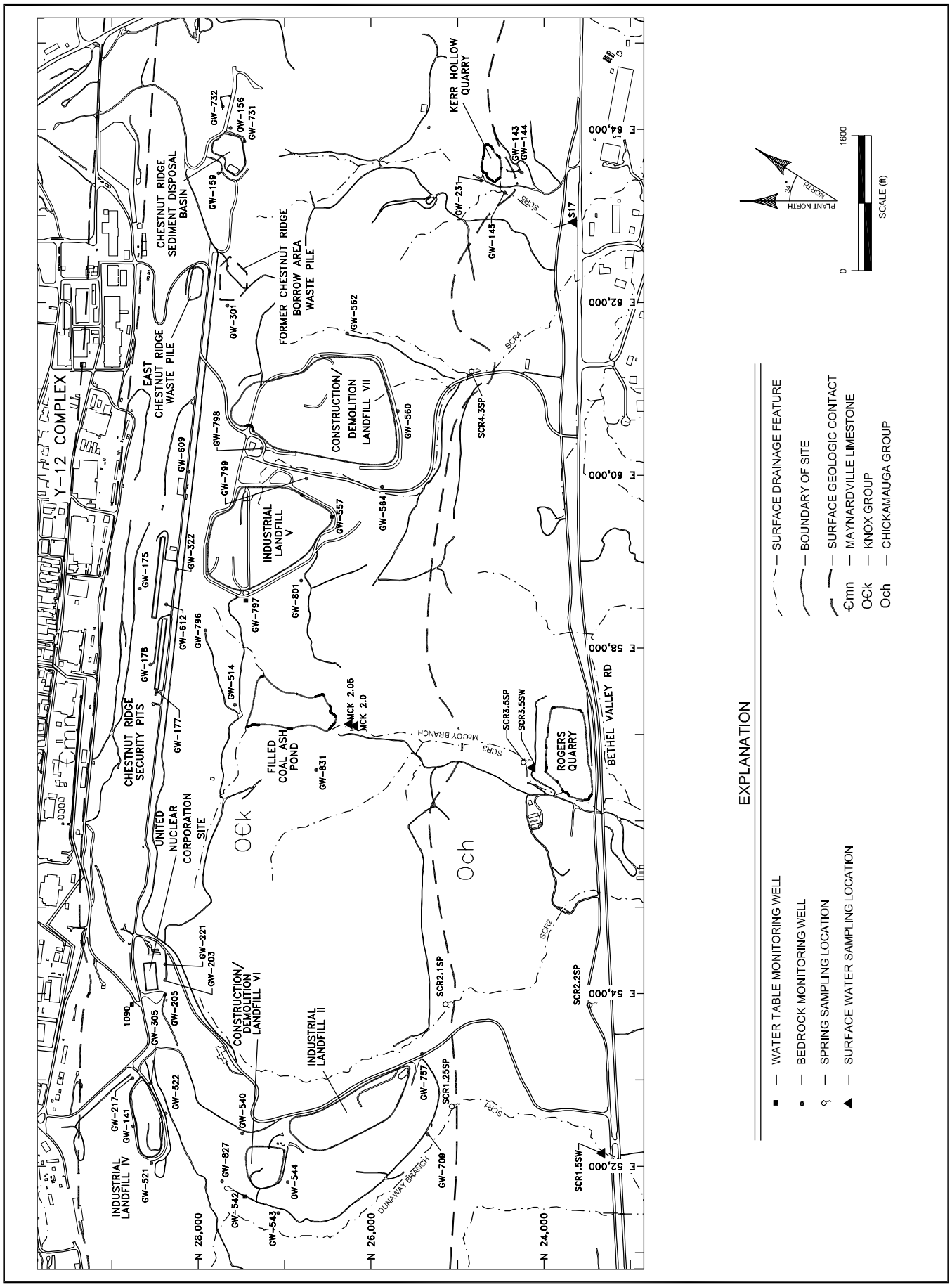
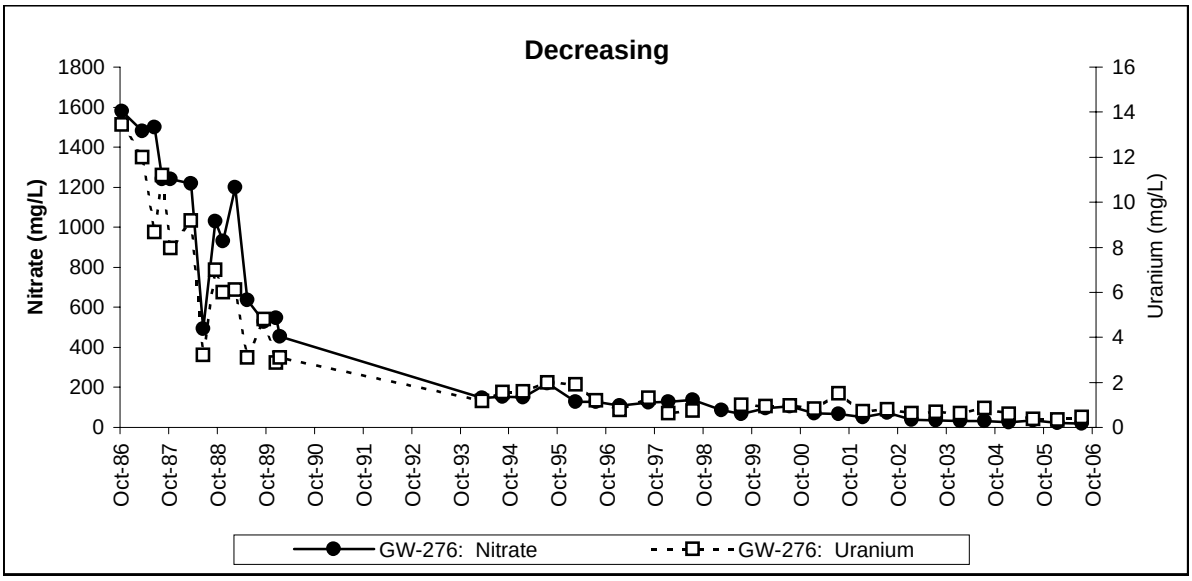
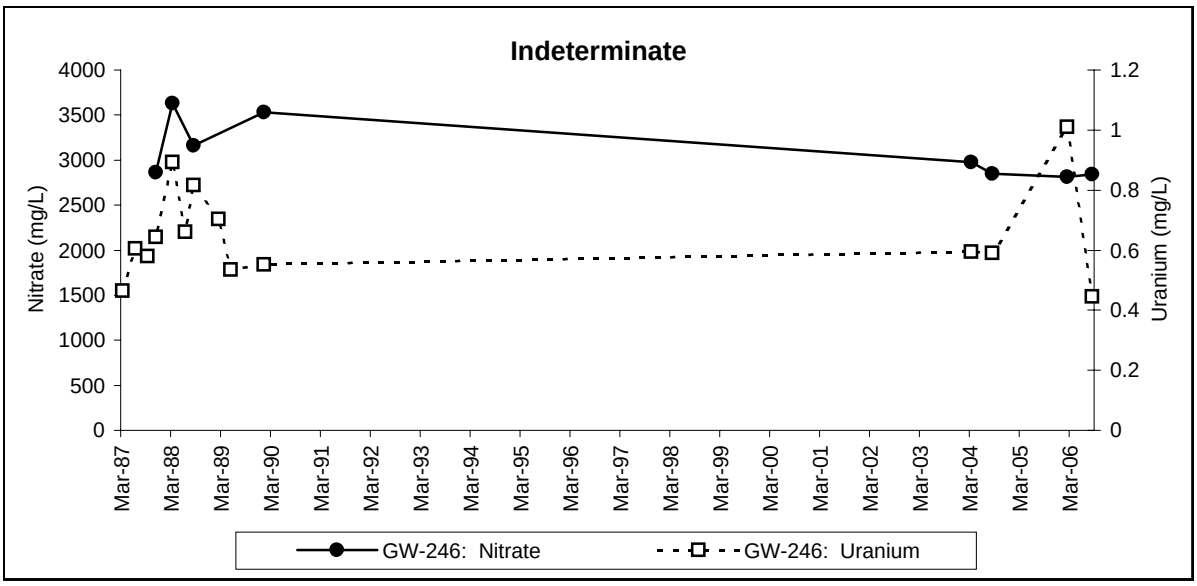
Fig. A.16. Westbay™ monitoring system sampling port depths in well GW-722.

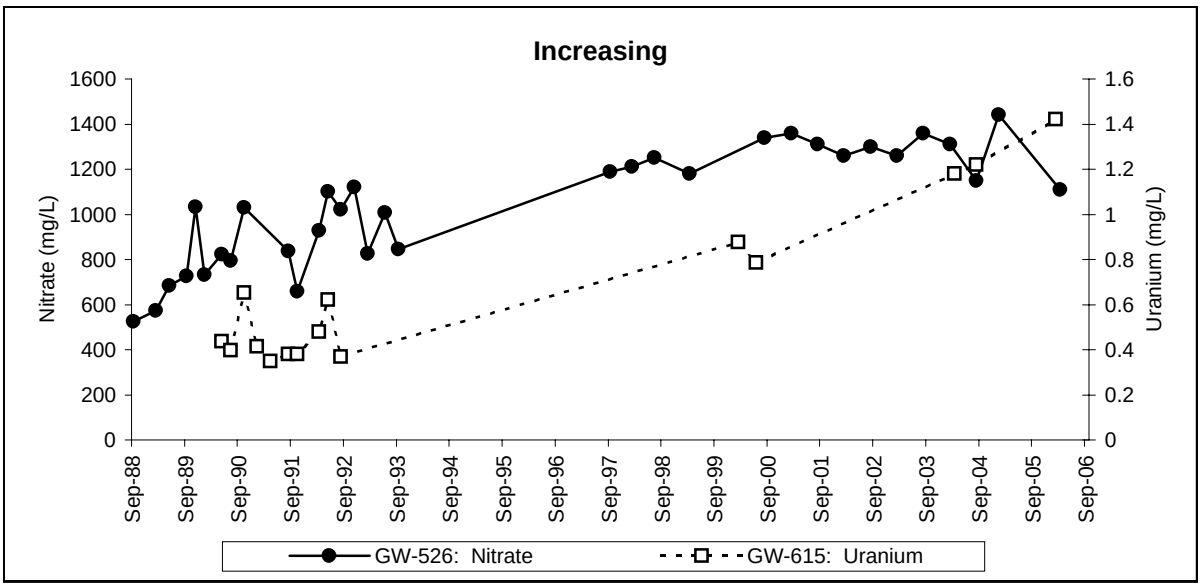


GWMR06_17 08/13/07

Fig. A.17. CY 2006 sampling locations in the Chestnut Ridge Hydrogeologic Regime.

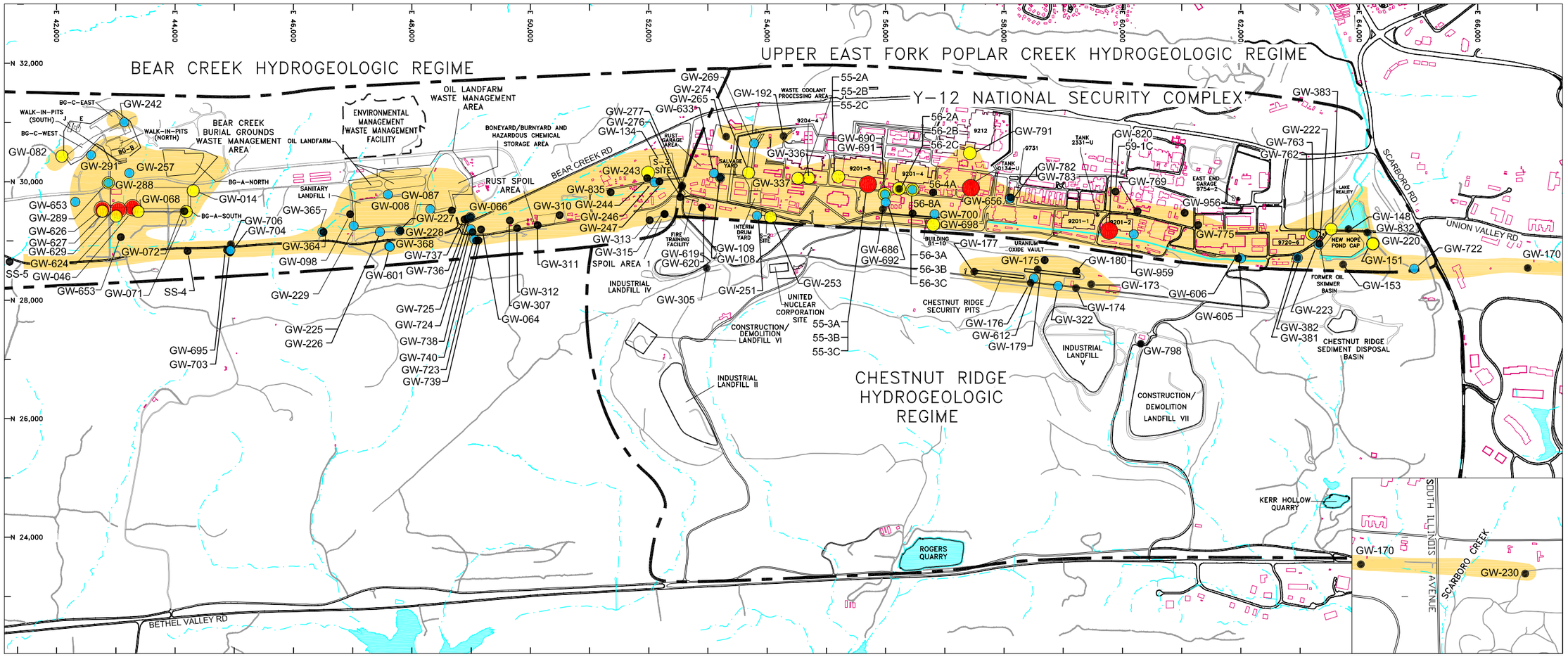






GWMR06 07/24/07

Fig. A.18. Bear Creek Regime CY 2006: nitrate and/or uranium concentration trends in surveillance monitoring aquitard wells GW-246, GW-276, GW-526, and GW-615.



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

EXPLANATION

- SURFACE DRAINAGE FEATURE
- BOUNDARY OF SITE
- BOUNDARY OF REGIME
- BUILDINGS
- CHLOROETHENES > 5 ug/L (PCE, TCE, 12DCE, 11DCE, VC)

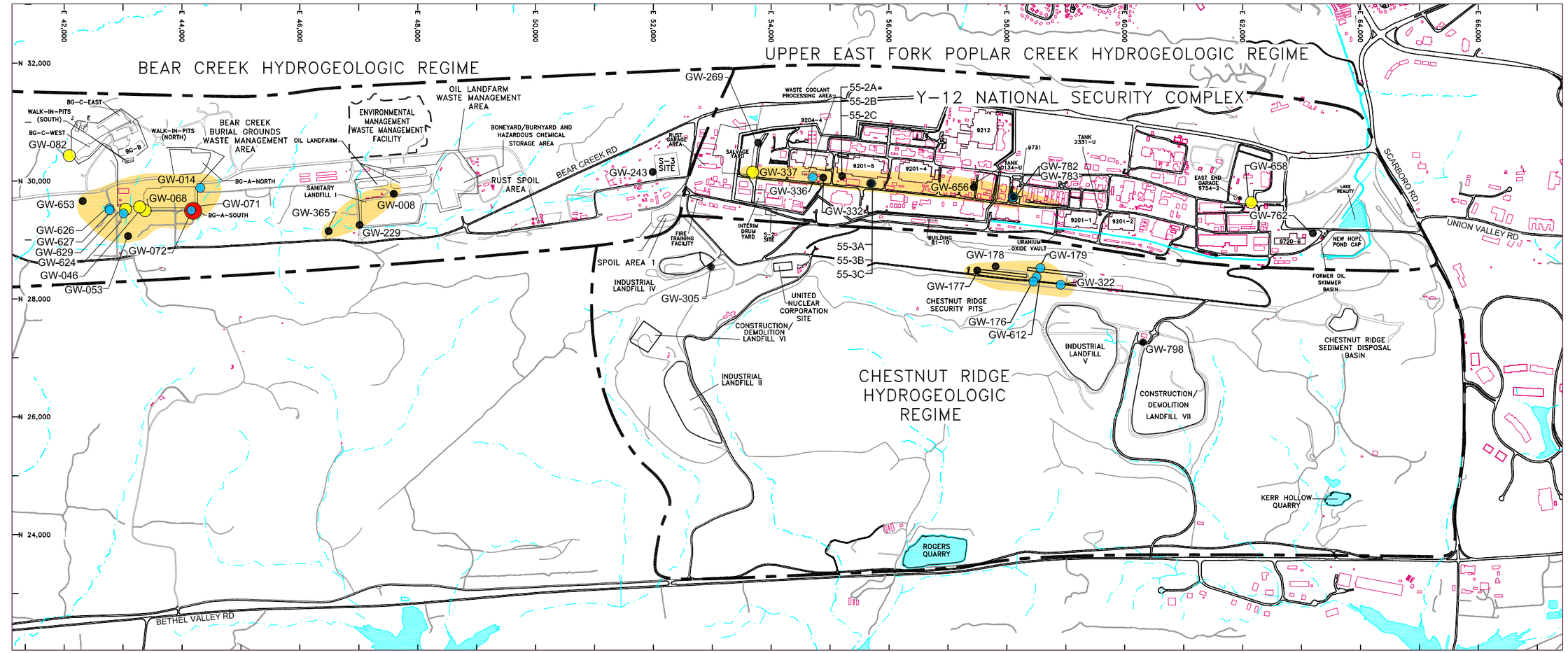
MAXIMUM SUMMED CHLOROETHENES
CY 2001 - CY 2006

- 5-50 ug/L
- 50-500 ug/L
- 500-5,000 ug/L
- >5,000 ug/L

PLANT NORTH
MAP NORTH
0
1800
SCALE (ft)

GWMR06_19 07/13/07

Fig. A.19. Generalized extent of chloroethenes 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
— BOUNDARY OF REGIME
— BUILDINGS
— CHLOROETHANES > 5 ug/L (111TCA, 12DCA, 11DCA, Chloroethane)

MAXIMUM SUMMED CHLOROETHANES CY 2001 - CY 2006

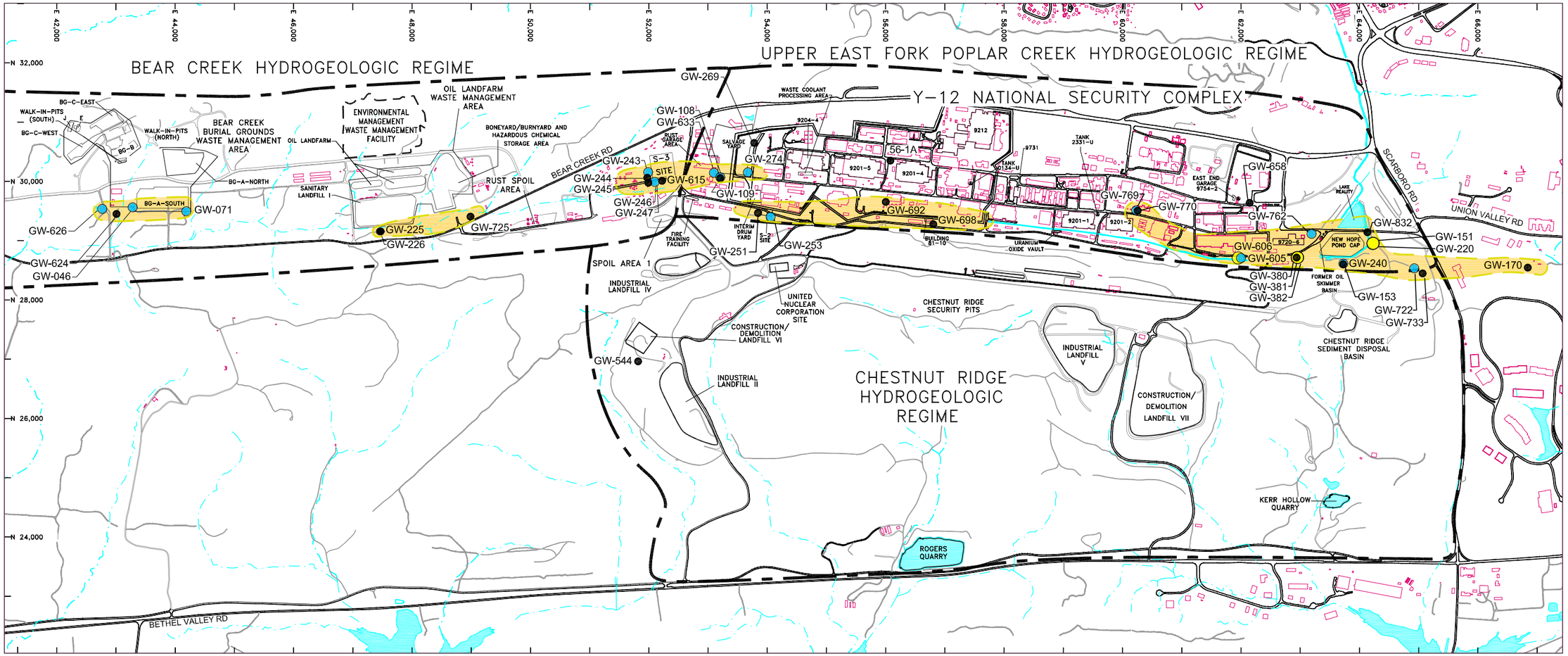
— 5-50 ug/L
— 50-500 ug/L
— 500-5,000 ug/L
— >5,000 ug/L

PLANT NORTH
NORTH

0 1800
SCALE (ft)

GWMR06_20 07/18/07

Fig. A.20. Generalized extent of chloroethanes 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
- BOUNDARY OF REGIME
- BUILDINGS
- CHLOROMETHANES > 5 ug/L (CTET, MC, Chloroform, Chloromethane)

MAXIMUM SUMMED CHLOROMETHANES
CY 2001 - CY 2006

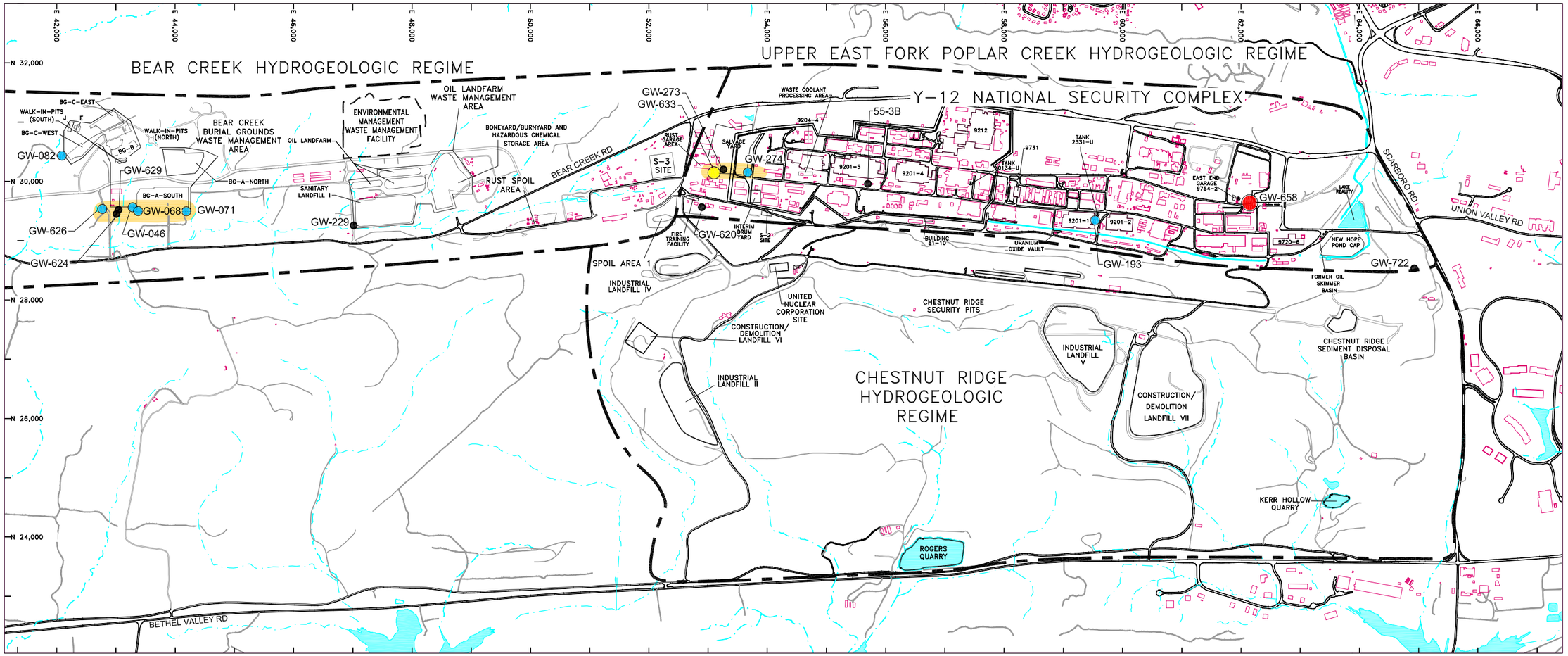
- 5-50 ug/L
- 50-500 ug/L
- 500-5,000 ug/L
- >5,000 ug/L

PLANT NORTH
NORTH

0 1800
SCALE (ft)

GWMR06_21 07/16/07

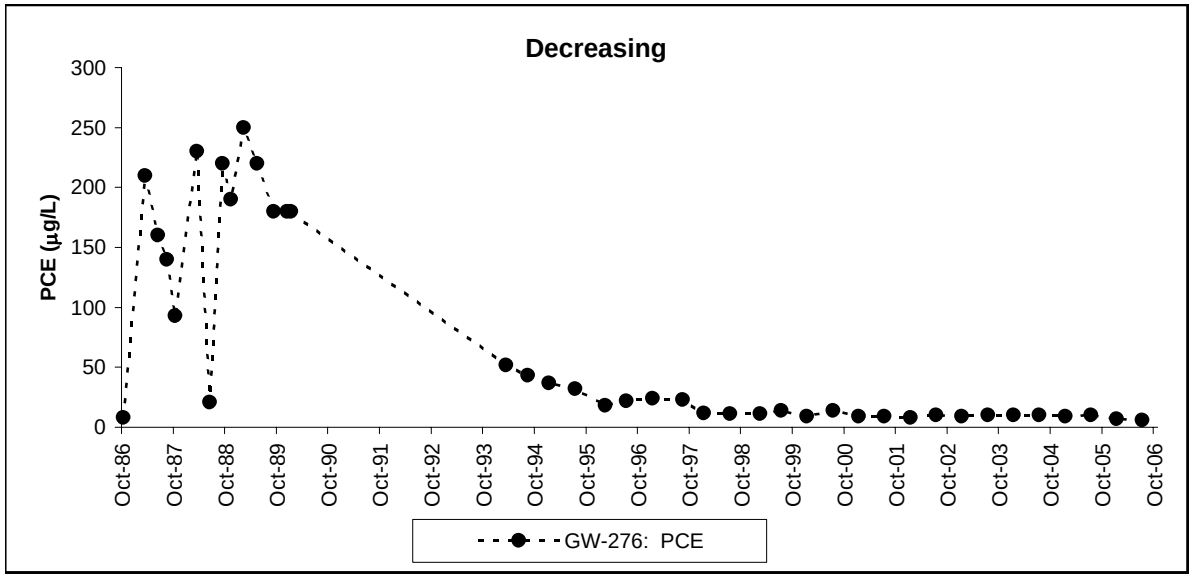
Fig. A.21. Generalized extent of chloromethanes in groundwater at the Y-12 National Security Complex.

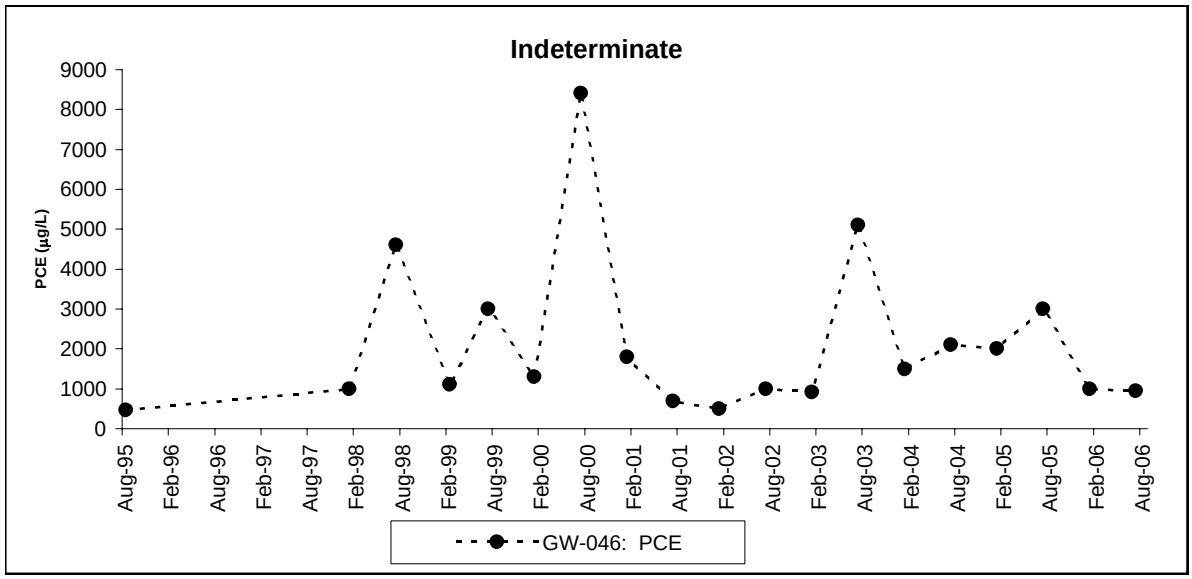


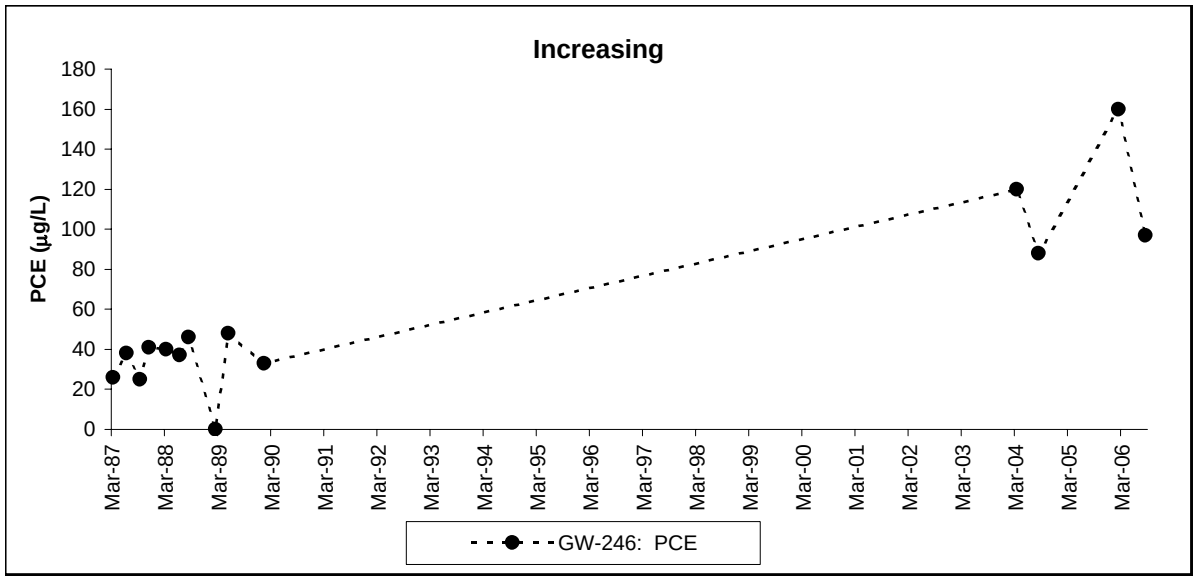
SOURCES: U.S. Department of Energy 1997a
U.S. Department of Energy 1998

GWMR06_22 07/16/07

Fig. A.22. Generalized extent of petroleum hydrocarbons in groundwater at the Y-12 National Security Complex.

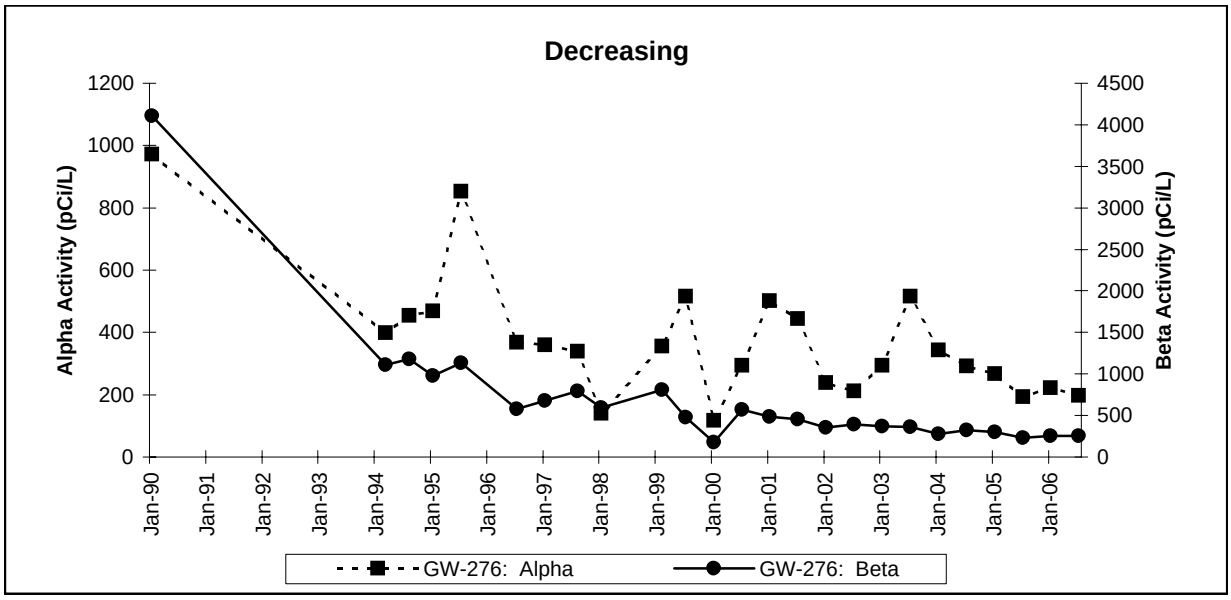


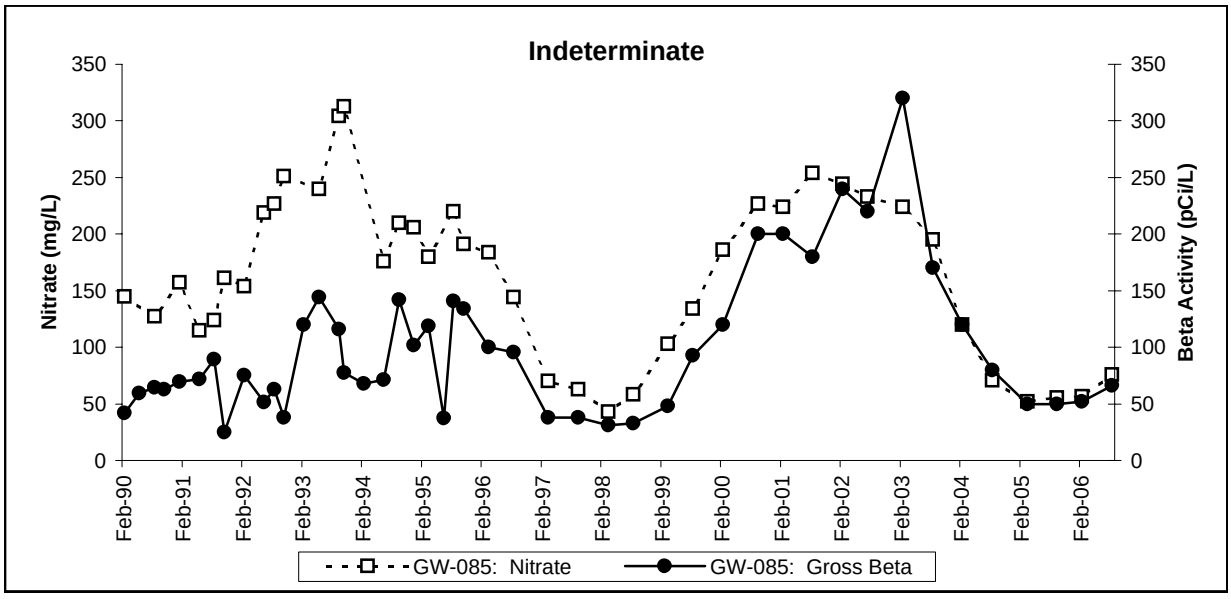


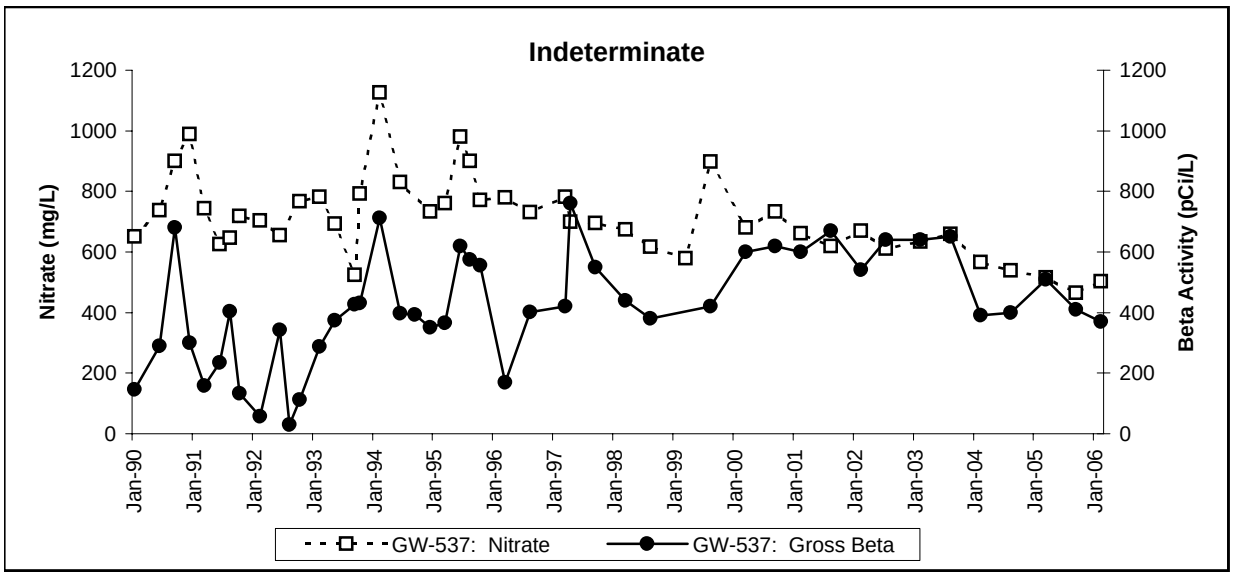


GWMR06 07/24/07

Fig. A.23. Bear Creek Regime CY 2006: PCE concentration trends in surveillance monitoring aquitard wells GW-046, GW-246, and GW-276.

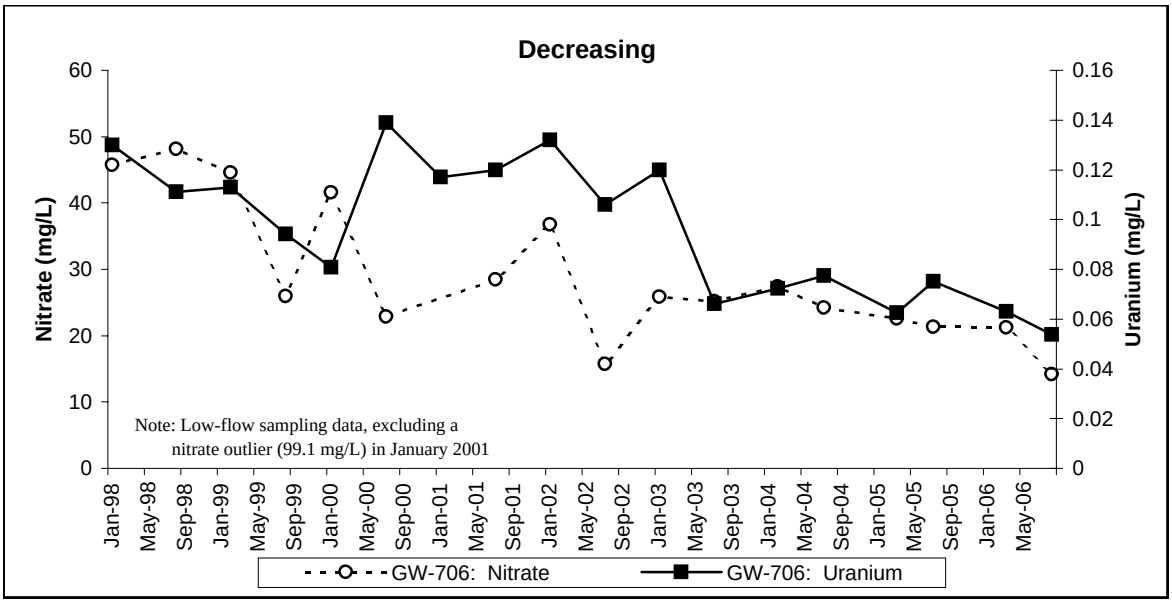


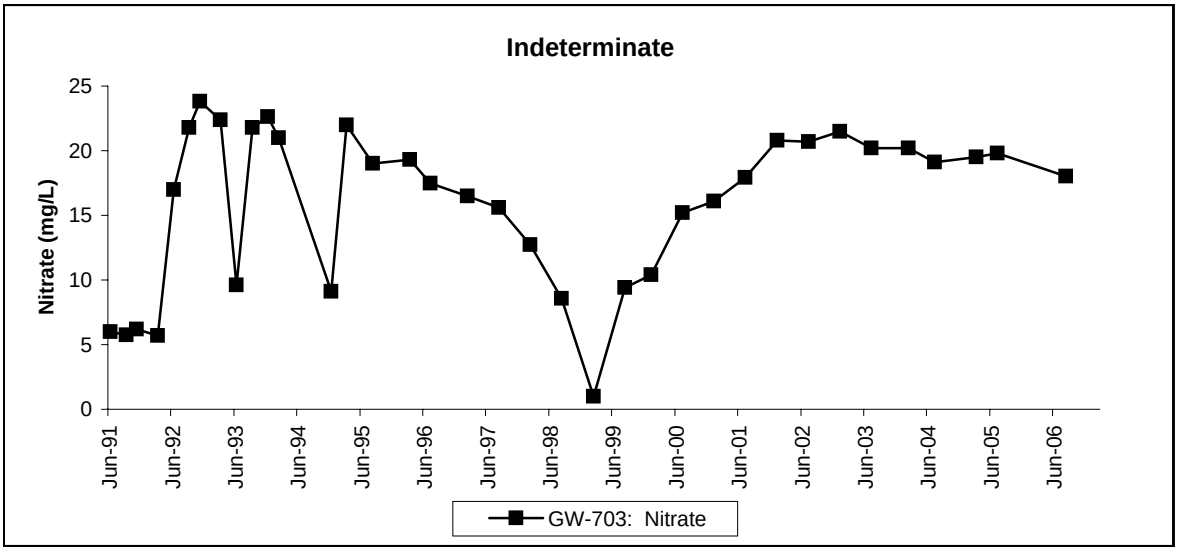


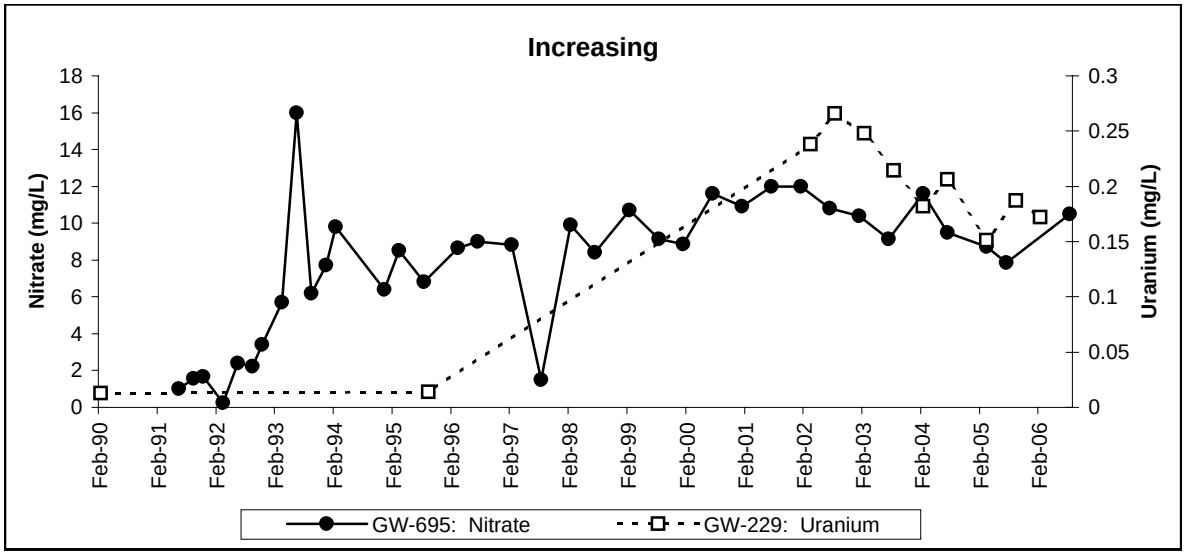


GWMR06 07/24/07

Fig. A.24. Bear Creek Regime CY 2006: gross alpha and/or gross beta activity trends in surveillance monitoring aquitard wells GW-085, GW-276, and GW-537.

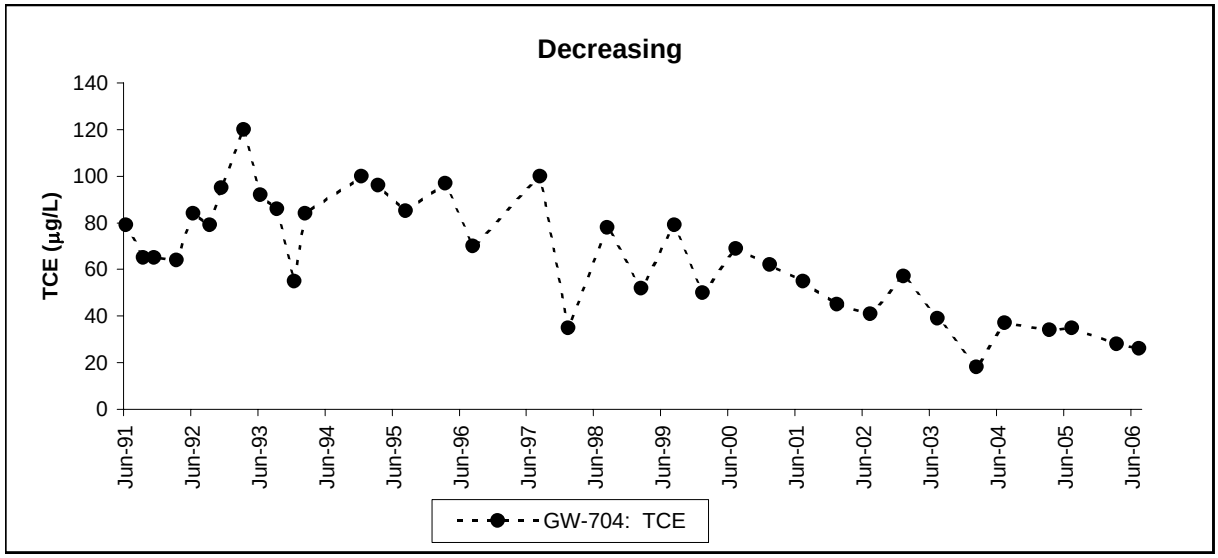


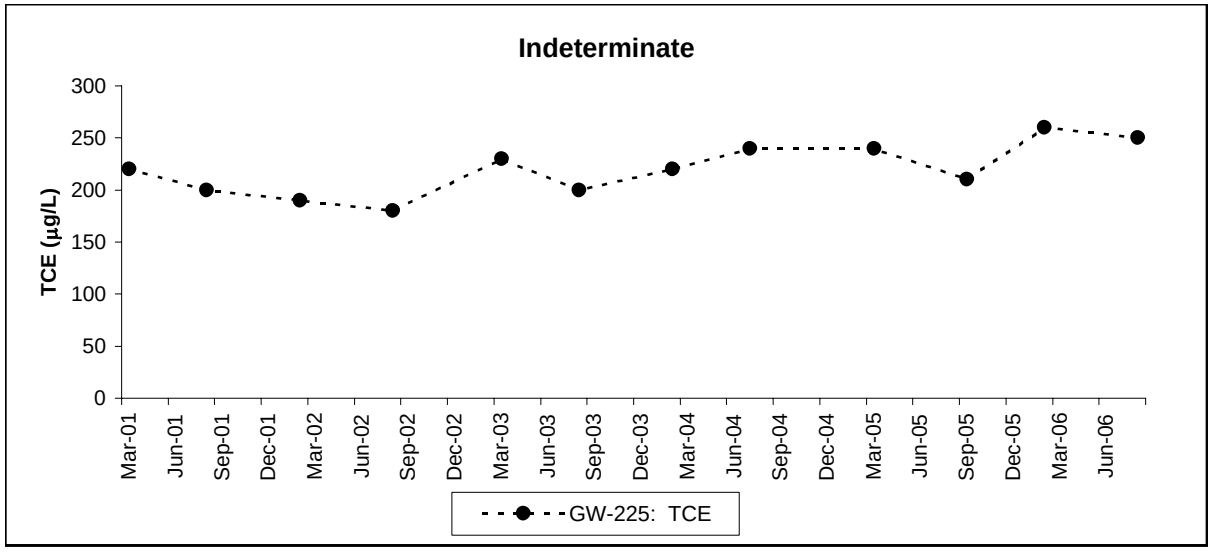


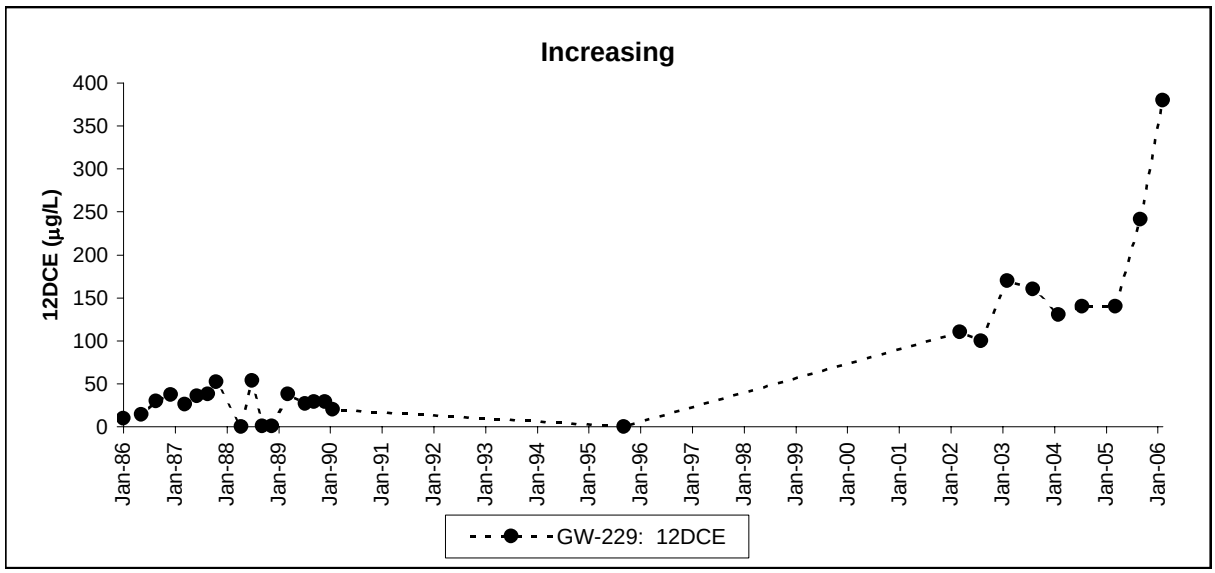


GWMR06 07/24/07

Fig. A.25. Bear Creek Regime CY 2006: nitrate and/or uranium concentration trends in surveillance monitoring aquifer wells GW-229, GW-695, GW-703, and GW-706.

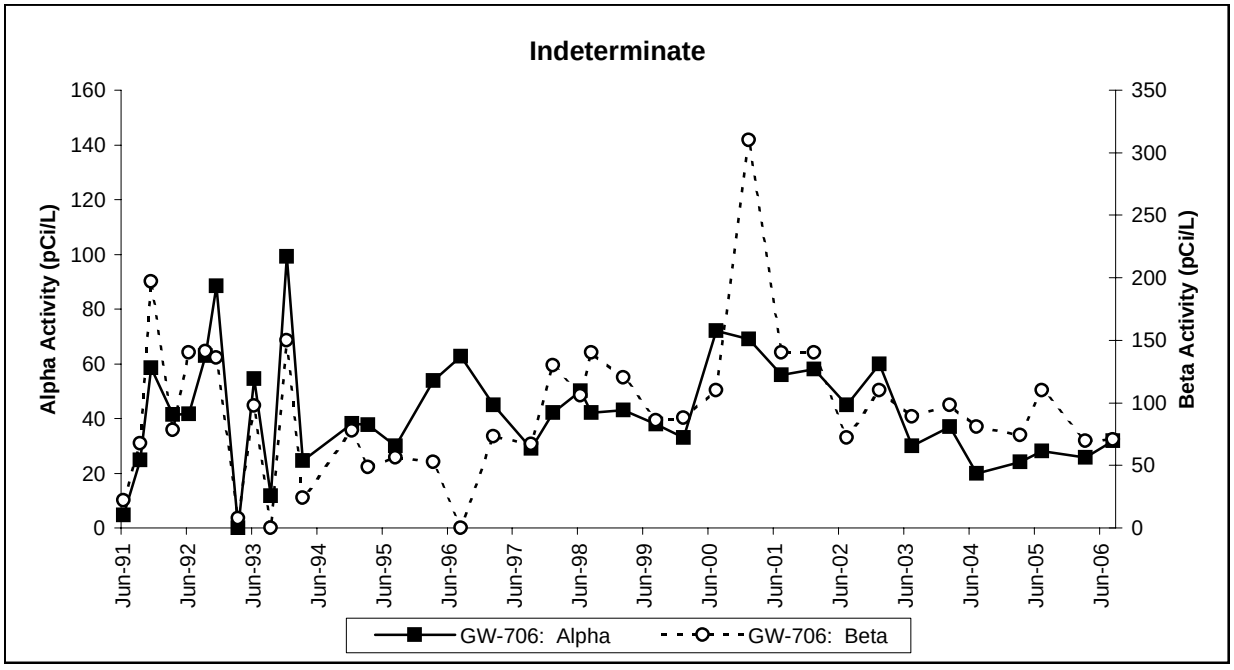


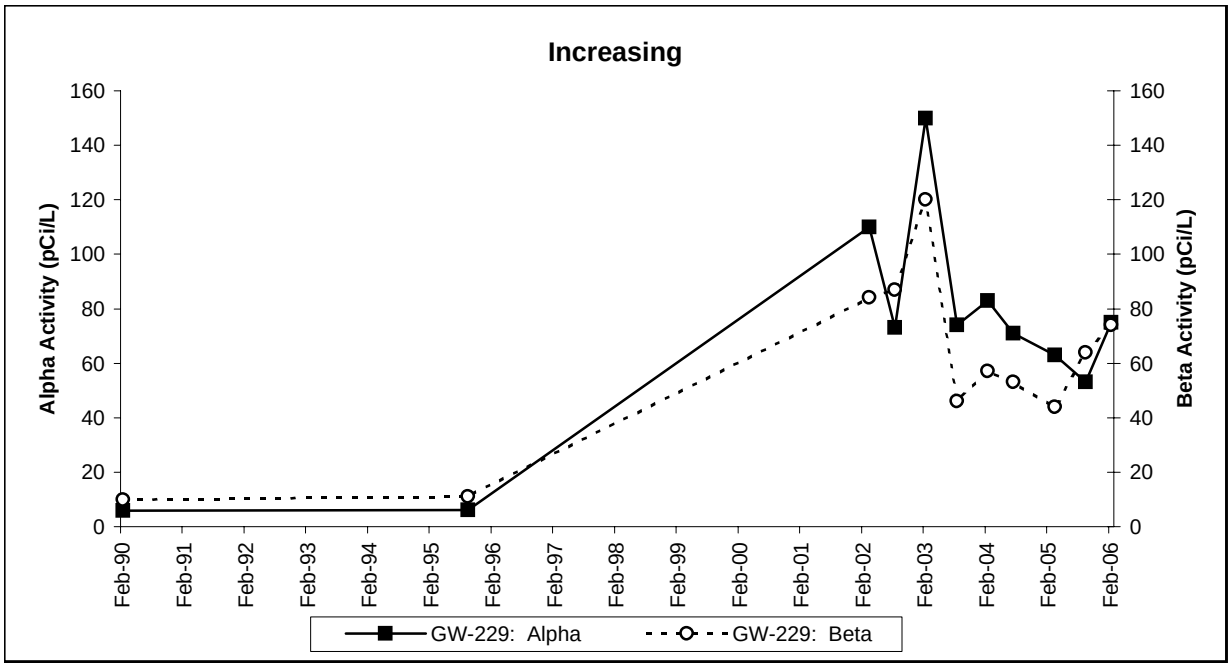




GWMR06 07/24/07

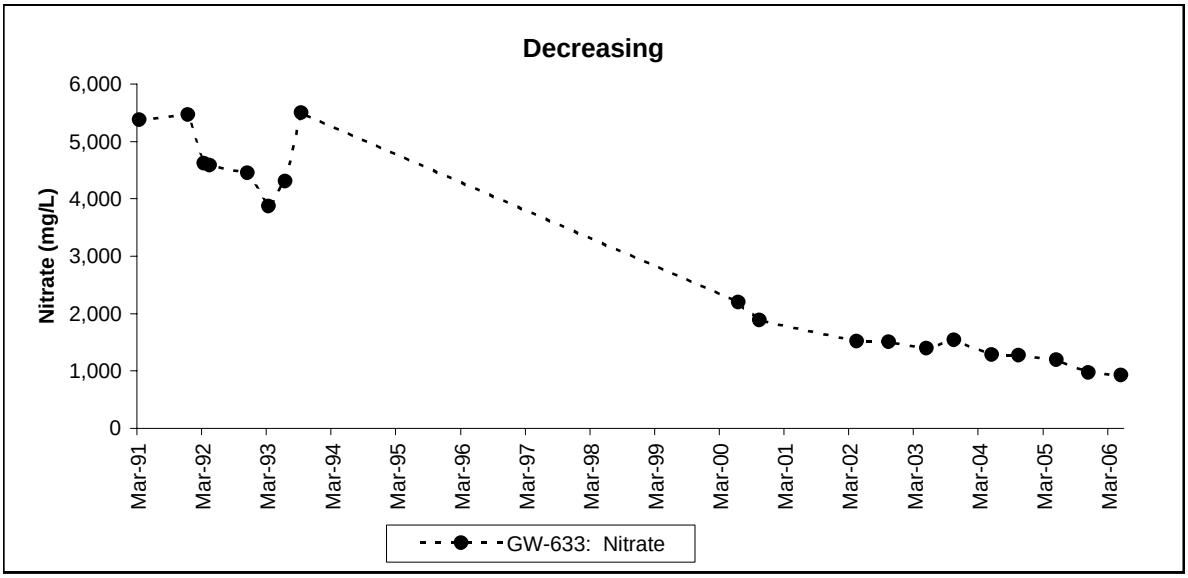
Fig. A.26. Bear Creek Regime CY 2006: selected VOC concentration trends in surveillance monitoring aquifer wells GW-225, GW-229, and GW-704.

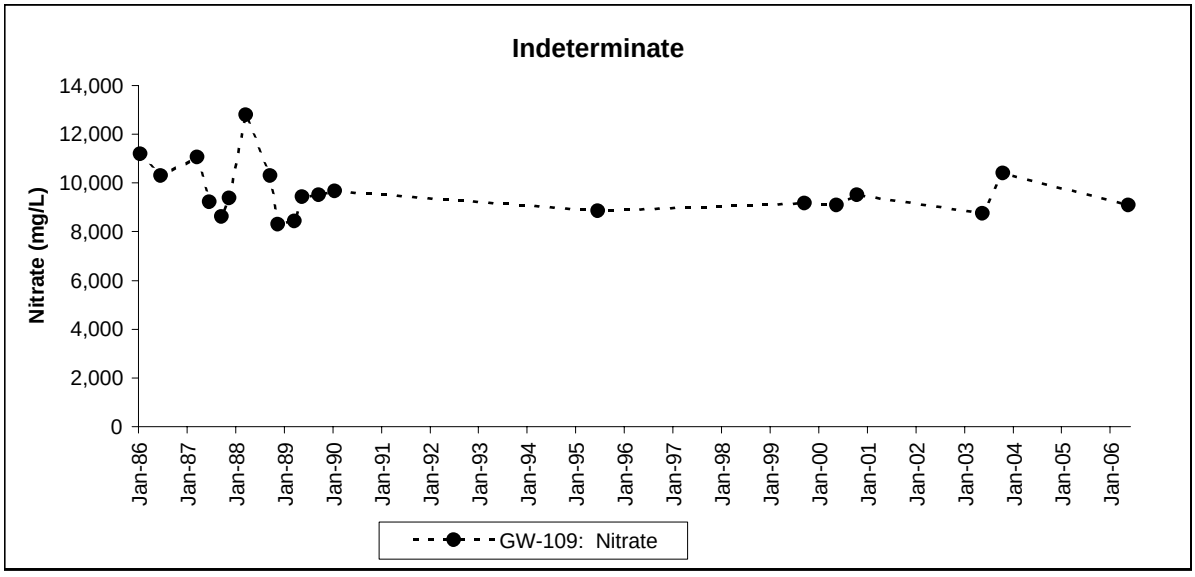


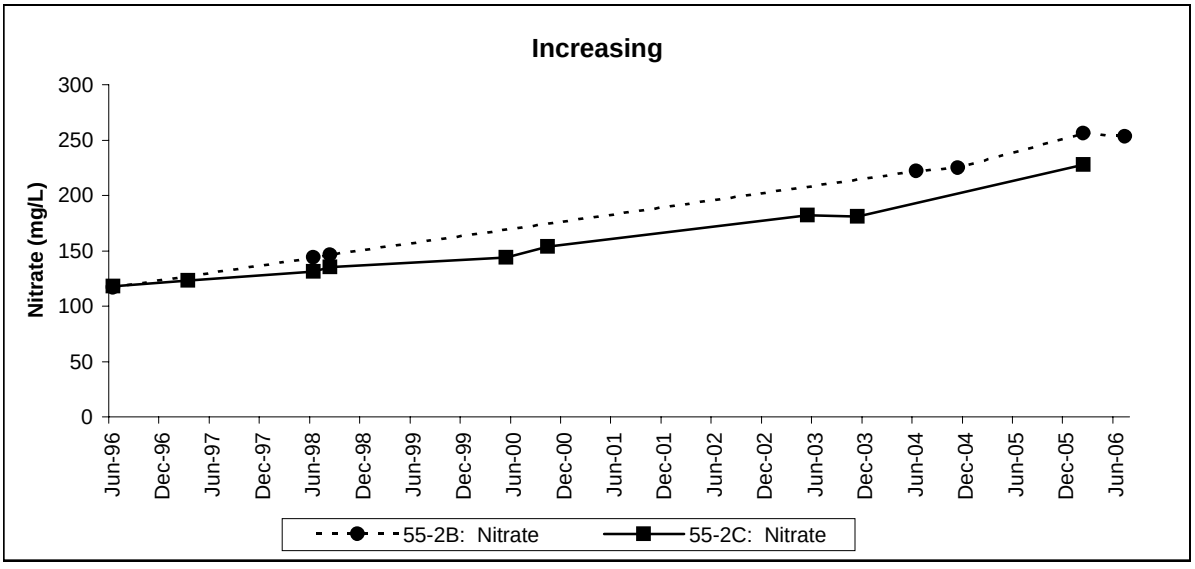


GWMR06 07/24/07

Fig. A.27. Bear Creek Regime CY 2006: gross alpha and gross beta activity trends in surveillance monitoring aquifer wells GW-229 and GW-706.

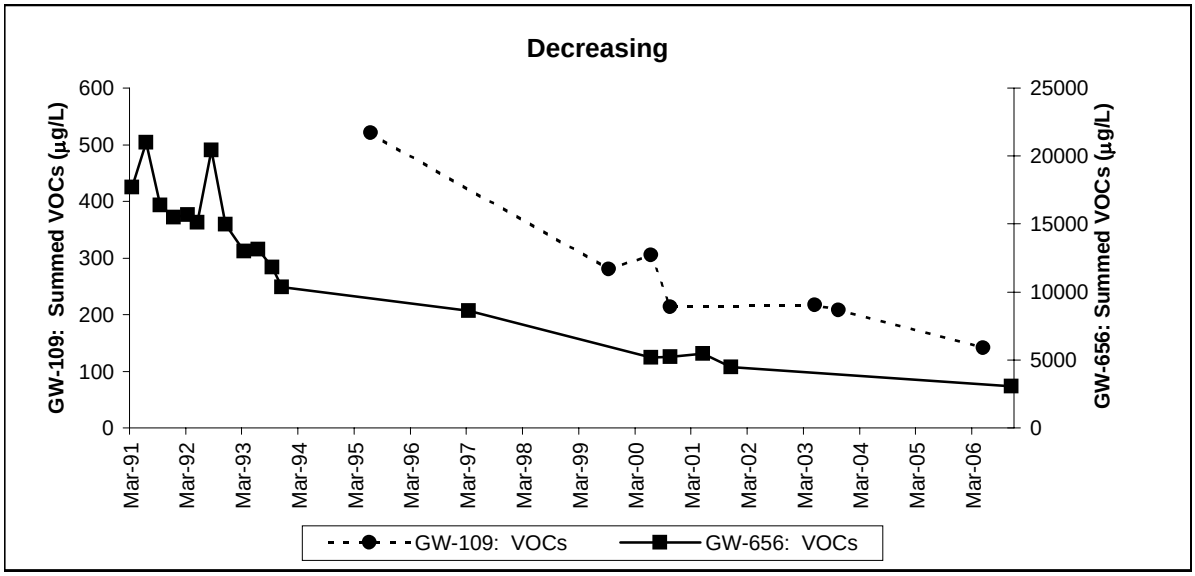


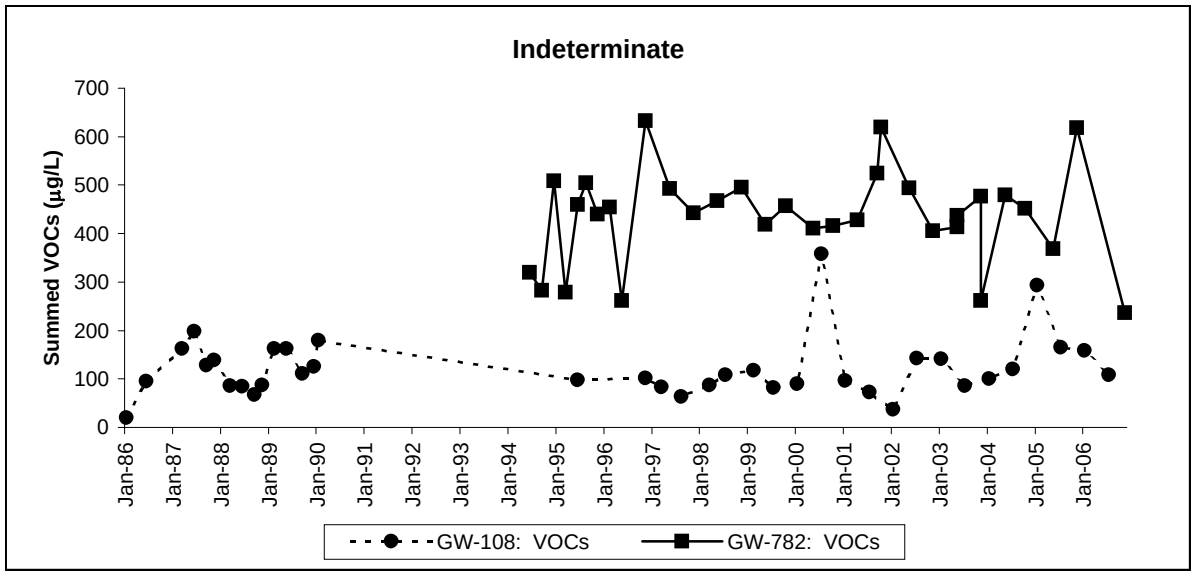


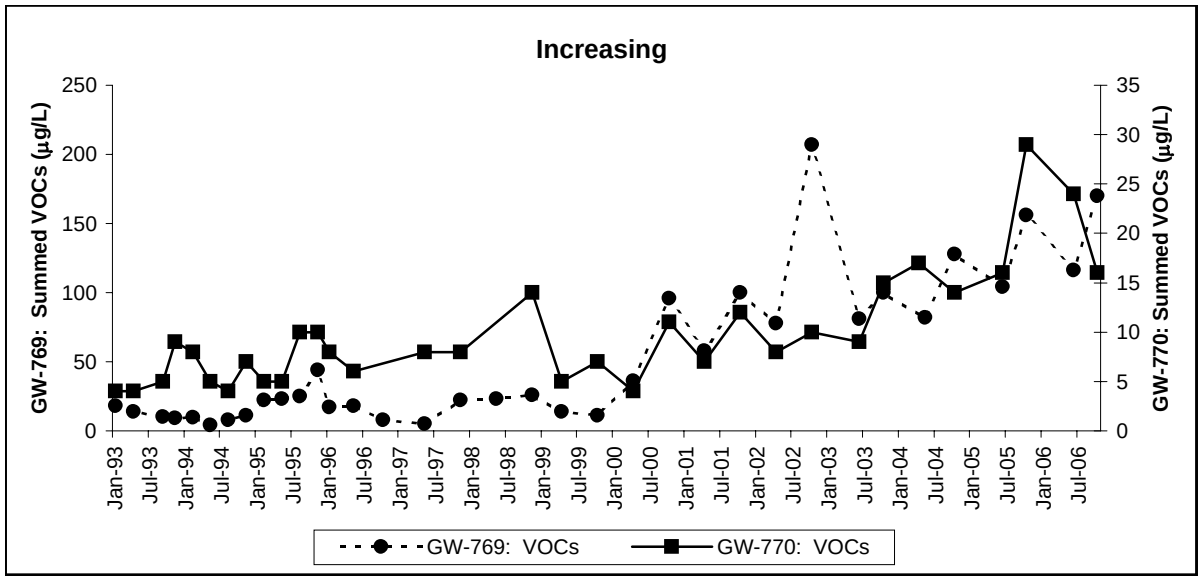


GWMR06 07/24/07

Fig. A.28. East Fork Regime CY 2006: nitrate concentration trends in surveillance monitoring aquitard wells 55-2B, 55-2C, GW-109, and GW-633.

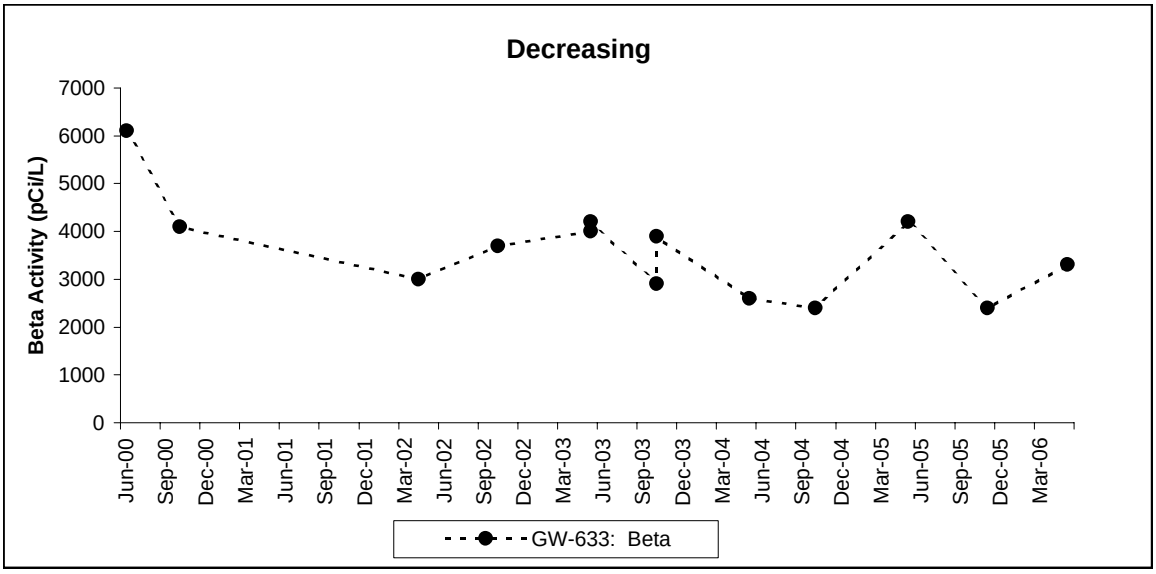


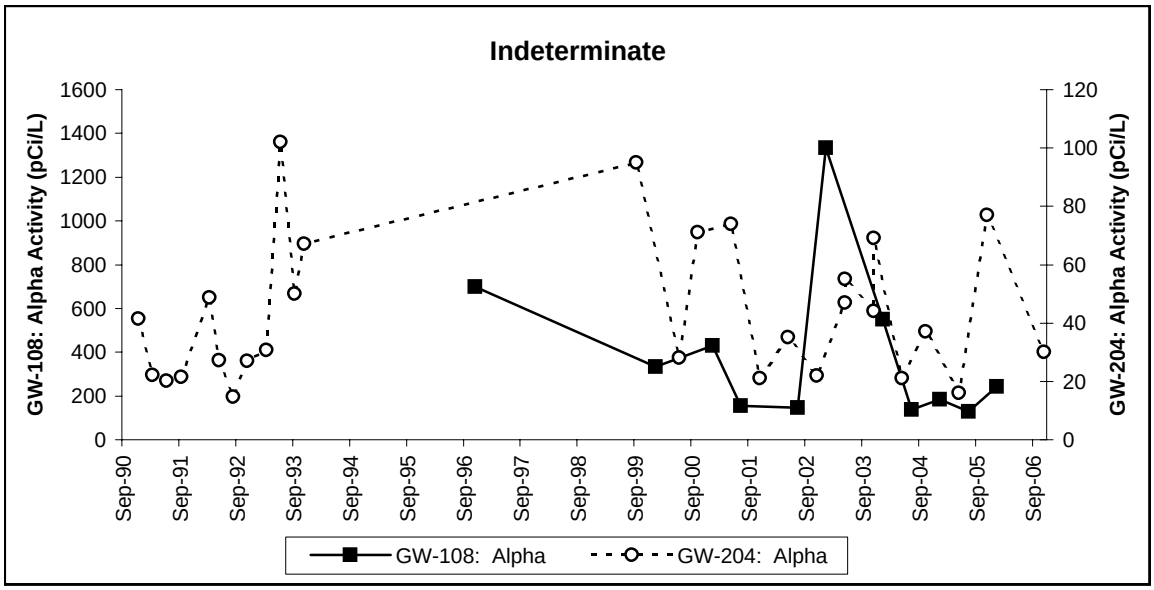


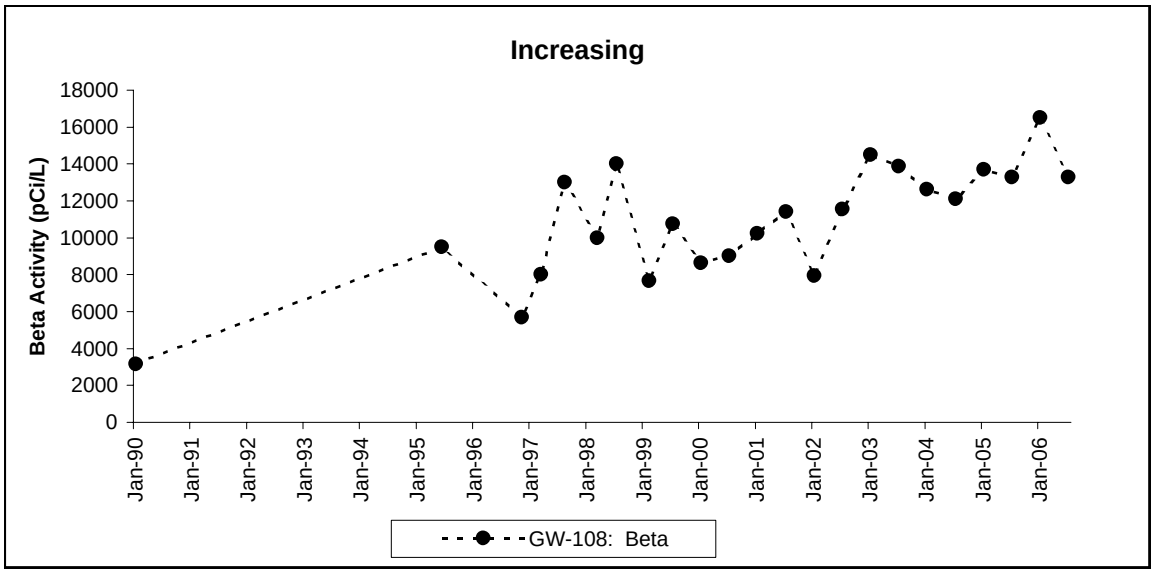


GWMR06 07/24/07

Fig. A.29. East Fork Regime CY 2006: summed VOC concentration trends in surveillance monitoring aquitard wells GW-108, GW-109, GW-656, GW-769, GW-770, and GW-782.

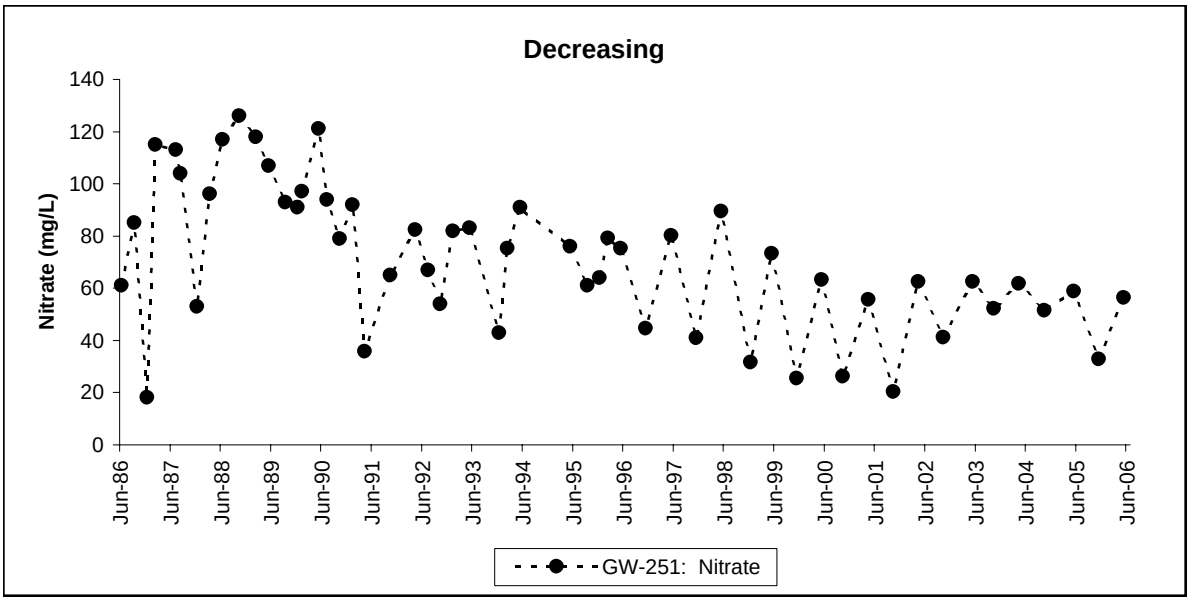


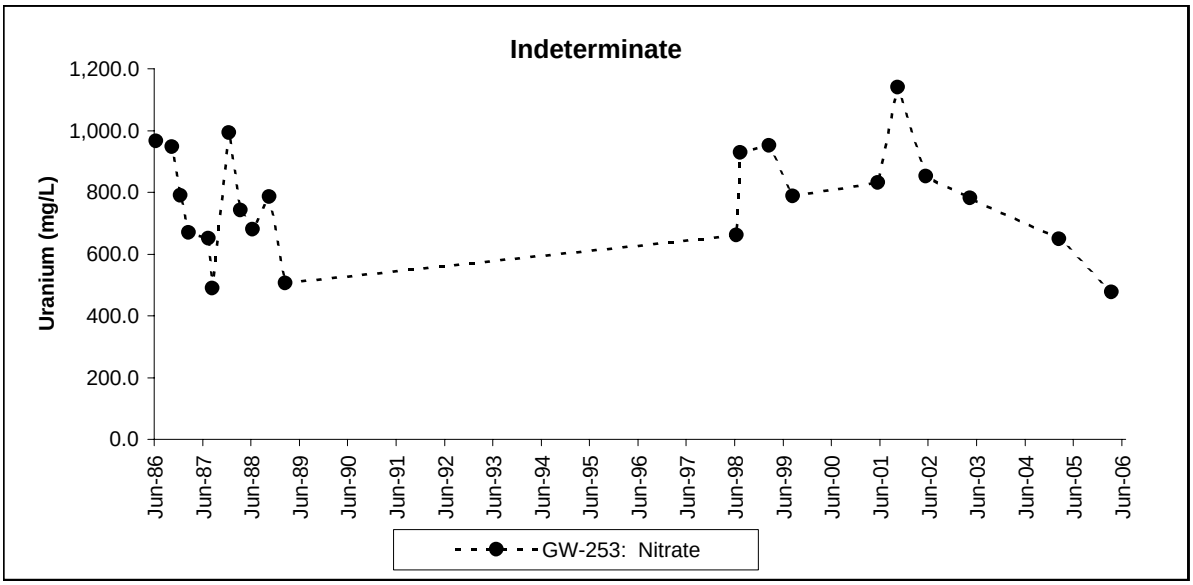


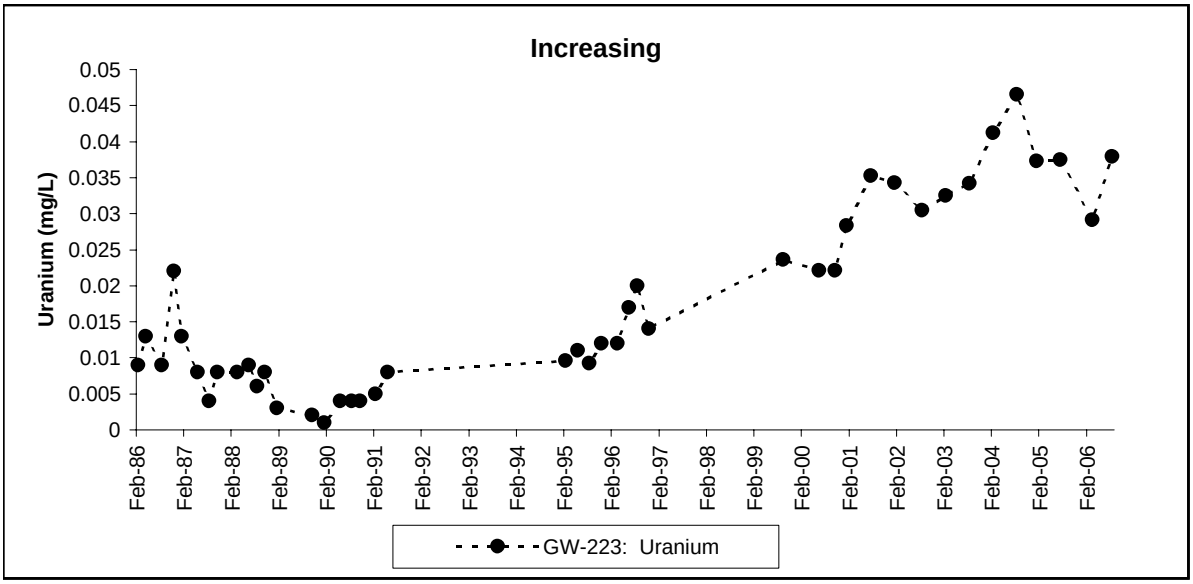


GWMR06 07/24/07

Fig. A.30. East Fork Regime CY 2006: gross alpha and/or gross beta activity trends in surveillance monitoring aquitard wells GW-108, GW-204, and GW-633.

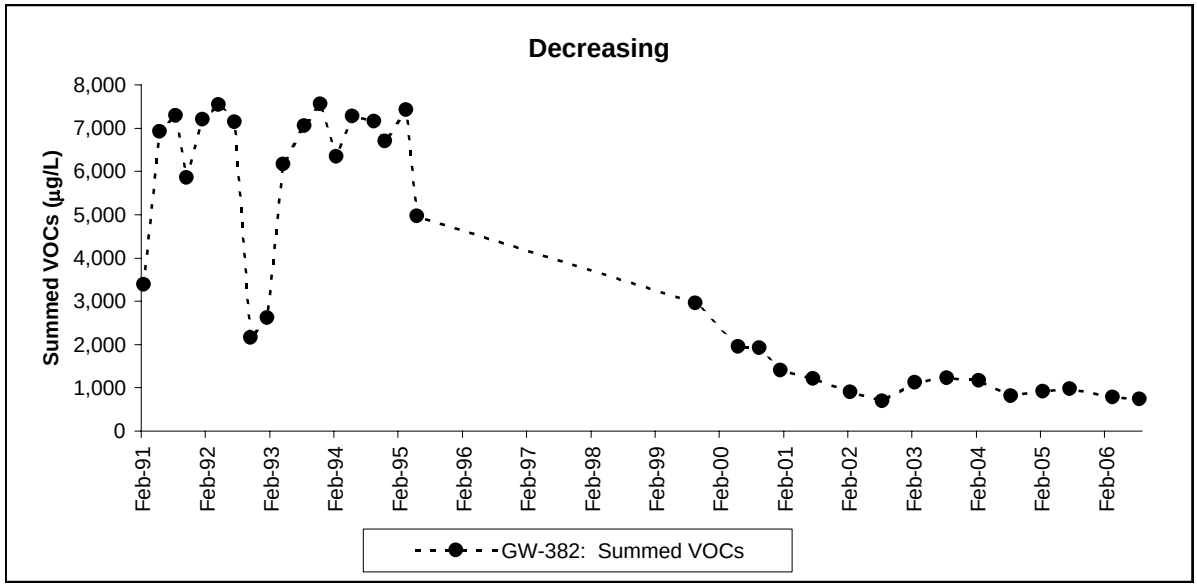


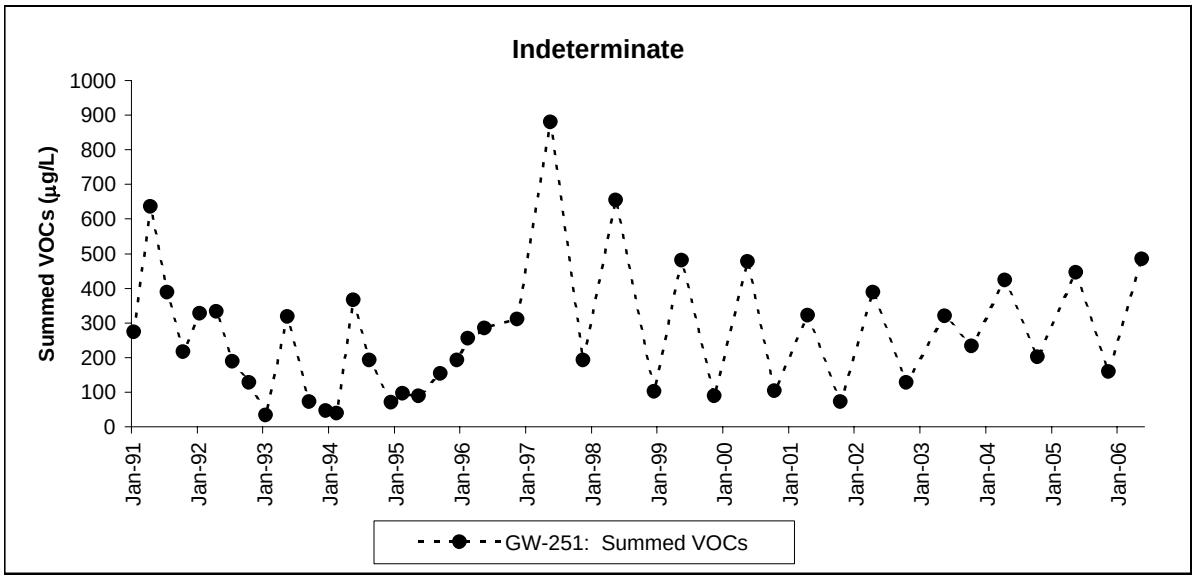


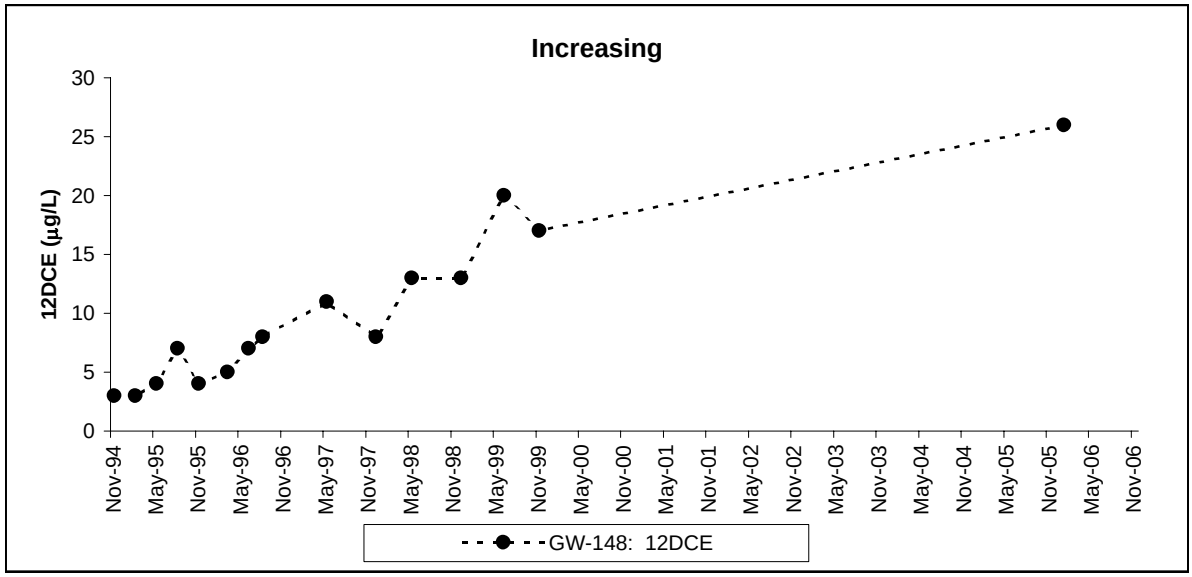


GWMR06 07/24/07

Fig. A.31. East Fork Regime CY 2006: nitrate and/or uranium concentration trends in surveillance monitoring aquifer wells GW-223, GW-251, and GW-253.

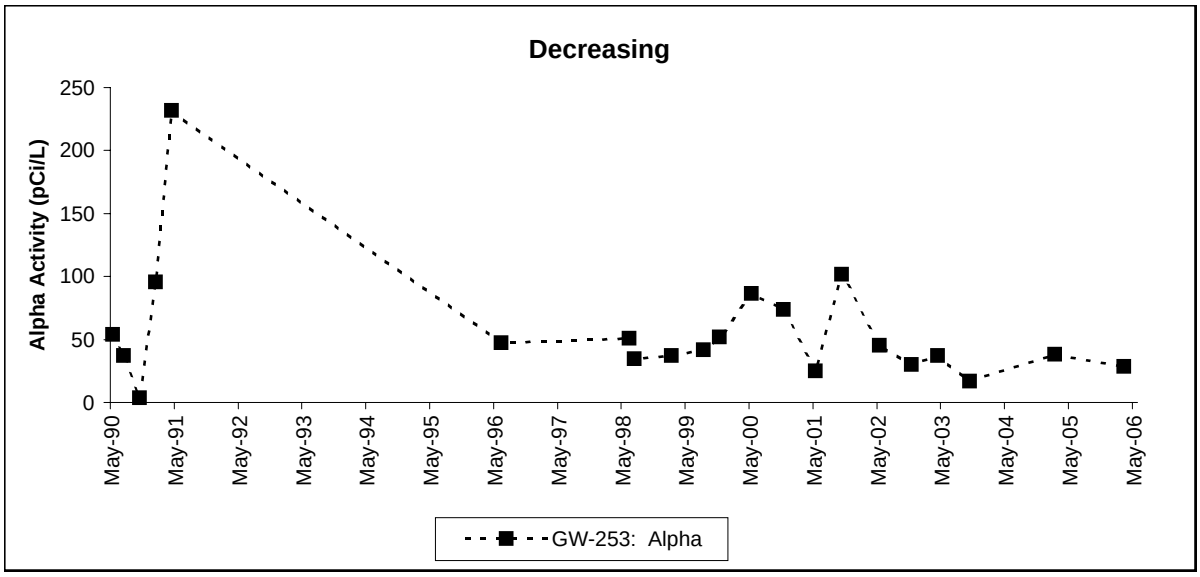


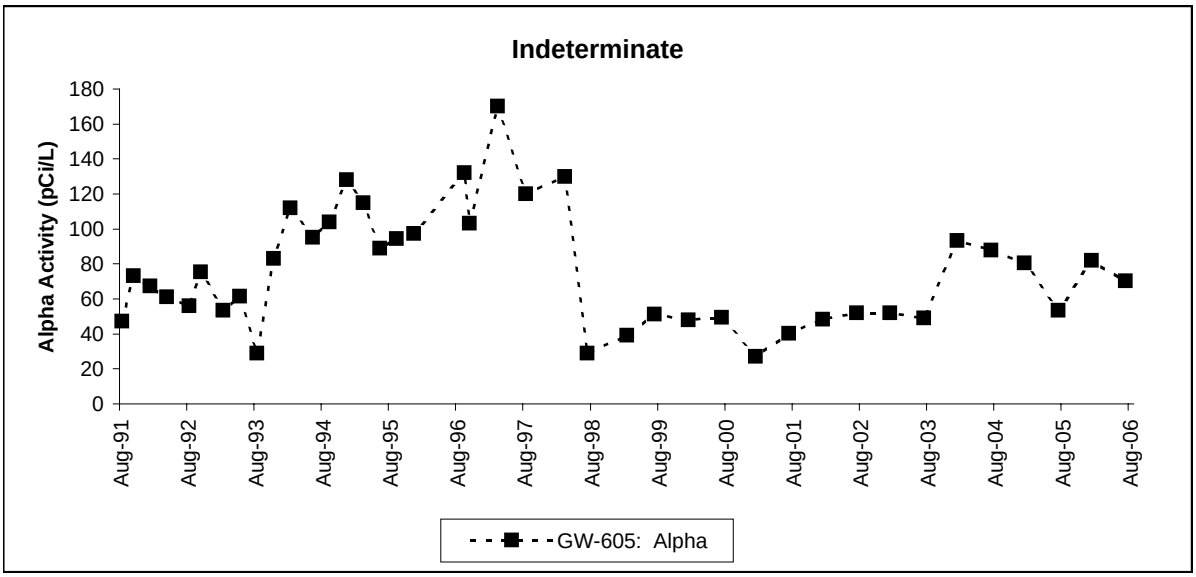


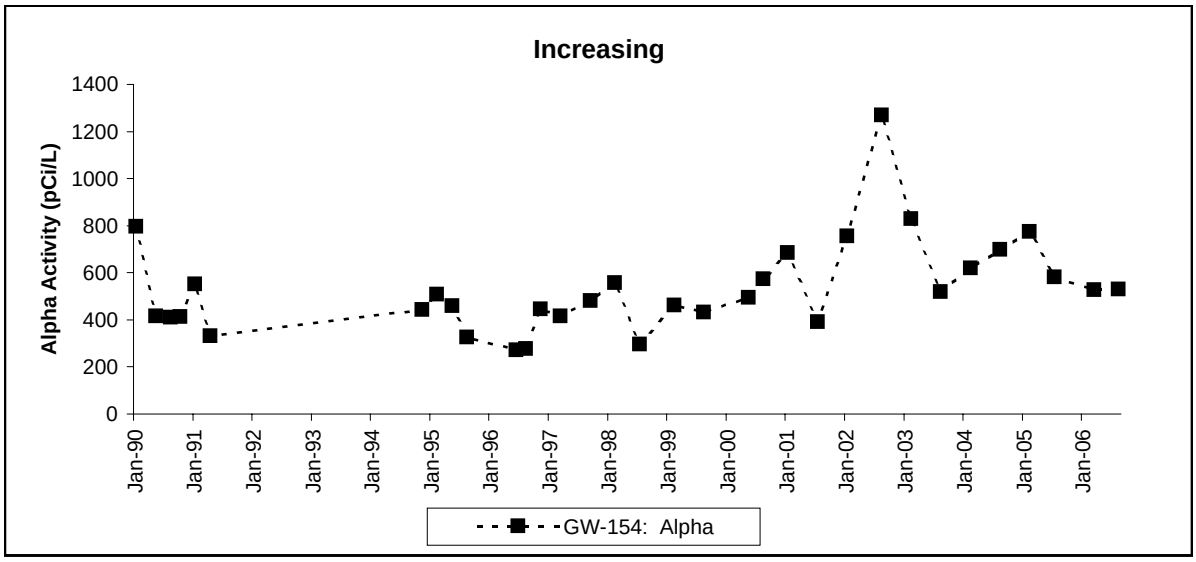


GWMR06 07/24/07

Fig. A.32. East Fork Regime CY 2006: VOC concentration trends in surveillance monitoring aquifer wells GW-148, GW-251, and GW-382.

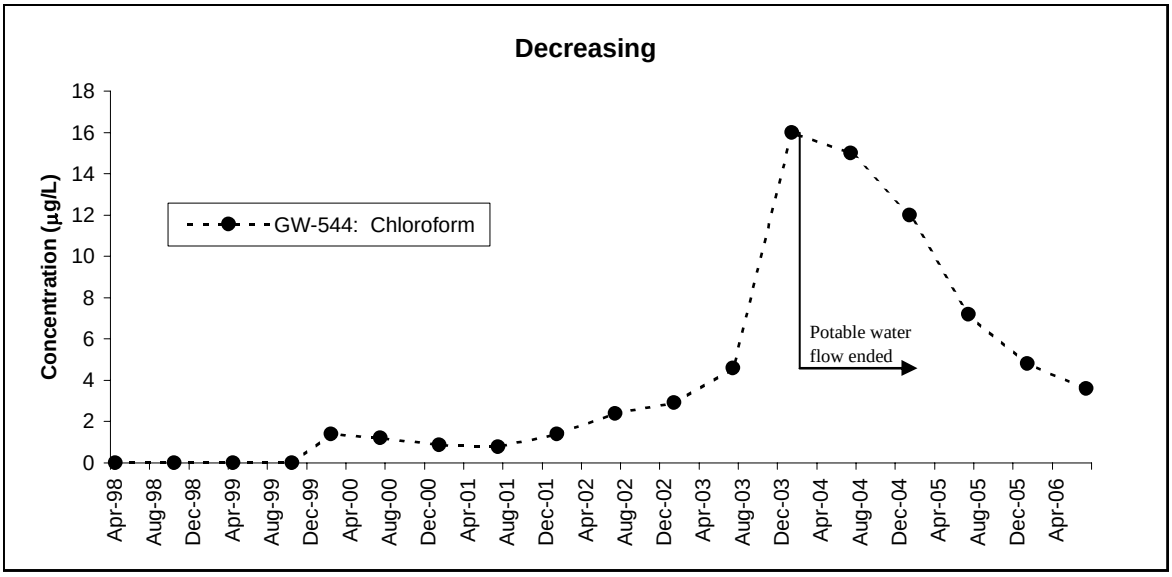


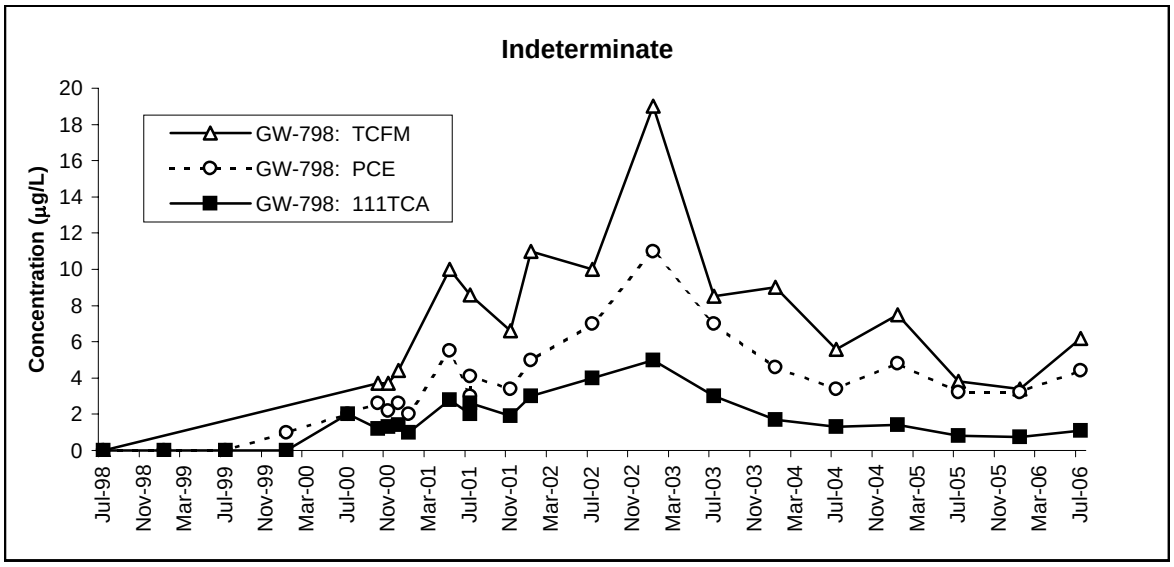


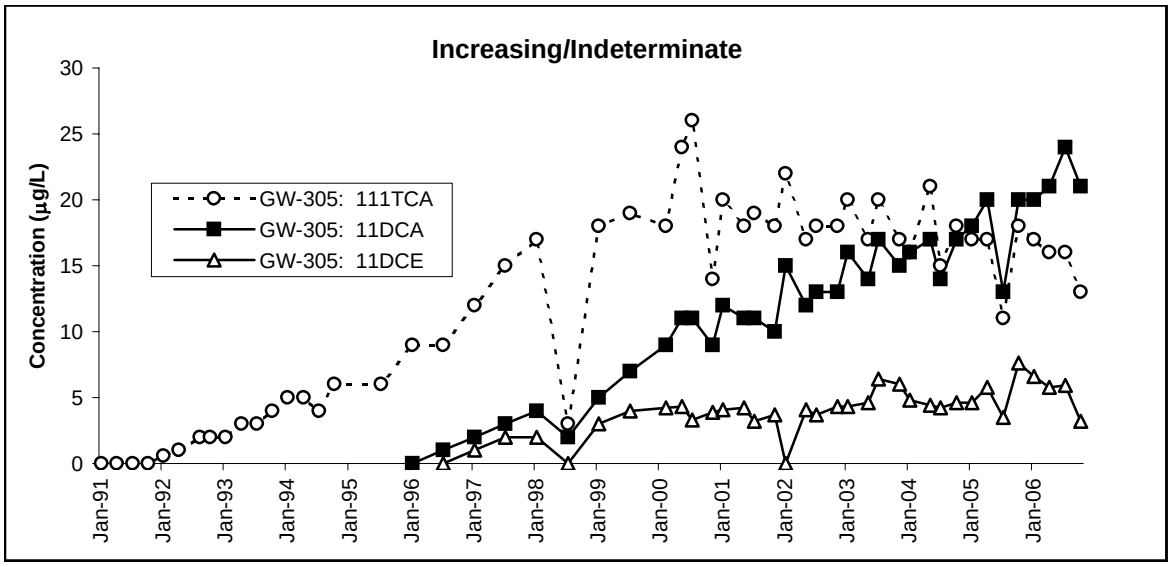


GWMR06 07/24/07

Fig. A.33. East Fork Regime CY 2006: gross alpha activity trends in surveillance monitoring aquifer wells GW-154, GW-253, and GW-605.

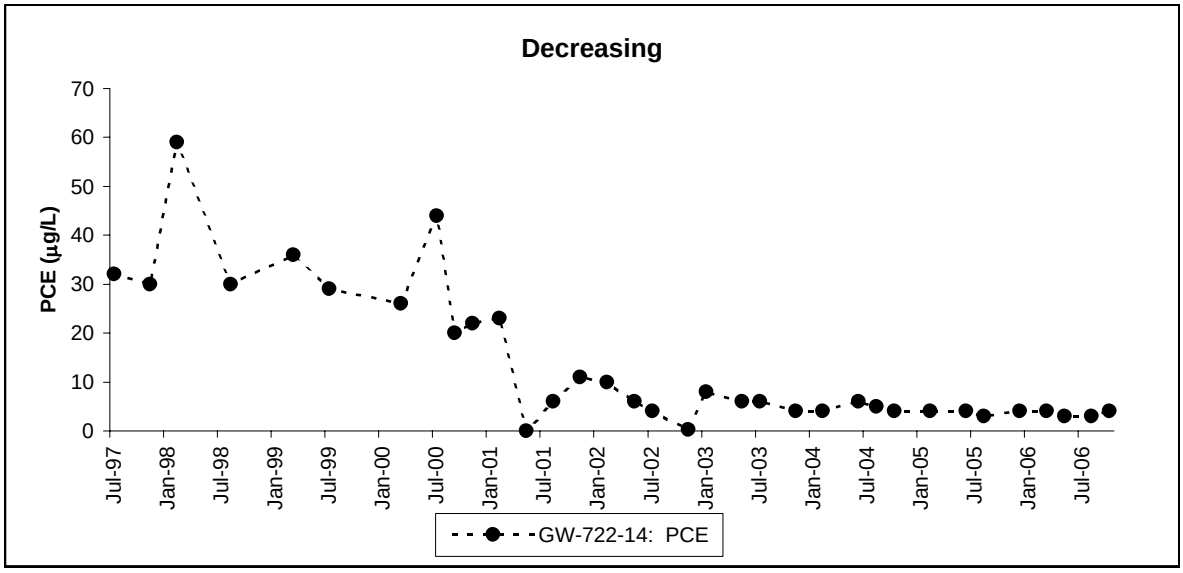


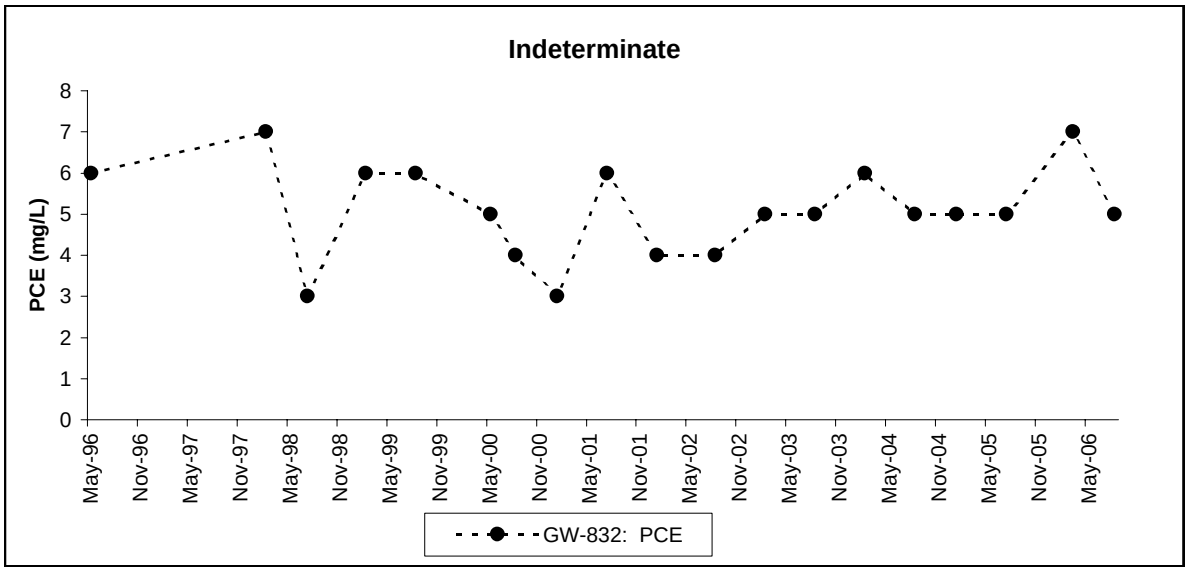


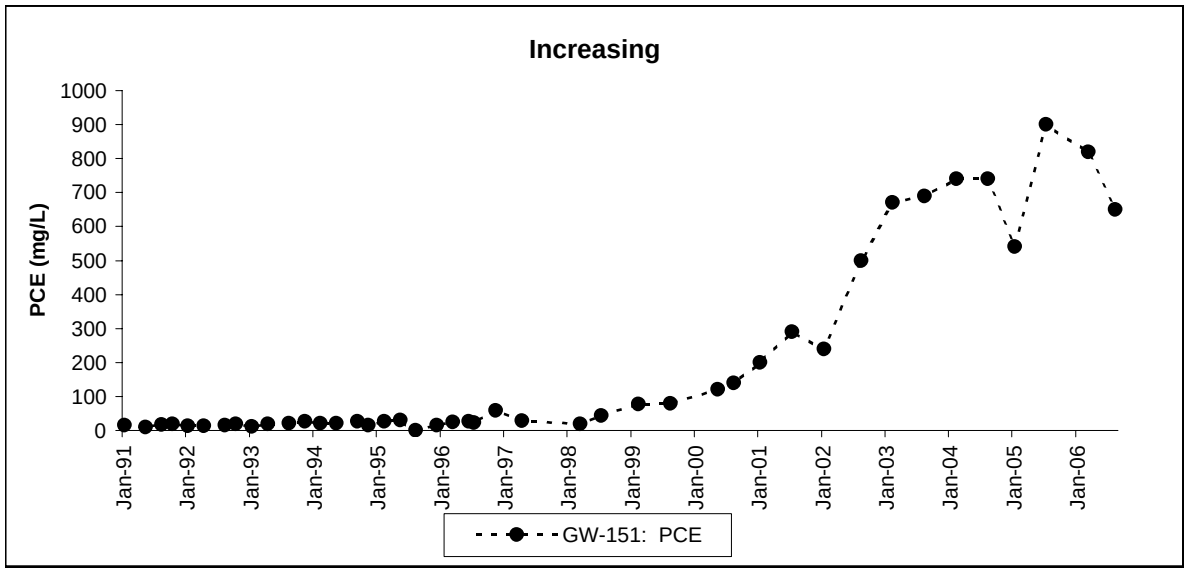


GWMR06 07/24/07

Fig. A.34. Chestnut Ridge Regime CY 2006: VOC trends in surveillance monitoring wells GW-305, GW-544, and GW-798.

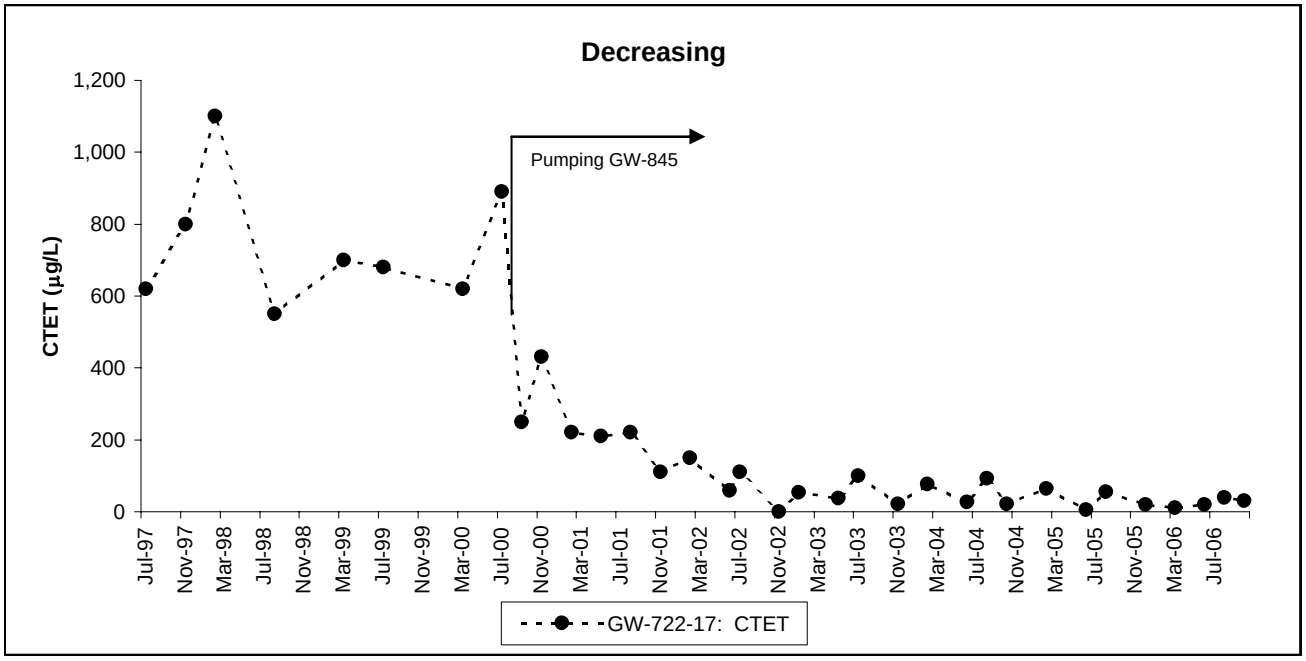






GWMR06 07/24/07

Fig. A.35. East Fork Regime CY 2006: PCE concentration trends in exit pathway monitoring wells GW-151, GW-722-14, and GW-832.



GWMR06 07/24/07

Fig. A.36. East Fork Regime CY 2006: CTET concentration trend in exit pathway monitoring well GW-722-17.

APPENDIX B

TABLES

Table B.1. Summary of CY 2006 sampling and analysis plan addenda

Addendum No.	Effective Date	Modification to the CY 2006 Sampling and Analysis Plan [1]
2006-01	02/01/06	Remove well 58-6A from sample group EF-6.
2006-02	02/14/06	Remove well GW-075 from sample group BC-2.
2006-03	02/01/06	Remove parameter group RAD(13) from all locations during CY 2006. Total U and weight % U-235 are not needed to meet waste acceptance criteria.
2006-04	03/08/06	Remove wells GW-786 and GW-787 from sample group EF-3.
2006-05	02/02/06	Drop parameter group VOC(2) for well GW-071 (BC-1) during the first quarter sampling event.
2006-06	05/17/06	Add parameter group METHANOL to wells 56-8A, GW-686, and GW-698 in sample group EF-6 during the second quarter sampling event.
2006-07	07/01/06	Add parameter group METHANOL to eight wells in sample group EF-1 and four wells in sample group EF-2 during the third quarter sampling event.
2006-08	10/01/06	Add well GW-629 in sample group BC-4 for the fourth quarter sampling event, analyze for the Standard Parameter Suite.
2006-09	10/01/06	Drop parameter group VOC(2) for well GW-269 (EF-6) for the fourth quarter sampling event.
2006-10	12/18/06	Drop sampling of well GW-629 (BC-4) for the fourth quarter sampling event. The well will be added to the first quarter sampling event of CY 2007.

Note:

1 Modification to the *Y-12 Groundwater Protection Program Groundwater and Surface Water Sampling and Analysis Plan for Calendar Year 2006* (BWXT 2006a).

Table B.2. CY 2006 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 2006 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
GW-008	OLF	01/03/06	.	07/05/06	.	x		●	
GW-014	BG	02/02/06	.	08/14/06	.	●			
GW-046	BG	01/04/06	.	07/05/06	.	x		●	
GW-058	BG	.	06/12/06	.	.	●			
GW-068	BG	.	06/08/06	.	.	●			
GW-071	BG	02/02/06	.	08/14/06	.	●			
GW-077	BG	03/07/06	.	07/26/06	.	x			●
GW-078	BG	03/07/06	.	07/26/06	.	x			●
GW-079	BG	03/07/06	.	07/26/06	.	x			●
GW-080	BG	**03/07/06 D**	.	**07/26/06 D**	.	x			●
GW-082	BG	.	06/05/06	.	.	●			
GW-085	OLF	**02/08/06 D**	.	08/22/06	.	●			
GW-098	OLF	02/14/06	.	.	.	●			
GW-122	S3	02/21/06	.	.	.	●			
GW-126	BG	.	06/06/06	.	.	●			
GW-225	OLF	02/07/06	.	**08/17/06 D**	.	●			
GW-226	OLF	02/07/06	.	08/17/06	.	●			
GW-229	OLF	02/16/06	.	.	.	●			
GW-246	S3	02/08/06	.	08/21/06	.	●			
GW-257	BG	.	06/07/06	.	.	●			
GW-276	S3	01/04/06	.	07/06/06	.	x		●	
GW-289	BG	.	06/07/06	.	.	●			
GW-310	RS	.	.	**09/06/06 D**	.	●			
GW-311	RS	.	.	09/06/06	.	●			
GW-315	SPI	02/16/06	.	.	.	●			
GW-363	EMWMF	02/15/06	04/24/06	08/14/06	11/13/06	x			□
GW-526	S3	03/07/06	.	07/25/06	.	x			●
GW-537	OLF	02/15/06	.	.	.	●			
GW-615	S3	02/21/06	.	.	.	●			
GW-616	S3	**02/22/06 D**	.	.	.	●			
GW-626	BG	02/06/06	.	08/15/06	.	●			
GW-627	BG	02/06/06	.	08/15/06	.	●			
GW-629	BG	.	**06/08/06 D**	.	.	●			
GW-639	EMWMF	02/16/06	04/19/06	08/08/06	11/08/06	x			□
GW-653	BG	.	06/05/06	.	.	●			

Table B.2 (continued)

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 2006 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
GW-683	EXP-A	03/08/06	.	08/07/06	.	x			●
GW-684	EXP-A	03/08/06	.	07/24/06	.	x			●
GW-694	EXP-B	.	.	08/23/06	.	●			
GW-695	EXP-B	.	.	08/23/06	.	●			
GW-703	EXP-B	.	.	08/30/06	.	●			
GW-704	EXP-B	03/08/06	.	07/31/06	.	●			
GW-706	EXP-B	03/29/06	.	08/01/06	.	●			
GW-712	EXP-W	01/03/06	.	07/05/06	.		x	●	
GW-713	EXP-W	**01/03/06 D**	.	**07/05/06 D**	.		x	●	
GW-714	EXP-W	01/03/06	.	07/05/06	.		x	●	
GW-724	EXP-C	.	.	08/28/06	.	●			
GW-725	EXP-C	.	.	08/24/06	.	●			
GW-738	EXP-C	.	.	08/28/06	.	●			
GW-740	EXP-C	.	.	08/31/06	.	●			
GW-829	OLF	02/15/06	.	.	.	●			
GW-916	EMWMF	02/23/06	04/18/06	08/10/06	11/13/06	x			□
GW-917	EMWMF	02/16/06	04/18/06	08/10/06	11/06/06	x			□
GW-918	EMWMF	03/01/06	04/18/06	08/09/06	11/13/06	x			□
GW-920	EMWMF	02/27/06	04/18/06	08/09/06	11/09/06	x			□
GW-921	EMWMF	02/21/06	04/24/06	08/09/06	11/07/06	x			□
GW-922	EMWMF	02/21/06	04/18/06	08/09/06	11/14/06	x			□
GW-923	EMWMF	02/27/06	04/24/06	Dry	11/14/06	x			□
GW-924	EMWMF	**02/27/06 D**	**04/20/06 D**	**08/14/06 D**	**11/06/06 D**	x			□
GW-925	EMWMF	02/21/06	04/19/06	08/09/06	11/07/06	x			□
GW-926	EMWMF	02/28/06	04/20/06	08/14/06	11/06/06	x			□
GW-927	EMWMF	02/16/06	04/19/06	08/09/06	11/07/06	x			□
BCK-03.30	EXP-SW	02/28/06	.	08/17/06	.		x		●
BCK-04.55	EXP-SW	.	04/19/06	.	.		●		
BCK-07.87	EXP-SW	02/28/06	.	08/17/06	.		x		●
BCK-09.20	EXP-SW	02/28/06	.	08/16/06	.		x		●
BCK-09.47	EXP-SW	02/28/06	.	08/16/06	.		x		●
BCK-11.54	EXP-SW	02/28/06	.	08/16/06	.		x		●
BCK-11.84	EXP-SW	02/28/06	.	08/16/06	.		x		●
BCK-12.34	EXP-SW	02/27/06	05/25/06	08/01/06	.		x		●
BCK-12.34	EXP-SW	02/28/06	.	08/16/06	.		x		●
BCK-12.47	EXP-SW	02/27/06	05/25/06	08/01/07	.		x		●

Table B.2 (continued)

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 2006 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
EMWNT-03A	EXP-SW	02/14/06	04/17/06	Dry	11/07/06		x		□
EMWNT-05	EXP-SW	02/14/06	04/17/06	08/16/06	11/07/06		x		□
EMW-VWEIR	EXP-SW	02/14/06	04/17/06	08/16/06	11/07/06		x		□
EMW-VWUND	EXP-SW	02/27/06	04/20/06	08/16/06	11/14/06		x		□
NT-01	EXP-SW	.	04/19/06	.	.		●		
NT-01	EXP-SW	03/01/06	.	.	.		x		●
NT-01	EXP-SW	02/27/06	05/25/06	08/01/06	.		x		●
NT-03	EXP-SW	03/01/06	.	08/16/06	.		x		●
NT-04	EXP-SW	02/14/06	04/17/06	08/16/06	11/07/06		x		□
NT-07	EXP-SW	02/28/06	.	08/17/06	.		x		○
NT-08	EXP-SW	02/28/06	.	08/17/06	.		x		○
S07(NT-02)	EXP-SW	02/28/06	.	08/17/06	.		x		●
SS-1	EXP-SW	.	04/19/06	.	.		●		
SS-4	EXP-SW	.	**04/19/06 D**	.	.		●		
SS-4	EXP-SW	.	**04/19/06 D**	**08/01/06 D**	.		x		●
SS-5	EXP-SW	.	04/19/06	.	.		●		
SS-5	EXP-SW	02/28/06	.	08/16/06	.		x		●
SS-6	EXP-SW	03/13/06	.	07/05/06	.		x	●	
SS-6.6	EXP-SW	02/28/06	.	08/17/06	.		x		●
SS-7	EXP-SW	02/28/06	.	08/17/06	.		x		●
SS-8	EXP-SW	**02/28/06 D**	.	**08/17/06 D**	.		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 2006 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.

Notes: **(continued)**

3	BCK	-	Bear Creek Kilometer
	EMW-VWUND	-	EMW-VWUNDRDRAIN; outfall for an underdrain installed to lower the water table and relieve hydrostatic pressure beneath the EMWMF liners.
	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	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
	Dry	-	Insufficient water volume for sample collection
	D	-	Duplicate sample collected on specified date

Table B.3. CY 2006 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 2006 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
55-1A	GRID B2	03/07/06	.	.	.	●			
55-2A	GRID B3	02/23/06	.	07/18/06	.	●			
55-2B	GRID B3	02/23/06	.	07/18/06	.	●			
55-2C	GRID B3	02/23/06	.	07/18/06	.	●			
55-3A	B9201-5	**03/01/06 D**	.	07/24/06	.	●			
55-3B	B9201-5	03/01/06	.	07/24/06	.	●			
55-3C	B9201-5	03/01/06	.	07/24/06	.	●			
56-1A	Y12	.	05/22/06	.	10/12/06	●			
56-2A	GRID C3	02/28/06	.	07/27/06	.	●			
56-2B	GRID C3	02/28/06	.	07/27/06	.	●			
56-2C	GRID C3	02/28/06	.	07/27/06	.	●			
56-3A	Y12	03/06/06	.	07/25/06	.	●			
56-3B	Y12	03/06/06	.	**07/25/06 D**	.	●			
56-3C	Y12	03/06/06	.	07/25/06	.	●			
56-4A	Y12	03/02/06	.	07/26/06	.	●			
56-6A	Y12	03/02/06	.	07/26/06	.	●			
56-8A	Y12	.	05/23/06	.	10/12/06	●			
60-1A	Y12	.	**06/15/06 D**	.	10/31/06	●			
GW-105	S3	.	05/09/06	.	.	●			
GW-106	S3	.	05/09/06	.	.	●			
GW-108	S3	01/05/06	.	07/31/06	.	**x**		●	
GW-109	S3	.	05/10/06	.	.	●			
GW-148	NHP	01/19/06	.	.	.	●			
GW-151	NHP	03/06/06	.	08/07/06	.		**x**		●
GW-153	NHP	01/18/06	.	.	.	●			
GW-154	NHP	03/07/06	.	08/07/06	.	**x**			●
GW-169	EXP-UV	03/07/06	05/23/06	08/02/06	.	**x**			●
GW-170	EXP-UV	**03/07/06 D**	**05/23/06 D**	**08/02/06 D**	.	**x**			●
GW-171	EXP-UV	03/08/06	.	.	.	**x**			●
GW-172	EXP-UV	03/08/06	.	.	.	**x**			●
GW-192	B4	.	**05/11/06 D**	.	.	●			
GW-193	T2331	01/05/06	.	07/06/06	.	**x**		●	
GW-204	T0134	.	.	.	11/09/06	●			
GW-220	NHP	.	06/21/06	.	11/06/06		●		
GW-223	NHP	03/06/06	.	08/07/06	.	**x**			●
GW-230	EXP-UV	03/08/06	.	.	.	**x**			●

Table B.3 (continued)

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 2006 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
GW-232	EXP-UV	03/07/06	05/23/06	08/03/06	.	x			●
GW-240	NHP	**01/18/06 D**	.	.	.	●			
GW-251	S2	.	05/16/06	.	.	●			
GW-253	S2	03/09/06	.	.	.	x			○
GW-265	SY	.	06/01/06	.	10/10/06	●			
GW-269	SY	.	06/01/06	.	10/10/06	●			
GW-274	SY	03/27/06	.	.	.	●			
GW-275	SY	03/27/06	.	.	.	●			
GW-281	FF	.	05/22/06	.	.	x			○
GW-332	WCPA	03/08/06	.	.	.	●			
GW-336	WCPA	**03/08/06 D**	.	.	.	●			
GW-337	WCPA	03/07/06	.	.	.	●			
GW-380	NHP	.	05/31/06	.	.	x			●
GW-381	NHP	.	.	08/02/06	.	●			
GW-382	NHP	03/07/06	.	08/08/06	.	x			●
GW-383	NHP	.	06/21/06	.	11/06/06	●			
GW-605	EXP-I	**01/05/06 D**	.	**07/06/06 D**	.	x		●	
GW-606	EXP-I	01/05/06	.	07/06/06	.	x		●	
GW-617	EXP-E	.	05/16/06	.	.	●			
GW-618	EXP-E	03/09/06	.	.	.	x			○
GW-619	FTF	.	05/15/06	.	.	●			
GW-620	FTF	.	05/15/06	.	.	●			
GW-633	RG	.	05/10/06	.	.	●			
GW-656	T0134	.	.	.	**11/14/06 D**	●			
GW-658	FF	.	05/24/06	.	.	x			○
GW-686	CPT	.	06/06/06	.	10/19/06	●			
GW-690	CPT	.	.	.	11/14/06	●			
GW-691	CPT	.	.	.	11/16/06	●			
GW-692	CPT	.	.	.	11/30/06	●			
GW-698	B8110	.	**05/23/06 D**	.	10/19/06	●			
GW-700	B8110	.	.	.	11/09/06	●			
GW-722-06	EXP-J	.	.	08/08/06	.		●		
GW-722-10	EXP-J	.	.	08/10/06	.		●		
GW-722-14	EXP-J	.	.	08/15/06	.		●		
GW-722-14	EXP-J	03/13/06	05/31/06	.	10/30/06		x		●
GW-722-17	EXP-J	.	.	08/15/06	.		●		
GW-722-17	EXP-J	03/13/06	06/01/06	.	10/30/06		x		●

Table B.3 (continued)

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 2006 Sampling Date [5]							
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter				
GW-722-20	EXP-J	.	.	08/14/06	.		●		
GW-722-20	EXP-J	03/14/06	**05/31/06 D**	.	**10/30/06 D**		**x**		●
GW-722-22	EXP-J	.	.	08/10/06	.		●		
GW-722-22	EXP-J	03/14/06	05/31/06	.	10/30/06		**x**		●
GW-722-26	EXP-J	.	.	08/09/06	.		●		
GW-722-30	EXP-J	.	.	08/09/06	.		●		
GW-722-32	EXP-J	.	.	08/09/06	.		●		
GW-722-33	EXP-J	.	.	**08/10/06 D**	.		●		
GW-722-33	EXP-J	03/14/06	05/31/06	.	10/30/06		**x**		●
GW-733	EXP-J	01/04/06	.	07/06/06	.		**x**	●	
GW-744	GRID K1	01/11/06	.	.	.		●		
GW-747	GRID K2	01/11/06	.	.	.		●		
GW-748	GRID K2	01/10/06	.	.	.		●		
GW-749	GRID K2	01/10/06	.	.	.		●		
GW-762	GRID J3	**03/06/06 D**	.	**08/07/06 D**	.	**x**			●
GW-763	GRID J3	.	.	08/02/06	.	●			
GW-769	GRID G3	.	06/19/06	.	10/30/06	●			
GW-770	GRID G3	.	06/19/06	.	**10/30/06 D**	●			
GW-781	GRID E3	.	.	.	11/08/06	●			
GW-782	GRID E3	.	.	.	11/13/06	●			
GW-783	GRID E3	.	.	.	11/13/06	●			
GW-791	GRID D2	.	.	08/01/06	.	●			
GW-792	GRID D2	.	.	**08/03/06 D**	.	●			
GW-802	FF	.	05/22/06	.	.	**x**			○
GW-816	EXP-SR	01/19/06	.	.	.		●		
GW-820	B9201-2	.	06/20/06	.	11/02/06	●			
GW-832	NHP	03/06/06	.	08/03/06	.		**x**		●
GW-954-1	Y12	.	06/13/06	.	10/25/06	●			
GW-954-2	Y12	.	06/13/06	.	**10/25/06 D**	●			
GW-954-3	Y12	.	06/13/06	.	10/25/06	●			
GW-956-1	Y12	.	06/14/06	.	10/24/06	●			
GW-956-2	Y12	.	06/14/06	.	10/24/06	●			
GW-956-3	Y12	.	06/14/06	.	10/24/06	●			
GW-956-4	Y12	.	06/14/06	.	10/24/06	●			
GW-959	B9201-2	.	06/20/06	.	10/31/06	●			
GHK2.51WSW	EXP-SW	.	04/24/06	.	.		●		
NPR07.0SW	EXP-SW	.	04/24/06	.	.		●		

Table B.3 (continued)

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 2006 Sampling Date [5]**							
		1st Quarter	**2nd Quarter**	**3rd Quarter**	**4th Quarter**				
NPR12.0SW	EXP-SW	.	04/24/06	.	.		●		
NPR23.0SW	EXP-SW	.	04/24/06	.	.		●		
SP-17	EXP-SW	.	**04/24/06 D**	.	.		●		
OF 51	EXP-SW	02/15/06	.	09/14/06	.		**x**		●
OF 200	EXP-SW	02/15/06	.	09/14/06	.		**x**		●
SCR7.1SP	EXP-SW	02/13/06	.	.	.		**x**		●
SCR7.8SP	EXP-SW	02/13/06	.	.	.		**x**		●
STATION 17	EXP-SW	02/15/06	.	09/14/06	.		**x**		●
STATION 8	EXP-SW	02/15/06	.	09/14/06	.		**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 2006 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
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)

Table B.3 (continued)

Notes: (continued)

4	B4	-	Beta-4 Security Pit
	B8110	-	Building 81-10
	B9201-2	-	Building 9201-2
	B9201-5	-	Building 9201-5
	CPT	-	Coal Pile Trench
	EXP-E	-	Exit Pathway Picket E
	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
	SY	-	Y-12 Salvage Yard
	T0134	-	Tank 0134-U
	T2331	-	Tank 2331-U
	WCPA	-	Waste Coolant Processing Area
	Y12	-	Y-12 Complex
5	**.**	-	Not sampled.
	D	-	Duplicate sample collected on specified date (shown in bold typeface).

Table B.4. CY 2006 groundwater and surface water sampling dates in the Chestnut Ridge Hydrogeologic Regime

BJC [1]		Solid Waste Disposal Facility Detection Monitoring								
		RCRA Post-Closure Detection (●) and Corrective Action (○) Monitoring								
		CERCLA ROD (●) and Baseline (○) Monitoring								
GWPP [2]		DOE Order Exit Pathway/Perimeter Monitoring								
		DOE Order Surveillance Monitoring								
Sampling Point [3]	Functional Area [4]	CY 2006 Sampling Date [5]								
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter					
1090	UNCS	03/01/06	.	07/20/06	.	x		●		
GW-141	LIV	01/12/06	.	07/11/06	.	x				●
GW-143	KHQ	.	04/06/06	.	10/16/06	x			●	
GW-144	KHQ	.	04/06/06	.	10/16/06	x			●	
GW-145	KHQ	.	04/10/06	.	10/12/06	x			●	
GW-156	CRSDB	.	**04/11/06 D**	.	**10/16/06 D**	x			●	
GW-159	CRSDB	.	04/11/06	.	10/16/06	x			●	
GW-175	CRSP	.	05/01/06	.	.	●				
GW-177	CRSP	03/06/06	.	07/06/06	.	x			○	
GW-178	CRSP	.	05/02/06	.	.	●				
GW-203	UNCS	03/01/06	.	07/25/06	.	x		●		
GW-205	UNCS	03/02/06	.	07/24/06	.	x		●		
GW-217	LIV	01/10/06	.	07/11/06	.	x				●
GW-221	UNCS	03/01/06	.	07/25/06	.	x		●		
GW-231	KHQ	.	**04/10/06 D**	.	**10/12/06 D**	x			●	
GW-301	CRBAWP	**01/09/06 D**	.	**07/10/06 D**	.	x			○	
GW-305	LIV	01/09/06	04/12/06	07/11/06	10/31/06	x				●
GW-322	CRSP	.	05/08/06	.	.	●				
GW-514	FCAP	.	05/01/06	.	.	●				
GW-521	LIV	01/09/06	.	07/10/06	.	x				●
GW-522	LIV	01/09/06	.	07/10/06	.	x				●
GW-540	LII/CDLVI	01/18/06	.	07/18/06	.	x				●
GW-542	CDLVI	**01/17/06 D**	.	**07/17/06 D**	.	x				●
GW-543	CDLVI	01/18/06	.	07/17/06	.	x				●
GW-544	CDLVI	01/18/06	.	07/18/06	.	x				●
GW-557	LV	01/10/06	.	07/13/06	.	x				●
GW-560	CDLVII	01/12/06	.	07/17/06	.	x				●
GW-562	CDLVII	01/17/06	.	07/17/06	.	x				●
GW-564	CDLVII	**01/12/06 D**	.	**07/13/06 D**	.	x				●
GW-609	CRSP	.	**05/02/06 D**	.	.	●				
GW-612	CRSP	.	05/03/06	.	.	●				
GW-709	LII	01/11/06	.	07/18/06	.	x				●

Table B.4 (continued)

BJC [1]		Solid Waste Disposal Facility Detection Monitoring								
		RCRA Post-Closure Detection (●) and Corrective Action (○) Monitoring								
		CERCLA ROD (●) and Baseline (○) Monitoring								
GWPP [2]		DOE Order Exit Pathway/Perimeter Monitoring								
		DOE Order Surveillance Monitoring								
Sampling Point [3]	**Functional Area [4]**	**CY 2006 Sampling Date [5]**								
		1st Quarter	**2nd Quarter**	**3rd Quarter**	**4th Quarter**					
GW-731	CRSDB	.	04/11/06	.	10/19/06	**x**			●	
GW-732	CRSDB	.	04/06/06	.	10/19/06	**x**			●	
GW-757	LII	01/11/06	.	07/11/06	.	**x**				●
GW-796	LV/CDLVII	01/11/06	.	07/12/06	.	**x**				●
GW-797	LV	01/23/06	.	07/12/06	.	**x**				●
GW-798	CDLVII	01/12/06	.	07/13/06	.	**x**				●
GW-799	LV	01/10/06	.	07/12/06	.	**x**				●
GW-801	LV	01/11/06	.	07/12/06	.	**x**				●
GW-827	CDLVI	01/17/06	.	07/17/06	.	**x**				●
GW-831	FCAP	01/09/06	.	07/10/06	.	**x**			○	
MCK 2.0	FCAP	02/13/06	.	09/11/06	.		**x**	●		
MCK 2.05	FCAP	**02/13/06 D**	.	**09/11/06 D**	.		**x**	●		
S17	EXP-SW	.	04/20/06	.	.		●			
SCR1.25SP	EXP-SW	02/13/06	.	09/12/06	.		**x**	○		
SCR1.5SW	EXP-SW	.	04/20/06	.	.		●			
SCR2.1SP	EXP-SW	.	04/20/06	.	.		●			
SCR2.2SP	EXP-SW	.	**04/20/06 D**	.	.		●			
SCR3.5SP	EXP-SW	02/13/06	.	09/12/06	.		**x**	○		
SCR3.5SW	EXP-SW	.	04/20/06	.	.		●			
SCR4.3SP	EXP-SW	01/10/06	.	07/18/06	.		**x**			●

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 2006 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.4 (continued)

Notes: **(continued)**

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.
	D	-	Duplicate sample collected on specified date (shown in bold typeface).

Table B.5. Field measurements and laboratory analytes for CY 2006 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	Celsius
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
Anions			
Carbonate	EPA-310.1	1.0	mg/L
Bicarbonate	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
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
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

Table B.5 (continued)

Metals/Cations (continued)	Analytical Method [1]	Reporting Limit [2]	Units [3]
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
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

Table B.5 (continued)

Volatile Organic Compounds (cont'd)	Analytical Method [1]	CRQL [4]	Units [3]
1,4-Dioxane	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
Methanol	SW846-8015A	5,000	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
Total Xylene	SW846-8260B UP	5	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

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

Table B.5 (continued)

Notes: (continued)

3 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 2006

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	09/11/06	18.92	962.08
GW-008	OLF			965.39	09/18/06	16.35	949.04
GW-010	OLF			952.70	09/18/06	2.92	949.78
GW-012	OLF			955.57	09/18/06	7.96	947.61
GW-013	OLF			965.14	09/12/06	7.56	957.58
GW-014	BG			934.50	09/12/06	8.28	926.22
GW-016	BG			928.81	09/12/06	11.82	916.99
GW-018	BG			924.49	09/12/06	11.41	913.08
GW-041	BG			1008.10	09/12/06	26.40	981.70
GW-045	BG	●		910.29	09/12/06	17.70	892.59
GW-046	BG			921.17	09/12/06	5.96	915.21
GW-047	BG			929.00	09/12/06	10.55	918.45
GW-052	BG	●		905.70	09/11/06	17.92	887.78
GW-053	BG			903.42	09/11/06	11.35	892.07
GW-065	OLF			982.50	09/11/06	28.99	953.51
GW-084	OLF			997.18	09/13/06	17.19	979.99
GW-086	OLF			982.80	09/13/06	15.78	967.02
GW-090	BG			961.88	09/13/06	7.75	954.13
GW-091	BG			952.62	09/13/06	9.35	943.27
GW-097	OLF			945.41	09/13/06	11.60	933.81
GW-100	S3			987.40	09/13/06	6.29	981.11
GW-101	S3			1007.40	09/13/06	9.63	997.77
GW-115	S3			1055.01	09/13/06	14.22	1040.79
GW-127	S3			1005.90	09/13/06	14.74	991.16
GW-236	S3			983.21	09/14/06	12.18	971.03
GW-242	BG			978.69	09/18/06	7.38	971.31
GW-245	S3			1009.08	09/19/06	13.66	995.42
GW-249	BG			991.15	09/18/06	37.90	953.25
GW-257	BG			961.68	09/19/06	29.87	931.81
GW-276	S3			1001.57	09/19/06	6.72	994.85
GW-287	BG			927.04	09/18/06	9.77	917.27
GW-289	BG			948.73	09/19/06	19.25	929.48
GW-291	BG			948.66	09/19/06	12.02	936.64
GW-307	RS			993.14	09/18/06	33.90	959.24
GW-309	RS			988.17	09/18/06	22.08	966.09
GW-310	RS			995.52	09/18/06	23.08	972.44
GW-316	SPI			1047.17	09/19/06	60.74	986.43
GW-323	SPI			1130.11	09/19/06	86.05	1044.06
GW-325	S3			1003.00	09/19/06	18.43	984.57

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-345	S3			999.63	09/19/06	21.24	978.39
GW-347	S3	●		1001.05	09/19/06	19.63	981.42
GW-370	BG			960.81	09/19/06	16.90	943.91
GW-372	BG			983.16	09/19/06	25.85	957.31
GW-531	LD			1004.61	09/19/06	19.91	984.70
GW-537	OLF			976.65	09/19/06	8.51	968.14
GW-613	S3			1013.58	09/20/06	16.90	996.68
GW-621	EXP-B			925.44	09/20/06	18.30	907.15
GW-622	BG			924.16	09/20/06	16.58	907.58
GW-624	BG			922.15	09/20/06	0.13	909.15
GW-630	LD			986.65	09/20/06	10.61	976.04
GW-638	OLF			941.77	09/20/06	9.55	932.22
GW-641	BG			946.66	09/20/06	21.90	924.76
GW-642	BG			1014.95	09/20/06	23.25	991.70
GW-645	OLF	●		1006.40	09/20/06	80.56	925.84
GW-648	RS	●		1029.20	09/20/06	70.84	958.36
GW-652	BG	●		900.83	09/20/06	12.40	888.43
GW-653	BG			931.84	09/20/06	25.50	906.34
GW-654	BG			940.79	09/20/06	8.90	931.89
GW-795	AGLLSF			926.18	09/18/06	9.40	916.78
GW-835	S3			1000.91	09/21/06	14.91	1000.99
GW-916	EMWMF			1002.85	09/21/06	7.47	995.38
GW-917	EMWMF			997.10	09/21/06	24.60	972.50
GW-918	EMWMF			1067.96	09/21/06	6.11	1061.85
GW-923	EMWMF			1016.73	09/21/06	33.60	983.13
GW-924	EMWMF			968.90	09/21/06	12.20	956.70

Notes:

1 AGLLSF - Above Grade Low-Level 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

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.7 Depth-to-water measurements and groundwater elevations in the Upper East Fork Poplar Creek Hydrogeologic Regime, September 2006

Well Number	Location [1]	Hydrogeologic Unit		Measuring Point [2]	Date Measured	Depth to Water [3]	Groundwater Elevation [4]
		Aquifer	Aquitard				
55-1A	Y12			986.91	09/11/06	10.90	976.01
55-3A	Y12			972.46	09/11/06	11.94	960.52
55-6A	Y12			989.29	09/11/06	10.93	978.36
56-1A	Y12			969.25	09/11/06	7.61	961.64
56-2A	Y12			963.53	09/11/06	8.67	954.86
56-8A	Y12			962.46	09/11/06	20.37	942.09
60-1A	Y12			929.66	09/11/06	12.08	917.58
GW-105	S3			1018.20	09/13/06	9.15	1009.05
GW-108*	S3			999.00	09/13/06	6.72	992.28
GW-115	S3			1055.01	09/13/06	14.22	1040.79
GW-148	NHP			907.76	09/13/06	8.76	899.00
GW-152	NHP			921.18	09/13/06	20.07	901.11
GW-154	NHP			911.70	09/13/06	9.98	901.72
GW-167	EXP			931.95	09/13/06	31.90	900.05
GW-169	EXP-UV			932.12	09/13/06	32.77	899.35
GW-192	B4			1008.83	09/14/06	6.11	1002.72
GW-193	T2331			934.17	09/18/06	9.51	924.66
GW-195	B4			1002.90	09/14/06	7.37	995.53
GW-199	GRIDI1			961.08	09/14/06	17.81	943.27
GW-202	RDS			968.02	09/14/06	10.49	957.53
GW-204	T0134			958.74	09/14/06	8.62	950.12
GW-219	UOV			935.83	09/14/06	11.98	923.85
GW-253	S2			1004.24	09/19/06	25.66	978.58
GW-255	S2			1027.13	09/18/06	51.71	975.42
GW-261	SY			1049.99	09/18/06	19.40	1030.59
GW-263	SY			1057.73	09/18/06	31.88	1025.85
GW-334	WC			983.73	09/19/06	11.65	972.08
GW-335	WC			981.88	09/19/06	9.84	972.04
GW-349	S2			993.50	09/19/06	6.00	987.50
GW-380	NHP			913.55	09/19/06	11.48	902.07
GW-383	NHP			908.77	09/19/06	9.50	899.27
GW-605	EXP-I			919.06	09/19/06	11.47	907.59
GW-606	EXP-I			919.59	09/19/06	14.25	905.34
GW-617	EXP-E			985.28	09/20/06	14.58	970.70
GW-619	FTF			1015.42	09/20/06	27.76	987.66
GW-686	CPT			963.76	09/20/06	13.04	950.72
GW-691	CPT			968.59	09/20/06	12.46	956.13
GW-733	EXP-J			959.84	09/19/06	59.95	899.89

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-746	GRIDK1			906.88	09/21/06	9.24	897.64
GW-752	GRIDJ3			912.78	09/21/06	4.55	908.23
GW-754	GRIDJ2			928.78	09/21/06	12.83	915.95
GW-756	GRIDJ1			928.11	09/21/06	6.75	921.36
GW-759	GRIDG1			994.01	09/21/06	18.94	975.07
GW-761	GRIDG2			968.23	09/21/06	12.37	955.86
GW-763	GRIDJ3			915.03	09/21/06	9.60	905.43
GW-765	GRIDE1			1008.54	09/21/06	19.50	989.04
GW-767	GRIDI2			948.54	09/21/06	12.67	935.87
GW-770	GRIDG3			944.72	09/21/06	14.72	930.00
GW-774	GRIDH2			963.16	09/21/06	16.85	946.31
GW-776	GRIDH3			931.25	09/21/06	15.40	915.85
GW-783	GRIDE3			948.49	09/21/06	10.69	937.80
GW-792	GRIDD2			992.74	09/18/06	25.85	966.89
GW-816	EXP-SR			898.42	09/18/06	12.48	885.94
GW-960	GRID F2			963.26	09/21/06	12.45	950.81

Notes:

1
- B4 - Beta-4 Security Pits
- B8110 - Building 81-10
- B9201-2 - Building 9201-2
- 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

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.8 Depth-to-water measurements and groundwater elevations in the Chestnut Ridge Hydrogeologic Regime, September 2006

Well Number	Location [1]	Measuring Point [2]	Date Measured	Depth to Water [3]	Groundwater Elevation [4]
1082	ORSF	837.28	09/11/06	25.73	811.55
1084	ORSF	965.40	09/11/06	63.50	901.90
1090	UNCS	1104.48	09/25/06	58.05	1046.43
GW-141	LIV	1186.23	09/13/06	100.83	1085.40
GW-142	KHQ	971.15	09/13/06	140.41	830.74
GW-144	KHQ	913.54	09/18/06	83.27	830.27
GW-145	KHQ	840.24	09/18/06	9.48	830.76
GW-156	CRSDB	1049.28	09/18/06	143.81	905.47
GW-159	CRSDB	1051.38	09/18/06	119.03	932.35
GW-160	CRBAWP	1093.09	09/13/06	150.61	942.48
GW-173	CRSP	1115.00	09/13/06	156.23	958.77
GW-174	CRSP	1116.66	09/13/06	124.54	992.12
GW-175	CRSP	1084.19	09/18/06	126.50	957.69
GW-176	CRSP	1125.30	09/14/06	116.42	1008.88
GW-177	CRSP	1158.20	09/18/06	120.39	1037.81
GW-178	CRSP	1143.49	09/14/06	98.16	1045.33
GW-179	CRSP	1128.00	09/14/06	116.42	1011.58
GW-180	CRSP	1104.14	09/14/06	132.59	971.55
GW-184	RQ	927.63	09/14/06	111.00	816.63
GW-186	RQ	831.32	09/14/06	15.07	816.25
GW-188	RQ	837.09	09/14/06	20.54	816.55
GW-203	UNCS	1105.45	09/18/06	84.20	1021.25
GW-205	UNCS	1104.14	09/18/06	81.55	1022.59
GW-217	LIV	1177.03	09/14/06	118.65	1058.38
GW-221	UNCS	1106.16	09/18/06	81.14	1025.02
GW-231	KHQ	849.67	09/18/06	18.92	830.75
GW-241	CRSDB	982.84	09/14/06	54.29	928.55
GW-292	ECRWP	1073.00	09/18/06	116.08	956.92
GW-298	CRBAWP	1049.01	09/18/06	111.04	937.97
GW-299	CRBAWP	1053.86	09/18/06	103.04	950.82
GW-300	CRBAWP	1073.12	09/18/06	118.82	954.30
GW-301	CRBAWP	1086.55	09/19/06	136.38	950.17
GW-302	UNCS	1141.84	09/18/06	106.60	1035.24
GW-303	CRSDB	1007.16	09/18/06	89.27	917.89
GW-304	CRSDB	1045.49	09/18/06	118.32	927.17
GW-305	LIV	1183.72	09/19/06	129.25	1054.47
GW-322	CRSP	1134.98	09/19/06	164.86	970.12
GW-339	UNCS	1124.83	09/19/06	80.96	1043.87
GW-511	CRSP	1093.21	09/19/06	113.94	979.27
GW-512	FCAP	1001.54	09/19/06	31.53	970.01

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	09/19/06	90.07	1092.81
GW-522	LIV	1175.48	09/19/06	111.41	1064.07
GW-539	LII	1093.20	09/19/06	112.52	980.68
GW-541	CDLVI	1058.40	09/19/06	65.82	992.58
GW-542	CDLVI	1051.81	09/19/06	72.17	979.64
GW-543	CDLVI	1024.01	09/19/06	66.25	957.76
GW-544	CDLVI	1045.19	09/19/06	59.96	985.23
GW-546	CDLVI	1072.21	09/19/06	DRY	.
GW-557	LV	1081.36	09/19/06	125.03	956.33
GW-558	SSCR	981.42	09/19/06	52.68	928.74
GW-559	SSCR	1102.79	09/19/06	141.82	960.97
GW-560	CDLVII	949.05	09/19/06	51.52	897.53
GW-562	CDLVII	934.69	09/19/06	13.07	921.62
GW-564	CDLVII	938.07	09/19/06	12.43	925.64
GW-608	CRSP	1075.38	09/19/06	139.57	935.81
GW-609	CRSP	1112.31	09/19/06	170.39	941.92
GW-610	CRSP	1059.44	09/20/06	94.10	965.34
GW-611	CRSP	1048.38	09/20/06	109.20	939.18
GW-612	CRSP	1131.03	09/20/06	129.99	1001.04
GW-674	FCAP	883.79	09/20/06	10.58	873.21
GW-676	FCAP	846.50	09/20/06	6.43	840.07
GW-677	FCAP	1030.40	09/20/06	32.12	998.28
GW-678	FCAP	1000.70	09/20/06	28.03	972.67
GW-679	FCAP	1026.90	09/20/06	58.65	968.25
GW-680	FCAP	1001.50	09/20/06	32.44	969.06
GW-709	LII	906.81	09/18/06	30.13	876.68
GW-731	CRSDB	1049.38	09/19/06	125.55	923.83
GW-732	CRSDB	1064.29	09/19/06	158.08	906.21
GW-743	CRSP	1100.36	09/21/06	138.06	962.30
GW-757	LII	961.64	09/21/06	85.04	876.60
GW-796	LV	1052.62	09/19/06	85.01	967.61
GW-797	LV	1060.00	09/18/06	77.86	982.14
GW-798	CDLVII	1006.00	09/18/06	84.26	921.74
GW-799	LV	981.29	09/19/06	23.19	958.10
GW-801	LV	1097.16	09/19/06	117.97	979.19
GW-827	CDLVI	1051.60	09/21/06	45.93	1005.67
GW-831	FCAP	1091.29	09/19/06	131.69	959.60

Table B.8 (continued)

Notes:

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 2006 sampling locations in the Bear Creek Hydrogeologic Regime

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-008	●		.	.			.	.	.	.
GW-014	●		.	.			.	.	.	.
GW-046	●		.	.	○	○	○	○	.	.
GW-058		●	.		.	.	.	.	○	.
GW-068	●		.	.	,	,○	.	○	.	.
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-122		●		.	.	.	.	.	.	.
GW-126	●		.	.	.	.	.	.	.	.
GW-225		●		.	○	.	○	.	.	.
GW-226		●	○	.	○	.	○	.	.	.
GW-229		●	.			○	.	○		
GW-246	●		○	○		.	.	.	.	○
GW-257	●		.	.	○	.	.	.	.	.
GW-276	●					.	.	.		
GW-289	●		.	.	○	.	.	.	.	.
GW-310		●		.		.	.	.	.	.
GW-311		●	.	.	.	.	.	.	.	.
GW-315		●	.	.		.	.	.	.	.
GW-363	●		NA	.	.	NA	.	.	NA	NA
GW-526	●			.	.	.	.	.	.	○
GW-537	●		○	.	.	.	.	.	.	○
GW-615	●		○		.	.	.	.	.	○
GW-616	●		○	.	.	.	.	.	.	.
GW-626	●		.	.					.	.
GW-627	●		.	.			.	.	.	.
GW-629	●		.	.			.		.	.
GW-639	●		NA	.	.	NA	.	.	NA	NA
GW-653	●		.	.	○	.	.	.	.	.
GW-683		●	.	.	.	.	.	.	.	.
GW-684		●	.	.	.	.	.	.	.	.
GW-694		●	.		.	.	.	.	.	.

Table B.9 (continued)

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-695		●		.	○	.	.	.	○	.
GW-703		●	○	.		.	.	.	.	
GW-704		●	.	.		.	.	.	.	.
GW-706		●			○	.	.	.	○	○
GW-712		●	.	.	.	.	.	.	.	.
GW-713		●	.	.	R,Q	.	.	.	.	.
GW-714		●	.	.	.	.	.	.	.	.
GW-724		●	.	.	○	.	.	.	.	.
GW-725		●	○	.	○	.	.	.	.	.
GW-738		●		.		.	.	.	.	.
GW-740		●	.	.	○	.	.	.	.	.
GW-829	●			.	.	.	.	.	.	.
GW-916	●		NA	.	.	NA	.	.	NA	NA
GW-917	●		NA	.	.	NA	.	.	NA	NA
GW-918	●		NA	.	.	NA	.	.	NA	NA
GW-920	●		NA	.	.	NA	.	.	NA	NA
GW-921	●		NA	.	.	NA	.	.	NA	NA
GW-922	●		NA	.	.	NA	.	.	NA	NA
GW-923	●		NA	.	.	NA	.	.	NA	NA
GW-924	●		NA	.	.	NA	.	.	NA	NA
GW-925	●		NA	.	.	NA	.	.	NA	NA
GW-926	●		NA	.	.	NA	.	.	NA	NA
GW-927	●		NA	.	.	NA	.	.	NA	NA
BCK-03.30	.	.	.	.	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
BCK-12.47	.	.	NA	○	NA	NA	NA	NA	NA	NA
EMWNT-03A	.	.	NA	.	.	.	.	.	.	.
EMWNT-05	.	.	NA	.	.	.	.	.	.	.
EMW-VWEIR	.	.	NA	.	.	.	.	.	NA	NA
EMW-VWUND	.	.	NA	.	.	NA	.	.	NA	NA
NT-01	.	.	○			.	.	.	○	○
NT-02 (S07)	.	.	○	.	NA	NA	NA	NA	NA	NA
NT-03	.	.	.	NA	.	.	.	.	NA	NA

Table B.9 (continued)

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
NT-04	.	.	NA	.	.	NA	.	.	NA	NA
NT-07	.	.	.	.			.	.	NA	NA
NT-08	.	.	.			.	.	.	NA	NA
SS-1	.	.	.	.	.	.	.	.	.	.
SS-4	.	.	○	○	○	.	.	.	○	○
SS-5	.	.	.	○	.	.	.	.	.	.
SS-6	.	.	.	.	.	.	.	.	.	.
SS-6.6	.	.	.	.	.	.	.	.	NA	.
SS-7	.	.	.	.	NA	NA	NA	NA	NA	.
SS-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 - Monitoring 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
R,Q - Results not detected in duplicate sample, and inconsistent with historical data: elevated VOCs at GW-713 (not detected in January 2007).
○ - 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 2006 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 2006 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 2006 gross alpha activity greater than or equal to 15 pCi/L.
Maximum CY 2006 gross beta activity greater than or equal to 50 pCi/L.

Table B.10 Concentration trends for the principal contaminants detected at CY 2006 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime

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
55-1A	●		.	.	.	.	.	.	.	.
55-2A	●		○	.	○	○	.	.	○	.
55-2B	●			.	,○		.	.	○	.
55-2C	●			.			.	.	.	.
55-3A	●		.	.	○	○	.	.	.	.
55-3B	●		.	.	○	○	.	○	.	.
55-3C	●		.	.		○	.	.	.	.
56-1A	●		.	.	.	.	○	.	.	.
56-2A	●		.	.		.	.	.	.	.
56-2B	●		.	.	○	.	.	.	.	.
56-2C	●		.	.	,○	.	.	.	.	.
56-3A	●		.	.	○	.	.	.	.	.
56-3B	●		.	.	○	.	.	.	.	.
56-3C	●		.	.		.	.	.	.	.
56-4A	●		.	.	○	.	.	.	.	.
56-6A	●		.	.	.	.	.	.	.	.
56-8A		●	.	.	○	.	.	.	.	.
60-1A		●	.	.	.	.	.	.	.	.
GW-105	●			.	.	.	.	.	.	.
GW-106	●		○	.	.	.	.	.	.	○
GW-108	●			.	○	.	○	.	○	
GW-109	●		○	.		.		.	.	
GW-148		●	.	.		.	.	.	.	.
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-192	●		.	.	○	.	.	.	.	.
GW-193		●	NA	NA	NA	NA	NA	NA	NA	NA
GW-204	●		.	○	.	.	.	.	○	.
GW-220		●	.	.		.		.	.	.
GW-223		●	.			.	.	.		.
GW-230		●	NA	NA	.	.	.	.	NA	NA
GW-232		●	.	NA	.	.	.	.	.	.
GW-240		●	.	.	.	.		.	.	.
GW-251		●		.	○	.	○	.	.	.

Table B.10 (continued)

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-253		●	○	.	○,	.	○	.		.
GW-265	●		.	.		.	.	.	.	.
GW-269	●		.	.	○	○	○	.	.	.
GW-274	●					.			.	
GW-275	●		○	.	.	.	.	.	.	.
GW-281	●		NA	NA	.	.	.	.	NA	NA
GW-332	●		.	.	○		.	.	.	.
GW-336	●		.	.			.	.	.	.
GW-337	●		.	.			.	.	.	.
GW-380		●	.	.	.	.	.	.	.	.
GW-381		●	.	.	○	.		.	.	.
GW-382		●	.	.		.		.	.	.
GW-383	●		.	.	○,	.	.	.	.	.
GW-605		●	.	○	○,	.	○	.	○	.
GW-606		●	○	.	○	.		.	.	.
GW-617		●	.	.	.	.	.	.	.	.
GW-618		●	.	.		.	.	.	.	.
GW-619		●	.	.		.	.	.	.	.
GW-620		●	.	.		.	.	.	.	.
GW-633	●			.	○,	.	○	○,	.	
GW-656	●		.	.			.	.	.	.
GW-658	●		NA	NA	.	○	○	○	NA	NA
GW-686		●	.	.	○	.	.	.	.	.
GW-690		●	.	.		.	.	.	.	.
GW-691		●	.	.	○	.	.	.	.	.
GW-692		●	.	.		○		.	.	.
GW-698		●	○	.	○	.	○	.	.	.
GW-700		●	.	.		.	.	.	.	.
GW-722-06		●	.	.	.	.	.	.	.	.
GW-722-10		●	.	.	.	.	.	.	.	.
GW-722-14		●	.	.		.		.	.	.
GW-722-17		●	.	.		.		.	.	.
GW-722-20		●	.	.		.		.	.	.
GW-722-22		●	.	.		.		.	.	.
GW-722-26		●	.	.	.	.	.	○	.	.
GW-722-30		●	.	.	.	.	.	.	.	.
GW-722-32		●	.	.	.	.	.	.	.	.
GW-722-33		●	.	.	.	.	.	.	.	.
GW-733		●	.	.	.	.		.	.	.
GW-744	●		.	.	.	.	.	.	.	.

Table B.10 (continued)

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-747	●		.	.	.	.	.	.	.	.
GW-748	●		.	.	.	.	.	.	.	.
GW-749	●		.	.	.	.	.	.	.	.
GW-762	●		.	.	,○	,○	○	.	.	.
GW-763	●		.	.	.	.	.	.	.	.
GW-769	●		.	.		.		.	.	.
GW-770	●		.	.	.	.		.	.	.
GW-781	●		.	.	.	.	.	.	.	.
GW-782	●		.	.	○	○	.	.	○	.
GW-783	●		.	.		○	.	.	.	.
GW-791	●		.	.	○	.	.	.	.	.
GW-792	●		.	.	.	.	.	.	.	.
GW-802	●		NA	NA	.	.	.	.	NA	NA
GW-816	●		.	.	.	.	.	.	.	.
GW-820		●	.	.	○	.	.	.	.	.
GW-832		●	.	.	○	.	,○	.	.	.
GW-954-1	●		.	.	.	.	.	.	○	.
GW-954-2	●		.	.	.	.	.	.	.	.
GW-954-3	●		.	.	.	.	.	.	.	.
GW-956-1	●		.	.	○	.	.	.	.	.
GW-956-2	●		.	.	○	.	.	.	○	.
GW-956-3	●		.	.	.	.	.	.	.	.
GW-956-4	●		.	.	.	.	.	.	.	.
GW-959		●	.	.	○	.	.	.	.	.
GHK2.51WSW	.	.	.	.	.	.	.	.	.	.
NPR07.0SW	.	.	.	.	.	.	.	.	.	.
NPR12.0SW	.	.	.	.	.	.	.	.	.	.
NPR23.0SW	.	.	.	.	.	.	.	.	.	.
OF 51	.	.	.	.	○	.	.	.	.	.
OF 200	.	.	NA	.	NA	NA	NA	NA	NA	NA
SCR7.1SP	.	.	NA	NA	.	.	.	.	NA	NA
SCR7.8SP	.	.	NA	NA	.	.	.	.	NA	NA
SP-17	.	.	.	.	.	.	.	.	.	.
STATION 17	.	.	NA	.	NA	NA	NA	NA	NA	NA
STATION 8	.	.	NA	.	NA	NA	NA	NA	.	.

Table B.10 (continued)

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 2006 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 2006 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 56-2C, GW-253, GW-383, GW-605, GW-633, GW-762, and GW-832.

6 Maximum CY 2006 gross alpha activity greater than or equal to 15 pCi/L.
Maximum CY 2006 gross beta activity greater than or equal to 50 pCi/L.

Table B.11 Concentration trends for contaminants detected at CY 2006 sampling locations in the Chestnut Ridge Hydrogeologic Regime

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	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-175		.	.	.	.	.
GW-177	○	,	.	.	.	.
GW-178	○	,○	.	.	.	.
GW-203	NA	NA	NA	NA	.	.
GW-205	NA	NA	NA	NA	.	○
GW-217	.	.	.	.	.	.
GW-221	NA	NA	NA	NA	.	.
GW-231	.	.	.	.	.	.
GW-301	.	.	.	.	.	.
GW-305	○	,○	.	.	.	.
GW-322	○	,○	.	.	.	.
GW-514	.	.	.	.	.	.
GW-521	.	.	.	.	.	.
GW-522	.	.	.	.	.	.
GW-540	.	.	.	.	.	.
GW-542	.	.	.	.	.	.
GW-543	.	.	.	.	.	.
GW-544	.	.		.	.	.
GW-557	.	.	.	.	.	.
GW-560	.	.	.	.	.	.
GW-562	.	.	.	.	.	.
GW-564	.	.	.	.	.	.
GW-609	.	.	.	.	.	.
GW-612			.	.	.	.
GW-709	.	.	.	.	.	.
GW-731	NA	NA	NA	NA	NA	NA
GW-732	NA	NA	NA	NA	NA	NA
GW-757	.	.	.	.	.	.
GW-796	.	○	.	.	.	.
GW-797	.	.	.	.	.	.
GW-798	○	○	○	○	.	.
GW-799	.	.	.	.	.	.
GW-801	.	.	.	.	.	.

Table B.11 (continued)

Sampling Location [1]	Contaminant Type and Long-Term Trend [2] (○ = indeterminate, [= increasing, – = decreasing)					
	VOCs [3]				Radioactivity [4]	
	Ethenes	Ethanes	Methanes	Freons	Alpha	Beta
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.

3 Summed CY 2006 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, GW-305, and GW-322.

4 Maximum CY 2006 gross alpha activity greater than or equal to 15 pCi/L.
Maximum CY 2006 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:

B4	-	Beta-4 Security Pits
B8110	-	Building 81-10
B9201-2	-	Building 9201-2
B9201-5	-	Building 9201-5
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, -E, -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
WCPA	-	Waste Coolant Processing Area
Y12	-	Y-12 Complex

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), top of Well Wizard™ (TOWW), or the ground surface (GS)
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
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
SS/ppk	-	Stainless steel prepack screen, spiral wound
SS/sl	-	Stainless steel, slotted
SS/sw	-	Stainless steel, spiral wound
Slot Size	-	size of screen or slot 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 2003b).

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	1090	55-1A	55-2A	55-2B	55-2C	55-3A	55-3B	55-3C	56-1A	56-2A
Hydrogeologic Regime	CR	PC	PC	PC	PC	PC	PC	PC	PC	PC
Functional Area	UNCS	GRIDB2	GRIDB3	GRIDB3	GRIDB3	B9201-5	B9201-5	B9201-5	Y12	GRIDC3
General Information										
Date Installed	1982	09/09/83	08/08/83	1983	08/22/83	1983	1983	1983	1983	1983
Total Depth Drilled	96.7	19.3	14.1	27.6	75.9	14.3	38.1	77.5	19.0	15.1
East Coordinate	53,853	55,014	55,195	55,199	55,203	55,695	55,699	55,703	56,079	56,229
North Coordinate	28,718	30,470	30,085	30,085	30,085	29,959	29,959	29,959	30,351	29,881
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,104.48	986.91	976.74	977.42	977.02	972.46	973.32	974.34	969.25	963.53
Ground Surface Elevation	1,101.58	986.20	976.17	976.17	976.07	971.59	971.57	971.76	968.72	962.52
Tag Depth-(TOC)	98.02	19.22	13.98	27.69	76.00	14.25	37.98	77.43	18.95	15.03
Geologic Information										
Hydrostratigraphic Unit	AQF	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT
Geologic Formation	OCk	Cn	Cn	Cn	Cn	Cn	Cn	Cn	Cn	Cn
Aquifer Zone	WT	WT	WT	WT	BDR	WT	WT	BDR	WT	WT
Weathered Rock-Depth	.	5.0	11.5	10.0	14.5	7.0	5.0	7.0	2.0	.
Fresh Rock-Depth	.	.	.	.	47.2	.	.	.	.	.
Conductor Casing										
Casing Depth	.	.	.	.	15.5	.	.	.	.	.
Outside Diameter	.	.	.	.	4.5	.	.	.	.	.
Inside Diameter	.	.	.	.	.	.	.	.	.	.
Casing Material	.	.	.	.	STL	.	.	.	.	.
Well Casing										
Borehole Depth	96.7	19.3	14.1	27.6	75.9	14.3	38.1	77.5	19.0	15.1
Borehole Diameter	8	6	6	6	6	6	6	6	6	6
Casing Depth	.	14.3	9.1	22.6	70.9	9.3	33.1	72.5	14.0	10.1
Outside Diameter	6.5	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
Casing Material	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40
Monitored Interval										
Top-Depth	.	11.3	6.1	19.6	67.9	6.3	30.1	69.5	11.0	7.1
Midpoint-Depth	.	15.3	10.1	23.6	71.9	10.3	34.1	73.5	15.0	11.1
Pump Intake-Depth	84.80	16.30	11.43	25.00	73.30	12.13	33.75	72.42	15.97	12.00
Bottom of Screen-Depth	.	19.3	14.1	27.6	75.9	14.3	38.1	77.5	19.0	15.1
Bottom-Depth	96.7	19.3	14.1	27.6	75.9	14.3	38.1	77.5	19.0	15.1
Top-Elevation	.	974.90	970.07	956.57	908.17	965.29	941.47	902.26	957.72	955.42
Midpoint-Elevation	.	970.90	966.07	952.57	904.17	961.29	937.47	898.26	953.72	951.42
Pump Intake-Elevation	1016.78	969.91	964.74	951.22	902.82	959.46	937.82	899.34	952.75	950.53
Bottom-Elevation	1,004.88	966.90	962.07	948.57	900.17	957.29	933.47	894.26	949.72	947.42
Screen Length	.	5	5	5	5	5	5	5	5	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, CY 2006

Well Number	56-2B	56-2C	56-3A	56-3B	56-3C	56-4A	56-6A	56-8A	60-1A	GW-008
Hydrogeologic Regime	PC	PC	PC	PC	PC	PC	PC	PC	PC	BC
Functional Area	GRIDC3	GRIDC3	Y12	Y12	Y12	Y12	Y12	Y12	Y12	OLF
General Information										
Date Installed	1983	08/18/83	1983	1983	08/02/83	1983	1983	1983	08/12/83	09/21/83
Total Depth Drilled	38.8	77.3	17.8	33.4	55.5	12.1	21.0	25.6	23.2	25.5
East Coordinate	56,226	56,231	56,453	56,478	56,449	56,802	56,915	56,456	60,200	47,596
North Coordinate	29,884	29,885	29,867	29,866	29,859	29,820	29,783	29,466	29,226	29,783
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	962.45	965.11	963.03	964.33	962.86	962.07	960.28	962.46	929.66	965.39
Ground Surface Elevation	962.21	962.44	962.35	962.74	962.36	960.10	958.12	959.15	929.29	962.11
Tag Depth-(TOC)	38.63	77.03	17.92	30.85	55.35	12.60	20.97	25.44	23.10	26.69
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQF	AQF	AQT
Geologic Formation	Cn	Cn	Cn	Cn	Cn	Cn	Cn	Cmn	Cmn	Cn
Aquifer Zone	WT	BDR	WT	WT	BDR	WT	WT	WT	WT	WT
Weathered Rock-Depth	.	11.5	3.5	.	8.0	8.5	.	.	.	0.6
Fresh Rock-Depth	.	17.0	.	.	.	.	.	.	.	.
Conductor Casing										
Casing Depth	.	11.5	.	.	.	.	.	.	.	.
Outside Diameter	.	4.5	.	.	.	.	.	.	.	.
Inside Diameter	.	.	.	.	.	.	.	.	.	.
Casing Material	.	STL	.	.	.	.	.	.	.	.
Well Casing										
Borehole Depth	38.8	77.3	17.8	33.4	55.5	12.1	21.0	25.6	23.2	25.5
Borehole Diameter	6	6	6	6	6	6	6	6	6	4.5
Casing Depth	33.8	72.3	12.8	28.4	50.5	7.1	16.0	20.6	18.2	15.7
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	2.37
Inside Diameter	4	4	4	4	4	4	4	4	4	2
Casing Material	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	SS304
Monitored Interval										
Top-Depth	30.8	69.3	9.8	25.4	47.5	4.1	13.0	17.6	15.2	13.0
Midpoint-Depth	34.8	73.3	13.8	29.4	51.5	8.1	17.0	21.6	19.2	19.3
Pump Intake-Depth	35.80	72.30	14.82	26.91	52.00	9.53	16.34	20.19	20.13	17.70
Bottom of Screen-Depth	38.8	77.3	17.8	33.4	55.5	12.1	21.0	25.6	23.2	20.7
Bottom-Depth	38.8	77.3	17.8	33.4	55.5	12.1	21.0	25.6	23.2	25.5
Top-Elevation	931.41	893.14	952.55	937.34	914.86	956.00	945.12	941.55	914.09	949.11
Midpoint-Elevation	927.41	889.14	948.55	933.34	910.86	952.00	941.12	937.55	910.09	942.86
Pump Intake-Elevation	926.45	890.11	947.53	935.83	910.36	950.57	941.78	938.96	909.16	944.39
Bottom-Elevation	923.41	885.14	944.55	929.34	906.86	948.00	937.12	933.55	906.09	936.61
Screen Length	5	5	5	5	5	5	5	5	5	5
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, CY 2006

Well Number	GW-014	GW-046	GW-058	GW-068	GW-071	GW-077	GW-078	GW-079	GW-080	GW-082
Hydrogeologic Regime	BC	BC	BC	BC	BC	BC	BC	BC	BC	BC
Functional Area	BG	BG	BG	BG	BG	BG	BG	BG	BG	BG
General Information										
Date Installed	09/29/83	10/27/83	03/06/84	03/22/84	03/25/84	03/29/84	03/30/84	03/23/84	03/24/84	03/17/84
Total Depth Drilled	13.2	20.5	45.2	85.0	220.6	100.5	21.1	65.0	30.0	35.0
East Coordinate	44,308	43,284	43,211	43,377	44,191	41,234	41,209	41,616	41,621	42,090
North Coordinate	29,848	29,562	28,714	29,500	29,495	29,729	29,730	30,630	30,622	30,434
Measuring Point	TOWW	TOWW	TOC	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	934.50	921.17	913.30	924.61	928.90	919.30	918.10	981.20	981.00	964.00
Ground Surface Elevation	931.50	918.13	910.00	921.20	925.40	914.70	914.50	977.20	977.10	960.52
Tag Depth-(TOC)	14.50	23.85	48.90	86.10	218.40	104.10	23.40	64.70	33.00	38.45
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQF	AQT	AQT	AQT	AQT	AQT	AQT	AQT
Geologic Formation	Cn	Cn	Cmn	Cn	Cn	Cn	Cn	Crg	Crg	Cm
Aquifer Zone	WT	WT	BDR	BDR	BDR	BDR	BDR	BDR	WT	BDR
Weathered Rock-Depth	4.0	7.7	.	.	5.5	7.0	6.5	4.0	3.5	7.0
Fresh Rock-Depth	.	.	20.8	25.0	16.0	13.0	8.5	26.5	23.5	23.0
Conductor Casing										
Casing Depth	.	.	.	.	16.0	35.0	.	.	.	25.0
Outside Diameter	.	.	.	.	10.63	4.5	.	.	.	6.5
Inside Diameter	.	.	.	.	10	4	.	.	.	.
Casing Material	.	.	.	.	PVC40	STL	.	.	.	STL
Well Casing										
Borehole Depth	13.2	20.5	45.2	85.0	220.6	100.5	21.1	65.0	30.0	35.0
Borehole Diameter	6	6	4	8.75	8.75	3.88	6.5	6.5	6.5	4
Casing Depth	10.0	8.1	42.2	71.9	198.4	90.3	16.1	59.9	24.7	29.4
Outside Diameter	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
Inside Diameter	2	2	2	2	2	2	2	2	2	2
Casing Material	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	5.0	5.0	38.8	70.0	195.1	87.4	11.7	49.9	20.8	24.1
Midpoint-Depth	9.1	12.7	41.5	76.8	207.1	93.9	16.4	57.4	25.3	29.3
Pump Intake-Depth	9.00	12.00	43.70	77.59	208.50	.	.	61.80	.	31.50
Bottom of Screen-Depth	12.0	18.1	44.2	82.1	219.0	100.3	21.1	64.9	29.7	34.4
Bottom-Depth	13.2	20.3	44.2	83.6	219.0	100.3	21.1	64.9	29.7	34.4
Top-Elevation	926.50	913.13	871.20	851.20	730.30	827.30	902.80	927.30	956.30	936.42
Midpoint-Elevation	922.40	905.48	868.50	844.40	718.35	820.85	898.10	919.80	951.85	931.27
Pump Intake-Elevation	922.50	906.17	866.30	843.61	716.90	.	.	915.40	.	929.00
Bottom-Elevation	918.30	897.83	865.80	837.60	706.40	814.40	893.40	912.30	947.40	926.12
Screen Length	2	10	2	10.2	20.6	10	5	5	5	5
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, CY 2006

Well Number	GW-085	GW-098	GW-105	GW-106	GW-108	GW-109	GW-122	GW-126	GW-141	GW-143
Hydrogeologic Regime	BC	BC	PC	PC	PC	PC	BC	BC	CR	CR
Functional Area	OLF	OLF	S3	S3	S3	S3	S3	BG	LIV	KHQ
General Information										
Date Installed	03/22/84	09/21/84	09/18/84	09/26/84	09/26/84	09/27/84	07/25/85	06/24/85	09/04/87	10/24/85
Total Depth Drilled	62.0	104.0	17.0	75.0	58.6	147.6	142.0	155.0	156.0	253.0
East Coordinate	49,058	46,959	52,833	52,843	53,207	53,207	51,807	42,679	52,463	63,522
North Coordinate	30,003	29,452	30,417	30,418	30,070	30,056	29,741	29,362	28,755	24,257
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOC	TOWW	TOWW
Measuring Point Elevation	983.57	945.95	1,018.20	1,016.92	999.00	997.82	1,007.20	932.06	1,186.23	913.98
Ground Surface Elevation	979.80	942.40	1,014.30	1,014.50	995.80	995.30	1,004.15	929.02	1,183.45	911.04
Tag Depth-(TOC)	62.34	105.65	19.40	74.10	58.30	125.45	145.28	159.18	158.81	252.70
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQF	AQT	AQF	AQF
Geologic Formation	Cn	Cn	Cn	Cn	Cn	Cn	Cmn	Cn	OCk	OCk
Aquifer Zone	BDR	BDR	WT	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	2.0	1.0	10.0	12.5	4.0	5.0	.	10.0	.	.
Fresh Rock-Depth	40.0	7.5	.	.	.	16.0	37.0	27.0	57.0	18.0
Conductor Casing										
Casing Depth	.	20.0	2.5	20.0	20.7	20.0	39.0	31.0	65.0	20.0
Outside Diameter	.	10.63	7	10.63	10.63	10.63	10.75	10.75	10.75	10.63
Inside Diameter	.	10	.	10	10	10	10	10	10	9.87
Casing Material	.	PVC40	S/GAL	PVC40	PVC40	PVC40	SF25	SF25	SF25	PVC40
Well Casing										
Borehole Depth	62.0	104.0	17.0	75.0	58.6	147.6	92.0	105.0	156.0	205.0
Borehole Diameter	4	9	6.5	9	9	9	9.79	9.87	10	10
Casing Depth	53.8	82.4	12.1	61.9	46.7	102.9	92.0	105.0	144.5	205.0
Outside Diameter	2.37	4.5	2.37	4.5	4.5	4.5	4.5	4.5	4.5	6.62
Inside Diameter	2	4	2	4	4	4	4	4	4	6.12
Casing Material	SS304	SS304	PVC	PVC	PVC40	PVC40	SF25	SF25	SS304	SF25
Monitored Interval										
Top-Depth	48.4	76.6	9.5	53.3	41.0	96.6	92.0	105.0	141.0	205.0
Midpoint-Depth	53.6	90.3	13.3	64.2	49.8	112.6	117.0	130.0	148.5	229.0
Pump Intake-Depth	51.20	96.40	14.60	67.58	49.80	113.50	131.90	141.80	147.70	226.10
Bottom of Screen-Depth	58.8	103.4	16.1	70.9	55.7	121.9	.	.	155.2	.
Bottom-Depth	58.8	104.0	17.0	75.0	58.6	128.5	142.0	155.0	156.0	253.0
Top-Elevation	931.40	865.80	1,004.80	961.20	954.80	898.70	912.15	824.02	1,042.45	706.04
Midpoint-Elevation	926.20	852.10	1,001.05	950.35	946.00	882.75	887.15	799.02	1,034.95	682.04
Pump Intake-Elevation	928.57	845.95	999.70	946.92	946.00	881.82	872.20	787.22	1035.73	684.98
Bottom-Elevation	921.00	838.40	997.30	939.50	937.20	866.80	862.15	774.02	1,027.45	658.04
Screen Length	5	21	4	9	9	19	.	.	10.7	.
Screen Material	SS/sw	SS/sw	PVC/sl	PVC/sl	PVC/sl	PVC/sl	.	.	SS/sw	.
Slot Size	0.01	0.01	0.01	0.01	0.01	0.01	.	.	0.01	.
Open-Hole Length	.	.	.	.	.	.	50	50	.	48
Open-Hole Diameter	.	.	.	.	.	.	4	4	.	6

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-144	GW-145	GW-148	GW-151	GW-153	GW-154	GW-156	GW-159	GW-169	GW-170
Hydrogeologic Regime	CR	CR	PC	PC	PC	PC	CR	CR	PC	PC
Functional Area	KHQ	KHQ	NHP	NHP	NHP	NHP	CRSDB	CRSDB	EXP-UV	EXP-UV
General Information										
Date Installed	10/24/85	10/14/85	07/30/85	08/14/85	10/31/85	07/30/85	10/18/85	10/18/85	09/16/86	04/01/86
Total Depth Drilled	195.0	110.0	11.1	96.5	60.0	11.2	157.6	157.0	34.8	156.9
East Coordinate	63,502	63,266	63,817	64,232	63,728	63,346	64,020	63,496	66,854	66,843
North Coordinate	24,255	24,441	29,202	28,958	28,613	28,987	27,626	27,764	28,545	28,545
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	913.54	840.24	907.76	916.17	921.68	911.70	1,049.28	1,051.38	932.12	932.64
Ground Surface Elevation	910.48	837.29	904.53	913.06	918.53	908.60	1,046.94	1,048.79	929.95	930.70
Tag Depth-(TOC)	194.34	113.49	13.93	99.63	60.84	13.35	157.65	155.87	36.23	156.16
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	Cmn	Cmn	Cmn	Cmn	OCk	OCk	Cmn	Cmn
Aquifer Zone	BDR	BDR	WT	BDR	BDR	WT	BDR	BDR	WT	BDR
Weathered Rock-Depth	.	.	11.1	.	.	11.2	84.0	.	.	.
Fresh Rock-Depth	40.0	12.0	.	12.0	14.0	.	93.0	100.0	.	30.0
Conductor Casing										
Casing Depth	40.0	12.0	.	12.0	29.0	.	94.0	123.0	.	30.0
Outside Diameter	12.5	12.5	.	12.5	10.63	.	10.75	10.75	.	8.63
Inside Diameter	11.75	11.75	.	11.75	9.88	.	10	10	.	.
Casing Material	PVC40	PVC40	.	PVC40	PVC40	.	SF25	SF25	.	PVC40
Well Casing										
Borehole Depth	195.0	110.0	11.1	96.5	60.0	11.2	157.0	157.0	42.0	104.0
Borehole Diameter	11	11	8	11	11	8	8.5	8.5	8	6.62
Casing Depth	150.0	88.5	5.6	86.0	49.5	5.7	147.0	147.0	29.7	104.0
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	2.37	4.38
Inside Diameter	4	4	4	4	4	4	4	4	2	4
Casing Material	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	PVC40	STL
Monitored Interval										
Top-Depth	148.0	86.0	4.6	85.0	45.0	4.7	145.0	145.0	28.7	104.0
Midpoint-Depth	171.5	98.0	7.9	90.8	52.5	8.0	151.3	151.0	31.8	130.5
Pump Intake-Depth	170.90	100.00	7.80	90.80	52.90	8.40	150.70	148.40	.	124.10
Bottom of Screen-Depth	190.0	108.5	10.6	96.0	59.5	10.7	157.0	157.0	34.7	.
Bottom-Depth	195.0	110.0	11.1	96.5	60.0	11.2	157.6	157.0	34.8	156.9
Top-Elevation	762.48	751.29	899.93	828.06	873.53	903.90	901.94	903.79	901.25	826.70
Midpoint-Elevation	738.98	739.29	896.68	822.31	866.03	900.65	895.64	897.79	898.20	800.25
Pump Intake-Elevation	739.54	737.24	896.76	822.27	865.68	900.20	896.28	900.38	.	806.64
Bottom-Elevation	715.48	727.29	893.43	816.56	858.53	897.40	889.34	891.79	895.15	773.80
Screen Length	40	20	5	10	10	5	10	10	5	.
Screen Material	PVC/sl	PVC/sl	PVC/sl	PVC/sl	PVC/sl	PVC/sl	PVC/sl	PVC/sl	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	.	.	.	.	.	.	.	.	.	52.9
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	3.88

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-171	GW-172	GW-175	GW-177	GW-178	GW-192	GW-193	GW-203	GW-204	GW-205
Hydrogeologic Regime	PC	PC	CR	CR	CR	PC	PC	CR	PC	CR
Functional Area	EXP-UV	EXP-UV	CRSP	CRSP	CRSP	B4	T2331	UNCS	T0134	UNCS
General Information										
Date Installed	02/26/86	05/05/86	06/22/88	10/24/85	08/20/87	09/30/85	08/04/89	10/24/85	08/30/89	10/25/85
Total Depth Drilled	31.2	133.9	166.7	145.0	133.0	17.5	18.5	156.0	17.5	164.0
East Coordinate	69,654	69,579	58,686	57,497	57,808	54,277	59,536	54,190	57,411	54,008
North Coordinate	28,403	28,358	28,677	28,483	28,552	30,772	29,344	28,356	29,956	28,363
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	920.72	926.69	1,084.19	1,158.20	1,143.49	1,008.83	934.17	1,105.45	958.74	1,104.14
Ground Surface Elevation	918.55	922.85	1,081.89	1,155.52	1,141.06	1,006.04	931.11	1,102.34	955.47	1,101.46
Tag Depth-(TOC)	32.64	137.50	169.49	150.69	134.68	21.58	21.17	157.61	20.23	165.13
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQT	AQF	AQF	AQT	AQF
Geologic Formation	Cmn	Cmn	OCk	OCk	OCk	Cm	Cmn	OCk	Cc	OCk
Aquifer Zone	WT	BDR	BDR	BDR	BDR	WT	WT	BDR	WT	BDR
Weathered Rock-Depth	.	15.0	46.0	62.0	37.0	17.5	2.5	86.0	10.0	100.0
Fresh Rock-Depth	.	19.0	98.5	98.0	95.0	.	.	93.0	.	146.0
Conductor Casing										
Casing Depth	.	35.0	61.3	82.0	89.0	.	5.0	94.0	.	154.0
Outside Diameter	.	8.63	10.75	10.75	10.75	.	9.63	10.75	.	10.75
Inside Diameter	.	.	10	10	10	.	.	10	.	10
Casing Material	.	SF25	.	SF25	SF25	.	STL	SF25	.	SF25
Well Casing										
Borehole Depth	31.2	105.0	166.7	145.0	133.0	17.5	18.5	156.0	17.5	164.0
Borehole Diameter	8	6.62	9.5	8	10	6	8	8.5	6	10
Casing Depth	26.8	105.0	150.6	133.0	122.0	7.5	8.2	146.0	7.3	154.0
Outside Diameter	2.37	4.38	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Inside Diameter	2	4	4	4	4	4	4	4	4	4
Casing Material	PVC40	STL	SS304	PVC40	SS304	PVC40	SS304	PVC40	SS304	PVC40
Monitored Interval										
Top-Depth	25.8	105.0	148.3	130.0	117.5	6.5	5.5	144.0	6.5	152.0
Midpoint-Depth	28.5	119.4	157.5	137.5	125.3	12.0	12.0	150.0	11.9	158.0
Pump Intake-Depth	.	123.20	162.70	.	127.60	12.70	13.90	146.90	11.70	147.30
Bottom of Screen-Depth	31.2	.	166.4	143.0	132.0	17.5	18.5	156.0	17.3	164.0
Bottom-Depth	31.2	133.8	166.7	145.0	133.0	17.5	18.5	156.0	17.3	164.0
Top-Elevation	892.75	817.85	933.59	1,025.52	1,023.56	999.54	925.61	958.34	948.97	949.46
Midpoint-Elevation	890.05	803.45	924.39	1,018.02	1,015.81	994.04	919.14	952.34	943.57	943.46
Pump Intake-Elevation	.	799.69	919.19	.	1013.49	993.33	917.17	955.45	943.74	954.14
Bottom-Elevation	887.35	789.05	915.19	1,010.52	1,008.06	988.54	912.66	946.34	938.17	937.46
Screen Length	4.4	.	15.8	10	10	10	10.3	10	10	10
Screen Material	PVC/sl	.	SS/sw	PVC/sl	SS/sw	PVC/sl	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	.	28.8	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	3.63	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-217	GW-220	GW-221	GW-223	GW-225	GW-226	GW-229	GW-230	GW-231	GW-232
Hydrogeologic Regime	CR	PC	CR	PC	BC	BC	BC	PC	CR	PC
Functional Area	LIV	NHP	UNCS	NHP	OLF	OLF	OLF	EXP-UV	KHQ	EXP-UV
General Information										
Date Installed	08/13/87	08/22/85	10/24/85	08/21/85	10/08/85	10/14/85	10/30/85	05/12/86	10/02/85	03/27/86
Total Depth Drilled	180.0	45.2	158.0	90.5	200.0	55.0	55.0	406.4	35.0	411.7
East Coordinate	53,020	64,225	54,389	63,311	47,461	47,473	47,017	69,617	63,410	66,863
North Coordinate	28,758	28,949	28,359	28,938	29,155	29,156	29,256	28,388	24,725	28,546
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,177.03	915.64	1,106.16	911.62	943.11	943.57	949.00	923.11	849.67	931.39
Ground Surface Elevation	1,174.29	912.74	1,103.36	908.97	940.21	940.56	945.71	919.57	846.90	929.52
Tag Depth-(TOC)	179.13	49.00	159.34	93.57	203.30	58.47	51.45	409.48	37.70	412.88
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	Cmn	OCk	Cmn	Cmn	Cmn	Cmn	Cmn	OCk	Cmn
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	55.0	.	36.0	.	.	.	.	19.0	.	.
Fresh Rock-Depth	75.0	11.0	90.0	10.0	25.0	26.0	30.0	38.0	10.5	.
Conductor Casing										
Casing Depth	81.7	13.0	92.0	11.0	32.0	30.0	37.0	31.0	11.0	33.0
Outside Diameter	10.75	12.5	6.63	12.5	10.75	10.75	10.75	8.63	10.63	8.63
Inside Diameter	10	11.75	.	11.75	10	10	10	.	10	.
Casing Material	SF25	PVC40	SF25	PVC40	STL	STL	STL	STL	PVC40	PVC40
Well Casing										
Borehole Depth	180.0	45.2	158.0	90.5	150.0	45.0	40.0	341.0	35.0	401.0
Borehole Diameter	10	11	6	11	10	10	10	5.5	11	6.62
Casing Depth	166.8	34.7	148.0	80.0	150.0	45.0	40.0	341.0	24.5	401.0
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.38	4.5	4.38
Inside Diameter	4	4	4	4	4	4	4	4	4	4
Casing Material	SS304	PVC40	PVC40	PVC40	STL	STL	STL	STL	PVC40	STL
Monitored Interval										
Top-Depth	165.2	31.0	146.0	79.0	150.0	45.0	40.0	341.0	22.8	401.0
Midpoint-Depth	172.6	38.1	152.0	84.8	175.0	50.0	47.5	373.7	28.9	406.4
Pump Intake-Depth	172.10	41.10	149.20	84.40	190.10	49.80	44.70	383.50	28.70	404.10
Bottom of Screen-Depth	177.4	44.7	158.0	90.0	.	.	.	.	34.5	.
Bottom-Depth	180.0	45.2	158.0	90.5	200.0	55.0	55.0	406.4	35.0	411.7
Top-Elevation	1,009.09	881.74	957.36	829.97	790.21	895.56	905.71	578.57	824.10	528.52
Midpoint-Elevation	1,001.69	874.64	951.36	824.22	765.21	890.56	898.21	545.87	818.00	523.17
Pump Intake-Elevation	1002.23	871.64	954.16	824.62	750.11	890.77	901.00	536.11	818.17	525.39
Bottom-Elevation	994.29	867.54	945.36	818.47	740.21	885.56	890.71	513.17	811.90	517.82
Screen Length	10.6	10	10	10	.	.	.	.	10	.
Screen Material	SS/sw	PVC/sl	PVC/sl	PVC/sl	.	.	.	.	PVC/sl	.
Slot Size	0.01	0.01	0.01	0.01	.	.	.	.	0.01	.
Open-Hole Length	.	.	.	.	50	10	15	65.4	.	10.7
Open-Hole Diameter	.	.	.	.	4	4	4	3.63	.	3.88

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-240	GW-246	GW-251	GW-253	GW-257	GW-265	GW-269	GW-274	GW-275	GW-276
Hydrogeologic Regime	PC	BC	PC	PC	BC	PC	PC	PC	PC	BC
Functional Area	NHP	S3	S2	S2	BG	SY	SY	SY	SY	S3
General Information										
Date Installed	10/31/85	03/11/86	04/08/86	04/11/86	03/03/87	06/16/86	06/16/86	06/09/86	05/30/86	07/15/86
Total Depth Drilled	29.5	76.0	51.0	50.0	33.7	23.1	30.0	35.0	65.5	18.5
East Coordinate	63,726	52,098	53,843	54,057	43,230	53,308	53,779	53,673	53,688	52,557
North Coordinate	28,604	29,992	29,467	29,404	30,148	30,763	30,649	30,152	30,151	29,926
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOC	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	922.90	1,009.19	1,003.80	1,004.24	961.68	1,032.68	1,027.81	995.60	995.53	1,001.57
Ground Surface Elevation	919.50	1,006.07	1,001.60	1,001.60	959.21	1,030.85	1,025.38	992.94	993.08	998.70
Tag Depth-(TOC)	32.55	76.50	50.04	50.51	36.63	25.68	33.50	36.12	68.47	21.34
Geologic Information										
Hydrostratigraphic Unit	AQF	AQT	AQF	AQF	AQT	AQT	AQT	AQT	AQT	AQT
Geologic Formation	Cmn	Cn	Cmn	Cmn	Cm	Cm	Cm	Cn	Cn	Cn
Aquifer Zone	BDR	WT	BDR	WT	WT	WT	WT	WT	BDR	WT
Weathered Rock-Depth	.	26.0	32.5	.	.	10.0	10.0	3.0	5.0	18.5
Fresh Rock-Depth	14.0	.	.	.	33.7	22.0	.	35.0	35.0	.
Conductor Casing										
Casing Depth	14.0	27.0	.	.	.	.	.	.	38.0	.
Outside Diameter	12.5	12.5	.	.	.	.	.	.	10.63	.
Inside Diameter	12	12	.	.	.	.	.	.	10	.
Casing Material	PVC40	PVC40	.	.	.	.	.	.	PVC40	.
Well Casing										
Borehole Depth	29.5	76.0	51.0	50.0	33.7	23.1	30.0	35.0	65.5	18.5
Borehole Diameter	11	11	8.25	8.25	9	10	10	8	10	8
Casing Depth	24.0	46.5	37.5	37.0	23.0	17.5	23.7	28.5	54.8	13.0
Outside Diameter	4.5	6.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Inside Diameter	4	6	4	4	4	4	4	4	4	4
Casing Material	PVC40	PVC40	PVC40	PVC40	SS304	PVC40	PVC40	SS304	SS304	SS304
Monitored Interval										
Top-Depth	21.0	34.2	35.0	36.2	19.0	15.5	21.9	25.8	53.3	11.3
Midpoint-Depth	25.3	55.1	43.0	43.1	26.4	19.3	26.0	30.4	59.4	14.9
Pump Intake-Depth	26.60	59.40	42.80	41.60	33.00	20.67	28.10	30.80	62.60	14.10
Bottom of Screen-Depth	29.0	74.6	47.1	46.7	33.7	23.1	29.4	33.9	65.2	18.3
Bottom-Depth	29.5	76.0	51.0	50.0	33.7	23.1	30.0	35.0	65.5	18.5
Top-Elevation	898.50	971.87	966.60	965.40	940.21	1,015.35	1,003.48	967.14	939.78	987.40
Midpoint-Elevation	894.25	950.97	958.60	958.50	932.86	1,011.55	999.43	962.54	933.68	983.80
Pump Intake-Elevation	892.90	946.69	958.80	960.04	926.18	1010.18	997.31	962.10	930.53	984.57
Bottom-Elevation	890.00	930.07	950.60	951.60	925.51	1,007.75	995.38	957.94	927.58	980.20
Screen Length	5	28.1	9.6	9.7	10.7	5.6	5.7	5.4	10.4	5.3
Screen Material	PVC/sl	PVC/sl	PVC/sl	PVC/sl	SS/sw	PVC/sl	PVC/sl	SS/sw	SS/sw	SS/sw
Slot Size	0.01	0.03	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01
Open-Hole Length	.	.	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-281	GW-289	GW-301	GW-305	GW-310	GW-311	GW-315	GW-322	GW-332	GW-336
Hydrogeologic Regime	PC	BC	CR	CR	BC	BC	BC	CR	PC	PC
Functional Area	FF	BG	CRBAWP	LIV	RS	RS	SPI	CRSP	WCPA	WCPA
General Information										
Date Installed	08/20/86	11/20/86	07/02/87	08/25/87	07/23/87	07/15/87	09/25/87	09/02/87	08/11/87	08/06/87
Total Depth Drilled	17.5	40.8	182.0	179.6	27.1	40.3	104.0	193.0	24.1	21.4
East Coordinate	61,907	42,875	61,964	52,962	50,497	50,126	52,268	58,912	54,882	54,694
North Coordinate	29,771	29,982	27,662	28,548	29,437	29,267	29,455	28,241	30,058	30,057
Measuring Point	TOC	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	946.10	948.73	1,086.55	1,183.72	995.52	999.52	1,047.45	1,134.98	981.24	985.92
Ground Surface Elevation	946.53	946.32	1,083.94	1,181.07	992.40	996.43	1,044.84	1,131.81	979.55	981.56
Tag Depth-(TOC)	14.85	43.14	165.23	181.06	30.47	43.64	105.98	191.99	27.07	23.93
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQF	AQF	AQF	AQF	AQF	AQF	AQT	AQT
Geologic Formation	Cn	Cm	OCk	OCk	Cmn	Cmn	Cmn	OCk	Cn	Cn
Aquifer Zone	WT	WT	BDR	BDR	WT	WT	BDR	BDR	WT	WT
Weathered Rock-Depth	17.5	24.0	94.0	53.0	27.1	40.3	54.0	49.0	6.0	4.0
Fresh Rock-Depth	.	38.0	136.0	84.0	.	.	71.0	120.0	.	.
Conductor Casing										
Casing Depth	.	.	105.0	64.0	.	.	84.4	61.0	.	.
Outside Diameter	.	.	10.75	10.75	.	.	10.75	10.75	.	.
Inside Diameter	.	.	10	10	.	.	10	10	.	.
Casing Material	.	.	SF25	SF25	.	.	SF25	SF25	.	.
Well Casing										
Borehole Depth	17.5	40.8	163.5	179.6	27.1	40.3	104.0	135.0	24.1	21.4
Borehole Diameter	6	9	10	10	10	10	10	10	10	10
Casing Depth	5.0	30.6	151.0	168.9	21.8	29.7	93.3	128.0	18.7	15.8
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	7	4.5	4.5
Inside Diameter	4	4	4	4	4	4	4	.	4	4
Casing Material	SS304	SS304	SS304	SS304	SS304	SS304	SS304	STL	SS304	SS304
Monitored Interval										
Top-Depth	4.0	28.9	148.5	165.3	19.5	25.6	90.0	128.0	16.8	13.2
Midpoint-Depth	9.5	34.9	156.0	172.5	23.3	33.0	97.0	160.5	20.5	17.3
Pump Intake-Depth	.	35.60	157.40	173.40	25.00	31.90	97.40	182.30	21.30	17.10
Bottom of Screen-Depth	15.0	40.6	161.0	179.6	27.1	40.3	103.3	.	24.1	21.4
Bottom-Depth	15.0	40.8	163.5	179.6	27.1	40.3	104.0	193.0	24.1	21.4
Top-Elevation	942.53	917.42	935.44	1,015.77	972.90	970.83	954.84	1,003.81	962.75	968.36
Midpoint-Elevation	937.03	911.47	927.94	1,008.62	969.10	963.48	947.84	971.31	959.10	964.26
Pump Intake-Elevation	.	910.73	926.55	1007.62	967.35	964.52	947.45	949.48	958.24	964.42
Bottom-Elevation	931.53	905.52	920.44	1,001.47	965.30	956.13	940.84	938.81	955.45	960.16
Screen Length	10	10	10	10.7	5.3	10.6	10	.	5.4	5.6
Screen Material	SS/sl	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	.	.	.	.	.	.	.	65	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	6	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-337	GW-363	GW-380	GW-381	GW-382	GW-383	GW-514	GW-521	GW-522	GW-526
Hydrogeologic Regime	PC	BC	PC	PC	PC	PC	CR	CR	CR	BC
Functional Area	WCPA	EMWMF	NHP	NHP	NHP	NHP	FCAP	LIV	LIV	S3
General Information										
Date Installed	08/12/87	03/16/88	08/19/88	04/25/88	04/11/88	04/04/88	03/24/88	09/14/88	09/20/88	06/13/88
Total Depth Drilled	22.1	75.0	15.5	60.4	173.0	24.1	195.0	136.0	195.5	123.0
East Coordinate	54,519	46,872	62,938	62,948	62,956	63,522	57,341	52,040	52,612	50,708
North Coordinate	30,057	29,961	28,714	28,715	28,716	29,201	27,575	28,541	28,377	30,033
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOC	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	987.48	957.91	913.55	913.36	913.17	908.77	1,001.22	1,182.88	1,175.48	998.25
Ground Surface Elevation	984.12	955.41	913.66	913.44	913.16	906.00	998.66	1,179.46	1,172.04	995.34
Tag Depth-(TOC)	25.33	77.27	15.80	61.01	173.20	26.54	197.13	136.70	197.10	123.80
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQF	AQF	AQF	AQT	AQF	AQF	AQF	AQT
Geologic Formation	Cn	Cn	Cmn	Cmn	Cmn	Cn	OCk	OCk	OCk	Cn
Aquifer Zone	WT	BDR	WT	BDR	BDR	WT	BDR	BDR	BDR	BDR
Weathered Rock-Depth	.	9.0	15.5	13.5	12.7	11.5	44.0	.	85.0	3.5
Fresh Rock-Depth	.	21.0	.	26.0	17.0	.	92.0	54.0	130.0	23.6
Conductor Casing										
Casing Depth	.	36.0	.	13.5	12.7	5.0	105.0	60.5	90.0	23.6
Outside Diameter	.	10.75	.	13	10.75	10.75	10.75	10.75	10.75	10.75
Inside Diameter	.	10	.	.	10	10	10	10	10	10
Casing Material	.	STL	.	STL	STL	STL	STL	STL	STL	STL
Well Casing										
Borehole Depth	22.1	50.0	15.5	49.3	125.0	24.1	174.0	136.0	195.5	101.0
Borehole Diameter	10	9.5	10	9.5	9.5	8.75	9.5	9.5	9.5	9.5
Casing Depth	16.7	48.3	4.8	47.8	123.2	18.1	172.3	124.9	184.6	99.7
Outside Diameter	4.5	6.62	4.5	6.62	6.62	4.5	6.62	4.5	4.5	6.62
Inside Diameter	4	.	.	.	.	4	.	4	4	.
Casing Material	SS304	SF25	SS304	SF25	SF25	SS304	SF25	SS304	SS304	SF25
Monitored Interval										
Top-Depth	15.0	50.0	2.8	49.3	125.0	16.6	174.0	123.2	183.0	101.0
Midpoint-Depth	18.6	62.5	9.2	54.9	149.0	20.1	184.5	129.6	189.2	112.0
Pump Intake-Depth	16.60	62.50	12.60	55.50	.	20.50	189.40	129.00	187.60	112.10
Bottom of Screen-Depth	22.1	.	15.2	.	.	23.1	.	135.2	195.0	.
Bottom-Depth	22.1	75.0	15.5	60.4	173.0	23.6	195.0	136.0	195.3	123.0
Top-Elevation	969.12	905.41	910.86	864.14	788.16	889.40	824.66	1,056.26	989.04	894.34
Midpoint-Elevation	965.57	892.91	904.51	858.59	764.16	885.90	814.16	1,049.86	982.89	883.34
Pump Intake-Elevation	967.48	892.91	901.05	857.96	.	885.47	809.22	1050.48	984.48	883.25
Bottom-Elevation	962.02	880.41	898.16	853.04	740.16	882.40	803.66	1,043.46	976.74	872.34
Screen Length	5.4	.	10.4	.	.	5	.	10.3	10.4	.
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	.	25	.	11.1	48	.	21	.	.	22
Open-Hole Diameter	.	6	.	6.1	6.13	.	6	.	.	6.1

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-537	GW-540	GW-542	GW-543	GW-544	GW-557	GW-560	GW-562	GW-564	GW-605
Hydrogeologic Regime	BC	CR	CR	CR	CR	CR	CR	CR	CR	PC
Functional Area	OLF	LII	CDLVI	CDLVI	CDLVI	LV	CDLVII	CDLVII	CDLVII	EXP-I
General Information										
Date Installed	09/14/88	06/02/89	05/18/89	06/02/89	05/30/89	12/02/88	12/30/88	01/13/89	01/27/89	03/19/91
Total Depth Drilled	24.5	171.5	77.5	94.0	110.0	139.0	117.0	133.0	88.0	40.5
East Coordinate	49,539	52,371	51,642	51,458	51,820	59,520	60,743	61,640	59,865	62,002
North Coordinate	30,057	27,489	27,466	27,072	26,963	26,450	25,692	26,276	25,873	28,707
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	976.65	1,072.31	1,051.81	1,024.01	1,045.19	1,081.36	949.05	934.69	938.07	919.06
Ground Surface Elevation	974.49	1,069.38	1,049.03	1,021.19	1,042.53	1,078.63	945.76	931.86	935.12	916.97
Tag Depth-(TOC)	27.35	173.83	79.09	96.24	111.80	136.07	82.90	61.24	78.74	42.00
Geologic Information										
Hydrostratigraphic Unit	AQT	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cn	OCk	OCk	OCk	OCk	OCk	OCk	OCk	OCk	Cmn
Aquifer Zone	WT	BDR	WT	BDR	BDR	WT	WT	WT	WT	BDR
Weathered Rock-Depth	14.9	110.0	.	16.0	47.0	113.8	92.0	.	.	.
Fresh Rock-Depth	.	150.0	.	37.0	52.5	134.0	.	52.0	72.0	9.5
Conductor Casing										
Casing Depth	.	154.0	.	29.3	54.5	85.0	.	.	.	9.5
Outside Diameter	.	10.75	.	10.75	10.75	10.75	.	.	.	11.75
Inside Diameter	.	10	.	10	10	10	.	.	.	11
Casing Material	.	STL	.	STL	STL	STL	.	.	.	SJ55
Well Casing										
Borehole Depth	24.5	171.5	76.5	93.6	109.3	138.0	117.0	60.0	81.0	40.5
Borehole Diameter	8.75	9.25	9.25	9.25	9.25	9.5	9.5	9.5	9.5	10.6
Casing Depth	8.0	161.2	60.8	78.0	93.4	115.8	49.0	38.0	55.3	29.7
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.25
Inside Diameter	4	4	4	4	4	4	4	4	4	4
Casing Material	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	4.8	158.5	59.0	76.2	91.0	112.9	45.2	36.0	52.0	28.2
Midpoint-Depth	14.1	165.0	67.8	84.9	100.2	125.5	57.1	48.0	66.5	34.1
Pump Intake-Depth	22.80	166.10	68.70	85.60	100.80	123.60	59.40	48.20	65.50	33.90
Bottom of Screen-Depth	23.0	171.5	76.5	93.6	109.3	135.8	69.0	58.0	75.3	39.7
Bottom-Depth	23.3	171.5	76.5	93.6	109.3	138.0	69.0	60.0	81.0	39.9
Top-Elevation	969.69	910.88	990.03	944.99	951.53	965.73	900.56	895.86	883.12	888.77
Midpoint-Elevation	960.44	904.38	981.28	936.29	942.38	953.18	888.66	883.86	868.62	882.92
Pump Intake-Elevation	951.65	903.31	980.31	935.61	941.69	955.06	886.35	883.69	869.57	883.06
Bottom-Elevation	951.19	897.88	972.53	927.59	933.23	940.63	876.76	871.86	854.12	877.07
Screen Length	15	10.3	15.7	15.6	15.9	20	20	20	20	10
Screen Material	SS/sw	SS/sl	SS/sl	SS/sl	SS/sl	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, CY 2006

Well Number	GW-606	GW-609	GW-612	GW-615	GW-616	GW-617	GW-618	GW-619	GW-620	GW-626
Hydrogeologic Regime	PC	CR	CR	BC	BC	PC	PC	PC	PC	BC
Functional Area	EXP-I	CRSP	CRSP	S3	S3	EXP-E	EXP-E	FTF	FTF	BG
General Information										
Date Installed	03/20/91	10/18/90	11/01/89	02/13/90	03/10/90	03/19/90	03/15/90	03/27/90	03/27/90	12/15/89
Total Depth Drilled	175.0	269.0	254.0	245.0	269.0	18.0	37.0	40.8	75.0	78.0
East Coordinate	61,951	60,040	58,504	52,224	51,907	54,756	54,738	52,906	52,895	42,772
North Coordinate	28,708	28,109	28,371	30,009	29,724	29,806	29,798	29,563	29,565	29,535
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	919.59	1,112.31	1,131.03	1,017.55	1,011.81	985.28	985.14	1,015.42	1,015.57	942.87
Ground Surface Elevation	916.98	1,109.70	1,128.65	1,014.17	1,009.81	982.61	982.64	1,012.74	1,012.84	939.95
Tag Depth-(TOC)	174.36	268.80	256.28	246.84	270.59	20.69	38.30	43.63	77.91	80.92
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQT	AQT	AQF	AQF	AQF	AQF	AQT
Geologic Formation	Cmn	OCk	OCk	Cn	Cn	Cmn	Cmn	Cmn	Cmn	Cn
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	WT	WT	WT	WT	BDR
Weathered Rock-Depth	.	.	78.0	15.0	35.0	.	25.0	40.0	41.0	2.0
Fresh Rock-Depth	10.8	107.0	125.0	40.0	42.0	.	27.0	.	70.0	64.0
Conductor Casing										
Casing Depth	64.7	107.0	136.9	84.5	45.6	.	27.5	.	42.5	62.5
Outside Diameter	7	10.75	11.75	11.75	11.75	.	10.75	.	10.75	11.75
Inside Diameter	6.4	10	11	11	11	.	10	.	10	11
Casing Material	SJ55	SJ55	SJ55	SJ55	SJ55	.	SJ55	.	SJ55	SJ55
Well Casing										
Borehole Depth	175.0	269.0	235.0	222.5	219.7	18.0	37.0	40.8	75.0	78.0
Borehole Diameter	9.63	9.5	10.63	10.63	10.63	9.5	9.5	9.5	9.5	9.5
Casing Depth	161.0	258.7	230.6	221.2	217.8	7.3	26.7	30.0	64.2	67.7
Outside Diameter	4.25	4.5	7	7	7	4.5	4.5	4.5	4.5	4.5
Inside Diameter	4	4.25	6.54	6.54	6.54	4.25	4.25	4.25	4.25	4.25
Casing Material	SS304	SS304	SF25	SF25	SF25	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	155.0	256.4	230.6	222.5	219.1	6.8	26.0	26.8	61.7	63.0
Midpoint-Depth	163.0	262.7	242.3	233.8	244.1	12.4	31.5	33.8	68.4	70.5
Pump Intake-Depth	166.40	261.40	247.60	68.60	263.00	15.30	32.50	35.20	70.30	73.30
Bottom of Screen-Depth	171.0	269.0	.	.	.	17.6	37.0	40.8	75.0	77.7
Bottom-Depth	171.0	269.0	254.0	245.0	269.0	18.0	37.0	40.8	75.0	78.0
Top-Elevation	761.98	853.30	898.05	791.67	790.71	975.81	956.64	985.94	951.14	876.95
Midpoint-Elevation	753.98	847.00	886.35	780.42	765.76	970.21	951.14	978.94	944.49	869.45
Pump Intake-Elevation	750.59	848.31	881.03	945.55	746.81	967.28	950.14	977.52	942.57	866.67
Bottom-Elevation	745.98	840.70	874.65	769.17	740.81	964.61	945.64	971.94	937.84	861.95
Screen Length	10	10.3	.	.	.	10.3	10.3	10.8	10.8	10
Screen Material	SS/ppk	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
Open-Hole Length	.	.	23.4	22.5	49.9	.	.	.	.	.
Open-Hole Diameter	.	.	6.25	6.25	6.25	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-627	GW-629	GW-633	GW-639	GW-653	GW-656	GW-658	GW-683	GW-684	GW-686
Hydrogeologic Regime	BC	BC	PC	BC	BC	PC	PC	BC	BC	PC
Functional Area	BG	BG	RG	EMWMF	BG	T0134	FF	EXP-A	EXP-A	CPT
General Information										
Date Installed	12/11/89	02/02/90	05/03/90	06/15/90	08/10/90	07/19/90	08/31/90	12/03/90	10/09/90	10/18/90
Total Depth Drilled	270.0	312.0	15.0	125.5	39.0	21.5	19.1	197.5	129.6	17.0
East Coordinate	42,774	43,047	53,100	45,260	42,317	57,439	62,146	41,552	41,354	55,956
North Coordinate	29,505	29,522	30,145	29,626	29,660	29,895	29,638	28,282	28,525	29,540
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOC
Measuring Point Elevation	943.51	928.03	996.43	940.95	931.84	954.79	944.81	972.23	898.83	963.76
Ground Surface Elevation	940.39	924.42	996.66	937.98	928.85	954.90	942.04	969.45	895.53	964.43
Tag Depth-(TOC)	270.96	314.59	15.15	129.64	41.53	20.60	20.64	199.83	132.21	16.23
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQF	AQF	AQF
Geologic Formation	Cn	Cn	Cn	Cn	Cn	Cn	Cn	OCk	Cmn	Cmn
Aquifer Zone	BDR	BDR	WT	BDR	WT	WT	WT	BDR	BDR	WT
Weathered Rock-Depth	3.0	12.0	8.5	3.0	3.5	12.0	1.5	22.0	.	17.0
Fresh Rock-Depth	43.0	42.0	.	20.0	35.0	.	.	26.0	9.5	.
Conductor Casing										
Casing Depth	47.5	45.1	.	31.0	.	.	3.5	82.0	87.0	.
Outside Diameter	11.75	11.75	.	11.75	.	.	10.75	11.75	11.75	.
Inside Diameter	11	11	.	11	.	.	10	11	11	.
Casing Material	SJ55	SJ55	.	SJ55	.	.	SJ55	SJ55	SJ55	.
Well Casing										
Borehole Depth	254.0	262.3	15.0	95.5	39.0	21.5	19.1	197.5	129.6	16.0
Borehole Diameter	10.63	10.63	10.5	10	9.5	9.5	9.5	10.63	10.5	12
Casing Depth	252.7	266.3	5.0	94.5	29.0	10.7	8.8	146.0	113.8	6.0
Outside Diameter	7	7	4.5	7	4.5	4.5	4.5	4.5	4.5	4.5
Inside Diameter	6.54	6.54	4	6.54	4.25	4.25	4.25	4.25	4.25	4.25
Casing Material	SF25	SF25	PVC	SF25	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	254.0	262.3	3.5	95.5	26.3	8.3	6.9	133.9	106.4	4.0
Midpoint-Depth	262.0	287.2	9.3	110.5	32.7	14.9	13.0	165.4	118.0	10.0
Pump Intake-Depth	255.90	286.40	12.20	.	33.50	18.10	13.80	171.20	119.70	15.67
Bottom of Screen-Depth	.	.	15.0	.	39.0	20.7	18.8	196.8	128.4	16.0
Bottom-Depth	270.0	312.0	15.0	125.5	39.0	21.5	19.1	196.8	129.6	16.0
Top-Elevation	686.39	662.12	993.16	842.48	902.55	946.60	935.14	835.55	789.13	960.43
Midpoint-Elevation	678.39	637.27	987.41	827.48	896.20	940.00	929.04	804.10	777.53	954.43
Pump Intake-Elevation	684.51	638.03	984.43	.	895.34	936.79	928.21	798.23	775.83	948.76
Bottom-Elevation	670.39	612.42	981.66	812.48	889.85	933.40	922.94	772.65	765.93	948.43
Screen Length	.	.	10	.	10	10	10	50.8	14.6	10
Screen Material	.	.	PVC/sl	.	SS/sw	SS/sw	SS/sw	SS/ppck	SS/ppck	SS/sw
Slot Size	.	.	0.01	.	0.01	0.01	0.01	0.01	0.01	0.01
Open-Hole Length	16	49.7	.	30	.	.	.	.	.	.
Open-Hole Diameter	6.25	6.5	.	6.25	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-690	GW-691	GW-692	GW-694	GW-695	GW-698	GW-700	GW-703	GW-704	GW-706
Hydrogeologic Regime	PC	PC	PC	BC	BC	PC	PC	BC	BC	BC
Functional Area	CPT	CPT	CPT	EXP-B	EXP-B	B8110	B8110	EXP-B	EXP-B	EXP-B
General Information										
Date Installed	10/24/90	10/24/90	10/25/90	02/07/91	02/21/91	11/02/90	10/03/90	12/07/90	12/20/90	01/27/91
Total Depth Drilled	53.0	20.0	53.0	204.5	62.6	75.0	31.0	182.0	256.0	182.5
East Coordinate	55,990	55,983	56,001	44,893	44,868	56,804	56,828	44,931	44,935	44,944
North Coordinate	29,787	29,794	29,653	28,845	28,845	29,277	29,453	28,806	28,845	28,946
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	967.36	968.59	964.38	941.98	939.54	970.09	960.18	955.29	945.33	929.47
Ground Surface Elevation	967.71	968.09	964.55	938.58	937.22	970.09	957.78	951.80	941.99	925.78
Tag Depth-(TOC)	53.25	20.39	53.05	207.27	65.28	74.88	33.19	185.29	258.65	185.79
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cmn	Cmn	Cmn	Cmn	OCk	Cmn	Cmn	Cmn	Cmn	Cmn
Aquifer Zone	BDR	WT	BDR	BDR	BDR	BDR	WT	BDR	BDR	BDR
Weathered Rock-Depth	24.0	20.0	23.0	11.0	6.0	42.0	31.0	7.0	16.0	17.0
Fresh Rock-Depth	.	.	.	21.0	18.0	.	.	10.0	23.0	27.0
Conductor Casing										
Casing Depth	26.0	.	25.0	25.8	22.5	42.0	.	.	21.0	40.3
Outside Diameter	10.5	.	10.5	11.75	11.75	10.5	.	.	11.75	11.75
Inside Diameter	10	.	10	11	11	10	.	.	11	11
Casing Material	PVC40	.	PVC40	STL	SJ55	PVC40	.	.	SJ55	SJ55
Well Casing										
Borehole Depth	53.0	20.0	53.0	154.0	62.6	75.0	31.0	135.0	246.0	157.0
Borehole Diameter	8.5	12	8.5	10.6	9.88	8.5	12	10.63	10.63	10.6
Casing Depth	42.8	10.0	43.0	152.0	52.4	65.0	21.0	132.8	243.5	155.1
Outside Diameter	4.5	4.5	4.5	7	4.5	4.5	4.5	7	7	7
Inside Diameter	4.25	4.25	4.25	6.45	4.25	4.25	4.25	6.54	6.54	6.54
Casing Material	SS304	SS304	SS304	SF25	SS304	SS304	SS304	SF25	SF25	SF25
Monitored Interval										
Top-Depth	40.8	8.0	41.0	153.0	50.6	63.0	19.0	133.8	244.5	156.1
Midpoint-Depth	46.8	14.0	47.0	178.8	56.6	69.0	25.0	157.9	250.3	169.3
Pump Intake-Depth	48.40	14.50	48.20	178.70	57.70	71.00	26.10	158.50	250.20	174.80
Bottom of Screen-Depth	52.8	20.0	53.0	.	62.4	75.0	31.0	.	.	.
Bottom-Depth	52.8	20.0	53.0	204.5	62.6	75.0	31.0	182.0	256.0	182.5
Top-Elevation	926.91	960.09	923.55	785.58	886.62	907.09	938.78	818.00	697.49	769.68
Midpoint-Elevation	920.91	954.09	917.55	759.83	880.62	901.09	932.78	793.90	691.74	756.48
Pump Intake-Elevation	919.36	953.59	916.38	759.88	879.54	899.09	931.68	793.29	691.83	750.97
Bottom-Elevation	914.91	948.09	911.55	734.08	874.62	895.09	926.78	769.80	685.99	743.28
Screen Length	10	10	10	.	10	10	10	.	.	.
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	.	.	.	51.5	.	.	.	48.2	11.5	26.4
Open-Hole Diameter	.	.	.	6.25	.	.	.	6.25	6.5	6.25

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-709	GW-712	GW-713	GW-714	GW-722	GW-724	GW-725	GW-731	GW-732	GW-733
Hydrogeologic Regime	CR	BC	BC	BC	PC	BC	BC	CR	CR	PC
Functional Area	LII	EXP-W	EXP-W	EXP-W	EXP-J	EXP-C	EXP-C	CRSDB	CRSDB	EXP-J
General Information										
Date Installed	04/05/91	06/20/91	01/13/92	01/24/92	08/09/91	08/12/91	08/27/91	09/12/91	09/11/91	10/02/91
Total Depth Drilled	80.6	457.5	315.2	145.0	644.3	301.6	142.5	180.4	190.6	256.5
East Coordinate	52,372	36,507	36,434	36,435	64,926	48,995	48,989	63,863	64,268	65,067
North Coordinate	25,344	28,233	28,236	28,422	28,532	29,198	29,405	27,464	27,717	28,447
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOC	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	906.81	877.89	881.43	875.88	953.71	979.75	961.63	1,049.38	1,064.29	959.84
Ground Surface Elevation	903.84	873.61	877.83	872.30	951.04	976.62	958.26	1,045.75	1,060.65	955.69
Tag Depth-(TOC)	83.52	460.53	318.39	146.90	642.68	293.60	145.42	178.53	192.84	259.93
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	Cmn	Cmn	Cmn	Cmn	Cmn	OCk	OCk	Cmn
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock-Depth	39.0	12.0	26.8	27.0	54.0	33.5	14.0	95.4	85.0	42.5
Fresh Rock-Depth	43.0	66.0	63.8	35.0	73.0	40.0	17.5	129.4	96.0	47.1
Conductor Casing										
Casing Depth	50.0	44.8	80.2	40.5	56.2	40.0	21.0	122.0	100.7	51.8
Outside Diameter	11.75	11.75	.	11.75	10.75	11.75	11.75	11.75	11.75	11.75
Inside Diameter	11	11	.	11	10	11	11	11	11	11
Casing Material	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55	SJ55
Well Casing										
Borehole Depth	80.6	441.5	305.0	115.1	75.0	289.6	132.5	175.4	189.5	240.1
Borehole Diameter	10.6	10.6	10.6	10.6	6	10.6	10.6	10.6	10.6	10.6
Casing Depth	70.4	440.2	303.7	113.8	74.5	288.3	131.2	165.2	179.3	238.8
Outside Diameter	4.25	7	7	7	4.5	7	7	4.5	4.5	7
Inside Diameter	4	6.54	6.54	6.54	4	6.54	6.54	4.25	4.25	6.54
Casing Material	SS304	SF25	SF25	SF25	SJ55	SF25	SF25	SS304	SS304	SF25
Monitored Interval										
Top-Depth	68.7	441.5	305.0	115.1	74.5	289.6	132.5	164.0	178.3	240.1
Midpoint-Depth	74.7	449.5	310.1	130.1	359.4	295.6	137.5	171.4	184.2	248.3
Pump Intake-Depth	75.50	446.20	307.40	138.40	.	294.40	137.10	169.90	184.40	248.90
Bottom of Screen-Depth	80.4	.	.	.	.	.	.	175.2	189.3	.
Bottom-Depth	80.6	457.5	315.2	145.0	644.3	301.6	142.5	178.7	190.0	256.5
Top-Elevation	835.14	432.11	572.83	757.20	876.54	687.02	825.76	881.75	882.35	715.59
Midpoint-Elevation	829.19	424.11	567.73	742.25	591.64	681.02	820.76	874.40	876.50	707.39
Pump Intake-Elevation	828.31	427.39	570.43	733.88	.	682.25	821.13	875.88	876.29	706.84
Bottom-Elevation	823.24	416.11	562.63	727.30	306.74	675.02	815.76	867.05	870.65	699.19
Screen Length	10	.	.	.	.	.	.	10	10	.
Screen Material	SS/sw	.	.	.	.	.	.	SS/sw	SS/sw	.
Slot Size	0.01	.	.	.	.	.	.	0.01	0.01	.
Open-Hole Length	.	16	10.2	29.9	569.8	12	10	.	.	16.4
Open-Hole Diameter	.	6.25	6.25	6.25	3.5	6.25	6.25	.	.	6.25

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-738	GW-740	GW-744	GW-747	GW-748	GW-749	GW-757	GW-762	GW-763	GW-769
Hydrogeologic Regime	BC	BC	PC	PC	PC	PC	CR	PC	PC	PC
Functional Area	EXP-C	EXP-C	GRIDK1	GRIDK2	GRIDK2	GRIDK2	LII	GRIDJ3	GRIDJ3	GRIDG3
General Information										
Date Installed	11/21/91	12/20/91	01/08/92	01/28/92	01/30/92	02/04/92	04/24/92	05/15/92	05/13/92	06/04/92
Total Depth Drilled	90.1	190.0	69.5	79.9	27.2	16.4	166.5	60.2	17.0	61.4
East Coordinate	49,026	49,055	64,324	64,570	64,579	64,586	53,303	63,193	63,220	60,230
North Coordinate	29,150	29,027	30,282	29,730	29,741	29,726	25,410	29,115	29,117	29,510
Measuring Point	TOWW	TOWW	TOWW	TOC	TOC	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	983.31	1,020.25	907.43	911.06	911.19	921.19	961.64	915.56	915.03	944.43
Ground Surface Elevation	980.36	1,016.95	905.05	911.68	911.71	918.69	958.65	911.85	911.38	941.53
Tag Depth-(TOC)	91.78	192.67	69.28	82.33	29.80	18.80	168.54	62.04	20.41	62.73
Geologic Information										
Hydrostratigraphic Unit	AQF	AQF	AQT	AQT	AQT	AQT	AQF	AQT	AQT	AQT
Geologic Formation	Cmn	Cmn	Cpv	Cm	Cm	Cm	OCk	Cn	Cn	Cn
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	WT	BDR	BDR	WT	BDR
Weathered Rock-Depth	12.0	38.1	9.6	10.5	8.0	9.0	29.5	12.0	17.0	14.2
Fresh Rock-Depth	15.1	45.1	14.6	12.0	11.8	11.0	48.0	14.5	.	.
Conductor Casing										
Casing Depth	16.5	46.9	27.6	23.8	.	.	46.8	19.4	.	17.2
Outside Diameter	11.75	11.75	10.75	10.75	.	.	10.75	11.75	.	11.75
Inside Diameter	11	11	10	10	.	.	10.25	11	.	11
Casing Material	SJ55	SJ55	SJ55	SJ55	.	.	SJ55	SJ55	.	SJ55
Well Casing										
Borehole Depth	90.1	165.6	69.5	79.9	27.2	16.4	166.5	60.2	17.0	61.4
Borehole Diameter	10.6	10.6	9.87	9.87	9.87	9.87	9.62	9.87	8	10.62
Casing Depth	67.3	164.3	57.0	69.2	17.0	6.0	135.5	48.2	5.2	49.4
Outside Diameter	4.5	7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Inside Diameter	4.25	6.54	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Casing Material	SS304	SF25	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval										
Top-Depth	63.5	165.6	55.0	67.4	14.8	4.8	134.0	46.4	4.0	48.2
Midpoint-Depth	75.8	177.8	62.3	73.5	21.0	10.6	150.3	52.6	10.0	54.3
Pump Intake-Depth	78.60	183.70	65.10	68.62	17.52	13.50	155.00	.	11.80	54.90
Bottom of Screen-Depth	87.3	.	66.9	79.1	26.9	4.8	165.5	58.1	15.2	59.3
Bottom-Depth	88.0	190.0	69.5	79.6	27.2	16.4	166.5	58.7	16.0	60.3
Top-Elevation	916.86	851.35	850.05	844.28	896.91	913.89	824.65	865.45	907.38	893.33
Midpoint-Elevation	904.61	839.15	842.80	838.18	890.71	908.09	808.40	859.30	901.38	887.28
Pump Intake-Elevation	901.81	833.25	839.93	843.06	894.19	905.19	803.64	.	899.63	886.63
Bottom-Elevation	892.36	826.95	835.55	832.08	884.51	902.29	792.15	853.15	895.38	881.23
Screen Length	20	.	9.9	9.9	9.9	9.9	30	9.9	10	9.9
Screen Material	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	.	24.4	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	6.25	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number	GW-770	GW-781	GW-782	GW-783	GW-791	GW-792	GW-796	GW-797	GW-798	GW-799
Hydrogeologic Regime	PC	PC	PC	PC	PC	PC	CR	CR	CR	CR
Functional Area	GRIDG3	GRIDE3	GRIDE3	GRIDE3	GRIDD2	GRIDD2	LV	LV	CDLVII	LV
General Information										
Date Installed	06/04/92	08/10/92	08/12/92	08/13/92	09/21/92	09/24/92	03/04/93	03/16/93	03/18/93	03/25/93
Total Depth Drilled	20.0	69.6	36.0	16.3	70.6	29.2	139.7	134.1	135.5	92.0
East Coordinate	60,255	58,118	58,099	58,113	57,423	57,442	58,206	58,550	60,310	59,961
North Coordinate	29,505	29,711	29,719	29,734	30,483	30,481	27,924	27,447	27,265	26,746
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	944.72	947.89	947.73	948.49	992.13	992.74	1,052.62	1,060.00	1,006.00	981.29
Ground Surface Elevation	941.67	944.66	944.48	945.81	988.51	989.60	1,048.80	1,056.10	1,002.42	978.10
Tag Depth-(TOC)	21.68	71.07	38.23	17.98	72.45	31.99	139.82	135.71	134.00	97.58
Geologic Information										
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQF	AQF	AQF	AQF
Geologic Formation	Cn	Cn	Cn	Cn	Cm	Cm	OCk	OCk	OCk	OCk
Aquifer Zone	WT	BDR	BDR	WT	BDR	WT	BDR	BDR	BDR	BDR
Weathered Rock-Depth	12.0	0.9	1.0	1.0	14.7	14.5	102.0	67.1	94.4	60.8
Fresh Rock-Depth	16.5	14.0	7.5	8.5	26.0	.	103.0	89.0	95.8	62.8
Conductor Casing										
Casing Depth	.	23.8	.	.	31.5	.	107.6	95.0	99.7	65.0
Outside Diameter	.	10.75	.	.	10.75	.	10.75	10.75	10.75	10.75
Inside Diameter	.	10	.	.	10	.	10	10	10	10
Casing Material	.	SJ55	.	.	SJ55	.	SJ55	SJ55	SJ55	SJ55
Well Casing										
Borehole Depth	20.0	69.6	36.0	16.3	70.6	29.2	139.7	134.1	135.5	92.0
Borehole Diameter	10.62	9.87	9.87	9.87	9.87	9.87	9.5	9.5	9.5	9.5
Casing Depth	8.5	57.8	25.0	4.2	59.0	18.5	126.5	123.5	124.5	81.0
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	7.5	56.0	23.8	3.6	57.5	17.0	122.9	118.0	122.0	78.7
Midpoint-Depth	13.3	62.7	29.9	10.0	64.1	23.0	129.7	126.1	128.7	85.4
Pump Intake-Depth	13.60	62.80	29.80	10.30	63.80	24.90	131.20	128.10	125.90	84.80
Bottom of Screen-Depth	18.4	68.0	34.9	13.9	68.9	28.2	136.4	133.4	134.4	90.9
Bottom-Depth	19.0	69.3	35.9	16.3	70.6	29.0	136.5	134.1	135.4	92.0
Top-Elevation	934.17	888.66	920.68	942.21	931.01	972.60	925.90	938.10	880.42	899.40
Midpoint-Elevation	928.42	882.01	914.63	935.86	924.46	966.60	919.10	930.05	873.72	892.75
Pump Intake-Elevation	928.02	881.89	914.73	935.49	924.73	964.74	917.62	928.00	876.50	893.29
Bottom-Elevation	922.67	875.36	908.58	929.51	917.91	960.60	912.30	922.00	867.02	886.10
Screen Length	9.9	10.2	9.9	9.7	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, CY 2006

Well Number	GW-801	GW-802	GW-816	GW-820	GW-827	GW-829	GW-831	GW-832
Hydrogeologic Regime	CR	PC	PC	PC	CR	BC	CR	PC
Functional Area	LV	FF	EXP-SR	B9201-2	CDLVI	OLF	FCAP	NHP
General Information								
Date Installed	07/01/93	06/25/93	06/02/94	.	01/24/95	03/17/95	07/30/96	05/09/96
Total Depth Drilled	188.9	26.5	16.1	17.3	135.0	115.0	200.0	11.9
East Coordinate	58,780	62,217	64,031	59,773	51,826	50,036	56,593	64,134
North Coordinate	26,808	29,655	31,582	29,175	27,721	29,953	26,654	29,142
Measuring Point	TOWW	TOC	TOWW	TOWW	TOWW	TOWW	TOWW	TOC
Measuring Point Elevation	1,097.16	941.83	898.42	929.57	1,051.60	985.95	1,091.29	906.18
Ground Surface Elevation	1,093.82	942.30	894.56	929.67	1,048.13	981.92	1,088.04	906.83
Tag Depth-(TOC)	190.92	25.42	17.99	17.18	137.22	118.68	198.06	10.36
Geologic Information								
Hydrostratigraphic Unit	AQF	AQT	AQT	AQF	AQF	AQT	AQF	AQF
Geologic Formation	OCk	Cn	Cr	Cmn	OCk	Cn	OCk	Cmn
Aquifer Zone	BDR	WT	WT	WT	BDR	BDR	BDR	WT
Weathered Rock-Depth	112.5	10.0	.	.	.	1.3	134.8	.
Fresh Rock-Depth	113.4	15.0	.	.	40.5	29.0	140.8	.
Conductor Casing								
Casing Depth	115.4	.	.	.	43.4	.	138.3	.
Outside Diameter	10.75	.	.	.	10.75	.	10.75	.
Inside Diameter	10	.	.	.	10	.	10	.
Casing Material	SJ55	.	.	.	STL	.	STL	.
Well Casing								
Borehole Depth	188.9	26.5	15.8	.	135.0	115.0	200.0	11.9
Borehole Diameter	9.87	10.62	10	.	9.87	9.87	9.87	12
Casing Depth	178.1	15.5	4.2	.	124.1	104.7	183.2	5.9
Outside Diameter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.63
Inside Diameter	4.25	4	4.25	4	4.25	4.25	4.25	6
Casing Material	SS304	PVC40	SS304	PVC	SS304	SS304	SLS	PVC
Monitored Interval								
Top-Depth	175.8	13.3	2.9	.	122.1	102.9	182.0	4.0
Midpoint-Depth	182.4	19.9	9.4	.	128.5	108.8	190.8	7.9
Pump Intake-Depth	177.70	.	11.10	15.60	128.70	109.50	188.80	.
Bottom of Screen-Depth	188.0	25.5	13.6	.	134.1	114.5	193.6	10.9
Bottom-Depth	188.9	26.5	15.8	17.3	134.8	114.6	199.6	11.8
Top-Elevation	918.02	929.00	891.66	.	926.03	879.02	906.04	902.83
Midpoint-Elevation	911.47	922.40	885.21	.	919.68	873.17	897.24	898.93
Pump Intake-Elevation	916.16	.	883.42	914.07	919.40	872.45	899.29	.
Bottom-Elevation	904.92	915.80	878.76	912.37	913.33	867.32	888.44	895.03
Screen Length	9.9	10	9.4	.	10	9.8	10.4	5
Screen Material	SS/sw	PVC/sl	SS/sw	.	SS/sw	SS/sw	SS/sw	PVC/sl
Slot Size	0.01	0.01	0.01	.	0.01	0.01	0.01	0.02
Open-Hole Length	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.

APPENDIX C: MONITORING WELL CONSTRUCTION DETAILS, CY 2006

Well Number Hydrogeologic Regime Functional Area	GW-916 BC EMWMF	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
General Information									
Date Installed	01/29/01	01/22/01	02/02/01	01/16/01	01/31/01	01/17/01	02/01/01	01/29/01	02/05/01
Total Depth Drilled	36.0	51.0	75.0	55.0	50.0	46.0	102.0	54.0	170.0
East Coordinate	48,276	47,914	47,549	47,375	47,139	47,147	48,184	46,300	47,128
North Coordinate	31,186	30,463	31,672	30,193	30,350	30,024	30,822	30,185	30,349
Measuring Point	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW	TOWW
Measuring Point Elevation	1,002.85	997.10	1,067.96	967.43	971.29	956.91	1,016.73	968.90	971.14
Ground Surface Elevation	.	.	.	.	.	.	.	.	.
Tag Depth-(TOC)	.	.	.	.	.	.	.	.	.
Geologic Information									
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT
Geologic Formation	Cc	Cc	Cc	Cc	Cc	Cc	Cc	Cc	Cc
Aquifer Zone	WT	WT	WT	BDR	BDR	BDR	WT	WT	BDR
Weathered Rock-Depth	10.0	21.0	.	.	.	10.0	.	21.8	.
Fresh Rock-Depth	15.0	27.0	30.0	12.0	13.0	13.0	62.0	22.0	15.0
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
Outside Diameter	.	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
Casing Material	.	SS304	SS304	SS304	SS304	SS304	SS304	SS304	SS304
Monitored Interval									
Top-Depth	13.0	18.0	18.0	22.0	16.0	23.0	36.0	21.0	92.0
Midpoint-Depth	24.5	34.5	25.5	38.5	33.0	34.5	55.5	37.5	120.0
Pump Intake-Depth	.	.	.	.	.	.	.	.	.
Bottom of Screen-Depth	35.0	50.0	30.0	54.0	48.0	45.0	70.0	53.0	147.0
Bottom-Depth	36.0	51.0	33.0	55.0	50.0	46.0	75.0	54.0	148.0
Top-Elevation	.	.	.	.	.	.	.	.	.
Midpoint-Elevation	.	.	.	.	.	.	.	.	.
Pump Intake-Elevation	975.35	959.60	1039.46	925.93	935.29	919.41	958.23	928.40	848.14
Bottom-Elevation	.	.	.	.	.	.	.	.	.
Screen Length	20	30	10	30	30	20	30	30	50
Screen Material	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, CY 2006

Well Number	GW-926	GW-927	GW-954	GW-956	GW-959
Hydrogeologic Regime	BC	BC	EF	EF	EF
Functional Area	EMWMF	EMWMF	Y12	Y12	B9201-2
General Information					
Date Installed	02/01/01	02/01/01	08/09/05	08/10/05	03/11/05
Total Depth Drilled	145.0	172.0	170.0	170.0	9.0
East Coordinate	46,290	47,906	58,218	61,050	60,189
North Coordinate	30,185	30,463	30,622	29,475	29,115
Measuring Point	TOWW	TOWW	TOC	GS	TOWW
Measuring Point Elevation	968.94	997.19	988.27	940.00	927.69
Ground Surface Elevation	.	.	988.73	940.00	928.32
Tag Depth-(TOC)	.	.	.	.	.
Geologic Information					
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQF
Geologic Formation	Cc	Cc	Cc	Cc	Cmn
Aquifer Zone	BDR	BDR	BDR	BDR	WT
Weathered Rock-Depth	15.0	25.0	.	.	.
Fresh Rock-Depth	18.0	30.0	.	.	.
Conductor Casing					
Casing Depth	.	.	.	.	.
Outside Diameter	.	.	.	.	.
Inside Diameter	.	.	.	.	.
Casing Material	.	.	.	.	.
Well Casing					
Borehole Depth	.	.	.	.	9.0
Borehole Diameter	.	.	.	.	7.5
Casing Depth	113.0	60.0	.	.	3.4
Outside Diameter	2.37	2.37	.	.	4.5
Inside Diameter	2.07	2.07	.	.	4.25
Casing Material	SS304	SS304	.	.	SS304
Monitored Interval					
Top-Depth	103.0	57.0	25.3	18.0	2.4
Midpoint-Depth	124.0	74.5	.	.	5.4
Pump Intake-Depth	.	.	.	.	8.13
Bottom of Screen-Depth	143.0	90.0	.	.	8.4
Bottom-Depth	145.0	92.0	105.4	121.2	9.0
Top-Elevation	.	.	963.43	922.00	925.92
Midpoint-Elevation	.	.	.	.	922.92
Pump Intake-Elevation	841.94	919.69	.	.	920.19
Bottom-Elevation	.	.	883.33	818.80	919.32
Screen Length	30	30	.	.	5
Screen Material	SS/sw	SS/sw	.	.	SS/sw
Slot Size	0.01	0.01	.	.	0.01
Open-Hole Length	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.

APPENDIX D

CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME

EXPLANATION

Sampling Point:

BCK - Bear Creek Kilometer
EMW-VWUNDER - outfall for an underdrain installed to lower the water table and relieve hydrostatic pressure beneath the EMWMF liner.
GW - Monitoring Well
NT - Northern Tributary (Bear Creek)
SS - South Side (of Bear Creek, spring sampling station)

Location:

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

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

EXPLANATION (continued)

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.

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	Bicarbonate	1.0	NS
Magnesium	0.2	0.05	Carbonate	1.0	NS
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
Note: "NS" - not specified.					

The major ion results for the following samples are qualitative because the ion charge balance error (percent difference between summed cation charge and summed anion charge) exceeds 20%.

Sampling Point	Date Sampled	Charge Balance Error (%)	Suspected Source of Error
BCK-11.84	02/28/06	-88.1	High nitrate
NT-08	02/28/06	-40.3	High bicarbonate

The Y-12 GWPP sampling and analysis plan (SAP) for CY 2006 (BWXT 2006a) specifies trace metal reporting limits and analytical methods 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. For this report, the analytical methods for metals used by BJC monitoring programs (EPA-7470, SW846-6010B, SW846-6020, and ASTM-D5174-M) are considered to be functionally equivalent to the methods used by the GWPP (Table B.5). 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 2005 and 2006) shown below. The trace metals shown in bold typeface below were detected in at least one groundwater or surface water sample collected during CY 2006 and are presented in Appendix D.1.

EXPLANATION (continued)

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	0.0025	0.006	**Manganese**	0.005	0.005
Arsenic	0.005	0.005	**Mercury**	0.0002	0.0002
Barium	0.004	0.005*	**Molybdenum**	0.05	0.01*
Beryllium	0.001	0.001	**Nickel**	0.005	0.01
Boron	0.1	0.01*	**Selenium**	0.01	0.005*
Cadmium	0.0025	0.001*	Silver	0.02	0.005*
Chromium	0.005	0.005	**Strontium**	0.005	0.005
Cobalt	0.02	0.005*	**Thallium**	0.0005	0.002
Copper	0.02	0.005*	**Thorium**	0.2	NS
Iron	0.05	0.01*	**Uranium**	0.0005	0.004
Lead	0.0005	0.003	Vanadium	0.02	0.01*
			Zinc	0.05	0.01*

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

Groundwater samples collected from the following wells for metals analysis during CY 2006 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-246	02/08/06	10	GW-615	02/21/06	10
GW-246	08/21/06	10			

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
J - Positively identified; estimated concentration
Q - Result is inconsistent with historical measurements for the location
R - Result does not meet data quality objectives (charge balance error exceeds +/- 20%)

EXPLANATION (continued)

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, 30 compounds were detected in the CY 2006 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	45	4,600	Carbon tetrachloride	6	390
cis-1,2-Dichloroethene	42	6,600	2-Butanone	5	40
Tetrachloroethene	41	17,000	Dichlorodifluoromethane	4	53
1,1-Dichloroethene	27	300	1,1,2-Trichloroethane	4	11 Q
1,1-Dichloroethane	22	5,600	1,2-Dichloroethane	3	3 J
Vinyl chloride	17	1,500	1,2-Dimethylbenzene	3	2
Benzene	14	2,800	Methylene chloride	2	17
Acetone	14	20	Chlorobenzene	2	11
Toluene	13	55	Ethylbenzene	2	5
trans-1,2-Dichloroethene	12	65	1,2-Dichloropropane	2	3 J
1,1,1-Trichloroethane	10	2,100	Dibromochloromethane	1	7
Chloroform	10	76	Carbon disulfide	1	5
Chloroethane	10	22	1,4-Dichlorobenzene	1	3
Total Xylene	10	19	1,4-Dichloro-2-butene	1	2 J
1,1,2-Trichloro-1,2,2-trifluoroethane	9	980	Trichlorofluoromethane	1	2 J

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
Q - Result is inconsistent with historical measurements for the location

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 2006 includes analyses for 34 isotopes with low detection limits. The following summary shows the primary radiological analytes relevant to DOE Order monitoring collected during CY 2006 in the Bear Creek Regime.

Analyte	No. of Results	No. Detected	Analyte	No. of Results	No. Detected
Gross Alpha	86	42	Technetium-99	129	33
Gross Beta	107	83	Uranium-234*	141	124
Americium-241	77	6	Uranium-235*	141	53
Neptunium-237	77	5	Uranium-236	59	27
Total Radium Alpha	2	1	Uranium-238	141	97
Strontium-89/90*	76	27			

Note: * = Reported by BJC laboratories 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 three pages of Appendix D.3, followed by results for the primary isotopes shown above (pages D.3-5 through D.3-17).

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	75	17	Plutonium-236	41	3
Americium-243	41	10	Plutonium-238	41	1
Carbon-14	73	1	Plutonium-239/240	75	9
Cesium-137	75	3	Plutonium-241	41	0
Chlorine-36	73	5	Plutonium-242	41	11
Cobalt-60	41	0	Plutonium-244	41	0
Curium-242	41	0	Potassium-40	41	1
Curium-243/244	41	0	Radium-226	75	19
Curium-245	41	12	Radium-228	75	11
Curium-246	41	12	Thorium-227	41	13
Curium-247	41	7	Thorium-228	75	11
Curium-248	75	28	Thorium-229	40	6
Europium-152	41	0	Thorium-230	75	67
Europium-154	41	0	Thorium-232	75	17
Europium-155	41	0	Tritium	73	1
Iodine-129	73	7	Uranium-232	41	2
Nickel-63	41	1	Yttrium-90	75	26

Results for the isotopes that exceed the MDA (shown above as detected) are presented after the primary isotopic data (beginning on page D.3-19).

EXPLANATION (continued)

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

Activity	-	Result in picoCuries per liter (pCi/L)
TPU	-	Total propagated uncertainty (two standard deviations); calculation includes the counting error (instrument uncertainty) as reported previously, plus other sources of uncertainty (e.g., volumetric, chemical yield)
MDA	-	Minimum detectable activity
.	-	Not analyzed
<	-	Analyzed but less than the MDA (not detected)
R	-	Result does not meet data quality objectives: exceeds the MDA but is less than the TPU.

Additional Analytes Not Presented in Appendix D tables:

As shown below, a few semivolatile organic compounds were detected in at least one sample from most of the locations at the Environmental Management Waste Management Facility.

Sampling Location	Date Sampled	Compound	Result (µg/L)
GW-363	08/14/06	2-Methylnaphthalene	1 J
GW-363	08/14/06	Naphthalene	2 J
GW-916	11/13/06	Di-n-octylphthalate	0.6 J
GW-917	11/06/06	Di-n-butylphthalate	0.6 J
GW-918	08/09/06	Di-n-butylphthalate	3 J
GW-918	11/13/06	Carbazole	0.7
GW-921	11/07/06	Bis(2-ethylhexyl)phthalate	0.8 J
GW-921	11/07/06	Phenol	2 J
GW-922	04/18/06	Di-n-butylphthalate	2
GW-924	08/14/06	Bis(2-ethylhexyl)phthalate	0.9 J
GW-924	11/06/06	Bis(2-ethylhexyl)phthalate	0.5 J
GW-925	04/19/06	Di-n-butylphthalate	0.6 J
GW-925	11/07/06	Bis(2-ethylhexyl)phthalate	0.9 J
GW-926	11/06/06	Bis(2-ethylhexyl)phthalate	0.9 J
GW-927	11/07/06	Bis(2-ethylhexyl)phthalate	0.7 J
EMW-VWEIR	04/17/06	Di-n-butylphthalate	0.5 J
EMW-VWEIR	11/07/06	Benzo(k)fluoranthene	0.5
EMW-VWEIR	11/07/06	Bis(2-ethylhexyl)phthalate	2 J
EMW-VWEIR	11/07/06	Indeno(1,2,3-cd)pyrene	0.6
EMW-VWUNDER	04/20/06	Di-n-butylphthalate	0.5 J
EMWNT-03A	11/07/06	Bis(2-ethylhexyl)phthalate	2 J
EMWNT-05	04/17/06	Di-n-butylphthalate	0.6 J
EMWNT-05	08/16/06	Bis(2-ethylhexyl)phthalate	0.9 J
EMWNT-05	11/07/06	Bis(2-ethylhexyl)phthalate	1 J
NT-04	04/17/06	Di-n-butylphthalate	0.5 J
NT-04	11/07/06	Bis(2-ethylhexyl)phthalate	0.5 J

Because the concentrations are very low (most are estimated values) and the compounds are typically detected in only one sample from a location, these results may be analytical artifacts.

APPENDIX D.1

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

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-008		GW-014		GW-046		GW-058	GW-068	GW-071	
Functional Area	OLF		BG		BG		BG	BG	BG	
Date Sampled	01/03/06	07/05/06	02/02/06	08/14/06	01/04/06	07/05/06	06/12/06	06/08/06	02/02/06	08/14/06
Program	BJC	BJC	GWPP	GWPP	BJC	BJC	GWPP	GWPP	GWPP	GWPP
Sample Type										
Field Measurements										
Time Sampled	13:20	13:35	9:20	9:05	9:25	15:20	9:40	10:55	10:50	10:25
Measuring Point Elev. (ft)	965.39	965.39	934.50	934.50	921.17	921.17	913.30	924.61	928.90	928.90
Depth to Water (ft)	14.84	15.97	6.07	7.78	4.91	5.29	25.39	7.64	8.23	10.17
Groundwater Elevation (ft)	950.55	949.42	928.43	926.72	916.26	915.88	887.91	916.97	920.67	918.73
Conductivity (μmho/cm)	201	103	532	617	161	130	715	647	1,715	1,582
Dissolved Oxygen (ppm)	1.45	1	1.62	0.16	0.4	0.78	1.41	1.39	0.79	0.99
Oxidation/Reduction (mV)	59	2	150	134	156	188	202	-16	-260	-317
Temperature (degrees C)	15.6	18.5	11.4	18.3	12.4	19.8	15.5	17.1	13.7	19.5
Turbidity (NTU)	6	0	.	.	3	41	.	.	.	.
pH	5.97	5.77	7.12	6.96	4.99	5.36	6.94	8.55	10.4	10.59
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	312	326	.	.	468	342	880	891
Suspended Solids (mg/L)	.	.	<	<	.	.	20	2	<	<
Turbidity (NTU)	.	.	1.6	2.45	.	.	128	1.06	1.39	0.497
Major Ions (mg/L)										
Calcium	18.2	15.5	90	86.8	.	.	86.2	46.5	1.71	1.12
Magnesium	8.29	8.7	13.5	13	.	.	30.9	15.7	<	<
Potassium	1.18	1.16	<	<	.	.	3.54	20	2.38	2.24
Sodium	2.94	3.41	9.38	8.77	.	.	12	41.2	364	369
Bicarbonate	.	.	281	273	.	.	314	163	371	339
Carbonate	.	.	<	<	.	.	<	<	340	340
Chloride	.	.	8.18	18.6	.	.	19	87.7	42.8	46.4
Fluoride	.	.	<	<	.	.	0.16	0.123	7.06	5.54
Nitrate as N	.	.	<	<	.	.	3.71	<	<	<
Sulfate	.	.	8.61	6.13	.	.	27.7	4.76	19.2	20.1
Charge balance error (%)	.	.	-0.1	-2.7	.	.	-1.4	0.6	-1.4	0.6
Trace Metals (mg/L)										
Aluminum	0.209	<	<	<	.	.	10.6	<	<	0.25
Arsenic	<	<	<	<	.	.	0.00585	0.0371	0.00928	0.0117
Barium	0.0989	0.0995	0.496	0.482	.	.	0.109	0.609	0.0953	0.0829
Beryllium	<	<	<	<	.	.	<	<	<	<
Boron	<	<	3.15	3.12	.	.	<	<	0.735	0.745
Cadmium	<	<	<	<	.	.	<	<	<	<
Chromium	0.0068	<	0.0232	0.0253	.	.	0.0332	0.0142	<	0.0104
Cobalt	<	0.032	<	<	.	.	<	<	<	<
Iron	2.17	5.47	0.0786	0.112	.	.	5.81	0.218	<	0.169
Lead	<	<	0.00162	0.00504	.	.	0.0175	0.00505	0.00063	0.00821
Lithium	<	<	0.0237	0.0245	.	.	0.0157	0.0854	0.163	0.15
Manganese	2.25	2.96	0.141	0.469	.	.	0.151	0.016	<	<
Mercury	.	.	<	<	.	.	<	<	<	<
Molybdenum	<	<	<	<	.	.	<	<	<	<
Nickel	0.024	0.0307	0.00611	0.0102	.	.	0.0266	0.0711	<	<
Selenium	<	<	<	<	.	.	<	0.18	<	<
Strontium	0.0434	0.0395	0.308	0.3	.	.	0.124	1.55	0.234	0.196
Thallium	<	<	<	<	.	.	<	<	0.00056	0.00051
Uranium	<	<	0.00233	0.00151	<	<	0.0314	<	<	<
Zinc	<	<	<	<	.	.	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-077		GW-078		GW-079		GW-080			
Functional Area	BG		BG		BG		BG			
Date Sampled	03/07/06	07/26/06	03/07/06	07/26/06	03/07/06	07/26/06	03/07/06		07/26/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup		Dup
Field Measurements										
Time Sampled	14:05	9:15	13:12	9:45	10:55	13:40	10:06	.	14:25	.
Measuring Point Elev. (ft)	919.30	919.30	918.10	918.10	981.20	981.20	981.00	.	981.00	.
Depth to Water (ft)	9.53	12.03	7.60	10.11	21.90	23.47	.	.	23.55	.
Groundwater Elevation (ft)	909.77	907.27	910.50	907.99	959.30	957.73	.	.	957.45	.
Conductivity (μmho/cm)	769	333	408	385	231	227	201	.	181	.
Dissolved Oxygen (ppm)	0.7	1.12	1.42	3.92	1.92	1.08	2.45	.	5.65	.
Oxidation/Reduction (mV)	-20	111	107	240	-70	-41	-46	.	17	.
Temperature (degrees C)	14.3	18.7	14.8	16.8	13.2	16.6	13.4	.	22.8	.
Turbidity (NTU)	1	3	<	1	1	1	7	.	6	.
pH	7.69	7.37	7.76	7.39	7.55	7.66	7.5	.	6.95	.
Miscellaneous Analytes										
Dissolved Solids (mg/L)	225	235	296	244	127	152	101	116	124	109
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<	6.1	7.5
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	.	.	.	.	.	.	.	.	.	.
Magnesium	.	.	.	.	.	.	.	.	.	.
Potassium	.	.	.	.	.	.	.	.	.	.
Sodium	.	.	.	.	.	.	.	.	.	.
Bicarbonate	.	.	.	.	.	.	.	.	.	.
Carbonate	.	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)										
Aluminum	.	.	.	.	.	.	.	.	.	.
Arsenic	.	.	.	.	.	.	.	.	.	.
Barium	.	.	.	.	.	.	.	.	.	.
Beryllium	.	.	.	.	.	.	.	.	.	.
Boron	.	.	.	.	.	.	.	.	.	.
Cadmium	.	.	.	.	.	.	.	.	.	.
Chromium	.	.	.	.	.	.	.	.	.	.
Cobalt	.	.	.	.	.	.	.	.	.	.
Iron	.	.	.	.	.	.	.	.	.	.
Lead	.	.	.	.	.	.	.	.	.	.
Lithium	.	.	.	.	.	.	.	.	.	.
Manganese	.	.	.	.	.	.	.	.	.	.
Mercury	.	.	.	.	.	.	.	.	.	.
Molybdenum	.	.	.	.	.	.	.	.	.	.
Nickel	.	.	.	.	.	.	.	.	.	.
Selenium	.	.	.	.	.	.	.	.	.	.
Strontium	.	.	.	.	.	.	.	.	.	.
Thallium	.	.	.	.	.	.	.	.	.	.
Uranium	<	<	<	<	<	<	<	<	<	<
Zinc	.	.	.	.	.	.	.	.	.	.

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-082	GW-085			GW-098	GW-122	GW-126	GW-225		
Functional Area	BG	OLF			OLF	S3	BG	OLF		
Date Sampled	06/05/06	02/08/06		08/22/06	02/14/06	02/21/06	06/06/06	02/07/06	08/17/06	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup							Dup
Field Measurements										
Time Sampled	9:40	9:30	9:30	9:05	10:10	9:55	9:25	10:30	10:10	10:10
Measuring Point Elev. (ft)	964.00	983.57	983.57	983.57	945.95	1,007.20	932.06	943.11	943.11	943.11
Depth to Water (ft)	21.00	13.41	13.41	15.62	12.28	16.06	17.75	9.58	17.13	17.13
Groundwater Elevation (ft)	943.00	970.16	970.16	967.95	933.67	991.14	914.31	933.53	925.98	925.98
Conductivity (μmho/cm)	853	866	866	1,087	1,261	3,640	844	990	1,037	1,037
Dissolved Oxygen (ppm)	0.75	0.95	0.95	1.01	0.11	0.9	0.25	0	1.34	1.34
Oxidation/Reduction (mV)	-90	123	123	154	18	149	67	101	100	100
Temperature (degrees C)	16.4	15.4	15.4	17.8	14.8	14.1	15	12.3	16.1	16.1
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
pH	6.94	7.05	7.05	6.93	6.55	6.71	9.08	7.29	7.23	7.23
Miscellaneous Analytes										
Dissolved Solids (mg/L)	529	616	581	794	750	2,550	476	589	605	629
Suspended Solids (mg/L)	2	2	2	1	<	<	1	<	<	<
Turbidity (NTU)	3.45	1.82	1.82	0.421	1.66	2.64	0.925	11.1	1.93	1.98
Major Ions (mg/L)										
Calcium	148	146	151	163	207	437	1.64	119	111	113
Magnesium	17.7	9.78	10.1	11.3	28.6	135	0.553	49.6	50.7	50.3
Potassium	<	<	<	<	4.89	24.9	2.34	2.8	3.03	3.04
Sodium	8.8	8.79	9.15	9.3	26.7	100	197	24.5	26	25.8
Bicarbonate	328	202	202	194	548	375	378	241	222	223
Carbonate	<	<	<	<	<	<	<	<	<	<
Chloride	90.1	5.43	5.48	5.99	100	105	11.9	78.5	81.1	81
Fluoride	<	<	<	0.107	<	<	2.74	0.482	0.511	0.522
Nitrate as N	<	56.6	74.4	75.8	<	547	<	44.5	45.3	44.5
Sulfate	6.45	7.93	7.89	6.76	21.3	9.01	28.1	61.9	58.4	58.5
Charge balance error (%)	0	0.4	-4.9	-0.7	-0.9	-13.5	0.7	-1.6	-1.3	-0.9
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.885	0.414	0.43	0.468	0.527	2.22	0.0754	0.175	0.177	0.174
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	13.4	<	<	<	0.184	0.421	0.616	0.122	0.14	0.137
Cadmium	<	<	<	<	<	<	<	<	<	<
Chromium	0.0195	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Iron	0.753	0.0681	<	0.0724	0.251	0.151	0.126	1.38	0.112	0.124
Lead	0.00716	<	<	<	0.0039	0.00085	0.00202	0.00167	<	<
Lithium	0.164	0.0141	0.0157	0.0172	0.0378	0.175	0.0942	0.0195	0.0198	0.0211
Manganese	0.997	<	<	0.00655	0.599	0.09	<	0.0439	0.00664	0.00667
Mercury	<	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	0.0168	<	<	<	0.0342	0.00878	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.285	0.348	0.362	0.402	1.08	15.1	0.15	1.85	2.15	2.13
Thallium	0.000595	<	<	<	<	0.000595	<	<	0.0007	<
Uranium	<	<	<	<	0.00162	0.00166	<	0.00284	0.00329	0.00302
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-226		GW-229	GW-246		GW-257	GW-276		GW-289
Functional Area	OLF		OLF	S3		BG	S3		BG
Date Sampled	02/07/06	08/17/06	02/16/06	02/08/06	08/21/06	06/07/06	01/04/06	07/06/06	06/07/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	GWPP
Sample Type									
Field Measurements									
Time Sampled	8:55	8:45	9:18	10:50	10:05	10:50	12:55	9:10	9:50
Measuring Point Elev. (ft)	943.40	943.40	949.00	1,009.19	1,009.19	961.68	1,001.57	1,001.57	948.73
Depth to Water (ft)	8.76	18.00	21.39	12.54	13.60	28.42	5.57	5.64	18.08
Groundwater Elevation (ft)	934.64	925.40	927.61	996.65	995.59	933.26	996.00	995.93	930.65
Conductivity (μmho/cm)	974	1,037	1,457	16,690	17,440	301	1,499	785	318
Dissolved Oxygen (ppm)	0	0.49	0.03	1.74	0.32	0.8	2.61	5.85	0.23
Oxidation/Reduction (mV)	167	220	-68	401	312	159	293	280	126
Temperature (degrees C)	8.5	17.4	15.1	15.5	18.4	17.1	14.6	19.7	16.9
Turbidity (NTU)	.	.	.	.	.	.	4	1	.
pH	6.81	7	6.43	4.32	4.76	6.45	4.73	4.51	6.5
Miscellaneous Analytes									
Dissolved Solids (mg/L)	592	562	864	17,200	15,900	178	.	.	163
Suspended Solids (mg/L)	2	3	22	3	1	<	.	.	<
Turbidity (NTU)	18.6	22.5	133	0.121	1.75	0.23	.	.	0.266
Major Ions (mg/L)									
Calcium	152	124	182	2,870	2,780	46	45.3	44.8	41.3
Magnesium	33.3	44.2	33.3	615	574	3.93	8.01	7.89	5.37
Potassium	2.73	2.81	12.2	39.9	38.2	<	7.44	6.81	<
Sodium	15.7	27.2	74	586	469	8.73	64.5	71.6	5.48
Bicarbonate	497	271	645	43.3	65.9	139	.	.	126
Carbonate	<	<	<	<	<	<	.	.	<
Chloride	37.2	85.3	135	322	285	1.6	.	.	2.48
Fluoride	<	<	0.128	1.22	3.45	0.116	.	.	<
Nitrate as N	3.9	34.4	<	2,810	2,840	0.285	23.8	18.6	0.307
Sulfate	17	30	19.3	37.3	23.8	9.31	.	.	8.55
Charge balance error (%)	-2.4	0.8	-5.4	2.1	-1.3	-0.7	.	.	-0.8
Trace Metals (mg/L)									
Aluminum	<	<	<	98.4	46.9	<	1.84	2.61	<
Arsenic	<	<	0.00942	<	0.00528	<	<	<	<
Barium	0.248	0.188	1.26	2.31	3.48	0.109	0.0966	0.0848	0.106
Beryllium	<	<	<	0.0481	0.0217	<	0.0025	0.0033	<
Boron	0.143	0.12	3.13	<	<	<	<	<	<
Cadmium	<	<	<	0.57	0.332	<	0.0115	0.0117	<
Chromium	<	<	<	<	<	0.0102	<	<	<
Cobalt	<	<	<	0.701	0.45	<	0.055	0.0586	<
Iron	1.04	1.64	19.7	<	<	<	<	<	<
Lead	<	0.00174	<	<	<	<	<	<	<
Lithium	0.011	0.018	0.111	0.865	0.693	<	0.0149	0.0165	<
Manganese	1.59	0.269	4.6	145	106	<	2.56	2.56	<
Mercury	<	<	<	0.00265	0.000318	<	.	.	<
Molybdenum	<	<	<	<	<	<	<	<	<
Nickel	0.00615	<	0.051	7.79	3.49	<	0.152	0.147	<
Selenium	<	<	<	<	0.0126	<	<	<	<
Strontium	0.425	0.761	0.548	10.1	10.4	0.0734	0.107	0.105	0.0836
Thallium	<	<	<	<	<	<	<	<	<
Uranium	0.00984	0.00559	0.172	1.01	0.445	<	0.331	0.448	<
Zinc	<	<	<	<	<	0.13	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-310		GW-311	GW-315	GW-363				GW-526	
Functional Area	RS		RS	SPI	EMWMF				S3	
Date Sampled	09/06/06		09/06/06	02/16/06	02/15/06	04/24/06	08/14/06	11/13/06	03/07/06	07/25/06
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup								
Field Measurements										
Time Sampled	10:05	10:05	9:05	10:30	10:45	11:50	14:00	13:30	15:20	15:00
Measuring Point Elev. (ft)	995.35	995.35	999.52	1,047.45	957.91	957.91	957.91	957.91	998.25	998.25
Depth to Water (ft)	22.54	22.54	39.01	56.15	4.35	4.10	5.50	4.51	13.39	14.08
Groundwater Elevation (ft)	972.81	972.81	960.51	991.30	953.56	953.81	952.41	953.40	984.86	984.17
Conductivity (μmho/cm)	1,086	1,086	483	736	959	465	282	932	10,400	9,110
Dissolved Oxygen (ppm)	0.52	0.52	3.91	0.5	0.73	0.35	0.98	1.31	0.76	0.41
Oxidation/Reduction (mV)	159	159	181	92	183	190	14	188	121	158
Temperature (degrees C)	16	16	16.1	14.8	10.8	16.9	26.8	13.4	12	24.6
Turbidity (NTU)	.	.	.	.	1	1	8	1	2	12
pH	6.65	6.65	7.14	7.01	9.4	8.94	9.39	9.52	8.53	8.14
Miscellaneous Analytes										
Dissolved Solids (mg/L)	651	618	259	453	.	.	.	.	8,500	7,960
Suspended Solids (mg/L)	<	<	<	<	.	.	.	.	<	<
Turbidity (NTU)	0.2	0.197	0.371	0.681	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	152	158	83.6	131	2.05	2.21	2.3	1.69	187	186
Magnesium	16.4	16.8	5.53	14	0.849	0.811	0.881	0.666	68.3	66.3
Potassium	3.66	3.77	<	3.63	1.37	1.69	1.88	1.72	21.4	21.8
Sodium	25	25.8	3.53	7.71	98.6	105	106	107	1810	1760
Bicarbonate	304	304	225	289	.	.	.	.	48.6	38.5
Carbonate	<	<	<	<	.	.	.	.	<	<
Chloride	86.3	85.3	1.7	12.5	.	.	.	.	29.1	29.5
Fluoride	0.224	0.224	<	<	.	.	.	.	<	<
Nitrate as N	10.3	10.4	0.355	6.32	.	.	.	.	1,110	555
Sulfate	46.9	48	2.82	88.5	.	.	.	.	2.8	4.8
Charge balance error (%)	-0.6	1.2	1.6	-1.8	.	.	.	.	7.5	37.9 R
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	.	<	<	<	<	<
Barium	0.0762	0.0788	0.0194	0.0606	0.0672	0.0696	0.0744	0.0599	15.8	17.4
Beryllium	<	<	<	<	.	<	<	<	<	<
Boron	<	<	<	<	0.317	0.308	0.323	0.326	0.219	0.214
Cadmium	<	<	<	<	.	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	.	<	<	<	<	<
Iron	<	<	<	<	<	<	0.0774	<	0.0771	0.211
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	<	<	<	<	0.0487	0.0451	0.0525	0.0502	1.36	0.88
Manganese	<	<	<	0.0561	<	<	<	<	0.0262	0.0348
Mercury	<	<	<	<	<	<	<	<	.	.
Molybdenum	<	<	<	<	<	<	<	<	.	.
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	0.0104	0.0128	0.0103	<	<	<	<	<	<	<
Strontium	0.388	0.4	0.0746	0.208	0.0897	0.0916	0.0953	0.0814	20.5	21.9
Thallium	<	<	<	<	.	<	<	<	<	<
Uranium	0.00383	0.00388	<	0.00276	.	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-537	GW-615	GW-616		GW-626		GW-627		GW-629	
Functional Area	OLF	S3	S3		BG		BG		BG	
Date Sampled	02/15/06	02/21/06	02/22/06		02/06/06	08/15/06	02/06/06	08/15/06	06/08/06	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type				Dup						Dup
Field Measurements										
Time Sampled	11:00	9:35	10:30	10:30	10:15	8:45	9:05	9:55	9:10	9:10
Measuring Point Elev. (ft)	976.65	1,017.55	1,011.81	1,011.81	942.87	942.87	943.51	943.51	928.03	928.03
Depth to Water (ft)	6.58	12.74	9.54	9.54	27.58	28.48	24.73	25.90	6.06	6.06
Groundwater Elevation (ft)	970.07	1,004.81	1,002.27	1,002.27	915.29	914.39	918.78	917.61	921.97	921.97
Conductivity (μmho/cm)	4,570	24,300	2,770	2,770	590	442	1,309	1,289	1,163	1,163
Dissolved Oxygen (ppm)	0.3	2.38	0.87	0.87	0.15	1.39	0.1	0.56	0.53	0.53
Oxidation/Reduction (mV)	217	82	-30	-30	134	42	-206	-179	-142	-142
Temperature (degrees C)	14.6	14.6	14.2	14.2	11.8	16.6	12.2	18.5	16.4	16.4
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
pH	6.57	5.9	9.88	9.88	7.27	7.3	9.34	9.26	9.27	9.27
Miscellaneous Analytes										
Dissolved Solids (mg/L)	3,340	62,000	1,760	1,780	340	266	723	724	673	671
Suspended Solids (mg/L)	<	4	<	<	<	<	<	<	<	<
Turbidity (NTU)	0.345	4.93	0.673	0.677	0.117	2.16	0.245	0.206	0.328	0.334
Major Ions (mg/L)										
Calcium	758	9,510	2.1	2.13	102	74.7	1.22	1.22	1.23	1.17
Magnesium	55.1	2,380	0.74	0.748	6.77	4.96	0.24	0.234	0.231	0.218
Potassium	3.03	122	4.65	4.76	<	<	<	<	<	<
Sodium	38	2,330	504	512	6.06	5.03	301	303	292	283
Bicarbonate	339	283	130	120	250	203	487	546	569	476
Carbonate	<	<	<	<	<	<	88.8	<	<	91
Chloride	26.5	112	16.7	17.2	33.4	10.7	59	62.9	6.16	5.91
Fluoride	<	0.138	0.826	0.832	<	<	6.18	4.64	4.36	4.35
Nitrate as N	503	11,300	275	268	<	0.0384	<	<	<	<
Sulfate	4.55	<	15.4	15.6	4.58	2.26	4.6	3.28	23.6	23.5
Charge balance error (%)	0.6	-2.6	-2.1	0.2	-1	-0.6	-1.6	0.9	2	0.6
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	1.78	385	0.149	0.151	0.326	0.242	0.0484	0.0472	0.0583	0.0564
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	<	0.901	0.911	<	<	0.481	0.48	0.532	0.515
Cadmium	<	0.0215	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	0.0101	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Iron	<	4.23	0.0979	0.103	<	<	0.0799	0.0603	0.0744	0.0548
Lead	0.000995	0.0015	0.00078	0.00136	<	<	<	<	<	<
Lithium	0.037	1.11	0.302	0.308	0.0166	0.014	0.0932	0.0994	0.0832	0.0808
Manganese	<	21.9	<	<	<	<	0.0119	0.0113	0.00556	0.00521
Mercury	<	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	<	0.251	<	<	0.0715	0.0226	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	2	288	0.305	0.31	0.215	0.16	0.0878	0.0862	0.0789	0.0764
Thallium	<	0.000775	0.0007	<	<	<	<	<	<	<
Uranium	0.0012	1.42	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-639				GW-653	GW-683		GW-684		GW-694
Functional Area	EMWMF				BG	EXP-A		EXP-A		EXP-B
Date Sampled	02/16/06	04/19/06	08/08/06	11/08/06	06/05/06	03/08/06	08/07/06	03/08/06	07/24/06	08/23/06
Program	BJC	BJC	BJC	BJC	GWPP	BJC	BJC	BJC	BJC	GWPP
Sample Type										
Field Measurements										
Time Sampled	11:15	10:30	16:00	13:00	10:55	9:10	9:45	9:10	14:40	9:00
Measuring Point Elev. (ft)	940.95	940.95	940.95	940.95	931.84	972.23	972.23	898.83	898.83	941.98
Depth to Water (ft)	10.99	10.76	12.84	10.90	23.48	88.91	89.07	15.62	15.76	31.64
Groundwater Elevation (ft)	929.96	930.19	928.11	930.05	908.36	883.32	883.16	883.21	883.07	910.34
Conductivity (μmho/cm)	1,713	880	1,793	1,783	38	570	420	981	493	473
Dissolved Oxygen (ppm)	0.85	0.38	0.99	0.81	4.05	5.78	2.01	0.54	0.41	1.09
Oxidation/Reduction (mV)	177	183	74	209	261	203	197	206	185	203
Temperature (degrees C)	11.6	15	26.6	14.1	14.6	12.7	14.8	12.5	14.7	15.2
Turbidity (NTU)	1	2	2	0	.	6	3	41	1	.
pH	9.56	9.2	9.4	9.56	5.39	7.71	7.62	7.65	7.74	7.51
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	.	.	28	315	325	332	339	272
Suspended Solids (mg/L)	.	.	.	.	<	<	<	24.1	<	<
Turbidity (NTU)	.	.	.	.	0.138	.	.	.	.	3.09
Major Ions (mg/L)										
Calcium	1.16	1.19	1.28	1.24	2.03	52.9	51.4	55.9	65	60
Magnesium	0.457	0.417	0.442	0.445	1.09	22.1	22.9	15.7	20.4	13.7
Potassium	1.73	2.54	2.69	2.75	<	1.17	1	4.89	3.93	<
Sodium	205	214	21.9 Q	186	2.12	4.15	2.47	5.07	6.77	6.69
Bicarbonate	.	.	.	.	18.2	225	194	211	168	163
Carbonate	.	.	.	.	<	<	<	<	<	<
Chloride	.	.	.	.	1	7.5	4.6	14.2	14.8	10.2
Fluoride	.	.	.	.	<	0.1	0.11	0.16	0.18	0.171
Nitrate as N	.	.	.	.	<	3.2	1.9	1.9	3.5	6.45
Sulfate	.	.	.	.	1.7	21.2	18.7	12.1	13.8	16
Charge balance error (%)	.	.	.	.	-19.6	-7.1	0.5	-6.2	10.3	0.7
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	0.584	<	<
Arsenic	.	<	<	<	<	<	<	<	<	<
Barium	0.0766	0.0782	0.0828	0.0807	0.0351	0.131	0.123	0.0943	0.106	0.0739
Beryllium	.	<	<	<	<	<	<	<	<	<
Boron	0.6	0.574	0.601	0.605	<	<	<	<	<	<
Cadmium	.	<	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	0.0061	0.0148	<	<
Cobalt	.	<	<	<	<	<	<	<	<	<
Iron	0.0827	0.061	0.0715	0.061	<	0.0604	<	1.47	<	0.506
Lead	<	<	<	<	0.0133	<	<	<	<	<
Lithium	0.115	0.104	0.108	0.117	<	<	<	0.035	0.0265	<
Manganese	<	<	<	<	<	<	<	0.125	0.0213	<
Mercury	<	<	<	<	<	.	.	.	.	<
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	0.028	<	<
Selenium	<	<	<	<	<	<	<	<	<	0.0108
Strontium	0.125	0.125	0.134	0.131	0.0183	0.137	0.146	0.153	0.169	0.124
Thallium	.	<	<	<	<	<	<	<	<	<
Uranium	.	<	<	<	<	0.0166	0.0132	0.0177	0.0209	0.0324
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-695	GW-703	GW-704		GW-706		GW-712		GW-713	
Functional Area	EXP-B	EXP-B	EXP-B		EXP-B		EXP-W		EXP-W	
Date Sampled	08/23/06	08/30/06	03/08/06	07/31/06	03/29/06	08/01/06	01/03/06	07/05/06	01/03/06	
Program	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										Dup
Field Measurements										
Time Sampled	10:15	9:05	12:35	14:25	9:50	9:10	10:00	14:00	9:35	.
Measuring Point Elev. (ft)	939.54	954.69	945.33	945.33	929.47	929.47	877.89	877.89	881.43	.
Depth to Water (ft)	30.88	46.63	34.92	36.33	12.99	18.64	33.20	35.25	36.42	.
Groundwater Elevation (ft)	908.66	908.06	910.41	909.00	916.48	910.83	844.69	842.64	845.01	.
Conductivity (μmho/cm)	598	696	569	605	747	1,559	1,074	438	287	.
Dissolved Oxygen (ppm)	1.95	1.95	2.29	0.58	0.27	0.38	.	0.53	1	.
Oxidation/Reduction (mV)	152	159	160	175	229	192	101	162	-116	.
Temperature (degrees C)	17.5	16.8	13.9	17.4	13.6	15.7	13.1	16.2	10.9	.
Turbidity (NTU)	.	.	27	2	3	3	3	2	9	.
pH	7.51	7.45	8.73	9	7.42	7.13	7.76	8.56	7.84	.
Miscellaneous Analytes										
Dissolved Solids (mg/L)	322	354	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	<	2	.	.	.	.	.	.	.	.
Turbidity (NTU)	0.168	3.59	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	59.1	73.6	11.8	5.82	85.2 J	104	55.2	49.1	58.5	59
Magnesium	25.2	30.2	24.4	24.3	20.6	23.4	33.1	32.5	32	32.4
Potassium	2.2	5.86	9.34	12	7.85	5.34	1.9	2.01	2.52	2.56
Sodium	7.06	12.9	11.3	12.6	15.6	15.4	6.49	7.16	10.9	10.8
Bicarbonate	202	212	120	101	161	272	.	.	.	.
Carbonate	<	<	<	<	<	<	.	.	.	.
Chloride	14.4	22.5	23.5	24.7	39.2	31.3	.	.	.	.
Fluoride	0.192	0.248	0.18	0.18	0.23	0.23	.	.	.	.
Nitrate as N	10.5	18	2.2	0.17	21.2	14.2	<	<	<	<
Sulfate	13.9	26.1	19.3	18.5	27.9	20.8	.	.	.	.
Charge balance error (%)	-1	1.1	-4.4	0.2	3	0.9	.	.	.	.
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.0462	0.1	0.0271	0.0157	0.147	0.153	0.0344	0.0306	0.0428	0.0437
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	0.121	<	<	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<
Chromium	0.0115	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Iron	<	0.262	1.3	0.305	0.462	0.0644	0.255	0.244	0.957	0.993
Lead	<	0.00714	<	<	<	<	<	<	<	<
Lithium	<	0.0217	0.0254	0.0293	0.0204	0.0151	0.0103	0.0104	0.014	0.0142
Manganese	<	0.0114	0.0233	0.0214	0.0052	0.0058	0.125	0.102	0.136	0.138
Mercury	<	<	.	.	.	.	.	.	.	.
Molybdenum	<	<	.	.	.	.	.	.	.	.
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	0.0106	<	<	<	<	<	<	<	<
Strontium	0.102	0.259	0.0543	0.0233	0.366	0.29	0.634	0.572	1.18	1.2
Thallium	<	<	<	<	<	<	<	<	<	<
Uranium	0.0113	0.00906	<	<	0.0629	0.0538	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-713		GW-714		GW-724	GW-725	GW-738	GW-740	GW-829
Functional Area	EXP-W		EXP-W		EXP-C	EXP-C	EXP-C	EXP-C	OLF
Date Sampled	07/05/06		01/03/06	07/05/06	08/28/06	08/24/06	08/28/06	08/31/06	02/15/06
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup							
Field Measurements									
Time Sampled	10:10	.	13:40	10:00	9:05	10:10	9:50	8:50	9:35
Measuring Point Elev. (ft)	881.43	.	875.88	875.88	979.27	961.05	983.31	1,020.25	985.95
Depth to Water (ft)	38.20	.	29.19	30.91	33.32	13.55	31.33	74.26	14.36
Groundwater Elevation (ft)	843.23	.	846.69	844.97	945.95	947.50	951.98	945.99	971.59
Conductivity (μmho/cm)	338	.	298	298	666	968	867	520	577
Dissolved Oxygen (ppm)	4.69	.	1.6	3.02	0.21	0	2.34	1.8	2.2
Oxidation/Reduction (mV)	236	.	117	117	-43	98	129	172	109
Temperature (degrees C)	18.3	.	11.5	19.9	16	16.1	17.5	15.4	12
Turbidity (NTU)	1	.	9	6	.	.	.	.	.
pH	8.41	.	7.67	7.49	7.79	6.87	6.91	7.29	9.13
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	.	.	454	559	528	326	329
Suspended Solids (mg/L)	.	.	.	.	2	3	<	<	<
Turbidity (NTU)	.	.	.	.	1.74	3.93	0.164	0.565	0.677
Major Ions (mg/L)									
Calcium	10.4	10.4	60.7	61.7	52.6	135	135	64.6	9.12
Magnesium	25.7	26.2	24.8	25.3	35.7	21.5	23.2	31.4	3.25
Potassium	2.88	2.97	1.46	1.36	4.51	2.93	2.87	<	4.03
Sodium	10.3	10.8	5.17	5.73	29	23.7	9.03	2.04	104
Bicarbonate	.	.	.	.	170	325	323	257	218
Carbonate	.	.	.	.	<	<	<	<	<
Chloride	.	.	.	.	76.1	54.1	17.4	6.99	2.08
Fluoride	.	.	.	.	0.19	0.242	<	0.169	0.789
Nitrate as N	<	<	0.52	0.42	7.96	12.8	17.8	1.8	11.4
Sulfate	.	.	.	.	27.4	38.7	32.9	12.2	17.8
Charge balance error (%)	.	.	.	.	1.8	-0.7	1.2	1.5	-2.8
Trace Metals (mg/L)									
Aluminum	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<
Barium	0.0074	0.0077	0.0807	0.0827	0.129	0.195	0.0653	0.0908	0.329
Beryllium	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	0.247
Cadmium	<	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<
Iron	0.215	0.26	0.0899	0.139	0.235	0.298	<	0.0661	0.0621
Lead	<	<	<	<	<	<	<	<	<
Lithium	0.0147	0.0151	<	<	0.02	<	<	0.0157	0.0493
Manganese	0.0367	0.0358	0.012	0.0452	0.00894	0.858	0.0196	<	<
Mercury	.	.	.	.	<	<	<	<	<
Molybdenum	.	.	.	.	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	0.01	0.0111	0.0116	<	<
Strontium	0.142	0.141	0.31	0.326	0.758	0.33	0.155	0.0551	0.561
Thallium	<	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	0.0112	0.00202	<	0.00172
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 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	02/23/06	04/18/06	08/10/06	11/13/06	02/16/06	04/18/06	08/10/06	11/06/06	03/01/06	04/18/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Field Measurements										
Time Sampled	11:00	15:30	15:15	10:45	13:45	14:40	9:45	10:45	10:20	10:50
Measuring Point Elev. (ft)	1,002.85	1,002.85	1,002.85	1,002.85	997.10	997.10	997.10	997.10	1,067.96	1,067.96
Depth to Water (ft)	4.00	4.93	7.48	4.91	22.84	21.79	23.95	24.43	5.68	5.61
Groundwater Elevation (ft)	998.85	997.92	995.37	997.94	974.26	975.31	973.15	972.67	1,062.28	1,062.35
Conductivity (μmho/cm)	382	216	371	220	408	394	238	237	67	68
Dissolved Oxygen (ppm)	1.77	5.1	2.17	6.44	1.37	1.06	5.32	4.78	7.91	8.84
Oxidation/Reduction (mV)	-20	142	-29	53	81	251	131	165	189	172
Temperature (degrees C)	14.3	16.4	17.3	15.3	16.5	17.1	18.5	15.8	15.1	16.4
Turbidity (NTU)	2	16	2	1	6.89	2	3	3	2	5
pH	7.76	7.88	7.79	7.48	7.65	7.46	7.64	7.51	6.7	6.75
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	41.1	40	39.4	42.1	60	59.9	62.7	63.8	8.71	9.89
Magnesium	5.99	5.87	5.89	6.42	5.89	8.19	8.26	8.53	3.87	4.22
Potassium	2.95	3.53	3.61	3.87	0.81	1.28	1.32	1.38	1.77	1.81
Sodium	23.7	27.2	24.3	26.4	6.77	8.7	9.05	8.96	4.13	4.24
Bicarbonate	.	.	.	.	.	.	.	.	.	.
Carbonate	.	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)										
Aluminum	0.391	<	0.248	<	<	<	0.225	0.517	0.342	<
Arsenic	.	<	<	<	.	<	<	<	.	<
Barium	0.134	0.158	0.168	0.164	0.198	0.174	0.178	0.18	0.109	0.114
Beryllium	.	<	<	<	.	<	<	<	.	<
Boron	<	<	<	<	<	<	<	<	<	<
Cadmium	.	<	<	<	.	<	<	<	.	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	.	<	<	<	.	<	<	<	.	<
Iron	0.542	0.25	0.387	0.207	0.802	0.118	0.654	0.585	0.448	0.205
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	0.069	0.0667	0.069	0.0732	0.0161	0.0158	0.017	0.0177	0.0113	0.0116
Manganese	0.0598	0.0629	0.112	0.0734	0.0285	0.0174	0.0346	0.0282	0.0144	0.0054
Mercury	<	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.984	1.05	1.05	1.13	0.099	0.131	0.128	0.13	0.0435	0.0461
Thallium	.	<	<	<	.	<	<	<	.	<
Uranium	.	<	<	<	.	<	<	<	.	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 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	08/09/06	11/13/06	02/27/06	04/18/06	08/09/06	11/09/06	02/21/06	04/24/06	08/09/06	11/07/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Field Measurements										
Time Sampled	9:45	14:30	9:30	13:45	15:15	10:00	14:00	11:00	14:15	10:00
Measuring Point Elev. (ft)	1,067.96	1,067.96	967.43	967.43	967.43	967.43	971.29	971.29	971.29	971.29
Depth to Water (ft)	5.84	5.80	6.72	7.17	9.65	7.26	6.90	5.99	7.93	6.88
Groundwater Elevation (ft)	1,062.12	1,062.16	960.71	960.26	957.78	960.17	964.39	965.30	963.36	964.41
Conductivity (μmho/cm)	100	66	795	332	199	194	392	230	386	222
Dissolved Oxygen (ppm)	8.96	8.38	1.95	0.96	5.72	6.23	3.1	1.37	1.73	4.83
Oxidation/Reduction (mV)	105	143	20	-20	10	109	-47	98	-36	31
Temperature (degrees C)	17.8	15.1	14	16.8	19.1	15.2	16.8	17.1	17.9	15.8
Turbidity (NTU)	28	36	7	2	22	1	1	12	1	1
pH	7.85	7.09	7.68	7.87	7.89	6.98	7.95	7.76	7.67	7.4
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	9.6	9.92	55.1	49.7	51.5	50.5	41.6	39.8	41.1	39.9
Magnesium	3.93	4.08	8.21	7.74	8.18	7.98	11.8	12	12	11.8
Potassium	1.78	2.03	1.51	1.54	1.62	1.57	2.52	2.74	2.81	2.82
Sodium	4.07	4.15	5.86	5.37	5.57	5.57	19.5	21.4	19.5	20.5
Bicarbonate	.	.	.	.	.	.	.	.	.	.
Carbonate	.	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)										
Aluminum	0.686	1.6	<	<	<	<	<	<	<	<
Arsenic	<	<	.	<	<	<	.	<	<	<
Barium	0.116	0.119	0.246	0.248	0.264	0.243	0.253	0.277	0.28	0.26
Beryllium	<	<	.	<	<	<	.	<	<	<
Boron	<	<	<	<	<	<	<	<	<	<
Cadmium	<	<	.	<	<	<	.	<	<	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	.	<	<	<	.	<	<	<
Iron	0.898	0.623	0.142	0.22	0.135	0.251	0.124	0.0988	0.0665	0.0699
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	0.0116	0.0142	0.0116	0.0103	0.0106	0.0105	0.0251	0.0238	0.0229	0.0248
Manganese	0.0216	0.0153	0.0411	0.0398	0.0344	0.0327	0.0093	0.0082	0.0082	0.0082
Mercury	<	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.046	0.0459	0.412	0.408	0.441	0.415	1.16	1.24	1.21	1.16
Thallium	<	<	.	<	<	<	.	<	<	<
Uranium	<	<	.	<	<	<	.	0.007	<	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-922				GW-923		GW-924			
Functional Area	EMWMF				EMWMF		EMWMF			
Date Sampled	02/21/06	04/18/06	08/09/06	11/14/06	02/27/06	11/14/06	02/27/06		04/20/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup		Dup
Field Measurements										
Time Sampled	15:10	10:30	13:45	10:00	15:00	10:30	10:15	.	10:30	.
Measuring Point Elev. (ft)	956.91	956.91	956.91	956.91	1,016.73	1,016.73	968.90	.	968.90	.
Depth to Water (ft)	4.87	4.95	5.20	5.20	31.23	32.78	8.23	.	9.42	.
Groundwater Elevation (ft)	952.04	951.96	951.71	951.71	985.50	983.95	960.67	.	959.48	.
Conductivity (μmho/cm)	337	323	211	188	516	499	313	.	320	.
Dissolved Oxygen (ppm)	3.03	1.03	6.06	7.84	7.25	5.12	0.87	.	2.54	.
Oxidation/Reduction (mV)	-36	225	88	98	179	227	183	.	129	.
Temperature (degrees C)	15.7	15.6	20.4	14.4	13.2	14.1	13.8	.	16.2	.
Turbidity (NTU)	1	2	12	1	27	75	2	.	8	.
pH	7.85	7.39	8.13	7.46	7.5	7.16	7.35	.	7.58	.
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	44	42.4	45.2	44	72.3	67.1	56.7	57.8	51.7	50.2
Magnesium	8.68	9.67	10.2	9.73	11.6	11.7	4.46	4.5	4.92	4.82
Potassium	2.46	2.86	3	2.83	1.58	1.8	0.816	0.775	0.803	0.796
Sodium	7.63	8.69	8.91	8.29	9.26	9.37	5.03	5.1	5.38	5.45
Bicarbonate	.	.	.	.	.	.	.	.	.	.
Carbonate	.	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)										
Aluminum	0.394	<	<	<	1.49	1.72	<	<	<	<
Arsenic	.	<	<	<	.	<	.	.	<	<
Barium	0.618	0.711	0.728	0.697	0.117	0.121	0.283	0.287	0.271	0.264
Beryllium	.	<	<	<	.	<	.	.	<	<
Boron	<	<	<	<	<	<	<	<	<	<
Cadmium	.	<	<	<	.	<	.	.	<	<
Chromium	<	<	<	<	0.0147	0.0094	<	<	<	<
Cobalt	.	<	<	<	.	<	.	.	<	<
Iron	0.611	0.168	0.128	0.259	1.74	1.85	0.0528	0.0647	0.0614	0.0523
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	0.013	0.013	0.0135	0.0135	0.0171	0.0195	0.0114	0.0116	0.0105	0.0102
Manganese	0.0369	0.0199	0.021	0.0222	0.0536	0.0526	0.0312	0.0322	0.0351	0.0348
Mercury	<	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	0.0125	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.614	0.812	0.829	0.775	0.107	0.105	0.0995	0.101	0.104	0.102
Thallium	.	<	<	<	.	<	.	.	<	<
Uranium	.	0.0043	<	<	.	<	.	.	<	0.0059
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-924				GW-925				GW-926	
Functional Area	EMWMF				EMWMF				EMWMF	
Date Sampled	08/14/06		11/06/06		02/21/06	04/19/06	08/09/06	11/07/06	02/28/06	04/20/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup						
Field Measurements										
Time Sampled	10:00	.	14:00	.	11:30	11:45	11:50	13:00	13:30	11:30
Measuring Point Elev. (ft)	968.90	.	968.90	.	971.14	971.14	971.14	971.14	968.94	968.94
Depth to Water (ft)	10.47	.	9.64	.	5.01	4.51	5.76	5.46	7.47	8.00
Groundwater Elevation (ft)	958.43	.	959.26	.	966.13	966.63	965.38	965.68	961.47	960.94
Conductivity (μmho/cm)	178	.	180	.	1,285	1,265	1,224	1,238	197	324
Dissolved Oxygen (ppm)	3.7	.	5.61	.	3.83	0.47	0.92	1.17	0.64	0.37
Oxidation/Reduction (mV)	41	.	90	.	96	30	71	75	140	77
Temperature (degrees C)	17	.	16.2	.	10	16.1	22.7	15.7	13.6	15.7
Turbidity (NTU)	5	.	1	.	6	56	2	16	6	1
pH	7.67	.	7.77	.	9.3	9.27	8.96	8.54	7.82	7.54
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	54.2	54.2	55.9	54.1	2.61	2.73	2.58	2.48	36.8	41.7
Magnesium	4.68	4.67	4.77	4.58	1.14	1.16	1.09	1.07	9.03	9.9
Potassium	0.843	0.849	0.871	0.841	1.33	1.99	2.01	1.96	1.58	1.97
Sodium	5.51	5.5	5.4	5.23	115	143	128	121	8.37	9.21
Bicarbonate	.	.	.	.	.	.	.	.	.	.
Carbonate	.	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	0.219	<	<
Arsenic	<	<	<	<	.	<	<	<	.	<
Barium	0.279	0.28	0.294	0.284	0.0906	0.0993	0.101	0.0971	0.197	0.211
Beryllium	<	<	<	<	.	<	<	<	.	<
Boron	<	<	<	<	0.179	0.185	0.198	0.191	<	<
Cadmium	<	<	<	<	.	<	<	<	.	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	.	<	<	<	.	<
Iron	<	0.052	0.062	0.0576	0.11	0.0735	0.0868	0.0863	1.37 Q	0.0824
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	0.0112	0.0111	0.0105	0.0102	0.0505	0.0481	0.0505	0.0527	0.0115	0.0119
Manganese	0.0361	0.0361	0.0384	0.0369	<	<	0.0064	<	0.013	0.0112
Mercury	<	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.1	0.0999	0.1	0.0966	0.169	0.184	0.182	0.173	0.512	0.631
Thallium	<	<	<	<	.	<	<	<	.	<
Uranium	<	<	<	<	.	<	<	<	.	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-926		GW-927				BCK-03.30		BCK-04.55
Functional Area	EMWMF		EMWMF				EXP-SW		EXP-SW
Date Sampled	08/14/06	11/06/06	02/16/06	04/19/06	08/09/06	11/07/06	02/28/06	08/17/06	04/19/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	GWPP
Sample Type									
Field Measurements									
Time Sampled	12:15	16:00	15:00	14:50	15:00	15:30	13:05	8:40	8:30
Measuring Point Elev. (ft)	968.94	968.94	997.19	997.19	997.19	997.19	.	.	.
Depth to Water (ft)	10.39	8.98	20.00	18.50	21.22	21.08	.	.	.
Groundwater Elevation (ft)	958.55	959.96	977.19	978.69	975.97	976.11	.	.	.
Conductivity (μmho/cm)	656	664	370	354	235	213	270	377	363
Dissolved Oxygen (ppm)	0.86	1.86	1.1	0.97	7.39	4.3	13.1	8.52	5.62
Oxidation/Reduction (mV)	-76	178	152	143	29	-26	144.3	164	136
Temperature (degrees C)	20.7	18.5	15.9	17.3	24.8	15.1	12.9	22.5	13.8
Turbidity (NTU)	2	2	9	2	4	1	3.94	2.82	.
pH	7.73	7.51	7.79	7.52	7.94	7.66	8	8.71	7.27
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	.	.	.	.	189	237	165
Suspended Solids (mg/L)	.	.	.	.	.	.	7.9	<	<
Turbidity (NTU)	.	.	.	.	.	.	.	.	2.57
Major Ions (mg/L)									
Calcium	43.3	44.8	58.2	56.3	61.8	59.1	36.3 J	42.3	37.4
Magnesium	9.94	9.97	8.32	5.69	6.26	6	8.83	13.3	11.4
Potassium	2.1	1.98	1.25	0.812	0.895	0.85	1.18	1.56	<
Sodium	10	9.28	8.14	6.97	7.35	7.26	3.99	4.34	2.52
Bicarbonate	.	.	.	.	.	.	98.7	168	142
Carbonate	.	.	.	.	.	.	<	<	<
Chloride	.	.	.	.	.	.	6	9.4	4
Fluoride	.	.	.	.	.	.	<	0.13	<
Nitrate as N	.	.	.	.	.	.	1.5	1.2	0.312
Sulfate	.	.	.	.	.	.	24.6	13.8	3.2
Charge balance error (%)	.	.	.	.	.	.	-0.4	-7.7	-2.1
Trace Metals (mg/L)									
Aluminum	<	<	0.24	<	<	<	<	<	<
Arsenic	<	<	.	<	<	<	<	<	<
Barium	0.231	0.216	0.168	0.196	0.206	0.193	0.0449	0.0583	0.0418
Beryllium	<	<	.	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium	<	<	.	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<
Cobalt	<	<	.	<	<	<	<	<	<
Iron	0.392	0.301	0.449	0.128	0.211	0.123	0.155	0.0854	0.127
Lead	<	<	<	<	<	<	<	<	0.00178
Lithium	0.0127	0.0125	0.0174	0.0155	0.0161	0.016	<	<	<
Manganese	0.0198	0.0175	0.0225	0.0208	0.0226	0.0208	0.0206	0.0245	0.0321
Mercury	<	<	<	<	<	<	.	.	<
Molybdenum	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<
Strontium	0.619	0.587	0.124	0.101	0.109	0.103	0.0883	0.0878	0.0401
Thallium	<	<	.	<	<	<	<	<	<
Uranium	<	0.0053	.	<	<	<	0.0147	0.0213	0.00112 Q
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	BCK-07.87		BCK-09.20		BCK-09.47		BCK-11.54		BCK-11.84	
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW		EXP-SW	
Date Sampled	02/28/06	08/17/06	02/28/06	08/16/06	02/28/06	08/16/06	02/28/06	08/16/06	02/28/06	08/16/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Field Measurements										
Time Sampled	8:30	9:55	9:10	13:50	8:50	13:25	9:45	14:25	10:05	15:15
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	456	508	407	506	429	470	568	826	708	842
Dissolved Oxygen (ppm)	9.5	7.9	8.3	12.1	8.2	11.9	8.7	14.2	7.57	12.6
Oxidation/Reduction (mV)	186.1	135.1	125	69.6	150.1	66.8	121	103.8	132.7	106.2
Temperature (degrees C)	7.09	22.48	8.42	22.74	6.57	23.88	6.97	25.68	7.48	25.21
Turbidity (NTU)	4.22	3	3.67	7	4.64	13	3.32	3.23	2.3	4.88
pH	6.68	7.73	7.63	7.82	7.55	7.78	7.85	7.9	8.2	7.91
Miscellaneous Analytes										
Dissolved Solids (mg/L)	260	315	272	314	308	303	420	593	558	609
Suspended Solids (mg/L)	<	7.1	<	<	<	<	<	<	<	<
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	54.4	67.9	59	64.7	65.7	62.2	81.3	111	104	104
Magnesium	11.1	15.8	12.2	14.4	11.8	10.5	12.8	16.6	13.8	14.5
Potassium	1.36	2.68	1.42	2.7	1.75	3.14	1.77	3.38	2.19	3.25
Sodium	6.66	9.44	7.56	8.94	8.96	9.1	12.9	20.6	17.6	18.8
Bicarbonate	142	194	157	178	159	145	140	216	165	212
Carbonate	<	<	<	<	<	<	<	<	<	<
Chloride	12	14.6	13	14.6	15.6	13.3	21.5	28.7	29.9	29.1
Fluoride	0.17	0.25	0.2	0.27	0.21	0.37	0.35	0.61	0.44	0.64
Nitrate as N	7.1	36.2	8.2	11.4	10.9	210	24.9	43.4	1,510 Q	39
Sulfate	20.6	19.8	23.5	19.6	25.4	20.6	31.6	36	34.7	36.5
Charge balance error (%)	-2.1	-17.1	-3.1	-3.3	-2.6	-61.6 R	-1.2	-6.6	-88.1 R	-8.5
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	0.275	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.0711	0.0949	0.0761	0.0927	0.0875	0.087	0.125	0.156	0.149	0.139
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	0.122	<	0.128	0.138	0.196	<	0.117	<	0.141
Cadmium	<	<	<	<	<	<	<	<	0.0014	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Iron	0.0852	0.0877	0.0832	0.145	0.142	0.527	0.0905	0.0675	<	0.18
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	0.0149	0.0204	0.0178	0.0207	0.0318	0.0328	<	<	0.012	<
Manganese	0.0581	0.0127	0.0154	0.0142	0.0366	0.0411	0.0976	0.0125	0.215	0.0343
Mercury	.	.	.	.	.	.	.	.	.	.
Molybdenum	<	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.126	0.165	0.14	0.159	0.169	0.162	0.232	0.327	0.3	0.308
Thallium	<	<	<	<	<	<	<	<	<	<
Uranium	0.053	0.0507	0.0549	0.0504	0.0797	0.0688	0.0682	0.142	0.0713	0.128
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 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		EMWNT-03A		
Functional Area	EXP-SW					EXP-SW		EXP-SW		
Date Sampled	02/27/06	02/28/06	05/25/06	08/01/06	08/16/06	02/27/06	05/25/06	02/14/06	04/17/06	11/07/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Field Measurements										
Time Sampled	14:08	10:20	8:50	13:10	15:30	14:30	8:40	14:10	10:45	11:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	.	954	.	.	798	.	.	147	145	257
Dissolved Oxygen (ppm)	.	8	.	.	12.3	.	.	9.1	11.5	11
Oxidation/Reduction (mV)	.	137.9	.	.	107.1	.	.	33	58.5	-26.1
Temperature (degrees C)	.	8.63	.	.	26.37	.	.	10.79	20.04	12.96
Turbidity (NTU)	.	1.8	.	.	2.24	.	.	9.1	9.4	7.31
pH	.	7.12	.	.	7.78	.	.	7.92	6.44	7.4
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	144	.	208	205	.	.	.	18.5	18.3	39.4
Magnesium	18.2	.	24.4	25.3	.	.	.	3.82	4.14	7.33
Potassium	2.73	.	3.67	5.29	.	.	.	1.31	1.43	1.53
Sodium	28.6	.	38.2	40	.	.	.	3.17	2.69	4.27
Bicarbonate	.	195	.	.	222	.	.	.	.	.
Carbonate	.	<	.	.	<	.	.	.	.	.
Chloride	.	51.1	.	.	33.8	.	.	.	.	.
Fluoride	.	0.62	.	.	0.66	.	.	.	.	.
Nitrate as N	.	62.7	.	.	39.5	.	.	.	.	.
Sulfate	.	36.4	.	.	31	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)										
Aluminum	<	.	0.262	<	.	.	.	0.374	0.357	0.242
Arsenic	<	.	<	<	.	.	.	.	<	<
Barium	0.203	.	0.322	0.298	.	.	.	0.0387	0.0523	0.0509
Beryllium	<	.	<	<	.	.	.	.	<	<
Boron	<	.	0.107	0.155	.	.	.	<	<	<
Cadmium	0.0057	.	0.0082	0.0043	.	.	.	.	<	<
Chromium	<	.	<	<	.	.	.	<	<	<
Cobalt	<	.	<	<	.	.	.	.	<	<
Iron	0.0788	.	0.364	<	.	.	.	0.83	1.6	0.842
Lead	<	.	<	<	.	.	.	<	<	<
Lithium	<	.	0.0138	0.0127	.	.	.	<	<	<
Manganese	1.24	.	1.55	0.547	.	.	.	0.0916	0.65	0.24
Mercury	.	.	.	.	.	.	.	<	<	<
Molybdenum	12.6	.	62.8	<	.	.	.	<	<	<
Nickel	0.0252	.	0.0342	0.014	.	.	.	0.01 J	<	<
Selenium	<	.	<	<	.	.	.	<	<	<
Strontium	0.383	.	0.529	0.528	.	.	.	0.0404	0.0429	0.0735
Thallium	<	.	<	<	.	.	.	.	<	<
Uranium	0.137	.	0.21	0.261	.	0.439	0.509	.	<	0.004 J
Zinc	<	.	<	<	.	.	.	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	EMWNT-05				EMW-VWEIR				
Functional Area	EXP-SW				EXP-SW				
Date Sampled	02/14/06	04/17/06	08/16/06	11/07/06	02/14/06		04/17/06	08/16/06	11/07/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type						Dup			
Field Measurements									
Time Sampled	13:00	10:00	10:20	11:15	10:05	.	10:50	9:30	10:00
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.
Conductivity (µmho/cm)	207	223	342	243	422	.	240	275	207
Dissolved Oxygen (ppm)	8.9	11.8	10	7.9	8.7	.	7.17	7	7.7
Oxidation/Reduction (mV)	-13	89	-49.3	-49.4	104	.	245	181.4	132.4
Temperature (degrees C)	8.2	18.39	23.11	12.14	4.7	.	22.1	24.71	12.6
Turbidity (NTU)	2.8	4.1	13.4	4.24	19.7	.	42	45.5	72
pH	8.07	6.78	7.5	7.44	8.9	.	7.38	6.75	6.87
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	.	.	.	.	.	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	.	.	.
Turbidity (NTU)	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)									
Calcium	22.1	21.1	45.2	33.4	39.4	41.6	26.7	34.1	28.2
Magnesium	7.52	6.59	12.4	9.73	11	11.2	5.5	5.7	6.33
Potassium	1.43	1.66	2.79	2.17	2.71	2.63	1.96	3.46	4.27
Sodium	3.85	3.6	5.59	5.28	7.59	7.57	2.26	2.52	1.41
Bicarbonate	.	.	.	.	.	.	.	.	.
Carbonate	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.
Charge balance error (%)	.	.	.	.	.	.	.	.	.
Trace Metals (mg/L)									
Aluminum	<	<	<	<	0.281	0.235	0.892	0.802	1.37
Arsenic	.	<	<	<	.	.	<	<	<
Barium	0.0399	0.0533	0.0851	0.0584	0.0462	0.0468	0.0572	0.0668	0.0652
Beryllium	.	<	<	<	.	.	<	<	<
Boron	<	<	<	<	<	<	<	<	<
Cadmium	.	<	<	<	.	.	<	<	<
Chromium	<	<	<	<	<	<	<	<	<
Cobalt	.	<	<	<	.	.	<	<	<
Iron	0.885	1.11	2.39	1.43	0.472	0.4	1.43	1.15	2.31
Lead	<	<	<	<	<	<	<	<	<
Lithium	<	<	<	<	<	<	<	<	<
Manganese	0.288	0.493	1.05	0.551	0.011 Q	0.011 Q	0.0646	0.0534	0.0328
Mercury	<	<	<	<	<	<	<	<	<
Molybdenum	<	<	<	<	<	<	<	<	<
Nickel	0.01 J	<	<	<	0.01 J	0.01 J	<	<	<
Selenium	<	<	<	<	<	<	<	<	<
Strontium	0.0606	0.0598	0.115	0.0854	0.103	0.105	0.068	0.0842	0.0615
Thallium	.	<	<	<	.	.	<	<	<
Uranium	.	<	<	<	.	.	0.0116	<	0.004 J
Zinc	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	EMW-VWUNDER				NT-01				
Functional Area	EXP-SW				EXP-SW				
Date Sampled	02/27/06	04/20/06	08/16/06	11/14/06	02/27/06	03/01/06	04/19/06	05/25/06	08/01/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	BJC	BJC
Sample Type									
Field Measurements									
Time Sampled	14:45	13:15	14:00	13:30	14:40	14:00	7:50	8:30	13:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	376	347	317	219	.	1,082	1,407	.	.
Dissolved Oxygen (ppm)	4.03	4.25	4.65	9.5	.	10.9	4.61	.	.
Oxidation/Reduction (mV)	176	169	150	162	.	156.4	195	.	.
Temperature (degrees C)	14.9	17.6	21	17.1	.	17.88	16.2	.	.
Turbidity (NTU)	10	30	14	1	.	3.17	.	.	.
pH	6.44	7.48	7.32	7.69	.	6.58	6.7	.	.
Miscellaneous Analytes									
Dissolved Solids (mg/L)	.	.	.	.	.	.	1,110	.	.
Suspended Solids (mg/L)	.	.	.	.	.	.	5	.	.
Turbidity (NTU)	.	.	.	.	.	.	3.7	.	.
Major Ions (mg/L)									
Calcium	58	50.2	51.2	55.9	153	.	191	315	542
Magnesium	9.6	8.42	7.64	9.22	21.3	.	25.4	38.2	72.4
Potassium	1.87	1.99	1.72	2	2.73	.	3.74	5	10.2
Sodium	7.57	7.67	7.05	7.37	20	.	24.7	38.2	67
Bicarbonate	.	.	.	.	.	112	135	.	.
Carbonate	.	.	.	.	.	<	<	.	.
Chloride	.	.	.	.	.	14.9	17.3	.	.
Fluoride	.	.	.	.	.	0.79	0.777	.	.
Nitrate as N	.	.	.	.	.	110	138	.	.
Sulfate	.	.	.	.	.	23.9	19.3	.	.
Charge balance error (%)	.	.	.	.	.	.	-2.6	.	.
Trace Metals (mg/L)									
Aluminum	0.205 Q	<	<	<	0.559	.	0.588	0.704	0.338
Arsenic	.	<	<	<	<	.	0.0059	<	<
Barium	0.0881	0.0843	0.0879	0.0869	0.357	.	0.44	0.732	1.27
Beryllium	.	<	<	<	<	.	<	<	<
Boron	<	<	<	<	0.121	.	0.125	0.256	0.834
Cadmium	.	<	<	<	0.0151	.	0.0193	0.0322	0.0519
Chromium	<	<	<	<	<	.	<	<	<
Cobalt	.	<	<	<	<	.	<	<	<
Iron	0.258 Q	0.0752	<	<	0.132	.	0.148	0.193	<
Lead	<	<	<	<	<	.	<	<	0.0067
Lithium	<	<	<	<	0.0119	.	0.0103	0.026	<
Manganese	0.067	0.386	0.891	0.124	3.22	.	3.48	6.19	12.9
Mercury	<	<	<	<	.	.	<	.	.
Molybdenum	<	<	<	<	11.4	.	<	101.3	<
Nickel	<	<	<	<	0.0662	.	0.076	0.14	0.2
Selenium	<	<	<	<	<	.	<	<	0.005
Strontium	0.167	0.16	0.151	0.165	0.44	.	0.521	0.843	1.51
Thallium	.	<	<	<	<	.	<	<	<
Uranium	.	<	0.0045	<	0.0068	.	0.0151	0.0216	0.0607
Zinc	<	<	<	<	<	.	<	<	0.338

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	NT-03		NT-04				NT-07		NT-08	
Functional Area	EXP-SW		EXP-SW				EXP-SW		EXP-SW	
Date Sampled	03/01/06	08/16/06	02/14/06	04/17/06	08/16/06	11/07/06	02/28/06	08/17/06	02/28/06	08/17/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										
Field Measurements										
Time Sampled	13:12	14:45	10:30	11:00	9:50	10:40	15:10	10:30	14:50	10:20
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	214	351	530	607	520	541	327	269	283	354
Dissolved Oxygen (ppm)	11.6	11.8	9.9	12.1	6.5	7.4	10.4	8.35	9.5	7.8
Oxidation/Reduction (mV)	119.6	78.4	12	35.8	137.6	43.4	124.1	31	128.2	145
Temperature (degrees C)	21.96	28.1	4.6	18.7	23.49	12.84	10.92	24.6	14.06	23.4
Turbidity (NTU)	10.1	14.9	2.1	5.3	8	6.25	1.63	1.04	6.41	4.03
pH	8.62	8.34	7.72	6.49	7.13	6.71	7.81	8.08	7.62	7.79
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	.	.	.	.	238	252	202	216
Suspended Solids (mg/L)	.	.	.	.	.	.	<	<	5.3	<
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	30.7	44.9	86.2	95.7	83.2	101	52.1 J	66.4	47 J	41.8
Magnesium	6.29	11.1	16.1	17.5	15.2	17.9	8.49	9.23	5.87	4.04
Potassium	1.45	2.01	1.65	1.75	3.07	2.49	2.13	4.8	1.6	2.69
Sodium	3.49	4.18	6.06	7.92	7.36	7.76	5.78	4.76	4.73	3.18
Bicarbonate	75.3	111	.	.	.	.	128	172	323 Q	150
Carbonate	<	<	.	.	.	.	<	<	<	<
Chloride	1.9	2.9	.	.	.	.	15.5	23.7	9.8	10.6
Fluoride	0.32	0.74	.	.	.	.	<	0.12	0.12	0.19
Nitrate as N	<	<	.	.	.	.	0.022	<	2.7	0.054
Sulfate	40.6	57.1	.	.	.	.	20.8	14.4	14.2	10.8
Charge balance error (%)	-4	-2.1	.	.	.	.	2.5	-0.1	-40.3 R	-14.8
Trace Metals (mg/L)										
Aluminum	0.24	0.363	<	<	<	<	<	<	<	<
Arsenic	<	<	.	<	<	<	<	<	<	<
Barium	0.0354	0.0298	0.164	0.206	0.219	0.523 Q	0.038	0.0583	0.0678	0.0641
Beryllium	<	<	.	<	0.001 J	<	<	<	<	<
Boron	<	<	<	<	<	<	0.285	0.231	0.433	0.972
Cadmium	<	<	.	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	.	<	<	<	<	<	<	<
Iron	0.411	0.637	1.4	1.08	0.608	0.556	<	<	0.339	0.226
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	<	<	<	<	<	<	0.0685	0.0495	0.0946	0.157
Manganese	0.0346	0.0338	0.541	0.953	0.501	0.584	0.0059	0.0114	0.0912	0.0752
Mercury	.	.	<	<	<	<	.	.	.	.
Molybdenum	.	.	<	<	<	<	.	.	.	.
Nickel	<	<	0.01 J	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.105	0.186	0.224	0.26	0.237	0.273	0.113	0.146	0.109	0.0985
Thallium	<	<	.	<	<	<	<	<	<	<
Uranium	.	.	.	0.0085 J	0.0058 J	0.0064 J	0.0174	0.0145	0.196	0.276
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	S07		SS-1	SS-4				SS-5		
Functional Area	EXP-SW		EXP-SW	EXP-SW				EXP-SW		
Date Sampled	02/28/06	08/17/06	04/19/06	04/19/06		08/01/06		02/28/06	04/19/06	08/16/06
Program	BJC	BJC	GWPP	GWPP	GWPP	BJC	BJC	BJC	GWPP	BJC
Sample Type					Dup		Dup			
Field Measurements										
Time Sampled	10:40	8:45	8:10	9:00	9:00	12:50	.	9:30	8:45	13:55
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	378	1,126	1,169	677	677	877	.	355	409	542
Dissolved Oxygen (ppm)	9.1	9.4	4.29	5.27	5.27	11.1	.	6.2	4.24	8.2
Oxidation/Reduction (mV)	119.4	154.4	170	167	167	174.1	.	123.8	149	85.2
Temperature (degrees C)	7.72	23.26	15	15.5	15.5	22.3	.	11.35	13.9	17.84
Turbidity (NTU)	5.79	5.63	.	.	.	4.4	.	3.06	.	3.35
pH	7.52	7.15	7.2	7.22	7.22	6.76	.	7.03	7.12	7.42
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	632	331	341	.	.	253	197	307
Suspended Solids (mg/L)	.	.	4	3	3	.	.	<	1	<
Turbidity (NTU)	.	.	0.593	2.93	2.5	.	.	.	2.29	.
Major Ions (mg/L)										
Calcium	52.8	184	170	86.6	84.6	104	104	53	50.1	71.9
Magnesium	6.57	20.6	16.5	18.7	18	19.7	19.7	12.5	13.7	17.8
Potassium	1.27	3.12	3.15	2.14	<	3.06	3.06	1.27	<	2.27
Sodium	4.85	10.6	26.1	11.7	11.3	19.1	18.8	5.74	4.16	8.99
Bicarbonate	57.2	184	362	205	204	103	93.6	161	175	208
Carbonate	<	<	<	<	<	<	<	<	<	<
Chloride	3.6	9.1	83.3	18.5	21	32.8	33.7	8.9	7.78	15.2
Fluoride	<	0.13	0.197	0.29	0.291	0.36	0.35	0.14	0.134	0.21
Nitrate as N	26.2	95.2	8.35	16.8	16.7	38.6	42.7	4.2	3.37	82.2
Sulfate	13.2	31.9	56	25	27	29.8	30.5	21.3	15.5	19.6
Charge balance error (%)	0.4	0.1	-1.3	0.5	-1.9	9.5	8.3	-3.2	-5.9	-32.8 R
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	0.267	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.142	0.389	0.0839	0.126	0.122	0.158	0.159	0.0645	0.0584	0.0961
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Iron	0.245	0.289	0.0554	0.217	0.214	0.284	0.393	0.0601	0.0906	0.0627
Lead	<	<	0.00099	0.00094	0.00164	<	<	<	0.0397	<
Lithium	<	<	<	0.0123	0.0106	0.0106	0.0108	<	<	<
Manganese	0.0292	0.0304	0.0326	0.0473	0.0452	0.0659	0.0845	0.0052	0.00631	0.0053
Mercury	.	.	<	<	<	.	.	.	<	.
Molybdenum	.	.	<	<	<	.	.	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.17	0.556	0.414	0.204	0.197	0.273	0.272	0.105	0.0786	0.154
Thallium	<	<	<	<	<	<	<	<	<	<
Uranium	<	<	0.0287	0.0699	0.0705	0.0958	0.0883	0.025	0.0264	0.0355
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.1: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	SS-6		SS-6.6		SS-7		SS-8			
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW			
Date Sampled	03/13/06	07/05/06	02/28/06	08/17/06	02/28/06	08/17/06	02/28/06		08/17/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup		Dup
Field Measurements										
Time Sampled	14:15	8:35	14:15	10:00	13:55	9:25	13:45	.	9:00	.
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	429	444	366	261	236	402	242	.	218	.
Dissolved Oxygen (ppm)	9.2	5.3	9.5	8.4	8.5	5.4	12.8	.	8.64	.
Oxidation/Reduction (mV)	96.8	152.5	134.5	-17	118.3	140.4	136	.	120	.
Temperature (degrees C)	15.35	16.01	17.26	21.7	14.3	18.97	14.92	.	18.6	.
Turbidity (NTU)	12.3	21.9	1.5	4.19	2.88	4.71	3.84	.	4.55	.
pH	6.95	5.09	7.28	8.24	7.11	7.21	7.41	.	8.48	.
Miscellaneous Analytes										
Dissolved Solids (mg/L)	.	.	258	245	179	216	183	182	174	183
Suspended Solids (mg/L)	.	.	8.7	7	<	<	<	<	<	<
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
Major Ions (mg/L)										
Calcium	52.9	58.7	53 J	55.5	29.8 J	46.5	36.1 J	35.9 J	42.2	43
Magnesium	16.8	18.6	13	15.5	13.3	18.4	8.87	8.83	15.5	15.6
Potassium	0.957	1.11	1.16	1.22	0.804	1.33	0.944	0.94	1.11	1.11
Sodium	3.84	3.89	4.24	3.68	2.71	4.64	4.44	4.4	3.23	3.33
Bicarbonate	.	.	188	206	106	170	125	123	158	160
Carbonate	.	.	<	<	<	<	<	<	<	<
Chloride	.	.	8.5	8	4.3	8.4	9.1	9.3	5.9	5.9
Fluoride	.	.	<	<	<	0.1	<	<	<	<
Nitrate as N	1.8	1	0.8	0.24	0.31	0.74	0.27	0.27	0.28	0.28
Sulfate	.	.	12.5	9.8	6.3	9.7	5	4.8	5.5	6.2
Charge balance error (%)	.	.	-4.7	-3.7	6.4	2.2	-2.3	-1.9	1.3	1.3
Trace Metals (mg/L)										
Aluminum	<	0.55	0.246	0.222	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.0717	0.0822	0.0482	0.0496	0.0434	0.0671	0.0393	0.04	0.0613	0.0615
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Iron	0.0954	0.574	0.393	0.505	0.151	0.206	0.113	0.145	0.104	0.0867
Lead	<	<	<	<	<	<	<	<	<	<
Lithium	<	<	<	<	<	<	<	<	<	<
Manganese	0.0263	0.0371	0.011	0.0281	0.0086	0.0061	0.0087	0.0073	0.0123	0.012
Mercury	.	.	.	.	.	.	.	.	.	.
Molybdenum	.	.	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.0853	0.1	0.0705	0.0706	0.0319	0.0681	0.0462	0.0461	0.0512	0.051
Thallium	<	<	<	<	<	<	<	<	<	<
Uranium	0.00924	0.0112	<	<	<	0.015	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2

VOLATILE ORGANIC COMPOUNDS

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-008		GW-014		GW-046		GW-058	GW-068	GW-071	
Functional Area	OLF		BG		BG		BG	BG	BG	
Date Sampled	01/03/06	07/05/06	02/02/06	08/14/06	01/04/06	07/05/06	06/12/06	06/08/06	02/02/06	08/14/06
Program	BJC	BJC	GWPP	GWPP	BJC	BJC	GWPP	GWPP	GWPP	GWPP
Sample Type										
Chloroethenes (µg/L)										
Tetrachloroethene	53	65	23	45	1,000	950	4 J	9	1,400	1,500
Trichloroethene	18	11	170	290	1,500	1,000	<	70	200	170
cis-1,2-Dichloroethene	33	26	760	1,500	5,300	2,600	<	1,000	59	52
trans-1,2-Dichloroethene	<	<	2 J	5	50	9	<	2 J	<	2 J
1,1-Dichloroethene	6	5	46	100	120	35	<	110	190	230
Vinyl chloride	<	<	120	110	450	270	<	260	13	12
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	<	<	<	<	11 Q	<	<	<	<	<
1,1,1-Trichloroethane	<	.	<	<	95	21	<	<	1,500	2,100
1,2-Dichloroethane	<	.	<	2 J	3 J	<	<	3 J	<	<
1,1-Dichloroethane	14	15	190	320	190 J	120	<	530	2,800	5,600
Chloroethane	<	<	7	13	<	<	<	5	20	22
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	390
Chloroform	<	.	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	1 J	.	2 J	4 J	19	28	<	47	2,300	2,800
Ethylbenzene	<	<	<	<	<	<	<	<	5	5 J
Toluene	<	<	<	<	1 J	<	<	5 J	55	49
Total Xylene	<	.	<	<	4 J	<	<	3 J	19	18
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	<	<	33	39	<	<	800	980
Trichlorofluoromethane	.	.	<	<	.	.	<	2 J	<	<
Dichlorodifluoromethane	.	.	<	<	.	.	<	3 J	53	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	12	20
2-Butanone	<	<	<	<	<	<	<	15 Q	<	<
Chlorobenzene	<	.	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	.	.	<	<	.	.	<	<	<	<
1,4-Dichloro-2-butene	.	.	<	<	.	.	<	<	<	2 J
Dibromochloromethane	<	.	<	<	<	<	<	7	<	<
Carbon disulfide	<	.	<	<	5	<	<	<	<	<
1,2-Dichloropropane	1 J	.	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-077		GW-078		GW-079		GW-080			
Functional Area	BG		BG	BG	BG		BG			
Date Sampled	03/07/06	07/26/06	03/07/06	07/26/06	03/07/06	07/26/06	03/07/06		07/26/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup		Dup
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
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	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	<	.	<	.	<	.	<	<	.	.
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichloro-2-butene	.	.	.	.	.	.	.	.	.	.
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-082	GW-085			GW-098	GW-122	GW-126	GW-225		
Functional Area	BG	OLF			OLF	S3	BG	OLF		
Date Sampled	06/05/06	02/08/06		08/22/06	02/14/06	02/21/06	06/06/06	02/07/06	08/17/06	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup							Dup
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	2 J	1 J	1 J
Trichloroethene	<	<	<	<	8	<	<	260	250	260
cis-1,2-Dichloroethene	360	<	<	<	3 J	<	<	3 J	2 J	2 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	2 J	<	<	<	2 J	<	<	3 J	2 J	3 J
Vinyl chloride	84	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	51	<	<	<	1 J	<	<	<	<	<
Chloroethane	7	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	4 J	5 J	5
Chloroform	<	<	<	<	<	<	<	2 J	2 J	2 J
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	2 J	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichloro-2-butene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-226		GW-229	GW-246		GW-257	GW-276		GW-289
Functional Area	OLF		OLF	S3		BG	S3		BG
Date Sampled	02/07/06	08/17/06	02/16/06	02/08/06	08/21/06	06/07/06	01/04/06	07/06/06	06/07/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	GWPP
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	<	1 J	<	160	97	180	7	6	600
Trichloroethene	40	250	8	2 J	2 J	<	<	<	14
cis-1,2-Dichloroethene	9	4 J	380	2 J	<	<	<	<	2 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	3 J	28	3 J	2 J	<	<	<	<
Vinyl chloride	<	<	48	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	1 J	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	11	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	<	6	<	<	<	<	<	<	<
Chloroform	<	2 J	<	40	30	<	<	<	<
Methylene chloride	<	<	<	17	14	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	6	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	15	74	52	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	.	.	<
Dichlorodifluoromethane	<	<	<	<	<	<	.	.	<
Miscellaneous (µg/L)									
Acetone	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
Chlorobenzene	1 J	<	11	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	<	<	3 J	<	<	<	.	.	<
1,4-Dichloro-2-butene	<	<	<	<	<	<	.	.	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-310		GW-311	GW-315	GW-363				GW-526	
Functional Area	RS		RS	SPI	EMWMF				S3	
Date Sampled	09/06/06		09/06/06	02/16/06	02/15/06	04/24/06	08/14/06	11/13/06	03/07/06	07/25/06
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup								
Chloroethenes (µg/L)										
Tetrachloroethene	3 J	3 J	<	6	<	<	<	<	<	<
Trichloroethene	5 J	5 J	3 J	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	.	.	.	.	<	<
trans-1,2-Dichloroethene	<	<	<	<	.	.	.	.	<	<
1,1-Dichloroethene	<	<	<	<	.	.	.	.	<	<
Vinyl chloride	<	<	<	<	.	.	.	.	<	<
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	<	<	<	<	.	.	.	.	<	<
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	<	<	0.2 J	<	<
Total Xylene	<	<	<	<	0.1 J	<	4	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	.	.	.	.	.	.
Dichlorodifluoromethane	<	<	<	<	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	.	.	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	.	.	.	.	2	<	<	.
1,4-Dichlorobenzene	<	<	<	<	<	<	.	<	.	.
1,4-Dichloro-2-butene	<	<	<	<	.	.	.	.	.	.
Dibromochloromethane	<	<	<	<	.	.	.	.	<	<
Carbon disulfide	<	<	<	<	.	.	<	<	<	<
1,2-Dichloropropane	<	<	<	<	.	.	.	.	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-537	GW-615	GW-616		GW-626		GW-627		GW-629	
Functional Area	OLF	S3	S3		BG		BG		BG	
Date Sampled	02/15/06	02/21/06	02/22/06		02/06/06	08/15/06	02/06/06	08/15/06	06/08/06	
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type				Dup						Dup
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	940	240	1,200	1,000	17,000 Q	17,000
Trichloroethene	<	<	<	<	470	150	320	340	3,500 Q	4,600
cis-1,2-Dichloroethene	<	<	<	<	6,600	1,600	25	28	54 Q	54
trans-1,2-Dichloroethene	<	<	<	<	16	3 J	3 J	4 J	65 Q	62
1,1-Dichloroethene	<	<	<	<	100	26	34	34	280 Q	300
Vinyl chloride	<	<	<	<	1,500	150	35	38	29 Q	27
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	<	<	<	<	2 J	<	<	<	6 Q	6
1,1,1-Trichloroethane	<	<	<	<	27	8	<	<	91 Q	91
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	300	68	100	110	1,200 Q	1,400
Chloroethane	<	<	<	<	<	<	2 J	2 J	3 J	3 J
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	<	<
Chloroform	2 J	<	<	<	76	23	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	170	14	<	<	6 Q	6
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	7 Q	7
Total Xylene	<	<	<	<	<	<	<	<	4 J	4 J
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	200 J	55	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	26	4 J	<	<	<	<
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	40	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichloro-2-butene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	3 J	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-639				GW-653	GW-683		GW-684		GW-694
Functional Area	EMWMF				BG	EXP-A		EXP-A		EXP-B
Date Sampled	02/16/06	04/19/06	08/08/06	11/08/06	06/05/06	03/08/06	08/07/06	03/08/06	07/24/06	08/23/06
Program	BJC	BJC	BJC	BJC	GWPP	BJC	BJC	BJC	BJC	GWPP
Sample Type										
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	0.2 J	<	2 J	<	<	<	<	<
Trichloroethene	<	<	<	<	1 J	<	<	<	<	2 J
cis-1,2-Dichloroethene	.	.	.	.	23	<	<	<	<	<
trans-1,2-Dichloroethene	.	.	.	.	<	<	<	<	<	<
1,1-Dichloroethene	.	.	.	.	<	<	<	<	<	<
Vinyl chloride	.	.	.	.	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	.	.	.	.	<	<	<	<	<	<
1,1,1-Trichloroethane	.	.	.	.	<	<	<	<	<	<
1,2-Dichloroethane	.	.	.	.	<	<	<	<	<	<
1,1-Dichloroethane	.	.	.	.	1 J	<	<	<	<	<
Chloroethane	.	.	.	.	<	<	<	<	<	<
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	0.1 J	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<	<
Methylene chloride	.	.	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	.	.	<	<	<	<	<	<	<	<
Toluene	0.1 J	<	<	<	<	<	<	<	<	<
Total Xylene	0.1 J	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	<	.	.	.	.	<
Trichlorofluoromethane	.	.	.	.	<	.	.	.	.	<
Dichlorodifluoromethane	.	.	.	.	<	.	.	.	.	<
Miscellaneous (µg/L)										
Acetone	<	<	<	3 J	<	<	<	<	<	<
2-Butanone	.	.	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	<	.	<	.	<	.	.
1,4-Dichlorobenzene	<	<	<	<	<	.	.	.	.	<
1,4-Dichloro-2-butene	.	.	.	.	<	.	.	.	.	<
Dibromochloromethane	.	.	.	.	<	<	<	<	<	<
Carbon disulfide	.	.	<	<	<	<	<	<	<	<
1,2-Dichloropropane	.	.	.	.	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-695	GW-703	GW-704		GW-706		GW-712		GW-713	
Functional Area	EXP-B	EXP-B	EXP-B		EXP-B		EXP-W		EXP-W	
Date Sampled	08/23/06	08/30/06	03/08/06	07/31/06	03/29/06	08/01/06	01/03/06	07/05/06	01/03/06	
Program	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type										Dup
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	6	11	28	26	13	17	<	<	<	<
cis-1,2-Dichloroethene	5 J	4 J	2 J	<	15	20	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	1 J	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
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	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	.	.	.	.	<	<	<	<
Trichlorofluoromethane	<	<	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	<	<	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	1 J	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	2 J
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	.	<	.	.	.	.	.
1,4-Dichlorobenzene	<	<	.	.	.	.	.	.	.	.
1,4-Dichloro-2-butene	<	<	.	.	.	.	.	.	.	.
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-713		GW-714		GW-724	GW-725	GW-738	GW-740	GW-829
Functional Area	EXP-W		EXP-W		EXP-C	EXP-C	EXP-C	EXP-C	OLF
Date Sampled	07/05/06		01/03/06	07/05/06	08/28/06	08/24/06	08/28/06	08/31/06	02/15/06
Program	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup							
Chloroethenes (µg/L)									
Tetrachloroethene	14 R	< R	<	<	3 J	7	<	1 J	<
Trichloroethene	3 Q	<	<	<	88	10	18	50	<
cis-1,2-Dichloroethene	2 Q	<	<	<	3 J	3 J	<	2 J	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
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	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	.	.	.	.	<	<	<	<	<
Dichlorodifluoromethane	.	.	.	.	<	<	<	<	<
Miscellaneous (µg/L)									
Acetone	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	.	.	.	.	.	.	.
1,4-Dichlorobenzene	.	.	.	.	<	<	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-916				GW-917				GW-918	
Functional Area	EMWMF				EMWMF				EMWMF	
Date Sampled	02/23/06	04/18/06	08/10/06	11/13/06	02/16/06	04/18/06	08/10/06	11/06/06	03/01/06	04/18/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	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)										
1,1,2-Trichloroethane	.	.	.	.	.	.	.	.	.	.
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	<	0.1 J	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	4 J	<	<	<	4 J	<	2 J	<	<
2-Butanone	.	.	<	<	.	.	<	<	.	.
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	<	.	.	<	<	.	.
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	.	.	.	.	.
Dibromochloromethane	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	<	<	.	.	<	<	.	.
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-918		GW-920				GW-921			
Functional Area	EMWMF		EMWMF				EMWMF			
Date Sampled	08/09/06	11/13/06	02/27/06	04/18/06	08/09/06	11/09/06	02/21/06	04/24/06	08/09/06	11/07/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	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)										
1,1,2-Trichloroethane	.	.	.	.	.	.	.	.	.	.
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	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	.	.	<	<	.	.	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	<	<	.	.	<	<	.	.	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	.	.	.	.	.
Dibromochloromethane	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	<	<	.	.	<	<	.	.	<	<
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-922				GW-923		GW-924			
Functional Area	EMWMF				EMWMF		EMWMF			
Date Sampled	02/21/06	04/18/06	08/09/06	11/14/06	02/27/06	11/14/06	02/27/06		04/20/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup		Dup
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethene	.	.	.	.	.	.	.	.	.	.
Vinyl chloride	.	.	.	.	.	.	.	.	.	.
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	.	.	.	.	.	.	.	.	.	.
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	<	<	<	2 J	<	<	<	<	<	<
Total Xylene	<	<	<	2 J	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	5	<	<	<	<	<	<	<	<
2-Butanone	.	.	<	<	.	<	.	.	.	.
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	0.1 J	.	<	.	.	.	.
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	.	.	.	.	.
Dibromochloromethane	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	<	<	.	<	.	.	.	.
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-924				GW-925				GW-926	
Functional Area	EMWMF				EMWMF				EMWMF	
Date Sampled	08/14/06		11/06/06		02/21/06	04/19/06	08/09/06	11/07/06	02/28/06	04/20/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup						
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethene	.	.	.	.	.	.	.	.	.	.
Vinyl chloride	.	.	.	.	.	.	.	.	.	.
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	.	.	.	.	.	.	.	.	.	.
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	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	2 J	<	<
2-Butanone	.	.	<	<	.	.	<	<	.	.
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	<	.	.	<	<	.	.
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	.	.	.	.	.
Dibromochloromethane	.	.	.	.	.	.	.	.	.	.
Carbon disulfide	.	.	<	<	.	.	<	<	.	.
1,2-Dichloropropane	.	.	.	.	.	.	.	.	.	.

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-926		GW-927				BCK-04.55	BCK-09.20	
Functional Area	EMWMF		EMWMF				EXP-SW	EXP-SW	
Date Sampled	08/14/06	11/06/06	02/16/06	04/19/06	08/09/06	11/07/06	04/19/06	02/28/06	08/16/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	BJC	BJC
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	<	5 J	<
trans-1,2-Dichloroethene	.	.	.	.	.	.	<	<	<
1,1-Dichloroethene	.	.	.	.	.	.	<	<	<
Vinyl chloride	.	.	.	.	.	.	<	<	<
Chloroethanes (µg/L)									
1,1,2-Trichloroethane	.	.	.	.	.	.	<	<	<
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	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	<	.	.
Trichlorofluoromethane	.	.	.	.	.	.	<	.	.
Dichlorodifluoromethane	.	.	.	.	.	.	<	.	.
Miscellaneous (µg/L)									
Acetone	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	.	.	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	<	<	.	.	<	<	.	<	.
1,4-Dichlorobenzene	<	<	<	<	<	<	<	.	.
1,4-Dichloro-2-butene	.	.	.	.	.	.	<	.	.
Dibromochloromethane	.	.	.	.	.	.	<	<	<
Carbon disulfide	<	<	.	.	<	<	<	<	<
1,2-Dichloropropane	.	.	.	.	.	.	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	BCK-09.47		BCK-11.54		BCK-11.84		BCK-12.34		EMWNT-03A		
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW		EXP-SW		
Date Sampled	02/28/06	08/16/06	02/28/06	08/16/06	02/28/06	08/16/06	02/28/06	08/16/06	02/14/06	04/17/06	11/07/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type											
Chloroethenes (µg/L)											
Tetrachloroethene	3 J	<	<	<	<	<	11	<	<	<	<
Trichloroethene	3 J	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	17	<	<	<	<	<	<	<	.	.	.
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<	.
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<	.
Vinyl chloride	<	<	<	<	<	<	<	<	<	<	.
Chloroethanes (µg/L)											
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<	.
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	<	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)											
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	<	<	.
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	<	<	.
Miscellaneous (µg/L)											
Acetone	<	<	<	<	<	<	<	<	<	6 J	<
2-Butanone	<	<	<	<	<	<	<	<	.	.	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	<	.	<	.	<	.	<	.	.	.	<
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	.	.	.	.	.	.
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<	.
Carbon disulfide	<	<	<	<	<	<	<	<	.	.	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<	.

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	EMWNT-05				EMW-VWEIR					
Functional Area	EXP-SW				EXP-SW					
Date Sampled	02/14/06	04/17/06	08/16/06	11/07/06	02/14/06		04/17/06		08/16/06	11/07/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type						Dup		Dup		
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	.	.	.	.	.	.
trans-1,2-Dichloroethene	<	<	.	.	<	.	<	<	.	.
1,1-Dichloroethene	<	<	.	.	<	.	<	<	.	.
Vinyl chloride	<	<	.	.	<	.	<	<	.	.
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	<	<	.	.	<	.	<	<	.	.
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	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	.	.	<	.	<	<	.	.
Dichlorodifluoromethane	<	<	.	.	<	.	<	<	.	.
Miscellaneous (µg/L)										
Acetone	<	5 J	4 J	<	<	<	<	<	<	<
2-Butanone	.	.	2 J	<	.	.	.	.	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	<	.	.	.	.	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	.	.	.	.	.
Dibromochloromethane	<	<	.	.	<	.	<	<	.	.
Carbon disulfide	.	.	<	<	.	.	.	.	<	<
1,2-Dichloropropane	<	<	.	.	<	.	<	<	.	.

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	EMW-VWUNDER				NT-01		NT-03		NT-04	
Functional Area	EXP-SW				EXP-SW		EXP-SW		EXP-SW	
Date Sampled	02/27/06	04/20/06	08/16/06	11/14/06	03/01/06	04/19/06	03/01/06	08/16/06	02/14/06	04/17/06
Program	BJC	BJC	BJC	BJC	BJC	GWPP	BJC	BJC	BJC	BJC
Sample Type										
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	<	<	32	32	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	.	.	.	.	1 J	<	<	<	.	.
trans-1,2-Dichloroethene	.	.	.	.	<	<	<	<	.	.
1,1-Dichloroethene	.	.	.	.	<	<	<	<	.	.
Vinyl chloride	.	.	.	.	<	<	<	<	.	.
Chloroethanes (µg/L)										
1,1,2-Trichloroethane	.	.	.	.	<	<	<	<	.	.
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	<	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	<	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	<	.	.	.	.
Dichlorodifluoromethane	.	.	.	.	.	<	.	.	.	.
Miscellaneous (µg/L)										
Acetone	<	<	<	<	<	<	<	<	<	5 J
2-Butanone	.	.	<	<	<	<	<	<	.	.
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	0.1 J	<	.	<	.	.	.
1,4-Dichlorobenzene	<	<	<	<	.	<	.	.	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	<	.	.	.	.
Dibromochloromethane	.	.	.	.	<	<	<	<	.	.
Carbon disulfide	.	.	<	<	<	<	<	<	.	.
1,2-Dichloropropane	.	.	.	.	<	<	<	<	.	.

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	NT-04		NT-07		NT-08		SS-1	SS-4	
Functional Area	EXP-SW		EXP-SW		EXP-SW		EXP-SW	EXP-SW	
Date Sampled	08/16/06	11/07/06	02/28/06	08/17/06	02/28/06	08/17/06	04/19/06	04/19/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP
Sample Type									Dup
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	20	<	8	<	<	<	<
Trichloroethene	<	<	18	<	6	<	<	4 J	4 J
cis-1,2-Dichloroethene	.	.	69	10	49	<	<	1 J	1 J
trans-1,2-Dichloroethene	.	.	<	<	<	<	<	<	<
1,1-Dichloroethene	.	.	2 J	<	1 J	<	<	<	<
Vinyl chloride	.	.	1 J	<	1 J	<	<	<	<
Chloroethanes (µg/L)									
1,1,2-Trichloroethane	.	.	<	<	<	<	<	<	<
1,1,1-Trichloroethane	.	.	1 J	<	<	<	<	<	<
1,2-Dichloroethane	.	.	<	<	<	<	<	<	<
1,1-Dichloroethane	.	.	9	<	4 J	<	<	<	<
Chloroethane	.	.	<	<	<	<	<	<	<
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	1 J	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	<	<	<
Trichlorofluoromethane	.	.	.	.	.	.	<	<	<
Dichlorodifluoromethane	.	.	.	.	.	.	<	<	<
Miscellaneous (µg/L)									
Acetone	2 J	<	<	<	<	<	<	<	<
2-Butanone	2 J	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	<	<	<	.	<	.	.	.	.
1,4-Dichlorobenzene	<	<	.	.	.	.	<	<	<
1,4-Dichloro-2-butene	.	.	.	.	.	.	<	<	<
Dibromochloromethane	.	.	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	.	.	<	<	<	<	<	<	<

APPENDIX D.2: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	SS-4		SS-5			SS-6		SS-6.6	
Functional Area	EXP-SW		EXP-SW			EXP-SW		EXP-SW	
Date Sampled	08/01/06		02/28/06	04/19/06	08/16/06	03/13/06	07/05/06	02/28/06	08/17/06
Program	BJC	BJC	BJC	GWPP	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)									
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
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	<	<	<	<	<	<	<	<	<
Chlorofluorocarbons (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	<	.	<	<	.	.
Trichlorofluoromethane	.	.	.	<	.	.	.	.	.
Dichlorodifluoromethane	.	.	.	<	.	.	.	.	.
Miscellaneous (µg/L)									
Acetone	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
1,2-Dimethylbenzene	.	.	<	.	.	.	.	<	.
1,4-Dichlorobenzene	.	.	.	<	.	.	.	.	.
1,4-Dichloro-2-butene	.	.	.	<	.	.	.	.	.
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<

APPENDIX D.3

RADIOLOGICAL ANALYTES

APPENDIX D.3: CY 2006 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	TPU	MDA	Activity	TPU	MDA
GW-008	OLF	01/03/06	BJC	<	.	1.57	3.16	1.51	2.38
GW-008	OLF	07/05/06	BJC	2.46	0.96	1.16	3.59	1.46	2.27
GW-014	BG	02/02/06	GWPP	4.4 R	6.2	2.7	<	.	7.9
GW-014	BG	08/14/06	GWPP	<	.	4.1	<	.	10
GW-046	BG	01/04/06	BJC	<	.	1.99	7.97	1.6	2.09
GW-046	BG	07/05/06	BJC	2.2	0.89	1.06	4.32	1.48	2.24
GW-058	BG	06/12/06	GWPP	17	5.5	2	17	5.6	6.2
GW-068	BG	06/08/06	GWPP	<	.	1.8	16	6.2	7.8
GW-071	BG	02/02/06	GWPP	<	.	7.7	<	.	19
GW-071	BG	08/14/06	GWPP	<	.	8.4	<	.	11
GW-082	BG	06/05/06	GWPP	<	.	4.5	<	.	5.7
GW-085	OLF	02/08/06	GWPP	<	.	4.9	52	12	13
GW-085 Dup	OLF	02/08/06	GWPP	<	.	6.2	58	18	20
GW-085	OLF	08/22/06	GWPP	<	.	6.2	66	14	13
GW-098	OLF	02/14/06	GWPP	<	.	7.7	<	.	26
GW-122	S3	02/21/06	GWPP	16 R	35	11	<	.	37
GW-126	BG	06/06/06	GWPP	<	.	4.5	<	.	17
GW-225	OLF	02/07/06	GWPP	6 R	7.6	3.9	18	8.5	11
GW-225	OLF	08/17/06	GWPP	6	5.7	3.6	21	6.3	7.1
GW-225 Dup	OLF	08/17/06	GWPP	<	.	4.7	18	6.4	7.5
GW-226	OLF	02/07/06	GWPP	<	.	4	9.8	9.3	9.2
GW-226	OLF	08/17/06	GWPP	<	.	5.3	17	6.6	7
GW-229	OLF	02/16/06	GWPP	75	31	7.9	74	29	29
GW-246	S3	02/08/06	GWPP	550	130	40	18,000	360	98
GW-246	S3	08/21/06	GWPP	230	170	43	15,000	240	67
GW-257	BG	06/07/06	GWPP	<	.	2.3	<	.	6
GW-276	S3	01/04/06	BJC	222	19.56	4.34	251	14.9	5.63
GW-276	S3	07/06/06	BJC	197	16.23	2.67	255	13.22	2.53
GW-289	BG	06/07/06	GWPP	<	.	2.4	<	.	6.3
GW-310	RS	09/06/06	GWPP	9.9	7.1	3.7	21	6.5	7.7
GW-310 Dup	RS	09/06/06	GWPP	8.4	7	3.2	27	6.4	6.5
GW-311	RS	09/06/06	GWPP	<	.	1.6	<	.	4.2
GW-315	SPI	02/16/06	GWPP	<	.	3.1	12	5.4	6.8
GW-526	S3	03/07/06	BJC	<	.	41.1	79.8	27.55	40.6
GW-526	S3	07/25/06	BJC	<	.	35.1	80.1	32.22	49.9
GW-537	OLF	02/15/06	GWPP	<	.	5.1	370	28	16
GW-615	S3	02/21/06	GWPP	320 R	390	54	790	260	180
GW-616	S3	02/22/06	GWPP	<	.	8.6	<	.	31
GW-616 Dup	S3	02/22/06	GWPP	<	.	9.1	<	.	25
GW-626	BG	02/06/06	GWPP	5 R	5.4	2	<	.	7.9
GW-626	BG	08/15/06	GWPP	4.3 R	4.6	3.7	8.6	4.3	5.2
GW-627	BG	02/06/06	GWPP	<	.	6.9	<	.	19
GW-627	BG	08/15/06	GWPP	<	.	5	<	.	7.4
GW-629	BG	06/08/06	GWPP	<	.	4.4	<	.	11
GW-629 Dup	BG	06/08/06	GWPP	<	.	7	<	.	15
GW-653	BG	06/05/06	GWPP	<	.	1.8	<	.	5.6
GW-683	EXP-A	03/08/06	BJC	9.49	1.66	0.18	19.3	2.19	2.29
GW-683	EXP-A	08/07/06	BJC	8.7	2.03	2.17	16.5	2	2.02
GW-684	EXP-A	03/08/06	BJC	11.6	2.01	0.8	22.3	2.41	2.51
GW-684	EXP-A	07/24/06	BJC	13.5	2.29	1.28	27.4	2.62	2.31

APPENDIX D.3: CY 2006 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	TPU	MDA	Activity	TPU	MDA
GW-694	EXP-B	08/23/06	GWPP	8.6	4.4	3.2	26	5.4	5
GW-695	EXP-B	08/23/06	GWPP	15	4.6	2.9	38	6.3	5.2
GW-703	EXP-B	08/30/06	GWPP	<	.	4.2	37	7.6	8
GW-704	EXP-B	03/08/06	BJC	1.61	0.98	1.38	10.5	1.98	2.66
GW-704	EXP-B	07/31/06	BJC	<	.	1.95	14.9	2.42	2.86
GW-706	EXP-B	03/29/06	BJC	25.8	6.37	4.84	69.5	7.64	5.73
GW-706	EXP-B	08/01/06	BJC	31.7	4.94	3.29	70.4	5.89	4.53
GW-712	EXP-W	01/03/06	BJC	<	.	2.13	4.65	2	3.11
GW-712	EXP-W	07/05/06	BJC	<	.	2.36	4.99	1.57	2.32
GW-713	EXP-W	01/03/06	BJC	<	.	1.33	<	.	3.27
GW-713 Dup	EXP-W	01/03/06	BJC	<	.	2.08	5.44	2.03	3.11
GW-713	EXP-W	07/05/06	BJC	1.83	0.91	1.19	6.49	1.7	2.47
GW-713 Dup	EXP-W	07/05/06	BJC	<	.	1.34	3.37	1.62	2.57
GW-714	EXP-W	01/03/06	BJC	3.87	1.28	1	3.55	2.03	3.25
GW-714	EXP-W	07/05/06	BJC	<	.	2.03	6.63	1.58	2.2
GW-724	EXP-C	08/28/06	GWPP	<	.	3.2	7.4	5	6.7
GW-725	EXP-C	08/24/06	GWPP	4 R	5.6	4	22	6	7.2
GW-738	EXP-C	08/28/06	GWPP	<	.	4.6	48	6.9	5.3
GW-740	EXP-C	08/31/06	GWPP	6.8	4.2	3.2	<	.	5.3
GW-829	OLF	02/15/06	GWPP	<	.	9.1	<	.	25
BCK-03.30	EXP-SW	02/28/06	BJC	9.26	1.75	0.97	10.6	1.92	2.54
BCK-03.30	EXP-SW	08/17/06	BJC	.	.	.	17.2	2.29	2.73
BCK-04.55	EXP-SW	04/19/06	GWPP	<	.	2.7	<	.	7.4
BCK-07.87	EXP-SW	02/28/06	BJC	.	.	.	32	2.72	1.89
BCK-07.87	EXP-SW	08/17/06	BJC	.	.	.	63.5	4.28	2.41
BCK-09.20	EXP-SW	02/28/06	BJC	.	.	.	41.3	3.28	2.33
BCK-09.20	EXP-SW	08/16/06	BJC	.	.	.	69.7	4.77	2.95
BCK-09.47	EXP-SW	02/28/06	BJC	.	.	.	32.2	2.83	2.4
BCK-09.47	EXP-SW	08/16/06	BJC	.	.	.	79	4.95	2.2
BCK-11.54	EXP-SW	02/28/06	BJC	.	.	.	76.4	5.35	3.32
BCK-11.54	EXP-SW	08/16/06	BJC	.	.	.	143	8.38	3.16
BCK-11.84	EXP-SW	02/28/06	BJC	.	.	.	96.3	6.67	4.14
BCK-11.84	EXP-SW	08/16/06	BJC	.	.	.	147	8.67	2.98
EMWNT-03A	EXP-SW	02/14/06	BJC	1.81	0.76	0.83	4.3	1.29	1.85
EMWNT-03A	EXP-SW	04/17/06	BJC	<	.	1.35	4.82	1.53	2.27
EMWNT-05	EXP-SW	02/14/06	BJC	<	.	1.6	3.18	1.35	2.06
EMWNT-05	EXP-SW	04/17/06	BJC	<	.	1.65	2.33	1.42	2.3
NT-01	EXP-SW	03/01/06	BJC	8.48	3.79	4.56	256	17.4	9.89
NT-01	EXP-SW	04/19/06	GWPP	16	8.5	4.5	450	28	13
SS-1	EXP-SW	04/19/06	GWPP	14	8.4	6.3	30	11	12
SS-4	EXP-SW	04/19/06	GWPP	34	6	2.7	65	7.8	5.2
SS-4 Dup	EXP-SW	04/19/06	GWPP	31	6.2	2.7	60	7.6	5.2
SS-4	EXP-SW	08/01/06	BJC	54	7.22	3.51	177	11.76	5.8
SS-4 Dup	EXP-SW	08/01/06	BJC	52.7	7.22	3.36	114	9.36	7.82
SS-5	EXP-SW	02/28/06	BJC	.	.	.	20.3	2.21	2.22
SS-5	EXP-SW	04/19/06	GWPP	12	4.4	2.4	23	6.1	6.7
SS-5	EXP-SW	08/16/06	BJC	.	.	.	57.3	3.94	2.02
SS-6	EXP-SW	03/13/06	BJC	4.26	1.41	1.58	9.85	1.82	2.36
SS-6	EXP-SW	07/05/06	BJC	5.55	1.78	2.01	14.5	2.44	2.96

APPENDIX D.3: CY 2006 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	TPU	MDA	Activity	TPU	MDA
SS-6.6	EXP-SW	02/28/06	BJC	.	.	.	6.53	1.71	2.47
SS-6.6	EXP-SW	08/17/06	BJC	.	.	.	11.7	1.96	2.46
SS-7	EXP-SW	02/28/06	BJC	.	.	.	5.34	1.75	2.66
SS-7	EXP-SW	08/17/06	BJC	.	.	.	9.6	1.94	2.65
SS-8	EXP-SW	02/28/06	BJC	.	.	.	<	.	2.68
SS-8 Dup	EXP-SW	02/28/06	BJC	.	.	.	3.69	1.7	2.68
SS-8	EXP-SW	08/17/06	BJC	.	.	.	3.07	1.52	2.4
SS-8 Dup	EXP-SW	08/17/06	BJC	.	.	.	3.1	1.51	2.38

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-046						GW-058			GW-246		
Functional Area	BG						BG			S3		
Date Sampled	01/04/06			07/05/06			06/12/06			02/08/06		
Program	BJC			BJC			GWPP			GWPP		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	1.99	2.2	0.88	1.06	17	5.5	2	550	130	40
Gross Beta	7.97	1.56	2.09	4.32	1.47	2.24	17	5.6	6.2	18,000	360	98
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<	.	5.38	<	.	5.62	<	.	18	38,000	120	17
Uranium-234	1.83	0.75	0.45	<	.	0.38	6.4	1.1	0.46	110	11	0.48
Uranium-235	<	.	0.37	<	.	0.29	0.36	0.23	0.31	6	1	0.2
Uranium-236	0.47	0.39	0.43	<	.	0.15	.	.	.	.	.	.
Uranium-238	<	.	0.53	0.33	0.27	0.31	9.1	1.3	0.39	250	24	0.18

Sampling Point	GW-246			GW-276						GW-363		
Functional Area	S3			S3						EMWMF		
Date Sampled	08/21/06			01/04/06			07/06/06			02/15/06		
Program	GWPP			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	230	170	43	222	12.3	4.34	197	9.03	2.67	.	.	.
Gross Beta	15,000	240	67	251	9.27	5.63	255	5.85	2.53	.	.	.
Americium-241	.	.	.	<	.	0.47	<	.	0.28	<	.	0.32
Neptunium-237	.	.	.	8.48	1.1	0.19	7.04	0.98	0.15	<	.	0.19
Total Radium Alpha	.	.	.	1.71	0.42	0.38	<	.	0.47	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	0.89	0.5	0.8
Technetium-99	24,000	91	15	239	6.18	5.39	225	6.04	5.39	4.38	1.96	3.2
Uranium-234	60	6.5	1.8	63.9	11.6	1.28	78.6	19.3	4.84	0.34	0.21	0.21
Uranium-235	3.1	0.72	0.36	4.08	1.88	0.53	6.99	5.28	4.95	<	.	0.24
Uranium-236	.	.	.	5.75	2.19	0.47	4.1	3.71	2.22	.	.	.
Uranium-238	150	15	0.37	148	24.4	0.73	162	32.6	6.23	<	.	0.17

Sampling Point	GW-363									GW-526		
Functional Area	EMWMF									S3		
Date Sampled	04/24/06			08/14/06			11/13/06			03/07/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	<	.	41.1
Gross Beta	.	.	.	.	.	.	.	.	.	79.8	27.3	40.6
Americium-241	<	.	0.28	<	.	0.16	<	.	0.12	.	.	.
Neptunium-237	<	.	0.1	<	.	0.04	<	.	0.11	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	1.12	0.47	0.73	<	.	0.8	1.07	0.49	0.77	.	.	.
Technetium-99	<	.	4.59	<	.	2.79	<	.	3.31	<	.	5.83
Uranium-234	0.18	0.11	0.15	0.32	0.14	0.07	0.34	0.15	0.12	1.6	0.7	0.43
Uranium-235	0.23	0.13	0.2	<	.	0.19	<	.	0.2	<	.	0.44
Uranium-236	.	.	.	.	.	.	.	.	.	0.49	0.39	0.4
Uranium-238	0.19	0.11	0.13	0.09	0.07	0.07	0.28	0.14	0.13	<	.	0.43

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-526			GW-615			GW-616					
Functional Area	S3			S3			S3					
Date Sampled	07/25/06			02/21/06			02/22/06					
Program	BJC			GWPP			GWPP					
Sample Type										Dup		
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	35.1	320 R	390	54	<	.	8.6	<	.	9.1
Gross Beta	80.1	32	49.9	790	260	180	<	.	31	<	.	25
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<	.	5.51	34	9.7	15	<	.	15	<	.	15
Uranium-234	0.63	0.38	0.31	160	17	0.98	<	.	0.5	<	.	0.5
Uranium-235	0.31	0.28	0.17	7.8	1.7	0.42	<	.	0.19	<	.	0.21
Uranium-236	<	.	0.26	.	.	.	.	.	.	.	.	.
Uranium-238	<	.	0.27	440	45	0.39	<	.	0.17	<	.	0.21

Sampling Point	GW-639											
Functional Area	EMWMF											
Date Sampled	02/16/06			04/19/06			08/08/06			11/08/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.25	<	.	0.13	<	.	0.19	<	.	0.18
Neptunium-237	<	.	0.12	0.12	0.09	0.08	<	.	0.07	<	.	0.1
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.91	<	.	0.95	<	.	0.9	<	.	0.92
Technetium-99	<	.	3.2	<	.	4.6	<	.	2.79	<	.	3.31
Uranium-234	0.8	0.31	0.07	0.44	0.16	0.1	0.47	0.17	0.04	0.63	0.27	0.2
Uranium-235	<	.	0.31	<	.	0.11	0.18	0.11	0.09	0.35	0.2	0.21
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	<	.	0.16	0.15	0.09	0.08	0.23	0.12	0.07	0.31	0.18	0.12

Sampling Point	GW-683						GW-684					
Functional Area	EXP-A						EXP-A					
Date Sampled	03/08/06			08/07/06			03/08/06			07/24/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	9.49	1.53	0.18	8.7	1.94	2.17	11.6	1.85	0.8	13.5	2.09	1.28
Gross Beta	19.3	2	2.29	16.5	1.85	2.02	22.3	2.18	2.51	27.4	2.29	2.31
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	18.4	3.42	5.27	7.37	3.49	5.72	12.9	3.33	5.27	16.6	3.52	5.51
Uranium-234	4.02	1.06	0.27	3.28	0.94	0.28	5.3	1.35	0.31	5.58	1.45	0.29
Uranium-235	<	.	0.17	0.31	0.28	0.17	<	.	0.38	0.23 R	0.27	0.21
Uranium-236	<	.	0.15	<	.	0.26	0.25	0.25	0.17	0.28	0.28	0.19
Uranium-238	6.12	1.4	0.13	4.65	1.18	0.14	6.12	1.48	0.31	8.37	1.92	0.17

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-704						GW-706					
Functional Area	EXP-B						EXP-B					
Date Sampled	03/08/06			07/31/06			03/29/06			08/01/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	1.61	0.98	1.38	<	.	1.95	25.8	6.12	4.84	31.7	4.44	3.29
Gross Beta	10.5	1.92	2.66	14.9	2.32	2.86	69.5	6.92	5.73	70.4	4.9	4.53
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	1.48	0.64	0.32	0.89	0.45	0.37	11.9	2.56	0.58	30.7	5.15	0.25
Uranium-235	<	.	0.4	0.25	0.25	0.17	1.67	0.81	0.24	0.92	0.52	0.31
Uranium-236	0.4	0.33	0.18	<	.	0.25	0.76	0.51	0.43	0.65	0.41	0.28
Uranium-238	1.47	0.64	0.32	0.39	0.29	0.23	23.8	4.4	0.47	20.3	3.61	0.32

Sampling Point	GW-712						GW-713					
Functional Area	EXP-W						EXP-W					
Date Sampled	01/03/06			07/05/06			01/03/06					
Program	BJC			BJC			BJC					
Sample Type										Dup		
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	2.13	<	.	2.36	<	.	1.33	<	.	2.08
Gross Beta	4.65	1.99	3.11	4.99	1.55	2.32	<	.	3.27	5.44	2.01	3.11
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<	.	5.5	<	.	5.62	<	.	5.5	<	.	5.5
Uranium-234	0.72	0.44	0.33	0.55	0.37	0.45	1.13	0.54	0.26	0.52	0.37	0.44
Uranium-235	<	.	0.21	<	.	0.28	0.35	0.32	0.19	<	.	0.18
Uranium-236	0.34	0.31	0.18	<	.	0.15	<	.	0.17	<	.	0.16
Uranium-238	<	.	0.33	<	.	0.36	0.4	0.31	0.15	0.59	0.37	0.15

Sampling Point	GW-713						GW-714					
Functional Area	EXP-W						EXP-W					
Date Sampled	07/05/06						01/03/06			07/05/06		
Program	BJC						BJC			BJC		
Sample Type				Dup								
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	1.83	0.9	1.19	<	.	1.34	3.87	1.25	1	<	.	2.03
Gross Beta	6.49	1.67	2.47	3.37	1.61	2.57	3.55	2.02	3.25	6.63	1.55	2.2
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	<	.	5.62	<	.	5.62	<	.	5.5	<	.	5.62
Uranium-234	<	.	0.33	0.57	0.4	0.48	1.57	0.6	0.23	1.23	0.55	0.32
Uranium-235	<	.	0.38	<	.	0.32	0.29	0.28	0.28	0.19 R	0.23	0.18
Uranium-236	<	.	0.15	<	.	0.28	<	.	0.25	0.17 R	0.2	0.16
Uranium-238	<	.	0.31	<	.	0.47	0.88	0.44	0.23	1.08	0.52	0.43

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-829			GW-916								
Functional Area	OLF			EMWMF								
Date Sampled	02/15/06			02/23/06			04/18/06			08/10/06		
Program	GWPP			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	9.1	.	.	.	.	.	.	.	.	.
Gross Beta	<	.	25	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	<	.	0.27	<	.	0.24	<	.	0.16
Neptunium-237	.	.	.	<	.	0.14	<	.	0.15	<	.	0.09
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	0.95	0.49	0.78	<	.	0.74	<	.	0.81
Technetium-99	<	.	15	<	.	3.21	<	.	4.6	<	.	2.8
Uranium-234	0.96	0.44	0.51	0.67	0.28	0.12	0.29	0.14	0.1	<	.	0.19
Uranium-235	<	.	0.2	0.22	0.16	0.17	<	.	0.15	<	.	0.21
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.57	0.31	0.21	0.15	0.13	0.14	0.13	0.1	0.12	<	.	0.11

Sampling Point	GW-916			GW-917								
Functional Area	EMWMF			EMWMF								
Date Sampled	11/13/06			02/16/06			04/18/06			08/10/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.16	<	.	0.44	<	.	0.17	<	.	0.49
Neptunium-237	<	.	0.14	<	.	0.17	<	.	0.11	<	.	0.12
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	1	1.14	0.52	0.83	<	.	0.88	<	.	0.82
Technetium-99	<	.	3.31	<	.	3.21	<	.	4.6	<	.	2.79
Uranium-234	0.24	0.13	0.14	0.36	0.21	0.2	0.21	0.11	0.11	0.3	0.14	0.08
Uranium-235	<	.	0.21	<	.	0.23	<	.	0.17	0.17	0.11	0.09
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.22	0.12	0.1	<	.	0.07	<	.	0.12	<	.	0.13

Sampling Point	GW-917			GW-918								
Functional Area	EMWMF			EMWMF								
Date Sampled	11/06/06			03/01/06			04/18/06			08/09/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.22	<	.	0.2	<	.	0.16	<	.	0.08
Neptunium-237	<	.	0.13	<	.	0.18	<	.	0.12	<	.	0.08
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	1.02	<	.	0.93	<	.	0.93	1.36	0.53	0.83
Technetium-99	<	.	3.32	<	.	3.26	<	.	4.61	<	.	2.79
Uranium-234	0.42	0.17	0.1	0.31	0.2	0.2	0.36	0.15	0.07	0.2	0.12	0.1
Uranium-235	0.25	0.14	0.16	0.28	0.2	0.26	0.13	0.09	0.13	<	.	0.19
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	<	.	0.15	0.17	0.15	0.16	0.17	0.11	0.12	<	.	0.08

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-918			GW-920								
Functional Area	EMWMF			EMWMF								
Date Sampled	11/13/06			02/27/06			04/18/06			08/09/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.12	0.29	0.25	0.23	<	.	0.11	<	.	0.26
Neptunium-237	<	.	0.17	<	.	0.19	<	.	0.14	<	.	0.04
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	1.01	1.35	0.48	0.74	<	.	0.91	<	.	1.01
Technetium-99	<	.	3.33	<	.	3.2	<	.	4.6	<	.	2.79
Uranium-234	0.27	0.15	0.17	0.48	0.25	0.14	0.42	0.16	0.1	0.27	0.14	0.1
Uranium-235	<	.	0.26	<	.	0.26	<	.	0.19	<	.	0.14
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.12	0.09	0.1	<	.	0.18	0.16	0.09	0.08	<	.	0.1

Sampling Point	GW-920			GW-921								
Functional Area	EMWMF			EMWMF								
Date Sampled	11/09/06			02/21/06			04/24/06			08/09/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.11	<	.	0.21	<	.	0.37	0.12	0.11	0.06
Neptunium-237	<	.	0.09	<	.	0.14	<	.	0.04	<	.	0.07
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.9	0.77	0.46	0.74	0.68	0.42	0.68	<	.	0.87
Technetium-99	<	.	3.31	<	.	3.21	<	.	4.6	<	.	2.79
Uranium-234	0.3	0.13	0.09	0.34	0.21	0.19	0.46	0.18	0.16	0.21	0.11	0.1
Uranium-235	<	.	0.17	0.41	0.24	0.3	0.21	0.12	0.2	<	.	0.16
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.15	0.09	0.04	<	.	0.17	0.25	0.13	0.1	<	.	0.07

Sampling Point	GW-921			GW-922								
Functional Area	EMWMF			EMWMF								
Date Sampled	11/07/06			02/21/06			04/18/06			08/09/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.16	<	.	0.15	0.1	0.09	0.1	<	.	0.2
Neptunium-237	<	.	0.07	<	.	0.16	<	.	0.15	<	.	0.07
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.99	2.91	0.58	0.82	<	.	0.98	<	.	0.88
Technetium-99	<	.	3.31	<	.	3.22	<	.	4.6	<	.	2.79
Uranium-234	0.53	0.19	0.08	0.55	0.28	0.21	0.36	0.15	0.08	0.12	0.09	0.04
Uranium-235	0.18	0.12	0.1	<	.	0.28	<	.	0.13	<	.	0.15
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.29	0.14	0.1	0.37	0.24	0.25	0.1	0.07	0.04	0.08	0.07	0.04

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-922			GW-923						GW-924		
Functional Area	EMWMF			EMWMF						EMWMF		
Date Sampled	11/14/06			02/27/06			04/24/06			02/27/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.2	<	.	0.17	<	.	0.29	<	.	0.53
Neptunium-237	<	.	0.15	<	.	0.18	<	.	0.04	<	.	0.12
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.9	<	.	0.87	<	.	0.9	1.4	0.46	0.7
Technetium-99	<	.	3.31	<	.	3.21	<	.	4.6	<	.	3.2
Uranium-234	0.33	0.16	0.15	1.03	0.39	0.14	0.58	0.2	0.13	<	.	0.36
Uranium-235	<	.	0.26	<	.	0.41	<	.	0.21	0.45	0.31	0.45
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.14	0.1	0.11	0.43	0.25	0.2	0.4	0.17	0.16	<	.	0.35

Sampling Point	GW-924											
Functional Area	EMWMF											
Date Sampled	02/27/06			04/20/06						08/14/06		
Program	BJC			BJC						BJC		
Sample Type	Dup						Dup					
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.35	<	.	0.11	<	.	0.17	<	.	0.22
Neptunium-237	<	.	0.18	<	.	0.12	<	.	0.13	<	.	0.1
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	1.07	0.45	0.71	<	.	0.8	1.15	0.52	0.82	<	.	1.02
Technetium-99	<	.	3.21	<	.	4.6	<	.	4.6	<	.	2.79
Uranium-234	0.38	0.22	0.17	0.29	0.14	0.08	0.14	0.1	0.13	0.23	0.15	0.18
Uranium-235	<	.	0.33	<	.	0.18	<	.	0.18	<	.	0.24
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.14	0.13	0.08	0.1	0.08	0.1	<	.	0.09	<	.	0.13

Sampling Point	GW-924									GW-925		
Functional Area	EMWMF									EMWMF		
Date Sampled	08/14/06			11/06/06						02/21/06		
Program	BJC			BJC						BJC		
Sample Type	Dup						Dup					
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.26	<	.	0.15	<	.	0.15	<	.	0.24
Neptunium-237	<	.	0.07	<	.	0.12	<	.	0.1	<	.	0.13
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.88	<	.	0.87	<	.	0.83	1.05	0.54	0.87
Technetium-99	<	.	2.79	3.32	2	3.31	<	.	3.31	<	.	3.44
Uranium-234	0.3	0.14	0.1	0.23	0.12	0.11	0.28	0.15	0.11	0.68	0.33	0.3
Uranium-235	<	.	0.21	<	.	0.2	<	.	0.18	<	.	0.39
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.23	0.12	0.04	0.21	0.11	0.08	0.19	0.12	0.11	0.29	0.2	0.22

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-925									GW-926		
Functional Area	EMWMF									EMWMF		
Date Sampled	04/19/06			08/09/06			11/07/06			02/28/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	0.05	0.05	0.04	0.19	0.13	0.16	0.14	0.11	0.05	<	.	0.2
Neptunium-237	<	.	0.11	<	.	0.11	<	.	0.08	<	.	0.13
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.89	<	.	0.87	<	.	0.79	<	.	0.99
Technetium-99	<	.	5.01	<	.	2.81	<	.	3.46	<	.	3.2
Uranium-234	0.48	0.19	0.14	0.24	0.13	0.05	0.76	0.23	0.09	0.29	0.19	0.2
Uranium-235	<	.	0.14	<	.	0.17	0.18	0.12	0.16	0.31	0.2	0.23
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.25	0.13	0.12	0.18	0.12	0.13	0.31	0.14	0.08	<	.	0.19

Sampling Point	GW-926									GW-927		
Functional Area	EMWMF									EMWMF		
Date Sampled	04/20/06			08/14/06			11/06/06			02/16/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.32	<	.	0.2	<	.	0.15	<	.	0.21
Neptunium-237	<	.	0.07	<	.	0.07	0.11	0.08	0.04	<	.	0.17
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	1.01	0.45	0.7	<	.	0.8	<	.	1.03	0.99	0.54	0.86
Technetium-99	<	.	4.6	<	.	2.79	<	.	3.31	<	.	3.21
Uranium-234	0.33	0.14	0.09	0.25	0.13	0.1	0.5	0.2	0.05	0.64	0.3	0.21
Uranium-235	0.3	0.14	0.09	<	.	0.22	<	.	0.24	<	.	0.4
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.11	0.08	0.04	<	.	0.15	0.17	0.12	0.14	<	.	0.21

Sampling Point	GW-927									BCK-03.30		
Functional Area	EMWMF									EXP-SW		
Date Sampled	04/19/06			08/09/06			11/07/06			02/28/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	9.26	1.63	0.97
Gross Beta	.	.	.	.	.	.	.	.	.	10.6	1.86	2.54
Americium-241	<	.	0.12	<	.	0.42	<	.	0.12	.	.	.
Neptunium-237	<	.	0.09	<	.	0.09	<	.	0.1	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.97	<	.	0.91	<	.	0.82	.	.	.
Technetium-99	<	.	4.6	<	.	2.79	<	.	3.31	7.37	3.36	5.5
Uranium-234	<	.	0.12	0.19	0.12	0.1	0.15	0.1	0.12	3.36	1.04	0.33
Uranium-235	<	.	0.14	<	.	0.17	<	.	0.18	0.52	0.41	0.35
Uranium-236	.	.	.	.	.	.	.	.	.	<	.	0.18
Uranium-238	0.08	0.07	0.08	<	.	0.13	0.13	0.09	0.09	5.6	1.45	0.33

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	BCK-03.30			BCK-07.87						BCK-09.20		
Functional Area	EXP-SW			EXP-SW						EXP-SW		
Date Sampled	08/17/06			02/28/06			08/17/06			02/28/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	17.2	2.15	2.73	32	2.28	1.89	63.5	3.1	2.41	41.3	2.66	2.33
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	11.1	3.5	5.63	25.6	3.59	5.35	62.9	4.29	5.64	35.9	3.75	5.34
Uranium-234	3.73	1.12	0.17	9.11	2.05	0.43	8.59	2.03	0.39	11.3	2.52	0.41
Uranium-235	<	.	0.36	0.54	0.44	0.44	0.52	0.44	0.41	<	.	0.43
Uranium-236	<	.	0.19	<	.	0.2	0.72	0.49	0.22	0.5	0.42	0.23
Uranium-238	7.7	1.81	0.37	18.8	3.54	0.4	21.6	4.06	0.39	23.6	4.44	0.2

Sampling Point	BCK-09.20			BCK-09.47						BCK-11.54		
Functional Area	EXP-SW			EXP-SW						EXP-SW		
Date Sampled	08/16/06			02/28/06			08/16/06			02/28/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	69.7	3.5	2.95	32.2	2.4	2.4	79	3.32	2.2	76.4	4	3.32
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	66.6	4.34	5.64	42.5	3.86	5.35	68.7	4.38	5.66	106	4.73	5.35
Uranium-234	11.7	2.67	0.38	14.4	3.04	0.42	11.4	2.92	0.63	19.5	3.73	0.58
Uranium-235	0.71	0.55	0.28	0.86	0.59	0.26	<	.	0.87	1.47	0.76	0.41
Uranium-236	<	.	0.25	0.51	0.43	0.23	0.73	0.65	0.7	0.52	0.43	0.43
Uranium-238	23.3	4.56	0.58	39.4	6.91	0.36	27.8	5.64	0.86	27.6	4.96	0.58

Sampling Point	BCK-11.54			BCK-11.84						BCK-12.34		
Functional Area	EXP-SW			EXP-SW						EXP-SW		
Date Sampled	08/16/06			02/28/06			08/16/06			02/28/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	143	5.11	3.16	96.3	4.94	4.14	147	5.34	2.98	.	.	.
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	190	5.79	5.64	144	5.18	5.34	211	6.01	5.65	266	6.42	5.35
Uranium-234	27.8	6.7	0.7	21.4	3.93	0.46	22.2	4.73	0.62	20.3	3.92	0.52
Uranium-235	<	.	1.47	1.09	0.63	0.53	0.97	0.83	0.77	0.73	0.53	0.25
Uranium-236	<	.	0.77	0.88	0.52	0.2	1.19	0.86	0.4	1.06	0.61	0.22
Uranium-238	48.2	9.91	0.7	36.1	6.11	0.56	49.5	8.87	0.81	40.9	7.05	0.48

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	BCK-12.34			EMW-VWEIR								
Functional Area	EXP-SW			EXP-SW								
Date Sampled	08/16/06			02/14/06						04/17/06		
Program	BJC			BJC						BJC		
Sample Type							Dup					
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	<	.	0.15	<	.	0.2	<	.	0.19
Neptunium-237	.	.	.	<	.	0.03	<	.	0.1	<	.	0.08
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	61.2	1.84	1.15	63.1	1.76	0.93	27.1	1.14	0.88
Technetium-99	155	5.42	5.63	28.8	2.42	3.31	30.9	2.45	3.31	<	.	4.65
Uranium-234	29.1	6.15	1.04	12.3	1.96	0.25	11.5	1.88	0.25	2.28	0.45	0.11
Uranium-235	<	.	1.28	1.01	0.38	0.38	1.41	0.47	0.36	0.13	0.09	0.12
Uranium-236	1.71	1.17	0.52	.	.	.	.	.	.	.	.	.
Uranium-238	59	10.6	0.79	9.87	1.64	0.25	8.9	1.53	0.19	1.85	0.39	0.11

Sampling Point	EMW-VWEIR									EMW-VWUNDER		
Functional Area	EXP-SW									EXP-SW		
Date Sampled	04/17/06			08/16/06			11/07/06			02/27/06		
Program	BJC			BJC			BJC			BJC		
Sample Type	Dup											
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.08	<	.	0.44	<	.	0.28	<	.	0.24
Neptunium-237	<	.	0.09	<	.	0.11	<	.	0.13	<	.	0.23
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	26.1	1.18	0.96	12.7	0.97	0.93	14.2	0.88	0.8	<	.	0.92
Technetium-99	<	.	4.66	<	.	5.75	<	.	2.85	<	.	3.22
Uranium-234	2.76	0.53	0.13	1.14	0.42	0.19	1.57	0.38	0.09	0.25	0.17	0.16
Uranium-235	0.14	0.1	0.13	<	.	0.38	0.3	0.16	0.15	<	.	0.31
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	1.85	0.4	0.11	0.69	0.32	0.17	0.89	0.27	0.12	<	.	0.16

Sampling Point	EMW-VWUNDER									EMWNT-03A		
Functional Area	EXP-SW									EXP-SW		
Date Sampled	04/20/06			08/16/06			11/14/06			02/14/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	1.81	0.75	0.83
Gross Beta	.	.	.	.	.	.	.	.	.	4.3	1.27	1.85
Americium-241	<	.	0.22	<	.	0.24	<	.	0.18	0.24	0.19	0.22
Neptunium-237	<	.	0.12	<	.	0.04	<	.	0.14	<	.	0.04
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.7	<	.	0.79	<	.	0.93	<	.	0.9
Technetium-99	<	.	4.6	<	.	2.79	<	.	3.31	<	.	3.27
Uranium-234	0.29	0.15	0.15	0.31	0.15	0.09	0.43	0.18	0.16	1.22	0.41	0.16
Uranium-235	<	.	0.3	<	.	0.22	<	.	0.19	0.46	0.26	0.31
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	<	.	0.15	0.13	0.09	0.04	0.17	0.12	0.13	0.35	0.22	0.22

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	EMWNT-03A						EMWNT-05					
Functional Area	EXP-SW						EXP-SW					
Date Sampled	04/17/06			11/07/06			02/14/06			04/17/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	1.35	.	.	.	<	.	1.6	<	.	1.65
Gross Beta	4.82	1.51	2.27	.	.	.	3.18	1.34	2.06	2.33	1.42	2.3
Americium-241	<	.	0.15	<	.	0.29	<	.	0.37	<	.	0.19
Neptunium-237	<	.	0.04	<	.	0.08	<	.	0.1	<	.	0.09
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	1.77	0.47	0.68	<	.	0.93	0.91	0.49	0.79	<	.	1.01
Technetium-99	<	.	4.62	<	.	2.8	<	.	3.25	<	.	4.6
Uranium-234	0.43	0.16	0.12	0.62	0.23	0.12	0.85	0.34	0.21	0.26	0.13	0.11
Uranium-235	<	.	0.18	<	.	0.25	<	.	0.36	<	.	0.2
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	0.24	0.12	0.09	0.51	0.21	0.12	0.31	0.2	0.21	0.16	0.1	0.1

Sampling Point	EMWNT-05						NT-01			NT-03		
Functional Area	EXP-SW						EXP-SW			EXP-SW		
Date Sampled	08/16/06			11/07/06			03/01/06			03/01/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	8.48	3.75	4.56	.	.	.
Gross Beta	.	.	.	.	.	.	256	12.7	9.89	.	.	.
Americium-241	<	.	0.48	<	.	0.2	.	.	.	.	.	.
Neptunium-237	<	.	0.14	0.06	0.06	0.04	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	0.98	0.93	0.55	0.9	.	.	.	.	.	.
Technetium-99	<	.	5.74	<	.	2.8	601	8.99	5.36	<	.	5.37
Uranium-234	0.22	0.2	0.21	0.4	0.18	0.14	3.67	1.6	1.01	21.6	3.84	0.44
Uranium-235	<	.	0.33	<	.	0.2	<	.	0.78	1.51	0.68	0.41
Uranium-236	.	.	.	.	.	.	<	.	0.41	0.61	0.41	0.42
Uranium-238	0.16	0.16	0.11	0.24	0.14	0.13	3.94	1.66	0.95	21.4	3.8	0.29

Sampling Point	NT-03			NT-04								
Functional Area	EXP-SW			EXP-SW								
Date Sampled	08/16/06			02/14/06			04/17/06			08/16/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	.	.	.	<	.	0.22	<	.	0.18	<	.	0.53
Neptunium-237	.	.	.	<	.	0.09	<	.	0.07	<	.	0.16
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	<	.	1.06	0.83	0.49	0.8	<	.	1.05
Technetium-99	<	.	5.65	<	.	3.26	<	.	4.6	<	.	5.74
Uranium-234	13.6	2.62	0.15	1.8	0.5	0.2	1.47	0.36	0.11	1.31	0.5	0.29
Uranium-235	1	0.54	0.18	0.4	0.23	0.26	<	.	0.18	<	.	0.33
Uranium-236	0.42	0.32	0.16	.	.	.	.	.	.	.	.	.
Uranium-238	12.6	2.47	0.25	1.69	0.48	0.18	1.87	0.42	0.04	1.05	0.44	0.25

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	NT-04			NT-07						NT-08		
Functional Area	EXP-SW			EXP-SW						EXP-SW		
Date Sampled	11/07/06			02/28/06			08/17/06			02/28/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	.	.	.	.	.	.	.	.	.	.	.	.
Americium-241	<	.	0.38	.	.	.	.	.	.	.	.	.
Neptunium-237	<	.	0.12	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	0.84	0.45	0.73	.	.	.	.	.	.	.	.	.
Technetium-99	<	.	2.8	.	.	.	.	.	.	.	.	.
Uranium-234	0.88	0.24	0.08	6.64	1.6	0.16	3.51	0.97	0.23	19	5.59	1.81
Uranium-235	0.19	0.11	0.12	0.81	0.5	0.2	<	.	0.33	2.9	2.14	1.71
Uranium-236	.	.	.	0.53	0.38	0.18	0.32	0.27	0.25	1.99	1.65	0.9
Uranium-238	1.07	0.27	0.08	7.37	1.72	0.27	3.84	1.03	0.23	102	18.8	1.8

Sampling Point	NT-08			SS-4								
Functional Area	EXP-SW			EXP-SW								
Date Sampled	08/17/06			04/19/06						08/01/06		
Program	BJC			BJC						BJC		
Sample Type							Dup					
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	54	6.2	3.51
Gross Beta	.	.	.	.	.	.	.	.	.	177	8.41	5.8
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	4.24	1.14	0.25	13.4	2.88	0.54	15	3.07	0.68	20.4	4.65	0.81
Uranium-235	0.78	0.47	0.3	1.34	0.74	0.26	0.85	0.58	0.54	1	0.83	0.45
Uranium-236	<	.	0.32	0.74	0.53	0.47	0.79	0.52	0.37	<	.	0.69
Uranium-238	17.3	3.21	0.14	22.4	4.28	0.51	20.8	3.95	0.44	37.8	7.53	0.62

Sampling Point	SS-4			SS-5						SS-6		
Functional Area	EXP-SW			EXP-SW						EXP-SW		
Date Sampled	08/01/06			02/28/06			08/16/06			03/13/06		
Program	BJC			BJC			BJC			BJC		
Sample Type	Dup											
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	52.7	6.25	3.36	.	.	.	.	.	.	4.26	1.38	1.58
Gross Beta	114	7.72	7.82	20.3	2	2.22	57.3	2.9	2.02	9.85	1.76	2.36
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	.	.	.	20.4	3.5	5.34	55.4	4.18	5.62	7.36	3.29	5.38
Uranium-234	19.8	4.04	0.53	7.84	1.81	0.42	10.2	2.26	0.51	2.1	0.77	0.27
Uranium-235	1.56	0.9	0.33	<	.	0.48	0.55	0.43	0.37	0.43	0.36	0.2
Uranium-236	0.84	0.62	0.5	0.39	0.33	0.31	<	.	0.39	0.2 R	0.23	0.18
Uranium-238	36.1	6.52	0.45	12.4	2.53	0.42	13.2	2.74	0.35	4.2	1.17	0.16

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	SS-6			SS-6.6						SS-7		
Functional Area	EXP-SW			EXP-SW						EXP-SW		
Date Sampled	07/05/06			02/28/06			08/17/06			02/28/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	5.55	1.74	2.01	.	.	.	.	.	.	.	.	.
Gross Beta	14.5	2.34	2.96	6.53	1.68	2.47	11.7	1.88	2.46	5.34	1.73	2.66
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	7.41	3.32	5.42	<	.	5.52	<	.	5.64	<	.	5.5
Uranium-234	2.88	0.91	0.43	2.08	0.87	0.36	1.93	0.83	0.46	0.74	0.41	0.25
Uranium-235	<	.	0.37	<	.	0.26	<	.	0.56	<	.	0.18
Uranium-236	<	.	0.33	<	.	0.23	<	.	0.39	0.24	0.24	0.16
Uranium-238	4.07	1.12	0.3	1.82	0.81	0.42	1.25	0.67	0.61	1.21	0.54	0.29

Sampling Point	SS-7			SS-8								
Functional Area	EXP-SW			EXP-SW								
Date Sampled	08/17/06			02/28/06						08/17/06		
Program	BJC			BJC						BJC		
Sample Type							Dup					
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Gross Beta	9.6	1.89	2.65	<	.	2.68	3.69	1.69	2.68	3.07	1.51	2.4
Americium-241	.	.	.	.	.	.	.	.	.	.	.	.
Neptunium-237	.	.	.	.	.	.	.	.	.	.	.	.
Total Radium Alpha	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	.	.	.	.	.	.	.	.	.	.	.	.
Technetium-99	9.22	3.46	5.62	<	.	5.5	<	.	5.51	<	.	5.63
Uranium-234	2.76	0.98	0.55	0.52	0.38	0.18	0.39	0.3	0.15	0.98	0.53	0.38
Uranium-235	<	.	0.39	<	.	0.37	<	.	0.32	<	.	0.51
Uranium-236	<	.	0.41	0.29	0.29	0.2	<	.	0.33	<	.	0.32
Uranium-238	6.13	1.6	0.41	0.33	0.3	0.18	<	.	0.26	<	.	0.34

Sampling Point	SS-8		
Functional Area	EXP-SW		
Date Sampled	08/17/06		
Program	BJC		
Sample Type	Dup		
Result (pCi/L)	Activity	TPU	MDA
Gross Alpha	.	.	.
Gross Beta	3.1	1.5	2.38
Americium-241	.	.	.
Neptunium-237	.	.	.
Total Radium Alpha	.	.	.
Strontium-89/90	.	.	.
Technetium-99	<	.	5.62
Uranium-234	0.56	0.4	0.43
Uranium-235	<	.	0.49
Uranium-236	<	.	0.41
Uranium-238	<	.	0.47

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L)		
			Activity	TPU	MDA
GW-363	11/13/06	Americium-243	0.55	0.12	0.07
GW-363	04/24/06	Cesium-137	6.51	5.61	5.96
GW-363	11/13/06	Curium-245	0.96	0.17	0.07
GW-363	11/13/06	Curium-246	0.96	0.17	0.07
GW-363	04/24/06	Curium-248	1.48 Q	0.48	0.17
GW-363	11/13/06	Plutonium-242	0.14	0.05	0.05
GW-363	08/14/06	Radium-226	0.43 Q	0.25	0.32
GW-363	04/24/06	Radium-228	0.68	0.29	0.4
GW-363	02/15/06	Thorium-230	0.34	0.21	0.14
GW-363	04/24/06	Thorium-230	0.37	0.2	0.18
GW-363	08/14/06	Thorium-230	0.31	0.17	0.17
GW-363	11/13/06	Thorium-230	0.83	0.14	0.17
GW-363	04/24/06	Thorium-232	0.2	0.14	0.11
GW-363	02/15/06	Yttrium-90	0.89	0.51	0.8
GW-363	04/24/06	Yttrium-90	1.12	0.49	0.73
GW-363	11/13/06	Yttrium-90	1.07	0.25	0.77
GW-639	08/08/06	Actinium-227	0.22	0.15	0.21
GW-639	11/08/06	Curium-247	0.24	0.09	0.15
GW-639	02/16/06	Curium-248	0.36	0.22	0.14
GW-639	04/19/06	Curium-248	0.15	0.1	0.04
GW-639	08/08/06	Thorium-227	0.22	0.15	0.21
GW-639	02/16/06	Thorium-230	0.51	0.26	0.14
GW-639	04/19/06	Thorium-230	0.39	0.19	0.15
GW-639	08/08/06	Thorium-230	0.42	0.19	0.11
GW-639	04/19/06	Thorium-232	0.16	0.12	0.12
GW-639	08/08/06	Thorium-232	0.13	0.1	0.09
GW-916	08/10/06	Actinium-227	0.2	0.12	0.12
GW-916	11/13/06	Actinium-227	0.26	0.08	0.19
GW-916	08/10/06	Americium-243	0.41	0.32	0.16
GW-916	11/13/06	Americium-243	0.43	0.11	0.19
GW-916	08/10/06	Curium-245	0.46	0.35	0.32
GW-916	11/13/06	Curium-245	0.79	0.15	0.22
GW-916	08/10/06	Curium-246	0.46	0.35	0.32
GW-916	11/13/06	Curium-246	0.79	0.15	0.22
GW-916	11/13/06	Curium-247	0.17	0.08	0.16
GW-916	04/18/06	Curium-248	0.18	0.16	0.1
GW-916	11/13/06	Curium-248	0.21	0.08	0.16
GW-916	08/10/06	Radium-226	0.24	0.18	0.19
GW-916	11/13/06	Radium-226	0.22	0.05	0.1
GW-916	08/10/06	Thorium-227	0.2	0.12	0.12
GW-916	11/13/06	Thorium-227	0.26	0.08	0.19
GW-916	04/18/06	Thorium-228	0.19	0.12	0.13
GW-916	11/13/06	Thorium-228	0.19	0.06	0.15
GW-916	08/10/06	Thorium-229	0.25	0.15	0.05
GW-916	02/23/06	Thorium-230	0.56	0.28	0.21
GW-916	04/18/06	Thorium-230	0.46	0.18	0.09
GW-916	08/10/06	Thorium-230	0.44	0.18	0.09
GW-916	04/18/06	Thorium-232	0.11	0.08	0.08
GW-916	02/23/06	Yttrium-90	0.95	0.5	0.78
GW-917	04/18/06	Actinium-227	0.31	0.15	0.09
GW-917	08/10/06	Actinium-227	0.27	0.17	0.21
GW-917	11/06/06	Curium-247	0.21	0.08	0.18
GW-917	04/18/06	Curium-248	0.4	0.25	0.18
GW-917	11/06/06	Curium-248	0.36	0.1	0.13
GW-917	08/10/06	Radium-226	0.19	0.15	0.08
GW-917	02/16/06	Radium-228	1.3	0.37	0.41
GW-917	08/10/06	Thorium-227	0.27	0.17	0.21

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L)		
			Activity	TPU	MDA
GW-917	02/16/06	Thorium-230	0.24	0.18	0.14
GW-917	04/18/06	Thorium-230	0.41	0.18	0.11
GW-917	08/10/06	Thorium-230	0.35	0.18	0.15
GW-917	11/06/06	Thorium-230	0.7	0.11	0.12
GW-917	04/18/06	Thorium-232	0.27	0.14	0.09
GW-917	11/06/06	Thorium-232	0.17	0.06	0.13
GW-917	02/16/06	Yttrium-90	1.14	0.54	0.83
GW-918	04/18/06	Actinium-227	0.23	0.14	0.14
GW-918	08/09/06	Actinium-227	0.38	0.16	0.11
GW-918	11/13/06	Carbon-14	20.8	6.01	19.2
GW-918	04/18/06	Iodine-129	3.44	1.13	2.24
GW-918	08/09/06	Plutonium-242	0.14	0.14	0.09
GW-918	08/09/06	Radium-226	0.19	0.16	0.09
GW-918	08/09/06	Thorium-227	0.38	0.16	0.11
GW-918	03/01/06	Thorium-230	0.36	0.23	0.19
GW-918	04/18/06	Thorium-230	0.53	0.22	0.14
GW-918	08/09/06	Thorium-230	0.36	0.17	0.17
GW-918	11/13/06	Thorium-230	0.61	0.15	0.24
GW-918	04/18/06	Thorium-232	0.23	0.14	0.12
GW-918	08/09/06	Yttrium-90	1.36	0.56	0.83
GW-920	11/09/06	Iodine-129	3.53	0.55	1.31
GW-920	08/09/06	Plutonium-239/240	0.22	0.13	0.12
GW-920	11/09/06	Plutonium-242	0.28	0.09	0.15
GW-920	04/18/06	Radium-226	0.33	0.22	0.1
GW-920	11/09/06	Thorium-229	0.2	0.1	0.06
GW-920	02/27/06	Thorium-230	0.46	0.27	0.23
GW-920	04/18/06	Thorium-230	0.58	0.22	0.05
GW-920	08/09/06	Thorium-230	0.77	0.26	0.13
GW-920	11/09/06	Thorium-230	0.66	0.13	0.23
GW-920	02/27/06	Yttrium-90	1.35	0.51	0.74
GW-921	08/09/06	Actinium-227	0.18	0.13	0.16
GW-921	11/07/06	Americium-243	0.47	0.11	0.18
GW-921	02/21/06	Chlorine-36	13.2	3.35	3.97
GW-921	08/09/06	Chlorine-36	4.06	2.49	3.79
GW-921	11/07/06	Curium-245	0.76	0.15	0.24
GW-921	11/07/06	Curium-246	0.76	0.15	0.24
GW-921	11/07/06	Curium-247	0.24	0.09	0.08
GW-921	02/21/06	Curium-248	0.21	0.2	0.2
GW-921	04/24/06	Curium-248	2.14 Q	0.76	0.25
GW-921	08/09/06	Curium-248	0.19	0.15	0.17
GW-921	11/07/06	Curium-248	0.19	0.07	0.13
GW-921	04/24/06	Iodine-129	4.07	1.32	2.55
GW-921	02/21/06	Plutonium-239/240	0.23	0.2	0.22
GW-921	04/24/06	Radium-226	0.68 Q	0.36	0.44
GW-921	11/07/06	Radium-226	0.21	0.06	0.14
GW-921	08/09/06	Radium-228	0.6	0.31	0.46
GW-921	08/09/06	Thorium-227	0.18	0.13	0.16
GW-921	02/21/06	Thorium-230	0.62	0.29	0.17
GW-921	04/24/06	Thorium-230	0.5	0.22	0.12
GW-921	08/09/06	Thorium-230	0.3	0.14	0.11
GW-921	11/07/06	Thorium-230	0.55	0.1	0.13
GW-921	11/07/06	Thorium-232	0.16	0.06	0.14
GW-921	02/21/06	Yttrium-90	0.77	0.47	0.74
GW-922	02/21/06	Actinium-227	0.22	0.18	0.18
GW-922	11/14/06	Actinium-227	0.29	0.09	0.2
GW-922	11/14/06	Chlorine-36	30.5	2.31	4.26
GW-922	11/14/06	Plutonium-242	0.11	0.04	0.04

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L)		
			Activity	TPU	MDA
GW-922	04/18/06	Radium-226	0.22	0.19	0.21
GW-922	11/14/06	Thorium-227	0.29	0.09	0.2
GW-922	04/18/06	Thorium-230	0.42	0.18	0.09
GW-922	08/09/06	Thorium-230	0.65	0.24	0.16
GW-922	11/14/06	Thorium-230	0.82	0.14	0.17
GW-922	04/18/06	Thorium-232	0.16	0.11	0.09
GW-922	08/09/06	Thorium-232	0.14	0.1	0.1
GW-922	02/21/06	Yttrium-90	2.91	0.7	0.82
GW-923	04/24/06	Curium-248	1.76	0.57	0.22
GW-923	04/24/06	Radium-226	0.82	0.51	0.58
GW-923	04/24/06	Thorium-228	0.29	0.16	0.18
GW-923	02/27/06	Thorium-230	0.4	0.26	0.25
GW-923	04/24/06	Thorium-230	0.61	0.22	0.09
GW-923	04/24/06	Thorium-232	0.43	0.19	0.12
GW-924	08/14/06	Actinium-227	0.36	0.18	0.21
GW-924	08/14/06	Curium-245	0.57	0.46	0.39
GW-924	08/14/06	Curium-246	0.57	0.46	0.39
GW-924	02/27/06	Curium-248	1.21 Q	0.66	0.49
GW-924	04/20/06	Curium-248	0.14	0.1	0.04
GW-924	02/27/06	Radium-226	0.5 Q	0.37	0.43
GW-924 D	08/14/06	Radium-226	0.29	0.21	0.2
GW-924	02/27/06	Radium-228	0.66	0.34	0.5
GW-924	04/20/06	Radium-228	0.48	0.29	0.45
GW-924	08/14/06	Thorium-227	0.36	0.18	0.21
GW-924 D	08/14/06	Thorium-228	0.3	0.16	0.18
GW-924 D	02/27/06	Thorium-230	0.21	0.18	0.1
GW-924	04/20/06	Thorium-230	0.39	0.19	0.14
GW-924 D	04/20/06	Thorium-230	0.66	.	0.21
GW-924	08/14/06	Thorium-230	0.43	0.19	0.12
GW-924 D	08/14/06	Thorium-230	0.72	0.25	0.16
GW-924	11/06/06	Thorium-230	0.73	0.13	0.17
GW-924 D	11/06/06	Thorium-230	0.57	0.11	0.15
GW-924 D	08/14/06	Thorium-232	0.22	0.13	0.11
GW-924	02/27/06	Yttrium-90	1.4	0.5	0.7
GW-924 D	02/27/06	Yttrium-90	1.07	0.48	0.71
GW-924 D	04/20/06	Yttrium-90	1.15	.	0.82
GW-925	08/09/06	Curium-245	0.29	0.22	0.27
GW-925	08/09/06	Curium-246	0.29	0.22	0.27
GW-925	08/09/06	Curium-247	0.18	0.14	0.17
GW-925	11/07/06	Curium-247	0.24	0.09	0.15
GW-925	04/19/06	Curium-248	0.28	0.15	0.09
GW-925	08/09/06	Curium-248	0.34	0.18	0.14
GW-925	11/07/06	Plutonium-242	0.1	0.05	0.05
GW-925	11/07/06	Radium-226	0.23	0.06	0.14
GW-925	02/21/06	Radium-228	2.68 Q	0.63	0.55
GW-925	08/09/06	Radium-228	1.31	0.41	0.49
GW-925	04/19/06	Thorium-228	0.08	0.08	0.05
GW-925	11/07/06	Thorium-228	0.17	0.06	0.13
GW-925	02/21/06	Thorium-230	0.36	0.25	0.27
GW-925	04/19/06	Thorium-230	0.5	0.22	0.16
GW-925	08/09/06	Thorium-230	0.62	0.25	0.13
GW-925	02/21/06	Yttrium-90	1.05	0.56	0.87
GW-926	08/14/06	Actinium-227	0.37	0.18	0.18
GW-926	11/06/06	Actinium-227	0.26	0.07	0.15
GW-926	08/14/06	Curium-248	0.23	0.17	0.15
GW-926	08/14/06	Plutonium-242	0.18	0.16	0.1
GW-926	04/20/06	Radium-228	0.69	0.3	0.42

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L)		
			Activity	TPU	MDA
GW-926	08/14/06	Thorium-227	0.37	0.18	0.18
GW-926	11/06/06	Thorium-227	0.26	0.07	0.15
GW-926	04/20/06	Thorium-228	0.33	0.2	0.25
GW-926	08/14/06	Thorium-228	0.16	0.12	0.13
GW-926	08/14/06	Thorium-229	1.53	0.95	0.06
GW-926	02/28/06	Thorium-230	0.42	0.26	0.27
GW-926	04/20/06	Thorium-230	0.38	0.22	0.27
GW-926	08/14/06	Thorium-230	0.33	0.17	0.14
GW-926	11/06/06	Thorium-230	0.74	0.13	0.18
GW-926	11/06/06	Thorium-232	0.17	0.06	0.09
GW-926	04/20/06	Yttrium-90	1.01	0.47	0.7
GW-927	02/16/06	Actinium-227	0.24	0.19	0.19
GW-927	08/09/06	Actinium-227	0.33	0.17	0.15
GW-927	11/07/06	Americium-243	0.41	0.1	0.2
GW-927	11/07/06	Curium-248	0.26	0.08	0.15
GW-927	11/07/06	Plutonium-236	0.2	0.07	0.18
GW-927	08/09/06	Plutonium-238	0.08	0.08	0.05
GW-927	08/09/06	Plutonium-239/240	0.08	0.08	0.05
GW-927	11/07/06	Plutonium-242	0.08	0.04	0.05
GW-927	08/09/06	Radium-226	0.44	0.24	0.25
GW-927	11/07/06	Radium-226	0.18	0.05	0.15
GW-927	08/09/06	Thorium-227	0.33	0.17	0.15
GW-927	04/19/06	Thorium-228	0.16	0.11	0.09
GW-927	08/09/06	Thorium-229	0.13	0.13	0.06
GW-927	02/16/06	Thorium-230	0.47	0.28	0.28
GW-927	04/19/06	Thorium-230	0.3	0.15	0.04
GW-927	08/09/06	Thorium-230	0.54	0.22	0.16
GW-927	11/07/06	Thorium-230	0.57	0.1	0.04
GW-927	08/09/06	Uranium-232	0.32	0.29	0.05
GW-927	02/16/06	Yttrium-90	0.99	0.55	0.86
EMWNT-03A	04/17/06	Actinium-227	0.14	0.1	0.1
EMWNT-03A	11/07/06	Americium-243	0.21	0.17	0.17
EMWNT-03A	11/07/06	Curium-245	0.39	0.23	0.2
EMWNT-03A	11/07/06	Curium-246	0.39	0.23	0.2
EMWNT-03A	02/14/06	Curium-248	0.28	0.2	0.18
EMWNT-03A	04/17/06	Curium-248	0.16	0.13	0.13
EMWNT-03A	02/14/06	Iodine-129	1.51	1.13	1.32
EMWNT-03A	04/17/06	Potassium-40	33.8	31.81	32.6
EMWNT-03A	04/17/06	Thorium-227	0.14	0.1	0.1
EMWNT-03A	11/07/06	Thorium-229	0.07	0.07	0.05
EMWNT-03A	02/14/06	Thorium-230	0.32	0.16	0.14
EMWNT-03A	04/17/06	Thorium-230	0.38	0.16	0.08
EMWNT-03A	04/17/06	Thorium-232	0.1	0.08	0.04
EMWNT-03A	11/07/06	Thorium-232	0.11	0.09	0.09
EMWNT-03A	04/17/06	Yttrium-90	1.77	0.53	0.68
EMWNT-05	11/07/06	Cesium-137	7.92	7.92	7.86
EMWNT-05	08/16/06	Chlorine-36	4.51	2.62	3.96
EMWNT-05	02/14/06	Curium-248	0.33	0.24	0.11
EMWNT-05	04/17/06	Curium-248	0.16	0.14	0.08
EMWNT-05	08/16/06	Curium-248	0.45	0.37	0.37
EMWNT-05	08/16/06	Iodine-129	1.01	0.61	0.87
EMWNT-05	11/07/06	Plutonium-236	0.61	0.24	0.17
EMWNT-05	02/14/06	Plutonium-239/240	0.11	0.08	0.08
EMWNT-05	04/17/06	Plutonium-242	0.19	0.11	0.11
EMWNT-05	11/07/06	Plutonium-242	0.14	0.12	0.06
EMWNT-05	08/16/06	Radium-226	0.38	0.35	0.36
EMWNT-05	11/07/06	Radium-226	0.19	0.16	0.09

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L)		
			Activity	TPU	MDA
EMWNT-05	02/14/06	Thorium-230	0.46	0.21	0.17
EMWNT-05	04/17/06	Thorium-230	0.25	0.13	0.1
EMWNT-05	08/16/06	Thorium-230	0.2	0.16	0.14
EMWNT-05	11/07/06	Thorium-230	0.85	0.27	0.15
EMWNT-05	02/14/06	Yttrium-90	0.91	0.5	0.79
EMWNT-05	11/07/06	Yttrium-90	0.93	0.57	0.9
EMW-VWEIR	04/17/06	Americium-243	0.07	0.07	0.04
EMW-VWEIR D	04/17/06	Americium-243	0.74	.	0.18
EMW-VWEIR D	02/14/06	Chlorine-36	5.31	3.08	4.74
EMW-VWEIR	04/17/06	Curium-245	0.15	0.1	0.08
EMW-VWEIR D	04/17/06	Curium-245	1.7	.	0.24
EMW-VWEIR	11/07/06	Curium-245	0.38	0.21	0.22
EMW-VWEIR	04/17/06	Curium-246	0.15	0.1	0.08
EMW-VWEIR D	04/17/06	Curium-246	1.7	.	0.24
EMW-VWEIR	11/07/06	Curium-246	0.38	0.21	0.22
EMW-VWEIR D	04/17/06	Curium-247	0.28	.	0.2
EMW-VWEIR D	04/17/06	Curium-248	0.24	.	0.08
EMW-VWEIR D	04/17/06	Iodine-129	1.27	.	0.5
EMW-VWEIR D	04/17/06	Nickel-63	29.9	.	28.9
EMW-VWEIR	02/14/06	Plutonium-239/240	0.11	0.09	0.1
EMW-VWEIR	04/17/06	Plutonium-239/240	0.27	0.15	0.1
EMW-VWEIR	11/07/06	Plutonium-239/240	0.29	0.18	0.07
EMW-VWEIR	11/07/06	Plutonium-242	0.16	0.12	0.06
EMW-VWEIR D	04/17/06	Radium-228	2.56	.	0.48
EMW-VWEIR D	02/14/06	Thorium-228	0.2	0.13	0.19
EMW-VWEIR	04/17/06	Thorium-228	0.17	0.1	0.09
EMW-VWEIR	04/17/06	Thorium-229	0.18	0.13	0.04
EMW-VWEIR	02/14/06	Thorium-230	0.44	0.2	0.15
EMW-VWEIR D	02/14/06	Thorium-230	0.5	0.19	0.13
EMW-VWEIR	04/17/06	Thorium-230	0.42	0.17	0.09
EMW-VWEIR D	04/17/06	Thorium-230	0.52	.	0.14
EMW-VWEIR	08/16/06	Thorium-230	0.3	0.22	0.25
EMW-VWEIR	02/14/06	Tritium	385	173.8	276
EMW-VWEIR	08/16/06	Uranium-232	0.35	0.32	0.1
EMW-VWEIR	02/14/06	Yttrium-90	61.2	8.48	1.15
EMW-VWEIR D	02/14/06	Yttrium-90	63.1	8.72	0.93
EMW-VWEIR	04/17/06	Yttrium-90	29.8	4.22	1.01
EMW-VWEIR D	04/17/06	Yttrium-90	26.1	.	0.96
EMW-VWEIR	08/16/06	Yttrium-90	12.7	1.97	0.93
EMW-VWEIR	11/07/06	Yttrium-90	14.6	2.18	0.91
EMW-VWUNDER	08/16/06	Actinium-227	0.26	0.17	0.22
EMW-VWUNDER	08/16/06	Americium-243	0.27	0.24	0.26
EMW-VWUNDER	11/14/06	Cesium-137	4.87	2.24	4.51
EMW-VWUNDER	08/16/06	Curium-245	0.46	0.32	0.29
EMW-VWUNDER	08/16/06	Curium-246	0.46	0.32	0.29
EMW-VWUNDER	02/27/06	Curium-248	0.22	0.19	0.18
EMW-VWUNDER	08/16/06	Curium-248	0.44	0.22	0.16
EMW-VWUNDER	11/14/06	Plutonium-239/240	0.27	0.07	0.09
EMW-VWUNDER	11/14/06	Plutonium-242	0.17	0.06	0.12
EMW-VWUNDER	08/16/06	Thorium-227	0.26	0.17	0.22
EMW-VWUNDER	02/27/06	Thorium-230	0.61	0.32	0.1
EMW-VWUNDER	04/20/06	Thorium-230	0.3	0.19	0.23
EMW-VWUNDER	08/16/06	Thorium-230	0.55	0.23	0.17
EMW-VWUNDER	11/14/06	Thorium-230	0.57	0.11	0.18

APPENDIX D.3: CY 2006 MONITORING DATA FOR THE BEAR CREEK HYDROGEOLOGIC REGIME
Additional Isotopic Analyses at EMWMF: Detected Results

Sampling Point	Date Sampled	Isotope	Result (pCi/L)		
			Activity	TPU	MDA
NT-04	11/07/06	Americium-243	0.37	0.26	0.34
NT-04	11/07/06	Curium-245	0.54	0.32	0.41
NT-04	11/07/06	Curium-246	0.54	0.32	0.41
NT-04	04/17/06	Curium-248	0.21	0.14	0.06
NT-04	08/16/06	Curium-248	0.41	0.36	0.33
NT-04	08/16/06	Iodine-129	5.07	1	0.55
NT-04	04/17/06	Plutonium-236	0.22	0.15	0.19
NT-04	02/14/06	Plutonium-239/240	0.09	0.08	0.05
NT-04	04/17/06	Radium-226	0.24	0.17	0.16
NT-04	11/07/06	Radium-226	0.46	0.26	0.32
NT-04	04/17/06	Radium-228	0.67	0.29	0.42
NT-04	08/16/06	Radium-228	0.78	0.42	0.63
NT-04	02/14/06	Thorium-230	0.68	0.26	0.19
NT-04	04/17/06	Thorium-230	0.43	0.17	0.04
NT-04	08/16/06	Thorium-230	0.31	0.21	0.17
NT-04	02/14/06	Thorium-232	0.23	0.14	0.05
NT-04	11/07/06	Thorium-232	0.11 Q	0.09	0.1
NT-04	04/17/06	Yttrium-90	0.83	0.51	0.8
NT-04	11/07/06	Yttrium-90	0.84	0.47	0.73

APPENDIX E

CY 2006 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., 55-3A])
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
SP	-	Spring sampling location in the Y-12 Complex
STATION	-	Surface water sampling location in Upper East Fork Poplar Creek

Location:

B4	-	Beta-4 Security Pits
B8110	-	Building 81-10
B9201-2	-	Building 9201-2
B9201-5	-	Building 9201-5
CPT	-	Coal Pile Trench
EXP-E	-	Exit Pathway Picket E
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
WCPA	-	Waste Coolant Processing Area
Y-12	-	Y-12 Complex

Monitoring Program:

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

Sample Type:

Dup	-	Field Duplicate Sample

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 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	Bicarbonate	1.0	NS
Magnesium	0.2	0.05	Carbonate	1.0	NS
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
Note: "NS" = not specified.					

The major ion results for all of the samples collected from well GW-170 are qualitative because the ion charge balance error (percent) exceeds 20%. The geochemistry of samples from this well has reflected potential grout contamination since CY 2000, as shown by the elevated pH (typically > 12). The charge balance also exceeds 20% at wells GW-108 (January), GW-232 (August), and GW-722-14 (March).

The Y-12 GWPP SAP (BWXT 2006a) specifies analytical methods and 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. For this report, the analytical methods for metals used by BJC monitoring programs (EPA-7470, SW846-6010B, SW846-6020, and ASTM-D5174-M) are considered to be functionally equivalent to the methods used by the GWPP (Table B.5). To retain the highest quality data for DOE Order monitoring purposes and to standardize reporting limits for trace metal results obtained from

EXPLANATION (continued)

all sources, the GWPP reporting limits were given precedence over the BJC reporting limits (BJC 2005 and BJC 2006) shown below. The trace metals shown in bold typeface below were detected in at least one sample collected during CY 2006 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	0.0025	0.006	**Manganese**	0.005	0.005
Arsenic	0.005	0.005	**Mercury**	0.0002	0.0002
Barium	0.004	0.005*	Molybdenum	0.05	0.01*
Beryllium	0.001	0.001	**Nickel**	0.005	0.01
Boron	0.1	0.01*	**Selenium**	0.01	0.005*
Cadmium	0.0025	0.001*	Silver	0.02	0.005*
Chromium	0.005	0.005	**Strontium**	0.005	0.005
Cobalt	0.02	0.005*	**Thallium**	0.0005	0.002
Copper	0.02	0.005*	Thorium	0.2	NS
Iron	0.05	0.01*	**Uranium**	0.0005	0.004
Lead	0.0005	0.003	Vanadium	0.02	0.01*
			Zinc	0.05	0.01*

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

Groundwater samples collected from the following wells for metals analysis during CY 2006 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-108	01/05/06	12	GW-274	03/27/06	10
GW-109	05/10/06	50	GW-275	03/27/06	10
			GW-633	05/10/06	2

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.
- J - Positively identified; estimated concentration (some cation results obtained from BJC).
- Q - Result is inconsistent with historical measurements (e.g., extremely high nitrate (94,900 mg/L) in the January sample from well GW-108).
- R - Result does not meet data quality objectives (charge balance errors that exceed 20% or duplicate results that differ by more than an order of magnitude).

EXPLANATION (continued)

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, 36 compounds were detected in the CY 2006 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	115	72,000	Trichlorofluoromethane	4	17
Trichloroethene	96	5,700	1,4-Dichlorobenzene	4	3 J
cis-1,2-Dichloroethene	81	2,100	Total Xylene	3	6,100
Chloroform	60	170	Ethylbenzene	3	1,000 J
Carbon tetrachloride	53	1,300	Bromomethane	3	47
1,1-Dichloroethene	39	210	2-Butanone	3	16
Vinyl chloride	35	320	1,2-Dichloropropane	3	13
trans-1,2-Dichloroethene	30	70	Chlorobenzene	3	1 J
1,1-Dichloroethane	28	59	2-Hexanone	2	110
1,1,2-Trichloro-1,2,2-trifluoroethane	27	4,600	1,1,2-Trichloroethane	2	2 J
Acetone	16	70	1,2-Dichloroethane	1	690 J
1,1,1-Trichloroethane	16	66	Chloromethane	1	8
Dichlorodifluoromethane	13	81	Dibromochloromethane	1	5
Benzene	8	9,500	1,1,1,2-Tetrachloroethane	1	2 J
Toluene	6	3,000	Chloroethane	1	2 J
1,4-Dioxane	6	47	Styrene	1	2 J
Methylene chloride	6	47	1,1,2,2-Tetrachloroethane	1	1 J
Bromoform	5	9	Carbon disulfide	1	1 J

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 nine wells in the East Fork Regime during CY 2006.

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)
- D - Diluted before analysis: GW-151 (25X), GW-382 (5X), and GW-762 (25X). The detected results are valid, but some VOCs may be present at concentrations below the elevated detection limits.
- J - Positively identified, estimated concentration below the contract-required quantitation limit
- Q - Inconsistent with historical measurements for the location

EXPLANATION (continued)

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 2006 in the East Fork Regime.

Analyte	No. of Results	No. Detected	Analyte	No. of Results	No. Detected
Gross Alpha	182	44	Uranium-234	16	14
Gross Beta	182	77	Uranium-235	16	6
Technetium-99	18	6	Uranium-236	10	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 four pages of Appendix E.3, followed by the results for the isotopes. The following notes and qualifiers apply to Appendix E.3:

Result	-	Activity in picoCuries per liter (pCi/L)
TPU	-	Total propagated uncertainty (two standard deviations); calculation includes the counting error (instrument uncertainty) as reported previously, plus other sources of uncertainty (e.g., volumetric, chemical yield)
MDA	-	Minimum detectable activity
.	-	Not analyzed
<	-	Analyzed but less than the MDA (not detected)
Q	-	Inconsistent with historical measurements for the location
R	-	Result does not meet data quality objectives: exceeds the MDA but is less than the TPU

Additional Analyte Not Presented in Appendix E tables:

Methanol analysis was performed on groundwater samples collected from 15 monitoring wells (55-2A, 55-2B, 55-2C, 55-3A, 55-3B, 55-3C, 56-2A, 56-2B, 56-2C, 56-3A, 56-3B, 56-3C, 56-8A, GW-686, and GW-698) from May to July 2006. Analytical results for all of the samples (and duplicates) were below the reporting limit (5000 µg/L).

APPENDIX E.1

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

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	55-1A	55-2A		55-2B		55-2C		55-3A		
Functional Area	GRIDB2	GRIDB3		GRIDB3		GRIDB3		B9201-5		
Date Sampled	03/07/06	02/23/06	07/18/06	02/23/06	07/18/06	02/23/06	07/18/06	03/01/06		07/24/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type									Dup	
Field Measurements										
Time Sampled	9:35	9:00	9:50	10:05	10:50	11:05	11:45	9:15	9:15	8:55
Measuring Point Elev. (ft)	986.91	976.74	976.74	977.42	977.42	977.02	977.02	972.46	972.46	972.46
Depth to Water (ft)	11.02	8.46	8.44	7.42	7.99	7.50	7.97	11.59	11.59	11.77
Groundwater Elevation (ft)	975.89	968.28	968.30	970.00	969.43	969.52	969.05	960.87	960.87	960.69
Conductivity (μmho/cm)	1,040	1,818	1,662	1,951	2,310	1,931	2,240	719	719	708
Dissolved Oxygen (ppm)	0.69	0	3.85	0	6.77	0	3.32	4.95	4.95	0.62
Iron (++)	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	21	165	152	196	187	149	152	148	148	181
Temperature (degrees C)	13.4	13.3	23.4	15.8	20.7	16.3	22	15.2	15.2	19.6
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
pH	7.7	6.98	6.64	6.45	6.3	6.89	6.81	7.54	7.54	7.01
Miscellaneous Analytes										
Dissolved Solids (mg/L)	789	1,410	1,400	1,580	1,930	1,500	.	439	436	464
Suspended Solids (mg/L)	2	1	<	2	<	1	.	<	<	<
Turbidity (NTU)	6.46	1.82	0.479	1.11	1.3	0.468	.	0.29	0.292	0.198
Major Ions (mg/L)										
Calcium	141	346	284	371	356	265	.	105	109	110
Magnesium	17	23.3	19.3	32.9	30.6	47.5	.	16.3	16.5	14.9
Potassium	2.24	3.56	3.63	3.54	3.14	14.3	.	3.06	3.25	3.17
Sodium	26.3	10.9	10	11.7	10.9	83.8	.	9.67	9.94	9.6
Bicarbonate	140	216	229	147	140	224	.	162	164	161
Carbonate	<	<	<	<	<	<	.	<	<	<
Chloride	167	13.4	13.7	14.2	14.4	13.4	.	16.7	16.9	14.7
Fluoride	<	<	<	<	<	<	.	<	<	<
Nitrate as N	7.26	212	159	256	253	228	.	2.18	2.09	2.33
Sulfate	79.8	21.8	20.2	20.8	20	18.4	.	162	157	160
Charge balance error (%)	-0.3	-1.3	-1.4	-0.5	-2.0	-0.9	.	-1.1	1.0	0.6
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	.	<	<	<
Antimony	<	<	<	<	<	0.00592	.	<	<	<
Arsenic	<	<	<	<	<	<	.	<	<	<
Barium	0.0878	0.235	0.179	1.03	0.948	1.43	.	0.0333	0.0346	0.0408
Beryllium	<	<	<	<	<	<	.	<	<	<
Boron	<	<	<	<	<	<	.	0.133	0.135	0.129
Cadmium	<	<	<	<	<	<	.	<	<	<
Chromium	0.082	<	<	<	<	<	.	<	<	<
Cobalt	<	<	<	<	<	<	.	<	<	<
Copper	<	<	<	<	<	<	.	<	<	<
Iron	0.533	0.0884	<	0.071	<	<	.	<	<	<
Lead	<	0.00274	0.00266	0.00132	<	<	.	<	<	0.00058
Lithium	0.0302	<	<	0.0205	0.0196	0.0522	.	<	<	<
Manganese	0.0101	0.193	1.07	0.554	0.765	0.612	.	0.0103	0.0102	0.0291
Mercury	<	<	<	<	<	<	.	<	<	<
Nickel	0.384	0.0108	0.0126	0.0112	0.0131	0.00742	.	0.0149	0.0134	0.0453
Selenium	<	<	<	<	<	<	.	<	<	<
Strontium	0.27	0.849	0.698	1.23	1.16	5.55	.	0.253	0.26	0.287
Thallium	<	<	<	<	<	<	.	<	<	<
Uranium	0.000685	0.00632	0.0025	<	<	0.000525	.	0.00111	0.000965	0.000965
Zinc	<	<	<	<	<	<	.	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	55-3B		55-3C		56-1A		56-2A		56-2B	
Functional Area	B9201-5		B9201-5		Y12		GRIDC3		GRIDC3	
Date Sampled	03/01/06	07/24/06	03/01/06	07/24/06	05/22/06	10/12/06	02/28/06	07/27/06	02/28/06	07/27/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type										
Field Measurements										
Time Sampled	10:25	10:15	11:30	11:00	11:00	8:35	9:25	9:20	10:15	10:00
Measuring Point Elev. (ft)	973.32	973.32	974.34	974.34	969.25	969.25	963.30	963.30	962.28	962.28
Depth to Water (ft)	12.54	12.85	13.49	13.61	7.88	7.57	8.72	8.77	8.05	8.11
Groundwater Elevation (ft)	960.78	960.47	960.85	960.73	961.37	961.68	954.58	954.53	954.23	954.17
Conductivity (μmho/cm)	482	449	520	538	537	468	630	665	622	652
Dissolved Oxygen (ppm)	0.45	0.84	0.87	0.68	2.38	1.88	0.69	0.55	3.83	0.99
Iron (++)	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	-83	-23	19	54	158	151	-17	138	60	34
Temperature (degrees C)	17.4	19.7	17.5	20.9	18.7	21.8	14.9	19.7	16	20.9
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
pH	7.6	7.55	7.49	7.5	7.77	7.53	7.34	7.22	7.72	7.38
Miscellaneous Analytes										
Dissolved Solids (mg/L)	225	309	311	338	317	275	349	.	374	.
Suspended Solids (mg/L)	<	<	<	<	<	<	<	.	<	.
Turbidity (NTU)	0.616	0.281	0.442	0.144	5.98	1.14	2.5	.	0.185	.
Major Ions (mg/L)										
Calcium	61.1	61.9	69.6	65.6	70.4	57.8	104	.	92.9	.
Magnesium	12.6	12.6	15.6	17.1	12.2	10.1	8.29	.	14.2	.
Potassium	4.4	4.39	7.5	8.14	2.73	2.26	2.65	.	2.97	.
Sodium	3.96	4.04	11.9	18.1	14	11.6	10.2	.	12.3	.
Bicarbonate	144	139	185	178	129	137	203	.	191	.
Carbonate	<	<	<	<	<	<	<	.	<	.
Chloride	32.7	34	20.5	20.1	20.3	16	30.2	.	13.9	.
Fluoride	<	<	<	<	0.438	0.499	<	.	<	.
Nitrate as N	<	0.0316	0.474	0.501	0.531	0.818	0.47	.	1.7	.
Sulfate	31.2	34.5	60.7	67.9	113	56.6	76.3	.	103	.
Charge balance error (%)	-0.9	-0.5	-1.0	0.9	-3.4	-2.0	-1.2	.	-0.5	.
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	.	<	.
Antimony	<	<	<	<	<	<	<	.	<	.
Arsenic	<	<	<	<	<	<	<	.	<	.
Barium	0.26	0.259	0.148	0.169	0.0586	0.0525	0.116	.	0.0659	.
Beryllium	<	<	<	<	<	<	<	.	<	.
Boron	<	<	<	<	<	<	0.116	.	0.134	.
Cadmium	<	<	<	<	<	<	<	.	<	.
Chromium	<	<	<	<	0.085	0.0102	0.0159	.	<	.
Cobalt	<	<	<	<	<	<	<	.	<	.
Copper	<	<	<	<	<	<	<	.	<	.
Iron	0.119	<	<	<	0.611	0.0577	0.214	.	<	.
Lead	0.0012	0.000845	0.00894	0.00087	0.000595	0.00575	<	.	<	.
Lithium	0.0151	0.0155	0.0174	0.0206	0.0137	0.0153	0.0138	.	0.018	.
Manganese	0.0338	0.0666	0.0325	0.0367	<	<	0.0106	.	<	.
Mercury	<	<	<	<	<	0.000248	<	.	<	.
Nickel	<	<	<	<	0.219	0.0469	0.061	.	<	.
Selenium	<	<	<	<	<	<	<	.	<	.
Strontium	0.718	0.719	1.56	1.9	0.483	0.249	0.257	.	0.332	.
Thallium	<	<	<	<	<	0.00076	<	.	<	.
Uranium	<	<	<	<	0.00376	0.00196	0.000525	.	<	.
Zinc	<	<	<	<	<	<	<	.	<	.

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	56-2C		56-3A		56-3B			56-3C		56-4A	
Functional Area	GRIDC3		Y12		Y12			Y12		Y12	
Date Sampled	02/28/06	07/27/06	03/06/06	07/25/06	03/06/06	07/25/06		03/06/06	07/25/06	03/02/06	07/26/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type							Dup				
Field Measurements											
Time Sampled	10:15	10:45	8:40	8:55	9:45	9:50	9:50	10:50	10:55	10:10	10:40
Measuring Point Elev. (ft)	964.94	964.94	963.03	963.03	963.40	963.40	963.40	962.86	962.86	962.07	962.07
Depth to Water (ft)	9.85	9.87	10.74	10.79	11.01	11.08	11.08	10.69	10.73	10.38	10.33
Groundwater Elevation (ft)	955.09	955.07	952.29	952.24	952.39	952.32	952.32	952.17	952.13	951.69	951.74
Conductivity (µmho/cm)	622	621	556	574	575	580	580	558	559	260	311
Dissolved Oxygen (ppm)	1.22	1.99	2.79	0.68	0.63	1.45	1.45	0.65	1.76	4.93	1.27
Iron (++)	.	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	-13	26	160	175	118	124	124	100	132	144	102
Temperature (degrees C)	17.3	21.6	14.8	19.9	16.7	19.4	19.4	16.6	19.8	16.2	24.2
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.	.
pH	8.83	8.58	7.39	7.17	7.24	7.18	7.18	7.3	7.27	7.52	7.24
Miscellaneous Analytes											
Dissolved Solids (mg/L)	322	.	307	383	338	396	404	356	465	152	146
Suspended Solids (mg/L)	<	.	<	<	<	2	2	<	4	28	12
Turbidity (NTU)	0.542	.	0.556	0.527	0.524	3.67	3.75	0.858	7.87	79	21.3
Major Ions (mg/L)											
Calcium	7.09	.	100	101	111	104	104	105	101	33	33.6
Magnesium	2.34	.	7.68	7.47	4.54	4.42	4.42	6.43	6.48	4.59	4.8
Potassium	4.96	.	<	<	<	<	<	2.02	2.11	3.23	2.77
Sodium	129	.	3.36	3.93	5.67	5.65	5.59	8.1	8.04	8.73	9.14
Bicarbonate	224	.	218	215	211	189	190	181	173	88.5	96.8
Carbonate	<	.	<	<	<	<	<	<	<	<	<
Chloride	22.9	.	18.3	17.6	16.7	18.5	19	16.5	16.6	1.67	0.26
Fluoride	0.438	.	<	<	<	<	<	<	<	0.124	0.109
Nitrate as N	0.165	.	0.305	0.526	0.472	0.791	0.763	0.931	1.09	1.74	0.226
Sulfate	40.3	.	53.1	49	64.1	72.8	72	92.6	96.7	23.1	27
Charge balance error (%)	2.3	.	-2.0	-0.2	0.8	-0.6	-0.8	0.8	-0.3	1.2	0.3
Trace Metals (mg/L)											
Aluminum	<	.	<	<	<	0.265	0.483	<	0.586	4.69	2.54
Antimony	<	.	<	<	<	<	<	<	<	<	<
Arsenic	<	.	<	<	<	<	<	<	<	<	<
Barium	0.15	.	0.103	0.111	0.109	0.106	0.106	0.0718	0.0777	0.0605	0.0582
Beryllium	<	.	<	<	<	<	<	<	<	<	<
Boron	0.853	.	<	0.1	0.121	<	<	<	<	<	<
Cadmium	<	.	<	<	<	<	<	<	<	<	<
Chromium	0.0106	.	<	0.0121	<	<	0.0113	<	0.0111	0.059	0.0658
Cobalt	<	.	<	<	<	<	<	<	<	<	<
Copper	<	.	<	<	<	<	<	<	<	<	<
Iron	<	.	<	<	<	0.145	0.253	<	0.355	2.41	1.53
Lead	<	.	<	0.00194	<	0.00087	0.00246	0.00068	0.00264	0.000875	<
Lithium	0.0799	.	0.0102	<	<	<	<	0.0113	<	<	<
Manganese	<	.	<	0.00658	<	0.0819	0.0861	<	0.00862	0.0229	0.0454
Mercury	<	.	<	<	<	0.0013	0.00116	<	<	<	<
Nickel	<	.	0.0165	0.0197	0.0095	0.00693	0.00666	<	<	0.0151	0.0407
Selenium	<	.	<	<	<	<	<	<	<	<	<
Strontium	0.402	.	0.157	0.163	0.152	0.147	0.145	0.191	0.187	0.0593	0.0616
Thallium	<	.	<	<	0.000855	<	<	<	<	<	<
Uranium	<	.	0.00085	0.000905	0.00091	0.00099	0.00063	<	<	<	<
Zinc	<	.	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	56-6A		56-8A		60-1A			GW-105	GW-106	GW-108	
Functional Area	Y12		Y12		Y12			S3	S3	S3	
Date Sampled	03/02/06	07/26/06	05/23/06	10/12/06	06/15/06		10/31/06	05/09/06	05/09/06	01/05/06	07/31/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC
Sample Type						Dup					
Field Measurements											
Time Sampled	8:50	9:25	10:25	9:30	9:55	9:55	9:00	8:15	9:55	10:05	10:00
Measuring Point Elev. (ft)	960.28	960.28	962.46	962.46	929.66	929.66	929.66	1,018.20	1,017.30	999.00	999.00
Depth to Water (ft)	12.13	12.34	20.35	20.31	12.69	12.69	12.03	9.15	4.82	7.20	6.66
Groundwater Elevation (ft)	948.15	947.94	942.11	942.15	916.97	916.97	917.63	1,009.05	1,012.48	991.80	992.34
Conductivity (μmho/cm)	602	624	661	713	539	539	570	5,740	5,500	37,800	44,800
Dissolved Oxygen (ppm)	1.35	0.29	4.43	0.19	0.33	0.33	0.5	4.21	0.6	1.7	0.39
Iron (++)	.	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	138	-129	118	118	-72	-72	-51	218	191	263	333
Temperature (degrees C)	17.3	23.3	18.4	17.4	19.1	19.1	17.2	15.3	17.2	16.7	24.5
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	5	2
pH	7.71	7.4	7.75	7.48	7.31	7.31	7.2	6.62	6.88	4.91	5.64
Miscellaneous Analytes											
Dissolved Solids (mg/L)	355	377	362	424	342	342	324	4,080	4,180	.	.
Suspended Solids (mg/L)	3	<	<	<	<	<	2	6	<	.	.
Turbidity (NTU)	8.48	5.06	1.72	0.442	3.34	3.58	9.23	8.05	0.47	.	.
Major Ions (mg/L)											
Calcium	65.8	65.1	52.6	54.9	81	78.5	84	927	762	10,500	10,100
Magnesium	30.1	30.1	50.2	52.8	10.2	9.77	9.18	113	182	1,120	1,060
Potassium	2.13	<	<	<	<	<	<	8.92	13	26	25.5
Sodium	22.1	23.2	9.44	10.7	9.47	8.94	7.6	19.5	33.4	443	471
Bicarbonate	334	318	311	356	203	202	216	147	129	741	712
Carbonate	<	<	<	<	<	<	<	<	<	<	<
Chloride	6.27	4.88	7.81	6.78	6.28	6.26	6.16	15.4	12.5	148	185
Fluoride	0.125	0.123	<	<	<	<	<	<	<	<	<
Nitrate as N	<	<	0.111	0.0361	<	<	<	607	693	94,600 Q	7,980
Sulfate	5.45	2.58	30.2	27.9	60.6	61.1	59.1	6.78	15.1	10.1	9.7
Charge balance error (%)	-1.4	1.4	0.6	-2.2	-1.9	-3.7	-4.0	9.4	1.9	-82.8 R	1.9
Trace Metals (mg/L)											
Aluminum	0.787	<	<	<	<	<	<	0.56	<	<	<
Antimony	<	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<	0.0057
Barium	0.218	0.181	0.0537	0.0573	0.11	0.105	0.118	5.14	3.65	80.9	81.7
Beryllium	<	<	<	<	<	<	<	<	<	<	<
Boron	0.105	<	0.147	0.141	<	<	<	<	0.107	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<	<
Chromium	0.0157	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	0.139	0.126
Copper	<	<	<	<	<	<	<	0.0351	<	<	<
Iron	0.431	0.836	0.0957	<	0.416	0.357	1.08	0.32	<	<	<
Lead	<	<	0.00857	<	<	<	<	0.0027	<	<	0.0086
Lithium	<	<	<	<	1.34	1.31	1.5	0.034	0.072	<	<
Manganese	0.0156	0.608	0.0111	0.0948	1.2	1.15	1.82	0.0902	0.101	149	150
Mercury	<	<	<	<	<	<	<	<	<	<	<
Nickel	<	0.0116	<	0.00776	<	<	<	0.035	0.0256	0.202	0.149
Selenium	<	<	<	<	<	<	<	<	<	<	<
Strontium	0.307	0.279	0.168	0.196	0.263	0.254	0.25	2.09	21.4	30.4	30.7
Thallium	<	<	<	0.000995	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	0.00128	0.0029	0.018	0.0171
Zinc	<	<	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-109	GW-148	GW-151		GW-153	GW-154		GW-169		
Functional Area	S3	NHP	NHP		NHP	NHP		EXP-UV		
Date Sampled	05/10/06	01/19/06	03/06/06	08/07/06	01/18/06	03/07/06	08/07/06	03/07/06	05/23/06	08/02/06
Program	GWPP	GWPP	BJC	BJC	GWPP	BJC	BJC	BJC	BJC	BJC
Sample Type										
Field Measurements										
Time Sampled	9:50	9:50	14:40	14:00	9:10	9:22	9:30	12:26	9:49	11:45
Measuring Point Elev. (ft)	998.20	907.36	916.17	916.17	921.68	911.70	911.70	932.12	932.12	932.12
Depth to Water (ft)	5.40	8.35	15.76	15.92	19.45	9.85	9.54	31.91	31.47	31.10
Groundwater Elevation (ft)	992.80	899.01	900.41	900.25	902.23	901.85	902.16	900.21	900.65	901.02
Conductivity (μmho/cm)	33,500	1,141	428	973	449	761	701	189	360	390
Dissolved Oxygen (ppm)	0.72	3.41	0.49	1.64	2.29	3.45	3.45	5.84	4.2	5.01
Iron (++)	.	.	<	0.03	.	0.02	0	.	.	.
Manganese (++)	.	.	<	1.2	.	0.3	0.8	.	.	.
Oxidation/Reduction (mV)	212	109	62	133	112	235	160	191	207	294
Temperature (degrees C)	18.3	11.9	14.5	21.6	13.7	13.7	24.4	14.2	14.6	17.4
Turbidity (NTU)	.	.	2	0	.	4	42	14	6	4
pH	5.51	7.04	7.55	7.51	7.71	7.04	7.04	7.44	8.04	6.94
Miscellaneous Analytes										
Dissolved Solids (mg/L)	50,700	619	310	281	220	534	454	178	191	275
Suspended Solids (mg/L)	14	<	<	<	<	<	167	<	<	<
Turbidity (NTU)	1.02	0.403	.	.	1.07	.	.	.	.	.
Major Ions (mg/L)										
Calcium	10,500	172	55.8	59.8	47.5	120	256	57.7	64.6	73.3
Magnesium	1,260	11.7	26.9	27.8	19	21.9	21.4	3.22	3.33	4.26
Potassium	<	2.47	2.1	2.35	2.06	5.12	7.73	2.42	2.47	2.62
Sodium	383	36	7.07	7.26	10.6	6.91	8.03	1.15	1.14	1.31
Bicarbonate	546	339	235	224	181	.	.	171	192	189
Carbonate	<	<	<	<	<	.	.	<	<	<
Chloride	121	147	16.5	21.3	15.3	.	.	1.4	1.8	1.5
Fluoride	3.94	<	0.12	0.12	0.157	.	.	<	<	<
Nitrate as N	9,100	<	0.75	<	1.3	.	.	0.73	0.77	0.85
Sulfate	2.65	24.2	20.7	20.1	18.6	.	.	4.1	5.2	5.6
Charge balance error (%)	-1.5	-1.1	-2.7	1.3	-1.0	.	.	-4.9	-5.8	1.7
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	2.68	<	<	<
Antimony	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	84.1	0.281	0.177	0.182	0.047	0.0849	0.637	0.0291	0.0297	0.0316
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	0.12	<	<	<
Cadmium	0.966	<	<	<	<	<	0.0052	<	<	<
Chromium	<	<	<	<	<	<	0.008	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	0.0486	<	<	<
Iron	<	<	<	<	<	0.113	5.27	0.188	0.111	<
Lead	0.00667	<	<	<	<	<	0.042	<	<	<
Lithium	0.693	<	<	<	<	<	0.0124	<	<	<
Manganese	75.4	0.045	<	<	<	0.428	14.7	0.0063	<	<
Mercury	0.0027	<	.	.	<	.	.	.	.	.
Nickel	1.99	<	<	<	<	<	0.0385	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	64.8	0.598	0.535	0.549	0.14	0.458	0.503	0.0779	0.0819	0.0924
Thallium	0.00154	<	<	<	<	<	<	<	<	<
Uranium	0.0218	0.00159	<	<	0.00214	0.415	0.469	.	.	.
Zinc	<	<	<	<	<	<	0.222	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-170						GW-171	GW-172	GW-192	
Functional Area	EXP-UV						EXP-UV	EXP-UV	B4	
Date Sampled	03/07/06		05/23/06		08/02/06		03/08/06	03/08/06	05/11/06	05/11/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type		Dup		Dup		Dup				Dup
Field Measurements										
Time Sampled	10:00	.	9:00	.	11:20	.	13:20	9:25	10:30	10:30
Measuring Point Elev. (ft)	932.64	.	932.64	.	932.64	.	920.72	926.69	1,008.83	1,008.83
Depth to Water (ft)	35.72	.	35.86	.	36.06	.	7.88	17.03	5.91	5.91
Groundwater Elevation (ft)	896.92	.	896.78	.	896.58	.	912.84	909.66	1,002.92	1,002.92
Conductivity (μmho/cm)	817	.	2,280	.	1,501	.	363	1,317	600	600
Dissolved Oxygen (ppm)	0.39	.	0.3	.	0.32	.	0.75	0.88	0.9	0.9
Iron (++)	.	.	.	.	.	.	0.09	2.39	.	.
Manganese (++)	.	.	.	.	.	.	4.8	0.7	.	.
Oxidation/Reduction (mV)	-54	.	151	.	-97	.	-5	-96	173	173
Temperature (degrees C)	12.9	.	14.2	.	16.5	.	17.1	17	16.6	16.6
Turbidity (NTU)	8	.	14	.	5	.	11	2	.	.
pH	12.19	.	12.11	.	11.32	.	6.58	7.17	6.47	6.47
Miscellaneous Analytes										
Dissolved Solids (mg/L)	358	327	311	388	324	324	187	359	334	333
Suspended Solids (mg/L)	7	5.9	27.1	18.8	12.5	14.3	5.8	<	4	4
Turbidity (NTU)	.	.	.	.	.	.	.	.	24	22.9
Major Ions (mg/L)										
Calcium	106	103	105	104	114	115	.	.	96.3	93.6
Magnesium	2.39	1.94	6.2	7.12	2.37	2.56	.	.	8.53	8.52
Potassium	7.82	7.55	6.41	6.37	7.58	7.66	.	.	<	<
Sodium	5.21	5.13	4.63	4.6	5.41	5.46	.	.	8.64	8.62
Bicarbonate	<	<	<	<	<	<	.	.	261	259
Carbonate	268	151	76.8	67.2	46.8	62.4	.	.	<	<
Chloride	8	8.3	7.2	6.9	6.9	6.9	.	.	27.7	26.7
Fluoride	0.11	0.1	0.11	0.11	0.1	0.11	.	.	0.138	0.132
Nitrate as N	0.29	0.3	0.26	0.26	0.3	0.2	.	.	<	<
Sulfate	5.8	5.7	6	5.8	5.5	5.6	.	.	5.7	5.67
Charge balance error (%)	-56.4 R	25.4 R	-41.4 R	57 R	30.2 R	60.3 R	.	.	-2.0	-2.6
Trace Metals (mg/L)										
Aluminum	0.26	<	0.754	0.869	0.272	0.292	.	.	<	<
Antimony	<	<	<	<	<	<	.	.	<	<
Arsenic	<	<	<	<	<	<	.	.	<	<
Barium	0.112	0.11	0.106	0.108	0.117	0.118	.	.	0.147	0.142
Beryllium	<	<	<	<	<	<	.	.	<	<
Boron	<	<	<	<	<	<	.	.	<	<
Cadmium	<	<	<	<	<	<	.	.	<	<
Chromium	<	<	<	<	<	<	.	.	<	<
Cobalt	<	<	<	<	<	<	.	.	<	<
Copper	<	<	<	<	<	<	.	.	<	<
Iron	0.836	0.641	1.16	1.36	0.713	0.907	.	.	4.55	3.47
Lead	<	<	0.0034	0.0037	<	<	.	.	0.0019	<
Lithium	0.0274	0.027	0.0241	0.0244	0.0243	0.0248	.	.	0.017	0.017
Manganese	0.0055	<	0.0092	0.0104	0.0055	0.0068	.	.	1.98	1.82
Mercury	.	.	.	.	.	.	.	.	<	<
Nickel	<	<	<	<	<	<	.	.	<	<
Selenium	<	<	<	<	<	<	.	.	<	<
Strontium	0.415	0.411	0.381	0.386	0.44	0.445	.	.	0.155	0.155
Thallium	<	<	<	<	<	<	.	.	<	<
Uranium	.	.	.	.	.	.	.	.	<	<
Zinc	<	<	<	<	<	<	.	.	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-193		GW-204	GW-220		GW-223		GW-230	GW-232		
Functional Area	T2331		T0134	NHP		NHP		EXP-UV	EXP-UV		
Date Sampled	01/05/06	07/06/06	11/09/06	06/21/06	11/06/06	03/06/06	08/07/06	03/08/06	03/07/06	05/23/06	08/03/06
Program	BJC	BJC	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type											
Field Measurements											
Time Sampled	10:05	14:35	8:55	9:30	9:05	13:30	15:00	12:55	13:45	12:55	10:50
Measuring Point Elev. (ft)	934.17	934.17	958.74	915.64	915.64	911.62	911.62	923.11	931.39	931.39	931.39
Depth to Water (ft)	8.86	9.55	8.65	15.68	15.64	9.95	9.92	13.59	35.11	35.30	35.61
Groundwater Elevation (ft)	925.31	924.62	950.09	899.96	900.00	901.67	901.70	909.52	896.28	896.09	895.78
Conductivity (µmho/cm)	1,282	342	185	539	575	1,182	1,065	1,440	545	1,026	914
Dissolved Oxygen (ppm)	4.34	1.79	3.14	1.71	0.02	0.92	1.26	0.4	0.97	0.59	0.35
Iron (++)	.	.	.	.	.	0.1	0.07	0.59	.	.	.
Manganese (++)	.	.	.	.	.	0.8	0.3	0.8	.	.	.
Oxidation/Reduction (mV)	-121	-209	95	46	45	-20	-7	-41	-194	-208	-129
Temperature (degrees C)	12	26.7	17.2	17.4	15.7	16	21.1	16.7	13.3	17.4	18.3
Turbidity (NTU)	10	12	.	.	.	1	9	3	1	2	1
pH	7.6	7.35	7.75	7.51	7.4	7.28	7.26	6.81	9.78	9.83	9.31
Miscellaneous Analytes											
Dissolved Solids (mg/L)	.	.	119	295	309	359	319	605	567	523	511
Suspended Solids (mg/L)	.	.	<	2	3	<	<	<	<	<	<
Turbidity (NTU)	.	.	0.401	2.61	4.21	.	.	.	.	.	.
Major Ions (mg/L)											
Calcium	.	.	32.7	60.4	61.4	85.1	85.1	.	1.35	1.38	1.49
Magnesium	.	.	5.31	25.9	26.2	12.3	12.4	.	1.23	1.03	1.08
Potassium	.	.	<	2.39	2.59	1.66	1.92	.	3.28	3.18	5.13
Sodium	.	.	1.08	5.29	5.37	9.99	10.2	.	221	214	208
Bicarbonate	.	.	92.1	229	242	244	224	.	320	262	152
Carbonate	.	.	<	<	<	<	<	.	147	178	80.8
Chloride	.	.	0.58	15.9	16.7	21.9	20.5	.	11.6	9.5	10.3
Fluoride	.	.	0.454	<	<	0.16	0.18	.	2.3	2.4	2.3
Nitrate as N	.	.	0.221	0.628	0.601	<	<	.	<	0.31	<
Sulfate	.	.	19.5	16.8	16.4	36.7	34.5	.	19.1	15.9	4.3
Charge balance error (%)	.	.	-4.2	0.1	-1.5	-4.4	-0.2	.	-1.9	-0.3	28.7 R
Trace Metals (mg/L)											
Aluminum	.	.	<	0.226	<	<	<	.	<	<	<
Antimony	.	.	0.00284	<	<	<	<	.	<	<	<
Arsenic	.	.	<	<	<	<	<	.	<	<	<
Barium	.	.	0.047	0.108	0.109	0.263	0.264	.	0.0181	0.0173	0.0178
Beryllium	.	.	<	<	<	<	<	.	<	<	<
Boron	.	.	<	<	<	<	<	.	1.44	1.4	1.32
Cadmium	.	.	0.00302	<	<	<	<	.	<	<	<
Chromium	.	.	<	<	<	<	<	.	<	<	<
Cobalt	.	.	<	<	<	<	<	.	<	<	<
Copper	.	.	<	<	<	<	<	.	<	<	<
Iron	.	.	<	0.128	0.132	0.273	0.271	.	<	0.0731	<
Lead	.	.	<	<	0.000675	<	<	.	<	<	<
Lithium	.	.	0.0376	<	<	<	<	.	0.208	0.192	0.175
Manganese	.	.	0.00666	<	0.00823	0.564	0.548	.	<	<	<
Mercury	.	.	<	<	<	.	.	.	.	.	.
Nickel	.	.	<	<	<	<	<	.	<	<	<
Selenium	.	.	<	<	<	<	<	.	<	<	<
Strontium	.	.	0.0717	0.439	0.442	0.228	0.229	.	0.483	0.465	0.454
Thallium	.	.	<	<	<	<	<	.	<	<	<
Uranium	.	.	0.0355	<	<	0.0291	0.0379	.	.	.	.
Zinc	.	.	<	<	<	<	<	.	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-240		GW-251	GW-253	GW-265		GW-269		GW-274	GW-275	GW-281
Functional Area	NHP		S2	S2	SY		SY		SY	SY	FF
Date Sampled	01/18/06		05/16/06	03/09/06	06/01/06	10/10/06	06/01/06	10/10/06	03/27/06	03/27/06	05/22/06
Program	GWPP	GWPP	GWPP	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC
Sample Type		Dup									
Field Measurements											
Time Sampled	10:00	10:00	8:50	10:15	9:35	9:50	10:50	11:35	9:40	11:00	10:28
Measuring Point Elev. (ft)	922.90	922.90	1,003.80	1,004.24	1,032.68	1,032.68	1,027.81	1,027.81	995.60	995.36	946.10
Depth to Water (ft)	19.89	19.89	16.59	9.83	11.24	12.16	17.40	19.49	3.83	3.66	6.36
Groundwater Elevation (ft)	903.01	903.01	987.21	994.41	1,021.44	1,020.52	1,010.41	1,008.32	991.77	991.70	939.74
Conductivity (μmho/cm)	468	468	879	4,580	364	376	140	120	13,890	24,600	593
Dissolved Oxygen (ppm)	1.92	1.92	0.43	1.16	1.8	0.57	1.59	3.11	2.1	1.89	2.35
Iron (++)	.	.	.	0.06	.	.	.	.	.	.	.
Manganese (++)	.	.	.	59	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	75	75	236	385	168	121	191	162	300	296	112
Temperature (degrees C)	14.4	14.4	14.5	14.7	17.6	19.3	20.2	21.3	11.9	16.3	15.6
Turbidity (NTU)	.	.	.	6	.	.	.	.	.	.	203
pH	7.52	7.52	6.25	5.41	6.48	6.46	6	5.81	5.67	5.76	6.5
Miscellaneous Analytes											
Dissolved Solids (mg/L)	235	242	494	4,810	200	197	107	98	13,700	41,600	.
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<	4	<	.
Turbidity (NTU)	2.57	2.46	1.78	.	0.194	0.362	0.148	1.6	3.18	0.255	.
Major Ions (mg/L)											
Calcium	50.2	50.2	105	522	43.2	44.3	17.1	11.3	2,810	9,470	.
Magnesium	17.1	17	12.7	135	7.52	7.09	2.21	1.83	423	1,320	.
Potassium	2.13	2.08	3.12	9.04	<	<	<	<	<	30.8	.
Sodium	11.5	11.5	13.3	139	13.4	13	8.6	9.27	266	114	.
Bicarbonate	187	187	167	57	121	122	62.8	47.3	686	70.1	.
Carbonate	<	<	<	<	<	<	<	<	<	<	.
Chloride	16.5	16.2	7.02	119	24.1	22.9	4.48	3.66	62.3	47.8	.
Fluoride	0.172	0.174	0.944	5.5	0.101	0.112	<	<	<	<	.
Nitrate as N	1.4	1.41	56.3	476	0.113	0.0971	0.612	0.623	2,290	8,004	.
Sulfate	21.3	21.6	16.4	88.8	19.1	19.2	6.12	6.01	<	<	.
Charge balance error (%)	-3.1	-3.2	-6.7	3.3	-2.2	-2.0	-4.8	-4.2	2.1	1.1	.
Trace Metals (mg/L)											
Aluminum	<	0.202	<	3.93	<	<	<	<	<	<	.
Antimony	<	<	<	<	<	<	<	<	<	<	.
Arsenic	<	<	<	<	<	<	<	<	<	<	.
Barium	0.0425	0.0427	0.109	0.312	0.258	0.251	0.0542	0.0463	17.2	139	.
Beryllium	<	<	<	0.0134	<	<	<	<	<	<	.
Boron	<	<	<	0.359	<	<	<	<	<	<	.
Cadmium	<	<	0.112	4.15	<	<	<	<	<	<	.
Chromium	<	<	<	<	<	<	<	<	<	<	.
Cobalt	<	<	<	0.293	<	<	<	<	<	<	.
Copper	<	<	0.249	66.8	<	<	<	<	<	<	.
Iron	<	0.0723	<	0.109	<	<	<	0.0907	<	<	.
Lead	<	<	<	0.0276	<	0.000895	<	0.00056	<	0.00096	.
Lithium	0.0106	0.0107	<	<	<	<	<	<	<	0.368	.
Manganese	<	<	3.8	47.8	<	0.0105	<	0.0118	71.2	1.74	.
Mercury	<	<	<	.	<	<	<	<	<	<	.
Nickel	<	<	0.03	2.53	<	<	<	<	0.179	0.168	.
Selenium	<	<	<	<	<	<	<	<	<	<	.
Strontium	0.0729	0.073	0.185	1.09	0.156	0.151	0.0402	0.0302	8.45	70.1	.
Thallium	<	<	0.00172	<	<	<	<	<	<	<	.
Uranium	0.0038	0.00405	0.00308	<	<	<	<	<	0.0141	0.00148	.
Zinc	<	<	0.055	6.36	<	<	<	<	<	<	.

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-332	GW-336		GW-337	GW-380	GW-381	GW-382		GW-383	
Functional Area	WCPA	WCPA		WCPA	NHP	NHP	NHP		NHP	
Date Sampled	03/08/06	03/08/06		03/07/06	05/31/06	08/02/06	03/07/06	08/08/06	06/21/06	11/06/06
Program	GWPP	GWPP	GWPP	GWPP	BJC	GWPP	BJC	BJC	GWPP	GWPP
Sample Type			Dup							
Field Measurements										
Time Sampled	9:10	10:35	10:35	10:50	12:58	9:35	13:40	10:20	8:20	10:00
Measuring Point Elev. (ft)	981.24	985.92	985.92	987.48	913.55	913.36	913.17	913.17	908.77	908.77
Depth to Water (ft)	11.32	11.39	11.39	11.48	10.91	11.02	10.93	10.87	9.54	9.13
Groundwater Elevation (ft)	969.92	974.53	974.53	976.00	902.64	902.34	902.24	902.30	899.23	899.64
Conductivity (μmho/cm)	174	380	380	565	456	726	698	1,411	633	665
Dissolved Oxygen (ppm)	1.52	0.93	0.93	1.99	5.31	0.74	1.45	3.77	0.97	0.19
Iron (++)	.	.	.	.	.	.	0.01	.	.	.
Manganese (++)	.	.	.	.	.	.	0.1	.	.	.
Oxidation/Reduction (mV)	215	171	171	155	139	129	266	174	-60	-46
Temperature (degrees C)	14.6	15.9	15.9	13.8	17.3	20.5	14.9	21.9	20.5	18.2
Turbidity (NTU)	.	.	.	.	3	.	11	97	.	.
pH	6.16	6.57	6.57	6.95	7.02	7.36	7.25	7.24	7.19	7.1
Miscellaneous Analytes										
Dissolved Solids (mg/L)	146	206	216	307	247	361	460	400	334	373
Suspended Solids (mg/L)	<	<	<	<	<	13	<	<	5	<
Turbidity (NTU)	0.289	0.681	0.272	0.569	.	179	.	.	17.3	6.12
Major Ions (mg/L)										
Calcium	33.1	61.9	63.2	96.4	44.7	92.1	82	84.6	96.3	92.5
Magnesium	4.6	6.14	6.19	8.91	18.3	23.4	24.3	23.5	11.7	11.5
Potassium	<	<	<	<	1.52	2.39	3.8	3.54	2.66	2.99
Sodium	7.34	6.49	6.47	5.11	14.2	18	20.6	20.9	11.2	12.3
Bicarbonate	85.3	166	166	248	181	261	283	280	235	251
Carbonate	<	<	<	<	<	<	<	<	<	<
Chloride	11.8	10.8	10.9	16.7	17	66	68.2	74.1	38.6	39.4
Fluoride	<	<	<	<	0.19	<	0.16	0.16	<	<
Nitrate as N	1.94	1.68	1.65	2.24	1.6	<	0.15	0.18	<	<
Sulfate	11.6	9.34	9.16	13.4	19	0.46	4	4.3	17.2	18.3
Charge balance error (%)	-1.4	-0.8	0.1	-0.9	-2.5	1.9	-4.0	-4.3	1.4	-2.6
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	<	<	<
Antimony	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.134	0.185	0.184	0.218	0.0293	0.28	0.573	0.569	0.628	0.615
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	0.108	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<	<
Iron	<	<	<	<	0.385	11	1.67	1.63	2.8	0.793
Lead	<	0.00098	0.000735	<	<	<	<	<	<	0.00109
Lithium	<	<	<	<	<	<	<	<	0.0126	0.0155
Manganese	<	<	<	0.00758	0.0144	0.434	0.0242	0.0271	0.191	0.107
Mercury	<	<	<	<	.	<	.	.	<	<
Nickel	<	<	<	<	0.112	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.133	0.168	0.168	0.247	0.0488	0.18	0.312	0.319	0.425	0.424
Thallium	<	<	<	<	<	<	<	<	<	<
Uranium	<	<	<	0.00134	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 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-617	GW-618	GW-619	GW-620	GW-633
Functional Area	EXP-I				EXP-I		EXP-E	EXP-E	FTF	FTF	RG
Date Sampled	01/05/06		07/06/06		01/05/06	07/06/06	05/16/06	03/09/06	05/15/06	05/15/06	05/10/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	GWPP	BJC	GWPP	GWPP	GWPP
Sample Type		Dup		Dup							
Field Measurements											
Time Sampled	14:00	.	9:40	.	13:55	13:20	10:05	14:30	8:45	9:55	8:30
Measuring Point Elev. (ft)	919.06	.	919.06	.	919.59	919.59	985.28	985.14	1,015.42	1,015.57	996.43
Depth to Water (ft)	11.26	.	10.95	.	13.93	13.92	13.10	13.22	24.21	24.32	2.54
Groundwater Elevation (ft)	907.80	.	908.11	.	905.66	905.67	972.18	971.92	991.21	991.25	993.89
Conductivity (µmho/cm)	390	.	364	.	1,552	452	254	509	163	602	7,320
Dissolved Oxygen (ppm)	0.7	.	0.73	.	3.02	3.43	6	0.82	3.9	3.24	0.51
Iron (++)	.	.	.	.	.	.	.	<	.	.	.
Manganese (++)	.	.	.	.	.	.	.	0.4	.	.	.
Oxidation/Reduction (mV)	178	.	119	.	97	108	212	223	136	10	265
Temperature (degrees C)	15	.	18.8	.	14.2	21.9	16.2	18.8	15	14.1	18.7
Turbidity (NTU)	9	.	3	.	5	9	.	19	.	.	.
pH	7.5	.	7.05	.	7.61	7.3	5.92	7.1	8.7	11.74	5.3
Miscellaneous Analytes											
Dissolved Solids (mg/L)	.	.	.	.	.	.	138	350	106	293	6,150
Suspended Solids (mg/L)	.	.	.	.	.	.	<	<	5	<	<
Turbidity (NTU)	.	.	.	.	.	.	0.332	.	2.45	0.617	0.515
Major Ions (mg/L)											
Calcium	89.3	86.6	84.1	84.5	81	82.6	27.3	99.7	16.7	107	1220
Magnesium	21.1	20.4	19.7	19.8	42	42.1	5.82	8.86	3.87	<	121
Potassium	2.68	2.56	2.4	2.42	3.4	3.33	<	3.92	16.2	10.9	6.81
Sodium	16.3	15.9	14.1	14.2	6.1	6.5	7.85	13.9	2.04	2.2	81
Bicarbonate	262	270	255	250	296	285	66.5	320	75.6	<	306
Carbonate	<	<	<	<	<	<	<	<	<	<	<
Chloride	28.1	30.5	25.5	25	19.5	22.5	6.41	9.7	2.81	2.85	42.7
Fluoride	<	<	0.14	0.13	0.11	0.21	<	0.28	<	0.137	<
Nitrate as N	0.15	0.18	0.15	0.14	9.2	12.9	2.76	<	1.23	1.15	926
Sulfate	28.6	29.3	28.4	28.5	55.5	57.9	27.9	16.7	5.33	8.33	<
Charge balance error (%)	2.5	-0.9	0.5	1.7	-2.7	3.1	-2.3	-4.6	-4.0	-1.1	0.7
Trace Metals (mg/L)											
Aluminum	<	<	<	<	<	<	<	<	0.989	1.97	<
Antimony	<	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<	<
Barium	0.0497	0.0479	0.042	0.0423	0.185	0.185	0.0346	0.0475	0.00501	0.0241	5.57
Beryllium	<	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	0.158	0.109	<	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<	<
Chromium	0.01	0.0102	<	<	<	<	<	<	0.0117	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<	<	<
Iron	0.351	0.396	0.156	0.172	<	<	<	0.143	<	<	<
Lead	<	<	<	<	<	<	<	<	0.00244	<	0.00108
Lithium	<	<	<	<	<	<	<	<	<	0.0184	0.148
Manganese	0.352	0.421	0.253	0.248	0.0102	0.0099	0.0334	0.935	<	<	3.11
Mercury	.	.	.	.	.	.	<	.	<	<	<
Nickel	0.0184	0.0206	0.0203	0.0206	<	<	<	<	<	<	0.232
Selenium	<	<	<	<	<	<	<	<	<	<	<
Strontium	0.168	0.163	0.156	0.157	0.529	0.542	0.0473	0.209	0.0908	0.324	2.94
Thallium	<	<	<	<	<	<	<	<	<	<	<
Uranium	0.0853	0.0886	0.0809	0.08	0.00461	0.00459	<	<	0.000515	<	0.00076
Zinc	<	<	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-656		GW-658	GW-686		GW-690	GW-691	GW-692	GW-698		
Functional Area	T0134		FF	CPT		CPT	CPT	CPT	B8110		
Date Sampled	11/14/06	11/14/06	05/24/06	06/06/06	10/19/06	11/14/06	11/16/06	11/30/06	05/23/06		10/19/06
Program	GWPP	GWPP	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type		Dup								Dup	
Field Measurements											
Time Sampled	10:45	10:45	10:08	11:30	10:40	9:45	8:50	8:55	8:55	8:55	8:50
Measuring Point Elev. (ft)	954.79	954.79	944.81	963.76	963.76	967.36	968.59	964.38	970.09	970.09	970.09
Depth to Water (ft)	10.29	10.29	11.96	12.82	12.68	10.47	11.66	9.59	35.05	35.05	38.84
Groundwater Elevation (ft)	944.50	944.50	932.85	950.94	951.08	956.89	956.93	954.79	935.04	935.04	931.25
Conductivity (µmho/cm)	647	647	454	972	1,023	1,389	2,360	876	1,510	1,510	1,820
Dissolved Oxygen (ppm)	0.21	0.21	1.83	0.66	0.27	0.52	0.04	0.48	0.15	0.15	0.25
Iron (++)	.	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	-21	-21	-40	-14	-1	138	145	171	155	155	167
Temperature (degrees C)	21.5	21.5	18.8	18.8	19.8	17.5	18.2	19.6	17.4	17.4	17.8
Turbidity (NTU)	.	.	9	.	.	.	.	.	.	.	.
pH	6.74	6.74	6.31	6.68	6.56	6.78	6.31	7.17	6.91	6.91	6.9
Miscellaneous Analytes											
Dissolved Solids (mg/L)	378	375	.	679	640	1,030	1,640	568	1,120	1,140	1,220
Suspended Solids (mg/L)	2	2	.	1	<	4	<	16	5	5	5
Turbidity (NTU)	6.09	6.18	.	7.31	3.72	2.49	0.341	58.7	7.09	7.17	6.56
Major Ions (mg/L)											
Calcium	105	98.8	.	161	168	252	366	128	194	186	240
Magnesium	5.61	5.46	.	25.1	24.3	30.8	60.4	27.5	63.3	61.2	71.1
Potassium	2.3	2.12	.	2.42	2.48	4.74	8.23	4.99	3.22	3.05	3.59
Sodium	13	12.6	.	14.2	13.8	7.54	10	18.4	21.2	20.4	26.4
Bicarbonate	217	218	.	322	354	293	195	206	274	286	287
Carbonate	<	<	.	<	<	<	<	<	<	<	<
Chloride	37.2	36.4	.	14.2	14.5	58.9	11.8	12.3	17.5	17.5	21.5
Fluoride	<	<	.	<	<	<	0.111	0.751	<	<	<
Nitrate as N	<	<	.	<	0.337	3.72	0.743	0.201	122	118	173
Sulfate	52	50.8	.	198	410	374	947	186	59.7	60.2	56.6
Charge balance error (%)	-1.1	-3.7	.	-0.8	-18.5	0.0	-0.3	6.6	-0.1	-1.9	-2.1
Trace Metals (mg/L)											
Aluminum	<	<	.	<	<	<	<	2.94	0.34	0.291	0.44
Antimony	<	<	.	<	<	<	<	<	<	<	<
Arsenic	<	<	.	<	<	<	<	<	<	<	<
Barium	0.15	0.145	.	0.0723	0.0942	0.0267	0.0158	0.0916	0.186	0.179	0.241
Beryllium	<	<	.	<	<	<	<	<	<	<	<
Boron	<	<	.	<	<	<	0.331	0.104	<	<	<
Cadmium	<	<	.	<	<	0.00264	<	0.00299	<	<	<
Chromium	0.0209	<	.	0.0112	0.011	<	<	0.0154	<	<	<
Cobalt	<	<	.	<	<	<	<	<	<	<	<
Copper	<	<	.	<	<	<	<	<	<	<	<
Iron	0.949	0.887	.	1.32	3.9	0.0623	<	4.09	0.224	0.214	0.334
Lead	<	0.00204	.	<	0.00496	0.000995	<	0.00533	<	<	<
Lithium	<	<	.	<	<	0.0113	<	0.0152	<	<	<
Manganese	0.467	0.444	.	1.06	2.16	0.0117	5.98	0.369	0.0839	0.077	0.277
Mercury	<	<	.	<	<	<	<	0.00139	0.000734	0.000728	0.000888
Nickel	0.0335	0.0305	.	<	<	0.00655	0.0318	0.00948	<	<	<
Selenium	<	<	.	<	<	<	<	<	<	<	<
Strontium	0.197	0.192	.	0.395	0.388	0.365	0.706	0.324	0.56	0.54	0.742
Thallium	<	<	.	<	<	<	<	0.000515	<	<	<
Uranium	<	<	.	0.00077	0.00085	<	0.00079	0.000775	0.00152	0.00118	0.00112
Zinc	<	<	.	<	<	<	<	0.0589	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-700	GW-722-06	GW-722-10	GW-722-14				GW-722-17			
Functional Area	B8110	EXP-J	EXP-J	EXP-J				EXP-J			
Date Sampled	11/09/06	08/08/06	08/10/06	03/13/06	05/31/06	08/15/06	10/30/06	03/13/06	06/01/06	08/15/06	10/30/06
Program	GWPP	GWPP	GWPP	BJC	BJC	GWPP	BJC	BJC	BJC	GWPP	BJC
Sample Type											
Field Measurements											
Time Sampled	9:55	10:45	9:15	15:10	15:00	7:40	13:25	16:20	9:30	8:55	13:45
Measuring Point Elev. (ft)	960.18	953.71	953.71	953.71	953.71	953.71	953.71	953.71	953.71	953.71	953.71
Depth to Water (ft)	19.17	56.46	55.1	.	.	55.96	.	.	.	55.93	.
Groundwater Elevation (ft)	941.01	897.25	898.61	.	.	897.75	.	.	.	897.78	.
Conductivity (μmho/cm)	656	850	742	418	538	509	308	330	527	528	372
Dissolved Oxygen (ppm)	0.29	.	.	13.72	10.84	.	7.42	13.3	9.96	.	8.33
Iron (++)	.	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	132	.	.	206	243	.	65	186	156	.	81
Temperature (degrees C)	18.1	19.1	22.5	19.8	26.5	18	18.7	17.1	19.4	19.1	19.4
Turbidity (NTU)	.	.	.	2.29	5	.	5	11.2	6	.	5
pH	6.68	7.7	7.7	9.1	7.56	7.3	7.76	7.79	866	7.4	7.78
Miscellaneous Analytes											
Dissolved Solids (mg/L)	371	630	483	339	316	304	.	293	317	339	.
Suspended Solids (mg/L)	<	3	1	<	<	4	.	<	<	7	.
Turbidity (NTU)	0.395	12	0.381	.	.	1.82	.	.	.	2.59	.
Major Ions (mg/L)											
Calcium	101	17	29	56.7	59.3	57.5	.	50.8	43.5	42.1	.
Magnesium	8.73	12.3	19.9	27.8	27.7	27	.	27.3	24.9	25.7	.
Potassium	<	4.82	3.84	1.71	2.06	<	.	2.09	2.1	<	.
Sodium	12.6	164	107	14.9	14.5	14.7	.	29.4	32.3	34.2	.
Bicarbonate	235	255	222	538 Q	252	259	.	316	219	208	.
Carbonate	<	<	<	<	<	<	.	<	20.4	<	.
Chloride	11.5	93.2	77.2	10.2	9.8	9.03	.	27.8	32.1	33.9	.
Fluoride	<	1.07	0.957	0.24	0.23	0.195	.	0.66	0.71	0.65	.
Nitrate as N	0.233	<	<	0.54	<	0.479	.	<	<	0.0971	.
Sulfate	81.4	53.9	53.2	16.4	14.7	16	.	28.4	30.3	31.6	.
Charge balance error (%)	-3.3	1.2	0.4	-32.7 R	2.5	-0.7	.	-11.7	-5.7	-1.0	.
Trace Metals (mg/L)											
Aluminum	<	<	<	<	<	<	.	<	<	<	.
Antimony	<	<	<	<	<	<	.	<	<	<	.
Arsenic	<	<	<	<	<	<	.	<	<	<	.
Barium	0.0441	0.0316	0.0587	0.123	0.118	0.107	.	0.121	0.113	0.107	.
Beryllium	<	<	<	<	<	<	.	<	<	<	.
Boron	0.102	0.709	0.454	0.12	0.124	0.116	.	0.149	0.144	0.147	.
Cadmium	<	<	<	<	<	<	.	<	<	<	.
Chromium	<	0.0129	<	<	<	<	.	<	<	<	.
Cobalt	<	<	<	<	<	<	.	<	<	<	.
Copper	<	<	<	<	<	<	.	<	<	<	.
Iron	<	0.193	0.232	<	<	<	.	0.154	<	0.0521	.
Lead	0.0026	<	<	<	<	<	.	<	<	<	.
Lithium	<	0.119	0.0865	0.0207	0.018	0.015	.	0.0352	0.0365	0.0303	.
Manganese	0.56	0.00596	<	<	<	<	.	<	<	<	.
Mercury	<	<	<	.	.	<	.	.	.	<	.
Nickel	<	<	<	<	<	<	.	<	<	<	.
Selenium	<	<	<	<	<	<	.	<	<	<	.
Strontium	0.146	3.75	3.05	0.733	0.692	0.682	.	1.16	1.19	1.19	.
Thallium	<	<	<	<	<	<	.	<	<	<	.
Uranium	0.00063	<	<	<	<	<	.	<	<	<	.
Zinc	<	0.065	0.211	<	0.195	<	.	0.406	0.0523	<	.

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-722-20						GW-722-22				GW-722-26
Functional Area	EXP-J						EXP-J				EXP-J
Date Sampled	03/14/06	05/31/06		08/14/06	10/30/06		03/14/06	05/31/06	08/10/06	10/30/06	08/09/06
Program	BJC	BJC	BJC	GWPP	BJC	BJC	BJC	BJC	GWPP	BJC	GWPP
Sample Type			Dup			Dup					
Field Measurements											
Time Sampled	9:25	14:00	.	7:30	13:00	.	9:50	10:10	10:00	10:55	8:35
Measuring Point Elev. (ft)	953.71	953.71	.	953.71	953.71	.	953.71	953.71	953.71	953.71	953.71
Depth to Water (ft)	.	.	.	55.63	.	.	.	.	55.68	.	47.10
Groundwater Elevation (ft)	.	.	.	898.08	.	.	.	.	898.03	.	906.61
Conductivity (μmho/cm)	425	513	.	487	294	.	313	506	494	297	395
Dissolved Oxygen (ppm)	10.51	8.02	.	.	7.72	.	9.72	5.84	.	9.1	.
Iron (++)	.	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	207	156	.	.	45	.	207	210	.	119	.
Temperature (degrees C)	14.1	24.5	.	18.2	20.2	.	14.6	24.3	19.9	18.9	19.3
Turbidity (NTU)	13.9	6	.	.	18	.	2.84	7	.	17	.
pH	8.83	7.73	.	7.4	7.83	.	7.9	7.52	7.4	7.45	7.4
Miscellaneous Analytes											
Dissolved Solids (mg/L)	284	311	343	301	.	.	285	308	306	.	239
Suspended Solids (mg/L)	<	14.2	19.7	5	.	.	<	<	4	.	<
Turbidity (NTU)	.	.	.	0.289	.	.	.	.	1.31	.	9.79
Major Ions (mg/L)											
Calcium	48.1	53.2	54.7	48.5	.	.	49.2	59.6	59.3	.	53.5
Magnesium	26.1	28.4	28.5	27.5	.	.	24.4	29.3	28.4	.	20.4
Potassium	1.49	1.75	1.76	<	.	.	1.44	1.89	1.73	.	2.15
Sodium	14.8	14.5	14.7	15.1	.	.	11.7	12.7	13.2	.	2.55
Bicarbonate	236	235	235	237	.	.	252	250	255	.	210
Carbonate	<	<	<	<	.	.	<	<	<	.	<
Chloride	12	10	10.8	9.54	.	.	6.7	8.1	5.89	.	4.42
Fluoride	0.34	0.36	0.35	0.321	.	.	0.29	0.28	0.247	.	1.05
Nitrate as N	0.028	<	<	0.305	.	.	0.29	0.32	0.319	.	<
Sulfate	23.9	21.5	20.6	22	.	.	17.2	16.2	17	.	0.46
Charge balance error (%)	-3.2	2.0	2.8	-1.5	.	.	-5.8	3.3	2.3	.	1.4
Trace Metals (mg/L)											
Aluminum	<	<	<	<	.	.	<	<	<	.	<
Antimony	<	<	<	<	.	.	<	<	<	.	<
Arsenic	<	<	<	<	.	.	<	<	<	.	<
Barium	0.0884	0.0913	0.0952	0.083	.	.	0.0938	0.0989	0.095	.	0.224
Beryllium	<	<	<	<	.	.	<	<	<	.	<
Boron	0.103	<	0.103	0.107	.	.	<	<	0.111	.	<
Cadmium	<	<	<	<	.	.	<	<	<	.	<
Chromium	<	<	<	0.0101	.	.	<	<	<	.	<
Cobalt	<	<	<	<	.	.	<	<	<	.	<
Copper	<	<	<	<	.	.	<	0.0386	<	.	<
Iron	0.165	0.122	0.15	0.0834	.	.	0.135	<	0.0574	.	0.254
Lead	<	<	<	0.00056	.	.	<	<	<	.	0.00346
Lithium	0.0193	0.0175	0.0177	0.016	.	.	0.0171	0.0174	0.016	.	<
Manganese	<	<	<	<	.	.	<	<	<	.	0.088
Mercury	.	.	.	<	.	.	.	.	<	.	<
Nickel	<	<	<	<	.	.	<	<	<	.	<
Selenium	<	<	<	<	.	.	<	<	<	.	<
Strontium	0.677	0.639	0.65	0.635	.	.	0.65	0.668	0.686	.	1.22
Thallium	<	<	<	<	.	.	<	<	<	.	<
Uranium	<	<	<	<	.	.	<	<	<	.	<
Zinc	0.226	0.151	0.256	<	.	.	0.24	0.0696	<	.	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-722-30	GW-722-32	GW-722-33					GW-733		GW-744
Functional Area	EXP-J	EXP-J	EXP-J					EXP-J		GRIDK1
Date Sampled	08/09/06	08/09/06	03/14/06	05/31/06	08/10/06		10/30/06	01/04/06	07/06/06	01/11/06
Program	GWPP	GWPP	BJC	BJC	GWPP	GWPP	BJC	BJC	BJC	GWPP
Sample Type						Dup				
Field Measurements										
Time Sampled	7:35	9:30	10:45	9:10	8:00	8:00	10:30	13:35	15:40	9:15
Measuring Point Elev. (ft)	953.71	953.71	953.71	953.71	953.71	953.71	953.71	959.84	959.84	907.43
Depth to Water (ft)	49.9	47.88	.	.	48.01	48.01	.	58.52	59.43	5.82
Groundwater Elevation (ft)	903.81	905.83	.	.	905.70	905.70	.	901.32	900.41	901.61
Conductivity (μmho/cm)	298	445	255	529	416	416	322	208	356	465
Dissolved Oxygen (ppm)	.	.	9.4	7.55	.	.	9.01	2.4	0.57	0.15
Iron (++)	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	.	.	200	250	.	.	179	75	196	-232
Temperature (degrees C)	19.5	20.6	14.1	22.5	20.2	20.2	17.2	13	20.5	15.3
Turbidity (NTU)	.	.	1	8	.	.	5	6	1	.
pH	7.6	7.2	7.57	7.02	7.2	7.2	7.19	7.8	7.68	7.88
Miscellaneous Analytes										
Dissolved Solids (mg/L)	182	287	266	309	256	258	.	.	.	256
Suspended Solids (mg/L)	1	1	<	<	1	1	.	.	.	<
Turbidity (NTU)	1.98	2.21	.	.	1.21	1.22	.	.	.	0.349
Major Ions (mg/L)										
Calcium	41.8	77.4	71.6	87.6	64.3	64.2	.	.	.	41.4
Magnesium	15.2	13.7	11.9	14.9	13.8	14.1	.	.	.	11.2
Potassium	<	<	2.04	2.78	2.18	2.07	.	.	.	3.59
Sodium	0.754	3.06	2.81	3.65	2.58	2.62	.	.	.	35.2
Bicarbonate	149	234	241	242	209	215	.	.	.	215
Carbonate	<	<	<	<	<	<	.	.	.	<
Chloride	2.51	3.48	3.9	18	3.3	3.28	.	.	.	9.77
Fluoride	0.172	<	<	<	<	<	.	.	.	<
Nitrate as N	0.337	0.919	0.8	<	0.748	0.782	.	.	.	<
Sulfate	8.94	10.3	11.8	11.5	8.28	8.46	.	.	.	8.52
Charge balance error (%)	1.5	0.7	-5.1	2.1	0.2	-1.0	.	.	.	-1.5
Trace Metals (mg/L)										
Aluminum	<	0.466	<	<	<	<	.	.	.	<
Antimony	<	<	<	<	<	<	.	.	.	<
Arsenic	<	<	<	<	<	<	.	.	.	<
Barium	0.0485	0.0409	0.0354	0.0449	0.0351	0.0354	.	.	.	0.279
Beryllium	<	<	<	<	<	<	.	.	.	<
Boron	<	<	<	<	<	<	.	.	.	<
Cadmium	<	<	<	<	<	<	.	.	.	<
Chromium	0.0104	0.0112	<	<	<	<	.	.	.	<
Cobalt	<	<	<	<	<	<	.	.	.	<
Copper	<	<	<	<	<	<	.	.	.	<
Iron	<	0.453	<	<	<	<	.	.	.	<
Lead	0.00383	0.00768	<	<	<	<	.	.	.	<
Lithium	<	<	<	<	<	<	.	.	.	0.0272
Manganese	<	0.0103	<	<	<	<	.	.	.	0.0205
Mercury	<	<	.	.	<	<	.	.	.	<
Nickel	0.00525	<	<	<	<	<	.	.	.	<
Selenium	<	<	<	<	<	<	.	.	.	<
Strontium	0.0635	0.0866	0.076	0.0925	0.0607	0.0622	.	.	.	1.29
Thallium	<	<	<	<	<	<	.	.	.	0.000525
Uranium	0.00053	<	<	<	<	<	.	.	.	<
Zinc	0.0581	0.262	<	0.056	0.0556	0.0577	.	.	.	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-747	GW-748	GW-749	GW-762				GW-763	GW-769	
Functional Area	GRIDK2	GRIDK2	GRIDK2	GRIDJ3				GRIDJ3	GRIDG3	
Date Sampled	01/11/06	01/10/06	01/10/06	03/06/06		08/07/06		08/02/06	06/19/06	10/30/06
Program	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	GWPP	GWPP	GWPP
Sample Type					Dup		Dup			
Field Measurements										
Time Sampled	10:25	8:40	9:55	10:20	.	14:40	.	8:40	9:25	9:25
Measuring Point Elev. (ft)	920.96	921.36	921.34	915.56	.	915.56	.	915.03	944.43	944.43
Depth to Water (ft)	3.82	6.17	5.11	14.00	.	13.82	.	9.27	12.02	9.55
Groundwater Elevation (ft)	917.14	915.19	916.23	901.56	.	901.74	.	905.76	932.41	934.88
Conductivity (μmho/cm)	425	517	392	612	.	618	.	831	484	534
Dissolved Oxygen (ppm)	0.8	3.82	0.65	0.5	.	0.32	.	0.86	0.53	0.28
Iron (++)	.	.	.	<	.	0.01	.	.	.	.
Manganese (++)	.	.	.	0.1	.	0.2	.	.	.	.
Oxidation/Reduction (mV)	-138	163	136	211	.	114	.	130	75	48
Temperature (degrees C)	15	13.5	13.3	17.7	.	21.4	.	22.3	20.2	19.9
Turbidity (NTU)	.	.	.	2	.	3	.	.	.	.
pH	7.6	7.52	7.02	7.12	.	7.13	.	6.7	7.23	7.21
Miscellaneous Analytes										
Dissolved Solids (mg/L)	239	299	221	355	300	350	343	420	303	262
Suspended Solids (mg/L)	<	<	2	<	<	13	<	26	<	<
Turbidity (NTU)	23.2	0.326	1.63	.	.	.	.	327	0.197	1.18
Major Ions (mg/L)										
Calcium	46	80.8	57.5	71.3	73.4	79	80.8	109	81.3	83
Magnesium	10.2	9.25	4.61	22.5	23	23.6	24.1	15.2	9.77	9.76
Potassium	2.57	<	2.01	3.22	3.32	3.74	3.8	<	2.75	2.66
Sodium	27.6	10.5	6.89	10.3	10.5	10.8	11.2	22	6.83	7.03
Bicarbonate	211	226	143	272	276	261	261	260	216	224
Carbonate	<	<	<	<	<	<	<	<	<	<
Chloride	1.79	13.6	11.4	33.1	33.3	35.1	33.4	90.6	17.5	16.4
Fluoride	0.158	<	<	<	<	<	<	0.233	<	<
Nitrate as N	<	<	0.0542	<	<	0.021	0.021	<	0.233	0.332
Sulfate	13.1	26.7	25.2	14.9	14.6	14.7	14.5	<	19.7	20.7
Charge balance error (%)	-1.7	-1.9	-1.5	-5.9	-5.2	-0.5	1.1	-0.8	-0.1	-0.7
Trace Metals (mg/L)										
Aluminum	<	<	<	<	<	<	<	<	<	<
Antimony	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.171	0.179	0.0887	0.49	0.5	0.509	0.522	0.0601	0.373	0.368
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<
Chromium	<	0.0111	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<	<
Iron	2.1	0.0718	0.113	<	<	<	<	26.8	<	0.122
Lead	<	<	<	<	<	<	<	<	<	0.00114
Lithium	0.0146	<	<	0.0138	0.0141	0.014	0.0143	<	0.0147	0.0161
Manganese	0.0215	0.0347	0.677	0.0412	0.0424	0.0463	0.0469	0.732	0.00726	0.00766
Mercury	<	<	<	.	.	.	.	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<
Strontium	0.568	0.234	0.118	0.686	0.701	0.715	0.732	0.23	0.369	0.37
Thallium	<	<	<	<	<	<	<	<	<	<
Uranium	<	<	0.00318	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-770			GW-781	GW-782	GW-783	GW-791	GW-792		GW-802	GW-816
Functional Area	GRIDG3			GRIDE3	GRIDE3	GRIDE3	GRIDD2	GRIDD2		FF	EXP-SR
Date Sampled	06/19/06	10/30/06		11/08/06	11/13/06	11/13/06	08/01/06	08/03/06		05/22/06	01/19/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	GWPP
Sample Type			Dup						Dup		
Field Measurements											
Time Sampled	10:15	10:15	10:15	9:30	9:50	10:40	8:55	8:45	8:45	13:06	8:25
Measuring Point Elev. (ft)	944.72	944.72	944.72	947.89	947.73	948.49	992.13	992.74	992.74	941.83	898.42
Depth to Water (ft)	15.40	12.55	12.55	7.22	9.27	9.44	23.48	25.62	25.62	6.50	11.69
Groundwater Elevation (ft)	929.32	932.17	932.17	940.67	938.46	939.05	968.65	967.12	967.12	935.33	886.73
Conductivity (μmho/cm)	355	355	355	465	538	482	473	445	445	638	552
Dissolved Oxygen (ppm)	2.91	3.37	3.37	0.47	0.32	3.1	0.47	1.32	1.32	1.83	1.76
Iron (++)	.	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	110	127	127	38	16	48	124	182	182	148	-58
Temperature (degrees C)	20.2	22.2	22.2	15.2	16.7	18.4	20.9	23.2	23.2	19.9	13.6
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	2	.
pH	7.25	6.98	6.98	8.51	7.21	7.14	7.3	6.14	6.14	7.28	6.76
Miscellaneous Analytes											
Dissolved Solids (mg/L)	206	211	209	248	298	278	302	303	308	.	263
Suspended Solids (mg/L)	<	<	<	<	<	6	<	9	8	.	29
Turbidity (NTU)	0.448	0.277	0.284	0.756	0.547	14.1	0.247	41.5	40.1	.	104
Major Ions (mg/L)											
Calcium	58.6	53.2	52.8	8.59	71.6	73.5	69.6	57.3	57.4	.	58.9
Magnesium	4.5	5.03	4.94	3.02	15	6.38	14.3	5.81	5.88	.	17.4
Potassium	2.12	2.71	2.48	5.31	5.21	2.11	<	<	<	.	4.41
Sodium	6.46	6.7	6.7	82.5	10.4	15.3	7.26	11	11	.	8.87
Bicarbonate	153	153	154	207	241	209	213	82.8	80.9	.	217
Carbonate	<	<	<	<	<	<	<	<	<	.	<
Chloride	2.5	1.99	2.19	7	15.9	14.5	10.1	46.1	45.1	.	24.4
Fluoride	0.245	0.203	0.205	<	<	<	<	<	<	.	0.123
Nitrate as N	1.06	1.11	1.17	0.12	0.452	0.919	<	4.41	4.43	.	<
Sulfate	19	18.7	18.6	8.97	16.7	24.7	13	32.2	31.7	.	20.3
Charge balance error (%)	0.2	-2.3	-3.2	-1.5	-2.3	-2.5	1.6	-1.6	-0.5	.	-5.7
Trace Metals (mg/L)											
Aluminum	<	<	<	<	<	<	<	<	<	.	<
Antimony	<	<	<	<	<	<	<	<	<	.	<
Arsenic	<	<	<	<	<	<	<	<	<	.	<
Barium	0.058	0.0655	0.0644	0.262	0.527	0.13	0.248	0.147	0.143	.	0.0974
Beryllium	<	<	<	<	<	<	<	<	<	.	<
Boron	<	<	<	0.549	0.132	<	<	<	<	.	<
Cadmium	<	<	<	<	<	<	<	<	<	.	<
Chromium	<	<	<	0.0241	<	0.429	<	0.563	0.37	.	<
Cobalt	<	<	<	<	<	<	<	<	<	.	<
Copper	<	<	<	<	<	<	<	<	<	.	<
Iron	<	<	<	0.197	0.0625	3.19	<	4.96	4.05	.	19.9
Lead	<	<	0.00184	0.00104	<	<	<	<	<	.	<
Lithium	<	<	<	0.064	0.0212	<	0.0133	<	<	.	<
Manganese	<	<	<	0.00664	0.0276	0.0443	0.0152	0.09	0.0919	.	2.28
Mercury	<	<	<	<	<	<	<	<	<	.	<
Nickel	<	<	<	0.0142	<	0.158	<	0.222	0.226	.	<
Selenium	<	<	<	<	<	<	<	<	<	.	<
Strontium	0.0752	0.0837	0.0817	0.496	1.05	0.253	0.41	0.11	0.111	.	0.0813
Thallium	<	<	<	<	<	<	<	<	<	.	<
Uranium	0.000835	0.00183	0.00177	<	0.00088	0.00115	<	<	<	.	<
Zinc	<	<	<	<	<	<	<	<	<	.	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-820		GW-832		GW-954-1		GW-954-2			GW-954-3	
Functional Area	B9201-2		NHP		Y12		Y12			Y12	
Date Sampled	06/20/06	11/02/06	03/06/06	08/03/06	06/13/06	10/25/06	06/13/06	10/25/06		06/13/06	10/25/06
Program	GWPP	GWPP	BJC	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type									Dup		
Field Measurements											
Time Sampled	8:25	9:50	13:30	9:30	11:20	10:05	11:00	10:00	10:00	10:33	9:36
Measuring Point Elev. (ft)	929.57	929.57	906.18	906.18	988.27	988.27	988.27	988.27	988.27	988.27	988.27
Depth to Water (ft)	10.13	9.03	7.50	7.00	15.19	23.83	23.48	23.47	23.47	24.21	23.86
Groundwater Elevation (ft)	919.44	920.54	898.68	899.18	973.08	964.44	964.79	964.80	964.80	964.06	964.41
Conductivity (μmho/cm)	537	557	388	414	551	543	560	567	567	823	758
Dissolved Oxygen (ppm)	0.85	0.13	6.01	4.9	0.3	0.8	0.44	1.42	1.42	0.56	0.85
Iron (++)	.	.	0.01	0.03	.	.	.	.	.	.	.
Manganese (++)	.	.	0.1	0.4	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	-81	-88	278	29	-118	-114	-89	-55	-55	-29	-24
Temperature (degrees C)	19.8	19.9	13.2	21.1	21.2	16.2	20.2	15.6	15.6	21.1	15.6
Turbidity (NTU)	.	.	34	37	.	.	.	.	.	.	.
pH	7.31	7.36	7.6	7.46	8.71	8.79	7.57	7.71	7.71	6.95	7.13
Miscellaneous Analytes											
Dissolved Solids (mg/L)	325	316	232	232	340	371	332	288	290	502	457
Suspended Solids (mg/L)	<	<	59.7 Q	65.7	10	14	12	<	<	10	<
Turbidity (NTU)	1.9	8.13	.	.	4.71	6.61	5.48	2.4	2.44	6.21	1.72
Major Ions (mg/L)											
Calcium	67.8	72	55.8	68.2	2.26	2.21	33.7	33.1	34.4	120	107
Magnesium	12.3	12	13.4	17	1.33	1.28	9.19	8.14	8.55	18.5	14.5
Potassium	2.52	2.82	1.85	2.33	<	<	3.28	2.93	3.08	2.82	2.61
Sodium	19.4	21.6	8.6	9.59	124	119	76.4	72	74.8	31.1	33.3
Bicarbonate	178	186	162	152	262	268	261	268	266	357	339
Carbonate	<	<	<	<	<	<	<	<	<	<	<
Chloride	31.8	35	10.1	17.7	3.39	3.24	13.3	13.1	12.7	36	30.2
Fluoride	0.206	0.216	0.25	0.3	0.531	0.531	0.199	0.217	0.215	0.119	0.13
Nitrate as N	<	<	1	0.97	0.052	0.0361	<	<	<	0.0429	<
Sulfate	38.2	40.4	28.2	30.1	19.2	17.4	13	14.3	14.2	33.1	28.2
Charge balance error (%)	0.4	0.3	1.3	10.8	-1.3	-4.0	-0.2	-4.4	-2.0	0.5	-1.1
Trace Metals (mg/L)											
Aluminum	<	<	0.639	1.44	0.732	0.7	0.206	<	0.447	0.337	0.201
Antimony	<	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	0.00539	<	<	<	<	<
Barium	0.2	0.213	0.0466	0.0669	0.0803	0.0915	0.233	0.223	0.236	0.188	0.169
Beryllium	<	<	<	<	<	<	<	<	<	<	<
Boron	<	<	<	<	0.171	0.164	0.157	0.144	0.151	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<	<	<
Iron	0.218	0.632	0.929	2.19	0.215	0.215	0.239	0.199	0.276	0.415	0.296
Lead	<	0.000545	<	0.0044	<	0.00246	<	<	<	<	0.00201
Lithium	<	<	<	0.016	0.0305	0.0356	0.0364	0.0367	0.0383	0.029	0.0304
Manganese	0.736	0.659	0.0611	0.032	0.00509	0.00596	0.0437	0.0374	0.0406	0.354	0.324
Mercury	<	<	.	.	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<	<	<	<
Strontium	0.295	0.29	0.112	0.136	0.178	0.167	1.21	1.13	1.16	0.969	0.814
Thallium	<	0.00056	<	<	<	<	<	<	<	<	<
Uranium	<	<	0.00553	0.00435	0.00071	0.000595	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-956-1		GW-956-2		GW-956-3		GW-956-4		GW-959	
Functional Area	Y12		Y12		Y12		Y12		B9201-2	
Date Sampled	06/14/06	10/24/06	06/14/06	10/24/06	06/14/06	10/24/06	06/14/06	10/24/06	06/20/06	10/31/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type										
Field Measurements										
Time Sampled	10:31	11:45	10:05	11:15	10:10	11:05	9:25	10:30	10:05	10:25
Measuring Point Elev. (ft)	940.00	940.00	940.00	940.00	940.00	940.00	940.00	940.00	927.69	927.69
Depth to Water (ft)	13.68	13.68	11.19	11.20	19.47	19.48	13.49	18.67	2.90	2.64
Groundwater Elevation (ft)	926.32	926.32	928.81	928.80	920.53	920.52	926.51	921.33	924.79	925.05
Conductivity (μmho/cm)	770	745	538	495	519	492	453	442	660	690
Dissolved Oxygen (ppm)	0.55	0.62	0.54	0.76	0.6	1.12	0.62	0.96	0.08	0.35
Iron (++)	.	.	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	-146	-51	15	-113	-93	-63	-63	-24	63	99
Temperature (degrees C)	18.6	16	18.7	16.4	18.8	15.5	18.9	16.7	22.1	16.9
Turbidity (NTU)	.	.	.	.	.	.	.	.	.	.
pH	8.99	8.83	8.5	8.37	7.7	7.82	7.53	7.49	7.29	7.13
Miscellaneous Analytes										
Dissolved Solids (mg/L)	446	420	328	309	275	281	246	244	418	369
Suspended Solids (mg/L)	7	4	7	2	5	6	12	<	<	<
Turbidity (NTU)	4.73	4.42	22.7	20.4	6.53	6.56	2.19	3.48	0.705	1.73
Major Ions (mg/L)										
Calcium	1.81	1.63	6.26	5.79	42.5	44.3	65	61.1	94.3	88.5
Magnesium	1.09	0.9	2.79	2.5	16.2	15.4	9.08	8.18	9.13	8.47
Potassium	3.26	2.81	4.72	4.41	5.19	4.76	2.67	2.38	3.94	3.68
Sodium	183	171	106	103	35.1	31.1	10.2	9.27	28.3	27.3
Bicarbonate	344	358	214	223	194	203	184	193	182	190
Carbonate	<	<	<	<	<	<	<	<	<	<
Chloride	17.2	17.2	21.5	22.7	22.7	24	16	15.7	6.5	5.67
Fluoride	2.11	2.21	0.619	0.59	0.2	0.196	<	<	0.33	0.335
Nitrate as N	<	0.0316	<	<	<	<	<	<	0.0294	0.201
Sulfate	15.3	15.9	12.4	13.5	19.2	20.5	15.1	15.6	137	121
Charge balance error (%)	2.7	-2.7	0.9	-3.1	1.9	-2.2	0.7	-5.0	0.7	-0.9
Trace Metals (mg/L)										
Aluminum	1.18	0.344	2.17	1.6	0.4	<	0.296	<	<	<
Antimony	<	<	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<	<	<
Barium	0.0338	0.035	0.141	0.135	0.412	0.404	0.399	0.379	0.164	0.127
Beryllium	<	<	<	<	<	<	<	<	<	<
Boron	0.771	0.75	0.389	0.383	0.192	0.174	<	<	<	<
Cadmium	<	<	<	<	<	<	<	<	<	<
Chromium	<	<	0.0114	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<	<	<
Iron	0.414	0.155	0.908	0.695	0.371	0.239	0.164	0.11	<	0.0994
Lead	<	0.0126	<	<	<	0.00144	<	0.0104	<	<
Lithium	0.0864	0.0858	0.0619	0.0621	0.0317	0.0306	0.0163	0.0153	<	<
Manganese	0.00809	0.00559	0.006	0.00503	0.0267	0.0214	0.0682	0.0618	2.22	0.244
Mercury	<	<	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<	<	<
Selenium	0.0165	<	0.0233	<	<	<	<	<	0.0121	<
Strontium	0.103	0.102	0.285	0.272	1.03	1.01	0.362	0.325	0.259	0.236
Thallium	<	<	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<	0.00088	0.001
Zinc	<	<	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GHK2.51WSW	NPR07.0SW	NPR12.0SW	NPR23.0SW	OF 051		OF 200	
Functional Area	EXP-SW	EXP-SW	EXP-SW	EXP-SW	EXP-SW		EXP-SW	
Date Sampled	04/24/06	04/24/06	04/24/06	04/24/06	02/15/06	09/14/06	02/15/06	09/14/06
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	9:05	10:00	9:40	9:20	9:45	12:40	9:00	13:00
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	132	37	74	76	458	373	521	281
Dissolved Oxygen (ppm)	5.7	5.45	5.53	5.64	6.4	6.67	10.7	10.3
Iron (++)	.	.	.	.	.	.	.	.
Manganese (++)	.	.	.	.	.	.	.	.
Oxidation/Reduction (mV)	144	63	97	129	104	121.3	142	97.8
Temperature (degrees C)	14.3	15	14.6	14.7	13	19.94	17.8	19.52
Turbidity (NTU)	.	.	.	.	1.4	2.79	5.5	2.96
pH	6.79	7.29	7.27	7.27	7.45	7.63	7.09	7.95
Miscellaneous Analytes								
Dissolved Solids (mg/L)	71	49	40	45	253	333	256	219
Suspended Solids (mg/L)	4	29	1	3	<	<	8	5.5
Turbidity (NTU)	9.6	7.15	2.68	7.59	.	.	.	.
Major Ions (mg/L)								
Calcium	12.7	5	5.6	7.18	48.9	50.5	44.5	38.3
Magnesium	3.17	3.07	2.91	2.92	20.1	16	12.2	11
Potassium	2.17	3.09	2.86	2.39	1.51	2.01	1.92	1.75
Sodium	1.18	1.85	2.09	1.57	7.45	8.67	18	7.63
Bicarbonate	41.5	23.6	27.6	29.5	183	160	.	.
Carbonate	<	<	<	<	<	<	.	.
Chloride	0.83	1.03	0.91	0.81	9.8	9.2	.	.
Fluoride	<	<	<	<	0.22	0.31	.	.
Nitrate as N	0.0361	<	<	<	3.6	3.9	.	.
Sulfate	10.5	11	8.94	8.64	23.7	27.7	.	.
Charge balance error (%)	-3.5	-4.9	-5.6	-4.2	-2.6	-0.7	.	.
Trace Metals (mg/L)								
Aluminum	0.831	0.411	<	0.566	<	<	0.379	<
Antimony	<	<	<	<	<	<	<	<
Arsenic	0.00584	<	0.00976	<	<	<	<	<
Barium	0.039	0.0452	0.0392	0.0368	0.0709	0.0618	0.0438	0.0381
Beryllium	<	<	<	<	<	<	<	<
Boron	<	<	<	<	<	<	<	<
Cadmium	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Cobalt	<	<	<	<	<	<	<	<
Copper	<	<	<	<	<	<	<	<
Iron	0.466	0.304	0.149	0.336	0.0565	0.0946	2.47	0.107
Lead	0.00517	<	<	<	<	<	<	<
Lithium	<	<	<	<	0.011	0.0137	0.0137	<
Manganese	0.026	0.0252	0.0131	0.0113	0.007	0.012	0.0712	0.0957
Mercury	<	<	<	<	.	.	.	.
Nickel	<	<	<	<	<	<	<	<
Selenium	<	<	<	<	<	<	<	<
Strontium	0.0344	0.0294	0.0266	0.0235	0.109	0.136	0.144	0.125
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	0.00669	0.00583	0.0258	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX E.1: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	SCR7.1SP	SCR7.8SP	SP-17		STATION 17		STATION 8	
Functional Area	EXP-SW	EXP-SW	EXP-SW		EXP-SW		EXP-SW	
Date Sampled	02/13/06	02/13/06	04/24/06		02/15/06	09/14/06	02/15/06	09/14/06
Program	BJC	BJC	GWPP	GWPP	BJC	BJC	BJC	BJC
Sample Type				Dup				
Field Measurements								
Time Sampled	10:00	9:35	8:30	8:30	10:00	12:00	9:30	12:20
Measuring Point Elev. (ft)	.	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.	.
Conductivity (μmho/cm)	397	361	485	485	363	365	424	315
Dissolved Oxygen (ppm)	7.9	7.9	4.09	4.09	9.5	14.1	8.1	11.2
Iron (++)	<	<	.	.	.	.	.	.
Manganese (++)	0.2	0.1	.	.	.	.	.	.
Oxidation/Reduction (mV)	36.4	74.4	173	173	110	188.1	135	117.4
Temperature (degrees C)	8.64	8.98	14.6	14.6	10.6	20.84	14	20.3
Turbidity (NTU)	1.87	2.36	.	.	3.7	4.81	3.8	5.83
pH	7.49	8	6.8	6.8	8.14	8.47	7.84	8.15
Miscellaneous Analytes								
Dissolved Solids (mg/L)	266	221	235	228	196	442	242	273
Suspended Solids (mg/L)	6	34.5	<	<	<	<	<	<
Turbidity (NTU)	.	.	1.22	1.2	.	.	.	.
Major Ions (mg/L)								
Calcium	.	.	47.7	48.1	38.7	42.2	40.7	41.8
Magnesium	.	.	26.6	26.9	11.7	11.6	11.2	11.4
Potassium	.	.	<	<	1.75	2.04	1.82	2.05
Sodium	.	.	1.84	1.86	11.1	9.85	15.7	9.1
Bicarbonate	.	.	214	215	.	.	.	.
Carbonate	.	.	<	<	.	.	.	.
Chloride	.	.	3.24	3.05	.	.	.	.
Fluoride	.	.	<	<	.	.	.	.
Nitrate as N	.	.	6.39	6.39	.	.	.	.
Sulfate	.	.	5	4.92	.	.	.	.
Charge balance error (%)	.	.	-2.9	-2.6	.	.	.	.
Trace Metals (mg/L)								
Aluminum	.	.	<	<	<	<	0.2	<
Antimony	.	.	<	<	<	<	<	<
Arsenic	.	.	<	<	<	<	<	<
Barium	.	.	0.101	0.102	0.0392	0.0434	0.0412	0.0427
Beryllium	.	.	<	<	<	<	<	<
Boron	.	.	<	<	<	<	<	<
Cadmium	.	.	<	<	<	<	<	<
Chromium	.	.	<	<	<	<	<	<
Cobalt	.	.	<	<	<	<	<	<
Copper	.	.	<	<	<	<	<	<
Iron	.	.	0.0507	0.0656	0.21	0.131	1.06	0.141
Lead	.	.	0.00168	<	<	<	<	<
Lithium	.	.	<	<	<	<	0.0109	0.0296
Manganese	.	.	0.0297	0.032	0.0479	0.0426	0.0735	0.0629
Mercury	.	.	<	<	.	<	.	.
Nickel	.	.	<	<	<	<	<	<
Selenium	.	.	<	<	<	<	<	<
Strontium	.	.	0.0326	0.0329	0.126	0.133	0.132	0.134
Thallium	.	.	<	<	<	<	<	<
Uranium	.	.	0.00132	0.00136	0.00742	<	0.0151	<
Zinc	.	.	<	<	<	<	<	<

APPENDIX E.2

VOLATILE ORGANIC COMPOUNDS

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	55-1A	55-2A		55-2B		55-2C	55-3A		
Functional Area	GRIDB2	GRIDB3		GRIDB3		GRIDB3	B9201-5		
Date Sampled	03/07/06	02/23/06	07/18/06	02/23/06	07/18/06	02/23/06	03/01/06		07/24/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type								Dup	
Chloroethenes (µg/L)									
Tetrachloroethene	<	320	270	570	580	460	9,900	9,800	33,000
Trichloroethene	<	150	120	200	220	190	630	740	1,300
cis-1,2-Dichloroethene	<	470	440	660	710	740	690	820	1,300
trans-1,2-Dichloroethene	<	5	5 J	8	9	10	13	13	23
1,1-Dichloroethene	<	11	8	17	19	22	15	16	27
Vinyl chloride	<	8	10	16	17	18	27	34	43
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	1 J	1 J	<	3 J	2 J	<	<	3 J
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	10	9	15	15	21	3 J	4 J	6
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	210	140	330	360	290	10	10	35
1,2-Dichloropropane	<	<	<	<	<	<	<	<	2 J
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	5	4 J	10	14	12	<	<	<
Trichlorofluoromethane	<	<	<	2 J	<	2 J	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	55-3B		55-3C		56-1A		56-2A	56-2B	56-2C
Functional Area	B9201-5		B9201-5		Y12		GRIDC3	GRIDC3	GRIDC3
Date Sampled	03/01/06	07/24/06	03/01/06	07/24/06	05/22/06	10/12/06	02/28/06	02/28/06	02/28/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	72,000	51,000	12,000	23,000	<	<	23	760	970
Trichloroethene	4,300	5,700	1,400	1,600	<	<	6	47	560
cis-1,2-Dichloroethene	770	1,300	2,000	2,100	<	<	7	64	720
trans-1,2-Dichloroethene	70	55	28	30	<	<	<	<	9
1,1-Dichloroethene	80 J	160	32	34	<	<	<	1 J	14
Vinyl chloride	320	170	160	160	<	<	<	<	11
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	2 J	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	56	43	5	6	<	<	<	<	<
Chloroethane	<	<	<	2 J	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	2 J	9	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	2 J	1 J	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	9	3 J	<	<	<	<	<	<	<
Total Xylene	8	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	16	28	<	<	<	<	<
1,2-Dichloropropane	4 J	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	3 J	2 J	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	3 J	2 J	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	56-3A		56-3B			56-3C		56-4A	
Functional Area	Y12		Y12			Y12		Y12	
Date Sampled	03/06/06	07/25/06	03/06/06	07/25/06		03/06/06	07/25/06	03/02/06	07/26/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type					Dup				
Chloroethenes (µg/L)									
Tetrachloroethene	38	52	97	270	250	540	570	9	2 J
Trichloroethene	4 J	5	9	20	20	34	36	<	<
cis-1,2-Dichloroethene	8	10	19	34	35	59	64	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	1 J	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	56-6A		56-8A		60-1A			GW-105	GW-106
Functional Area	Y12		Y12		Y12			S3	S3
Date Sampled	03/02/06	07/26/06	05/23/06	10/12/06	06/15/06		10/31/06	05/09/06	05/09/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type						Dup			
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	16	28	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-108		GW-109	GW-148	GW-151		GW-153	GW-154	
Functional Area	S3		S3	NHP	NHP		NHP	NHP	
Date Sampled	01/05/06	07/31/06	05/10/06	01/19/06	03/06/06	08/07/06	01/18/06	03/07/06	08/07/06
Program	BJC	BJC	GWPP	GWPP	BJC	BJC	GWPP	BJC	BJC
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	4 J	<	110	<	820	650 D	1 J	<	<
Trichloroethene	4 J	<	3 J	<	150	120 J D	<	<	<
cis-1,2-Dichloroethene	<	<	<	26	73	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	1 J	<	<	<	2 J	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	.	.	<	<	.	.	<	.	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	1,300	1,200 D	54	<	<
Chloroform	33	38	9	<	78	<	3 J	<	<
Methylene chloride	46	47	14	<	<	<	<	<	<
Chloromethane	8 J	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	1 J	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	3 J	<	.	.	<	.	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	<	<	.	.	<	.	.
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	6 J	<	<	<	<	<	<	<	<
Bromoform	7	5	2 J	<	<	<	<	<	<
Bromomethane	47	12	<	<	<	<	<	<	<
Carbon disulfide	1 J	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	<	<	.	.	<	.	.
Trichlorofluoromethane	.	.	<	<	.	.	<	.	.
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	<	<	.	<	<
Ethylene	.	.	.	.	<	<	.	<	<
Methane	.	.	.	.	110	90	.	180	40

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-169			GW-170						GW-171
Functional Area	EXP-UV			EXP-UV						EXP-UV
Date Sampled	03/07/06	05/23/06	08/02/06	03/07/06		05/23/06		08/02/06		03/08/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type					Dup		Dup		Dup	
Chloroethenes (µg/L)										
Tetrachloroethene	2 J	2 J	<	2 J	2 J	1 J	1 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)										
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	.	.	.	.	.	.	.	.	.	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	6	6	4 J	4 J	6	6	<
Chloroform	<	<	<	3 J	2 J	2 J	2 J	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	2 J	2 J	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.	.	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	.	.	.	.	.	.	.	.
2-Butanone	<	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	.	.	.	.	.	.	.	.
Trichlorofluoromethane	.	.	.	.	.	.	.	.	.	.
Natural Attenuation (µg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-172	GW-192		GW-204	GW-220		GW-223		GW-230
Functional Area	EXP-UV	B4		T0134	NHP		NHP		EXP-UV
Date Sampled	03/08/06	05/11/06		11/09/06	06/21/06	11/06/06	03/06/06	08/07/06	03/08/06
Program	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC
Sample Type			Dup						
Chloroethenes (µg/L)									
Tetrachloroethene	<	3 J	2 J	<	360	540	39	34	<
Trichloroethene	<	5	4 J	<	90	120	16	14	<
cis-1,2-Dichloroethene	<	28	24	<	44	55	81	63	3 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	2 J	<	<	<
Vinyl chloride	<	<	<	<	<	<	5	6 J	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	.	<	<	<	<	<	.	.	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	1 J	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	790	1,100	<	<	<
Chloroform	<	<	<	<	69	79	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	<	<	<	<	<	.	.	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	<	<	<	<	<	.	.	.
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	1 J
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	.	<	<	<	<	<	.	.	.
Trichlorofluoromethane	.	<	<	<	<	1 J	.	.	.
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	<	<	.
Ethylene	.	.	.	.	.	.	<	<	.
Methane	.	.	.	.	.	.	100	73	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-232			GW-240		GW-251	GW-253	GW-265	
Functional Area	EXP-UV			NHP		S2	S2	SY	
Date Sampled	03/07/06	05/23/06	08/03/06	01/18/06		05/16/06	03/09/06	06/01/06	10/10/06
Program	BJC	BJC	BJC	GWPP	GWPP	GWPP	BJC	GWPP	GWPP
Sample Type					Dup				
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	300	670	23	29
Trichloroethene	<	<	<	<	<	150	590	4 J	5 J
cis-1,2-Dichloroethene	<	<	<	<	<	17	290	1 J	1 J
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	5 J	<	<
Vinyl chloride	<	<	<	<	<	1 J	83	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	.	.	.	<	<	<	.	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	1 J	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	4 J	3 J	6	34	<	<
Chloroform	<	<	<	1 J	<	10	50	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	1 J	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	<	<	<	.	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	.	<	<	<	.	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	.	<	<	<	.	<	<
Trichlorofluoromethane	.	.	.	<	<	<	.	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	2.4 J	.	.
Ethylene	.	.	.	.	.	.	<	.	.
Methane	.	.	.	.	.	.	15	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-269		GW-274	GW-275	GW-281	GW-332	GW-336		GW-337	GW-380
Functional Area	SY		SY	SY	FF	WCPA	WCPA		WCPA	NHP
Date Sampled	06/01/06	10/10/06	03/27/06	03/27/06	05/22/06	03/08/06	03/08/06		03/07/06	05/31/06
Program	GWPP	GWPP	GWPP	GWPP	BJC	GWPP	GWPP	GWPP	GWPP	BJC
Sample Type								Dup		
Chloroethenes (µg/L)										
Tetrachloroethene	24	19	1,400	2 J	<	940	240	280	490	<
Trichloroethene	4 J	2 J	11	<	<	250	260	290	480	<
cis-1,2-Dichloroethene	59	29	21	<	<	1,200	1,200	1,300	1,900	<
trans-1,2-Dichloroethene	<	<	<	<	<	15	13	14	19	<
1,1-Dichloroethene	160	64	<	<	<	37	63	67	59	<
Vinyl chloride	1 J	<	<	<	<	23	21	23	19	<
Chloroethanes (µg/L)										
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	2 J	<	.	<	<	<	<	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	18	4 J	<	<	<	6	20	21	66	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	5	2 J	<	<	<	33	41	44	50	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
1,4-Dioxane	47	.	.	.	.	14	12	11	9	.
Chloromethanes (µg/L)										
Carbon tetrachloride	3 J	<	<	<	<	2 J	<	<	<	<
Chloroform	4 J	1 J	21	<	<	<	<	<	<	<
Methylene chloride	<	<	34	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	180	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	43	38	<	<	.	4,600	1,100	1,200	1,300	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	.	<	<	<	<	.
2-Butanone	<	<	<	<	<	16	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	9	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	.	81	10	12	7	.
Trichlorofluoromethane	<	<	<	<	.	17	<	<	<	.
Natural Attenuation (µg/L)										
Ethane	.	.	.	.	.	.	.	.	.	<
Ethylene	.	.	.	.	.	.	.	.	.	<
Methane	.	.	.	.	.	.	.	.	.	<

APPENDIX E.2: CY 2006 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	08/02/06	03/07/06	08/08/06	06/21/06	11/06/06	01/05/06		07/06/06	
Program	GWPP	BJC	BJC	GWPP	GWPP	BJC	BJC	BJC	BJC
Sample Type							Dup		Dup
Chloroethenes (µg/L)									
Tetrachloroethene	3 J	9	<	390	340	65	68	110	150
Trichloroethene	<	2 J	<	150	160	64	66	130	140
cis-1,2-Dichloroethene	6	8	<	190	200	96	100	190	170
trans-1,2-Dichloroethene	<	<	<	1 J	2 J	1 J	1 J	<	<
1,1-Dichloroethene	<	<	<	3 J	3 J	<	<	<	<
Vinyl chloride	1 J	<	<	3	3	<	<	2 J	3
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	.	.	<	<	.	.	.	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	12	600	530 D	<	<	58	62	97	130
Chloroform	3 J	170	150 D	<	<	14	15	22	20
Methylene chloride	<	<	32 B D	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	.	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	.	.	<	<	.	.	.	.
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	1 J	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	.	.	<	<	.	.	.	.
Trichlorofluoromethane	<	.	.	<	<	.	.	.	.
Natural Attenuation (µg/L)									
Ethane	.	<	<	.	.	.	.	.	.
Ethylene	.	<	<	.	.	.	.	.	.
Methane	.	1000	1500 D	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-606		GW-617	GW-618	GW-619	GW-620	GW-633	GW-656		GW-658
Functional Area	EXP-I		EXP-E	EXP-E	FTF	FTF	RG	T0134		FF
Date Sampled	01/05/06	07/06/06	05/16/06	03/09/06	05/15/06	05/15/06	05/10/06	11/14/06		05/24/06
Program	BJC	BJC	GWPP	BJC	GWPP	GWPP	GWPP	GWPP	GWPP	BJC
Sample Type									Dup	
Chloroethenes (µg/L)										
Tetrachloroethene	6	5	<	1 J	19	4 J	260	49	55	<
Trichloroethene	<	<	<	5	5	1 J	7	2,600	2,800	<
cis-1,2-Dichloroethene	<	<	<	11	5 J	2 J	12	160	170	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	21	24	<
1,1-Dichloroethene	<	<	<	<	<	<	3 J	190	210	<
Vinyl chloride	<	<	<	<	<	<	<	5	6	<
Chloroethanes (µg/L)										
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	.	.	<	.	<	<	<	<	<	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	2 J
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	690 J
1,1-Dichloroethane	<	<	<	<	<	<	<	18	19	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	71	59	<	<	<	<	<	<	<	<
Chloroform	110	120	<	<	<	<	16	<	<	<
Methylene chloride	<	<	<	<	<	<	22	<	<	43
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	2,000	<	<	9,500
Ethylbenzene	<	<	<	<	<	<	2 J	<	<	1,000 J
Toluene	<	<	<	<	<	1 J	<	<	<	3,000
Total Xylene	<	<	<	<	<	<	94	<	<	6,100
Styrene	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	.	<	<	<	2 J	3 J	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	13
1,4-Dichlorobenzene	.	.	<	.	<	<	<	<	<	.
2-Butanone	<	<	<	1 J	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<	110
Acetone	<	<	<	<	<	<	<	<	<	18
Bromoform	<	<	<	<	<	<	3 J	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	<	.	<	<	<	<	<	.
Trichlorofluoromethane	.	.	<	.	<	<	<	<	<	.
Natural Attenuation (µg/L)										
Ethane	.	.	.	<	.	.	.	.	.	.
Ethylene	.	.	.	<	.	.	.	.	.	.
Methane	.	.	.	14	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-686		GW-690	GW-691	GW-692	GW-698			GW-700
Functional Area	CPT		CPT	CPT	CPT	B8110			B8110
Date Sampled	06/06/06	10/19/06	11/14/06	11/16/06	11/30/06	05/23/06		10/19/06	11/09/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type							Dup		
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	45	1,300	21	120	120	180	62
Trichloroethene	<	<	6	8	3 J	300	300	550	9
cis-1,2-Dichloroethene	12	35	6	6	33	16	16	42	39
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	1 J	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	5	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	5 J	5	10	<
Chloroform	<	<	<	<	16	13	13	22	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	8	8	23	2 J
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	1 J	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	5	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-722-06	GW-722-10	GW-722-14				GW-722-17			
Functional Area	EXP-J	EXP-J	EXP-J				EXP-J			
Date Sampled	08/08/06	08/10/06	03/13/06	05/31/06	08/15/06	10/30/06	03/13/06	06/01/06	08/15/06	10/30/06
Program	GWPP	GWPP	BJC	BJC	GWPP	BJC	BJC	BJC	GWPP	BJC
Sample Type										
Chloroethenes (µg/L)										
Tetrachloroethene	<	<	4 J	3 J	3 J	4 J	3 J	4 J	5	7
Trichloroethene	<	<	2 J	1 J	1 J	2 J	<	1 J	13	1 J
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	.	.	<	.	.	.	<	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	33	21	35	28	11	20	39	31
Chloroform	<	<	3 J	5 J	3 J	4 J	6	7	11	9
Methylene chloride	<	<	<	<	<	2 B J	<	<	<	1 J B
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	.	.	<	.	.	.	<	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	.	.	<	.	.	.	<	.
2-Butanone	<	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	4 J	<	5 J	70 Q	<	<	6 J
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	.	.	<	.	.	.	<	.
Trichlorofluoromethane	<	<	.	.	<	.	.	.	<	.
Natural Attenuation (µg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-722-20						GW-722-22			
Functional Area	EXP-J						EXP-J			
Date Sampled	03/14/06	05/31/06		08/14/06	10/30/06		03/14/06	05/31/06	08/10/06	10/30/06
Program	BJC	BJC	BJC	GWPP	BJC	BJC	BJC	BJC	GWPP	BJC
Sample Type			Dup			Dup				
Chloroethenes (µg/L)										
Tetrachloroethene	7	7	5	14	12	14	4 J	3 J	4 J	6
Trichloroethene	2 J	2 J	1 J	2 J	2 J	3 J	2 J	2 J	1 J	2 J
cis-1,2-Dichloroethene	<	<	<	<	1 J	1 J	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	.	.	.	<	.	.	.	.	<	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	33	41	32	130	59	69	15	16	23	21
Chloroform	11	13	11	15	15	16	3 J	2 J	2 J	3 J
Methylene chloride	<	<	<	<	1 B J	1 B J	<	<	<	1 J B
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	<	.	.	.	.	<	.
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	.	.	.	<	.	.	.	.	<	.
2-Butanone	<	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	29	30	<	14	7 J	<	5 J	<	12
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	.	.	.	<	.	.	.	.	<	.
Trichlorofluoromethane	.	.	.	<	.	.	.	.	<	.
Natural Attenuation (µg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-722-26	GW-722-30	GW-722-32	GW-722-33					GW-733	
Functional Area	EXP-J	EXP-J	EXP-J	EXP-J					EXP-J	
Date Sampled	08/09/06	08/09/06	08/09/06	03/14/06	05/31/06	08/10/06		10/30/06	01/04/06	07/06/06
Program	GWPP	GWPP	GWPP	BJC	BJC	GWPP	GWPP	BJC	BJC	BJC
Sample Type							Dup			
Chloroethenes (µg/L)										
Tetrachloroethene	1 J	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)										
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	.	.	<	<	.	.	.
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	<	<	8	<
Chloroform	<	2 J	<	<	<	2 J	2 J	<	<	<
Methylene chloride	<	<	<	<	<	<	<	2 B J	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	3 J	<	<	<	<	<	<	<	<	<
Toluene	2 J	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	2 J	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	.	.	<	<	.	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	.	.	<	<	.	.	.
2-Butanone	<	<	<	<	2 J	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	9 J	<	<	5 J	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	.	.	<	<	.	.	.
Trichlorofluoromethane	<	<	<	.	.	<	<	.	.	.
Natural Attenuation (µg/L)										
Ethane	.	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-744	GW-747	GW-748	GW-749	GW-762				GW-763
Functional Area	GRIDK1	GRIDK2	GRIDK2	GRIDK2	GRIDJ3				GRIDJ3
Date Sampled	01/11/06	01/11/06	01/10/06	01/10/06	03/06/06		08/07/06		08/02/06
Program	GWPP	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	GWPP
Sample Type						Dup		Dup	
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	2,500	2,600	2,600 D	2,600 D	<
Trichloroethene	<	<	<	<	170	180	150 D	150 D	<
cis-1,2-Dichloroethene	<	<	<	<	67	70	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	4 J	4 J	<	<	<
1,1-Dichloroethene	<	<	<	<	64	74	<	<	<
Vinyl chloride	<	<	<	<	5	6	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	.	.	.	.	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	4 J	5 J	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	16	17	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	.	.	.	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	.	.	.	.	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	25 Q	26 Q	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	.	.	.	.	<
Trichlorofluoromethane	<	<	<	<	.	.	.	.	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	<	<	<	<	.
Ethylene	.	.	.	.	<	<	<	<	.
Methane	.	.	.	.	22	22	22	24	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-769		GW-770			GW-781	GW-782	GW-783	GW-791
Functional Area	GRIDG3		GRIDG3			GRIDE3	GRIDE3	GRIDE3	GRIDD2
Date Sampled	06/19/06	10/30/06	06/19/06	10/30/06		11/08/06	11/13/06	11/13/06	08/01/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type					Dup				
Chloroethenes (µg/L)									
Tetrachloroethene	12	19	1 J	<	<	2 J	96	9	530
Trichloroethene	3 J	5 J	<	<	<	<	43	4 J	4 J
cis-1,2-Dichloroethene	3 J	4 J	<	<	<	<	12	4 J	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	2 J	1 J	<
1,1-Dichloroethene	1 J	2 J	<	<	<	<	17	3 J	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	1 J	<	<	<	<	1 J	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	59	10	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	7 J	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	91	130	21	14	15	<	<	<	<
Chloroform	4 J	5	2 J	2 J	2 J	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	2 J	4 J	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-792		GW-802	GW-816	GW-820		GW-832		GW-954-1	
Functional Area	GRIDD2		FF	EXP-SR	B9201-2		NHP		Y12	
Date Sampled	08/03/06		05/22/06	01/19/06	06/20/06	11/02/06	03/06/06	08/03/06	06/13/06	10/25/06
Program	GWPP	GWPP	BJC	GWPP	GWPP	GWPP	BJC	BJC	GWPP	GWPP
Sample Type		Dup								
Chloroethenes (µg/L)										
Tetrachloroethene	4 J	4 J	<	<	2,600	2,400	7	5 J	<	<
Trichloroethene	<	<	<	<	600	530	1 J	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	920	1,100	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	7	7	<	<	<	<
1,1-Dichloroethene	<	<	<	<	5	5 J	<	<	<	<
Vinyl chloride	<	<	<	<	74	78	<	<	<	<
Chloroethanes (µg/L)										
1,1,2,2-Tetrachloroethane	<	1 J	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	.	<	<	<	.	.	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)										
Carbon tetrachloride	<	<	<	<	<	<	9	8	<	<
Chloroform	<	<	<	<	<	<	2 J	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)										
Benzene	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)										
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	.	<	55	39	.	.	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	.	<	3 J	3 J	.	.	<	<
2-Butanone	<	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	1 J	1 J	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	.	<	2 J	2 J	.	.	<	<
Trichlorofluoromethane	<	<	.	<	<	<	.	.	<	<
Natural Attenuation (µg/L)										
Ethane	.	.	.	.	.	.	<	<	.	.
Ethylene	.	.	.	.	.	.	<	<	.	.
Methane	.	.	.	.	.	.	<	110	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-954-2			GW-954-3		GW-956-1		GW-956-2	
Functional Area	Y12			Y12		Y12		Y12	
Date Sampled	06/13/06	10/25/06		06/13/06	10/25/06	06/14/06	10/24/06	06/14/06	10/24/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type			Dup						
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	5	<	5 J	4 J
Trichloroethene	<	<	<	<	<	<	<	2 J	2 J
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	3 J	2 J	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	1 J	1 J	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-956-3		GW-956-4		GW-959		GHK2.51WSW	NPR07.0SW	NPR12.0SW
Functional Area	Y12		Y12		B9201-2		EXP-SW	EXP-SW	EXP-SW
Date Sampled	06/14/06	10/24/06	06/14/06	10/24/06	06/20/06	10/31/06	04/24/06	04/24/06	04/24/06
Program	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP	GWPP
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	1 J	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	61	30	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	33	<	<	<	<
Chloroethanes (µg/L)									
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	<	<	<	<	<	<	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)									
Benzene	<	<	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	<	<	<	<	<	<	<	<
2-Butanone	<	<	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	<	<	<	<	<	<	<	<
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Natural Attenuation (µg/L)									
Ethane	.	.	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.	.	.

APPENDIX E.2: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	NPR23.0SW	OF 051		SCR7.1SP	SCR7.8SP	SP-17	
Functional Area	EXP-SW	EXP-SW		EXP-SW	EXP-SW	EXP-SW	
Date Sampled	04/24/06	02/15/06	09/14/06	02/13/06	02/13/06	04/24/06	
Program	GWPP	BJC	BJC	BJC	BJC	GWPP	GWPP
Sample Type							Dup
Chloroethenes (µg/L)							
Tetrachloroethene	<	11	11	<	<	<	<
Trichloroethene	<	5 J	<	<	<	<	<
cis-1,2-Dichloroethene	<	5	6	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<
Vinyl chloride	<	<	<	<	<	<	<
Chloroethanes (µg/L)							
1,1,2,2-Tetrachloroethane	<	<	<	<	<	<	<
1,1,1,2-Tetrachloroethane	<	.	.	.	.	<	<
1,1,2-Trichloroethane	<	<	<	<	<	<	<
1,1,1-Trichloroethane	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<
Chloroethane	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.
Chloromethanes (µg/L)							
Carbon tetrachloride	<	<	<	<	<	<	<
Chloroform	<	2 J	<	<	<	<	<
Methylene chloride	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<
Petrol. Hydrocarb. (µg/L)							
Benzene	<	<	<	<	<	<	<
Ethylbenzene	<	<	<	<	<	<	<
Toluene	<	<	<	<	<	<	<
Total Xylene	<	<	<	<	<	<	<
Styrene	<	<	<	<	<	<	<
Miscellaneous (µg/L)							
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	.	.	.	<	<
1,2-Dichloropropane	<	<	<	<	<	<	<
1,4-Dichlorobenzene	<	.	.	.	.	<	<
2-Butanone	<	<	<	<	<	<	<
2-Hexanone	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<
Bromoform	<	<	<	<	<	<	<
Bromomethane	<	<	<	<	<	<	<
Carbon disulfide	<	<	<	<	<	<	<
Chlorobenzene	<	<	<	<	<	<	<
Dibromochloromethane	<	<	<	<	<	<	<
Dichlorodifluoromethane	<	.	.	.	.	<	<
Trichlorofluoromethane	<	.	.	.	.	<	<
Natural Attenuation (µg/L)							
Ethane	.	.	.	.	.	.	.
Ethylene	.	.	.	.	.	.	.
Methane	.	.	.	.	.	.	.

APPENDIX E.3

RADIOLOGICAL ANALYTES

APPENDIX E.3: CY 2006 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	TPU	MDA	Activity	TPU	MDA
55-1A	GRIDB2	03/07/06	GWPP	<	.	2.8	<	.	6.7
55-2A	GRIDB3	02/23/06	GWPP	<	.	9.3	<	.	25
55-2A	GRIDB3	07/18/06	GWPP	77 Q	30	9	37 Q	30	31
55-2B	GRIDB3	02/23/06	GWPP	<	.	7.4	38	25	24
55-2B	GRIDB3	07/18/06	GWPP	44 Q	31	12	<	.	32
55-2C	GRIDB3	02/23/06	GWPP	<	.	9.8	28	25	24
55-3A	B9201-5	03/01/06	GWPP	<	.	2.6	<	.	6.3
55-3A Dup	B9201-5	03/01/06	GWPP	<	.	4.5	<	.	8.1
55-3A	B9201-5	07/24/06	GWPP	<	.	4.8	<	.	8.2
55-3B	B9201-5	03/01/06	GWPP	<	.	3.7	<	.	10
55-3B	B9201-5	07/24/06	GWPP	<	.	3.3	9.8	4.3	5
55-3C	B9201-5	03/01/06	GWPP	5.8	4.2	2.3	13	5.4	6.6
55-3C	B9201-5	07/24/06	GWPP	<	.	3.9	9.9	4.4	5.4
56-1A	Y12	05/22/06	GWPP	<	.	2.2	<	.	7.8
56-1A	Y12	10/12/06	GWPP	<	.	2.2	<	.	4.8
56-2A	GRIDC3	02/28/06	GWPP	<	.	2.8	<	.	5.4
56-2B	GRIDC3	02/28/06	GWPP	<	.	2.5	<	.	5.8
56-2C	GRIDC3	02/28/06	GWPP	<	.	4.6	<	.	9
56-3A	Y12	03/06/06	GWPP	<	.	2.4	6.9	4.7	6.2
56-3A	Y12	07/25/06	GWPP	3.4 R	3.8	3	<	.	5.9
56-3B	Y12	03/06/06	GWPP	<	.	4.2	<	.	8.1
56-3B	Y12	07/25/06	GWPP	<	.	5.2	<	.	7
56-3B Dup	Y12	07/25/06	GWPP	<	.	4	<	.	6.7
56-3C	Y12	03/06/06	GWPP	<	.	2.9	<	.	7.8
56-3C	Y12	07/25/06	GWPP	<	.	3.6	<	.	6.7
56-4A	Y12	03/02/06	GWPP	<	.	2.1	<	.	6.4
56-4A	Y12	07/26/06	GWPP	<	.	2.8	<	.	6.6
56-6A	Y12	03/02/06	GWPP	<	.	2.7	<	.	5.3
56-6A	Y12	07/26/06	GWPP	<	.	4.7	<	.	8.1
56-8A	Y12	05/23/06	GWPP	<	.	3	<	.	5
56-8A	Y12	10/12/06	GWPP	6.2	3.3	1.7	<	.	5
60-1A	Y12	06/15/06	GWPP	<	.	2.2	<	.	4
60-1A Dup	Y12	06/15/06	GWPP	<	.	2.3	4.1	3.3	4.1
60-1A	Y12	10/31/06	GWPP	<	.	2.1	<	.	4.8
GW-105	S3	05/09/06	GWPP	22 R	55	18	<	.	52
GW-106	S3	05/09/06	GWPP	<	.	21	68	56	58
GW-108	S3	01/05/06	BJC	244	128.09	156	16,500	1,009.16	412
GW-108	S3	07/31/06	BJC	<	.	163	13,300	696.51	116
GW-109	S3	05/10/06	GWPP	<	.	120	6,200	480	380
GW-148	NHP	01/19/06	GWPP	<	.	2.8	<	.	5.6
GW-151	NHP	03/06/06	BJC	<	.	1.17	3.77	1.41	2.15
GW-151	NHP	08/07/06	BJC	<	.	1.98	<	.	3.23
GW-153	NHP	01/18/06	GWPP	<	.	2.4	<	.	6.3
GW-154	NHP	03/07/06	BJC	528	42.27	3.34	202	14.16	7.73
GW-154	NHP	08/07/06	BJC	529	39.81	3.56	164	9.51	3.12
GW-169	EXP-UV	03/07/06	BJC	<	.	1.02	2.95	1.4	2.2
GW-169	EXP-UV	05/23/06	BJC	<	.	1.35	2.67	1.51	2.41
GW-169	EXP-UV	08/02/06	BJC	1.95	1.07	1.51	5.55	1.52	2.21

APPENDIX E.3: CY 2006 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	TPU	MDA	Activity	TPU	MDA
GW-170	EXP-UV	03/07/06	BJC	<	.	1.64	7.71	1.77	2.49
GW-170 Dup	EXP-UV	03/07/06	BJC	<	.	1.26	9.17	1.61	1.99
GW-170	EXP-UV	05/23/06	BJC	1.96	0.85	0.81	7.65	1.64	2.23
GW-170 Dup	EXP-UV	05/23/06	BJC	<	.	2.19	6.03	1.66	2.43
GW-170	EXP-UV	08/02/06	BJC	<	.	2.45	11.5	2.41	3.24
GW-170 Dup	EXP-UV	08/02/06	BJC	2.48	1.63	2.47	10.3	2.25	3.08
GW-192	B4	05/11/06	GWPP	3.9 R	4.2	3	5.1	3.9	5
GW-192 Dup	B4	05/11/06	GWPP	<	.	3.1	<	.	6.8
GW-204	T0134	11/09/06	GWPP	30	4.7	1.6	8.4	3.6	4.1
GW-220	NHP	06/21/06	GWPP	<	.	2.9	<	.	5.4
GW-220	NHP	11/06/06	GWPP	2.5 R	3.2	2.2	<	.	4.8
GW-223	NHP	03/06/06	BJC	21.7	3.28	1.07	19.5	2.73	3.23
GW-223	NHP	08/07/06	BJC	20.2	3.29	2.47	23.9	3.02	3.51
GW-232	EXP-UV	03/07/06	BJC	<	.	1.99	4.42	1.9	2.94
GW-232	EXP-UV	05/23/06	BJC	<	.	2.95	<	.	3.3
GW-232	EXP-UV	08/03/06	BJC	<	.	3.24	<	.	2.37
GW-240	NHP	01/18/06	GWPP	3.4 R	3.9	2.4	7	4.1	5.1
GW-240 Dup	NHP	01/18/06	GWPP	5.1	4.1	3.2	<	.	5.5
GW-251	S2	05/16/06	GWPP	4.9 R	5	3.9	<	.	5.3
GW-253	S2	03/09/06	BJC	28.3	12.65	16.3	26.2	16.05	25.9
GW-265	SY	06/01/06	GWPP	<	.	2.9	<	.	5.1
GW-265	SY	10/10/06	GWPP	1.4 R	2.6	1.3	<	.	3.9
GW-269	SY	06/01/06	GWPP	<	.	2.8	<	.	5.4
GW-269	SY	10/10/06	GWPP	2.8	2.7	1.7	7.5	3.3	3.8
GW-274	SY	03/27/06	GWPP	<	.	19	6,000	130	56
GW-275	SY	03/27/06	GWPP	<	.	170	<	.	260
GW-332	WCPA	03/08/06	GWPP	<	.	1.7	<	.	5
GW-336	WCPA	03/08/06	GWPP	2.9 R	3.6	2.3	<	.	5.3
GW-336 Dup	WCPA	03/08/06	GWPP	<	.	2.5	<	.	5.3
GW-337	WCPA	03/07/06	GWPP	<	.	2.6	<	.	6.6
GW-380	NHP	05/31/06	BJC	<	.	1.54	5.39	1.81	2.68
GW-381	NHP	08/02/06	GWPP	<	.	4.2	<	.	5.1
GW-382	NHP	03/07/06	BJC	<	.	4.01	6.99	3.33	5.25
GW-382	NHP	08/08/06	BJC	3.16	1.44	1.81	9.86	1.91	2.52
GW-383	NHP	06/21/06	GWPP	7.8	5.9	2.6	18	9.1	12
GW-383	NHP	11/06/06	GWPP	1.9 R	3.5	1.8	<	.	5
GW-605	EXP-I	01/05/06	BJC	82	8.97	3.06	20.3	4.22	5.82
GW-605 Dup	EXP-I	01/05/06	BJC	72.4	8.4	1.76	26.9	4.83	6.26
GW-605	EXP-I	07/06/06	BJC	70.2	7.43	1.92	36.5	4.01	4.24
GW-605 Dup	EXP-I	07/06/06	BJC	62.2	6.46	2.34	34.4	3.34	3.06
GW-606	EXP-I	01/05/06	BJC	11	3.21	3.44	<	.	5.58
GW-606	EXP-I	07/06/06	BJC	15.6	3.93	4.26	8.79	3.52	5.43
GW-617	EXP-E	05/16/06	GWPP	<	.	2.8	<	.	5
GW-618	EXP-E	03/09/06	BJC	<	.	2.78	5.75	2.65	4.18
GW-619	FTF	05/15/06	GWPP	<	.	2.1	14	5.4	6.5
GW-620	FTF	05/15/06	GWPP	4.9 R	6.7	4.8	14	8.3	11
GW-633	RG	05/10/06	GWPP	26 R	32	11	3,300	89	42
GW-656	T0134	11/14/06	GWPP	3.7	3.3	1.9	<	.	5.3
GW-656 Dup	T0134	11/14/06	GWPP	<	.	2.3	<	.	3.8

APPENDIX E.3: CY 2006 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	TPU	MDA	Activity	TPU	MDA
GW-686	CPT	06/06/06	GWPP	<	.	4.2	<	.	5.4
GW-686	CPT	10/19/06	GWPP	<	.	2.5	<	.	3.7
GW-690	CPT	11/14/06	GWPP	<	.	2.1	7.2	3.2	3.7
GW-691	CPT	11/16/06	GWPP	4.3 R	7.7	3.1	<	.	5.9
GW-692	CPT	11/30/06	GWPP	<	.	3.2	6	3.1	5.2
GW-698	B8110	05/23/06	GWPP	<	.	15	<	.	38
GW-698 Dup	B8110	05/23/06	GWPP	<	.	5.5	<	.	18
GW-698	B8110	10/19/06	GWPP	<	.	13	<	.	40
GW-700	B8110	11/09/06	GWPP	<	.	2.7	<	.	4.8
GW-722-06	EXP-J	08/08/06	GWPP	4.8 R	5.4	4.2	<	.	5.3
GW-722-10	EXP-J	08/10/06	GWPP	<	.	4.1	<	.	5.2
GW-722-14	EXP-J	03/13/06	BJC	<	.	2.55	6.23	2.79	4.34
GW-722-14	EXP-J	05/31/06	BJC	2.05	0.89	0.27	3.89	2.13	3.4
GW-722-14	EXP-J	08/15/06	GWPP	<	.	3.8	<	.	5.1
GW-722-17	EXP-J	03/13/06	BJC	<	.	3.16	<	.	4.69
GW-722-17	EXP-J	06/01/06	BJC	<	.	2.61	10.1	2.96	4.28
GW-722-17	EXP-J	08/15/06	GWPP	<	.	3.9	<	.	5.4
GW-722-20	EXP-J	03/14/06	BJC	<	.	3.88	<	.	5.15
GW-722-20	EXP-J	05/31/06	BJC	<	.	1.27	3.61	1.93	3.07
GW-722-20 Dup	EXP-J	05/31/06	BJC	<	.	2.31	15.4	3.36	4.67
GW-722-20	EXP-J	08/14/06	GWPP	<	.	3.8	13	4.5	5
GW-722-22	EXP-J	03/14/06	BJC	<	.	3.24	<	.	4.97
GW-722-22	EXP-J	05/31/06	BJC	2.24	1.53	2.19	<	.	4.46
GW-722-22	EXP-J	08/10/06	GWPP	<	.	3.8	<	.	5.4
GW-722-26	EXP-J	08/09/06	GWPP	<	.	3.1	<	.	5.3
GW-722-30	EXP-J	08/09/06	GWPP	<	.	3.1	<	.	5.1
GW-722-32	EXP-J	08/09/06	GWPP	<	.	3.8	<	.	5.1
GW-722-33	EXP-J	03/14/06	BJC	3.56	1.44	1.52	<	.	5.04
GW-722-33	EXP-J	05/31/06	BJC	<	.	1.84	<	.	5.31
GW-722-33	EXP-J	08/10/06	GWPP	<	.	3.3	<	.	9.1
GW-722-33 Dup	EXP-J	08/10/06	GWPP	<	.	3.6	<	.	10
GW-733	EXP-J	01/04/06	BJC	<	.	1.8	<	.	3.2
GW-733	EXP-J	07/06/06	BJC	2.11	1	1.32	14.9	2.08	2.51
GW-744	GRIDK1	01/11/06	GWPP	<	.	2.6	7.8	5.2	7.1
GW-747	GRIDK2	01/11/06	GWPP	3.6	3.5	2.1	6.6	4.7	6.2
GW-748	GRIDK2	01/10/06	GWPP	<	.	2.9	<	.	7.7
GW-749	GRIDK2	01/10/06	GWPP	3 R	3.6	2.1	<	.	6.5
GW-762	GRIDJ3	03/06/06	BJC	<	.	1.62	6.97	2.14	3.19
GW-762 Dup	GRIDJ3	03/06/06	BJC	1.69	1.02	1.33	7.87	2.03	2.9
GW-762	GRIDJ3	08/07/06	BJC	<	.	2.55	7.94	2.84	4.31
GW-762 Dup	GRIDJ3	08/07/06	BJC	<	.	1.97	6.51	1.59	2.24
GW-763	GRIDJ3	08/02/06	GWPP	<	.	3.6	6	4.1	5.4
GW-769	GRIDG3	06/19/06	GWPP	2.8 R	3.2	1.8	5.7	3.1	3.5
GW-769	GRIDG3	10/30/06	GWPP	<	.	2	<	.	4.9
GW-770	GRIDG3	06/19/06	GWPP	<	.	2.9	<	.	7.6
GW-770	GRIDG3	10/30/06	GWPP	1.7 R	2.6	1.6	<	.	5.3
GW-770 Dup	GRIDG3	10/30/06	GWPP	<	.	1.9	<	.	3.8

APPENDIX E.3: CY 2006 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	TPU	MDA	Activity	TPU	MDA
GW-781	GRIDE3	11/08/06	GWPP	<	.	1.9	5.7	3.6	4.9
GW-782	GRIDE3	11/13/06	GWPP	23	4.7	2.3	<	.	4.8
GW-783	GRIDE3	11/13/06	GWPP	3.7	2.9	1.6	<	.	4.1
GW-791	GRIDD2	08/01/06	GWPP	<	.	2.9	<	.	7.1
GW-792	GRIDD2	08/03/06	GWPP	4.5	3.9	2.9	<	.	5.2
GW-792 Dup	GRIDD2	08/03/06	GWPP	<	.	3	<	.	6.5
GW-816	EXP-SR	01/19/06	GWPP	<	.	3.5	<	.	6.7
GW-820	B9201-2	06/20/06	GWPP	<	.	3.1	<	.	6.6
GW-820	B9201-2	11/02/06	GWPP	<	.	2.2	5	3.5	4.8
GW-832	NHP	03/06/06	BJC	5.46	1.79	2.14	10	1.76	2.18
GW-832	NHP	08/03/06	BJC	8.18	2.1	1.58	12.9	2.47	3.22
GW-954-1	Y12	06/13/06	GWPP	15	6.1	3.7	9.7	6.5	8.6
GW-954-1	Y12	10/25/06	GWPP	2.1 R	3.2	1.6	<	.	5
GW-954-2	Y12	06/13/06	GWPP	<	.	2.2	4.3	3.1	3.7
GW-954-2	Y12	10/25/06	GWPP	4.7	3.6	2.3	<	.	4.8
GW-954-2 Dup	Y12	10/25/06	GWPP	<	.	2.6	6	3.5	4.8
GW-954-3	Y12	06/13/06	GWPP	4.3 R	6.4	3.5	<	.	7
GW-954-3	Y12	10/25/06	GWPP	3.8	3.8	2.3	7	3.3	4
GW-956-1	Y12	06/14/06	GWPP	<	.	2.7	<	.	4.9
GW-956-1	Y12	10/24/06	GWPP	2.9 R	3.8	2.8	<	.	4.8
GW-956-2	Y12	06/14/06	GWPP	17	5.4	2.3	20	4.9	4.7
GW-956-2	Y12	10/24/06	GWPP	5	3.5	2	<	.	4.9
GW-956-3	Y12	06/14/06	GWPP	<	.	3.1	7.2	4.7	5.8
GW-956-3	Y12	10/24/06	GWPP	7.3	3.5	1.8	<	.	5.3
GW-956-4	Y12	06/14/06	GWPP	<	.	2.4	6.7	3.5	4.1
GW-956-4	Y12	10/24/06	GWPP	2.9 R	3.2	1.6	<	.	4
GW-959	B9201-2	06/20/06	GWPP	<	.	3.6	<	.	7
GW-959	B9201-2	10/31/06	GWPP	<	.	2.3	<	.	4.8
GHK2.51WSW	EXP-SW	04/24/06	GWPP	<	.	2.3	<	.	5.5
NPR07.0SW	EXP-SW	04/24/06	GWPP	2.4 R	3	2.2	<	.	5.5
NPR12.0SW	EXP-SW	04/24/06	GWPP	<	.	2.4	<	.	5.3
NPR23.0SW	EXP-SW	04/24/06	GWPP	<	.	2.2	6.5	3.9	4.9
OF 051	EXP-SW	02/15/06	BJC	5.56	1.74	2.08	<	.	2.75
OF 051	EXP-SW	09/14/06	BJC	6.32	1.51	1.06	21.5	2.31	2.18
SP-17	EXP-SW	04/24/06	GWPP	<	.	2.8	<	.	5.4
SP-17 Dup	EXP-SW	04/24/06	GWPP	4.3	3.8	2.6	<	.	5
STATION 8	EXP-SW	02/15/06	BJC	9.58	1.78	0.76	8.91	1.65	2.13
STATION 8	EXP-SW	09/14/06	BJC	<	.	1.75	5.02	1.59	2.38

APPENDIX E.3: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-105			GW-106			GW-108					
Functional Area	S3			S3			S3					
Date Sampled	05/09/06			05/09/06			01/05/06			07/31/06		
Program	GWPP			GWPP			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	18	<	.	21	244	127	156	<	.	163
Gross Beta	<	.	52	68	56	58	16,500	656	412	13,300	321	116
Technetium-99	<	.	15	<	.	15	30,800	60.4	5.63	33,900	123	21.9
Uranium-234	<	.	0.86	1.7	0.54	0.82	.	.	.	.	.	.
Uranium-235	<	.	0.32	<	.	0.29	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	<	.	0.39	0.88	0.32	0.36	.	.	.	.	.	.

Sampling Point	GW-109			GW-151						GW-154		
Functional Area	S3			NHP						NHP		
Date Sampled	05/10/06			03/06/06			08/07/06			03/07/06		
Program	GWPP			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	120	<	.	1.17	<	.	1.98	528	21.9	3.34
Gross Beta	6,200	480	380	3.77	1.4	2.15	<	.	3.23	202	10.6	7.73
Technetium-99	9,000	54	15	.	.	.	.	.	.	.	.	.
Uranium-234	4.8	1.2	0.84	0.67	0.38	0.23	0.46	0.32	0.24	354	64.8	6
Uranium-235	<	.	0.65	<	.	0.33	<	.	0.3	19.9	9.73	4.9
Uranium-236	.	.	.	<	.	0.33	<	.	0.27	6.49	5.14	4.4
Uranium-238	5.3	1.2	0.53	<	.	0.32	<	.	0.32	162	34.3	5.15

Sampling Point	GW-154			GW-193						GW-223		
Functional Area	NHP			T2331						NHP		
Date Sampled	08/07/06			01/05/06			07/06/06			03/06/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	529	16.5	3.56	.	.	.	.	.	.	21.7	2.92	1.07
Gross Beta	164	5.69	3.12	.	.	.	.	.	.	19.5	2.57	3.23
Technetium-99	.	.	.	<	.	5.63	<	.	5.38	.	.	.
Uranium-234	349	60.8	1.97	.	.	.	.	.	.	6.07	1.46	0.41
Uranium-235	13.4	7.22	2.43	.	.	.	.	.	.	0.53	0.39	0.31
Uranium-236	7.24	4.94	2.18	.	.	.	.	.	.	<	.	0.16
Uranium-238	159	31.9	4.36	.	.	.	.	.	.	15.9	2.98	0.38

APPENDIX E.3: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-223			GW-274			GW-275			GW-605		
Functional Area	NHP			SY			SY			EXP-I		
Date Sampled	08/07/06			03/27/06			03/27/06			01/05/06		
Program	BJC			GWPP			GWPP			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	20.2	2.98	2.47	<	.	19	<	.	170	82	7	3.06
Gross Beta	23.9	2.81	3.51	6,000	130	56	<	.	260	20.3	4.11	5.82
Technetium-99	.	.	.	13,000	77	20	17	9.1	15	<	.	5.62
Uranium-234	4.76	1.27	0.35	6.8	1	0.27	0.87	0.34	0.32	.	.	.
Uranium-235	<	.	0.19	0.28	0.19	0.25	<	.	0.26	.	.	.
Uranium-236	0.31	0.29	0.3	.	.	.	.	.	.	.	.	.
Uranium-238	13.8	2.72	0.27	3.8	0.74	0.28	0.33	0.21	0.25	.	.	.

Sampling Point	GW-605									GW-606		
Functional Area	EXP-I									EXP-I		
Date Sampled	01/05/06			07/06/06						01/05/06		
Program	BJC			BJC						BJC		
Sample Type	Dup						Dup					
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	72.4	6.78	1.76	70.2	5.66	1.92	62.2	4.85	2.34	11	3.12	3.44
Gross Beta	26.9	4.67	6.26	36.5	3.63	4.24	34.4	2.93	3.06	<	.	5.58
Technetium-99	<	.	5.62	<	.	5.38	<	.	5.38	<	.	5.62
Uranium-234	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-235	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	.	.	.	.	.	.	.	.	.

Sampling Point	GW-606			GW-633			GW-733					
Functional Area	EXP-I			RG			EXP-J					
Date Sampled	07/06/06			05/10/06			01/04/06			07/06/06		
Program	BJC			GWPP			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	15.6	3.78	4.26	<	.	11	<	.	1.8	2.11	0.99	1.32
Gross Beta	8.79	3.5	5.43	3,300	89	42	<	.	3.2	14.9	1.96	2.51
Technetium-99	<	.	5.38	4,500	39	16	<	.	5.39	<	.	5.38
Uranium-234	.	.	.	<	.	0.37	.	.	.	.	.	.
Uranium-235	.	.	.	<	.	0.28	.	.	.	.	.	.
Uranium-236	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-238	.	.	.	0.23	0.15	0.21	.	.	.	.	.	.

APPENDIX E.3: CY 2006 MONITORING DATA FOR THE UPPER EAST FORK POPLAR CREEK HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	GW-832						STATION 8					
Functional Area	NHP						EXP-SW					
Date Sampled	03/06/06			08/03/06			02/15/06			09/14/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	5.46	1.75	2.14	8.18	2.02	1.58	9.58	1.65	0.76	<	.	1.75
Gross Beta	10	1.7	2.18	12.9	2.4	3.22	8.91	1.6	2.13	5.02	1.57	2.38
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	5.53	1.36	0.25	1.23	0.58	0.36	2.81	0.92	0.16	1.71	0.7	0.39
Uranium-235	0.59	0.41	0.31	<	.	0.34	0.3	0.3	0.2	0.67	0.46	0.2
Uranium-236	0.36	0.3	0.16	<	.	0.31	<	.	0.18	0.32	0.3	0.31
Uranium-238	2.3	0.79	0.33	2.32	0.82	0.28	7.38	1.73	0.28	1.32	0.6	0.16

APPENDIX F

CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME

EXPLANATION

Sampling Point:

GW	-	Groundwater monitoring well (e.g., GW-141; one exception is 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

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

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 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	Bicarbonate	1.0	NS
Magnesium	0.2	0.05	Carbonate	1.0	NS
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
Note: NS = not specified					

Note that the ion charge balance error (percent difference) does not exceed 20% (when available) for any of the samples collected during CY 2006 in the Chestnut Ridge Regime.

The Y-12 GWPP SAP (BWXT 2006a) specifies analytical methods and 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. For this report, the analytical methods for metals used by BJC monitoring programs (EPA-7470, SW846-6010B, SW846-6020, and ASTM-D5174-M) are considered to be functionally equivalent to the methods used by the GWPP (Table B.5) 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 2005 and 2006) 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)

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	0.0025	0.006	**Manganese**	0.005	0.005
Arsenic	0.005	0.005	Mercury	0.0002	0.0002
Barium	0.004	0.005*	Molybdenum	0.05	0.01*
Beryllium	0.001	0.001	**Nickel**	0.005	0.01
Boron	0.1	0.01*	Selenium	0.01	0.005*
Cadmium	0.0025	0.001*	Silver	0.02	0.005*
Chromium	0.005	0.005	**Strontium**	0.005	0.005
Cobalt	0.02	0.005*	**Thallium**	0.0005	0.002
Copper	0.02	0.005*	Thorium	0.2	NS
Iron	0.05	0.01*	**Uranium**	0.0005	0.004
Lead	0.0005	0.003	Vanadium	0.02	0.01*
			Zinc	0.05	0.01*

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

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 ion results for landfill monitoring locations)
- Q - Inconsistent with historical measurements for a sampling location (e.g., high sulfate at well GW-544 in January 2006; confirmed in July 2006)

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.

Fourteen of the 55 compounds requested were detected in the CY 2006 groundwater samples collected in the Chestnut Ridge Regime. Results for these compounds are grouped by similar chemical composition (e.g., chloroethenes) in Appendix F.2.

Compound	No. Detected	Maximum (µg/L)	Compound	No. Detected	Maximum (µg/L)
1,1-Dichloroethane	12	97	cis-1,2-Dichloroethene	2	3.3
1,1,1-Trichloroethane	12	42	Carbon tetrachloride	2	2.2 J
1,1-Dichloroethene	10	71	Ethyl methacrylate	2	0.55 Q
Acetone	10	42 Q	Trichloroethene	2	0.41 J
Tetrachloroethene	5	10	1,4-Dioxane	1	40
Trichlorofluoromethane	4	36	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6
1,2-Dichloroethane	3	2.8 Q	Chloromethane	1	0.38 J
Chloroform	2	4.8	trans-1,2-Dichloroethene	1	0.34 J

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.,)

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 2006 in the Chestnut Ridge Regime.

Analyte	No. of Results	No. Detected	Analyte	No. of Results	No. Detected
Gross Alpha	99	35	Technetium-99	2	0
Gross Beta	99	48	Uranium-233/234	8	7
Cesium-137	2	0	Uranium-235	8	0
Cobalt-60	2	0	Uranium-236	8	0
Potassium-40	2	0	Uranium-238	8	1
Strontium-90	8	4			

Results for gross alpha and gross beta are presented in the first pages of Appendix F.3, followed by results for the isotopes. The following notes and qualifiers apply to this appendix:

Result	-	Activity in picoCuries per liter (pCi/L)
TPU	-	Total propagated uncertainty (two standard deviations); calculation includes the counting error (instrument uncertainty) as reported previously, plus other sources of uncertainty (e.g., volumetric, chemical yield)
MDA	-	Minimum detectable activity
.	-	Not analyzed
<	-	Analyzed but less than the MDA (not detected)
R	-	Result does not meet data quality objectives: exceeds the MDA but is less than the TPU.

APPENDIX F.1

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

APPENDIX F.1: CY 2006 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	03/01/06	07/20/06	01/12/06	07/11/06	04/06/06	10/16/06	04/06/06	10/16/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	13:05	13:40	9:50	10:00	10:30	10:30	13:45	13:10
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)	52.36	58.60	99.21	98.43	80.23	82.85	79.92	82.84
Groundwater Elevation (ft)	1,052.12	1,045.88	1,087.02	1,087.80	833.75	831.13	833.62	830.70
Conductivity (μmho/cm)	1,030	999	248	218	982	261	709	202
Dissolved Oxygen (ppm)	3.72	1.5	9.4	9.82	0.84	1.89	4.48	4.14
Oxidation/Reduction (mV)	162	134	161	192	-133	-106	141	77
Temperature (degrees C)	16.4	20.2	14	17.3	12.9	14	14.7	14.4
Turbidity (NTU)	1	1	8	9	6	4	<	3
pH	7.43	7.12	7.3	6.78	7.71	7.73	7.65	7.49
Miscellaneous Analytes								
Dissolved Solids (mg/L)	317	291	200	210	270	291	498	254
Suspended Solids (mg/L)	<	<	<	<	<	<	<	7.5
Turbidity (NTU)	.	.	1.4	1.1	.	.	.	.
Major Ions (mg/L)								
Calcium	50	53.8	45	43	29.8	29.7	46	55.4
Magnesium	32.2	31.9	27	25	24.9	25.2	15.8	18.5
Potassium	0.834	0.879	0.64 J	1 J	16.8	17.8	1.33	1.75
Sodium	6.56	6.67	0.77 J	0.92 J	19.3	19.2	0.84	1.26
Bicarbonate	276	205	220	200	.	.	.	.
Carbonate	<	<	<	<	.	.	.	.
Chloride	11.5	13.4	1.5 J	1.3 J	.	.	.	.
Fluoride	<	<	0.084 J	0.11 J	.	.	.	.
Nitrate as N	0.62	0.72	0.34 J	0.33 J	.	.	.	.
Sulfate	3	3.2	1.4 J	1.7 J	.	.	.	.
Charge Balance Error (%)	-4.4	10.1	0.2	2	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.0265	0.0264	0.017	0.016	0.046	0.0475	0.0417	0.0528
Boron	<	<	<	<	0.802	0.832	<	<
Chromium	<	<	<	0.013	<	<	<	<
Iron	<	<	<	0.25	0.54	0.63	<	<
Lead	<	<	<	<	<	<	<	<
Lithium	<	<	.	.	0.304	0.318	0.0221	0.0286
Manganese	<	<	<	<	0.009	0.0099	<	<
Nickel	<	<	<	0.012 J	<	<	<	<
Strontium	0.0251	0.0246	0.015	0.019	2.93	2.96	0.0842	0.116
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 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	04/10/06	10/12/06	04/11/06		10/16/06		04/11/06	10/16/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type				Dup		Dup		
Field Measurements								
Time Sampled	9:35	10:00	13:50	.	14:40	.	13:15	10:20
Measuring Point Elev. (ft)	840.24	840.24	1,049.28	.	1,049.28	.	1,051.38	1,051.38
Depth to Water (ft)	3.38	9.03	141.04	.	143.86	.	116.64	118.92
Groundwater Elevation (ft)	836.86	831.21	908.24	.	905.42	.	934.74	932.46
Conductivity (μmho/cm)	1,064	997	599	.	1,236	.	785	766
Dissolved Oxygen (ppm)	3.05	2.6	6.01	.	5.74	.	2.28	5.59
Oxidation/Reduction (mV)	210	156	264	.	174	.	189	181
Temperature (degrees C)	10.4	13.4	20.4	.	14.1	.	16.7	13.1
Turbidity (NTU)	2	1	4	.	1	.	3	2
pH	7.54	7.55	7.29	.	7.3	.	7.66	7.73
Miscellaneous Analytes								
Dissolved Solids (mg/L)	304	315	368	371	360	360	217	235
Suspended Solids (mg/L)	<	<	<	<	<	<	5.9	5.7
Turbidity (NTU)	.	.	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	43.4	42.5	65.8	64.8	66.2	64.4	40.5	40.6
Magnesium	35.5	35.6	40.5	39.7	41.6	40.4	25.5	24.9
Potassium	11.3	11.2	17.5	16.5	21	20.6	1.36	1.08
Sodium	3.84	3.69	4.33	4.25	5.71	5.54	0.473	0.505
Bicarbonate	.	.	.	.	.	.	.	.
Carbonate	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.
Nitrate as N	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.
Charge Balance Error (%)	.	.	.	.	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.0851	0.0883	0.0318	0.0307	0.0346	0.0335	0.0139	0.0138
Boron	0.228	0.238	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	<
Lead	<	<	<	<	<	<	<	<
Lithium	0.113	0.116	<	<	<	<	<	<
Manganese	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<
Strontium	6.8	6.85	0.0256	0.0246	0.0273	0.0266	0.0225	0.0179
Thallium	<	<	<	<	<	<	<	<
Uranium	0.011	0.011	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-175	GW-177		GW-178	GW-203		GW-205	
Functional Area	CRSP	CRSP		CRSP	UNCS		UNCS	
Date Sampled	05/01/06	03/06/06	07/06/06	05/02/06	03/01/06	07/25/06	03/02/06	07/24/06
Program	GWPP	BJC	BJC	GWPP	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	10:40	10:05	13:50	10:20	9:15	10:00	9:10	11:30
Measuring Point Elev. (ft)	1,084.00	1,158.20	1,158.20	1,143.49	1,105.45	1,105.45	1,104.14	1,104.14
Depth to Water (ft)	111.76	119.34	118.90	88.42	82.31	81.11	78.97	78.50
Groundwater Elevation (ft)	972.24	1,038.86	1,039.30	1,055.07	1,023.14	1,024.34	1,025.17	1,025.64
Conductivity (μmho/cm)	502	891	415	460	603	276	698	360
Dissolved Oxygen (ppm)	3.09	1.86	1.1	3.74	8.33	4.6	2.91	2.95
Oxidation/Reduction (mV)	132	198	92	162	214	199	202	162
Temperature (degrees C)	14.2	11.9	23.5	14	15.3	21.1	14.2	22
Turbidity (NTU)	.	10	2	.	2	1	1	1
pH	7.5	7.42	7.05	7.5	7.74	7.47	10.31	9.57
Miscellaneous Analytes								
Dissolved Solids (mg/L)	254	253	235	243	168	171	207	828
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<
Turbidity (NTU)	0.144	.	.	3.86	.	.	.	.
Major Ions (mg/L)								
Calcium	52.8	40.4	44.4	55	29.5	29.7	1.2	1.19
Magnesium	33.7	27.2	27.6	31.4	18.6	17.4	11.4	12.1
Potassium	<	1.99	2.05	<	0.75	0.776	67.9	71.1
Sodium	0.983	0.954	0.915	1.03	0.511	0.459	9.93	10.1
Bicarbonate	268	.	.	258	159	119	80.6	91.4
Carbonate	<	.	.	<	<	<	80.6	35.7
Chloride	1.68	.	.	2.13	2	1.8	2.6	2.7
Fluoride	<	.	.	<	<	<	<	<
Nitrate as N	0.262	.	.	0.339	0.54	0.6	0.044	0.051
Sulfate	0.81	.	.	1.29	1.4	1.1	2.9	3
Charge Balance Error (%)	0.1	.	.	1	-4.1	8.4	-5.9	9.8
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.046	0.018	0.0143	0.0143	0.0109	0.0105	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Iron	<	<	0.11	<	0.0524	<	<	<
Lead	0.00337	<	<	<	<	<	<	<
Lithium	<	<	<	<	<	<	0.141	0.142
Manganese	<	0.0171	0.0667	<	<	<	<	<
Nickel	<	<	<	0.00502	<	<	<	<
Strontium	0.0172	0.0169	0.0173	0.0218	0.0116	0.0111	<	<
Thallium	0.000585	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	0.058	0.0503	<	<	<	<	<

APPENDIX F.1: CY 2006 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	01/10/06	07/11/06	03/01/06	07/25/06	04/10/06		10/12/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type						Dup		Dup
Field Measurements								
Time Sampled	9:55	13:30	10:40	11:15	13:15	.	13:50	.
Measuring Point Elev. (ft)	1,177.03	1,177.03	1,106.16	1,106.16	849.67	.	849.67	.
Depth to Water (ft)	116.86	115.31	83.51	82.04	11.67	.	18.47	.
Groundwater Elevation (ft)	1,060.17	1,061.72	1,022.65	1,024.12	838.00	.	831.20	.
Conductivity (µmho/cm)	293	200	606	298	845	.	803	.
Dissolved Oxygen (ppm)	7.6	8.64	10.62	4.45	2.35	.	1.27	.
Oxidation/Reduction (mV)	194	135	186	209	131	.	125	.
Temperature (degrees C)	11.9	17.8	15.9	17.5	14.1	.	14.9	.
Turbidity (NTU)	8	13	1	2	1	.	8	.
pH	7.89	7.93	7.86	7.57	7.1	.	7.36	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	130	190	170	267	272	228	235	251
Suspended Solids (mg/L)	<	<	<	<	<	<	<	<
Turbidity (NTU)	0.16	0.05 J	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	35	37	29.5	32.2	47.2	46.1	43.9	45.4
Magnesium	21	22	18.8	20.2	23.9	23.4	22.8	23.4
Potassium	1.1 J	1.6 J	0.82	0.883	1.55	1.45	1.06	1.2
Sodium	5.6	4.9 J	0.496	0.513	1.08	1.01	0.641	0.651
Bicarbonate	180	180	155	125	.	.	.	.
Carbonate	<	<	<	<	.	.	.	.
Chloride	1.7 J	1.7 J	1.4	1.3	.	.	.	.
Fluoride	0.08 J	0.1 J	<	<	.	.	.	.
Nitrate as N	0.34 J	0.31 J	0.43	0.3	.	.	.	.
Sulfate	5.4	4.5 J	1.2	1.4	.	.	.	.
Charge Balance Error (%)	-0.5	1.9	-2.1	12.3	.	.	.	.
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.031	0.033	0.0077	0.0085	0.0896	0.0881	0.0843	0.0858
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	<
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	<	<	<	<	<	<
Manganese	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<
Strontium	0.017	0.018	0.0105	0.0114	0.0453	0.0442	0.0459	0.0467
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-301				GW-305			
Functional Area	CRBAWP				LIV			
Date Sampled	01/09/06		07/10/06		01/09/06	04/12/06	07/11/06	10/31/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup				
Field Measurements								
Time Sampled	9:45	.	14:00	.	10:15	10:20	10:10	11:30
Measuring Point Elev. (ft)	1,086.55	.	1,086.55	.	1,183.72	1,183.72	1,183.72	1,183.72
Depth to Water (ft)	136.08	.	135.39	.	128.50	118.24	126.21	125.67
Groundwater Elevation (ft)	950.47	.	951.16	.	1,055.22	1,065.48	1,057.51	1,058.05
Conductivity (μmho/cm)	250	.	412	.	783	715	362	241
Dissolved Oxygen (ppm)	8	.	5.6	.	6.09	9.65	5.59	7.44
Oxidation/Reduction (mV)	176	.	295	.	189	206	281	222
Temperature (degrees C)	14.3	.	18.5	.	14.2	15.6	18.3	16.5
Turbidity (NTU)	5	.	1	.	3	2	2	2
pH	7.79	.	7.62	.	7.74	7.87	7.59	7.47
Miscellaneous Analytes								
Dissolved Solids (mg/L)	216	225	239	243	170	180	180	200
Suspended Solids (mg/L)	<	<	<	<	<	<	<	10
Turbidity (NTU)	.	.	.	.	0.3	0.12	0.34	0.62
Major Ions (mg/L)								
Calcium	44.2	42.1	44	44.3	39	36	28	39
Magnesium	27.9	26.6	28.2	28.3	21	20	19	22
Potassium	0.714	0.688	0.705	0.708	0.81 J	0.78 J	0.91 J	0.97 J
Sodium	0.734	0.711	0.676	0.683	0.93 J	0.87 J	9.6	1 J
Bicarbonate	.	.	.	.	180	170	170	180
Carbonate	.	.	.	.	<	<	<	<
Chloride	.	.	.	.	5.8	3.2	4.9	5.2
Fluoride	.	.	.	.	<	0.16 J	0.11 J	<
Nitrate as N	.	.	.	.	0.37 J	0.52	1	0.37 J
Sulfate	.	.	.	.	1.6 J	1.8 J	1.3 J	1.6 J
Charge Balance Error (%)	.	.	.	.	-1.1	-1	-3.4	0.3
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.022	0.0216	0.0188	0.0184	0.01	0.01	0.0077 J	0.012
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Iron	<	<	<	<	<	<	<	<
Lead	<	<	<	<	<	<	<	<
Lithium	<	<	<	<	.	.	.	.
Manganese	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	0.2	0.14	0.09 J	0.24
Strontium	0.0235	0.0226	0.0224	0.0224	0.018	0.018	0.016	0.019
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-322	GW-514	GW-521		GW-522		GW-540	
Functional Area	CRSP	FCAP	LIV		LIV		LII	
Date Sampled	05/08/06	05/01/06	01/09/06	07/10/06	01/09/06	07/10/06	01/18/06	07/18/06
Program	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	9:05	8:55	12:55	10:00	10:25	13:00	10:20	10:30
Measuring Point Elev. (ft)	1,134.25	1,001.22	1,182.88	1,182.88	1,175.48	1,175.48	1,072.31	1,072.31
Depth to Water (ft)	146.66	18.70	90.92	86.51	111.23	107.32	84.85	85.78
Groundwater Elevation (ft)	987.59	982.52	1,091.96	1,096.37	1,064.25	1,068.16	987.46	986.53
Conductivity (μmho/cm)	548	369	617	169	318	204	459	264
Dissolved Oxygen (ppm)	4.21	0.21	12.27	8.92	5.56	7.64	1.92	3.15
Oxidation/Reduction (mV)	117	-43	162	135	127	112	192	-12
Temperature (degrees C)	15.6	13.9	15	16.8	15.2	18.4	10.5	19.6
Turbidity (NTU)	.	.	7	9	17	7	11	3
pH	7.28	7.74	8.28	7.63	7.09	7.53	7.58	7.91
Miscellaneous Analytes								
Dissolved Solids (mg/L)	293	184	110	160	150	200	220	240
Suspended Solids (mg/L)	1	1	<	<	<	<	<	<
Turbidity (NTU)	2.78	14.4	5.2	1.4	1.6	0.16	0.35	0.08 J
Major Ions (mg/L)								
Calcium	59.7	40.3	29	29	36	40	46	46
Magnesium	36.6	23.9	22	21	22	24	31	30
Potassium	<	<	1.1 J	0.94 J	0.87 J	0.8 J	1.8 J	1.7 J
Sodium	0.715	0.53	4.2 J	2.6 J	0.65 J	0.63 J	11	14
Bicarbonate	297	196	160	160	160	190	240	240
Carbonate	<	<	<	<	<	<	<	<
Chloride	1.93	0.99	1.4 J	2.3 J	1.4 J	2.3 J	2.4 J	1.5 J
Fluoride	<	<	<	<	<	0.13 J	<	<
Nitrate as N	0.425	<	0.22 J	0.35 J	0.38 J	0.51	<	<
Sulfate	1.16	2.99	1.9 J	2.3 J	1.9 J	3.2 J	4.1 J	3.1 J
Charge Balance Error (%)	-0.2	-0.1	2.6	-0.4	5.1	0.6	4.1	5
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.0175	0.00742	<	0.0072 J	0.01	0.01	0.014	0.012
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Iron	0.0952	1.46	0.16	<	<	<	<	<
Lead	0.000595	<	0.0032	<	<	<	<	<
Lithium	<	<	.	.	.	.	.	.
Manganese	<	0.00913	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<
Strontium	0.0209	0.0246	0.01	0.011	0.015	0.018	0.035	0.033
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-542				GW-543		GW-544	
Functional Area	CDLVI				CDLVI		CDLVI	
Date Sampled	01/17/06		07/17/06		01/18/06	07/17/06	01/18/06	07/18/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup		Dup				
Field Measurements								
Time Sampled	12:45	.	10:00	.	10:25	12:45	10:20	8:40
Measuring Point Elev. (ft)	1,051.81	.	1,051.81	.	1,024.01	1,024.01	1,045.19	1,045.19
Depth to Water (ft)	70.85	.	71.65	.	60.58	65.99	57.61	59.05
Groundwater Elevation (ft)	980.96	.	980.16	.	963.43	958.02	987.58	986.14
Conductivity (µmho/cm)	419	.	130	.	947	284	374	503
Dissolved Oxygen (ppm)	4.66	.	8	.	6.97	7.08	6.5	6.86
Oxidation/Reduction (mV)	194	.	158	.	179	127	164	195
Temperature (degrees C)	14	.	16.3	.	12.9	19.3	8.3	18.7
Turbidity (NTU)	15	.	2	.	3	3	17	1
pH	6.51	.	6.5	.	7.14	7.02	7.43	7.14
Miscellaneous Analytes								
Dissolved Solids (mg/L)	110	71	140	130	240	270	370	480
Suspended Solids (mg/L)	2.4 J	5.2	2.4 J	1.6 J	<	<	<	<
Turbidity (NTU)	2.7	2.9	0.2	0.11	0.11	0.06 J	0.07 J	0.13
Major Ions (mg/L)								
Calcium	27	28	29	27	55	59	76	88
Magnesium	14	14	14	13	32	32	43	47
Potassium	2.2 J	<	1.9 J	1.7 J	0.8 J	0.81 J	1.9 J	1.7 J
Sodium	0.89 J	<	0.78 J	0.75 J	2.1 J	2.1 J	8.5	11
Bicarbonate	120	110	120	120	250	250	260	260
Carbonate	<	<	<	<	<	<	<	<
Chloride	0.94 J	0.96 J	1 J	0.95 J	1.6 J	1.6 J	13	13
Fluoride	<	<	<	<	<	<	<	<
Nitrate as N	0.3 J	0.3 J	0.3 J	0.3 J	0.23 J	0.26 J	0.46 J	0.44 J
Sulfate	2.7 J	2.7 J	1.3 J	1.3 J	6.5	7	96 Q	110
Charge Balance Error (%)	1.8	5.1	4	0.4	2.8	4.4	1	5.4
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.016	0.016	0.014	0.013	0.011	0.012	0.019	0.02
Boron	<	<	<	<	<	<	0.34	0.58
Chromium	<	0.0094	<	<	<	<	<	<
Iron	0.13	0.15	<	0.055 J	<	<	<	<
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<
Strontium	0.02	0.019	0.02	0.018	0.033	0.036	0.043	0.047
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-557		GW-560		GW-562		GW-564	
Functional Area	LV		CDLVII		CDLVII		CDLVII	
Date Sampled	01/10/06	07/13/06	01/12/06	07/17/06	01/17/06	07/17/06	01/12/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup
Field Measurements								
Time Sampled	9:40	13:45	10:10	9:45	14:00	11:30	13:05	.
Measuring Point Elev. (ft)	1,081.36	1,081.36	949.05	949.05	934.69	934.69	938.07	.
Depth to Water (ft)	124.27	124.18	49.69	49.75	11.15	10.69	12.10	.
Groundwater Elevation (ft)	957.09	957.18	899.36	899.30	923.54	924.00	925.97	.
Conductivity (μmho/cm)	682	199	327	317	387	374	267	.
Dissolved Oxygen (ppm)	12.04	9.21	5.07	5.18	4.08	3.71	5.61	.
Oxidation/Reduction (mV)	213	166	204	278	262	265	181	.
Temperature (degrees C)	14.1	17.3	14.2	18.2	13.4	16.9	15.6	.
Turbidity (NTU)	2	8	14	2	34	38	2	.
pH	7.6	7.28	6.98	7.25	7.21	7.53	6.23	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	150	180	160	170	190	210	140	130
Suspended Solids (mg/L)	<	<	<	<	17	17	<	<
Turbidity (NTU)	1.2	0.14	<	<	20	30	0.91	0.89
Major Ions (mg/L)								
Calcium	37	40	41	43	43	45	34	33
Magnesium	21	22	18	18	25	25	13	13
Potassium	1.3 J	1.2 J	1.7 J	1.1 J	1.1 J	0.6 J	1.4 J	1.3 J
Sodium	0.67 J	0.54 J	0.63 J	0.56 J	4 J	1.7 J	1.2 J	1.2 J
Bicarbonate	180	180	170	160	200	200	120	120
Carbonate	<	<	<	<	<	<	<	<
Chloride	1.3 J	2.2 J	1.2 J	1.1 J	1.5 J	2.5 J	2.4 J	2.4 J
Fluoride	0.087 J	0.13 J	0.11 J	<	<	<	0.088 J	0.086 J
Nitrate as N	0.47 J	0.53	0.18 J	0.17 J	0.16 J	0.17 J	0.57	0.57
Sulfate	2 J	2.5 J	2.4 J	1.3 J	1.6 J	0.23 J	11	11
Charge Balance Error (%)	-1.1	1.4	1.4	5.9	3.8	3.6	2	1.1
Trace Metals (mg/L)								
Aluminum	<	<	<	<	1.6	0.82	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.011	0.01	0.25	0.25	0.019	0.014	0.019	0.019
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Iron	<	<	<	<	2	1	<	<
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	<	<	<	<	0.036	0.016	<	<
Nickel	<	<	<	<	<	<	<	<
Strontium	0.018	0.019	0.026	0.027	0.025	0.024	0.049	0.048
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-564		GW-609		GW-612	GW-709	
Functional Area	CDLVII		CRSP		CRSP	LII	
Date Sampled	07/13/06		05/02/06		05/03/06	01/11/06	07/18/06
Program	BJC	BJC	GWPP	GWPP	GWPP	BJC	BJC
Sample Type		Dup		Dup			
Field Measurements							
Time Sampled	10:10	.	9:10	9:10	9:30	10:10	9:50
Measuring Point Elev. (ft)	938.07	.	1,112.31	1,112.31	1,131.03	906.81	906.81
Depth to Water (ft)	11.73	.	160.58	160.58	118.13	29.55	29.92
Groundwater Elevation (ft)	926.34	.	951.73	951.73	1,012.90	877.26	876.89
Conductivity (μmho/cm)	271	.	408	408	460	765	368
Dissolved Oxygen (ppm)	5.69	.	4.12	4.12	4.29	2.6	3.69
Oxidation/Reduction (mV)	392	.	98	98	60	170	247
Temperature (degrees C)	17.5	.	15.2	15.2	15.8	11.8	20.9
Turbidity (NTU)	1	.	.	.	.	9	1
pH	6.78	.	7.56	7.56	7.45	8.19	7.82
Miscellaneous Analytes							
Dissolved Solids (mg/L)	150	150	209	207	242	180	210
Suspended Solids (mg/L)	<	<	<	<	3	<	<
Turbidity (NTU)	0.2	0.68	0.194	0.171	24	0.41	0.31
Major Ions (mg/L)							
Calcium	36	37	44.1	42.7	51.9	31	34
Magnesium	14	14	25.8	25.3	30.8	29	31
Potassium	1.2 J	1.2 J	<	<	<	1.3 J	1.2 J
Sodium	0.99 J	0.99 J	1.1	1.07	0.602	3.1 J	3.2 J
Bicarbonate	130	130	212	212	254	190	190
Carbonate	<	<	<	<	<	<	<
Chloride	2.8 J	2.8 J	1.44	1.16	1.93	2.9 J	2.8 J
Fluoride	0.14 J	0.14 J	<	<	<	<	<
Nitrate as N	0.47 J	0.47 J	1.19	1	0.124	0.043 J	<
Sulfate	6.8	6.8	2.42	2.45	2.42	9.3	8.4
Charge Balance Error (%)	2.8	3.6	-0.5	-1.5	-0.4	0.3	4.3
Trace Metals (mg/L)							
Aluminum	<	<	<	<	<	<	<
Arsenic	<	<	<	<	<	<	<
Barium	0.016	0.018	0.0144	0.0139	0.0172	0.6	0.61
Boron	<	<	<	<	0.246	<	<
Chromium	<	<	<	<	<	<	<
Iron	<	<	<	<	2.1	<	0.13
Lead	<	<	<	<	0.00691	<	<
Lithium	.	.	<	<	<	.	.
Manganese	<	<	<	<	0.075	<	0.0075 J
Nickel	<	<	<	<	<	<	<
Strontium	0.041	0.042	0.0149	0.0146	0.0294	0.044	0.044
Thallium	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-731		GW-732		GW-757		GW-796	
Functional Area	CRSDB		CRSDB		LII		LV	
Date Sampled	04/11/06	10/19/06	04/06/06	10/19/06	01/11/06	07/11/06	01/11/06	07/12/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	10:20	10:10	10:35	14:00	13:00	13:40	13:00	13:20
Measuring Point Elev. (ft)	1,049.38	1,049.38	1,064.29	1,064.29	961.64	961.64	1,052.62	1,052.62
Depth to Water (ft)	124.00	125.55	157.38	157.89	84.53	84.93	85.31	82.44
Groundwater Elevation (ft)	925.38	923.83	906.91	906.40	877.11	876.71	967.31	970.18
Conductivity (μmho/cm)	275	141	399	172	587	303	141	234
Dissolved Oxygen (ppm)	7.38	8.59	9.99	9.3	1.83	2.82	7.2	8.97
Oxidation/Reduction (mV)	271	153	185	160	100	220	127	285
Temperature (degrees C)	14.9	15.6	13.9	15.2	16.5	19.6	15.4	18.1
Turbidity (NTU)	8	5	6	5	5	2	8	7
pH	7.92	7.66	7.84	7.83	10.27	9.93	8.59	8.08
Miscellaneous Analytes								
Dissolved Solids (mg/L)	156	162	181	165	150	170	110	130
Suspended Solids (mg/L)	<	<	<	<	<	<	1.2 J	6
Turbidity (NTU)	.	.	.	.	0.34	0.17	3.2	8.2
Major Ions (mg/L)								
Calcium	29.4	25.9	34.2	33	2.3	2.4	23	25
Magnesium	17.2	15.4	22.6	20	1.6	1.7	14	15
Potassium	1.05	1.87	1.32	1.79	20	18	5.2	1.1 J
Sodium	0.648	1.05	0.582	0.713	45	45	1.1 J	0.58 J
Bicarbonate	.	.	.	.	38	37	120	120
Carbonate	.	.	.	.	70	71	7	<
Chloride	.	.	.	.	1.5 J	1.5 J	1.5 J	2.1 J
Fluoride	.	.	.	.	1.7	1.6	<	0.11 J
Nitrate as N	.	.	.	.	0.29 J	0.26 J	0.082 J	0.064 J
Sulfate	.	.	.	.	17	17	1.1 J	0.85 J
Charge Balance Error (%)	.	.	.	.	-2.4	-1.2	-2.6	1
Trace Metals (mg/L)								
Aluminum	<	<	<	<	<	<	0.34	0.37
Arsenic	<	<	<	<	<	0.0056 J	<	<
Barium	0.0084	0.0098	0.0105	0.0109	0.052	0.049	<	0.0085 J
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<	<
Iron	<	0.0542	<	<	<	<	0.2	0.28
Lead	<	<	<	<	<	<	<	<
Lithium	<	<	<	<	.	.	.	.
Manganese	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<
Strontium	0.0176	0.0259	0.0155	0.0151	0.11	0.11	0.014	0.014
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-797		GW-798		GW-799		GW-801	
Functional Area	LV		CDLVII		LV		LV	
Date Sampled	01/23/06	07/12/06	01/12/06	07/13/06	01/10/06	07/12/06	01/11/06	07/12/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Field Measurements								
Time Sampled	10:10	10:30	13:15	13:40	10:50	10:45	10:25	13:30
Measuring Point Elev. (ft)	1,060.00	1,060.00	1,006.00	1,006.00	981.29	981.29	1,097.16	1,097.16
Depth to Water (ft)	75.35	76.21	82.67	81.95	20.95	21.76	116.35	115.04
Groundwater Elevation (ft)	984.65	983.79	923.33	924.05	960.34	959.53	980.81	982.12
Conductivity (μmho/cm)	297	479	158	265	567	170	206	178
Dissolved Oxygen (ppm)	5.3	5.29	8.1	4.81	5.49	5.71	7.9	7.79
Oxidation/Reduction (mV)	106	325	169	275	179	124	168	143
Temperature (degrees C)	12.5	21.6	16	17.8	14.2	21.6	12.9	19.1
Turbidity (NTU)	9	2	10	2	10	10	6	7
pH	7.62	7.45	7.9	7.55	8.49	7.92	7.76	7.45
Miscellaneous Analytes								
Dissolved Solids (mg/L)	280	300	130	140	130	150	140	150
Suspended Solids (mg/L)	<	<	<	<	4.4	<	<	<
Turbidity (NTU)	0.22	0.32	0.19	0.19	5.9	1.6	0.18	0.19
Major Ions (mg/L)								
Calcium	50	52	28	33	32	33	32	33
Magnesium	30	30	16	17	17	17	18	19
Potassium	1.4 J	1.5 J	1.6 J	1.4 J	0.81 J	0.83 J	0.62 J	0.75 J
Sodium	5.4	4.8 J	0.51 J	0.46 J	0.55 J	0.49 J	0.67 J	0.65 J
Bicarbonate	190	190	130	130	140	140	150	150
Carbonate	<	<	<	<	<	<	<	<
Chloride	7.3	6.9	1 J	1.9 J	1.1 J	1.1 J	1.1 J	1.2 J
Fluoride	0.082 J	0.11 J	0.083 J	0.14 J	0.11 J	0.15 J	<	0.11 J
Nitrate as N	2.2	2	0.67	0.72	1.1	1.1	0.086 J	0.099 J
Sulfate	50	47	2.1 J	2.7 J	2.9 J	2.7 J	2.8 J	2.7 J
Charge Balance Error (%)	0.3	1.8	1	5.7	1.1	1.9	0.5	2.5
Trace Metals (mg/L)								
Aluminum	<	<	<	<	0.44	<	<	<
Arsenic	<	<	<	<	<	<	<	<
Barium	0.012	0.011	0.01	0.01	<	0.0052 J	<	<
Boron	<	<	<	<	<	<	<	<
Chromium	<	<	<	<	0.048	0.042	<	<
Iron	<	0.067 J	<	<	0.31	<	<	<
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	.	.	.	.	.	.
Manganese	<	<	<	<	<	<	<	<
Nickel	<	<	<	<	<	<	<	<
Strontium	0.033	0.032	0.016	0.018	0.021	0.022	0.017	0.018
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	GW-827		GW-831		MCK 2.0		MCK 2.05	
Functional Area	CDLVI		FCAP		EXP-SW		EXP-SW	
Date Sampled	01/17/06	07/17/06	01/09/06	07/10/06	02/13/06	09/11/06	02/13/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								Dup
Field Measurements								
Time Sampled	13:05	13:00	12:55	10:10	9:05	10:20	8:50	.
Measuring Point Elev. (ft)	1,051.60	1,051.60	1,091.29	1,091.29	.	.	.	.
Depth to Water (ft)	44.95	44.08	131.06	130.14	.	.	.	.
Groundwater Elevation (ft)	1,006.65	1,007.52	960.23	961.15	.	.	.	.
Conductivity (μmho/cm)	190	182	193	355	332	346	454	.
Dissolved Oxygen (ppm)	6.3	4.58	4.3	1.03	6.8	8.9	6.9	.
Oxidation/Reduction (mV)	207	161	216	104	99.5	1.8	121	.
Temperature (degrees C)	13.2	17.1	15.7	17.8	7.28	17.1	9.18	.
Turbidity (NTU)	14	4	7	1	11.5	1.78	4.78	.
pH	7.31	7.79	8.47	8.1	7.46	6.98	6.39	.
Miscellaneous Analytes								
Dissolved Solids (mg/L)	140	160	205	200	235	249	232	311
Suspended Solids (mg/L)	<	<	<	<	62.2	47.7	109	21.2
Turbidity (NTU)	0.42	0.06 J	.	.	.	.	.	.
Major Ions (mg/L)								
Calcium	33	36	36.2	34.4	43.5	49.6	41.2	41.1
Magnesium	20	20	25.5	25.4	14.4	16.1	14.8	14.6
Potassium	1.4 J	1.2 J	1.56	1.52	4.47	4.68	4.19	4.07
Sodium	0.79 J	0.66 J	0.447	0.455	1.66	1.97	1.57	1.54
Bicarbonate	160	160	.	.	160	171	168	160
Carbonate	<	<	.	.	<	<	<	<
Chloride	0.71 J	0.67 J	.	.	1.5	1.4	1.4	1.5
Fluoride	<	<	.	.	0.13	0.14	0.16	0.13
Nitrate as N	0.082 J	0.077 J	.	.	.	.	.	.
Sulfate	1.3 J	<	.	.	26.3	21.4	19.8	19.7
Charge Balance Error (%)	1.7	4.1	.	.	-3.4	1.2	-5.1	-3.3
Trace Metals (mg/L)								
Aluminum	<	<	<	<	0.94	<	<	<
Arsenic	<	<	<	<	0.0762	0.0207	0.141	0.745
Barium	<	0.0084 J	0.0181	0.0177	0.18	0.0799	0.0998	0.155
Boron	<	<	<	<	0.222	0.225	0.214	0.206
Chromium	<	<	<	<	<	<	<	<
Iron	<	0.13	0.0706	0.0787	3.3	0.238	4.37	28.3
Lead	<	<	<	<	<	<	<	<
Lithium	.	.	<	<	0.0784	0.0819	0.0739	0.0691
Manganese	<	<	0.0133	0.0084	4.01	0.281	1.58	2.3
Nickel	<	<	<	<	<	<	<	<
Strontium	0.019	0.019	0.0248	0.0237	0.839	0.942	0.823	0.802
Thallium	<	<	<	<	<	<	<	<
Uranium	<	<	<	<	<	<	<	<
Zinc	<	<	<	<	0.0709	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	MCK 2.05		S17	SCR1.25SP		SCR1.5SW	SCR2.1SP
Functional Area	EXP-SW		EXP-SW	EXP-SW		EXP-SW	EXP-SW
Date Sampled	09/11/06		04/20/06	02/13/06	09/12/06	04/20/06	04/20/06
Program	BJC	BJC	GWPP	BJC	BJC	GWPP	GWPP
Sample Type		Dup					
Field Measurements							
Time Sampled	10:00	.	8:15	10:10	9:10	9:10	9:30
Measuring Point Elev. (ft)	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.
Conductivity (μmho/cm)	366	.	338	298	335	300	381
Dissolved Oxygen (ppm)	3.6	.	5.73	11.2	7	5.94	5.23
Oxidation/Reduction (mV)	1.6	.	172	17.6	125.2	135	118
Temperature (degrees C)	18.28	.	15.9	11.75	18.09	14.8	14.8
Turbidity (NTU)	6.25	.	.	4.4	17.7	.	.
pH	6.24	.	7.21	7.27	6	8.08	7.56
Miscellaneous Analytes							
Dissolved Solids (mg/L)	232	228	161	143	235	152	165
Suspended Solids (mg/L)	<	<	1	5.4	16	<	8
Turbidity (NTU)	.	.	1.66	.	.	1.16	17.3
Major Ions (mg/L)							
Calcium	45	46	38.1	28.3	43.5	33.9	44.8
Magnesium	15.8	15.7	15.5	12.1	19.6	13.3	19.2
Potassium	4.39	4.45	<	0.748	1.14	<	<
Sodium	1.8	1.82	0.818	1.43	1.23	1.12	1.15
Bicarbonate	179	175	143	114	185	137	180
Carbonate	<	<	<	<	<	<	<
Chloride	1.6	1.7	1.38	2.6	2.2	1.87	1.68
Fluoride	0.14	0.13	<	<	<	<	<
Nitrate as N	.	.	2.28	0.086	0.096	<	0.303
Sulfate	19.7	18.7	4.99	9.1	5	6	6.09
Charge Balance Error (%)	-3.9	-2.1	0.8	-1.2	0	-1.4	0.9
Trace Metals (mg/L)							
Aluminum	<	<	<	<	<	<	<
Arsenic	0.0769	0.125	<	<	<	<	<
Barium	0.0952	0.099	0.0546	0.0388	0.078	0.0433	0.0404
Boron	0.21	0.213	<	<	<	<	<
Chromium	<	<	<	<	<	<	<
Iron	2.14	4.03	0.0775	0.0609	0.32	0.0607	0.143
Lead	<	<	<	<	<	0.000675	0.0103
Lithium	0.0725	0.0751	<	<	<	<	<
Manganese	1.26	1.24	0.0106	0.0088	0.11	<	0.0121
Nickel	<	<	<	<	<	<	<
Strontium	0.849	0.878	0.0472	0.0369	0.0513	0.0424	0.0502
Thallium	<	<	<	<	<	<	<
Uranium	<	<	0.00079	<	<	0.00107	0.00236
Zinc	<	<	<	<	<	<	<

APPENDIX F.1: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Field Measurements, Miscellaneous Analytes, Major Ions, and Trace Metals

Sampling Point	SCR2.2SP		SCR3.5SP		SCR3.5SW	SCR4.3SP	
Functional Area	EXP-SW		EXP-SW		EXP-SW	EXP-SW	
Date Sampled	04/20/06		02/13/06	09/12/06	04/20/06	01/10/06	07/18/06
Program	GWPP	GWPP	BJC	BJC	GWPP	BJC	BJC
Sample Type		Dup					
Field Measurements							
Time Sampled	8:55	8:55	9:30	10:00	8:30	13:50	11:20
Measuring Point Elev. (ft)	.	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.	.
Groundwater Elevation (ft)	.	.	.	.	.	.	.
Conductivity (μmho/cm)	360	360	320	334	361	178	348
Dissolved Oxygen (ppm)	4.57	4.57	6.3	7.6	5.82	6.4	6.37
Oxidation/Reduction (mV)	142	142	77.2	101.9	151	180	282
Temperature (degrees C)	13.9	13.9	5.59	18.42	14.9	14.4	17.8
Turbidity (NTU)	.	.	2.82	2.47	.	23	6
pH	7.32	7.32	7.84	7.03	7.79	6.88	7.07
Miscellaneous Analytes							
Dissolved Solids (mg/L)	191	194	214	244	196	140	230
Suspended Solids (mg/L)	<	<	6.3	47.5	<	8.8	<
Turbidity (NTU)	1.64	1.48	.	.	0.857	18	3.6
Major Ions (mg/L)							
Calcium	49.6	51.1	44.8	48.8	46.2	39	50
Magnesium	10.9	11	14.2	16.5	13.8	12	15
Potassium	<	<	1.86	2.2	<	1.6 J	1.7 J
Sodium	1.65	1.68	1.16	1.34	1.13	1.6 J	2.5 J
Bicarbonate	160	161	158	187	159	120	140
Carbonate	<	<	<	<	<	<	<
Chloride	2.12	2.13	1.7	1.9	1.3	3.5	5.2
Fluoride	<	0.108	0.14	0.15	<	0.11 J	0.17 J
Nitrate as N	0.865	0.845	0.47	0.13	0.314	0.88	0.78
Sulfate	7.68	7.67	14.3	9.6	13	18	21
Charge Balance Error (%)	-0.5	0.3	-0.6	-1.3	-0.3	1.7	5.9
Trace Metals (mg/L)							
Aluminum	<	<	<	<	<	0.91	<
Arsenic	0.00816	0.00678	<	<	<	<	<
Barium	0.0305	0.0306	0.0718	0.0883	0.0748	0.12	0.15
Boron	<	<	<	<	<	<	<
Chromium	<	<	<	<	<	<	<
Iron	<	<	0.0729	0.158	0.0898	0.45	0.1
Lead	0.041	0.0399	<	<	<	<	<
Lithium	<	<	0.0189	0.0227	0.0162	.	.
Manganese	<	<	0.0266	0.0716	0.0402	<	<
Nickel	<	<	<	<	<	<	<
Strontium	0.0634	0.0643	0.276	0.324	0.254	0.099	0.13
Thallium	<	<	<	<	<	<	<
Uranium	0.000675	0.000665	<	<	0.000545	<	<
Zinc	<	<	<	<	<	<	<

APPENDIX F.2

VOLATILE ORGANIC COMPOUNDS

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-141		GW-143		GW-144		GW-145		GW-175
Functional Area	LIV		KHQ		KHQ		KHQ		CRSP
Date Sampled	01/12/06	07/11/06	04/06/06	10/16/06	04/06/06	10/16/06	04/10/06	10/12/06	05/01/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	GWPP
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	7
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	1 J	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	<	.	<	.	<	.	<
Trichlorofluoromethane	<	<	.	.	.	.	.	.	6
Acetone	<	<	<	<	<	<	<	<	<
Ethyl methacrylate	<	<	.	.	.	.	.	.	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-177		GW-178	GW-217		GW-231			
Functional Area	CRSP		CRSP	LIV		KHQ			
Date Sampled	03/06/06	07/06/06	05/02/06	01/10/06	07/11/06	04/10/06		10/12/06	
Program	BJC	BJC	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type							Dup		Dup
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	6	<	2 J	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	6	<	6	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	23	18	8	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	<	<	.	.	<	<	.	.
Trichlorofluoromethane	.	.	<	<	<	.	.	.	.
Acetone	<	<	<	<	3.5 J	1 J	2 J	<	<
Ethyl methacrylate	.	.	<	<	<	.	.	.	.

APPENDIX F.2: CY 2006 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	01/09/06		07/10/06		01/09/06	04/12/06	07/11/06	10/31/06	05/08/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC	GWPP
Sample Type		Dup		Dup					
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	10
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	6.6	5.8	5.9	3.2	71
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	17	16	16	13	42
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	20	21	24	21	97
1,4-Dioxane	.	.	.	.	.	.	.	.	<
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	2.2 J	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	<	.	.	.	.	6
Trichlorofluoromethane	.	.	.	.	<	<	<	<	36
Acetone	<	<	<	<	<	<	<	<	<
Ethyl methacrylate	.	.	.	.	<	<	<	<	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-514	GW-521		GW-522		GW-540		GW-542	
Functional Area	FCAP	LIV		LIV		LII		CDLVI	
Date Sampled	05/01/06	01/09/06	07/10/06	01/09/06	07/10/06	01/18/06	07/18/06	01/17/06	
Program	GWPP	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	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	.	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	<
Ethyl methacrylate	<	<	<	<	<	<	<	<	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-542		GW-543		GW-544		GW-557	
Functional Area	CDLVI		CDLVI		CDLVI		LV	
Date Sampled	07/17/06		01/18/06	07/17/06	01/18/06	07/18/06	01/10/06	07/13/06
Program	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	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	4.8	3.6	<	<
Chloromethane	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Acetone	42 Q	21 Q	<	<	<	<	<	<
Ethyl methacrylate	<	<	<	<	<	<	<	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-560		GW-562		GW-564			
Functional Area	CDLVII		CDLVII		CDLVII			
Date Sampled	01/12/06	07/17/06	01/17/06	07/17/06	01/12/06		07/13/06	
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type						Dup		Dup
Chloroethenes (µg/L)								
Tetrachloroethene	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)								
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<
Ethyl methacrylate	<	<	<	<	<	<	<	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-609		GW-612	GW-709		GW-757		GW-796	
Functional Area	CRSP		CRSP	LII		LII		LV	
Date Sampled	05/02/06		05/03/06	01/11/06	07/18/06	01/11/06	07/11/06	01/11/06	07/12/06
Program	GWPP	GWPP	GWPP	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type		Dup							
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	3 J	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	28	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	19	<	<	<	<	0.4 J	0.5 J
1,2-Dichloroethane	<	<	1 J	<	<	<	<	<	<
1,1-Dichloroethane	<	<	57	<	<	<	<	<	0.28 J
1,4-Dioxane	.	.	40	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	<	.	.	.	.	.	.
Trichlorofluoromethane	<	<	<	<	<	<	<	<	<
Acetone	<	<	<	<	<	<	<	<	3.3 J
Ethyl methacrylate	<	<	<	<	<	<	<	<	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-797		GW-798		GW-799		GW-801	
Functional Area	LV		CDLVII		LV		LV	
Date Sampled	01/23/06	07/12/06	01/12/06	07/13/06	01/10/06	07/12/06	01/11/06	07/12/06
Program	BJC	BJC	BJC	BJC	BJC	BJC	BJC	BJC
Sample Type								
Chloroethenes (µg/L)								
Tetrachloroethene	<	<	3.2	4.4	<	<	<	<
Trichloroethene	<	<	0.24 J	0.41 J	<	<	<	<
cis-1,2-Dichloroethene	<	<	2.3	3.3	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	0.34 J	<	<	<	<
1,1-Dichloroethene	<	<	1.2	0.48 J	<	<	<	<
Chloroethanes (µg/L)								
1,1,1-Trichloroethane	<	<	0.75 J	1.1	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	1.5 Q	<	2.8 Q
1,1-Dichloroethane	<	<	0.94 J	1.6	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)								
Carbon tetrachloride	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<
Chloromethane	0.38 J	<	<	<	<	<	<	<
Miscellaneous (µg/L)								
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	.	.	.	.	.	.
Trichlorofluoromethane	<	<	3.4	6.2	<	<	<	<
Acetone	<	3.8 J	<	<	<	<	<	<
Ethyl methacrylate	<	<	<	<	0.55 J	<	<	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	GW-827		GW-831		S17	SCR1.25SP		SCR1.5SW	SCR2.1SP
Functional Area	CDLVI		FCAP		EXP-SW	EXP-SW		EXP-SW	EXP-SW
Date Sampled	01/17/06	07/17/06	01/09/06	07/10/06	04/20/06	02/13/06	09/12/06	04/20/06	04/20/06
Program	BJC	BJC	BJC	BJC	GWPP	BJC	BJC	GWPP	GWPP
Sample Type									
Chloroethenes (µg/L)									
Tetrachloroethene	<	<	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<	<	<
Chloroethanes (µg/L)									
1,1,1-Trichloroethane	<	<	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.	.	.
Chloromethanes (µg/L)									
Carbon tetrachloride	<	<	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<	<	<
Miscellaneous (µg/L)									
1,1,2-Trichloro-1,2,2-trifluoroethane	.	.	<	<	<	.	.	<	<
Trichlorofluoromethane	<	<	.	.	<	.	.	<	<
Acetone	<	<	<	<	<	2 J	<	<	<
Ethyl methacrylate	<	<	.	.	<	.	.	<	<

APPENDIX F.2: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Volatile Organic Compounds

Sampling Point	SCR2.2SP		SCR3.5SP		SCR3.5SW	SCR4.3SP	
Functional Area	EXP-SW		EXP-SW	EXP-SW	EXP-SW	EXP-SW	
Date Sampled	04/20/06		02/13/06	09/12/06	04/20/06	01/10/06	07/18/06
Program	GWPP	GWPP	BJC	BJC	GWPP	BJC	BJC
Sample Type		Dup					
Chloroethenes (µg/L)							
Tetrachloroethene	<	<	<	<	<	<	<
Trichloroethene	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	<	<	<	<	<	<	<
trans-1,2-Dichloroethene	<	<	<	<	<	<	<
1,1-Dichloroethene	<	<	<	<	<	<	<
Chloroethanes (µg/L)							
1,1,1-Trichloroethane	<	<	<	<	<	<	<
1,2-Dichloroethane	<	<	<	<	<	<	<
1,1-Dichloroethane	<	<	<	<	<	<	<
1,4-Dioxane	.	.	.	.	.	.	.
Chloromethanes (µg/L)							
Carbon tetrachloride	<	<	<	<	<	<	<
Chloroform	<	<	<	<	<	<	<
Chloromethane	<	<	<	<	<	<	<
Miscellaneous (µg/L)							
1,1,2-Trichloro-1,2,2-trifluoroethane	<	<	.	.	<	.	.
Trichlorofluoromethane	<	<	.	.	<	<	<
Acetone	<	<	2 J	<	<	<	3 J
Ethyl methacrylate	<	<	.	.	<	0.53 J	<

APPENDIX F.3

RADIOLOGICAL ANALYTES

APPENDIX F.3: CY 2006 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	TPU	MDA	Result	TPU	MDA
1090	UNCS	03/01/06	BJC	<	.	2.72	5.28	1.75	2.57
1090	UNCS	07/20/06	BJC	2.5	1.26	1.77	6.25	1.62	2.32
GW-141	LIV	01/12/06	BJC	<	.	2.3	<	.	2.1
GW-141	LIV	07/11/06	BJC	<	.	2	<	.	2.8
GW-143	KHQ	04/06/06	BJC	3.44	1.26	1.25	19.1	2.43	2.66
GW-143	KHQ	10/16/06	BJC	<	.	2.46	15	3.54	3.96
GW-144	KHQ	04/06/06	BJC	2.19	1.02	1.37	3.72	1.37	2.08
GW-144	KHQ	10/16/06	BJC	<	.	2.2	<	.	3.94
GW-145	KHQ	04/10/06	BJC	11.2	2.63	2.22	20.7	3.52	4.51
GW-145	KHQ	10/12/06	BJC	6.63	1.63	0.979	13.4	2.74	2.59
GW-175	CRSP	05/01/06	GWPP	<	.	2.3	<	.	7.6
GW-177	CRSP	03/06/06	BJC	2.62	1.08	1.33	3.23	1.47	2.3
GW-177	CRSP	07/06/06	BJC	4.25	1.53	1.83	5.39	1.89	2.83
GW-178	CRSP	05/02/06	GWPP	<	.	2.2	<	.	6.8
GW-203	UNCS	03/01/06	BJC	<	.	1.8	8.15	1.66	2.25
GW-203	UNCS	07/25/06	BJC	3.9	1.44	1.88	5.58	1.54	2.22
GW-205	UNCS	03/02/06	BJC	<	.	2.83	61.4	5.77	5.42
GW-205	UNCS	07/24/06	BJC	9.16	2.1	1.73	143	7.97	2.18
GW-217	LIV	01/10/06	BJC	<	.	1.8	3.2	1.4	2.1
GW-217	LIV	07/11/06	BJC	<	.	2	<	.	1.8
GW-221	UNCS	03/01/06	BJC	<	.	1.09	7.34	1.76	2.52
GW-221	UNCS	07/25/06	BJC	2.64	1.09	1.38	6.81	1.52	2.09
GW-231	KHQ	04/10/06	BJC	1.59	0.97	1.33	<	.	3.1
GW-231 Dup	KHQ	04/10/06	BJC	2.45	1.48	2.11	<	.	3.99
GW-231	KHQ	10/12/06	BJC	<	.	1.02	<	.	2.28
GW-231 Dup	KHQ	10/12/06	BJC	<	.	1.03	<	.	2.26
GW-301	CRBAWP	01/09/06	BJC	3.3	1.16	1.37	2.82	1.42	2.25
GW-301 Dup	CRBAWP	01/09/06	BJC	1.31	0.71	0.88	<	.	2.17
GW-301	CRBAWP	07/10/06	BJC	5.39	3.24	3.75	1,460 Q	75.15	5.68
GW-301 Dup	CRBAWP	07/10/06	BJC	<	.	4.54	244 Q	17.55	5.83
GW-305	LIV	01/09/06	BJC	<	.	2.2	<	.	1.8
GW-305	LIV	04/12/06	BJC	<	.	2.4	23.3	3.1	1.8
GW-305	LIV	07/11/06	BJC	2	1.3	1.6	<	.	1.4
GW-305	LIV	10/31/06	BJC	<	.	2.1	<	.	2.1
GW-322	CRSP	05/08/06	GWPP	<	.	2.7	7.9	4.3	5.4
GW-514	FCAP	05/01/06	GWPP	<	.	2.4	<	.	6.2
GW-521	LIV	01/09/06	BJC	<	.	2.5	<	.	1.7
GW-521	LIV	07/10/06	BJC	<	.	1.1	1.9	1.2	1.8
GW-522	LIV	01/09/06	BJC	<	.	2.8	<	.	2.3
GW-522	LIV	07/10/06	BJC	<	.	2	<	.	2.3
GW-540	LII	01/18/06	BJC	<	.	2.7	3.1	1.4	2
GW-540	LII	07/18/06	BJC	<	.	2.8	<	.	3.9
GW-542	CDLVI	01/17/06	BJC	<	.	1.7	4.8	1.2	1.4
GW-542 Dup	CDLVI	01/17/06	BJC	<	.	1.7	7.3	1.5	1.6
GW-542	CDLVI	07/17/06	BJC	<	.	1.3	3.1	1.2	1.8
GW-542 Dup	CDLVI	07/17/06	BJC	<	.	1.3	<	.	1.7
GW-543	CDLVI	01/18/06	BJC	<	.	4	<	.	2.2
GW-543	CDLVI	07/17/06	BJC	<	.	2.7	<	.	2.9
GW-544	CDLVI	01/18/06	BJC	<	.	3.3	<	.	3.4
GW-544	CDLVI	07/18/06	BJC	<	.	3.2	<	.	4.5

APPENDIX F.3: CY 2006 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	TPU	MDA	Result	TPU	MDA
GW-557	LV	01/10/06	BJC	<	.	1.8	<	.	2.2
GW-557	LV	07/13/06	BJC	<	.	1.2	2.7	1.4	2.1
GW-560	CDLVII	01/12/06	BJC	<	.	3.2	<	.	2.4
GW-560	CDLVII	07/17/06	BJC	1.47	0.95	1.2	<	.	1.9
GW-562	CDLVII	01/17/06	BJC	<	.	3.2	<	.	2.6
GW-562	CDLVII	07/17/06	BJC	<	.	1.9	<	.	2.6
GW-564	CDLVII	01/12/06	BJC	<	.	2.5	<	.	2.2
GW-564 Dup	CDLVII	01/12/06	BJC	<	.	2	<	.	2.4
GW-564	CDLVII	07/13/06	BJC	<	.	1.5	2.1	1.2	1.8
GW-564 Dup	CDLVII	07/13/06	BJC	<	.	1.3	<	.	1.9
GW-609	CRSP	05/02/06	GWPP	<	.	2	<	.	7.1
GW-609 Dup	CRSP	05/02/06	GWPP	<	.	3	<	.	7
GW-612	CRSP	05/03/06	GWPP	<	.	2.8	<	.	6.4
GW-709	LII	01/11/06	BJC	3.5	1.7	2	3.9	1.1	1.4
GW-709	LII	07/18/06	BJC	2.7	1.5	1.8	2.4	1.3	2
GW-757	LII	01/11/06	BJC	2.6	1.4	1.8	11.8	2	1.8
GW-757	LII	07/11/06	BJC	2	1.1	1.2	15.9	2.3	1.4
GW-796	LV	01/11/06	BJC	<	.	1.6	5.2	1.3	1.6
GW-796	LV	07/12/06	BJC	1.5	1	1.4	<	.	1.5
GW-797	LV	01/23/06	BJC	<	.	3.3	<	.	3.1
GW-797	LV	07/12/06	BJC	<	.	2.3	<	.	1.8
GW-798	CDLVII	01/12/06	BJC	<	.	2.8	5.4	1.7	2.3
GW-798	CDLVII	07/13/06	BJC	<	.	1.3	<	.	1.8
GW-799	LV	01/10/06	BJC	<	.	2.1	<	.	2
GW-799	LV	07/12/06	BJC	1.31	0.9	1.2	2.1	1.3	2
GW-801	LV	01/11/06	BJC	<	.	1.5	<	.	1.6
GW-801	LV	07/12/06	BJC	<	.	1.5	<	.	1.5
GW-827	CDLVI	01/17/06	BJC	<	.	2	5.4	1.3	1.4
GW-827	CDLVI	07/17/06	BJC	<	.	1.5	2.2	1.2	1.9
GW-831	FCAP	01/09/06	BJC	2.46	0.98	1.11	<	.	2.49
GW-831	FCAP	07/10/06	BJC	11.5 Q	4.52	3.4	2,300 Q	114.74	5.89
MCK 2.0	EXP-SW	02/13/06	BJC	3.21	1.19	1.42	9.17	1.59	1.96
MCK 2.0	EXP-SW	09/11/06	BJC	<	.	1.71	7.07	1.68	2.39
MCK 2.05	EXP-SW	02/13/06	BJC	<	.	2.17	8.19	1.77	2.47
MCK 2.05 Dup	EXP-SW	02/13/06	BJC	1.76	1	1.38	9.04	1.76	2.33
MCK 2.05	EXP-SW	09/11/06	BJC	2.32	1.08	1.41	5.87	1.65	2.43
MCK 2.05 Dup	EXP-SW	09/11/06	BJC	2.76	1.18	1.54	7.84	1.52	1.97
S17	EXP-SW	04/20/06	GWPP	4.3	3.3	2.2	<	.	5.1
SCR1.25SP	EXP-SW	02/13/06	BJC	<	.	1.68	<	.	2.42
SCR1.25SP	EXP-SW	09/12/06	BJC	5.37	1.47	1.38	3.69	1.53	2.37
SCR1.5SW	EXP-SW	04/20/06	GWPP	<	.	2.6	<	.	7.3
SCR2.1SP	EXP-SW	04/20/06	GWPP	3.4 R	3.7	3.2	<	.	6.6
SCR2.2SP	EXP-SW	04/20/06	GWPP	<	.	2.2	<	.	6.6
SCR2.2SP Dup	EXP-SW	04/20/06	GWPP	6.5	4.6	3.1	<	.	8.6
SCR3.5SP	EXP-SW	02/13/06	BJC	1.33	0.72	0.89	4.15	1.37	2.04
SCR3.5SP	EXP-SW	09/12/06	BJC	2.02	0.98	1.31	4.42	1.35	1.96
SCR3.5SW	EXP-SW	04/20/06	GWPP	<	.	2.4	<	.	5.2
SCR4.3SP	EXP-SW	01/10/06	BJC	<	.	2.1	<	.	2.1
SCR4.3SP	EXP-SW	07/18/06	BJC	<	.	1.6	2.5	1.2	1.8

APPENDIX F.3: CY 2006 MONITORING DATA FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
Radiological Analytes: Isotopic Analyses

Sampling Point	1090						GW-203					
Functional Area	UNCS						UNCS					
Date Sampled	03/01/06			07/20/06			03/01/06			07/25/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	2.72	2.5	1.26	1.77	<	.	1.8	3.9	1.44	1.88
Gross Beta	5.28	1.75	2.57	6.25	1.62	2.32	8.15	1.66	2.25	5.58	1.54	2.22
Cesium-137	.	.	.	.	.	.	.	.	.	.	.	.
Cobalt-60	.	.	.	.	.	.	.	.	.	.	.	.
Potassium-40	.	.	.	.	.	.	.	.	.	.	.	.
Strontium-89/90	<	.	1.03	1.21	0.7	1.1	<	.	1.36	1.34	0.64	0.96
Technetium-99	.	.	.	.	.	.	.	.	.	.	.	.
Uranium-234	0.52	0.36	0.37	0.65	0.39	0.31	0.67	0.42	0.29	0.48	0.32	0.27
Uranium-235	<	.	0.37	<	.	0.38	<	.	0.35	<	.	0.28
Uranium-236	<	.	0.34	<	.	0.31	<	.	0.19	<	.	0.15
Uranium-238	<	.	0.36	<	.	0.31	<	.	0.37	<	.	0.32

Sampling Point	GW-205						GW-221					
Functional Area	UNCS						UNCS					
Date Sampled	03/02/06			07/24/06			03/01/06			07/25/06		
Program	BJC			BJC			BJC			BJC		
Sample Type												
Result (pCi/L)	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA	Activity	TPU	MDA
Gross Alpha	<	.	2.83	9.16	2.1	1.73	<	.	1.09	2.64	1.09	1.38
Gross Beta	61.4	5.77	5.42	143	7.97	2.18	7.34	1.76	2.52	6.81	1.52	2.09
Cesium-137	<	.	8.93	<	.	8.43	.	.	.	.	.	.
Cobalt-60	<	.	9.11	<	.	9.68	.	.	.	.	.	.
Potassium-40	<	.	130	<	.	107	.	.	.	.	.	.
Strontium-89/90	<	.	1.41	17.8	2.72	1.18	<	.	1.13	2.83	0.8	1.03
Technetium-99	<	.	6.51	<	.	5.51	.	.	.	.	.	.
Uranium-234	1.09	0.55	0.34	0.62	0.42	0.35	0.56	0.37	0.27	<	.	0.33
Uranium-235	<	.	0.35	<	.	0.22	<	.	0.38	<	.	0.41
Uranium-236	<	.	0.32	<	.	0.19	<	.	0.38	<	.	0.16
Uranium-238	<	.	0.46	0.45	0.35	0.17	<	.	0.37	<	.	0.29

APPENDIX G

CY 2006 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., 53-1A)
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 2006. Each method and trip blank was analyzed for volatile organic compounds (VOCs). As shown in the table below, several compounds were detected in the five trip blank samples associated with groundwater samples collected from the sampling ports of well GW-722 on August 15, 2006.

Well GW-722 Sampling Port	Trip Blank Sample Number	Compound	Result (µg/L)	False-Positive Result (µg/L)
-06	A061950128	Methylene chloride	200	.
-26, -30, -32	A061950129	Acetone	5	14
		Methylene chloride	75	.
-10, -22, -33	A061950130	Methylene chloride	34	.
-20	A061950131	Methylene chloride	110	.
-14, -17	A061950132	4-Methyl-2-pentanone	1 J	.
		Methylene chloride	85	.

Only one acetone result was screened as a false positive based on the contamination in the trip blank samples.

EXPLANATION (continued)

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**
A060250095 A061950077	GW-246 GW-246	02/08/06 08/21/06	A061010071 A062710031	GW-220 GW-220	06/21/06 11/06/06

The field blanks were analyzed for VOCs and tetrachloroethene was detected at an estimated level (5 µg/L) in the field blank sample collected at GW-220 on June 21, 2006.

One equipment rinsate sample was collected during CY 2006 in the East Fork Regime at Westbay well GW-722 (third quarter). The rinsate sample was analyzed for the same analytes as the associated groundwater sample (see Appendix D and Appendix E), but only the analytes shown below were detected.

Well/Port	Sample Number	Date Sampled	Analyte	Result	Units
GW-722-17	A061950127	08/15/06	Lead Turbidity	0.0014 0.1	mg/L NTU

APPENDIX G: CY 2006 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	03/07/06	A060250134	A060250145	Q060960119
55-2A	EF	02/23/06	A060250116	A060250127	Q060820137
55-2A	EF	07/18/06	A061940088	A061940104	Q062360000
55-2B	EF	02/23/06	A060250117	A060250127	Q060820137
55-2B	EF	07/18/06	A061940089	A061940104	Q062360000
55-2C	EF	02/23/06	A060250133	A060250127	Q060820137
55-3A	EF	03/01/06	A060250118	A060250128	Q060960111
55-3A	EF	07/24/06	A061940090	A061940104	Q062360004
55-3A D	EF	03/01/06	A060250119	A060250128	Q060960115
55-3B	EF	03/01/06	A060250120	A060250128	Q060960111
55-3B	EF	07/24/06	A061940091	A061940105	Q062360004
55-3C	EF	03/01/06	A060250121	A060250128	Q060960115
55-3C	EF	07/24/06	A061940092	A061940105	Q062360004
56-1A	EF	05/22/06	A061010043	A061010053	Q061870000
56-1A	EF	10/12/06	A062710002	A062710013	Q063260087
56-2A	EF	02/28/06	A060250135	A060250144	Q060820137
56-2B	EF	02/28/06	A060250136	A060250144	Q060960111
56-2C	EF	02/28/06	A060250137	A060250144	Q060960111
56-3A	EF	03/06/06	A060250122	A060250130	Q060960123
56-3A	EF	07/25/06	A061940093	A061940106	Q062360041
56-3B	EF	03/06/06	A060250123	A060250130	Q060960123
56-3B	EF	07/25/06	A061940094	A061940106	Q062360041
56-3B D	EF	07/25/06	A061940095	A061940106	Q062360041
56-3C	EF	03/06/06	A060250124	A060250130	Q060960123
56-3C	EF	07/25/06	A061940096	A061940106	Q062360041
56-4A	EF	03/02/06	A060250125	A060250129	Q060960115
56-4A	EF	07/26/06	A061940097	A061940107	Q062360009
56-6A	EF	03/02/06	A060250126	A060250129	Q060960123
56-6A	EF	07/26/06	A061940098	A061940107	Q062360009
56-8A	EF	05/23/06	A061010044	A061010054	Q061870000
56-8A	EF	10/12/06	A062710003	A062710013	Q063260087
60-1A	EF	06/15/06	A061010063	A061010073	Q061870031
60-1A	EF	10/31/06	A062710023	A062710034	Q063400037
60-1A D	EF	06/15/06	A061010064	A061010073	Q061870031
GW-014	BC	02/02/06	A060250086	A060250096	Q060680082
GW-014	BC	08/14/06	A061950068	A061950078	Q062560097
GW-058	BC	06/12/06	A061010008	A061010014	Q061870027
GW-068	BC	06/08/06	A061010007	A061010013	Q061870019
GW-071	BC	02/02/06	A060250087	A060250096	Q060680082
GW-071	BC	08/14/06	A061950069	A061950078	Q062620040
GW-082	BC	06/05/06	A061010000	A061010010	Q061870009
GW-085	BC	02/08/06	A060250092	A060250099	Q060680028
GW-085	BC	08/22/06	A061950075	A061950082	Q062560108
GW-085 D	BC	02/08/06	A060250093	A060250099	Q060680028
GW-098	BC	02/14/06	A060250102	A060250111	Q060820114
GW-105	EF	05/09/06	A061010079	A061010089	Q061580232
GW-106	EF	05/09/06	A061010080	A061010089	Q061580232
GW-109	EF	05/10/06	A061010082	A061010090	Q061580232

APPENDIX G: CY 2006 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-122	BC	02/21/06	A060250107	A060250114	Q060820128
GW-126	BC	06/06/06	A061010004	A061010011	Q061870019
GW-148	EF	01/19/06	A060090194	A060090200	Q060470080
GW-153	EF	01/18/06	A060090193	A060090199	Q060470080
GW-175	CR	05/01/06	A061010025	A061010031	Q061580225
GW-178	CR	05/02/06	A061010028	A061010032	Q061580225
GW-192	EF	05/11/06	A061010083	A061010091	Q061650147
GW-192 D	EF	05/11/06	A061010084	A061010091	Q061650147
GW-204	EF	11/09/06	A062710038	A062710049	Q063410007
GW-220	EF	06/21/06	A061010070	A061010076	Q061870134
GW-220	EF	11/06/06	A062710030	A062710036	Q063400041
GW-225	BC	02/07/06	A060250091	A060250098	Q060680028
GW-225	BC	08/17/06	A061950073	A061950080	Q062560108
GW-225 D	BC	08/17/06	A061950074	A061950080	Q062560108
GW-226	BC	02/07/06	A060250090	A060250098	Q060680082
GW-226	BC	08/17/06	A061950072	A061950080	Q062560108
GW-229	BC	02/16/06	A060250103	A060250113	Q060820114
GW-240	EF	01/18/06	A060090195	A060090199	Q060470080
GW-240 D	EF	01/18/06	A060090196	A060090199	Q060470080
GW-246	BC	02/08/06	A060250094	A060250099	Q060680032
GW-246	BC	08/21/06	A061950076	A061950081	Q062560108
GW-251	EF	05/16/06	A061010087	A061010093	Q061650147
GW-257	BC	06/07/06	A061010003	A061010012	Q061870019
GW-265	EF	06/01/06	A061010045	A061010055	Q061870009
GW-265	EF	10/10/06	A062710004	A062710012	Q063260087
GW-269	EF	06/01/06	A061010046	A061010055	Q061870013
GW-269	EF	10/10/06	A062710005	A062710012	Q063260087
GW-274	EF	03/27/06	A060250138	A060250147	Q061150383
GW-275	EF	03/27/06	A060250139	A060250147	Q061150383
GW-289	BC	06/07/06	A061010002	A061010012	Q061870019
GW-315	BC	02/16/06	A060250106	A060250113	Q060820114
GW-322	CR	05/08/06	A061010030	A061010034	Q061580236
GW-332	EF	03/08/06	A060250143	A060250146	Q060960119
GW-336	EF	03/08/06	A060250141	A060250146	Q060960119
GW-336 D	EF	03/08/06	A060250142	A060250146	Q060960119
GW-337	EF	03/07/06	A060250140	A060250145	Q060960119
GW-381	EF	08/02/06	A061950108	A061950113	Q062360013
GW-383	EF	06/21/06	A061010069	A061010076	Q061870134
GW-383	EF	11/06/06	A062710029	A062710036	Q063400041
GW-514	CR	05/01/06	A061010024	A061010031	Q061580225
GW-537	BC	02/15/06	A060250105	A060250112	Q060820114
GW-609	CR	05/02/06	A061010026	A061010032	Q061580225
GW-609 D	CR	05/02/06	A061010027	A061010032	Q061580225
GW-612	CR	05/03/06	A061010029	A061010033	Q061580229
GW-615	BC	02/21/06	A060250110	A060250114	Q060820128
GW-616	BC	02/22/06	A060250108	A060250115	Q060820128
GW-616 D	BC	02/22/06	A060250109	A060250115	Q060820128

APPENDIX G: CY 2006 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-617	EF	05/16/06	A061010088	A061010093	Q061650147
GW-619	EF	05/15/06	A061010085	A061010092	Q061650147
GW-620	EF	05/15/06	A061010086	A061010092	Q061650147
GW-626	BC	02/06/06	A060250088	A060250097	Q060680082
GW-626	BC	08/15/06	A061950070	A061950079	Q062560101
GW-627	BC	02/06/06	A060250089	A060250097	Q060680028
GW-627	BC	08/15/06	A061950071	A061950079	Q062560101
GW-629	BC	06/08/06	A061010005	A061010013	Q061870019
GW-629 D	BC	06/08/06	A061010006	A061010013	Q061870019
GW-633	EF	05/10/06	A061010081	A061010090	Q061580232
GW-653	BC	06/05/06	A061010001	A061010010	Q061870009
GW-656 D	EF	11/14/06	A062710040	A062710051	Q063550149
GW-686	EF	06/06/06	A061010049	A061010011	Q061870019
GW-686	EF	10/19/06	A062710007	A062710014	Q063260091
GW-690	EF	11/14/06	A062710041	A062710051	Q063550149
GW-692	EF	11/30/06	A062710043	A063240011	Q063550171
GW-694	BC	08/23/06	A061950084	A061950093	Q062770056
GW-695	BC	08/23/06	A061950083	A061950093	Q062770056
GW-698	EF	05/23/06	A061010047	A061010054	Q061870000
GW-698	EF	10/19/06	A062710006	A062710014	Q063260091
GW-698 D	EF	05/23/06	A061010048	A061010054	Q061870000
GW-700	EF	11/09/06	A062710044	A062710049	Q063410007
GW-703	BC	08/30/06	A061950085	A061950096	Q062480121
GW-722-06	EF	08/08/06	A061950116	A061950128	Q062360017
GW-722-10	EF	08/10/06	A061950122	A061950130	Q062560097
GW-722-14	EF	08/15/06	A061950125	A061950132	Q062560104
GW-722-17	EF	08/15/06	A061950126	A061950132	Q062560104
GW-722-20	EF	08/14/06	A061950124	A061950131	Q062560097
GW-722-22	EF	08/10/06	A061950123	A061950130	Q062560097
GW-722-26	EF	08/09/06	A061950118	A061950129	Q062360033
GW-722-30	EF	08/09/06	A061950117	A061950129	Q062360033
GW-722-32	EF	08/09/06	A061950119	A061950129	Q062360033
GW-722-33	EF	08/10/06	A061950120	A061950130	Q062560097
GW-722-33 D	EF	08/10/06	A061950121	A061950130	Q062560097
GW-724	BC	08/28/06	A061950087	A061950095	Q062770056
GW-725	BC	08/24/06	A061950086	A061950094	Q062770056
GW-738	BC	08/28/06	A061950088	A061950095	Q062480121
GW-744	EF	01/11/06	A060090189	A060090198	Q060470073
GW-747	EF	01/11/06	A060090190	A060090198	Q060470073
GW-748	EF	01/10/06	A060090191	A060090197	Q060470073
GW-749	EF	01/10/06	A060090192	A060090197	Q060470073
GW-763	EF	08/02/06	A061950107	A061950113	Q062360013
GW-769	EF	06/19/06	A061010067	A061010074	Q061870031
GW-769	EF	10/30/06	A062710026	A062710033	Q063400037
GW-770	EF	06/19/06	A061010068	A061010074	Q061870031
GW-770	EF	10/30/06	A062710027	A062710033	Q063400037
GW-770 D	EF	10/30/06	A062710028	A062710033	Q063400037

APPENDIX G: CY 2006 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-781	EF	11/08/06	A062710045	A062710048	Q063400041
GW-782	EF	11/13/06	A062710046	A062710050	Q063550153
GW-783	EF	11/13/06	A062710047	A062710050	Q063550149
GW-791	EF	08/01/06	A061950104	A061950112	Q062360013
GW-792	EF	08/03/06	A061950105	A061950114	Q062360017
GW-792 D	EF	08/03/06	A061950106	A061950114	Q062360017
GW-816	EF	01/19/06	A060090188	A060090200	Q060470080
GW-820	EF	06/20/06	A061010065	A061010075	Q061870134
GW-820	EF	11/02/06	A062710024	A062710035	Q063400041
GW-829	BC	02/15/06	A060250104	A060250112	Q060820114
GW-954-1	EF	06/13/06	A061010050	A061010056	Q061870023
GW-954-1	EF	10/25/06	A062710008	A062710015	Q063260095
GW-954-2	EF	06/13/06	A061010051	A061010056	Q061870027
GW-954-2	EF	10/25/06	A062710009	A062710015	Q063260095
GW-954-2 D	EF	10/25/06	A062710010	A062710015	Q063260095
GW-954-3	EF	06/13/06	A061010052	A061010056	Q061870027
GW-954-3	EF	10/25/06	A062710011	A062710015	Q063260095
GW-956-1	EF	06/14/06	A061010058	A061010072	Q061870027
GW-956-1	EF	10/24/06	A062710017	A062710032	Q063260091
GW-956-2	EF	06/14/06	A061010059	A061010072	Q061870027
GW-956-2	EF	10/24/06	A062710018	A062710032	Q063260091
GW-956-3	EF	06/14/06	A061010060	A061010072	Q061870027
GW-956-3	EF	10/24/06	A062710019	A062710032	Q063260091
GW-956-4	EF	06/14/06	A061010061	A061010072	Q061870027
GW-956-4	EF	10/24/06	A062710020	A062710032	Q063260095
GW-959	EF	06/20/06	A061010066	A061010075	Q061870134
GW-959	EF	10/31/06	A062710025	A062710034	Q063400037
Surface water and Springs					
BCK-04.55	BC	04/19/06	A061010015	A061010021	Q061380316
GHK2.51WSW	EF	04/24/06	A061010097	A061010100	Q061440294
NPR07.0SW	EF	04/24/06	A061010094	A061010100	Q061380319
NPR12.0SW	EF	04/24/06	A061010095	A061010100	Q061380319
NPR23.0SW	EF	04/24/06	A061010096	A061010100	Q061440294
NT-01	BC	04/19/06	A061010020	A061010021	Q061380316
S17	CR	04/20/06	A061010040	A061010041	Q061380319
SCR1.5SW	CR	04/20/06	A061010035	A061010041	Q061380319
SCR2.1SP	CR	04/20/06	A061010036	A061010041	Q061380319
SCR2.2SP	CR	04/20/06	A061010037	A061010041	Q061380319
SCR2.2SP D	CR	04/20/06	A061010038	A061010041	Q061380319
SCR3.5SW	CR	04/20/06	A061010039	A061010041	Q061380319
SP-17	EF	04/24/06	A061010098	A061010100	Q061440294
SP-17 D	EF	04/24/06	A061010099	A061010100	Q061440294
SS-1	BC	04/19/06	A061010019	A061010021	Q061380316
SS-4	BC	04/19/06	A061010017	A061010021	Q061380316
SS-4 D	BC	04/19/06	A061010018	A061010021	Q061380316
SS-5	BC	04/19/06	A061010016	A061010021	Q061380316

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