

Y-12

**OAK RIDGE
Y-12
PLANT**

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FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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**CALENDAR YEAR 1996
ANNUAL GROUNDWATER MONITORING REPORT
FOR THE
BEAR CREEK HYDROGEOLOGIC REGIME
AT THE
U.S. DEPARTMENT OF ENERGY Y-12 PLANT,
OAK RIDGE, TENNESSEE**

February 1997

Prepared by

**AJA TECHNICAL SERVICES, INC.
Under Purchase Order 70Y-KDS15V-1**

for the

**Y-12 Surveillance and Maintenance Program,
Environmental Restoration Program
and the
Water Compliance Department
Environmental Compliance Organization
Oak Ridge Y-12 Plant**

Managed by

MASTER

**LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the U.S. Department of Energy
Under Contract No. DE-AC05-84OR21400**

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List of Acronyms and Abbreviations

AGLLSF	Above Grade Low-Level Storage Facility
ASO	Analytical Services Organization
BCV	Bear Creek Valley
BCK	Bear Creek Kilometer
Bear Creek Regime	Bear Creek Hydrogeologic Regime
BG	Burial Grounds
bgs	below ground surface
CA	Characterization Area
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CY	Calendar Year
DNAPL	Dense, Non-Aqueous Phase Liquids
DOE	U.S. Department of Energy
DQO	Data Quality Objective
East Fork Regime	Upper East Fork Poplar Creek Hydrogeologic Regime
ft	feet
ft/d	feet per day
GWPP	Groundwater Protection Program
GWPS	(RCRA) Groundwater Protection Standard
HCDA	Hazardous Chemical Disposal Area
HWDU	Hazardous Waste Disposal Unit
K-25	Oak Ridge K-25 Site
MDA	Minimum Detectable Activity
msl	mean sea level
µg/L	micrograms per liter
mg/L	milligrams per liter
NT	North Tributary (Bear Creek)
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PCE	Tetrachloroethene
pCi/L	picoCuries per liter
post-closure permit	RCRA Post-Closure Permit for the Bear Creek Hydrogeologic Regime
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation (CERCLA)
SAP	Sampling and Analysis Plan
SS	South Side (Bear Creek)
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
TDEC	Tennessee Department of Environment and Conservation

List of Acronyms and Abbreviations (cont'd)

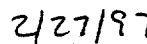
TDS	Total Dissolved Solids
TSD	treatment, storage, and disposal (unit)
UTL	upper tolerance limit
VOC	volatile organic compound
WMA	Waste Management Area
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2-DCA	1,2-dichloroethane
1,2-DCE	1,2-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
²³⁷ Np	Neptunium-237
²³⁸ Pu	Plutonium-238
⁹⁹ Tc	Technetium-99
²³⁴ U	Uranium-234
²³⁵ U	Uranium-235
²³⁸ U	Uranium-238

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Permittee Signature



Date

1.0 INTRODUCTION

This annual monitoring report contains groundwater and surface water monitoring data obtained in the Bear Creek Hydrogeologic Regime (Bear Creek Regime) during calendar year (CY) 1996. The Bear Creek Regime encompasses a portion of Bear Creek Valley (BCV) west of the U.S. Department of Energy (DOE) Oak Ridge Y-12 Plant (unless otherwise noted, directions are in reference to the Y-12 Plant administrative grid) that contains several sites used for management of hazardous and nonhazardous wastes associated with plant operations (Figure 1). Groundwater and surface water quality monitoring in the Bear Creek Regime is performed under the auspices of the Y-12 Plant Groundwater Protection Program (GWPP).

This report contains the information and monitoring data required under the Resource Conservation and Recovery Act (RCRA) Post-Closure Permit for the Bear Creek Hydrogeologic Regime (post-closure permit), as modified and issued by the Tennessee Department of Environment and Conservation (TDEC) in September 1995 (permit no. TNHW-087). In addition to the signed certification statement (Page vii) and the RCRA facility information summarized below, permit condition II.C.6 requires the annual monitoring report to address groundwater monitoring activities at the three RCRA Hazardous Waste Disposal Units (HWDUs) in the Bear Creek Regime that are in post-closure corrective action status (the S-3 Site, the Oil Landfarm, and the Bear Creek Burial Grounds/Walk-In Pits).

RCRA FACILITY INFORMATION	
Facility:	Y-12 Plant
Facility Identification No.:	TN3 89 009 0001
Facility Address:	P.O. Box 2001 Oak Ridge, Tennessee 37831

Included herein are the CY 1996 groundwater monitoring data obtained during RCRA post-closure corrective action monitoring (RCRA monitoring) at each HWDU, and the required data evaluations specified under conditions IV.G (S-3 Site), V.G (Oil Landfarm), and VI.G (Bear Creek Burial Grounds/Walk-In Pits) of the post closure permit (Table 1).

In addition to information required by the post-closure permit, this report contains CY 1996 groundwater and surface water monitoring data obtained under the auspices of the Y-12 Plant GWPP for the purposes of: (1) DOE Order 5400.1 surveillance monitoring and DOE Order 5400.1 exit pathway/perimeter monitoring (collectively referenced as DOE Order 5400.1 monitoring), (2) monitoring performed as a best management practice of the Y-12 Plant GWPP, and (3) the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial investigation (RI) for the Bear Creek Characterization Area (CA). These data are incorporated to provide a comprehensive presentation of all the CY 1996 groundwater and surface water monitoring results obtained for the multiple programmatic purposes of the Y-12 Plant GWPP. In addition to the monitoring data, the following narrative sections of the report:

- provide background information regarding the waste management sites in the Bear Creek Regime, the hydrogeologic framework, and the extent of groundwater and surface water contamination (Section 2.0);
- summarize the CY 1996 groundwater and surface water sampling and analysis activities, including quality assurance/quality control (QA/QC) sampling and data management (Section 3.0);
- describe results of the evaluations required for the RCRA monitoring data (Section 4.0);
and
- provide a brief summary of monitoring activities and findings (Section 5.0).

Documents cited for more detailed operational, regulatory, or technical information regarding the waste management sites and associated monitoring programs in the Bear Creek Regime are listed in Section 6.0.

Narrative sections of the report reference a series of appendices. Illustrations, data tables, and monitoring well construction details are presented in Appendix A, Appendix B, and Appendix C, respectively. Results of laboratory analyses and field measurements for each groundwater and surface water sampling location are presented in several subsections of Appendix D (organized by groups of related analytical parameters/measurements), including a separate subsection containing results obtained for RI purposes. Data for the QA/QC samples associated with each groundwater and surface water sample are presented in respective subsections of Appendix E.

Appendix F describes the process used to screen CY 1996 groundwater and surface water data and identify results that do not meet applicable data quality objectives (DQOs) of the Y-12 Plant GWPP.

2.0 BACKGROUND INFORMATION

The following sections contain background information regarding the waste management sites in the Bear Creek Regime and their current regulatory status, the characteristics of the groundwater and surface water flow systems in the regime, and the extent of groundwater and surface water contamination. This information provides a contextual framework for the groundwater flow direction/rate and contaminant concentration trend evaluations required for RCRA monitoring (see Section 4.0).

2.1 Waste Management Sites

The Bear Creek Regime encompasses a portion of BCV used since the early 1950s for the treatment, storage, and disposal (TSD) of various hazardous and nonhazardous wastes associated with operation of the Y-12 Plant (Table 2). With the exception of the Above Grade Low-Level Storage Facility (AGLLSF), all of these TSD facilities are closed and currently regulated under CERCLA, RCRA, or both; the AGLLSF is an operating facility that is not regulated under either program (Table 2).

All the closed TSD facilities in the Bear Creek Regime have been inactive since the late 1980s, and most have undergone some level of engineered closure (e.g., installation of multilayer caps), including all of the RCRA HWDUs. Many of these sites are confirmed or suspected sources of contamination in the Bear Creek Regime, and the contaminated media (groundwater, surface water, stream sediments in Bear Creek and its tributaries, and Bear Creek floodplain soils) are a major focus of the CERCLA RI for the Bear Creek CA (Table 2). The S-3 Site, Oil Landfarm Waste Management Area (WMA), and the Bear Creek Burial Grounds WMA constitute the RCRA-regulated units and are the primary sources of contamination in the regime. Brief descriptions of these sites are provided below.

S-3 Site

The S-3 Site (formerly the S-3 Ponds) is a closed RCRA surface impoundment located near the headwaters of Bear Creek, just west of the groundwater and surface water flow divide between

the Bear Creek Regime and the Upper East Fork Poplar Creek Hydrogeologic Regime (East Fork Regime) (Figure 2). The site consisted of four unlined ponds used between 1951 and 1984 for disposal of acidic, radioactive liquid wastes. Each 400 x 400-foot (ft) pond was about 17-ft deep and had a storage capacity of about 2.5 million gallons. When closed, the S-3 Site was covered with a low-permeability cap and an asphalt parking lot.

Oil Landfarm WMA

The Oil Landfarm WMA is north of Bear Creek about one mile west of the Y-12 Plant, and consists of the Oil Landfarm, the Boneyard/Burnyard/Hazardous Chemical Disposal Area (HCDA), and Sanitary Landfill I (Figure 2). As noted in Section 1.0, the Oil Landfarm is a RCRA HWDU addressed in the post-closure permit. Other sites within the Oil Landfarm WMA are former RCRA solid waste management units (SWMUs) currently regulated under CERCLA (Table 2).

The Oil Landfarm HWDU was used between 1973 and 1982 for the biodegradation of about one million gallons of waste oil and machine coolants via landfarming. This process involved application of the wastes to nutrient-adjusted surficial soils during the dry months of the year (April to October).

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. 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.

Sanitary Landfill I was used between 1968 and 1980 for disposal of combustible and decomposable solid wastes from the Y-12 Plant, some of which may have included toxic chemicals. Disposal trenches at the landfill were excavated to depths of about 20-ft below ground surface (bgs) and backfilled to about 15-ft above grade. The landfill was graded and capped in 1985.

Bear Creek Burial Grounds WMA

The Bear Creek Burial Grounds WMA is about two miles west of the Y-12 Plant, and consists of several waste disposal areas designated Burial Grounds (BG)-A, -B, -C, -D, -E, and -J; the Walk-In Pits; the Uranium Vaults; and the Oil Retention Ponds (Figure 2). Of these, only BG-A (North and South), BG-C (West), and the Walk-In Pits are RCRA HWDUs; the remaining are regulated under CERCLA (Table 2). Each waste disposal area consisted of shallow (i.e., <25-ft bgs) trenches. These trenches received a diverse mixture of solid wastes (1955 to 1993) and liquid wastes (1959 to 1979) from the Y-12 Plant, all or most of which contained varying amounts of radioisotopic contamination. Oil Retention Ponds No. 1 and 2 were constructed to collect oils seeping from disposal trenches in BG-A South and BG-A North, respectively (Figure 2).

2.2 Topography and Bedrock Geology

The Bear Creek Regime is bound to the north by Pine Ridge and to the south by Chestnut Ridge, and encompasses the portion of BCV extending from a surface water and shallow groundwater divide at the west end of the Y-12 Plant to the western boundary of the Bear Creek watershed. Surface elevations range from 900 ft above mean sea level (msl) in the Bear Creek channel along the floor of BCV, to about 1,200 ft msl along the crests of Pine Ridge and Chestnut Ridge (Figure 3).

The geology of the Bear Creek Regime is characterized by alternating sequences of clastic and carbonate strata that form the distinctive topography of the Valley and Ridge Physiographic Province. On the Oak Ridge Reservation (ORR), shale and siltstone beds of the Rome Formation form Pine Ridge to the north, limestone and shale formations of the Conasauga Group form BCV, and the primarily dolostone formations of the Knox Group form Chestnut Ridge to the south (Figure 3). Strike and dip of bedding are generally N 55°E and 45°SE, respectively (as referenced to true north). Bedrock is overlain by up to 50-ft of several materials, including man-made fill, alluvium, colluvium, fine-grained residuum from the weathering of the bedrock, and saprolite (weathered bedrock). In some areas the saprolite retains primary textural features of the bedrock.

2.3 Hydrogeologic Framework

The following discussion is based on the conceptual hydrologic model for BCV presented in the CERCLA RI Report for the Bear Creek CA (Science Applications International Corporation, 1996). This conceptual model incorporates: (1) the general hydrologic framework and associated nomenclature described in Solomon *et al.* (1992); (2) groundwater flow characteristics presented in Moore (1988 and 1992) and Moore and Toran (1992); (3) results of hydrologic studies and investigations in BCV, including Dreier *et al.* (1987), Shevenell (1994), and Turner *et al.* (1991); and (4) findings of sampling and analysis activities performed specifically for RI purposes. Key aspects of the conceptual model regarding the principal hydrogeologic units and respective groundwater flow characteristics, and the general hydrology of Bear Creek are summarized in the following discussion.

2.3.1 Groundwater System

Within the Bear Creek Regime the Rome Formation, Conasauga Group, and Knox Group comprise two basic hydrogeologic units: (1) the Aquifer, consisting of the Maynardville Limestone (upper Conasauga Group) and Copper Ridge Dolomite (lower Knox Group), and (2) the Aquitard, consisting of the remaining Conasauga Group formations (Nolichucky Shale, Maryville Limestone, Rogersville Shale, Rutledge Limestone, and Pumpkin Valley Shale) and the Rome Formation (Figure 3). Components of the Aquifer underlie the southern portion of BCV (Maynardville Limestone) and the steep flank and crest of Chestnut Ridge (Copper Ridge Dolomite). The Aquitard formations form the northern slope of BCV (Conasauga Group) and Pine Ridge (Rome Formation). The Aquitard, which underlies the primary contaminant source areas in the Bear Creek Regime, is hydraulically upgradient of the Aquifer, which functions as a hydrologic drain in BCV. Fractures provide the principal groundwater flowpaths in both units, and dissolution of carbonates in the Aquifer has enlarged fractures and produced solution cavities and conduits that greatly enhance its hydraulic conductivity relative to the Aquitard. Although negligible in both units, flow through the porous rock matrix plays an important role in contaminant migration because of matrix diffusion processes.

The water table in the Bear Creek Regime, under both seasonally high and low flow conditions, is a subdued replica of surface topography, with steep gradients along the flanks of Pine Ridge and Chestnut Ridge and a gentle gradient along the axis of BCV. Groundwater flow in both units is primarily parallel to bedding (along strike and dip), which in the Aquitard may or may not coincide with the direction of maximum hydraulic gradient inferred from water level isopleths. Flow tangent to bedding occurs primarily along permeable zones formed by cross-cutting fractures or fracture zones (and possibly small faults). The northern tributaries of Bear Creek are probably the surficial expression of these cross-cutting structures. Such structures provide preferred flowpaths that channel groundwater from the Aquitard to the Aquifer, or act as barriers to lateral flow, causing groundwater from deeper intervals to upwell and discharge to the shallower flow system in each hydrogeologic unit.

In the Aquitard, most groundwater flow occurs in a highly conductive interval near the bedrock/residuum interface (the water table interval). Below the water table interval, flow is most active at depths less than 100-ft bgs; however, contaminants in groundwater more than 200-ft bgs in the Nolichucky Shale clearly indicate permeable flowpaths at depth. Flow 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 and seeps in drainage features, and vertically (recharge) to the water table interval. Recharge to the water table interval promotes strike-parallel groundwater flow toward discharge areas in nearby cross-cutting streams. Only a small percentage of total flow ultimately recharges the deeper bedrock, where upward hydraulic gradients predominate. Overall, 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 (Science Applications International Corporation 1996).

Decreasing groundwater flux with depth in the Aquitard 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 occurs at a depth of about 100-ft bgs, and is interpreted to be a function of longer groundwater residence time related to reduced fracture aperture or increased fracture spacing

(Solomon et. al. 1992). 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 total dissolved solids (TDS).

Most groundwater flow in the Aquifer occurs at shallow depths (i.e., <100-ft bgs) in an extensively interconnected maze of solution conduits and cavities (karst network). Below the shallow karst network, fractures provide the primary flowpaths. Flow in the shallow karst network is relatively rapid and during rainfall occurs as "quickflow" discharge to Bear Creek. Active groundwater circulation occurs at greater depth than in the Aquitard, and groundwater from the deeper flow system discharges along major gaining (influent) reaches of Bear Creek. These discharge areas are probably related to large-scale structural (e.g., cross-strike faults) or stratigraphic discontinuities in the Maynardville Limestone. Overall, about 81% of the available groundwater in the Aquifer (Maynardville Limestone) discharges directly to Bear Creek, 16% flows into the creek from spring SS-5, and 3% follows strike-parallel flowpaths in the subsurface (Science Applications International Corporation, Inc. 1996).

Groundwater geochemistry is more homogeneous in the Aquifer than in the Aquitard; virtually every monitoring well in the Maynardville Limestone, regardless of depth, monitors calcium-magnesium-bicarbonate groundwater. Some shallow wells monitor sulfate-enriched groundwater, which probably reflects dissolution of locally disseminated sulfides, and several deep wells monitor calcium-magnesium-sulfate groundwater with very high TDS.

2.3.2 Surface Water System

Surface water in the Bear Creek Regime is drained by Bear Creek and its tributaries (Figure 3). From its headwaters near the west end of the Y-12 Plant, 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 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-09.40). Tributaries are designated as north (e.g., NT), or south, 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 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. 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. The main channel between NT-3 and NT-8 is seasonally dry, but flow is perennial in the channel downstream from the primary gauging station (BCK-09.40).

The main channel of Bear Creek functions as a major conduit of the shallow karst network within the Maynardville Limestone. Discharge from numerous 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 they 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 Aquifer discharge area. Losing reaches in the upper part of BCV, particularly south of Sanitary Landfill I, play an important role in transferring contaminants from Bear Creek to the Aquifer.

2.4 Groundwater Contamination

The following discussion is based on the contaminant transport models for the primary source areas in the Bear Creek Regime (the S-3 Site, the Oil Landfarm WMA, and the Burial Grounds WMA) and the principal contaminant migration pathways (the Maynardville Limestone and Bear Creek) described in the CERCLA RI Report for the Bear Creek CA (Science Applications International Corporation, 1996). These models incorporate the bulk of the geologic, hydrologic, and water quality databases maintained by the Y-12 Plant GWPP, and essentially represent the culmination of hydrogeologic characterization and contamination assessment efforts performed since the mid-1980's.

S-3 Site

Operation of the S-3 Site emplaced a large reservoir of contamination in the Aquitard (Nolichucky Shale) driven downward by the elevated hydraulic head in the ponds and the higher density of the acidic liquid wastes. The wastes also enlarged migration pathways in carbonate-rich horizons. The principal contaminants are nitrate, technetium-99 (^{99}Tc), uranium isotopes (^{234}U , ^{235}U , and ^{238}U), trace metals (e.g., cadmium), and volatile organic compounds (VOCs). An intermingled plume of these contaminants extends south toward the upper reaches of Bear Creek along preferred migration pathways in the water table interval, and west along deeper, strike- and dip-parallel pathways in bedrock.

As indicated by the distribution of nitrate, a highly mobile and chemically stable contaminant that delineates the maximum extent of transport and effectively traces the principal migration pathways, operation of the S-3 Ponds produced a contaminant plume in the Aquitard that extends downdip at least 400-ft bgs, and along strike at depth for over 3,000-ft to the west (Figure 4). Nitrate (as N) concentrations (hereafter synonymous with "nitrate" concentrations) within the plume exceed 10,000 milligrams per liter (mg/L) in the shallow groundwater near the site, and 10 mg/L near the plume boundaries.

Gross alpha activity and gross beta activity within the S-3 Site contaminant plume exceed 1,000 picoCuries per liter (pCi/L). Although a diverse population of radioisotopes may be present in the groundwater closest to the site, elevated gross alpha and gross beta activity in the groundwater (Figure 4) probably delineate migration of uranium isotopes and ^{99}Tc , respectively.

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, and concentrations are generally highest in the low pH (i.e., <5) groundwater within about 500-ft of the site. Acetone and tetrachloroethene (PCE) are the principal VOCs, and concentrations in wells adjacent to the site exceed 5,000 micrograms per liter ($\mu\text{g/L}$), suggesting that dense nonaqueous phase liquids (DNAPLs) are present in the subsurface.

When closed, the S-3 Site contained several feet of sludge produced by denitrification of the waste water. Sludges within the saturated zone may release ^{99}Tc and uranium isotopes to the shallow groundwater flow system in the Aquitard, which then may be transported westward through the

water table interval toward discharge points in NT-1 (Science Applications International Corporation, 1996). 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, the current plume of groundwater contamination from the S-3 Site has probably reached maximum concentration levels, with the center of mass moving slowly along strike towards NT-2. Migration along strike is expected to continue until the plume encounters a cross-cutting structure that promotes upward discharge into the shallow flow system in the Aquitard, or cross-strike flow into the Aquifer (Maynardville Limestone).

Oil Landfarm WMA

The primary sources of groundwater contaminants in the Oil Landfarm WMA (listed in order of importance) are the Boneyard/Burnyard/HCDA, the Oil Landfarm HWDU, and Sanitary Landfill I. Each is a source of VOCs in the shallow groundwater. The Boneyard/Burnyard also is a major source of elemental uranium and alpha radioactivity.

Uranium isotopes are the principal groundwater contaminants at the Boneyard/Burnyard. Contamination delineated by soil sampling, and geophysical and radiological surveys indicate a major source area located immediately northwest of the HCDA cap. Wastes in the Boneyard/Burnyard are probably within the saturated zone during seasonally high groundwater levels, and uranium isotopes may be leached and transported with the shallow groundwater that discharges into NT-3 or directly recharges into the Maynardville Limestone. Gross alpha and gross beta activity exceed 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 4).

The Boneyard/Burnyard/HCDA also is the source of a dissolved VOC plume in the shallow groundwater. Primary components of the plume are trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), and PCE. Concentrations of these VOCs are less than one percent of solubility, indicating that DNAPLs are probably not present in the subsurface. The HCDA is most likely the principal source of these VOCs, as indicated by the lack of these constituents in surface water at

NT-3, and their areal distribution relative to the radioactivity plume originating from elsewhere in the Boneyard/Burnyard (Figure 4).

Groundwater contaminants at the Oil Landfarm HWDU (Figure 4) are principally VOCs, and two distinct plumes are evident: one to the northeast dominated by 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), and 1,1-dichloroethene (1,1-DCE); and one to the south dominated by PCE, 1,2-DCE, trans-1,2-DCE, and TCE. Concentrations of these compounds exceed 1,000 µg/L in the northeast plume, and 100 µg/L in the southern plume. Both plumes appear to be restricted to the shallow flow system. Maximum concentrations within the plumes do not indicate the presence of DNAPLs in the subsurface.

Sanitary Landfill I is a probable source of 1,1-DCA, 1,2-DCE, and trans-1,2-DCE in the shallow groundwater (Aquitard and Aquifer) downgradient to the south of the site (Figure 4). Maximum VOC concentrations are typically less than 50 µg/L. In the Aquifer (Maynardville Limestone), these constituents have intermingled with the VOC plume (primarily TCE and 1,2-DCE) originating from upgradient sources.

Burial Grounds WMA

Groundwater in the Aquitard underlying the Burial Grounds WMA is extensively contaminated with VOCs at both shallow (water table) and deep (bedrock) intervals (Figure 4). There are five primary source areas: BG-A (North and South), BG-C (East and West), and the Walk-In Pits (Figure 2). Dissolved VOC plumes in the shallow groundwater at several of these source areas are probably related to widespread occurrence of DNAPLs 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 DNAPLs have 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 1,2-DCE. Summed concentrations of these plume constituents exceed 100,000 µg/L. Other common plume constituents are 1,1,1-TCA, 1,1-DCA, and 1,2-dichloroethane (1,2-DCA). Groundwater in the shallow 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 since 1990 from deeper bedrock wells at BG-A South.

Separate plumes of dissolved VOCs apparently occur in the shallow groundwater at BG-C East and BG-C West (Figure 4), both dominated by 1,2-DCE with lesser amounts of vinyl chloride. Concentrations within the plume are generally less than 500 µg/L. Groundwater containing these VOCs discharges to the NT-8 catchment on the northwest side of the Burial Grounds WMA. Data for both source areas do not clearly indicate the presence of DNAPLs in the subsurface.

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 DNAPLs in the subsurface. Contaminants in the shallow groundwater flow system may not discharge extensively to surface water.

Although large quantities of uranium wastes were disposed in the Bear Creek Burial Grounds WMA, few monitoring wells in the area yield radioactive groundwater samples (Figure 4). However, RI data for soil samples and surface water samples collected from Bear Creek tributaries NT-6, NT-7, and NT-8 indicate that BG-A South and BG-C East are probable sources of radioactivity. 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 is probably an artifact of the monitoring well network; few of the wells are screened within the shallowest water table interval where radioactive contamination likely occurs (Science Applications International Corporation, Inc. 1996).

Boron is the primary trace metal contaminant in the groundwater at the Bear Creek Burial Grounds 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 waste waters from the Y-12 Plant. 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.

Maynardville Limestone Exit Pathway

Primary groundwater contaminants in the Maynardville Limestone are nitrate, VOCs, radioactivity, and trace metals. These contaminants originate from the aforementioned source areas and enter the Maynardville Limestone via a combination of several input pathways, including direct recharge, hydrologic communication with surface water in Bear Creek, and inflow of shallow groundwater from the Aquitard. Contributions from the source areas have generally produced two primary plumes of contamination in the groundwater: one containing nitrate and radioactivity, and another containing VOCs (trace metal contaminants are more sporadic and chiefly occur close to the primary source areas). Both plumes occur in the shallow karst network and the deeper fracture flowpaths, and are commingled throughout much of the Bear Creek Regime.

The nitrate plume originates from the S-3 Site and extends along strike in the Maynardville Limestone for more than 9,000-ft down BCV to the west (Figure 4). Nitrate essentially delineates the maximum extent of contaminant transport in the Aquifer, and the plume effectively traces the primary migration pathways. Concentrations within the plume exceed 500 mg/L south of the S-3 Site, but rapidly decrease to less than 50 mg/L south of the Oil Landfarm WMA, and are typically highest in the deeper, fracture-dominated groundwater flow system. Lower concentrations in the shallow karst network are probably the combined effect of greater groundwater circulation and interaction with the less contaminated surface water in Bear Creek.

The distribution of VOCs in the Maynardville Limestone reflects the relative contributions of several source areas and commingling during downgradient transport along strike (Figure 4). Plume constituents in the upper part of BCV are TCE, 1,2-DCE, and PCE; probable source areas are Spoil Area I, the S-3 Site, and possibly another source area (the Fire Training Facility) located in the East Fork Regime. Additional inputs to the plume occur from the Rust Spoil Area (TCE), Boneyard/Burnyard/HCDA (TCE and 1,2-DCE), Sanitary Landfill I (1,1,1-TCA and 1,1-DCA), and discharge from the Bear Creek tributary (NT-7) that traverses BG-A North and A South (1,2-DCE and 1,2-DCA). The highest concentrations within the plume (i.e., >300 µg/L) occur in the deeper groundwater south (down dip) of the Boneyard/Burnyard. These high concentrations coincide with the downward vertical hydraulic gradients in the Maynardville Limestone in this area, and the major losing reach of Bear Creek south of Sanitary Landfill I.

In the upper part of BCV, the distribution of gross alpha and gross beta activity in the Maynardville Limestone tends to mirror that of nitrate, indicating both a common source area (the S-3 Site) and migration along common flowpaths (Figure 4). Increased gross alpha activity in the groundwater downstream of the NT-3 catchment reflects inputs of uranium isotopes from sources in the Boneyard/Burnyard.

Most trace metal contamination in the Maynardville Limestone occurs in the shallow groundwater near the S-3 Site and the Boneyard/Burnyard. The principal trace metal contaminants are barium, boron, cadmium, copper, lead, mercury, strontium, and uranium. Of these, boron and uranium are the most widespread, indicating that relatively mobile, ionic species of both metals are present in the groundwater.

2.5 Surface Water Contamination

Many of the principal components of the groundwater contamination plumes in the Bear Creek Regime, including nitrate, ^{99}Tc , uranium isotopes, several trace metals, and a few VOCs (PCE, TCE, and 1,2-DCE), occur in upper Bear Creek (i.e., upstream of BCK-09.40) and several of its northern tributaries. However, the quality of surface water in Bear Creek improved dramatically after waste disposal at the S-3 Site ceased in 1983. Nitrate concentrations in upper Bear Creek at BCK-12.46, for example, exceeded 1,000 mg/L in 1983, but were less than 200 mg/L in 1994. Currently, input from several northern tributaries (primarily NT-1, NT-2, NT-3, and NT-8) during seasonally high flow conditions contribute the bulk of the contamination to the creek. During dry periods, contaminant flux into Bear Creek is generally lower and is controlled by groundwater discharge from springs SS-4 and SS-5 (Science Applications International Corporation, 1996).

3.0 SUMMARY OF CY 1996 SAMPLING AND ANALYSIS ACTIVITIES

Groundwater and surface water sampling in the Bear Creek Regime during CY 1996 was performed in accordance with the *Sampling and Analysis Plan for Groundwater and Surface Water Monitoring at the Y-12 Plant during Calendar Year 1996* (Sampling and Analysis Plan) (HSW Environmental Consultants, Inc. 1995). Deviations from the CY 1996 Sampling and Analysis Plan (SAP) were documented in addenda issued by the Y-12 Plant GWPP Manager throughout the year, one of which addressed special RI sampling and analysis requirements for well GW-087 at the Oil Landfarm WMA and well GW-243 at the S-3 Site (Figure 5). Samples were collected from these wells during the second quarter of CY 1996 and were analyzed for a comprehensive suite of metals including rare earth and lanthanide series metals. Results of this effort, including sampling procedures and analytical methods, are contained in the RI for the Bear Creek CA. The following sections pertain only to the sampling and analysis activities performed for the purposes of RCRA monitoring, DOE Order 5400.1 monitoring, and Y-12 Plant GWPP best management practice monitoring.

3.1 Sampling Locations and Frequency

Groundwater and surface water samples were collected semiannually from a total of 53 monitoring wells, eight surface water stations, and three springs in the Bear Creek Regime (Figure 5). Semiannual sampling was performed January 16 - March 28, 1996 and July 1 - September 6, 1996 (Table 3). Descriptions of the respective monitoring well networks and sampling frequencies for RCRA monitoring, DOE Order 5400.1 monitoring, and Y-12 Plant GWPP best management practice monitoring are provided in the following sections.

3.1.1 RCRA Monitoring

The post-closure permit specifies the monitoring well networks for RCRA monitoring at the S-3 Site, the Oil Landfarm WMA, and the Bear Creek Burial Grounds WMA, as well as a semiannual sampling frequency. Site-specific and regime-wide components of the post-closure well network are: (1) several designated Aquitard monitoring wells located hydraulically upgradient of

contaminated groundwater at each site (background wells); (2) at least one of a group of eligible point-of-compliance monitoring wells designated for each HWDU (point-of-compliance wells), most of which are Aquitard monitoring wells located downgradient of the respective sites; (3) a common series of Aquifer (Maynardville Limestone) monitoring wells located downgradient of the groundwater contaminant plumes in the Bear Creek Regime (plume boundary wells); and (4) one monitoring well (GW-521) in the Chestnut Hydrogeologic Ridge Regime (Chestnut Ridge Regime) that serves as the plume boundary background well.

Groundwater samples were collected semiannually from a total of fifteen background wells, three point-of-compliance wells, and six plume boundary wells (Table 3). The locations of these wells are shown on Figure 5, and information regarding the depth and the hydrogeologic unit/aquifer zone monitored by each well are summarized below.

RCRA Monitoring Well Network Component		Background Well					
		Point-of-Compliance Well					
		Plume Boundary Well					
Well No.	Location	Depth (ft bgs)	Hydrogeologic Unit	Aquifer Zone			
GW-040	Bear Creek Burial Grounds	29.0	Aquitard	Water Table Interval			●
GW-042	Bear Creek Burial Grounds	28.2	Aquitard	Water Table Interval			●
GW-043	Oil Landfarm WMA	40.0	Aquitard	Water Table Interval			●
GW-044	Oil Landfarm WMA	70.0	Aquitard	Bedrock Interval			●
GW-069	Bear Creek Burial Grounds	99.2	Aquitard	Bedrock Interval		●	
GW-079	Bear Creek Burial Grounds	64.9	Aquitard	Bedrock Interval			●
GW-080	Bear Creek Burial Grounds	29.7	Aquitard	Water Table Interval			●
GW-084	Oil Landfarm WMA	27.8	Aquitard	Water Table Interval			●
GW-115	S-3 Site	53.0	Aquitard	Water Table Interval			●
GW-162	Bear Creek Burial Grounds	125.0	Aquitard	Bedrock Interval			●
GW-276	S-3 Site	18.5	Aquitard	Water Table Interval		●	
GW-363	Oil Landfarm WMA	75.0	Aquitard	Bedrock Interval		●	
GW-372	Bear Creek Burial Grounds	51.6	Aquitard	Water Table Interval			●
GW-373	Bear Creek Burial Grounds	158.0	Aquitard	Bedrock Interval			●
GW-521	Chestnut Ridge Regime	136.0	Aquifer	Bedrock Interval			●

RCRA Monitoring Well Network Component		Background Well					
		Point-of-Compliance Well					
		Plume Boundary Well					
Well No.	Location	Depth (ft bgs)	Hydrogeologic Unit	Aquifer Zone			
GW-613	S-3 Site	42.0	Aquitard	Water Table Interval			●
GW-614	S-3 Site	90.2	Aquitard	Bedrock Interval			●
GW-642	Bear Creek Burial Grounds	36.9	Aquitard	Water Table Interval			●
GW-710	Exit Pathway Picket W	744.5	Aquifer	Bedrock Interval	●		
GW-711	Exit Pathway Picket W	666.2	Aquifer	Bedrock Interval	●		
GW-712	Exit Pathway Picket W	457.5	Aquifer	Bedrock Interval	●		
GW-713	Exit Pathway Picket W	315.2	Aquifer	Bedrock Interval	●		
GW-714	Exit Pathway Picket W	145.0	Aquifer	Bedrock Interval	●		
GW-715	Exit Pathway Picket W	44.0	Aquifer	Water Table Interval	●		

Detailed construction information for these wells is provided in Appendix C .

3.1.2 DOE Order 5400.1 Monitoring

As noted in Section 1.0, DOE Order 5400.1 monitoring includes surveillance monitoring and exit pathway/perimeter monitoring. Both are implemented under the Y-12 Plant GWPP to provide data needed to evaluate: (1) groundwater quality trends near contaminant source areas, and contaminant plume migration within the Bear Creek Regime (surveillance monitoring), and (2) groundwater and surface water quality trends where contaminants are most likely to migrate beyond the boundaries of the ORR (exit pathway/perimeter monitoring).

Groundwater samples were collected semiannually from eleven monitoring wells for the purposes of DOE Order 5400.1 surveillance monitoring (Table 3), including four Aquitard wells GW-085, GW-537, GW-828, GW-829) located along geologic strike between the S-3 Site and the Oil Landfarm WMA, four Aquitard wells located downgradient or along strike of the Bear Creek Burial Grounds WMA (GW-053, GW-287, GW-627, and GW-653), and three Aquifer wells located downgradient of Spoil Area I (GW-315), the Rust Spoil Area (GW-311), and BG-A South (GW-095) (Figure 5). Detailed construction information for these wells is provided in Appendix C.

Fifteen Maynardville Limestone monitoring wells, eight Bear Creek surface water stations, and three springs that discharge into Bear Creek were sampled for the purposes of DOE Order 5400.1 exit pathway/perimeter monitoring. Samples were collected during both semiannual sampling events from all of these locations except surface water station BCK-00.63, which was sampled only during August 1996 (Table 3). The monitoring wells comprise Maynardville Limestone Exit Pathway Picket A (GW-056, GW-683, GW-684, and GW-685), Picket B (GW-621, GW-694, GW-695, GW-703, GW-704, and GW-706), and Picket C (GW-723, GW-724, GW-725, GW-738, and GW-740) (Figure 5). Wells in each Exit Pathway Picket are completed at various depths along a strike-normal transect across the Maynardville Limestone; well construction details are provided in Appendix C. Wells that comprise Exit Pathway Picket W (GW-710 - GW-715) also serve as the RCRA plume boundary wells.

3.1.3 Best Management Practice Monitoring

Groundwater samples were collected semiannually from three shallow (i.e. <40-ft bgs) Aquitard monitoring wells at the AGLLSF: bedrock interval wells GW-793 and GW-794, and water table interval well GW-795 (Table 3). The locations of these wells are shown on Figure 5; well construction information is provided in Appendix C. Groundwater monitoring at the site was requested by the TDEC-DOE Oversight Division and has been performed under the auspices of the Y-12 Plant GWPP since CY 1991.

3.2 Sample Collection, Transportation, and Chain-of-Custody Control

Personnel from the Oak Ridge K-25 Site (K-25) Sampling and Environmental Support Department were responsible for collection, transportation, and chain-of-custody control of groundwater and surface water samples obtained for the multiple programmatic purposes of the Y-12 Plant GWPP. Sampling was performed in accordance with the *Technical Procedure for Groundwater Sampling* (Lockheed Martin Energy Systems, Inc. 1995), which is incorporated in and referenced by the post-closure permit (Table 1); and the applicable methods and procedures specified in *Environmental Surveillance Procedures Quality Control Program* (Martin Marietta Energy

Systems, Inc. 1988), which have been approved by the U.S. Environmental Protection Agency (Region IV) and the TDEC (Tennessee Department of Health and Environment 1988).

Groundwater samples were obtained from 22 monitoring wells using dedicated, bladder pump sampling equipment (Well Wizards™). Samples from the remaining 31 monitoring wells were obtained using portable gas-piston pumps (Bennet Pumps™) and disposable bailers (Table 3). Surface water samples were collected using grab sample bottles.

Filtered and unfiltered samples were collected from each monitoring well, spring, and surface water station. Groundwater samples collected with Well Wizards™ and Bennet Pumps™ were filtered in the field using in-line 0.45 micron filters. Surface water samples, and groundwater samples collected with bailers, were filtered in the laboratory.

3.3 Field Measurements and Laboratory Analytes

Field personnel measured the depth to water before purging and sampling groundwater in each monitoring well; the depth-to-water measurements and calculated water-level elevations are included in Appendix D.1. This long-standing protocol of the Y-12 Plant GWPP addresses corresponding post-closure permit conditions for RCRA monitoring (Table 1). Sampling personnel also recorded field measurements of pH, temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential for each groundwater and surface water sample (Table 4). Applicable measurements recorded for each sampling location are presented in Appendix D.1.

Laboratory analyses of the groundwater samples and surface water samples included the following standard suite of analytes: (1) pH, specific conductance, turbidity, total suspended solids, and TDS; (2) major ions and trace metals, which is the term used hereafter to differentiate metals that are typically minor constituents in groundwater (e.g., cobalt) from metals that are usually major ionic species (e.g., magnesium); (3) VOCs; and (4) gross alpha and gross beta activity (Table 4). This standard suite of analyses was modified in January 1996 (SAP Addendum 96-10) to include Inductively Coupled Plasma (ICP) spectroscopy analysis for lithium. Unfiltered groundwater and surface water samples were analyzed for all of the standard laboratory analytes; filtered samples were analyzed only for the principal cations and trace metals (Table 4).

In addition to the standard laboratory analytes, unfiltered groundwater samples collected for RCRA monitoring purposes were analyzed for several radioisotopes, which along with the inorganic, organic, and radiological analytes summarized below, comprise the list of RCRA Groundwater Protection Standard (GWPS) constituents defined in site-specific attachments to the post-closure permit (S-3 Site: Attachment 2, Section F; Oil Landfarm: Attachment 3, Section F; and Bear Creek Burial Grounds/Walk-In Pits: Attachment 4, Section F).

RCRA GWPS Constituents		
Inorganic Constituents	Organic Constituents	Radiological Constituents
Barium	Acetone	Gross alpha
Cadmium	Benzene	Gross beta
Chromium	Bromoform	Americium-241
Lead	2-Butanone	Iodine-129
Mercury	Carbon Tetrachloride	Neptunium-237
Nickel	Chloroform	Plutonium-238
Nitrate (as N)	1,1-DCE	Radium (total)
Uranium	Trans-1,2-Dichloroethene	Strontium-89/90
	Methylene Chloride	⁹⁹ Tc
	4-Methyl-2-Pentanone	Tritium
	PCE	²³⁴ U
	Toluene	²³⁵ U
	1,1,1-TCA	²³⁸ U
	TCE	

The GWPS constituents are those parameters for which risk-based groundwater protection standards will be developed under CERCLA as part of the feasibility study for the Bear Creek CA.

Laboratory analyses were performed in accordance with the EPA- and TDEC-approved analytical methods listed in Table 4. However, new or revised analytical methods for several of the standard analytes were performed. Atomic Absorption Spectroscopy for lead analyses (total and dissolved) was replaced with Plasma Mass Spectroscopy (PMS) analyses in July 1996 (SAP Addendum 96-34). Similarly, beginning in October 1996, three separate methods used for VOC analyses were replaced with a revised procedure that captured most compounds required for the multiple programmatic purposes of the Y-12 Plant GWPP (SAP Addendum 96-44).

Most laboratory analyses of the groundwater and surface water samples were performed by the K-25 Analytical Service Organization (ASO). Selected radiochemical analyses were performed

by the Y-12 Plant ASO and the ORNL ASO. Analytical results are presented in Appendix D.1 (miscellaneous laboratory parameters), Appendix D.2 (inorganic analytes), Appendix D.3 (organic analytes), and Appendix D.4 (radiological analytes).

3.4 Quality Assurance/Quality Control Sampling

Quality assurance/quality control samples included a total of 51 laboratory blanks, 75 trip blanks, 2 field blanks, 22 equipment rinsate samples, and 14 duplicate groundwater samples. Laboratory blanks were samples of deionized water analyzed along with several associated groundwater and/or surface water samples. Trip blanks were samples of deionized water transported in each cooler containing groundwater and surface water samples scheduled for VOC analyses. Field blanks were samples of deionized water collected at the well head before groundwater samples were collected from selected monitoring wells. Equipment rinsates were samples of the deionized water used to decontaminate the portable groundwater sampling equipment (i.e., Bennet Pumps), and were collected after a sampling team had completed sampling at a site or finished each administrative well group (a series of sampling locations grouped in the SAP for data tracking and management purposes). If more than one sampling pump was used, an equipment rinsate sample was collected from each pump. Equipment rinsates for bailers were collected after they were unwrapped for use in the field.

Laboratory blanks, trip blanks, field blanks, and equipment rinsate samples were analyzed for VOCs; selected equipment rinsates were also analyzed for nitrate, trace metals, gross alpha and gross beta activity, and radionuclides. Analytical results for the QA/QC blanks and equipment rinsate samples are presented in respective subsections of Appendix E.

In addition to the blank samples and equipment rinsates, duplicate groundwater samples were collected for QA/QC purposes from a total of eight monitoring wells (see Appendix F), including at least one well in each administrative well group defined in the SAP (and associated addenda). The duplicate samples were analyzed for the constituents and parameters specified for the well from which they were collected; analytical results are presented in Appendix D.

3.5 Data Management

Analytical results for the groundwater and surface water samples were downloaded directly into the Y-12 Plant GWPP groundwater SAS™ data sets from data files provided by the K-25, Y-12 Plant, and ORNL ASOs. Some data were manually input from hard copy documentation (laboratory reports and field data sheets) by the data base management subcontractor. Downloaded and manually input data were verified in accordance with the *Y-12 Plant Groundwater Protection Program - Groundwater Monitoring Program Data Management Plan* (Data Management Plan) (Martin Marietta Energy Systems, Inc. 1993). The data base management subcontractor and the appropriate ASO staff worked to resolve any incomplete data transfers, irregular parameter names or reporting units, and discrepancies between electronic and hardcopy versions of the data.

A standardized data screening process was used to identify CY 1996 analytical data that do not meet the DQOs defined in the Data Management Plan. As shown below, most of the DQO criteria apply to analytical results for inorganic analytes.

DQO Criteria	Inorganic Analytes	Organic Analytes	Radiological Analytes	Miscellaneous Analytes
Duplicate Sample Data	●	●	●	●
Filtered/Unfiltered Sample Data	●	.	.	.
Ion Charge Balance	●	.	.	.
False Positive Results	.	●	.	.
Counting Errors	.	.	●	.

As described in Appendix F, the majority of the CY 1996 data met applicable DQO criteria. Screened data included three duplicate sample results and six total/dissolved trace metal concentrations that differ by an order-of-magnitude or more; 13 false positive results for VOCs, most of which probably reflect contamination from the laboratory environment; and 15 radioanalyte results that exceed the respective minimum detectable activity (MDA) but are less than the associated counting errors. Additionally, principal ion data for seven groundwater samples are not suitable for quantitative evaluation because of charge balance errors.

4.0 RCRA MONITORING DATA EVALUATION

The following sections describe evaluations of site-specific and regime-wide RCRA monitoring data required by the post-closure permit. Site-specific permit conditions for the S-3 Site, Oil Landfarm, and Bear Creek Burial Grounds/Walk-In Pits require evaluation of: (1) the groundwater flow direction and rate; (2) the performance of the low-permeability cap based on concentrations of GWPS constituents in groundwater at the point-of-compliance wells; and (3) evidence for contaminant plume migration based on concentrations of GWPS constituents in groundwater at the plume boundary wells relative to background levels (Table 1). Results of these evaluations are described in the following sections.

4.1 Groundwater Flow Direction and Rate

Evaluation of groundwater flow directions in the Bear Creek Regime was based on groundwater elevations determined from depth-to-water measurements obtained from 143 monitoring wells during April 1-9, 1996 (the seasonally high water table) and 144 wells during October 1-7, 1996 (the seasonally low water table) (Table 5). Depth-to-water measurements recorded during the semiannual sampling events were not used for this purpose because they were less contemporaneous, and may have been influenced by sampling activities (i.e., purging/sampling adjacent wells).

Rates of groundwater in the Bear Creek Regime flow were estimated using the modified Darcy equation: $V = KI/\eta$, where K is the hydraulic conductivity of the medium, I is the horizontal hydraulic gradient, η is the effective porosity. The calculated flow rates represent average velocities in the Aquitard and the Aquifer, based on the assumption that saturated regolith and fractured bedrock function as equivalent porous media. However, depending on fracture aperture and wall roughness, flow rates in individual fractures may vary over several orders of magnitude (Freeze and Cherry 1979). Additionally, variation in the effective porosity would produce an inversely proportional variation in the calculated Darcy flow velocity.

Groundwater Flow Directions

Isopleths of seasonal groundwater surface elevations in the water table interval (Figure 7) and shallow/intermediate bedrock intervals (Figure 8) indicate southwesterly (strike-normal) flow in the Aquitard toward the Aquifer (Maynardville Limestone), the hydrologic drain for the groundwater flow system in the Bear Creek Regime. Westerly (strike-parallel) flow toward the west end of BCV occurs in the Maynardville Limestone. Seasonal water level fluctuations, which were typically less than 10-ft in most water table interval and bedrock interval monitoring wells (Table 5), influenced the magnitude of horizontal hydraulic gradients, but did not significantly alter the overall directions of groundwater flow in the Bear Creek Regime.

Water level data for selected Aquitard and Aquifer monitoring wells were used to determine representative horizontal hydraulic gradients in the water table interval and shallow/intermediate bedrock intervals. Based on data for these wells, seasonal horizontal hydraulic gradients in the water table interval ranged from 0.027 to 0.102 across strike in the Aquitard, and from 0.001 to 0.014 along strike in the Aquifer. Horizontal gradients in the water table interval were usually higher during seasonally high water levels in the Aquitard, but in the Aquifer, gradients were typically higher during seasonally low water levels. In the shallow/intermediate bedrock intervals, seasonal horizontal hydraulic gradients ranged from 0.027 to 0.057 across strike in the Aquitard, and from 0.005 to 0.017 along strike in the Aquifer. Horizontal gradients in the bedrock intervals were usually higher during seasonally high water levels in both the Aquitard and the Aquifer. Additionally, review of pre-sampling water-level elevations for selected RCRA background wells and point-of-compliance wells indicate no reversals of horizontal hydraulic gradients at the S-3 Site, the Oil Landfarm WMA, or the Bear Creek Burial Grounds WMA (Figure 6).

Water level data for monitoring well clusters indicate a wide range of upward (0.001 to 0.227) and downward (0.001 to 0.602) vertical hydraulic gradients in the Aquitard and the Aquifer, with seasonal reversals of upward/downward flow directions evident in both hydrogeologic units. Available well clusters define no clear spatial patterns or distinct distributions of vertical gradients, but upward gradients are highest in the Aquitard, and downward gradients are highest in the Aquifer.

Groundwater Flow Rates

Rates of groundwater flow in the Bear Creek Regime were estimated only for the water table and shallow bedrock intervals in the Aquitard, and for the shallow karst network in the Aquifer. Flow rates were not estimated for the stormflow zone in either hydrogeologic unit because most waste sources in the Bear Creek Regime lie below this zone. Rates of groundwater flow in the intermediate and deep bedrock intervals were not estimated for either hydrogeologic unit, but are probably as low as a few centimeters per year (Solomon *et al.* 1992).

In the Aquitard, estimated rates of groundwater flow in the water table interval range from 0.19 to about 79 ft per day (ft/d) based on hydraulic conductivities of 0.03 to 3.25 ft/d for saturated regolith (Connell and Bailey 1989), strike-normal horizontal hydraulic gradients of 0.027 to 0.102, and an effective porosity of 0.0042 (Moore 1989). Estimated rates of groundwater flow in the shallow bedrock interval range from 0.01 to about 98 ft/d based on hydraulic conductivities of 0.0008 ft/d for matrix intervals (Moore 1989), 0.15 ft/d for permeable intervals (Moore 1989), and 0.6 ft/d for the continuum of permeable intervals (Moore and Toran 1992); strike-normal horizontal hydraulic gradients of 0.027 to 0.057; and effective porosities of 0.00035 (Moore and Toran 1992) and 0.004 (Lozier *et al.* 1987).

In the Aquifer, estimated rates of groundwater flow in the shallow karst network range from about 28 to 1,069 ft/d based on an average hydraulic conductivity of 22 ft/d determined from well test results (Geraghty & Miller, Inc. 1989a), strike-parallel horizontal hydraulic gradients of 0.005 to 0.017, and the same range of effective porosity referenced for the Aquitard. The rate of groundwater flow in the shallow karst network also is indicated by results of a dye-tracer study performed in the Bear Creek Regime, which indicated a transport rate of about 200 ft/d in the Maynardville Limestone (Geraghty & Miller, Inc. 1989b).

The wide range of groundwater flow rates estimated for the Aquitard and the Aquifer probably occur at various times under various conditions. However, given the long history of waste disposal operations in the Bear Creek Regime, the relatively limited extent of groundwater contamination suggests that the lower flow rates probably dominate (particularly in the Aquitard bedrock intervals), and that attenuation processes (e.g., matrix diffusion) greatly reduce contaminant transport relative to groundwater flow rates.

4.2 Point-of-Compliance Concentration Trends

Results for GWPS constituents reported for the groundwater samples collected from point-of-compliance wells GW-276 at the S-3 Site, GW-363 at the Oil Landfarm WMA, and GW-069 at the Bear Creek Burial Grounds WMA were used to evaluate the effectiveness of the low-permeability cap at each site. The evaluations were based on temporal concentration trends indicated by available data obtained since January 1990 (when Y-12 Plant GWPP sampling/analysis protocols were firmly established). Temporal trends were reviewed within the context of the contaminant transport models described in Section 2.4, whereby contaminant sources (including buried wastes, DNAPL, and contaminants diffused into the Aquitard bedrock underlying each site) lie below the water table and actively release constituents to the groundwater system. Concentrations should decrease over the long term as contaminants are naturally flushed during seasonal groundwater recharge/discharge cycles.

4.2.1 S-3 Site

Point-of-compliance well GW-276 is completed at a depth of 18.5-ft bgs in the Aquitard (Nolichucky Shale) about 250 ft south (downgradient) of the S-3 Site cap (Figure 6). Groundwater samples were collected from the well on February 29 and July 8, 1996, and the GWPS constituents detected in the samples were barium, cadmium, lead, nickel, nitrate, uranium, chloroform, PCE, and all of the radiological analytes except iodine-129, plutonium-238 (^{238}Pu), and tritium (Table 6). All results for the GWPS constituents met applicable DQO criteria.

As illustrated by data for selected GWPS constituents, temporal concentrations of highly mobile (nitrate and ^{99}Tc), comparably less mobile (e.g., PCE), and relatively immobile (e.g., cadmium) components of the S-3 Site contaminant plume have decreased in the groundwater at well GW-276 (Figure 9). However, the rate of decrease has generally slowed, particularly for the more mobile GWPS constituents. Nitrate concentrations, for example, decreased at an average rate of about 27% per year between January 1990 (454 mg/L) and March 1994 (147 mg/L), but only about 6% per year between March 1994 and July 1996 (129 mg/L). This suggests that the bulk of the highly contaminated groundwater in the more permeable flowpaths has been flushed from the shallow groundwater system, and that contaminant concentrations are increasingly controlled by

relative rates of molecular diffusion from the bedrock matrix into the permeable fractures, varying degrees of dilution during seasonal flow conditions, and hydrochemical transport characteristics.

Decreasing temporal trends indicated by data for well GW-276 reflect decreased contaminant flux since closure of the S-3 Site, and natural flushing during seasonal recharge/discharge cycles. Slower decreasing rates evident since March 1994 suggest that contaminant concentrations may be approaching relatively asymptotic levels. Such trends are consistent with slow, natural attenuation in the subsurface.

4.2.2 Oil Landfarm

Point-of-compliance well GW-363 is completed at a depth of 21-ft bgs in the Aquitard (Nolichucky Shale), and monitors groundwater downgradient along strike to the west of the Oil Landfarm WMA (Figure 7). Groundwater samples were collected from the well on February 12 and July 2, 1996 (Table 3); duplicate samples were also collected during each sampling event (see Appendix F). Barium (total and dissolved), lead (dissolved), acetone, 2-butanone, and radium (total) were the only GWPS constituents detected in these samples (Table 7).

Barium concentrations ranged from 0.05 to 0.066 mg/L in the unfiltered and filtered groundwater samples from well GW-363 (Table 7). These results are within the range of background levels at the Oil Landfarm WMA, as indicated by barium concentrations (0.019 to 0.25 mg/L) reported for the background wells (GW-043, GW-044, and GW-084) at the site (see Appendix D). Although a slightly increasing temporal trend is evident since June 1995, linear regression of total barium results obtained since March 1994 suggests an overall decreasing concentration trend in the groundwater at well GW-363 (Figure 10).

None of the chloroethenes (e.g., PCE) or chloroethanes (e.g., 1,1,1-TCA) which comprise the dissolved VOC plumes in shallow groundwater at the Oil Landfarm WMA (see discussion in Section 2.4) were detected in the groundwater samples collected from well GW-363 (Table 7). Low concentrations of acetone (13 µg/L) and 2-butanone (9 µg/L) reported for the groundwater sample collected in February 1996 were probably laboratory artifacts, although only the latter result was screened as a false positive (see Section F.5 in Appendix F). Both constituents are common laboratory reagents, and neither compound is a component of the dissolved VOC plume in the

groundwater at the Oil Landfarm. The lack of chloroethenes and chloroethanes in the groundwater at well GW-363 indicates that it lies beyond the boundaries of the VOC plume in shallow (Aquitard) groundwater at the Oil Landfarm WMA. Additionally, the results for well GW-363 provide little information regarding the effectiveness of the low-permeability cap at the site.

4.2.3 Bear Creek Burial Grounds/Walk-In Pits

Point-of-compliance well GW-069 is completed at a depth of 100-ft bgs in the Aquitard (Nolichucky Shale) about 250 ft south (downgradient) of BG-A South (Figure 7). Groundwater samples were collected from the well on February 25 and July 23, 1996, and all results for GWPS constituents met applicable DQO criteria. Barium and lead were the only GWPS constituents detected above analytical reporting limits (Table 8).

Total and dissolved barium concentrations ranged from 0.34 to 0.37 mg/L, which slightly exceeds the highest concentration (0.29 mg/L) reported for any of the background wells (GW-040, GW-042, GW-079, GW-080, GW-162, GW-372, GW-373, and GW-642) at the site (see Appendix D). However, results obtained since June 1990 do not indicate groundwater contaminant migration to this location, and generally reflect seasonal fluctuations in concentrations (Figure 11).

Lead was detected in filtered and unfiltered groundwater samples collected from well GW-069 in July 1996 (Table 8). Both results just exceed the PMS detection limit (0.0005 mg/L) and probably represent natural lead concentrations in the groundwater at the well.

The CY 1996 results for well GW-069 do not indicate groundwater contamination. Additionally, results for this monitoring well provide little if any indication of the effectiveness of the low-permeability cap at the Bear Creek Burial Grounds WMA.

4.3 Plume Boundary Concentrations

Groundwater samples were collected from the plume boundary wells (westernmost exit pathway transect) during January 26-29 and July 14-18, 1996 (Table 3). Every inorganic GWPS constituent except mercury was detected in at least one of these samples (barium and uranium most frequently) and results for several radiological constituents exceed corresponding MDAs, but VOCs were not detected in any of the samples (Table 9). All but the following radiological results passed applicable DQO criteria: (1) ^{238}U activity reported for the sample collected from well GW-710 in

January 1996, (2) ²³⁷Np activity reported for the sample collected from well GW-713 in January 1996, and (3) ²³⁸Pu activity reported for the sample collected from well GW-713 in July 1996 (see Section F.6 in Appendix F).

Condition IV.A of the post closure-permit requires evaluation of contaminant plume migration in the Bear Creek Regime to be based on comparison of the GWPS constituent results for the plume boundary wells (GW-710, GW-711, GW-712, GW-713, GW-714, and GW-715) to the corresponding results for plume boundary background well GW-521. However, the suitability of this approach is questionable because the plume boundary wells monitor groundwater in the Maynardville Limestone that has distinctly different geochemical characteristics and trace element concentrations than the groundwater in the Knox Group monitored by well GW-521 at the crest of Chestnut Ridge.

To address the concerns described above, evaluation of the plume boundary well results for inorganic GWPS constituents involved comparison with respective maximum values in the historical data (January 1990 - July 1996) for well GW-521, and the statistically-derived upper tolerance limits (UTLs) reported in *Determination of Reference Concentrations for Inorganic Analytes in Groundwater at the Department of Energy Y-12 Plant, Oak Ridge, Tennessee* (HSW Environmental Consultants, Inc. et al. 1995). The UTLs represent maximum concentrations expected in groundwater at the Y-12 Plant based on detailed statistical analysis of the groundwater quality data for more than 400 monitoring wells. Additionally, the UTLs were calculated for specific groups of wells (i.e., clusters) differentiated by similar geochemical characteristics. Historical data for well GW-521 and UTLs applicable to the plume boundary wells are summarized below.

Inorganic GWPS Constituent	Detection Limit (mg/L)	GW-521 Sampling History (January 1990 - July 1996)				UTL (mg/L)	
		No. of Samples	Results > Detection Limit	Minimum (mg/L)	Maximum (mg/L)	Cluster 1	Cluster 3
Barium	<0.001	26	26	0.0068	0.01	0.71	0.71
Cadmium	<0.003	26	1	<0.003	0.0032	0.002	0.002
Chromium	<0.01	26	1	<0.01	0.014	0.029	0.041
Lead	<0.0005	26	4	0.0017	0.011	0.0096	0.0096
Mercury	<0.0002	26	0	<0.0002	<0.0002	0.0003	0.0003
Nickel	<0.01	26	2	0.012	0.02	0.06	0.02
Nitrate (as N)	<0.2	26	9	<0.2	0.63	6.9	5.3
Uranium	<0.0005	26	1	<0.0005	0.001	0.012	0.005

Results for inorganic GWPS constituents that exceed both the maximum value for well GW-521 and the applicable UTL for Cluster 1 (GW-710, GW-711, GW-712, GW-713, and GW-715) or Cluster 3 (GW-714) were evaluated as potential evidence of groundwater contamination at the RCRA plume boundary wells.

As shown in the following data summary, results for barium, cadmium, chromium, nickel, nitrate (as N), and uranium (total) exceed the maximum background value for well GW-521, but only the results for cadmium, chromium, and nickel exceed the applicable UTL.

SUMMARY OF CY 1996 RESULTS FOR INORGANIC GWPS CONSTITUENTS THAT EXCEED WELL GW-521 MAXIMUM VALUES					
Inorganic GWPS Constituent	GW-521 Maximum Value (mg/L)	UTL (mg/L)	Well Number	Total Concentration (mg/L)	
				January 1996	July 1996
Barium	0.01	0.71	GW-712	0.045	0.051
			GW-713	0.051	0.053
			GW-714	0.069	0.058
			GW-715	0.093	0.091
Cadmium	0.0032	0.002	GW-710	.	0.0066
			GW-712	.	0.0076
Chromium	0.014	0.041	GW-715	0.099	0.076
Nickel	0.02	0.02	GW-715	0.047	0.12
Nitrate (as N)	0.63	5.3	GW-714	3.56	1.29
Uranium (total)	0.001	0.005	GW-714	0.0029	0.0015

Note: "." = Less than GW-521 maximum value; **BOLD** = result exceeds the UTL.

Although the total cadmium concentrations reported for the groundwater samples collected in July 1996 from wells GW-710 and GW-712 exceed the maximum value for well GW-521 and the UTL, results for these wells are not supported by historical results. Cadmium was not detected in the 13 samples collected from these wells between December 1991 and July 1995. Elevated cadmium concentrations in samples from these wells probably reflect analytical artifacts.

Elevated chromium and nickel concentrations reported for groundwater samples from well GW-715 are consistent with historical results and potentially reflect corrosion of the stainless steel well screen. Both metals are stainless steel corrosion products (Driscoll 1986), and a preliminary statistical analysis of data for monitoring wells at the Y-12 Plant indicated that total chromium and

nickel concentrations are statistically higher in the groundwater samples from wells with stainless steel well screens, chloride concentrations that exceed 8 mg/L, and static water levels that are below the top of the monitored interval (HSW Environmental Consultants, Inc. 1994). Chloride concentrations in the groundwater at well GW-715 have exceeded 100 mg/L, and static water levels are typically within the screened interval for the well.

As noted previously, VOCs were not detected in groundwater samples collected from the plume boundary wells during CY 1996, and most results for radiological GWPS constituents were below specified MDAs (Table 9). Radiological results that exceed the MDA are summarized below, and include at least one result for at least one groundwater sample from each of the plume boundary wells.

SUMMARY OF CY 1996 RADIOLOGICAL RESULTS THAT EXCEED MDAs				
Radiological GWPS Constituent	Well GW-521 Maximum Value (pCi/L ± Counting Error)	Well Number	Activity ± Counting Error (pCi/L)	
			January 1996	July 1996
Americium-234	8.13 ± 6.6	GW-711	1.34 ± 0.77	<MDA
		GW-715	0.488 ± 0.27	<MDA
Plutonium-238	<MDA	GW-714	0.271 ± 0.21	<MDA
		GW-715	1.24 ± 0.48	<MDA
Radium (Total)	1.5 ± 1.16	GW-710	2.1 ± 1.2	3.5 ± 2.6
		GW-711	5.4 ± 2.2	4.1 ± 2.4
		GW-713	1.3 ± 1.0	<MDA
		GW-715	1.1 ± 0.9	<MDA
Tritium	2700 ± 540	GW-712	230 ± 190	<MDA
		GW-715	270 ± 190	<MDA
Uranium-234	0.968 ± 0.087	GW-710	0.0314 ± 0.026	<MDA
		GW-713	0.85 ± 0.46	0.375 ± 0.28
		GW-714	1.42 ± 0.54	0.345 ± 0.22
		GW-715	0.423 ± 0.24	0.274 ± 0.21
Uranium-238	<MDA	GW-712	<MDA	0.491 ± 0.36
		GW-714	0.726 ± 0.37	0.692 ± 0.32
		GW-715	<MDA	0.196 ± 0.18

Note: <MDA = Less than minimum detectable activity; **BOLD** = result exceeds GW-521 maximum value

The bulk of the radiological results that exceed MDAs have large proportional (i.e., >50%) counting errors. This indicates a high degree of analytical uncertainty associated with these results, which

suggests that most are probably analytical artifacts related to the background activity in the laboratory environment. Analytical uncertainty is further indicated by detection of isotopes in the groundwater samples from background well GW-521, which is located upgradient of all known sources of radiological contamination in groundwater at the Y-12 Plant. Additionally, only the CY 1996 radiological results discussed below are generally supported by historical data.

Total radium results reported for wells GW-710 and GW-711 are generally consistent with historical data for both wells; radium has been detected in all seven groundwater samples collected from each well since November 1993. The CY 1996 results that exceed MDAs range from 2.1 ± 1.2 pCi/L (GW-710) to 5.4 ± 2.2 pCi/L (GW-711). In light of the depth of these wells (>600 ft bgs), however, the radium activities probably reflect natural levels at depth in the Knox Group (GW-710) and the Maynardville Limestone (GW-711).

The uranium isotope results for well GW-714 are generally consistent with historical data. Either ^{234}U , ^{238}U , or both were detected in five of the seven samples collected from well GW-714 since November 1993; results that exceed MDAs range from 0.345 ± 0.22 pCi/L (^{234}U) to 1.5 ± 0.68 pCi/L (^{234}U). However, it is not clear if these results reflect groundwater contamination because they are generally characterized by high proportional counting errors, are typically only just above the reported MDA, and do not define any discernable temporal trend. Additionally, transport of uranium in groundwater is generally retarded by pH-sensitive sorption reactions (Fetter 1992), and transport along strike-parallel flowpaths at depth in the Maynardville Limestone seems unlikely because the monitored interval for well GW-714, which is 115 to 145 ft bgs, does not intercept enlarged fractures or solution cavities (Jones *et al* 1995). Moreover, data for upgradient wells comprising Maynardville Limestone Exit Pathway Pickets A, B, and C strongly indicate contaminant migration toward a highly conductive hydrostratigraphic zone near the geologic contact between the Maynardville Limestone and the Copper Ridge Dolomite (AJA Technical Services, Inc. 1996), and well GW-714 monitors low-conductivity, fracture-dominated groundwater flow paths (Shevenell *et al.* 1995) within a less permeable hydrostratigraphic zone near the middle of the formation (Goldstrand 1995).

Based on review and evaluation of the CY 1996 RCRA post-closure corrective action monitoring data, contamination in the groundwater at the plume boundary wells is not conclusively

indicated. Nitrate and uranium concentrations in samples from well GW-714 exceed the background levels determined from data for well GW-521, but are below respective UTLs. Nitrate levels also show a downward trend over the past two years.

5.0 SUMMARY AND CONCLUSIONS

This CY 1996 annual monitoring report contains the groundwater and surface water monitoring data obtained under the auspices of the Y-12 Plant GWPP for the multiple programmatic purposes of: (1) RCRA monitoring in accordance with requirements of the RCRA post-closure permit for the Bear Creek Regime; (2) DOE Order 5400.1 surveillance monitoring and DOE Order 5400.1 exit pathway/perimeter monitoring; (3) monitoring performed as a best management practice of the Y-12 Plant GWPP; and (4) special sampling performed in support of the CERCLA RI for the Bear Creek CA.

Groundwater and surface water samples were collected from 55 monitoring wells, eight surface water sampling stations along Bear Creek, and three springs that discharge into Bear Creek. Samples were collected semiannually from each of these locations except one surface water station (BCK-00.63), and two monitoring wells sampled for CERCLA RI purposes (GW-087 at the Oil Landfarm WMA, and GW-243 at the S-3 Site).

Samples collected for the purposes of RCRA monitoring, DOE Order 5400.1 monitoring, and Y-12 Plant GWPP best management practice monitoring were analyzed for a standard suite of analytical parameters that included principal ions, trace metals, VOCs, radiological parameters, and several miscellaneous field and laboratory measurements. Groundwater samples collected from wells used for RCRA monitoring also were analyzed for several radioisotopes. Groundwater samples collected for CERCLA RI purposes were analyzed for a comprehensive suite of inorganic analytes.

As required in the post-closure permit, the RCRA monitoring data for the S-3 Site, Oil Landfarm WMA, and Bear Creek Burial Grounds WMA were reviewed to: (1) determine the groundwater flow rate and direction; (2) evaluate the performance of the low permeability caps based on concentrations of GWPS constituents in groundwater at selected point-of-compliance wells; and (3) identify results that reflect additional migration of groundwater contaminant plumes in the Maynardville Limestone, based on concentrations of GWPS constituents in groundwater at the plume boundary wells relative to corresponding background levels determined from data for well GW-521.

Seasonal groundwater flow directions at the S-3 Site, Oil Landfarm WMA, and Bear Creek Burial Grounds WMA were evaluated based on depth-to-water measurements recorded for 143 wells in April 1996 and 144 wells in October 1996. Isopleths of seasonal groundwater elevations indicate southwesterly flow in the Aquitard toward the Aquifer, the hydrologic drain in BCV, and westerly flow in the Aquifer. Flow rates at shallow depths in both hydrogeologic units, as estimated using the modified Darcy equation, range over several orders-of-magnitude, but the relatively limited extent of groundwater contamination in the Bear Creek Regime suggest that the lower flow rates dominate, and that attenuation processes greatly reduce contaminant transport relative to groundwater flow rates.

Based on the RCRA monitoring data for point-of-compliance well GW-276, which show decreasing long-term temporal concentrations of all GWPS constituents, the low permeability cap at the S-3 Site appears to effectively limit infiltration of rainfall. However, results for point-of-compliance wells GW-069 and GW-363, which monitor uncontaminated groundwater downgradient of the Bear Creek Burial Grounds WMA and the Oil Landfarm WMA, respectively, generally provide little information regarding cap effectiveness at either site.

Except for well GW-714, results for GWPS constituents in groundwater at the plume boundary wells do not indicate migration of contaminant plumes in the Bear Creek Regime beyond the westernmost picket. Because nitrate and uranium levels in samples from well GW-714 exceed the background levels determined from data for well GW-521, additional monitoring wells located downgradient from exit pathway Picket W must be considered. However, because data from well GW-521 is not appropriate to determine background levels for the Maynardville Limestone, a permit modification that uses UTLs as comparison values for groundwater at the plume boundary is the better alternative.

6.0 REFERENCES

- AJA Technical Services, Inc. 1996. *Calendar Year 1995 Groundwater Quality Report for the Bear Creek Hydrogeologic Regime, Y-12 Plant, Oak Ridge, Tennessee. Part 2: 1995 Groundwater Quality Data Interpretations*. Prepared for Lockheed Martin Energy Systems, Inc. (Y/SUB/96-KDS15V/3).
- Connell, J.F. and Z.C. Bailey. 1989. *Statistical and Simulation Analysis of Hydraulic- Conductivity Data For Bear Creek and Melton Valleys, Oak Ridge Reservation, Tennessee*. U.S. Geological Survey Water-Resources Investigations Report 89-4062.
- Dreier, R.B., D.K. Solomon, and C.M. Beaudoin. 1987. Fracture Characterization in the Unsaturated Zone of a Shallow Land Burial Facility. *Flow and Transport through Fractured Rock*. American Geophysical Union Monograph 42.
- Driscoll, F.G. 1986. *Groundwater and Wells*. Second Edition. Johnson Division, St. Paul, MN.
- Fetter, C. W. 1992. *Contaminant Hydrology*. Macmillan Publishing Company. New York, NY (pp 282-285).
- Freeze, R.A. and J.A. Cherry. 1979. *Groundwater*. Prentice-Hall, Inc., Eaglewood Cliffs, New Jersey, (pp. 408-409).
- Geraghty & Miller, Inc. 1989a. *Development of Ground-Water Flow Models for the S-3 Waste Management Area, Y-12 Plant, Oak Ridge, Tennessee*. Prepared for Martin Marietta Energy Systems, Inc. (Y/SUB/89-00206C/1).
- Geraghty & Miller, Inc. 1989b. *Tracer Study of the Hydrologic System of Upper Bear Creek, Y-12 Plant, Oak Ridge, Tennessee*. Prepared for Martin Marietta Energy Systems, Inc. (Y/SUB/89-00206C/4).
- Goldstrand, P.M. 1995. *Stratigraphic Variations and Secondary Porosity within the Maynardville Limestone in Bear Creek Valley, Y-12 Plant, Oak Ridge Tennessee*. Prepared for Martin Marietta Energy Systems, Inc. (Y/TS-1093).
- HSW Environmental Consultants, Inc. 1994. *Calendar Year 1993 Groundwater Quality Report for the Bear Creek Hydrogeologic Regime, Y-12 Plant, Oak Ridge, Tennessee. 1993 Groundwater Quality Data Interpretations and Proposed Program Modifications*. Prepared for Martin Marietta Energy Systems, Inc. (Y/SUB/95-EAQ10C/1/P2).
- HSW Environmental Consultants, Inc. 1995. *Sampling and Analysis Plan for Groundwater and Surface Water Monitoring at the Y-12 Plant During Calendar Year 1996*. Prepared for Lockheed Martin Energy Systems, Inc. (Y/SUB/95-EAQ10C/4).

- HSW Environmental Consultants, Inc., Paradigm Data Services, Inc., and ORNL Environmental Sciences Division. 1995. *Determination of Reference Concentrations for Inorganic Analytes in Groundwater at the Department of Energy Y-12 Plant, Oak Ridge, Tennessee*. Prepared for Lockheed Martin Energy Systems, Inc. (Y/ER-234).
- Jones, S.B., B.K. Thompson, and S.M. Field. 1995. *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*. Lockheed Martin Energy Systems, Inc. (Y/TS-881/R3).
- King, H.L. and C.S. Haase. 1987. *Subsurface-Controlled Geological Maps for the Y-12 Plant and Adjacent Areas of Bear Creek Valley*. Oak Ridge National Laboratory (ORNL/TM-10112).
- Lockheed Martin Energy Systems, Inc. 1995. *Technical Procedure for Groundwater Sampling*. K-25 Analytical Services Organization, procedure no. SESD-TP-8204.
- Lozier, W.B., C.A. Spiers, and R. Peerson. 1987. *Aquifer Pump Tests with Tracers*. Prepared for Martin Marietta Energy Systems, Inc. (ORNL/SUB/86-32136).
- Martin Marietta Energy Systems, Inc. 1988. *Environmental Surveillance Quality Control Program*. (ES/ESH/INT-14).
- Martin Marietta Energy Systems, Inc. 1993. *Y-12 Plant Groundwater Protection Program-Groundwater Monitoring Program Data Management Plan*. (Y/SUB/93-TK532C/1).
- Moore, G.K. 1988. *Concepts of Groundwater Occurrence and Flow Near Oak Ridge National Laboratory*. Oak Ridge National Laboratory (ORNL/TM-10969).
- Moore, G.K. 1989. *Groundwater Parameters and Flow System Near Oak Ridge National Laboratory*. Oak Ridge National Laboratory (ORNL/TM-11368).
- Moore, G.K. 1992. Hydrograph analysis in fractured rock terrain. *Ground Water*, Vol. 30, No. 3, pp. 390-395.
- Moore, G.K. and L.E. Toran. 1992. *Supplement to a Hydrogeologic Framework for the Oak Ridge Reservation, Oak Ridge, Tennessee*. Oak Ridge National Laboratory (ORNL/TM-12191).
- Science Applications International Corporation. 1996. *Remedial Investigation Report for Bear Creek Valley*. Volume 1. Prepared for Lockheed Martin Energy Systems, Inc.
- Shevenell, L.A. 1994. *Chemical Characteristics of Waters in Karst Formations at the Oak Ridge Y-12 Plant*. Oak Ridge National Laboratory (Y/TS-1001).

Shevenell, L.A., B.W. McMaster, and K.M. Desmarais. 1995. *Evaluation of Cross Borehole Tests at Selected Wells in the Maynardville Limestone and Copper Ridge Dolomite at the Oak Ridge Y-12 Plant*. Prepared for Lockheed Martin Energy Systems, Inc.(Y/TS-1166).

Solomon, D.K., G.K. Moore, L.E. Toran, R.B. Dreier, and W.M. McMaster. 1992. *Status Report - A Hydrologic Framework for the Oak Ridge Reservation*. Oak Ridge National Laboratory (ORNL/TM-12053).

Tennessee Department of Health and Environment. 1988. Letter from T. Tiesler, Director of the Division of Solid Waste-Management, to J.L. Foutch, U.S. Department of Energy - Oak Ridge Operations, January 13, 1988.

Turner, R.R., M.A. Bogel, R.B. Clapp, K.C. Dearstone, R.B. Drier, T.O. Early, S.E. Herbes, J.M. Loar, P.D. Parr, and G.R. Southworth. 1991. *Remedial Investigation Work Plan for Bear Creek (Y02-S600) at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee*. Martin Marietta Energy Systems, Inc. (ES/ER-19&D2).

U.S. Department of Energy. 1994. *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program*. U.S. Department of Energy Oak Ridge Field Office (DOE/OR-1001/R3).

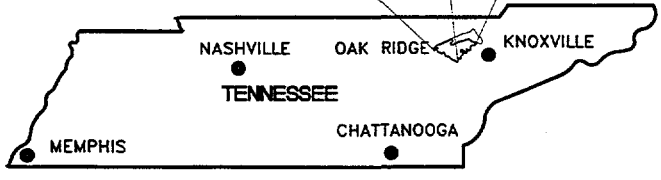
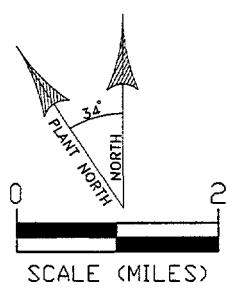
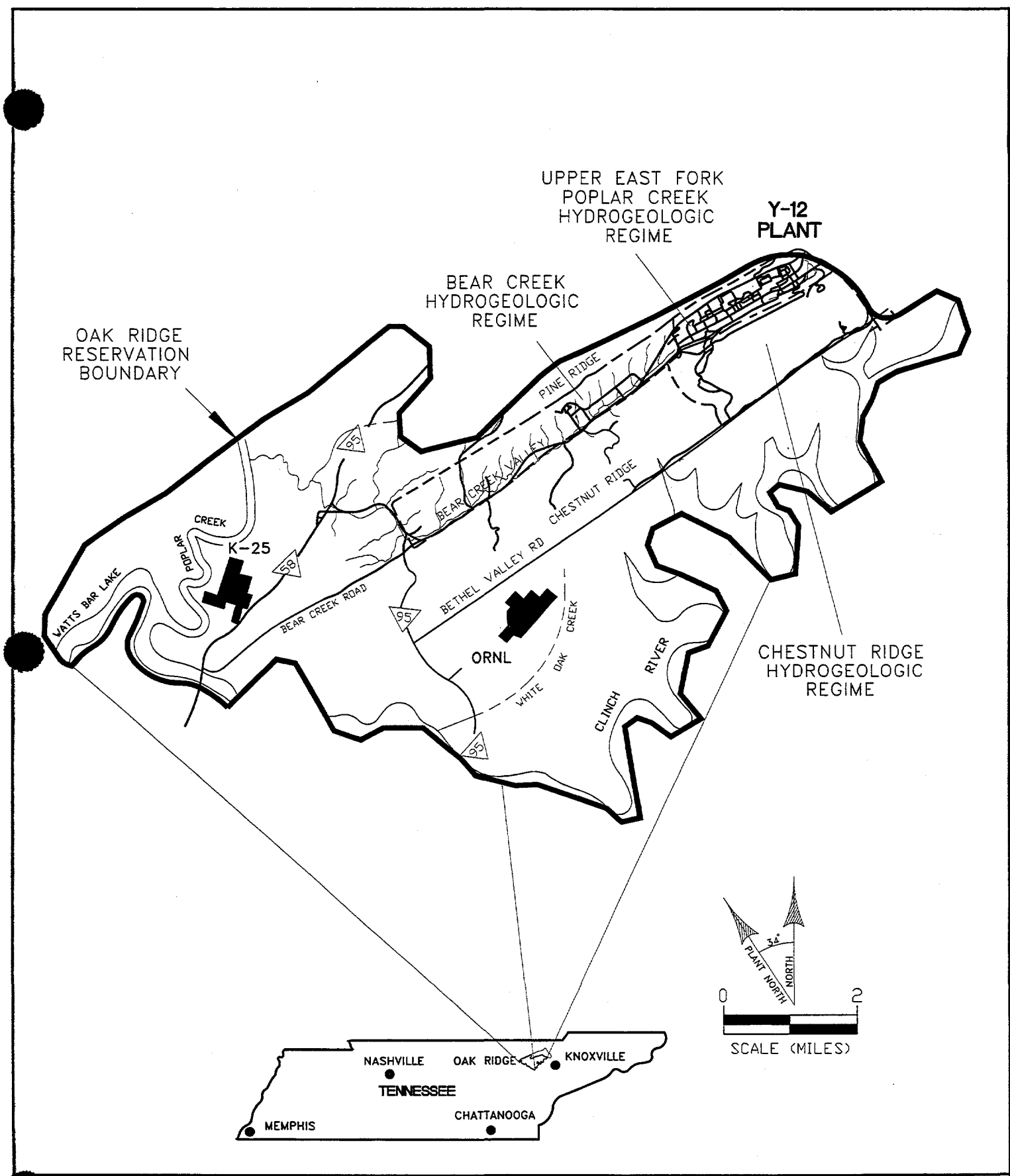
U.S. Environmental Protection Agency. 1983. *Methods for Chemical Analysis of Water and Wastes*.

U.S. Environmental Protection Agency. 1986. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods*.

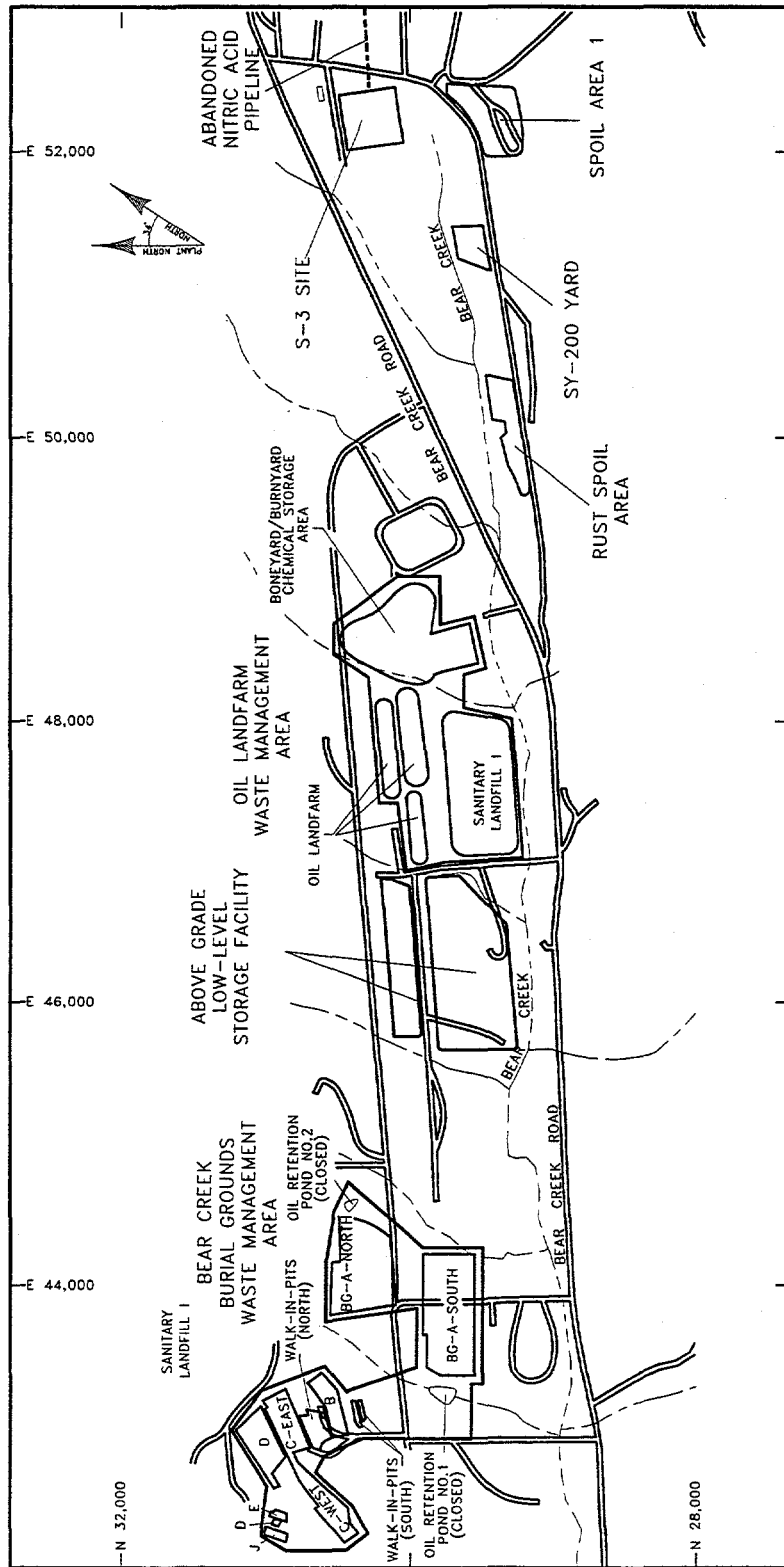
U.S. Environmental Protection Agency. 1988. *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*. U.S. EPA, Office of Solid Waste.

APPENDIX A

FIGURES



PREPARED FOR: LOCKHEED MARTIN ENERGY SYSTEMS, INC. PREPARED BY: AJA TECHNICAL SERVICES, INC.	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 1 HYDROGEOLOGIC REGIMES AT THE Y-12 PLANT
	DOC NUMBER:	97-D001	
	DWG ID.:	97-007	
	DATE:	2-12-97	



PREPARED FOR:
LOCKHEED MARTIN
ENERGY SYSTEMS, INC.

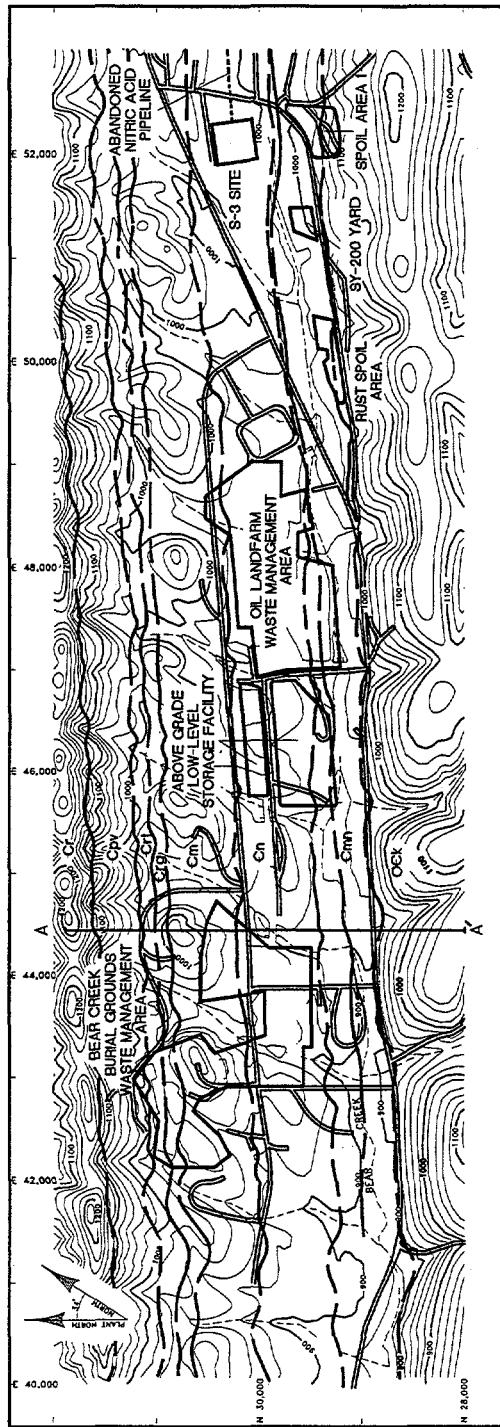
LOCATION: Y-12 PLANT
 OAK RIDGE, TN.

FIGURE 2

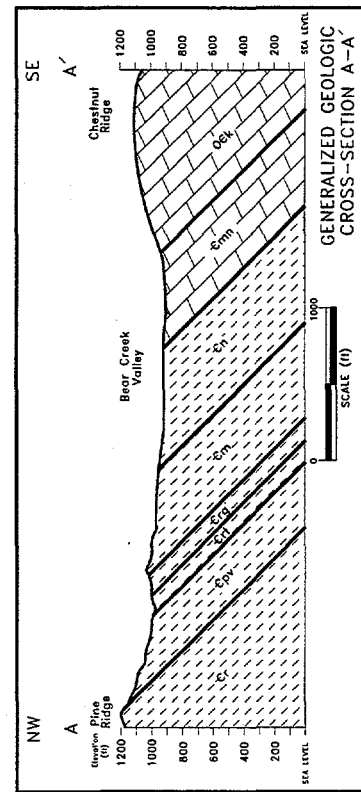
PREPARED BY:
AJA TECHNICAL
SERVICES, INC.

DOC NUMBER: 96-D006
 DWG ID.: 96-091
 DATE: 2-17-95

WASTE MANAGEMENT SITES
IN THE BEAR CREEK HYDROGEOLOGIC REGIME



SOURCE: King and Hoose, 1987



SYSTEM GROUP	HYDRO UNIT	FORMATION	MAP SYMBOL	THICKNESS (ft)
CAMBRIAN	UPPER	COPPER RIDGE DOLOMITE	Ock	NOT DETERMINED
	MIDDLE	MAYNARDVILLE LIMESTONE	Cmn	418-450
CONASAUGA	ORR AQUITARDS	NOLOCHUCKY SHALE	Cn	422-550
		MARYVILLE LIMESTONE	Cm	346-445
		ROGERSVILLE SHALE	Crg	90-120
		ROULLEGE LIMESTONE	Cr	90-120
		PUMPKIN VALLEY SHALE	Cpv	260-320
LOWER		ROME	Cr	NOT DETERMINED

PREPARED FOR:
LOCKHEED MARTIN ENERGY SYSTEMS, INC.

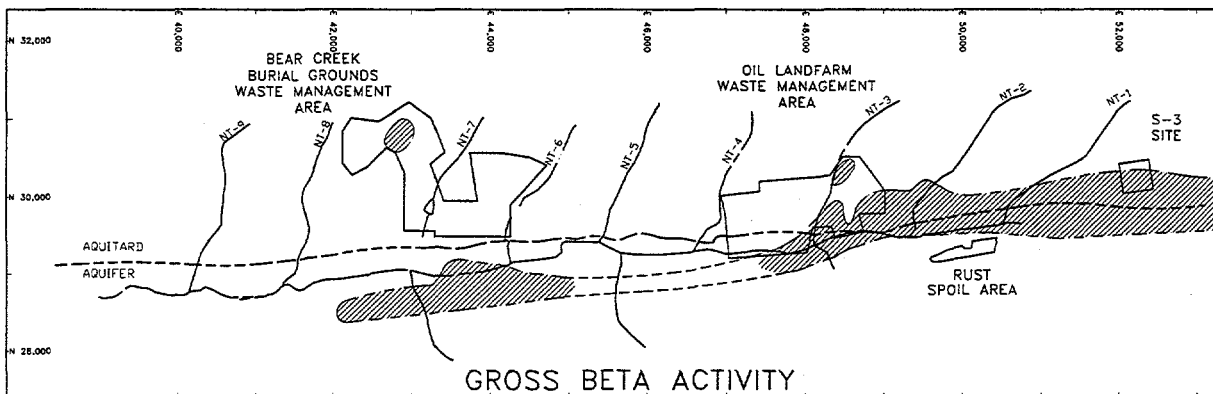
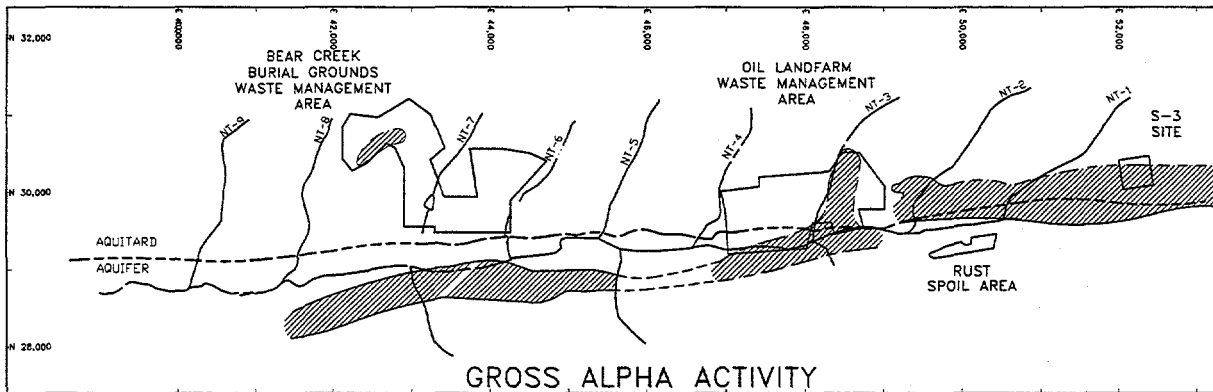
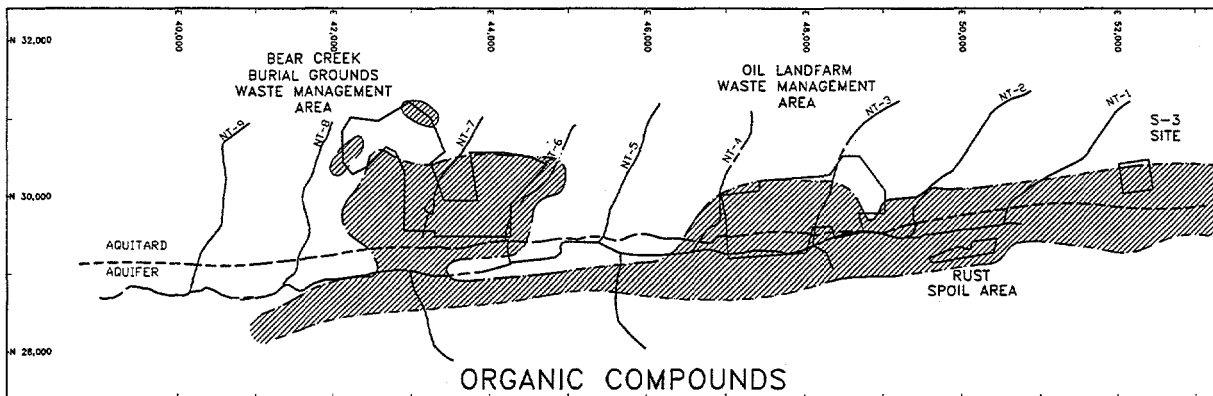
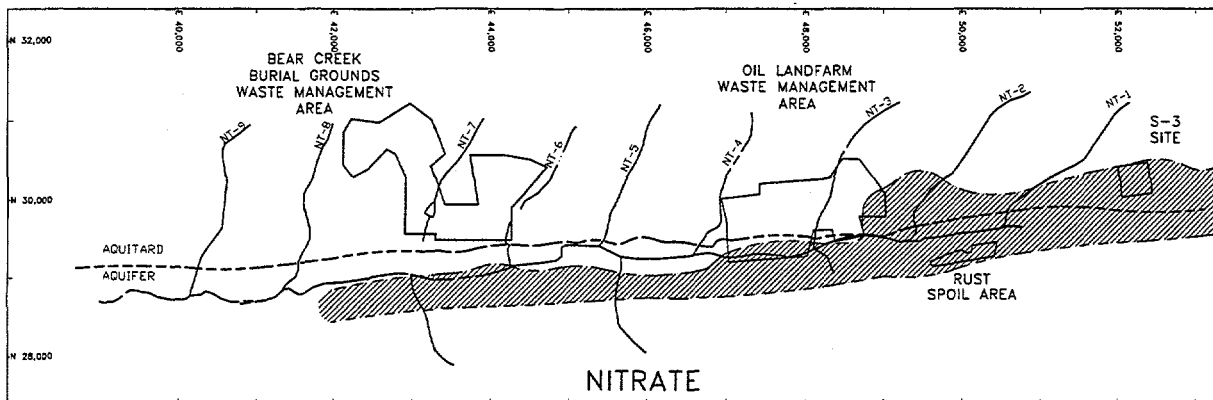
LOCATION: Y-12 PLANT
 OAK RIDGE, TN.

PREPARED BY:
AJA TECHNICAL SERVICES, INC.

DOC NUMBER: 96-D010
 DWG ID.: 96-090
 DATE: 2-12-97

FIGURE 3

TOPOGRAPHY AND BEDROCK GEOLOGY
 IN THE BEAR CREEK HYDROGEOLOGIC REGIME



EXPLANATION

 - PARAMETER CONCENTRATION/ACTIVITY EXCEEDS GROUNDWATER QUALITY STANDARDS

PREPARED FOR:
**LOCKHEED MARTIN
ENERGY SYSTEMS, INC.**

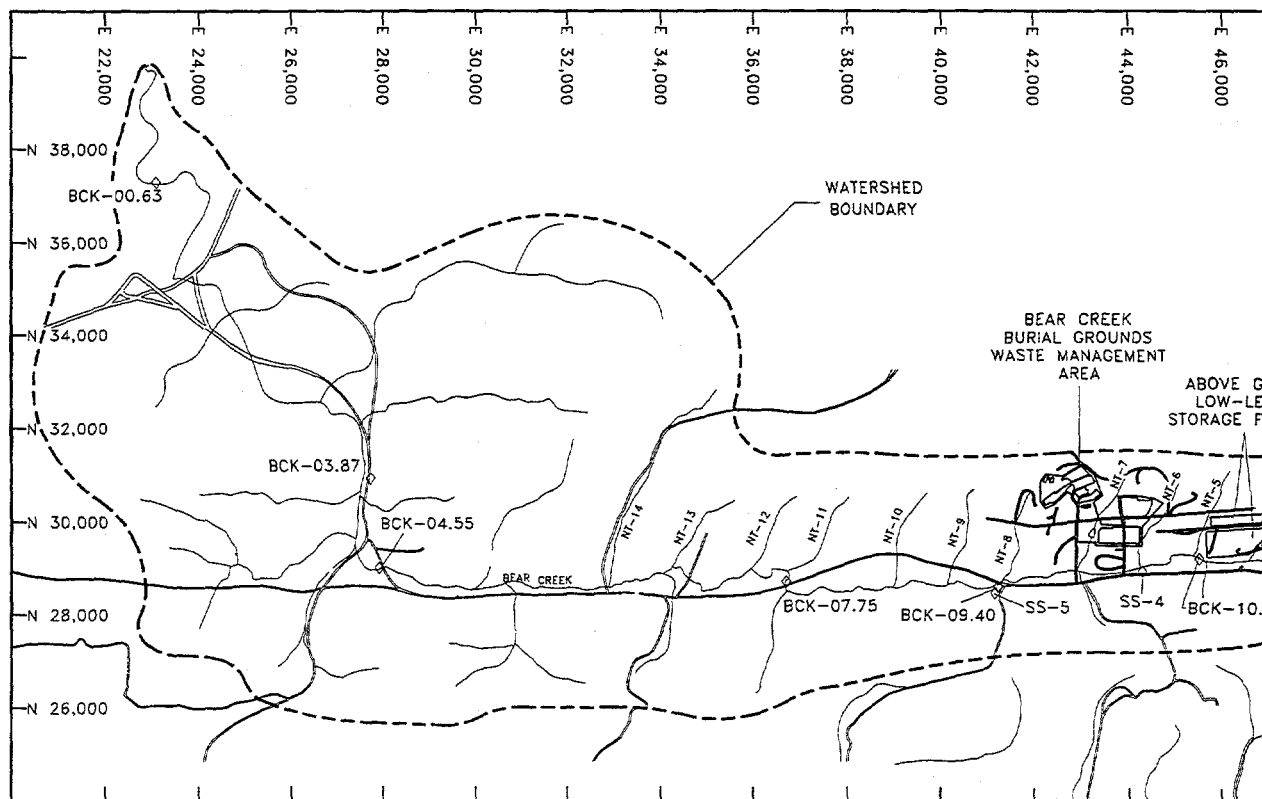
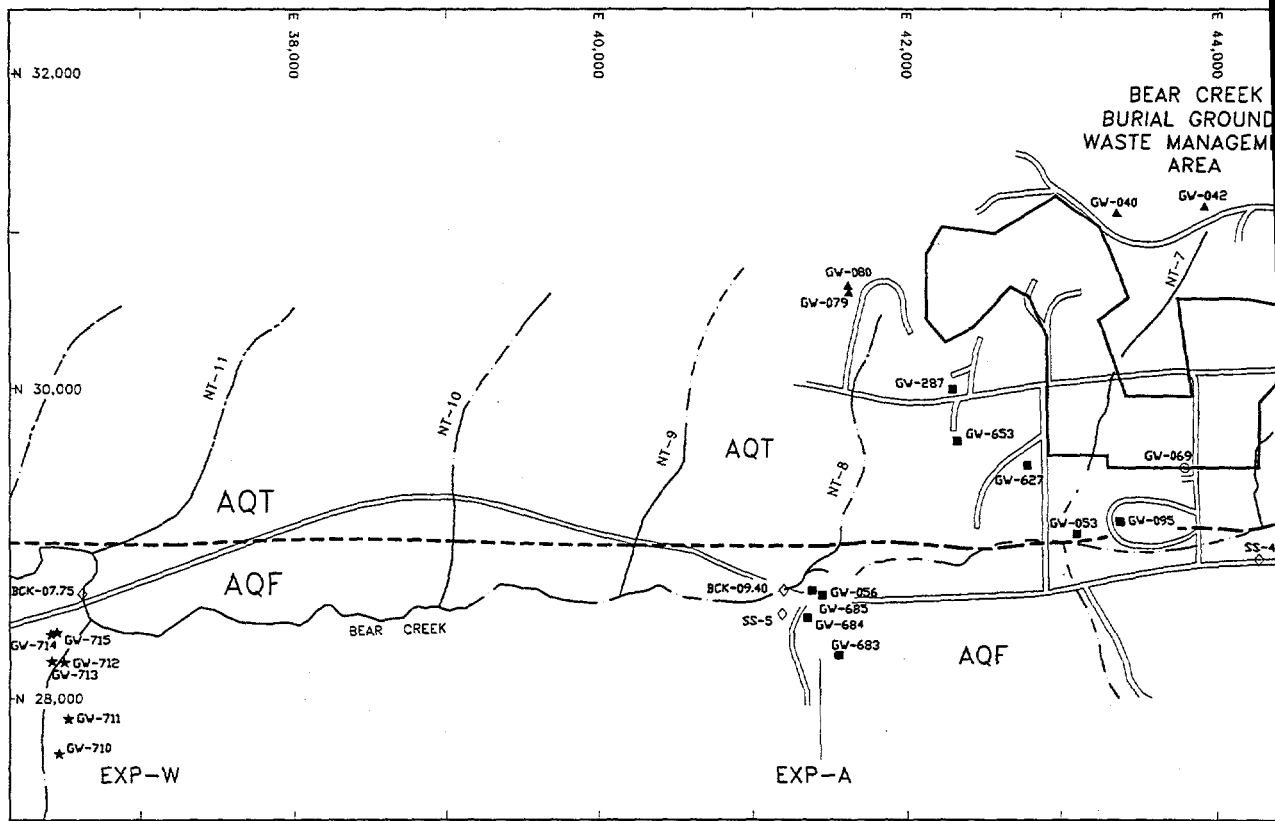
LOCATION: Y-12 PLANT
OAK RIDGE, TN.

FIGURE 4

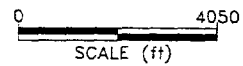
PREPARED BY:
**AJA TECHNICAL
SERVICES, INC.**

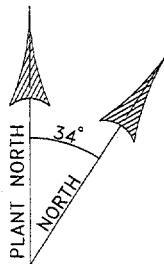
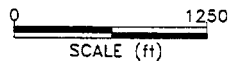
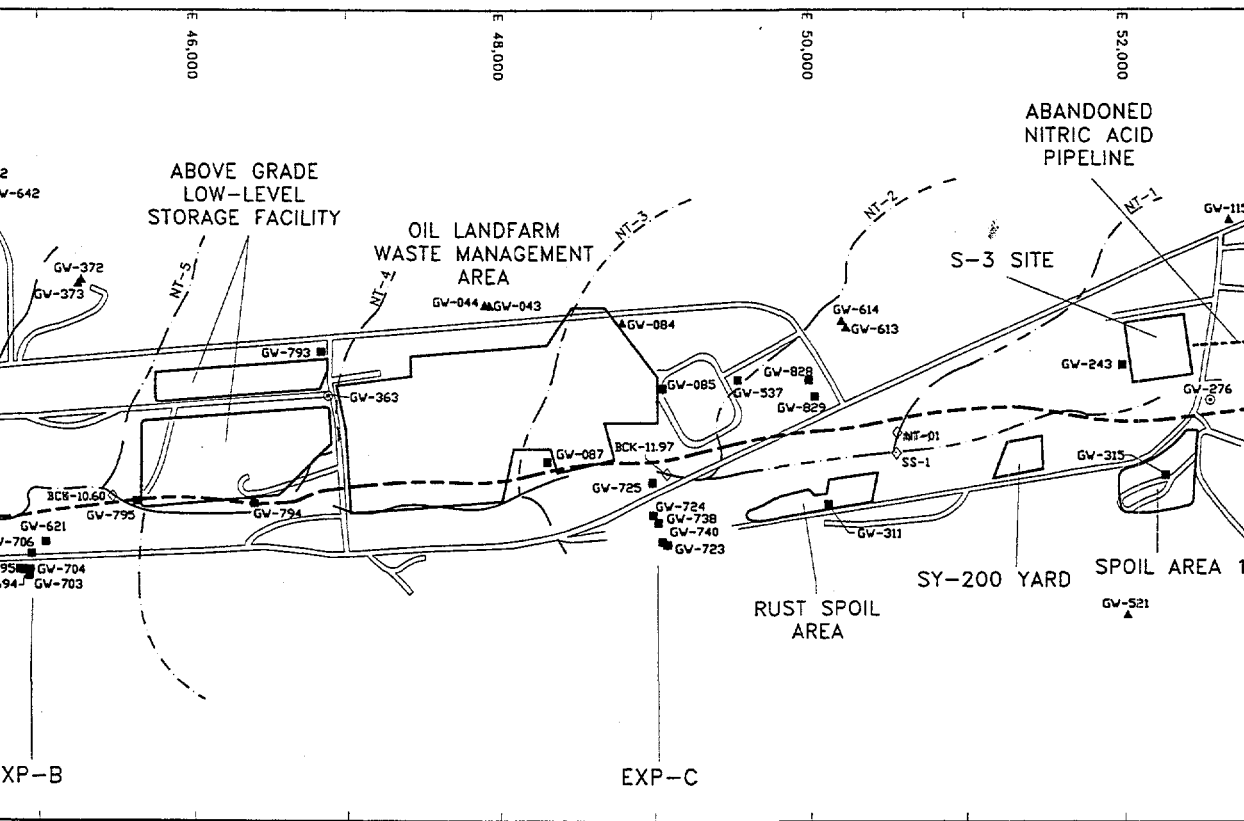
DOC NUMBER: 96-D010
DWG ID.: 96-089
DATE: 2-12-97

GROUNDWATER CONTAMINATION
IN THE BEAR CREEK HYDROGEOLOGIC REGIME



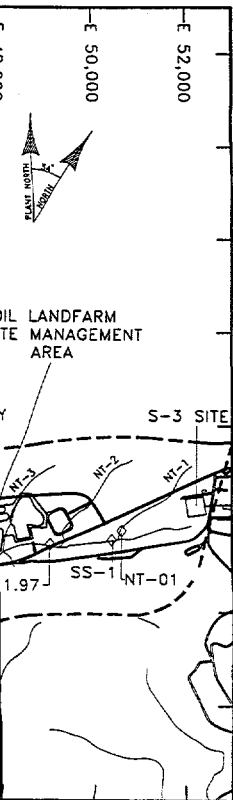
SPRINGS AND SURFACE WATER SAMPLING LOCATIONS



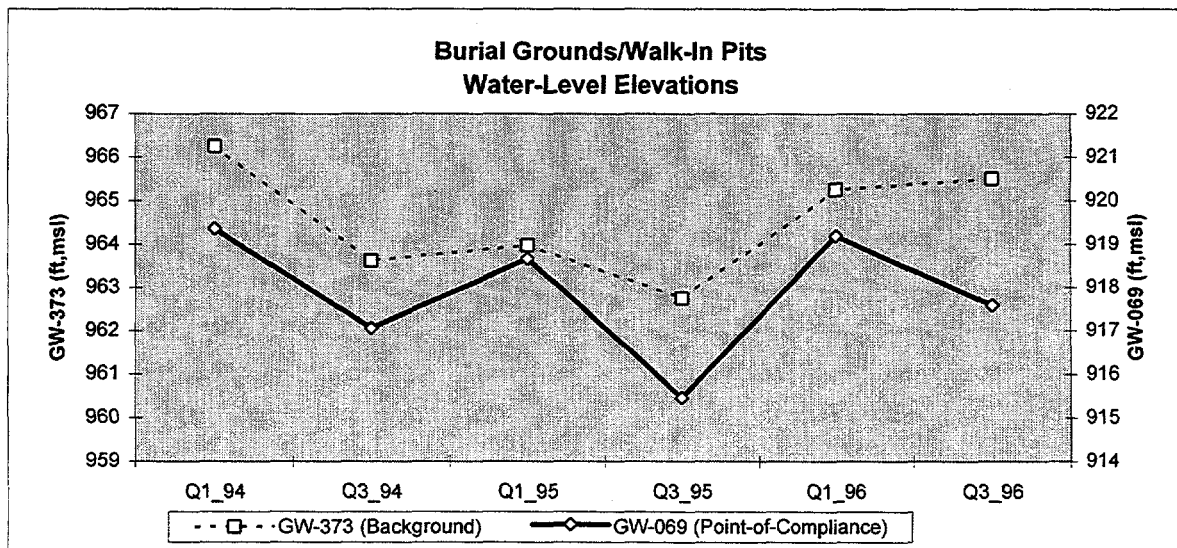
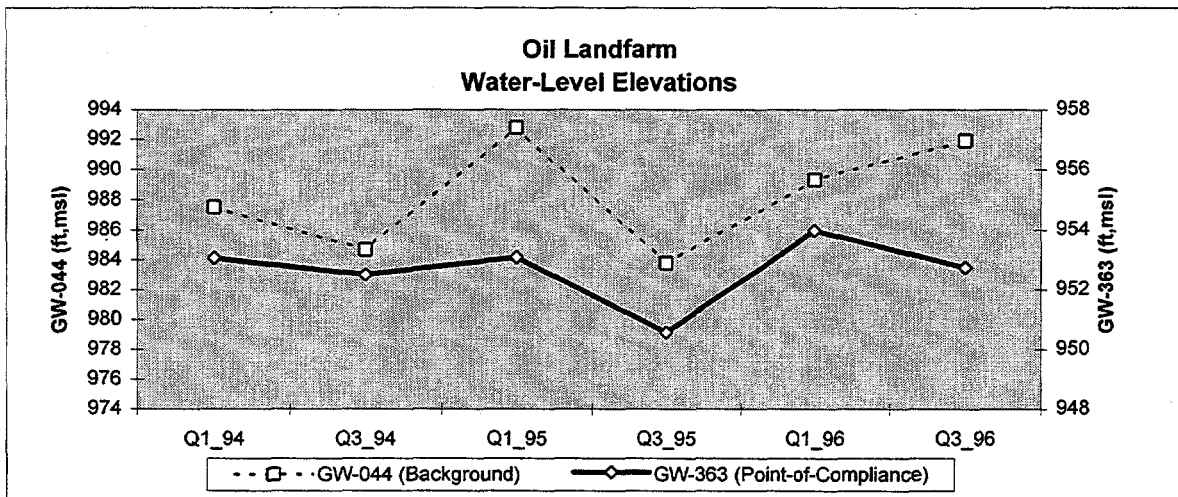
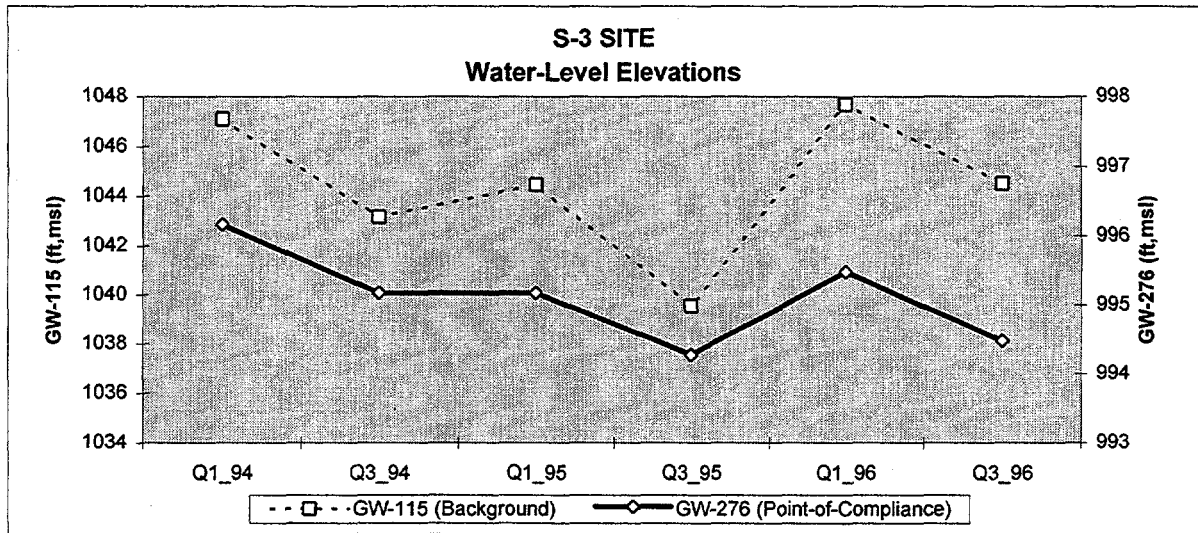


EXPLANATION

- — MONITORING WELL
- ⊙ — RCRA POINT-OF-COMPLIANCE MONITORING WELL
- ▲ — RCRA BACKGROUND/UPGRADIENT MONITORING WELL
- ★ — RCRA PLUME DELINEATION MONITORING WELL
- ◇ — SPRING OR SURFACE WATER SAMPLING LOCATION
- EXP-C — EXIT PATHWAY, MAYNARDVILLE LIMESTONE PICKET
- - - — SURFACE DRAINAGE FEATURE
- NT-5 — NORTH TRIBUTARY
- AQT — AQUITARD
- - - — APPROXIMATE NOLICHUCKY SHALE/MAYNARDVILLE LIMESTONE CONTACT
- AQF — AQUIFER

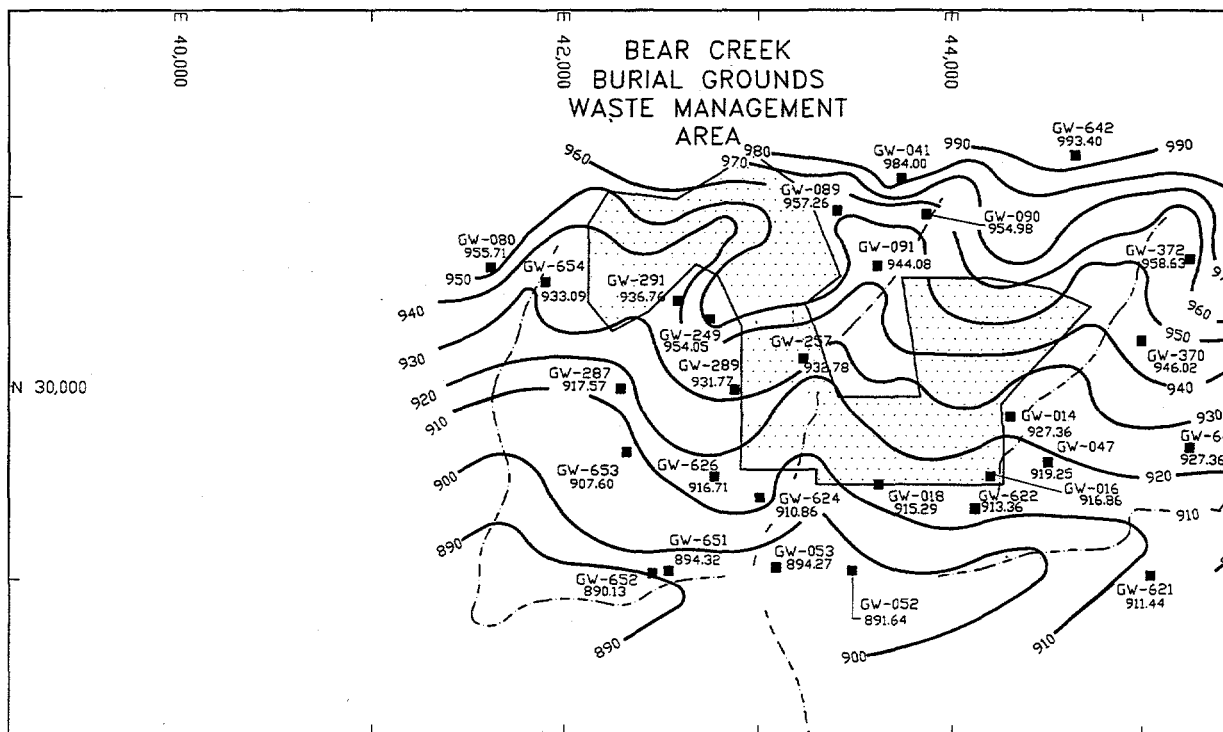
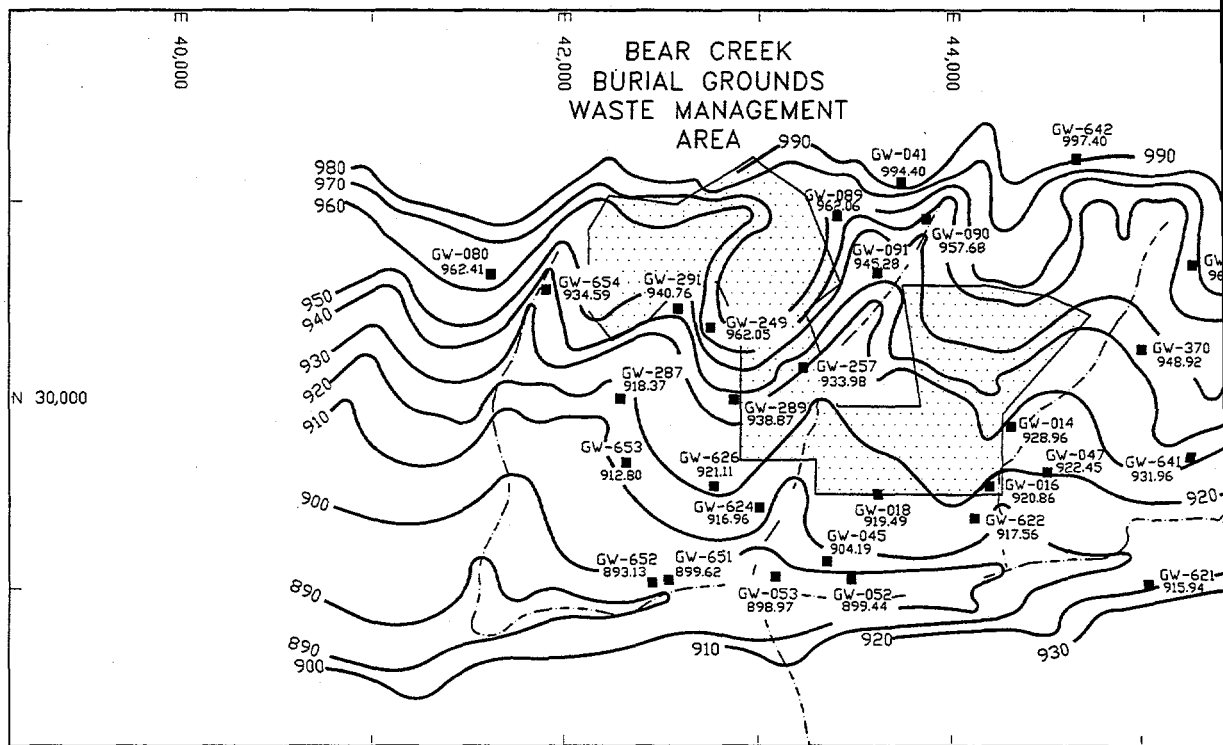


PREPARED FOR: LOCKHEED MARTIN ENERGY SYSTEMS, INC.	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 5
PREPARED BY: AJA TECHNICAL SERVICES, INC.	DOC NUMBER:	96-D010	
	DWG ID.:	96-083	GROUNDWATER AND SURFACE WATER SAMPLING LOCATIONS FOR CY 1996
	DATE:	2-11-97	



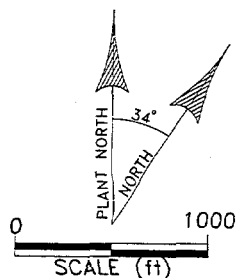
PREPARED FOR: LOCKHEED MARTIN ENERGY SYSTEMS, INC.	LOCATION:	Y-12 PLANT OAK RIDGE, TN.
PREPARED BY: AJA TECHNICAL SERVICES, INC.	DOC NUMBER:	96-D010
	DWG ID.:	96-084
	DATE:	2-12-97

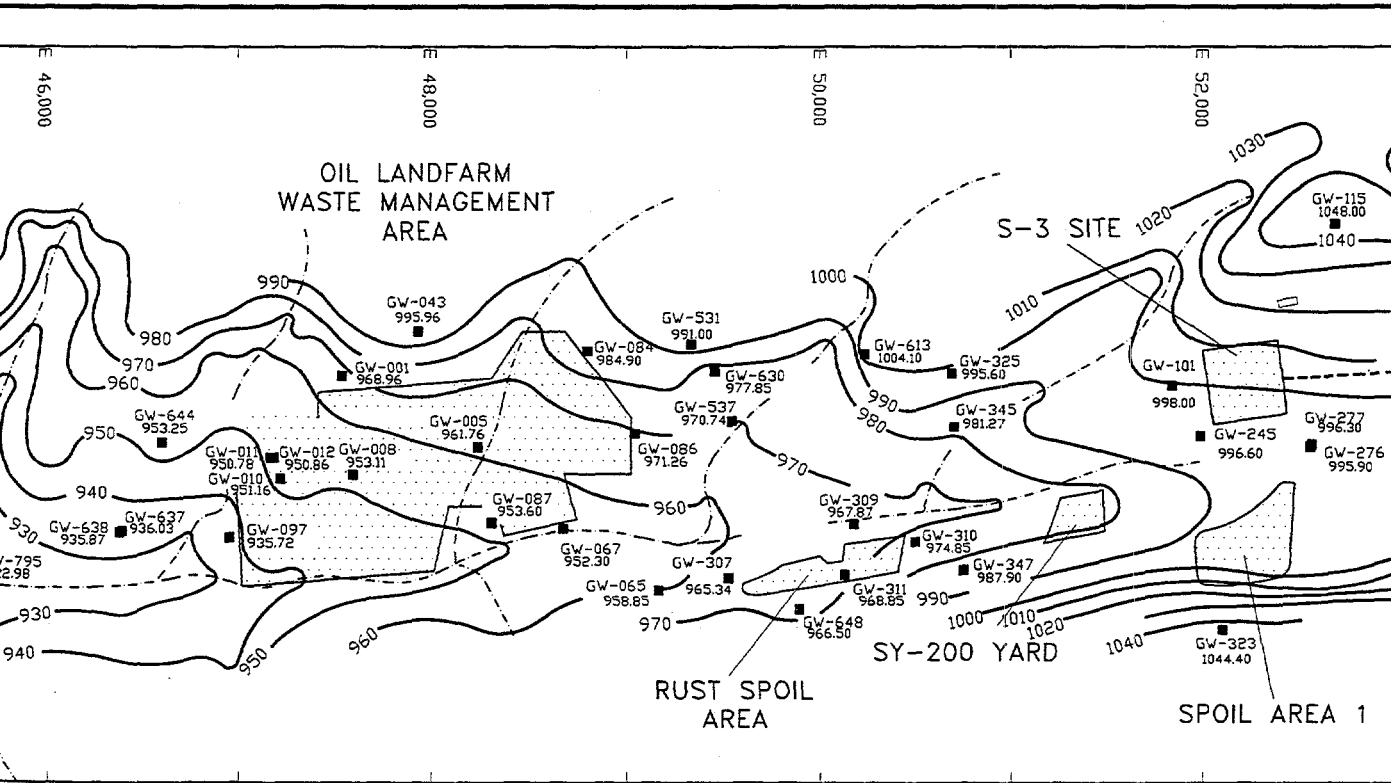
FIGURE 6
GROUNDWATER HYDROGRAPHS
FOR SELECTED RCRA BACKGROUND WELLS
AND RCRA POINT-OF-COMPLIANCE WELLS
IN THE BEAR CREEK REGIME



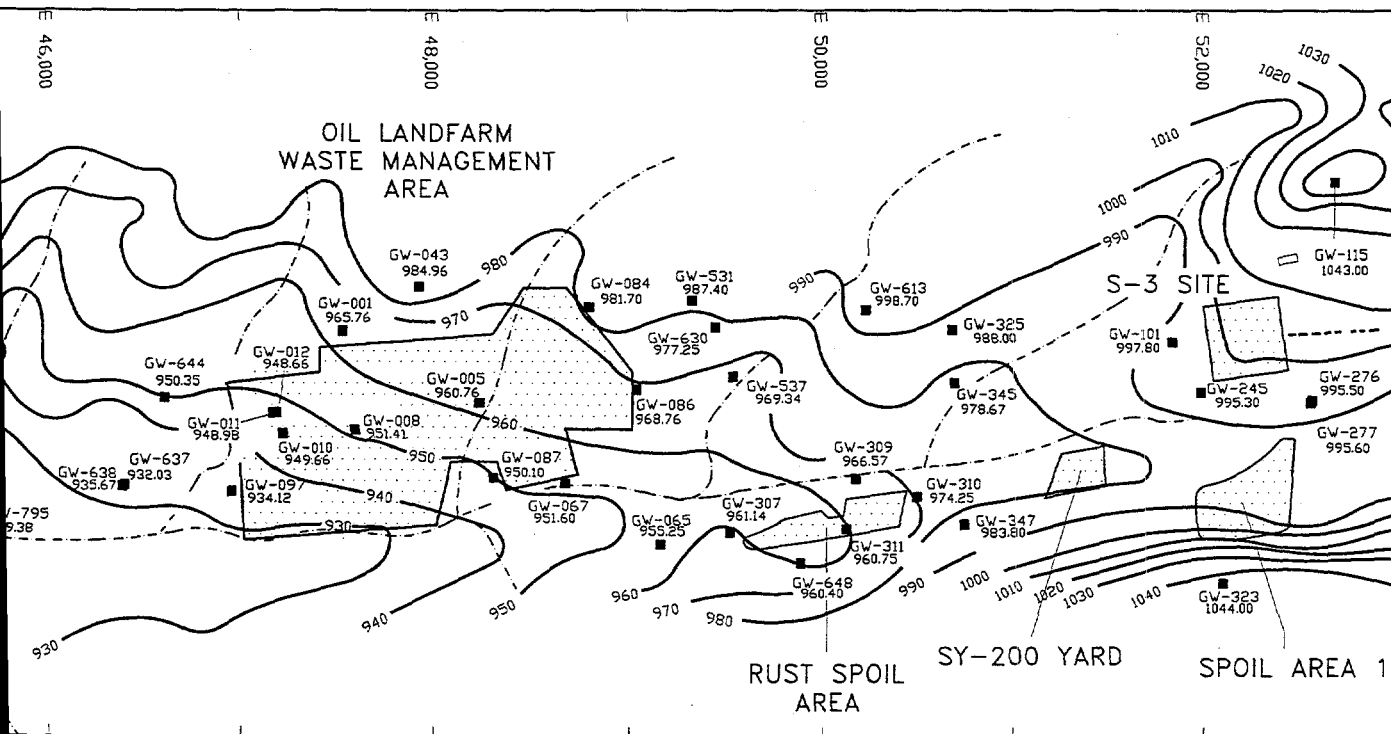
EXPLANATION

- GW-652 890.13 ■ — Water Table Monitoring Well
- Approximate Water Level Isopleth (ft msl)
- - - Surface Drainage Feature



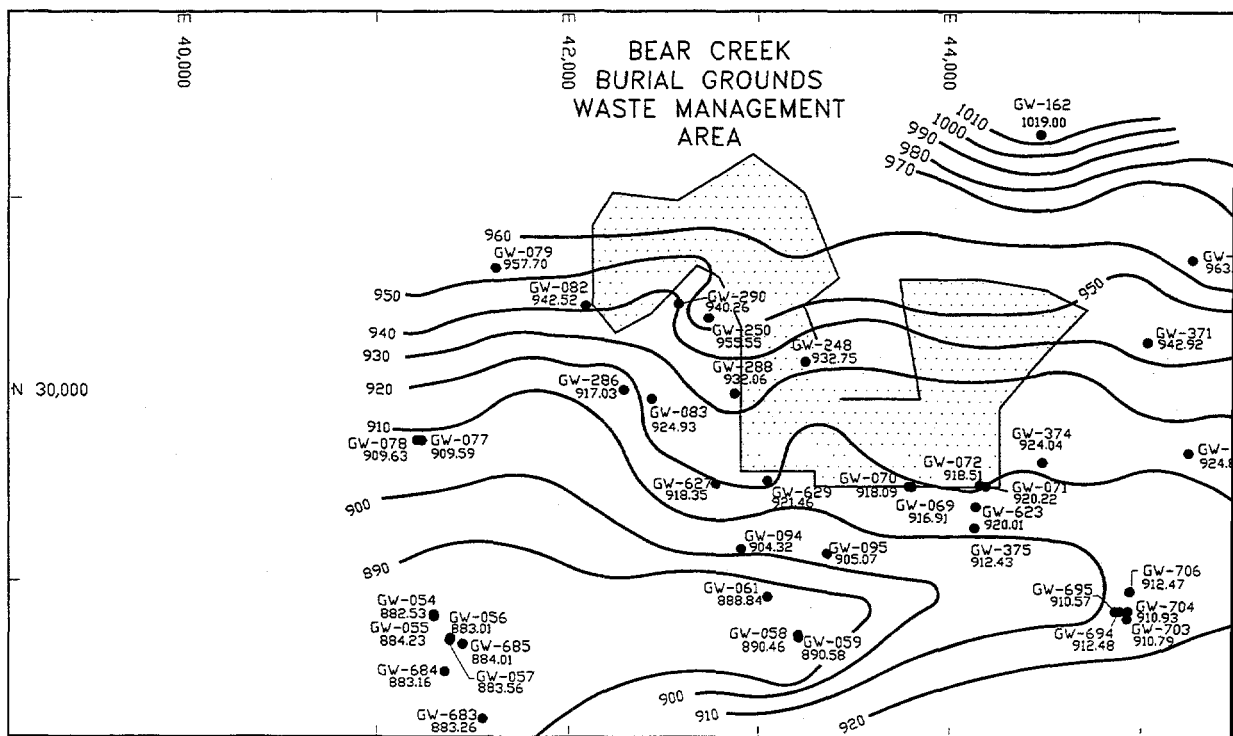
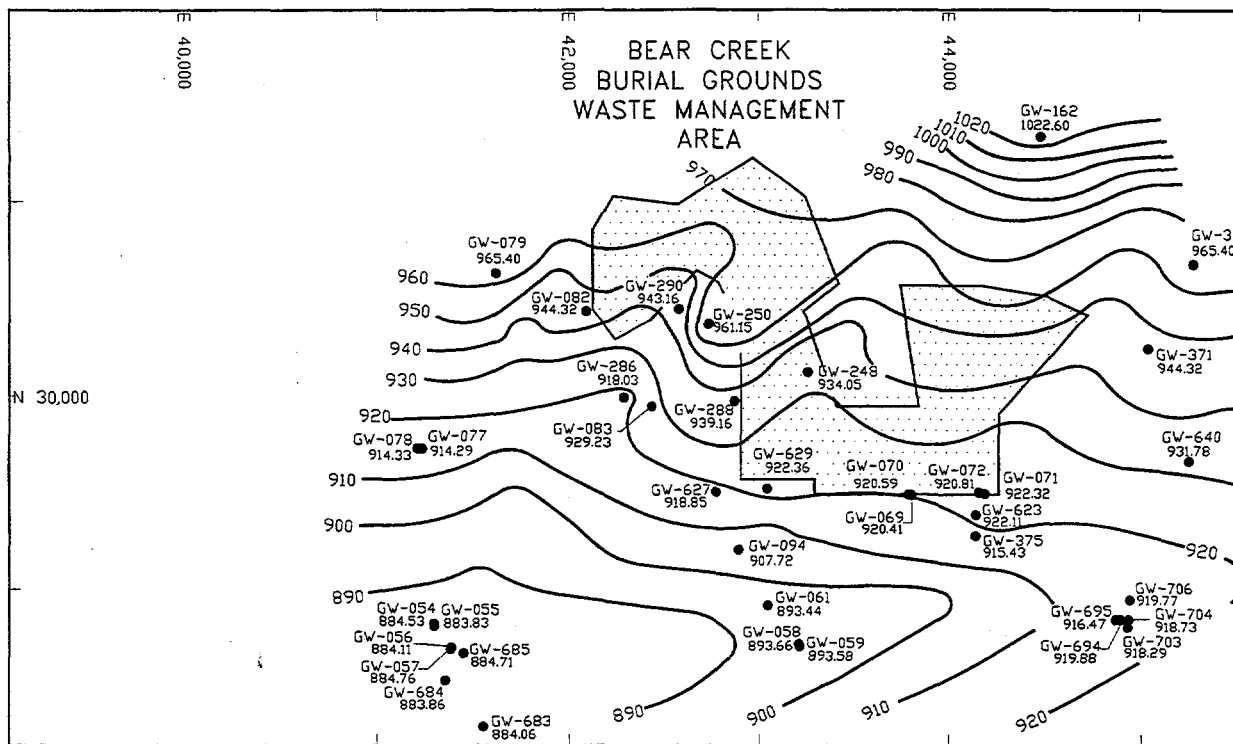


APRIL 1-9, 1996



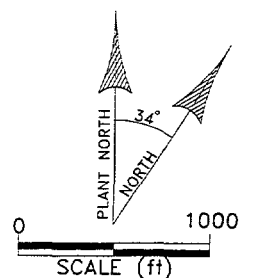
OCTOBER 2-7, 1996

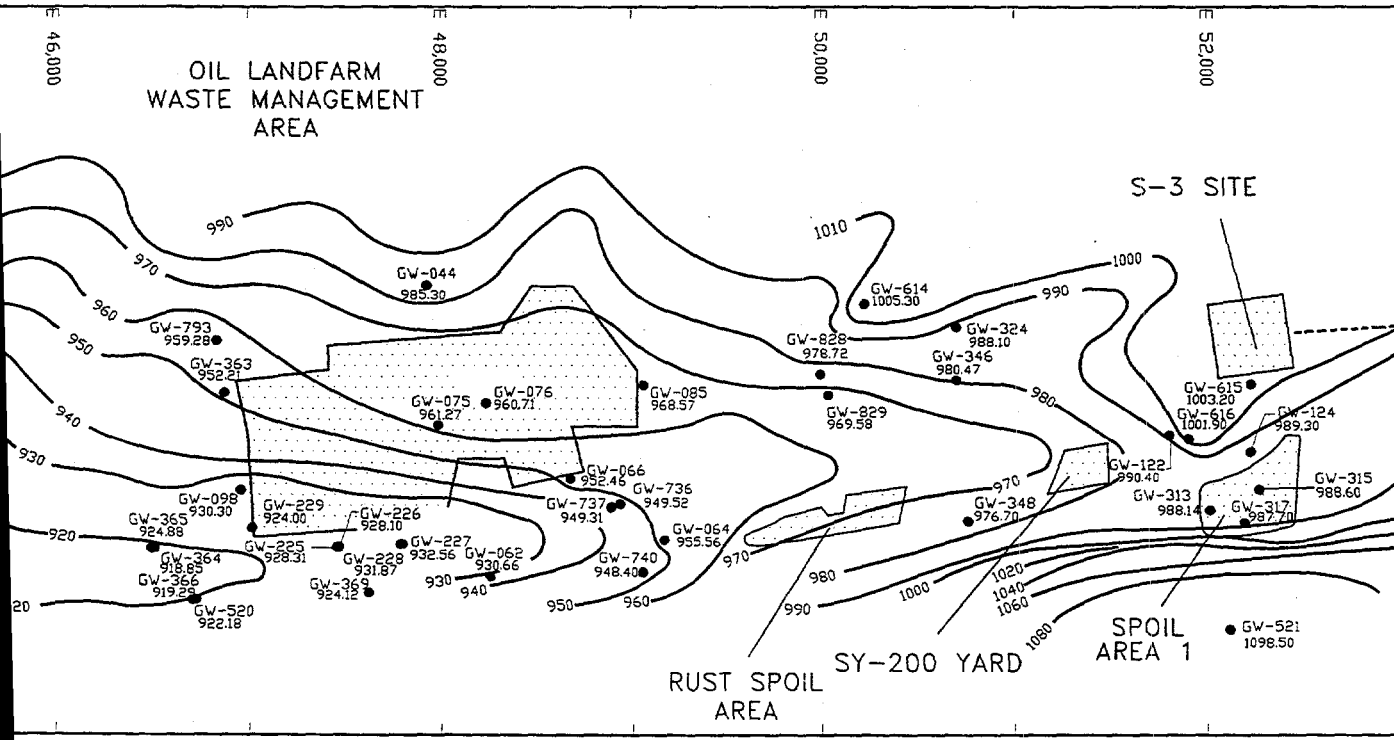
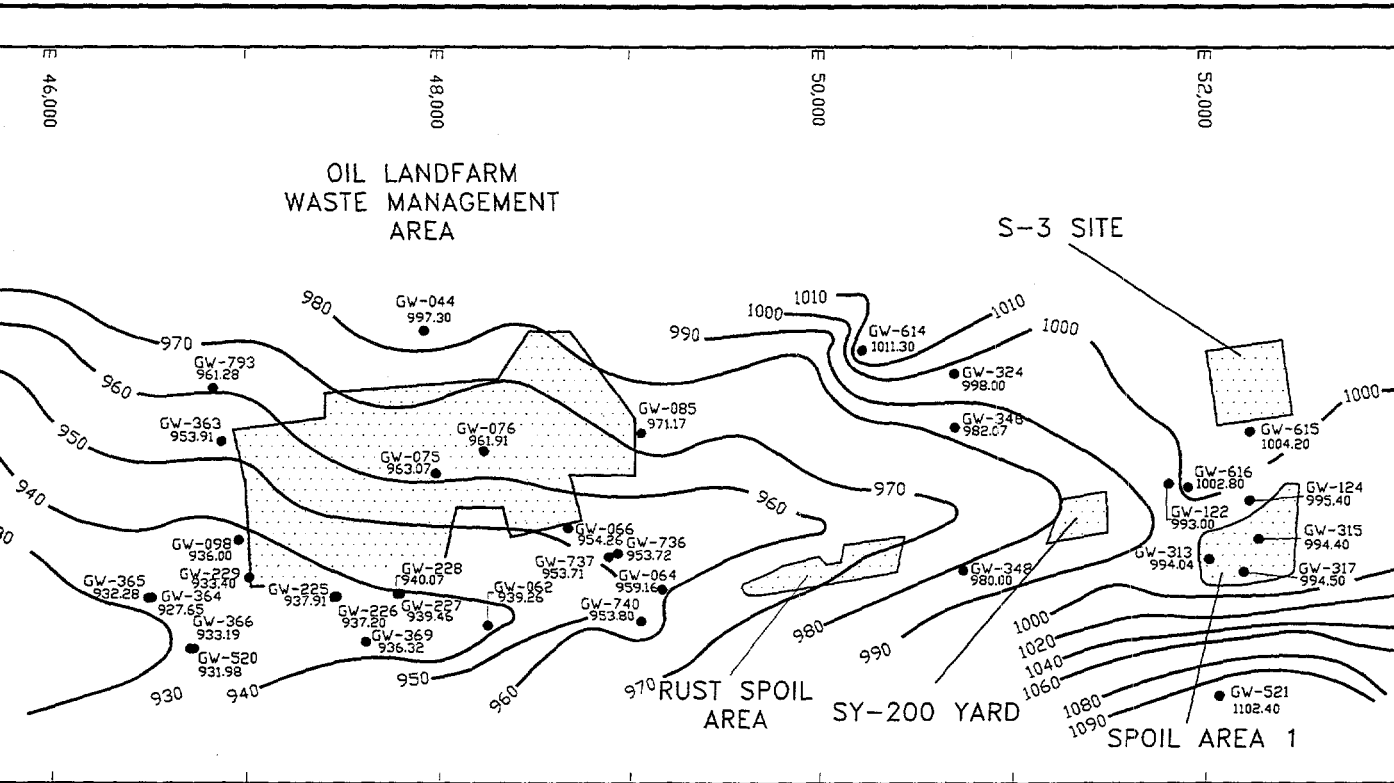
PREPARED FOR: LOCKHEED MARTIN ENERGY SYSTEMS, INC.	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 7
PREPARED BY: AJA TECHNICAL SERVICES, INC.	DOC NUMBER:	96-D010	
	DWG ID.:	96-082	SEASONAL GROUNDWATER ELEVATIONS IN THE WATER TABLE INTERVAL
	DATE:	2-12-97	



EXPLANATION

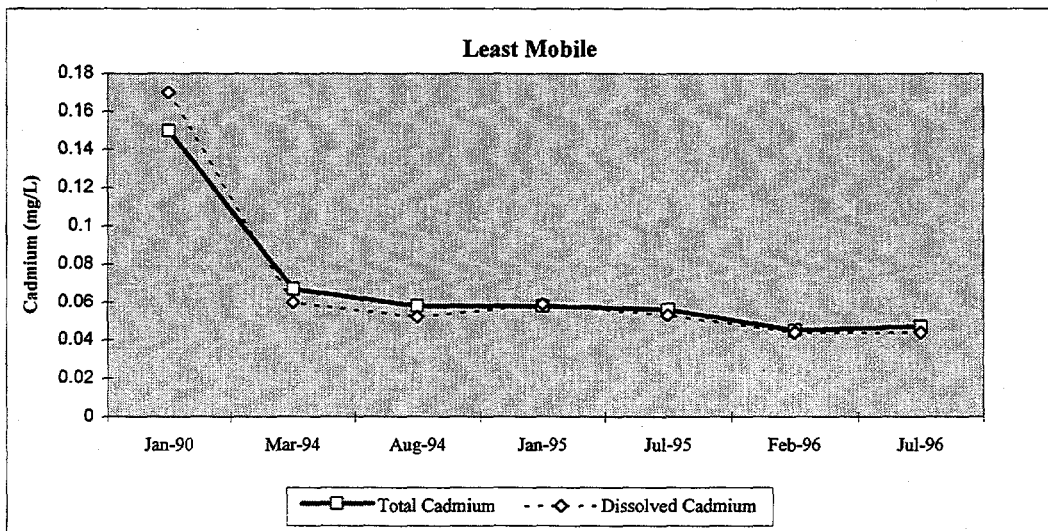
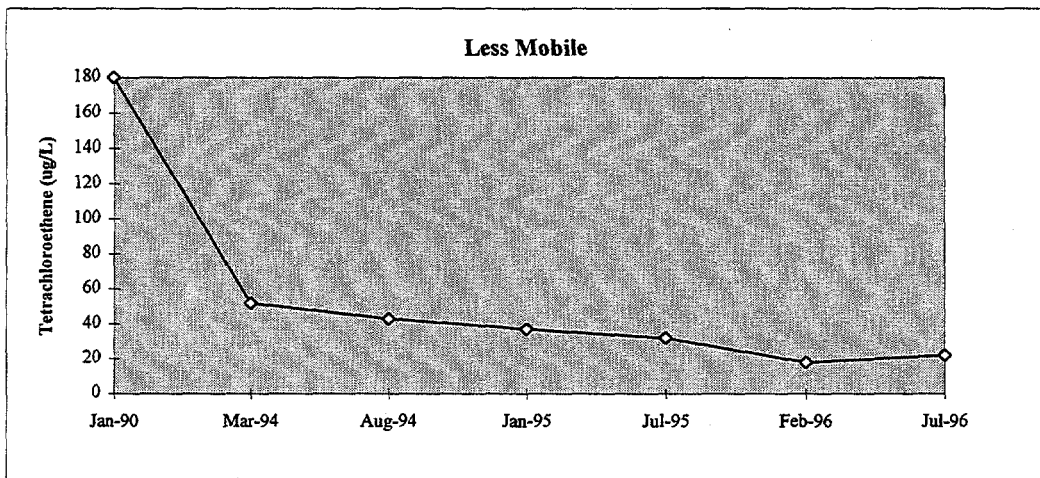
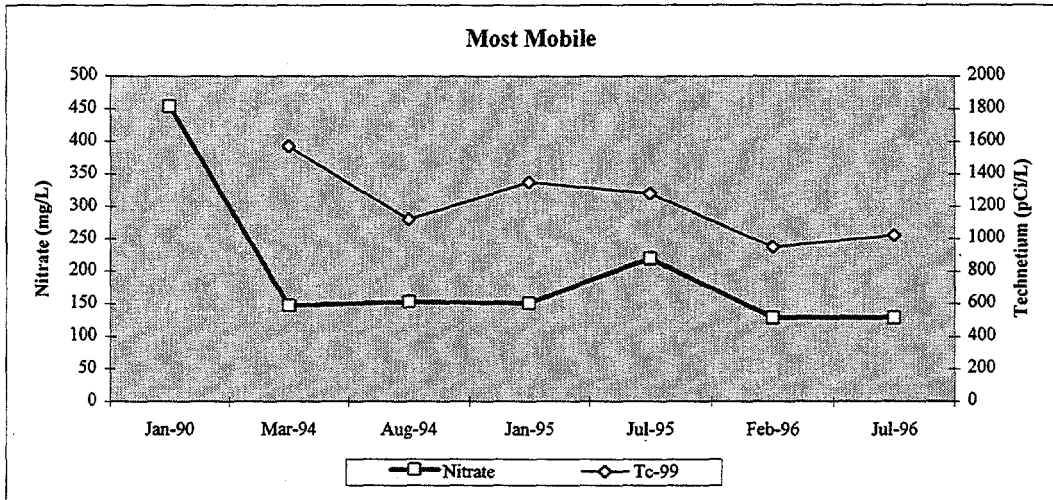
- GW-683 ● 883.26 — Monitoring Well and Water Level Elevation
- Approximate Water Level (isopleth) (ft msl)





PREPARED FOR: LOCKHEED MARTIN ENERGY SYSTEMS, INC.	LOCATION:	Y-12 PLANT OAK RIDGE, TN.
PREPARED BY: AJA TECHNICAL SERVICES, INC.	DOC NUMBER:	96-D010
	DWG ID.:	96-081
	DATE:	2-11-97

FIGURE 8
**SEASONAL GROUNDWATER ELEVATIONS
IN THE SHALLOW AND INTERMEDIATE
BEDROCK INTERVALS, CY 1996**



PREPARED FOR:
**LOCKHEED MARTIN
 ENERGY SYSTEMS, INC.**

PREPARED BY:
**AJA TECHNICAL
 SERVICES, INC.**

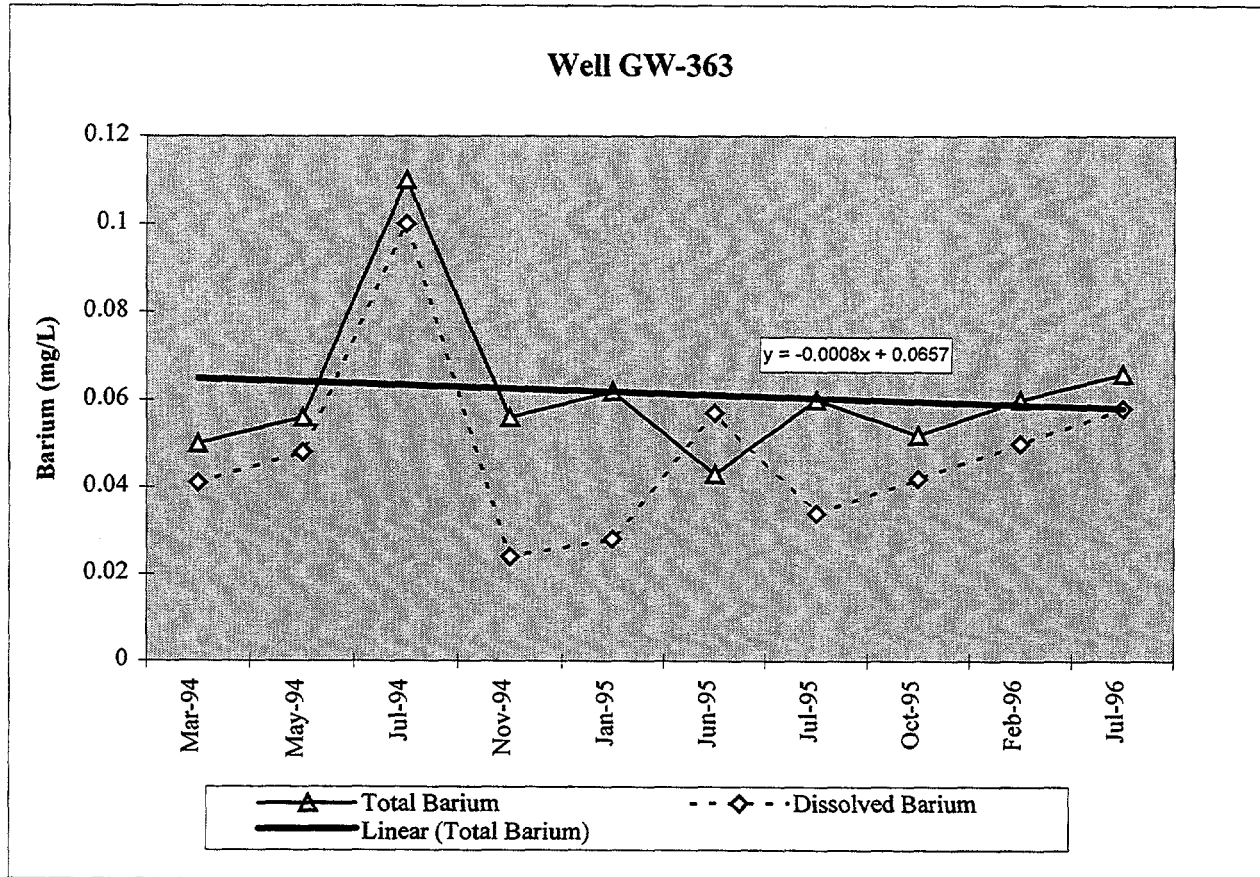
LOCATION: Y-12 PLANT
 OAK RIDGE, TN.

DOC NUMBER: 96-D006
 DWG ID.: 96-085
 DATE: 2-12-97

FIGURE 9

**CONCENTRATIONS OF SELECTED GWPS
 CONSTITUENTS IN GROUNDWATER AT THE S-3 SITE
 POINT-OF-COMPLIANCE WELL GW-276,
 JANUARY 1990-JULY 1996**

Well GW-363



PREPARED FOR:
**LOCKHEED MARTIN
 ENERGY SYSTEMS, INC.**

PREPARED BY:
**AJA TECHNICAL
 SERVICES, INC.**

LOCATION: Y-12 PLANT
 OAK RIDGE, TN.

DOC NUMBER: 96-D010
 DWG ID.: 96-086
 DATE: 2-12-97

FIGURE 10

**BARIUM CONCENTRATIONS IN GROUNDWATER
 AT THE OIL LANDFARM POINT-OF-COMPLIANCE
 WELL GW-363, MARCH 1994-JULY 1996**

Well GW-069

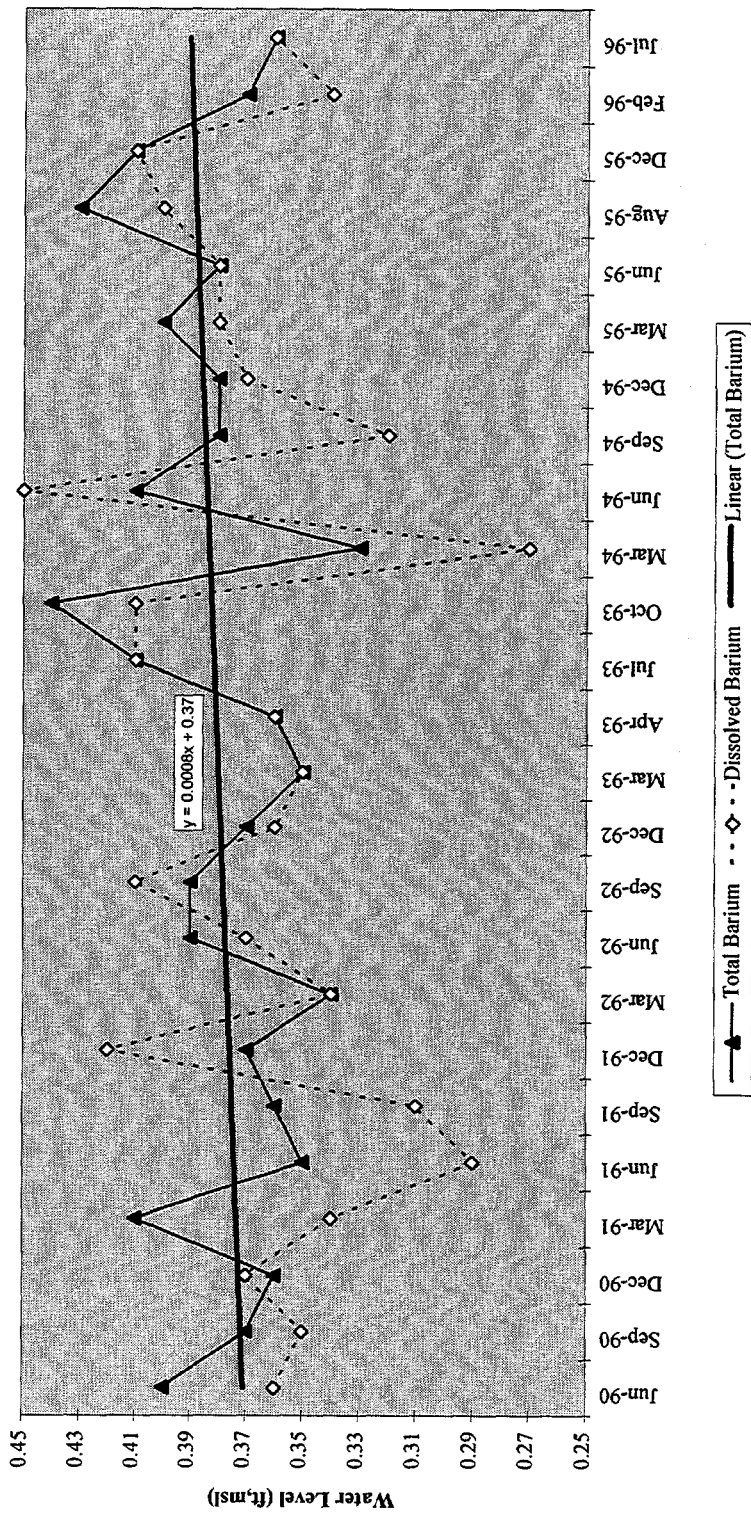


FIGURE 11

BARIUM CONCENTRATIONS IN GROUNDWATER AT THE BEAR CREEK BURIAL GROUNDS POINT-OF-COMPLIANCE WELL GW-069, JUNE 1990-JULY 1996

PREPARED FOR:
LOCKHEED MARTIN
ENERGY SYSTEMS, INC.

LOCATION: Y-12 PLANT
OAK RIDGE, TN.

PREPARED BY:
AJA TECHNICAL
SERVICES, INC.

DOC NUMBER: 96-D010
DWG ID.: 96-087
DATE: 2-12-97

APPENDIX B

TABLES

Table 1.
Index of Post-Closure Permit Conditions for RCRA Monitoring

SECTION OF REPORT				
Monitoring Requirement	Permit Condition			
	S-3 Site	Oil Landfarm	Burial Grounds/ Walk-In Pits	
Well Network/Sampling Frequency	IV.A and IV.C	V.A and V.C	VI.A and VI.C	3.0
Background Wells	IV.C.1	V.C.1	VI.C.1	3.1.1
Point-of-Compliance Wells	IV.C.1	V.C.1	VI.C.1	3.1.1
Plume Boundary Wells	IV.C.2	V.C.2	VI.C.2	3.1.1
Plume Boundary Background Well	IV.C.1	.	.	3.1.1
Sampling and Analysis	IV.E	V.E	VI.E	3.0
Sample Collection	IV.E.1	V.E.1	VI.E.1	3.2
Sample Preservation	IV.E.2	V.E.2	VI.E.2	3.2
Sample Transportation	IV.E.3	V.E.3	VI.E.3	3.2
Sample Chain-of-Custody Control	IV.E.4	V.E.4	VI.E.4	3.2
Analytical Parameters	IV.C.1 and 2	V.C.1 and 2	VI.C.1 and 2	3.3
Analytical Methods	IV.E.5	V.E.5	VI.E.5	3.3
Groundwater Surface Elevation	IV.F	V.F	VI.F	3.2
Data Evaluation	IV.G	V.G	VI.G	4.0
Groundwater Flow Rate/Direction	IV.G.3	V.G.3	VI.G.3	4.1
Plume Boundary	IV.G.5	V.G.5	VI.G.5	4.3
Point-of-Compliance	IV.G.6	V.G.6	VI.G.6	4.2

**Table 2.
Groundwater Monitoring Programs in the Bear Creek Hydrogeologic Regime**

PROGRAM DRIVER		MONITORING PROGRAM			
RCRA Post-Closure Permit for the Bear Creek Regime		RCRA Post-Closure Corrective Action Monitoring			
DOE Order 5400.1		Exit Pathway/Perimeter Monitoring			
Y-12 Plant GWPP Management Plan		Surveillance Monitoring			
Waste Management Site/ Regulated Unit		Best Management Practice Monitoring		Operational Status	
		Regulatory Classification ¹	General Waste Inventory	Closed	Active
Above Grade Low-Level Storage Facility	NR	Low level radioactive construction and demolition wastes.			●
Boneyard, Burnyard, and Hazardous Chemical Storage Area	CERCLA	Magnesium chips, construction debris, pesticide containers, metal shavings, solvents, oils, laboratory chemicals, acids, bases, organics, water-reactive compounds, and shock sensitive compounds.		●	
Burial Grounds A (North and South)	RCRA/ CERCLA	Waste oils, coolants, and spent solvents.		●	●
Burial Grounds C (West)	RCRA/ CERCLA	Waste oils, coolants, and spent solvents.		●	●
Burial Grounds B, D, E, and J	CERCLA	Solid wastes including salts, metals (beryllium and uranium) and metal oxides, metal saw fines, and asbestos.		●	●
Oil Landfarm	RCRA CERCLA	Waste oils and coolants containing beryllium compounds, depleted uranium, polychlorinated biphenyls, and spent solvents.		●	●
Oil Retention Pond No. 1	CERCLA	Oil seepage from Burial Ground A South.		●	
Oil Retention Pond No. 2	CERCLA	Oil seepage from Burial Ground A North.		●	
Receptor Media	CERCLA	Contaminated groundwater, surface water, Bear Creek stream sediments, and Bear Creek floodplain soils.		Not Applicable	●

Table 2 (cont'd)

PROGRAM DRIVER		MONITORING PROGRAM		
RCRA Post-Closure Permit for the Bear Creek Regime DOE Order 5400.1		RCRA Post-Closure Corrective Action Monitoring Exit Pathway/Perimeter Monitoring Surveillance Monitoring Best Management Practice Monitoring		
Y-12 Plant GWPP Management Plan		General Waste Inventory		
Waste Management Site/ Regulated Unit	Regulatory Classification ¹		Operational Status	
			Closed	Active
Rust Spoil Area	CERCLA	Nonradioactive construction debris.	●	●
Sanitary Landfill I	CERCLA	Nonhazardous solid wastes.	●	●
Spoil Area I	CERCLA	Nonradioactive construction debris.	●	●
SY-200 Yard	CERCLA	Temporary storage of equipment, machinery, and miscellaneous items.	●	●
S-3 Site	RCRA/ CERCLA	Liquid, radioactive, nitric acid wastes and demitrication	●	●
Walk-In Pits	RCRA/ CERCLA	Chemical wastes, shock-sensitive reagents, and uranium metal saw fines.	●	●

Notes:

1

From: *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program*
(U.S. Department of Energy 1994).

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

RCRA - Resource Conservation and Recover Act

NR - Not regulated under RCRA or CERCLA.

Table 3.
CY 1996 Sampling Dates for Monitoring Wells, Springs, and
Surface Water Stations in the Bear Creek Hydrogeologic Regime

Monitoring Program ¹		RCRA Post-Closure Corrective Action Monitoring							
		DOE Order 5400.1 Exit Pathway/Perimeter Monitoring							
		DOE Order 5400.1 Surveillance Monitoring							
		Best Management Practice Monitoring							
Sampling Point ²	Sampling Location ³	Sampling Equipment ⁴		Sampling Date ⁵					
		Dedicated	Portable	1st Quarter	3rd Quarter				
GW-040	BG	●		03/26/96	07/18/96				●
GW-042	BG	●		03/26/96	07/18/96				●
GW-043	OLF	●		02/01/96	07/08/96				●
GW-044	OLF	●		01/31/96	07/08/96				●
GW-053	BG		●	03/26/96	08/28/96		●		
GW-056	EXP-A	●		03/14/96	07/23/96			●	
GW-069	BG	●		02/25/96	07/23/96				●
GW-079	BG		●	02/25/96	07/24/96				●
GW-080	BG	●		02/24/96	07/24/96				●
GW-084	OLF	●		02/01/96	07/08/96				●
GW-085	OLF	●		03/25/96	08/20/96		●		
GW-095	BG		●	03/26/96	08/27/96		●		
GW-115	S3	●		01/31/96	07/02/96				●
GW-162	BG		●	02/26/96	07/24/96				●
GW-276	S3	●		02/29/96	07/08/96				●
GW-287	BG		●	03/26/96	08/27/96		●		
GW-311	RS	●		03/25/96	08/14/96		●		
GW-315	SPI	●		03/26/96	08/19/96		●		
GW-363	OLF		●	02/12/96	07/02/96				●
GW-372	BG	●		02/25/96	07/23/96				●
GW-373	BG		●	02/28/96	07/25/96				●
GW-521	LIV		●	01/16/96	07/02/96				●
GW-537	OLF	●		03/25/96	08/20/96		●		
GW-613	S3	●		01/31/96	07/01/96				●
GW-614	S3		●	02/12/96	07/01/96				●
GW-621	EXP-B	●		03/14/96	07/23/96			●	
GW-627	BG		●	03/28/96	09/06/96		●		
GW-642	BG	●		02/24/96	07/09/96				●
GW-653	BG		●	03/26/96	08/28/96		●		
GW-683	EXP-A		●	03/15/96	07/29/96			●	
GW-684	EXP-A		●	03/16/96	07/29/96			●	
GW-685	EXP-A		●	03/15/96	07/25/96			●	
GW-694	EXP-B		●	03/18/96	08/01/96			●	

Table 3 (cont'd)

Monitoring Program ¹		RCRA Post-Closure Corrective Action Monitoring									
		DOE Order 5400.1 Exit Pathway/Perimeter Monitoring									
		DOE Order 5400.1 Surveillance Monitoring									
		Best Management Practice Monitoring									
Sampling Point ²	Sampling Location ³	Sampling Equipment ⁴		Sampling Date ⁵							
		Dedicated	Portable	1st Quarter	3rd Quarter						
GW-695	EXP-B	●		03/14/96	07/23/96			●			
GW-703	EXP-B		●	03/16/96	07/31/96			●			
GW-704	EXP-B		●	03/17/96	08/01/96			●			
GW-706	EXP-B		●	03/19/96	08/06/96			●			
GW-710	EXP-W		●	01/29/96	07/16/96			●	●		
GW-711	EXP-W		●	01/26/96	07/14/96			●	●		
GW-712	EXP-W		●	01/26/96	07/15/96			●	●		
GW-713	EXP-W		●	01/28/96	07/17/96			●	●		
GW-714	EXP-W		●	01/29/96	07/17/96			●	●		
GW-715	EXP-W		●	01/29/96	07/18/96			●	●		
GW-723	EXP-C		●	03/21/96	08/09/96			●			
GW-724	EXP-C		●	03/21/96	08/14/96			●			
GW-725	EXP-C		●	03/22/96	08/13/96			●			
GW-738	EXP-C		●	03/20/96	08/08/96			●			
GW-740	EXP-C		●	03/19/96	08/07/96			●			
GW-793	AGLLSF	●		03/27/96	08/27/96	●					
GW-794	AGLLSF	●		03/25/96	08/27/96	●					
GW-795	AGLLSF	●		03/25/96	08/27/96	●					
GW-828	OLF		●	03/26/96	08/21/96		●				
GW-829	OLF		●	03/27/96	08/22/96		●				
BCK-00.63	EXP-SW		●	NS	08/06/96			●			
BCK-03.87	EXP-SW		●	01/30/96	07/14/96			●			
BCK-04.55	EXP-SW		●	01/30/96	07/14/96			●			
BCK-07.75	EXP-SW		●	01/30/96	07/14/96			●			
BCK-09.40	EXP-SW		●	03/16/96	07/29/96			●			
BCK-10.60	EXP-SW		●	03/17/96	07/30/96			●			
BCK-11.97	EXP-SW		●	03/17/96	08/13/96			●			
NT-01	EXP-SW		●	03/18/96	08/13/96			●			
SS-1	EXP-SW		●	03/18/96	08/13/96			●			
SS-4	EXP-SW		●	03/16/96	07/30/96			●			
SS-5	EXP-SW		●	03/16/96	07/29/96			●			
TOTAL SAMPLING LOCATIONS						Monitoring Wells:	53	3	11	15	24
						Springs:	3	0	0	3	0
						Surface Water Stations:	8	0	0	8	0

Table 3 (cont'd)

Notes:

- 1 See Table 4 for list of field measurements and laboratory analytes.
- 2 Duplicate groundwater samples denoted by "D".
 - BCK - Bear Creek Kilometer
 - GW - Groundwater Monitoring Well
 - NT - Northern Tributary
 - SS - Spring
- 3 AGLLSF - Above Grade Low-Level Storage Facility.
 - BG - Bear Creek Burial Grounds Waste Management Area
 - EXP-A - Exit Pathway (Maynardville Limestone) Picket A
 - EXP-B - Exit Pathway (Maynardville Limestone) Picket B
 - EXP-C - Exit Pathway (Maynardville Limestone) Picket C
 - EXP-W - Exit Pathway (Maynardville Limestone) Picket W
 - EXP-SW - Exit Pathway (Bear Creek) Surface Water
 - LIV - Industrial Landfill IV (Chestnut Ridge Regime)
 - OLF - Oil Landfarm Waste Management Area
 - RS - Rust Spoil Area
 - SPI - Spoil Area I
 - S3 - S-3 Site
- 4 Dedicated: Well Wizard™ (dedicated, bladder pump sampling apparatus)
Portable: Bennet Pumps™ and disposable bailers (groundwater) and grab bottles (surface water and springs).
- 5 NS - Not Sampled

Table 4.
Laboratory Analytes and Field Measurements for CY 1996
Groundwater and Surface Water Samples

MONITORING PROGRAM	RCRA Post-Closure Corrective Action Monitoring ¹						
	DOE Order 5400.1 Monitoring ²						
	Best Management Practice Monitoring ³						
PRINCIPAL IONS	Analytical Method ⁴	GWPS Constituent ⁵	Sample Type ⁶				
			Filtered	Unfiltered			
Alkalinity - HCO3	SM-2320 B	.	.	●	●	●	●
Alkalinity - CO3	SM-2320 B	.	.	●	●	●	●
Calcium	EPA-6010	.	●	●	●	●	●
Chloride	EPA-300.0	.	.	●	●	●	●
Fluoride	EPA-340.2	.	.	●	●	●	●
Magnesium	EPA-6010	.	●	●	●	●	●
Nitrate (as N)	EPA-300.0	●	.	●	●	●	●
Potassium	EPA-6010	.	●	●	●	●	●
Sodium	EPA-6010	.	●	●	●	●	●
Sulfate	EPA-300.0	.	.	●	●	●	●
TRACE METALS	Analytical Method	GWPS Constituent	Sample Type				
			Filtered	Unfiltered			
Aluminum	EPA-6010	.	●	●	●	●	●
Antimony	EPA-6010	.	●	●	●	●	●
Arsenic	EPA-6010	.	●	●	●	●	●
Barium	EPA-6010	●	●	●	●	●	●
Beryllium	EPA-6010	.	●	●	●	●	●
Boron	EPA-6010	.	●	●	●	●	●
Cadmium	EPA-6010	●	●	●	●	●	●
Chromium	EPA-6010	●	●	●	●	●	●
Cobalt	EPA-6010	.	●	●	●	●	●
Copper	EPA-6010	.	●	●	●	●	●
Iron	EPA-6010	.	●	●	●	●	●
Lead ⁷	EPA-6010	.	●	●	●	●	●
	EPA-7421	●	●	●	●	●	●
	EPA-200.8	●	●	●	●	●	●
Lithium	EPA-6010	.	●	●	●	●	●
Manganese	EPA-6010	.	●	●	●	●	●
Mercury	EPA-7470	●	●	●	●	●	●
Molybdenum	EPA-6010	.	●	●	●	●	●
Nickel	EPA-6010	●	●	●	●	●	●
Selenium	EPA-6010	.	●	●	●	●	●
Silver	EPA-6010	.	●	●	●	●	●
Strontium	EPA-6010	.	●	●	●	●	●

Table 4 (cont'd)

MONITORING PROGRAM	RCRA Post-Closure Corrective Action Monitoring ¹						
	DOE Order 5400.1 Monitoring ²						
	Best Management Practice Monitoring ³						
TRACE METALS (cont'd)	Analytical Method ⁴	GWPS Constituent ⁵	Sample Type ⁶				
			Filtered	Unfiltered			
Thallium	EPA-200.8	.	●	●	●	●	●
Thorium	EPA-6010	.	●	●	●	●	●
Uranium	EPA-200.8	●	●	●	●	●	●
Vanadium	EPA-6010	.	●	●	●	●	●
Zinc	EPA-6010	.	●	●	●	●	●
VOLATILE ORGANIC COMPOUNDS	Analytical Method	GWPS Constituent	Sample Type				
			Filtered	Unfiltered			
Acetone	ACD-240040	●	.	●	●	●	●
Benzene	ACD-240040	●	.	●	●	●	●
Bromodichloromethane	ACD-240040	.	.	●	●	●	●
Bromoform	ACD-240040	●	.	●	●	●	●
Bromomethane	ACD-240040	.	.	●	●	●	●
2-Butanone	ACD-240040	●	.	●	●	●	●
Carbon Disulfide	ACD-240040	.	.	●	●	●	●
Carbon Tetrachloride	ACD-240040	●	.	●	●	●	●
Chlorobenzene	ACD-240040	.	.	●	●	●	●
Chlorodibromomethane	ACD-240040	.	.	●	●	●	●
Chloroethane	ACD-240040	.	.	●	●	●	●
Chloroform	ACD-240040	●	.	●	●	●	●
Chloromethane	ACD-240040	.	.	●	●	●	●
1,1-Dichloroethane	ACD-240040	.	.	●	●	●	●
1,2-Dichloroethane	ACD-240040	.	.	●	●	●	●
1,1-Dichloroethene	ACD-240040	●	.	●	●	●	●
1,2-Dichloroethene	ACD-240040	.	.	●	●	●	●
Trans-1,2-Dichloroethene	ACD-240040	●	.	●	●	●	●
1,2-Dichloropropane	ACD-240040	.	.	●	●	●	●
Cis-1,3-Dichloropropene	ACD-240040	.	.	●	●	●	●
Trans-1,3-Dichloropropene	ACD-240040	.	.	●	●	●	●
Ethylbenzene	ACD-240040	.	.	●	●	●	●
2-Hexanone	ACD-240040	.	.	●	●	●	●
4-Methyl-2-Pentanone	ACD-240040	●	.	●	●	●	●
Methylene Chloride	ACD-240040	●	.	●	●	●	●
Styrene	ACD-240040	.	.	●	●	●	●
1,1,2,2-Tetrachloroethane	ACD-240040	.	.	●	●	●	●
Tetrachloroethene	ACD-240040	●	.	●	●	●	●
Toluene	ACD-240040	●	.	●	●	●	●

Table 4 (cont'd)

MONITORING PROGRAM	RCRA Post-Closure Corrective Action Monitoring ¹						
	DOE Order 5400.1 Monitoring ²						
	Best Management Practice Monitoring ³						
VOLATILE ORGANIC COMPOUNDS (cont'd)	Analytical Method ⁴	GWPS Constituent ⁵	Sample Type ⁶				
			Filtered	Unfiltered			
1,1,1-Trichloroethane	ACD-240040	●	.	●	●	●	●
1,1,2-Trichloroethane	ACD-240040	.	.	●	●	●	●
Trichloroethene	ACD-240040	●	.	●	●	●	●
Vinyl Acetate	ACD-240040	.	.	●	●	●	●
Vinyl Chloride	ACD-240040	.	.	●	●	●	●
Xylenes	ACD-240040	.	.	●	●	●	●
RADIOLOGICAL ANALYTES	Analytical Method	GWPS Constituent	Sample Type				
			Filtered	Unfiltered			
Gross Alpha Activity	Y/P65-7162	●	.	●	●	●	●
Gross Beta Activity	Y/P65-7162	●	.	●	●	●	●
Americium-241	Y/P65-7157	●	.	●	.	.	●
Iodine-129	EPA-901.1	●	.	●	.	.	●
Neptunium-237	Y/P65-7158	●	.	●	.	.	●
Plutonium-238	Y/P65-7159	●	.	●	.	.	●
Plutonium-239	Y/P65-7159	.	.	●	.	.	●
Radium (total)	EPA-903.0	●	.	●	.	.	●
Strontium-89/90	Y/P65-7196	●	.	●	.	●	●
Technetium-99	Y/P65-7154	●	.	●	.	●	●
Tritium	EPA-906.0	●	.	●	.	●	●
	Y/P65-7150	●	.	●	.	●	●
Uranium-234/-235/-238	Y/P65-7161	●	.	●	.	.	●
MISC. LABORATORY ANALYTES	Analytical Method	GWPS Constituent	Sample Type				
			Filtered	Unfiltered			
pH	EPA-150.1	.	.	●	●	●	●
Specific Conductance	EPA-129.1	.	.	●	●	●	●
Total Dissolved Solids	EPA-160.1	.	.	●	●	●	●
Total Suspended Solids	EPA-160.2	.	.	●	●	●	●
Turbidity	EPA-180.1	.	.	●	●	●	●
FIELD MEASUREMENTS	Analytical Method	GWPS Constituent ⁴	Sample Type ⁵				
			Filtered	Unfiltered			
Depth-to-Water	ESP 302-1	.	.	.	●	●	●
Water Temperature	ESP 307-1	.	.	●	●	●	●
pH	ESP 307-2	.	.	●	●	●	●
Specific Conductance	ESP 307-8	.	.	●	●	●	●
Dissolved Oxygen	ESP 307-5	.	.	●	●	●	●
REDOX	ESP 307-5	.	.	●	●	●	●

Table 4 (cont'd)

Notes:

- 1 Resource Conservation and Recovery Act (RCRA) post-closure corrective action monitoring per the requirements of the RCRA Post-Closure Permit for the Bear Creek Regime.
- 2 Surveillance monitoring and exit-pathway/perimeter monitoring per the requirements of U.S. Department of Energy (DOE) Order 5400.1.
- 3 Monitoring performed as a best management practice of the Y-12 Plant Groundwater Protection Program.
- 4 Analytical/field methods/procedures from:
 - *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (U.S. Environmental Protection Agency 1986)
 - *Methods for Chemical Analysis of Water and Wastes* (U.S. Environmental Protection Agency 1983)
 - *Environmental Surveillance Procedures Quality Control Program* (Martin Marietta Energy Systems, Inc. 1988)
 - K-25 Site Analytical Chemistry Department Procedures Manual
- 5 Groundwater protection standard (GWPS) constituent specified in the RCRA Post-Closure Permit for the Bear Creek Regime.
- 6 Groundwater samples for metals analysis were collected with dedicated sampling equipment or portable Bennet Pumps™ and were filtered in the field; all other samples were filtered in the laboratory as required by analytical procedures.
- 7 Lead concentrations in groundwater samples collected for RCRA monitoring during the first quarter and third quarter of 1996 were determined by Atomic Absorption Spectroscopy (EPA-7421), and Plasma Mass Spectroscopy (EPA-200.8), respectively. Lead results were obtained by the Inductively Coupled Plasma Spectroscopy (EPA-6010) for all samples; however, these results were evaluated only when no other data was available.

Table 5.
Depth-to-Water Measurements and Water-Level Elevations in the Bear Creek
Hydrogeologic Regime, April 1996 and October 1996

Water-Level Elevation (ft above mean sea level)					October 2- 7, 1996				
					April 1 - 9, 1996				
					Seasonal Fluctuation (+/- ft)				
Depth-to-Water (ft below top of well casing)					October 2 -7, 1996				
					April 1 - 9, 1996				
Water Table Interval Monitoring Wells									
Well No. ¹	Location ²	Hydrogeologic Unit		Top of Casing Elevation ³					
		Aquifer	Aquitard						
GW-001	OLF		●	980.86	11.9	15.1	-3.2	968.96	965.76
GW-005	OLF		●	965.13	5.9	6.9	-1.0	961.76	960.76
GW-008	OLF		●	964.79	13.7	15.4	-1.7	953.11	951.41
GW-010	OLF		●	952.76	1.6	3.1	-1.5	951.16	949.66
GW-011	OLF		●	953.08	2.3	4.1	-1.8	950.78	948.98
GW-012	OLF		●	953.57	4.7	6.9	-2.2	950.86	948.66
GW-014	BG		●	933.76	4.8	6.4	-1.6	928.96	927.36
GW-016	BG		●	928.06	7.2	11.2	-4.0	920.86	916.86
GW-018	BG		●	924.49	5.0	9.2	-4.2	919.49	915.29
GW-041	BG		●	1007.55	13.2	23.6	-10.4	994.40	984.00
GW-043	OLF		●	1011.51	18.0	29.0	-11.0	995.96	984.96
GW-045	BG		●	909.79	5.6	NM ⁴	NA ⁵	904.19	NA
GW-047	BG		●	928.25	5.8	9.0	-3.2	922.45	919.25
GW-052	BG		●	906.04	6.6	14.4	-7.8	899.44	891.64
GW-053	BG	●		902.67	3.7	8.4	-4.7	898.97	894.27
GW-065	OLF		●	982.25	23.4	27.0	-3.6	958.85	955.25
GW-067	OLF		●	961.50	9.2	9.9	-0.7	952.30	951.60
GW-080	BG		●	980.31	17.9	24.6	-6.7	962.41	955.71
GW-084	OLF		●	996.60	11.7	14.9	-3.2	984.90	981.70
GW-086	OLF		●	982.76	11.5	14.0	-2.5	971.26	968.76
GW-087	OLF		●	960.50	6.9	10.4	-3.5	953.60	950.10
GW-089	BG		●	964.36	2.3	7.1	-4.8	962.06	957.26
GW-090	BG		●	961.88	4.2	6.9	-2.7	957.68	954.98
GW-091	BG		●	953.48	8.2	9.4	-1.2	945.28	944.08
GW-097	OLF		●	944.62	8.9	10.5	-1.6	935.72	934.12
GW-101	S3		●	1007.33	9.3	9.5	-0.2	998.00	997.80
GW-115	S3		●	1054.41	6.4	11.4	-5.0	1048.00	1043.00
GW-245	S3		●	1009.08	12.5	13.8	-1.3	996.60	995.30
GW-249	BG		●	991.15	29.1	37.1	-8.0	962.05	954.05
GW-257	BG		●	961.68	27.7	28.9	-1.2	933.98	932.78
GW-276	S3		●	1001.27	5.4	5.8	-0.4	995.90	995.50
GW-277	S3		●	1001.76	5.5	6.2	-0.7	996.30	995.60

Table 5 (cont'd)

Water-Level Elevation (ft above mean sea level)					October 2 - 7, 1996				
					April 1 - 9, 1996				
					Seasonal Fluctuation (+/- ft)				
Depth-to-Water (ft below top of well casing)					October 2 - 7, 1996				
					April 1 - 9, 1996				
Water Table Interval Monitoring Wells									
Well No. ¹	Location ²	Hydrogeologic Unit		Top of Casing Elevation ³					
		Aquifer	Aquitard						
GW-287	BG		●	926.87	8.5	9.3	-0.8	918.37	917.57
GW-289	BG		●	948.47	9.6	16.7	-7.1	938.87	931.77
GW-291	BG		●	948.36	7.6	11.6	-4.0	940.76	936.76
GW-307	RS	●		993.14	27.8	32.0	-4.2	965.34	961.14
GW-309	RS	●		988.17	20.3	21.6	-1.3	967.87	966.57
GW-310	RS	●		995.35	20.5	21.1	-0.6	974.85	974.25
GW-311	RS	●		999.35	30.5	38.6	-8.1	968.85	960.75
GW-323	SPI	●		1130.11	85.7	86.1	-0.4	1044.40	1044.00
GW-325	S3		●	1003.00	7.4	15.0	-7.6	995.60	988.00
GW-345	S3		●	999.46	16.5	19.1	-2.6	981.27	978.67
GW-347	S3		●	1001.56	13.7	17.8	-4.1	987.90	983.80
GW-370	BG		●	960.62	11.7	14.6	-2.9	948.92	946.02
GW-372	BG		●	983.53	14.0	24.9	-10.9	969.53	958.63
GW-531	LD		●	1004.61	13.6	17.2	-3.6	991.00	987.40
GW-537	OLF		●	976.24	5.5	6.9	-1.4	970.74	969.34
GW-613	S3		●	1013.37	9.3	14.7	-5.4	1004.10	998.70
GW-621	EXP-B	●		925.24	9.3	13.8	-4.5	915.94	911.44
GW-622	BG		●	924.16	6.6	10.8	-4.2	917.56	913.36
GW-624	BG		●	921.96	5.0	11.1	-6.1	916.96	910.86
GW-626	BG		●	942.61	21.5	25.9	-4.4	921.11	916.71
GW-630	LD		●	986.65	8.8	9.4	-0.6	977.85	977.25
GW-637	OLF		●	941.83	5.8	9.8	-4.0	936.03	932.03
GW-638	OLF		●	941.77	5.9	6.1	-0.2	935.87	935.67
GW-641	BG		●	946.66	14.7	19.3	-4.6	931.96	927.36
GW-642	BG		●	1014.67	17.3	21.3	-4.0	997.40	993.40
GW-644	OLF		●	959.75	6.5	9.4	-2.9	953.25	950.35
GW-648	RS		●	1029.17	62.7	68.8	-6.1	966.50	960.40
GW-651	BG		●	903.12	3.5	8.8	-5.3	899.62	894.32
GW-652	BG		●	900.83	7.7	10.7	-3.0	893.13	890.13
GW-653	BG		●	931.60	18.8	24.0	-5.2	912.80	907.60
GW-654	BG		●	940.79	6.2	7.7	-1.5	934.59	933.09
GW-715	EXP-W	●		874.72	24.6	28.6	-4.0	850.12	846.12
GW-795	AGLLSF		●	925.98	3.0	6.6	-3.6	922.98	919.38

Table 5 (cont'd)

Water-Level Elevation (ft above mean sea level)					October 2 - 7, 1996				
					April 1 - 9, 1996				
Depth-to-Water (ft below top of well casing)					Seasonal Fluctuation (+/- ft)				
					October 2 - 7, 1996				
					April 1 - 9, 1996				
Bedrock Interval Monitoring Wells									
Well No. ¹	Location ²	Hydrogeologic Unit		Top of Casing Elevation ³					
		Aquifer	Aquitard						
GW-044	OLF		●	1013.49	16.2	28.2	-12.0	997.30	985.30
GW-054	BG		●	893.33	8.8	10.8	-2.0	884.53	882.53
GW-055	BG		●	892.53	8.7	8.3	+0.4	883.83	884.23
GW-056	EXP-A	●		890.71	6.6	7.7	-1.1	884.11	883.01
GW-057	EXP-A	●		889.36	4.6	5.8	-1.2	884.76	883.56
GW-058	BG		●	912.96	19.3	22.5	-3.2	893.66	890.46
GW-059	BG		●	912.48	18.9	21.9	-3.0	893.58	890.58
GW-061	BG		●	904.44	11.0	15.6	-4.6	893.44	888.84
GW-062	OLF		●	962.16	22.9	31.5	-8.6	939.26	930.66
GW-064	OLF	●		981.56	22.4	26.0	-3.6	959.16	955.56
GW-066	OLF		●	961.72	7.4	9.2	-1.8	954.26	952.46
GW-069	BG	●		927.01	6.6	10.1	-3.5	920.41	916.91
GW-070	BG		●	926.39	5.8	8.3	-2.5	920.59	918.09
GW-071	BG		●	928.42	6.1	8.2	-2.1	922.32	920.22
GW-072	BG		●	929.91	9.1	11.4	-2.3	920.81	918.51
GW-075	OLF		●	964.31	3.8	5.6	-1.8	963.07	961.27
GW-076	OLF		●	966.01	4.1	5.3	-1.2	961.91	960.71
GW-077	BG		●	918.39	4.1	8.8	-4.7	914.29	909.59
GW-078	BG		●	917.33	3.0	7.7	-4.7	914.33	909.63
GW-079	BG		●	980.50	15.1	22.8	-7.7	965.40	957.70
GW-082	BG		●	962.49	19.4	21.2	-1.8	944.32	942.52
GW-083	BG		●	937.83	8.6	12.9	-4.3	929.23	924.93
GW-085	OLF		●	982.87	11.7	14.3	-2.6	971.17	968.57
GW-094	BG		●	913.12	5.4	8.8	-3.4	907.72	904.32
GW-095	BG		●	910.87	NM	5.8	NA	NA	905.07
GW-098	OLF		●	945.10	9.1	14.8	-5.7	936.00	930.30
GW-122	S3	●		1007.20	14.2	16.8	-2.6	993.00	990.40
GW-123	S3		●	1007.45	4.7	4.5	+0.2	1002.80	1003.00
GW-124	S3	●		1006.78	11.4	17.5	-6.1	995.40	989.30
GW-162	BG		●	1040.44	17.8	21.4	-3.6	1022.60	1019.00
GW-225	OLF	●		943.11	5.2	14.8	-9.6	937.91	928.31
GW-226	OLF	●		943.40	6.2	15.3	-9.1	937.20	928.10
GW-227	OLF	●		946.46	7.0	13.9	-6.9	939.46	932.56

Table 5 (cont'd)

Water-Level Elevation (ft above mean sea level)					October 2 - 7, 1996				
					April 1 - 9, 1996				
					Seasonal Fluctuation (+/- ft)				
Depth-to-Water (ft below top of well casing)					October 2-7, 1996				
					April 1 - 9, 1996				
Bedrock Interval Monitoring Wells									
Well No. ¹	Location ²	Hydrogeologic Unit		Top of Casing Elevation ³					
		Aquifer	Aquitard						
GW-228	OLF	●		946.47	6.4	14.6	-8.2	940.07	931.87
GW-229	OLF	●		949.00	15.6	25.0	-9.4	933.40	924.00
GW-248	BG		●	961.25	27.2	28.5	-1.3	934.05	932.75
GW-250	BG		●	991.25	30.1	35.7	-5.6	961.15	955.55
GW-286	BG		●	926.83	8.8	9.8	-1.0	918.03	917.03
GW-288	BG		●	948.36	9.2	16.3	-7.1	939.16	932.06
GW-290	BG		●	948.46	5.3	8.2	-2.9	943.16	940.26
GW-313	SPI	●		1052.52	65.7	71.6	-5.9	994.04	988.14
GW-315	SPI	●		1047.28	52.9	58.7	-5.8	994.40	988.60
GW-317	SPI	●		1062.98	68.5	75.3	-6.8	994.50	987.70
GW-324	S3		●	1003.83	5.8	15.7	-9.9	998.00	988.10
GW-346	S3		●	995.65	15.7	17.3	-1.6	982.07	980.47
GW-348	S3		●	1000.12	20.1	23.4	-3.3	980.00	976.70
GW-363	OLF		●	957.91	4.0	5.7	-1.7	953.91	952.21
GW-364	OLF		●	935.95	8.3	17.1	-8.8	927.65	918.85
GW-365	OLF		●	935.58	3.3	10.7	-7.4	932.28	924.88
GW-366	OLF		●	988.79	55.6	69.5	-13.9	933.19	919.29
GW-369	OLF		●	999.72	63.4	75.6	-12.2	936.32	924.12
GW-371	BG		●	960.22	15.9	17.3	-1.4	944.32	942.92
GW-373	BG		●	982.80	17.4	19.4	-2.0	965.40	963.40
GW-374	BG		●	926.94	NM	2.9	NA	NA	924.04
GW-375	BG		●	920.83	5.4	8.4	-3.0	915.43	912.43
GW-520	OLF		●	987.38	55.4	65.2	-9.8	931.98	922.18
GW-614	S3		●	1012.22	0.9	6.9	-6.0	1011.30	1005.30
GW-615	S3		●	1016.75	12.6	13.6	-1.0	1004.20	1003.20
GW-616	S3		●	1011.81	9.0	9.9	-0.9	1002.80	1001.90
GW-623	BG		●	925.21	3.1	5.2	-2.1	922.11	920.01
GW-627	BG		●	942.85	24.0	24.5	-0.5	918.85	918.35
GW-629	BG		●	927.16	4.8	5.7	-0.9	922.36	921.46
GW-640	BG		●	945.38	13.6	20.5	-6.9	931.78	924.88
GW-683	EXP-A	●		972.06	88.0	88.8	-0.8	884.06	883.26
GW-684	EXP-A	●		898.66	14.8	15.5	-0.7	883.86	883.16
GW-685	EXP-A	●		891.51	6.8	7.5	-0.7	884.71	884.01

Table 5 (cont'd)

Water-Level Elevation (ft above mean sea level)					October 2 - 7, 1996				
					April 1 - 9, 1996				
					Seasonal Fluctuation (+/- ft)				
Depth-to-Water (ft below top of well casing)					October 2 - 7, 1996				
					April 1 - 9, 1996				
Bedrock Interval Monitoring Wells									
Well No. ¹	Location ²	Hydrogeologic Unit		Top of Casing Elevation ³					
		Aquifer	Aquitard						
GW-694	EXP-B	●		941.38	21.5	28.9	-7.4	919.88	912.48
GW-695	EXP-B	●		939.37	22.9	28.8	-5.9	916.47	910.57
GW-703	EXP-B	●		954.69	36.4	43.9	-7.5	918.29	910.79
GW-704	EXP-B	●		944.73	26.0	33.8	-7.8	918.73	910.93
GW-706	EXP-B	●		928.67	8.9	16.2	-7.3	919.77	912.47
GW-710	EXP-W	●		911.26	64.4	68.1	-3.7	846.86	843.16
GW-711	EXP-W	●		905.20	62.7	66.4	-3.7	842.50	838.80
GW-712	EXP-W	●		877.09	30.8	35.0	-4.2	846.29	842.09
GW-713	EXP-W	●		880.63	33.9	37.7	-3.8	846.73	842.93
GW-714	EXP-W	●		875.08	25.9	30.2	-4.3	849.18	844.88
GW-736	EXP-C	●		960.12	6.4	10.6	-4.2	953.72	949.52
GW-737	EXP-C	●		959.91	6.2	10.6	-4.4	953.71	949.31
GW-740	EXP-C	●		1019.63	65.8	71.2	-5.4	953.80	948.40
GW-793	AGLLSF		●	968.18	6.9	8.9	-2.0	961.28	959.28

Notes:

- 1 Well locations shown on Figure 7 (water table interval wells) and Figure 8 (bedrock interval wells); wells sampled during CY1996 denoted by bold typeface.
- 2
 - AGLLSF - Above Grade Low-Level Storage Facility
 - BG - Bear Creek Burial Grounds Waste Management Area
 - EXP-A - Exit Pathway (Maynardville Limestone) Picket A
 - EXP-B - Exit Pathway (Maynardville Limestone) Picket B
 - EXP-C - Exit Pathway (Maynardville Limestone) Picket C
 - EXP-W - Exit Pathway (Maynardville Limestone) Picket W
 - LD - Lysimeter Demonstration Site
 - OLF - Oil Landfarm Waste Management Area
 - RS - Rust Spoil Area
 - SPI - Spoil Area I
 - S3 - S-3 Site
- 3 Measuring point (top of well casing) elevation (ft above mean sea level).
- 4 Not measured.
- 5 Not applicable.

Table 6.
CY 1996 Results for RCRA GWPS Constituents in Groundwater Samples
from S-3 Site Point-of-Compliance Well GW-276

INORGANIC CONSTITUENTS ¹ (mg/L)	Reporting Limit (mg/L)	February 29, 1996		July 8, 1996	
		Total ²	Dissolved ³	Total	Dissolved
Barium	0.001	0.5	0.48	0.52	0.49
Cadmium	0.003	0.045	0.044	0.047	0.047
Chromium	0.01	.	.	.	.
Lead ⁴	0.004	.	.	NA	NA
	0.0005	NA	NA	0.0032	0.0024
Mercury	0.0002	.	.	.	.
Nickel	0.01	0.5	0.48	0.51	0.5
Nitrate (as N)	0.2	129	NA	129	NA
Uranium	0.0005	1.9	1.6	1.2	1.1
ORGANIC CONSTITUENTS ⁵ (µg/L)	Reporting Limit (µg/L)	February 29, 1996		July 8, 1996	
Acetone	10	.	.	.	.
Benzene	10	.	.	.	.
Bromoform	10	.	.	.	.
2-Butanone	10	.	.	.	.
Carbon Tetrachloride	10	.	.	.	.
Chloroform	10	1	.	1	.
1,1-Dichloroethene	10	.	.	.	.
Trans-1,2-Dichloroethene	10	.	.	.	.
Methylene Chloride	10	.	.	.	.
4-Methyl-2-Pentanone	10	.	.	.	.
Tetrachloroethene	10	18	.	22	.
Toluene	10	.	.	.	.
1,1,1-Trichloroethane	10	.	.	.	.
Trichloroethene	10	.	.	.	.

Table 6 (cont'd)

RADIOLOGICAL CONSTITUENTS ⁶ (pCi/L)	February 29, 1996		July 8, 1996	
	MDA (pCi/L)	Activity ± Counting Error	MDA (pCi/L)	Activity ± Counting Error
Gross alpha	8.6	410 ± 55	8.06	368 ± 51
Gross beta	8.1	810 ± 110	8.74	575 ± 75
Americium-241	0.2	0.2 ± 0.17	0.288	.
Iodine-129	25	.	23	.
Neptunium-237	0.12	25 ± 2.7	0.0903	19.8 ± 2.1
Plutonium-238	0.19	.	0.18	.
Radium (total)	1.3	1.3 ± 1	0.46	3.5 ± 1.5
Strontium-89/90	0.89	2.2 ± 0.52	3.09	3.38 ± 1.8
Technetium-99	13	950 ± 97	13.1	1020 ± 100
Tritium	390	.	215	.
Uranium-234	0.31	170 ± 41	0.493	.
Uranium-235	0.94	8.6 ± 3	0.253	.
Uranium-238	0.94	410 ± 96	0.203	.

Notes:

- 1 Analytical results reported in milligrams per liter (mg/L).
 . = Not detected at specified reporting limit.
 NA = Not analyzed.
- 2 Unfiltered groundwater sample.
- 3 Filtered groundwater sample.
- 4 Reporting limit for lead analysis by Atomic Absorption Spectroscopy is 0.004 mg/L (February 1996) and Plasma Mass Spectroscopy is 0.0005 mg/L (July 1996).
- 5 Analytical results reported in micrograms per liter (µg/L).
 . = Not detected at specified reporting limit.
- 6 Analytical results reported in picoCuries per liter (pCi/L).
 . = Result below the specified minimum detectable activity (MDA).

Table 7.
CY 1996 Results for RCRA GWPS Constituents in Groundwater Samples
from Oil Landfarm Point-of-Compliance Well GW-363

INORGANIC CONSTITUENTS ¹ (mg/L)	Reporting Limit (mg/L)	February 12, 1996		July 2, 1996	
		Total ²	Dissolved ³	Total	Dissolved
Barium	0.001	0.06	0.05	0.066	0.058
Cadmium	0.003	.	.	.	.
Chromium	0.01	.	.	.	.
Lead ⁴	0.004	.	.	NA	NA
	0.0005	NA	NA	.	0.00098
Mercury	0.0002	.	.	.	.
Nickel	0.01	.	.	.	.
Nitrate (as N)	0.2	.	NA	.	NA
Uranium	0.0005	.	.	.	.
ORGANIC CONSTITUENTS ⁵ (µg/L)	Reporting Limit (µg/L)	February 12, 1996		July 2, 1996	
Acetone	10	13		.	
Benzene	10	.		.	
Bromoform	10	.		.	
2-Butanone	10	FP1		.	
Carbon Tetrachloride	10	.		.	
Chloroform	10	.		.	
1,1-Dichloroethene	10	.		.	
Trans-1,2-Dichloroethene	10	.		.	
Methylene Chloride	10	.		.	
4-Methyl-2-Pentanone	10	.		.	
Tetrachloroethene	10	.		.	
Toluene	10	.		.	
1,1,1-Trichloroethane	10	.		.	
Trichloroethene	10	.		.	

Table 7 (cont'd)

RADIOLOGICAL CONSTITUENTS ⁶ (pCi/L)	February 12, 1996		July 2, 1996	
	MDA (pCi/L)	Activity ± Counting Error	MDA (pCi/L)	Activity ± Counting Error
Gross alpha	8.09	.	15.3	.
Gross beta	7.86	.	17.2	.
Americium-241	0.265	.	0.378	.
Iodine-129	20	.	23	.
Neptunium-237	0.073	.	0.268	.
Plutonium-238	0.526	.	0.523	.
Radium (total)	1.27	.	0.45	1.7 ± 1.1
Strontium-89/90	2.87	.	3.12	.
Technetium-99	11.9	.	13.1	.
Tritium	217	.	215	.
Uranium-234	0.303	.	0.748	.
Uranium-235	0.156	.	0.308	.
Uranium-238	0.304	.	0.248	.

Notes:

- 1 Analytical results reported in milligrams per liter (mg/L).
 - . - Not detected at specified reporting limit.
 - NA - Not analyzed.
- 2 Unfiltered groundwater sample.
- 3 Filtered groundwater sample.
- 4 Reporting limit for lead analysis by Atomic Absorption Spectroscopy is 0.004 mg/L (February 1996) and Plasma Mass Spectroscopy is 0.0005 mg/L (July 1996).
- 5 Analytical results reported in micrograms per liter (µg/L).
 - . - Not detected at specified reporting limit.
 - FP1 - False positive result screened by laboratory blank data (see Appendix F, Section F.5).
- 6 Analytical results reported in picoCuries per liter (pCi/L).
 - . - Result below the specified minimum detectable activity (MDA).

Table 8.
CY 1996 Results for RCRA GWPS Constituents in Groundwater Samples
from Bear Creek Burial Grounds Point-of-Compliance Well GW-069

INORGANIC CONSTITUENTS ¹ (mg/L)	Reporting Limit (mg/L)	February 25, 1996		July 23, 1996	
		Total ²	Dissolved ³	Total	Dissolved
Barium	0.001	0.37	0.34	0.36	0.36
Cadmium	0.003	.	.	.	.
Chromium	0.01	.	.	.	.
Lead ⁴	0.004	.	.	NA	NA
	0.0005	NA	NA	0.00061	0.0022
Mercury	0.0002	.	.	.	.
Nickel	0.01	.	.	.	.
Nitrate (as N)	0.2	.	NA	.	NA
Uranium	0.0005	.	.	.	.
ORGANIC CONSTITUENTS ⁵ (µg/L)	Reporting Limit (µg/L)	February 25, 1996		July 23, 1996	
Acetone	10	.	.	.	.
Benzene	10	.	.	.	.
Bromoform	10	.	.	.	.
2-Butanone	10	.	.	.	.
Carbon Tetrachloride	10	.	.	.	.
Chloroform	10	.	.	.	.
1,1-Dichloroethene	10	.	.	.	.
Trans-1,2-Dichloroethene	10	.	.	.	.
Methylene Chloride	10	.	.	.	.
4-Methyl-2-Pentanone	10	.	.	.	.
Tetrachloroethene	10	.	.	.	.
Toluene	10	.	.	.	.
1,1,1-Trichloroethane	10	.	.	.	.
Trichloroethene	10	.	.	.	.

Table 8 (cont'd)

RADIOLOGICAL CONSTITUENTS * (pCi/L)	February 25, 1996		July 23, 1996	
	MDA (pCi/L)	Activity ± Counting Error	MDA (pCi/L)	Activity ± Counting Error
Gross alpha	6.98	.	3.05	.
Gross beta	8.23	.	8.17	.
Americium-241	0.433	.	0.284	.
Iodine-129	22	.	41	.
Neptunium-237	0.384	.	0.0785	.
Plutonium-238	0.0767	.	0.413	.
Radium (total)	1.32	.	6.86	.
Strontium-89/90	3.14	.	3.29	.
Technetium-99	11.7	.	6.26	.
Tritium	207	.	235	.
Uranium-234	0.289	.	0.376	.
Uranium-235	0.148	.	0.377	.
Uranium-238	0.29	.	0.125	.

Notes:

- 1 Analytical results reported in milligrams per liter (mg/L).
 . - Not detected at specified reporting limit.
 NA - Not analyzed.
- 2 Unfiltered groundwater sample.
- 3 Filtered groundwater sample.
- 4 Reporting limit for lead analysis by Atomic Absorption Spectroscopy is 0.004 mg/L (February 1996) and Plasma Mass Spectroscopy is 0.0005 mg/L (July 1996).
- 5 Analytical results reported in micrograms per liter (µg/L).
 . - Not detected at specified reporting limit.
- 6 Analytical results reported in picoCuries per liter (pCi/L).
 . - Result below the specified minimum detectable activity (MDA).

Table 9.
CY 1996 Results for RCRA GWPS Constituents in Groundwater Samples from
Plume Boundary Wells GW-710 through GW-715

INORGANIC CONSTITUENTS ¹ (mg/L)	Reporting Limit (mg/L)	GW-710						GW-711						GW-712					
		Jan. 96		Jul. 96		Jan. 96		Jul. 96		Jan. 96		Jul. 96		Jan. 96		Jul. 96			
		Tot. ²	Dis. ³	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.		
Barium	0.001	0.0024	0.004	0.0051	0.0057	0.0078	0.0094	0.0094	0.0078	0.01	0.013	0.045	0.044	0.051	0.054	0.0098	0.0098		
Cadmium	0.003	.	.	0.0066	.	.	.	.	.	.	.	.	.	.	.	.	.
Chromium	0.01	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lead ⁴	0.004	.	.	NA	NA	.	.	.	.	NA	NA	.	.	NA	NA	NA	NA
	0.0005	NA	NA	0.0016	.	NA	NA	NA	NA	0.0012	.	NA	NA	0.00067	.	.	.		
Mercury	0.0002	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nickel	0.01	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nitrate (as N)	0.2	.	NA	.	NA	.	.	.	NA	.	NA	0.4	NA	.	NA	NA	NA		
Uranium	0.0005	.	.	.	.	.	.	.	.	.	.	0.0006	0.0007	.	.	.	.
INORGANIC CONSTITUENTS (mg/L)	Reporting Limit (mg/L)	GW-713						GW-714						GW-715					
		Jan. 96		Jul. 96		Jan. 96		Jul. 96		Jan. 96		Jul. 96		Jan. 96		Jul. 96			
		Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.	Tot.	Dis.		
Barium	0.001	0.051	0.052	0.053	0.054	0.073	0.069	0.069	0.073	0.058	0.051	0.093	0.073	0.091	0.08	.	.		
Cadmium	0.003	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chromium	0.01	.	.	.	.	.	.	.	.	.	.	.	.	0.099	.	0.076	.
Lead	0.004	.	.	NA	NA	.	.	.	.	NA	NA	0.0064	.	NA	NA	NA	NA
	0.0005	NA	NA	0.0013	0.0035	NA	NA	NA	NA	.	.	NA	NA	0.0013	0.0011	.	.		
Mercury	0.0002	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nickel	0.01	.	.	.	.	.	.	.	.	.	.	0.047	0.019	0.12	0.085	.	.
Nitrate (as N)	0.2	0.39	NA	.	NA	.	3.56	NA	NA	1.29	NA	0.61	NA	0.57	NA	NA	NA		
Uranium	0.0005	.	.	.	.	.	0.0029	0.0029	0.0029	0.0015	0.0014	0.00059	0.00057	0.00072	0.00071	.	.

Table 9 (cont'd)

ORGANIC CONSTITUENTS, (µg/L)	Reporting Limit (µg/L)	GW-710		GW-711		GW-712		GW-713		GW-714		GW-715	
		Feb. 96	Jul. 96	Feb. 96	Jul. 96	Feb. 96	Jul. 96	Feb. 96	Jul. 96	Feb. 96	Jul. 96	Feb. 96	Jul. 96
Acetone	10	.	.	.	.	.	.	.	.	.	.	.	.
Benzene	10	.	.	.	.	.	.	.	.	.	.	.	.
Bromoform	10	.	.	.	.	.	.	.	.	.	.	.	.
2-Butanone	10	.	.	.	.	.	.	.	.	.	.	.	.
Carbon Tetrachloride	10	.	.	.	.	.	.	.	.	.	.	.	.
Chloroform	10	.	.	.	.	.	.	.	.	.	.	.	.
1,1-Dichloroethene	10	.	.	.	.	.	.	.	.	.	.	.	.
Trans-1,2-Dichloroethene	10	.	.	.	.	.	.	.	.	.	.	.	.
Methylene Chloride	10	.	.	.	.	.	.	.	.	.	.	.	.
4-Methyl-2-Pentanone	10	.	.	.	.	.	.	.	.	.	.	.	.
Tetrachloroethene	10	.	.	.	.	.	.	.	.	.	.	.	.
Toluene	10	.	.	.	.	.	.	.	.	.	.	.	.
1,1,1-Trichloroethane	10	.	.	.	.	.	.	.	.	.	.	.	.
Trichloroethene	10	.	.	.	.	.	.	.	.	.	.	.	.

Table 9 (cont'd)

RADIOLOGICAL CONSTITUENTS ⁶ (pCi/L)	GW-710						GW-711		
	Jan. 96		Jul. 96		Jan. 96		Jul. 96		
	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error	MDA
Gross alpha	35.7	.	135	.	87.5	.	143	.	.
Gross beta	29.6	.	174	.	86.3	.	175	.	.
Americium-241	0.217	.	0.819	.	0.748	1.34 ± 0.77	1.15	.	.
Iodine-129	15	.	35	.	23	.	67	.	.
Neptunium-237	0.326	.	0.463	.	0.101	.	0.156	.	.
Plutonium-238	0.265	.	0.289	.	0.267	.	0.42	.	.
Radium (total)	1	2.1 ± 1.2	3.11	3.5 ± 2.6	1.6	5.4 ± 2.2	2.76	4.1 ± 2.4	.
Strontium-89/90	2.81	.	2.71	.	3.09	.	2.9	.	.
Technetium-99	12.8	.	12.7	.	12.8	.	12.7	.	.
Tritium	203	.	222	.	203	.	222	.	.
Uranium-234	0.0142	0.0314 ± 0.026	0.485	.	0.338	.	0.283	.	.
Uranium-235	0.0429	.	0.249	.	0.174	.	0.145	.	.
Uranium-238	0.0142	<CE	0.2	.	0.139	.	0.283	.	.

Table 9 (cont'd)

RADIOLOGICAL CONSTITUENTS, (pCi/L)	GW-712				GW-713			
	Jan. 96		Jul. 96		Jan. 96		Jul. 96	
	MDA ⁷	Activity ± Counting Error	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error
Gross alpha	7.88	.	7.72	.	7.62	.	8.7	.
Gross beta	8.51	.	8.8	.	8.47	.	8.36	.
Americium-241	0.319	.	0.478	.	0.549	.	0.334	.
Iodine-129	16	.	21	.	16	.	23	.
Neptunium-237	0.264	.	0.222	.	0.0989	<CE	0.0767	.
Plutonium-238	0.226	.	0.396	.	0.545	.	0.122	<CE
Radium (total)	1.4	.	2.27	.	1.3	1.3 ± 1	4.78	.
Strontium-89/90	3.28	.	3.52	.	3.22	.	2.81	.
Technetium-99	12.8	.	12.7	.	12.8	.	12.7	.
Tritium	203	230 ± 190	222	.	203	.	222	.
Uranium-234	0.466	.	0.501	.	0.154	0.85 ± 0.46	0.297	0.375 ± 0.28
Uranium-235	0.406	.	0.207	.	0.191	.	0.153	.
Uranium-238	0.134	.	0.166	0.491 ± 0.36	0.374	.	0.37	.

Table 9 (cont'd)

RADIOLOGICAL CONSTITUENTS ⁶ (pCi/L)	GW-714				GW-715			
	Jan. 96		Jul. 96		Jan. 96		Jul. 96	
	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error	MDA	Activity ± Counting Error
Gross alpha	7.33	.	8.43	.	7.57	.	8.66	.
Gross beta	8.43	.	8.32	.	8.46	.	8.36	.
Americium-241	0.296	.	0.348	.	0.0944	0.488 ± 0.27	0.41	.
Iodine-129	21	.	55	.	16	.	26	.
Neptunium-237	0.259	.	0.118	.	0.083	.	0.0921	.
Plutonium-238	0.105	0.271 ± 0.21	0.343	.	0.311	1.24 ± 0.48	0.29	.
Radium (total)	2	.	2.4	.	1.1	1.1 ± 0.9	32.81	.
Strontium-89/90	3.57	.	3.2	.	2.81	.	2.83	.
Technetium-99	12.8	.	12.7	.	12.8	.	12.7	.
Tritium	203	.	222	.	203	270 ± 190	222	.
Uranium-234	0.281	1.42 ± 0.54	0.0935	0.345 ± 0.22	0.0882	0.423 ± 0.24	0.106	0.274 ± 0.21
Uranium-235	0.35	.	0.117	.	0.11	.	0.132	.
Uranium-238	0.116	0.726 ± 0.37	0.0937	0.692 ± 0.32	0.307	.	0.106	0.196 ± 0.18

Table 9 (cont'd)

Notes:

- 1 Analytical results reported in milligrams per liter (mg/L).
 - - Not detected at specified reporting limit.
 - NA - Not analyzed.
- 2 Unfiltered groundwater sample.
- 3 Filtered groundwater sample.
- 4 Reporting limit for lead analysis by Atomic Absorption Spectroscopy is 0.004 mg/L (January and February 1996) and Plasma Mass Spectroscopy is 0.0005 mg/L (July 1996).
- 5 Analytical results reported in micrograms per liter ($\mu\text{g/L}$).
 - - Not detected at specified reporting limit.
- 6 Analytical results reported in picoCuries per liter (pCi/L).
 - - Result below the specified minimum detectable activity (MDA).
 - <CE - Result less than the associated counting error (see Section F.6 in Appendix F)

APPENDIX C

MONITORING WELL CONSTRUCTION DETAILS

EXPLANATION

LOCATION:

- AGLLSF - Above Grade Low-Level Storage Facility
- BG - Bear Creek Burial Grounds WMA
- EXP - Exit Pathway Monitoring Location:
Maynardville Limestone Picket (-A, -B, -C, -W)
- LIV - Industrial Landfill IV (Chestnut Ridge Regime)
- OLF - Oil Landfarm WMA
- RS - Rust Spoil Area
- S3 - S-3 Site
- SPI - Spoil Area I

PROGRAM:

- CMP - RCRA Corrective Action Monitoring
Background well (-B)
Point-of-compliance well (-C)
Plume boundary well (-E)
- EXP - DOE Order 5400.1 Monitoring: exit pathway
- SMP - DOE Order 5400.1 Monitoring: surveillance

GENERAL INFORMATION:

- Coordinates - Y-12 Plant grid system
- Elevations - Feet above mean sea level
- Depths - Feet below ground surface
- AQF - Knox Aquifer
- AQT - ORR Aquitards
- BDR - Bedrock Interval
- WT - Water Table Interval
- Ock - Knox Group
- Cm - Maryville Limestone
- Cn - Nolichucky Shale
- Cmn - Maynardville Limestone
- Cpv - Pumpkin Valley Shale
- Crg - Rogersville Shale
- . - Not Applicable or not available

EXPLANATION (cont'd)

CASING:

- Diameters - Outside dimensions, in inches (nominal)
- Casing Material:
- PVC/#40 - Polyvinyl chloride, schedule 40
 - SS/#304 - Stainless steel, schedule 304
 - Steel - Carbon steel
 - F-25/J-55 - American Petroleum Institute Grade

MONITORED INTERVAL:

- Top - Depth to top of filter pack or open-hole
 - Bottom - Depth to bottom of filter pack or open-hole
- Screen Material:
- PVC/sl - PVC/slotted
 - PVC/sw/.01 - PVC, spiral wound, 0.01 inch slot size
 - SS/sw/.01 - Stainless steel, spiral wound, 0.01 inch slot size
 - SS/pp/.01 - Stainless steel prepack screen, spiral wound, 0.01 inch slot size

Length of screen and open hole interval is in feet.

NOTE:

Data Compiled from *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* (Jones et al. 1995).

APPENDIX C
Monitoring Well Construction Details

Well No.	GW-040	GW-042	GW-043	GW-044	GW-053	GW-056	GW-069	GW-079
Location	BG	BG	OLF	OLF	BG	EXP-A	BG	BG
Program	CMP-B	CMP-B	CMP-B	CMP-B	SMP	EXP	CMP-C	CMP-B
GENERAL INFORMATION								
East Coordinate	43358.00	43938.00	47932.00	47928.00	43091.00	41384.00	43803.00	41619.00
North Coordinate	31111.00	31137.00	30522.00	30526.00	29061.00	28698.00	29490.00	30632.00
Measuring Pt. Elevation	1008.00	1003.40	1011.50	1013.50	902.67	890.71	927.01	980.50
Surface Elevation	1004.10	999.95	1009.80	1010.30	900.33	886.65	924.25	977.14
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQF	AQF	AQT	AQT
Geologic Formation	Cpv	Cpv	Cm	Cm	Cmn	Cmn	Cn	Crg
Aquifer Zone	WT	WT	WT	BDR	WT	BDR	BDR	BDR
Weathered Rock - Depth	.	3.5	1.0	1.0	4.0	.	3.0	4.0
Weathered Rock - Elevation	.	996.45	1008.80	1009.30	896.33	.	921.25	973.14
Fresh Rock - Depth	.	.	38.0	38.0	.	6.4	24.0	26.5
Fresh Rock - Elevation	.	.	971.80	972.30	.	880.25	900.25	950.64
Total Depth Drilled	35.0	30.0	40.0	70.0	39.7	55.2	100.0	65.0
SURFACE/CONDUCTOR CASING								
Casing Depth	.	.	.	.	4.0	32.0	.	.
Casing Diameter	.	.	.	.	6.50	4.50	.	.
Casing Material	none	none	none	unknown	PVC/#40	PVC/#40	unknown	none
WELL CASING								
Borehole Depth	35.0	30.0	40.0	70.0	39.7	55.2	100.0	65.0
Borehole Diameter	6.00	6.00	6.00	4.00	4.00	4.00	7.88	6.50
Well Casing Depth	25.7	24.9	22.8	48.0	26.6	53.2	89.0	59.9
Well Casing Diameter	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
Well Casing Material	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304
MONITORED INTERVAL								
Top - Depth	21.0	13.4	10.0	42.5	11.4	49.1	79.0	49.9
Top - Elevation	983.10	986.55	999.80	967.80	888.93	837.55	845.25	927.24
Midpoint - Depth	25.0	20.8	25.0	56.3	22.1	52.2	89.1	57.4
Midpoint - Elevation	979.10	979.15	984.80	954.05	878.23	834.50	835.15	919.74
Bottom - Depth	29.0	28.2	40.0	70.0	32.8	55.2	99.2	64.9
Bottom - Elevation	975.10	971.75	969.80	940.30	867.53	831.45	825.05	912.24
Screen Material	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01
Screen Length	2.0	2.0	10.0	10.0	5.0	2.0	10.2	5.0
Open-Hole Length	.	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well No.	GW-080	GW-084	GW-085	GW-095	GW-115	GW-162	GW-276	GW-287
Location	BG	OLF	OLF	BG	S3	BG	S3	BG
Program	CMP-B	CMP-B	SMP	SMP	CMP-B	CMP-B	CMP-C	SMP
GENERAL INFORMATION								
East Coordinate	41622.00	48801.00	49058.00	43363.00	52685.00	44480.91	52557.00	42288.00
North Coordinate	30624.00	30421.00	30002.00	29142.00	31073.00	31330.75	29926.00	29989.00
Measuring Pt. Elevation	980.31	996.60	982.87	910.87	1054.40	1040.40	1001.30	926.87
Surface Elevation	977.03	994.37	979.82	907.98	1051.90	1038.10	998.80	924.60
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT
Geologic Formation	Crg	Cm	Cn	Cn	Cm	Cpv	Cn	Cm
Aquifer Zone	WT	WT	BDR	BDR	WT	BDR	WT	WT
Weathered Rock - Depth	3.5	4.0	2.0	15.0	.	.	18.5	4.5
Weathered Rock - Elevation	973.53	990.37	977.82	892.98	.	.	980.30	920.10
Fresh Rock - Depth	23.5	.	40.0	24.0	.	12.0	.	11.0
Fresh Rock - Elevation	953.53	.	939.82	883.98	.	1026.10	.	913.60
Total Depth Drilled	30.0	34.0	62.0	156.0	53.0	125.0	18.5	12.5
SURFACE/CONDUCTOR CASING								
Casing Depth	.	.	.	15.0	.	26.0	.	.
Casing Diameter	.	.	.	10.63	.	10.75	.	.
Casing Material	none	none	unknown	PVC/#40	none	Steel/F25	none	none
WELL CASING								
Borehole Depth	30.0	34.0	62.0	156.0	53.0	92.0	18.5	12.5
Borehole Diameter	6.50	6.50	4.00	9.00	.	10.00	8.00	9.00
Well Casing Depth	24.7	22.8	53.8	134.8	42.0	92.0	13.0	7.3
Well Casing Diameter	2.37	2.37	2.37	4.50	2.37	6.62	4.50	4.50
Well Casing Material	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	Steel/F25	SS/#304	SS/#304
MONITORED INTERVAL								
Top - Depth	20.8	18.5	48.4	130.2	37.6	92.0	11.3	5.6
Top - Elevation	956.23	975.87	931.42	777.78	1014.30	946.10	987.50	919.00
Midpoint - Depth	25.3	23.2	53.6	143.1	45.3	108.5	14.9	9.1
Midpoint - Elevation	951.78	971.22	926.22	764.88	1006.60	929.60	983.90	915.55
Bottom - Depth	29.7	27.8	58.8	156.0	53.0	125.0	18.5	12.5
Bottom - Elevation	947.33	966.57	921.02	751.98	998.90	913.10	980.30	912.10
Screen Material	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	.	SS/sw/.01	SS/sw/.01
Screen Length	5.0	5.0	5.0	21.0	10.0	.	5.3	5.0
Open-Hole Length	.	.	.	.	.	33.0	.	.
Open-Hole Diameter	.	.	.	.	.	6.00	.	.

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well No.	GW-311	GW-315	GW-363	GW-372	GW-373	GW-521	GW-537	GW-613
Location	RS	SPI	OLF	BG	BG	LIV	OLF	S3
Program	SMP	SMP	CMP-C	CMP-B	CMP-B	SDM/C	SMP	CMP-B
GENERAL INFORMATION								
East Coordinate	50126.00	52268.00	46872.00	45257.00	45271.00	52040.00	49539.23	50231.77
North Coordinate	29267.00	29455.00	29961.00	30673.00	30679.00	28541.00	30057.19	30406.77
Measuring Pt. Elevation	999.35	1047.30	957.91	983.53	982.80	1182.70	976.24	1013.40
Surface Elevation	996.43	1044.80	955.41	979.87	980.75	1179.50	974.19	1010.20
Hydrostratigraphic Unit	AQF	AQF	AQT	AQT	AQT	AQF	AQT	AQT
Geologic Formation	Cmn	Cmn	Cn	Cm	Cm	OCK	Cn	Cn
Aquifer Zone	WT	BDR	BDR	WT	BDR	BDR	WT	WT
Weathered Rock - Depth	40.3	54.0	9.0	14.5	21.0	-	14.9	15.0
Weathered Rock - Elevation	956.13	990.80	946.41	965.37	959.75	-	959.29	995.20
Fresh Rock - Depth	-	71.0	21.0	47.0	75.0	54.0	-	-
Fresh Rock - Elevation	-	973.80	934.41	932.87	905.75	1125.50	-	-
Total Depth Drilled	40.3	104.0	75.0	51.6	158.0	136.0	24.5	42.0
SURFACE/CONDUCTOR CASING								
Casing Depth	-	84.4	36.0	-	34.5	60.5	-	16.8
Casing Diameter	-	10.75	10.75	-	10.75	10.75	-	10.75
Casing Material	none	Steel/F25	unknown	none	unknown	unknown	none	Steel/J55
WELL CASING								
Borehole Depth	40.3	104.0	50.0	51.6	123.0	136.0	24.5	42.0
Borehole Diameter	10.00	10.00	9.50	9.50	9.50	9.50	8.75	9.50
Well Casing Depth	29.7	93.3	50.0	41.0	123.0	124.9	8.0	31.7
Well Casing Diameter	4.50	4.50	6.62	4.50	6.62	4.50	4.50	4.50
Well Casing Material	SS/#304	SS/#304	Steel/F25	SS/#304	Steel/F25	SS/#304	SS/#304	SS/#304
MONITORED INTERVAL								
Top - Depth	25.6	90.0	50.0	39.8	123.0	123.2	4.8	30.0
Top - Elevation	970.83	954.80	905.41	940.07	857.75	1056.30	969.39	980.20
Midpoint - Depth	33.0	97.0	62.5	45.7	140.5	129.6	14.1	36.0
Midpoint - Elevation	963.48	947.80	892.91	934.17	840.25	1049.90	960.14	974.20
Bottom - Depth	40.3	104.0	75.0	51.6	158.0	136.0	23.3	42.0
Bottom - Elevation	956.13	940.80	880.41	928.27	822.75	1043.50	950.89	968.20
Screen Material	SS/sw/.01	SS/sw/.01	-	SS/sw/.01	-	SS/sw/.01	SS/sw/.01	SS/sw/.01
Screen Length	10.6	10.0	-	10.0	-	10.3	15.0	10.3
Open-Hole Length	-	-	25.0	-	35.0	-	-	-
Open-Hole Diameter	-	-	6.00	-	6.00	-	-	-

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well No.	GW-614	GW-621	GW-627	GW-642	GW-653	GW-683	GW-684	GW-685
Location	S3	EXP-B	BG	BG	BG	EXP-A	EXP-A	EXP-A
Program	CMP-B	EXP	SMP	CMP-B	SMP	EXP	EXP	EXP
GENERAL INFORMATION								
East Coordinate	50223.05	45032.91	42774.10	44654.05	42317.29	41552.33	41353.53	41447.78
North Coordinate	30425.77	29023.30	29505.05	31215.27	29660.39	28281.78	28524.52	28667.40
Measuring Pt. Elevation	1012.20	925.24	942.85	1014.70	931.60	972.06	898.66	891.51
Surface Elevation	1009.40	923.07	940.39	1011.90	928.85	969.45	895.53	889.28
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT	AQT	AQT	AQT
Geologic Formation	Cn	Cmn	Cn	Crg	Cn	OCK	Cmn	Cmn
Aquifer Zone	BDR	WT	BDR	WT	WT	BDR	BDR	BDR
Weathered Rock - Depth	12.5	22.0	3.0	1.0	3.5	22.0	.	5.0
Weathered Rock - Elevation	996.90	901.07	937.39	1010.90	925.35	947.45	.	884.28
Fresh Rock - Depth	50.8	.	43.0	20.0	.	26.0	9.0	15.5
Fresh Rock - Elevation	958.60	.	897.39	991.90	.	943.45	886.53	873.78
Total Depth Drilled	90.2	43.0	270.0	36.9	39.0	197.5	129.6	138.3
SURFACE/CONDUCTOR CASING								
Casing Depth	44.4	24.0	47.5	21.5	.	82.0	87.0	.
Casing Diameter	10.75	10.75	11.75	10.75	.	11.75	11.75	.
Casing Material	Steel/J55	Steel/J55	Steel/J55	Steel/J55	none	Steel/J55	Steel/J55	none
WELL CASING								
Borehole Depth	90.2	43.0	254.0	36.9	39.0	197.5	129.6	88.5
Borehole Diameter	9.50	7.88	10.63	9.50	9.50	10.63	10.50	10.63
Well Casing Depth	75.2	24.8	254.0	20.3	29.0	146.0	113.8	88.3
Well Casing Diameter	4.50	4.50	7.00	4.50	4.50	4.50	4.50	7.00
Well Casing Material	SS/#304	SS/#304	Steel/F25	SS/#304	SS/#304	SS/#304	SS/#304	Steel/F25
MONITORED INTERVAL								
Top - Depth	71.6	23.3	254.0	18.5	26.3	133.9	106.4	88.5
Top - Elevation	937.80	899.77	686.39	993.40	902.55	835.55	789.13	800.78
Midpoint - Depth	80.9	31.9	262.0	27.7	32.7	165.4	117.4	113.4
Midpoint - Elevation	928.50	891.17	678.39	984.20	896.20	804.10	778.13	775.88
Bottom - Depth	90.2	40.5	270.0	36.9	39.0	196.8	128.4	138.3
Bottom - Elevation	919.20	882.57	670.39	975.00	889.85	772.65	767.13	750.98
Screen Material	SS/sw/.01	SS/sw/.01	.	SS/sw/.01	SS/sw/.01	SS/pp/.01	SS/pp/.01	.
Screen Length	15.0	15.7	.	16.2	10.0	50.8	14.6	.
Open-Hole Length	.	.	16.0	.	.	.	.	49.8
Open-Hole Diameter	.	.	6.25	.	.	.	.	6.63

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well No.	GW-694	GW-695	GW-703	GW-704	GW-706	GW-710	GW-711	GW-712
Location	EXP-B	EXP-B	EXP-B	EXP-B	EXP-B	EXP-W	EXP-W	EXP-W
Program	EXP	EXP	EXP	EXP	EXP	CMP-E	CMP-E	CMP-E
GENERAL INFORMATION								
East Coordinate	44893.28	44868.30	44930.51	44934.98	44943.63	36470.81	36535.38	36506.87
North Coordinate	28844.77	28844.73	28806.34	28844.67	28946.41	27645.05	27872.80	28232.52
Measuring Pt. Elevation	941.38	939.37	954.69	944.73	928.67	911.26	905.20	877.09
Surface Elevation	938.58	937.22	951.80	941.99	925.78	908.03	901.96	873.61
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cmn	Ock	Cmn	Cmn	Cmn	Ock	Cmn	Ock
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock - Depth	11.0	6.0	7.0	16.0	17.0	.	15.0	12.0
Weathered Rock - Elevation	927.58	931.22	944.80	925.99	908.78	.	886.96	861.61
Fresh Rock - Depth	21.0	18.0	10.0	23.0	27.0	3.5	20.5	66.0
Fresh Rock - Elevation	917.58	919.22	941.80	918.99	898.78	904.53	881.46	807.61
Total Depth Drilled	204.5	62.6	182.0	256.0	182.5	744.5	666.2	457.5
SURFACE/CONDUCTOR CASING								
Casing Depth	25.8	22.5	.	21.0	40.3	83.4	17.0	44.8
Casing Diameter	11.75	11.75	.	11.75	11.75	11.75	11.75	11.75
Casing Material	Steel	Steel/J55	none	Steel/J55	Steel/J55	Steel/J55	Steel/J55	Steel/J55
WELL CASING								
Borehole Depth	154.0	62.6	135.0	246.0	157.0	539.7	616.0	441.5
Borehole Diameter	10.60	9.88	10.63	10.63	10.60	10.60	10.60	10.60
Well Casing Depth	153.0	52.4	133.8	244.5	156.1	539.7	616.0	440.2
Well Casing Diameter	7.00	4.50	7.00	7.00	7.00	7.00	7.00	7.00
Well Casing Material	Steel/F25	SS/#304	Steel/F25	Steel/F25	Steel/F25	Steel/F25	Steel/F25	Steel/F25
MONITORED INTERVAL								
Top - Depth	154.0	50.6	135.0	246.0	157.0	539.7	616.0	441.5
Top - Elevation	784.58	886.62	816.80	695.99	768.78	368.33	285.96	432.11
Midpoint - Depth	179.3	56.6	158.5	251.0	169.8	642.1	641.1	449.5
Midpoint - Elevation	759.33	880.62	793.30	690.99	756.03	265.93	260.86	424.11
Bottom - Depth	204.5	62.6	182.0	256.0	182.5	744.5	666.2	457.5
Bottom - Elevation	734.08	874.62	769.80	685.99	743.28	163.53	235.76	416.11
Screen Material	.	SS/sw/.01	.	.	.	.	.	.
Screen Length	.	10.0	.	.	.	.	.	.
Open-Hole Length	50.5	.	47.0	10.0	25.5	204.8	50.2	16.0
Open-Hole Diameter	6.25	.	6.25	6.50	6.25	6.25	6.25	6.25

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well No.	GW-713	GW-714	GW-715	GW-723	GW-724	GW-725	GW-738	GW-740
Location	EXP-W	EXP-W	EXP-W	EXP-C	EXP-C	EXP-C	EXP-C	EXP-C
Program	CMP-E	CMP-E	CMP-E	EXP	EXP	EXP	EXP	EXP
GENERAL INFORMATION								
East Coordinate	36434.40	36435.09	36453.11	49088.55	48995.17	48989.13	49026.00	49055.00
North Coordinate	28235.95	28421.56	28424.58	29006.44	29198.24	29405.44	29150.00	29027.00
Measuring Pt. Elevation	880.63	875.08	874.72	1022.20	979.27	961.05	983.08	1019.60
Surface Elevation	877.83	872.30	872.17	1019.30	976.62	958.26	980.36	1017.00
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	Cmn	Cmn	Cmn	Cmn	Cmn	Cmn	Cmn	Cmn
Aquifer Zone	BDR	BDR	WT	BDR	BDR	BDR	BDR	BDR
Weathered Rock - Depth	26.8	27.0	34.0	26.7	33.5	14.0	12.0	38.1
Weathered Rock - Elevation	851.03	845.30	838.17	992.60	943.12	944.26	968.36	978.90
Fresh Rock - Depth	63.8	35.0	.	29.7	40.0	17.5	15.1	45.1
Fresh Rock - Elevation	814.03	837.30	.	989.60	936.62	940.76	965.26	971.90
Total Depth Drilled	315.2	145.0	44.6	444.5	301.6	142.5	90.1	190.0
SURFACE/CONDUCTOR CASING								
Casing Depth	50.0	40.5	.	39.0	40.0	21.0	16.5	46.9
Casing Diameter	11.75	11.75	.	11.75	11.75	11.75	11.75	11.75
Casing Material	Steel/J55	Steel/J55	none	Steel/J55	Steel/J55	Steel/J55	Steel/J55	Steel/J55
WELL CASING								
Borehole Depth	305.0	115.1	44.6	340.6	289.6	132.5	90.1	165.6
Borehole Diameter	10.60	10.60	10.60	10.60	10.60	10.60	10.60	10.60
Well Casing Depth	305.0	115.1	33.1	340.6	289.6	132.5	67.3	165.6
Well Casing Diameter	7.00	7.00	4.25	7.00	7.00	7.00	4.50	7.00
Well Casing Material	Steel/F25	Steel/F25	SS/#304	Steel/F25	Steel/F25	Steel/F25	SS/#304	Steel/F25
MONITORED INTERVAL								
Top - Depth	305.0	115.1	32.0	340.6	289.6	132.5	63.5	165.6
Top - Elevation	572.83	757.20	840.17	678.70	687.02	825.76	916.86	851.40
Midpoint - Depth	310.1	130.1	38.0	392.6	295.6	137.5	75.8	177.8
Midpoint - Elevation	567.73	742.25	834.17	626.75	681.02	820.76	904.61	839.20
Bottom - Depth	315.2	145.0	44.0	444.5	301.6	142.5	88.0	190.0
Bottom - Elevation	562.63	727.30	828.17	574.80	675.02	815.76	892.36	827.00
Screen Material	.	.	SS/sw/.01	.	.	.	SS/sw/.01	.
Screen Length	.	.	10.0	.	.	.	20.2	.
Open-Hole Length	10.2	29.9	.	103.9	12.0	10.0	.	24.4
Open-Hole Diameter	6.25	6.25	.	6.25	6.25	6.25	.	6.25

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well No.	GW-793	GW-794	GW-795	GW-828	GW-829
Location	AGLLSF	AGLLSF	AGLLSF	OLF	OLF
Program	BMP	BMP	BMP	SMP	SMP
GENERAL INFORMATION					
East Coordinate	46831.52	46392.92	45630.06	49995.02	50035.53
North Coordinate	30235.82	29273.17	29286.69	30059.52	29952.81
Measuring Pt. Elevation	968.18	934.17	925.98	982.92	985.78
Surface Elevation	965.05	930.91	922.92	979.08	981.92
Hydrostratigraphic Unit	AQT	AQT	AQT	AQT	AQT
Geologic Formation	Cn	Cn	Cn	Cn	Cn
Aquifer Zone	BDR	BDR	WT	BDR	BDR
Weathered Rock - Depth	11.0	3.5	5.0	7.5	1.3
Weathered Rock - Elevation	954.05	927.41	917.92	971.58	980.62
Fresh Rock - Depth	14.0	13.3	12.0	38.7	29.0
Fresh Rock - Elevation	951.05	917.61	910.92	940.38	952.92
Total Depth Drilled	29.0	39.3	20.1	82.7	115.0
SURFACE/CONDUCTOR CASING					
Casing Depth	.	.	.	19.2	.
Casing Diameter	.	.	.	10.75	.
Casing Material	none	none	none	Steel	none
WELL CASING					
Borehole Depth	29.0	39.3	20.1	168.0	115.0
Borehole Diameter	9.87	9.87	9.87	9.87	9.87
Well Casing Depth	18.4	28.7	9.8	155.5	104.7
Well Casing Diameter	4.50	4.50	4.50	4.50	4.50
Well Casing Material	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304
MONITORED INTERVAL					
Top - Depth	16.9	25.8	7.5	153.0	102.9
Top - Elevation	948.15	905.11	915.42	826.08	879.02
Midpoint - Depth	23.0	32.6	13.8	160.5	108.8
Midpoint - Elevation	942.10	898.36	909.12	818.58	873.17
Bottom - Depth	29.0	39.3	20.1	168.0	114.6
Bottom - Elevation	936.05	891.61	902.82	811.08	867.32
Screen Material	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01
Screen Length	10.0	10.1	10.0	10.4	9.9
Open-Hole Length	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.

APPENDIX D
CY 1996 DATA FOR
GROUNDWATER AND SURFACE WATER SAMPLES

EXPLANATION

SAMPLING POINT:

- BCK - Bear Creek Kilometer
- GW - Monitoring Well
- NT - Northern Tributary
- SS - Spring

PROGRAM:

- CMP - RCRA Corrective Action Monitoring
 - Background well (-B)
 - Point-of-compliance well (-C)
 - Plume boundary well (-E)
- EXP - DOE Order 5400.1 Monitoring: exit pathway
- SMP - DOE Order 5400.1 Monitoring: surveillance

LOCATION:

- AGLLSF - Above Grade Low-Level Storage Facility
- BG - Bear Creek Burial Grounds WMA
- EXP - Exit Pathway Monitoring Location:
 - Maynardville Limestone Picket (-A, -B, -C, -W)
 - Spring or Surface Water Sampling Location (-SW)
- LIV - Industrial Landfill IV (Chestnut Ridge Regime)
- OLF - Oil Landfarm WMA
- RS - Rust Spoil Area
- S3 - S-3 Site
- SPI - Spoil Area I

SAMPLE TYPE:

- DUP - Field Duplicate Sample
- DIS - Dissolved concentration (Filtered Sample)
- TOT - Total concentration (Unfiltered Sample)
- ACT - Activity
- ERR - Counting Error (two standard deviations)
- MDA - Minimum Detectable Activity

EXPLANATION (cont'd)

NOTES:

Bicarbonate (HCO₃) and carbonate (CO₃) alkalinity are reported as calcium carbonate.

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

- . - Not analyzed
- AAS - Atomic Absorption Spectroscopy
- CVAA - Cold Vapor Atomic Absorption
- PMS - Plasma Mass Spectroscopy
- TDS - Total Dissolved Solids
- TSS - Total Suspended Solids
- Sp. Cond. - Specific Conductance

UNITS:

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

DATA QUALIFICATION:

Laboratory qualifiers presented with results:

- < - Inorganic compound not detected at the minimum attainable detection limit.
- U - Organic compound not detected at the minimum attainable detection limit.

Miscellaneous Parameters:

The following results were associated with a "*" qualifier that indicates that replicate analyses were outside control limits.

Sampling Location	Sampling Date	Parameter
GW-095	08/27/96	Turbidity
GW-115	01/31/96	Turbidity
GW-276	02/29/96	Turbidity
GW-738	08/08/96	TSS
GW-795	08/26/96	Turbidity

EXPLANATION (cont'd)

Inorganic Analytes:

PMS - All samples are diluted before analysis to obtain an optimal matrix; reporting limits were set with a five-fold dilution. Results less than the reporting limits were reported with a "d" qualifier.

ICP - The following unfiltered and filtered samples were diluted before analysis to obtain accurate results:

Sampling Location	Sampling Date	Dilution Factor
GW-537	03/25/96	2
	08/20/96	2
GW-710	01/29/96	2
	07/16/96	2
GW-711	01/26/96	5
	07/14/96	2

Organic Analytes:

All results less than 10 ug/L are estimated values and were reported with a "J" qualifier.

Ten results for samples collected during the first quarter sampling event were reported with a "B" qualifier, indicating that a compound also was detected in the associated laboratory blank. All false positive results that were screened by data reported for the laboratory or trip blanks (not indicated by a qualifier) are presented in Appendix F.

Radiological Analytes:

Radionuclide activities that were reported with a "J" qualifier indicate that a chemical tracer recovery was less than 50% or greater than 125%. This information is reflected in the counting error associated with the activity. The following results were associated with a "J" qualifier.

Sampling Point	Date Sampled	Results (pCi/L)						
		²⁴¹ Am	²³⁷ Np	²³⁸ Pu	²³⁹ Pu	²³⁴ U	²³⁵ U	²³⁸ U
GW-040	07/18/96	.	.	.	.	-0.0301	0	0
GW-042	03/26/96	.	-0.137	.	.	.	.	.
	07/18/96	.	.	.	.	0.0133	0	0.057
GW-043	07/08/96	0.102	.	.	.	0.0441	0	0.0885

Sampling Point	Date Sampled	Results (pCi/L)						
		²⁴¹ Am	²³⁷ Np	²³⁸ Pu	²³⁹ Pu	²³⁴ U	²³⁵ U	²³⁸ U
GW-044	01/31/96	0.176	.	0.0824	-0.125	.	.	.
	07/08/96	.	.	.	.	0.145	0.0907	-0.051
GW-069	02/25/96	0.152	0.309	.	.	0.101	0	-0.0306
	07/23/96	.	.	.	.	-0.0179	-0.04	0.092
GW-079	02/25/96	0.0218	.	.	.	0.0707	0	0.0543
	07/24/96	.	.	.	.	0.012	0	0.169
GW-084	07/08/96	-0.0688	.	.	.	0.141	0	0.163
GW-115	07/02/96	.	.	.	.	0.0782	0.0228	-0.065
GW-162	02/26/96	0.164	.	.	.	0.0463	0.0629	0.0155
	07/24/96	.	.	.	.	0.0945	-0.027	0.104
GW-276	07/08/96	.	.	.	.	0.0229	0	0.075
GW-363	02/12/96	.	.	0.296	-0.0446	0.0601	0.115	.
	07/02/96	.	.	0.0611	-0.0735	0.238	0	0
GW-363 D	02/12/96	.	.	-0.0598	-0.0383	.	.	.
	07/02/96	.	.	.	.	0	-0.069	0
GW-372	02/25/96	0.0866	0.0758	.	.	0.0598	0.171	0.321
	07/23/96	.	.	.	.	0.129	0	0.361
GW-372 D	02/25/96	0.064	0.122	.	.	0.204	0	-0.0977
GW-373	02/28/96	-0.0625	.	-0.0848	-0.0848	0.146	0	0.0171
	07/25/96	.	.	.	.	0.115	-0.05	0
GW-521	07/02/96	.	.	.	.	0.296	0	0
GW-613	01/31/96	-0.022	.	0.13	0	.	.	.
	07/01/96	.	.	.	.	0.0523	0	0
GW-614	02/12/96	.	.	.	.	0.222	-0.0769	0
GW-614	07/01/96	.	.	.	.	0	-0.068	0.0791
GW-642	07/9/96	.	.	.	.	0.0604	0	0.0605
GW-710	01/29/96	0.0801	.	.	.	.	.	.
	07/16/96	-0.181	.	.	.	0.0225	0	0.0738
GW-711	01/26/96	1.34	.	.	.	0.0157	0	0.103
	07/14/96	-0.25	.	.	.	.	.	.
GW-712	07/15/96	0.094	.	.	.	.	.	.
GW-713	01/28/96	.	.	-0.0259	0.0406	.	.	.
	07/17/96	.	.	.	.	0.375	0	-0.063
GW-713 D	01/28/96	0.176	.	.	.	.	.	.
GW-715	01/29/96	0.488	.	.	.	.	.	.

D - Duplicate Am - Americium Np - Neptunium Pu - Plutonium U - Uranium

APPENDIX D.1

**FIELD MEASUREMENTS AND
MISCELLANEOUS PARAMETERS**

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	BCK-00.63	BCK-03.87	BCK-04.55	BCK-07.75	BCK-09.40
Program	EXP	EXP	EXP	EXP	EXP
Location	EXP-SW	EXP-SW	EXP-SW	EXP-SW	EXP-SW
Date Sampled	08/06/96	01/30/96	07/14/96	01/30/96	07/14/96
Sample Type					
FIELD MEASUREMENTS					
Top-of-Casing Elev. (ft)	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.
Water-Level Elev. (ft)	.	.	.	.	.
Water Temp (degrees C)	21.3	8	20	8.1	20.1
pH (pH units)	6.9	6.7	7.8	7	6.6
Sp. Cond. (umho/cm)	273	478	64	321	31
Dissolved Oxygen (ppm)	8.3	12.2	9.5	12.2	6.3
Oxidation/Reduction (mV)	10	180	-69	165	29
MISCELLANEOUS PARAMETERS					
pH (pH units)	8.14	7.75	8.15	7.73	7.87
Sp. Cond. (umho/cm)	316	222	352	234	355
TDS (mg/L)	194	112	218	154	212
TSS (mg/L)	2	<1	<1	<1	2.5
Turbidity (NTU)	3.42	6.26	2.32	6.05	3.51

(CONTINUED)

Sampling Point	BCK-10.60	BCK-11.97	GW-040	GW-042	GW-043
Program	EXP	EXP	CMP-B	CMP-B	CMP-B
Location	EXP-SW	EXP-SW	BG	BG	OLF
Date Sampled	03/17/96	07/30/96	03/17/96	08/13/96	03/26/96
Sample Type					
FIELD MEASUREMENTS					
Top-of-Casing Elev. (ft)	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.
Water-Level Elev. (ft)	.	.	.	.	.
Water Temp (degrees C)	12.5	20.8	15.1	21	13.5
pH (pH units)	8	7.5	8.2	7.4	6.4
Sp. Cond. (umho/cm)	392	429	839	643	138
Dissolved Oxygen (ppm)	10	5.6	12.7	1.5	3.6
Oxidation/Reduction (mV)	184	137	190	49	152
MISCELLANEOUS PARAMETERS					
pH (pH units)	7.68	7.98	7.96	7.79	6.34
Sp. Cond. (umho/cm)	455	444	990	667	150
TDS (mg/L)	186	282	514	442	238
TSS (mg/L)	<1	5	<1	3.5	46
Turbidity (NTU)	9.1	10.4	4.18	8.31	257

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	GW-043	GW-044	GW-053	GW-056	GW-069				
Program	CMP-B	CMP-B	SMP	EXP	CMP-C				
Location	OLF	OLF	BG	EXP-A	BG				
Date Sampled	07/08/96	01/31/96	07/08/96	03/26/96	08/28/96	03/14/96	07/23/96	02/25/96	07/23/96
Sample Type									
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	1011.5	1013.5	1013.5	902.67	902.67	890.71	890.71	927.01	927.01
Depth to Water (ft)	23.40	24.16	21.55	5.11	8.79	5.55	8.14	7.82	9.43
Water-Level Elev. (ft)	988.1	989.34	991.95	897.56	893.88	885.16	882.57	919.19	917.58
Water Temp (degrees C)	15.5	13.2	15.1	15.1	17.1	14	16	15.2	16.6
pH (pH units)	6.1	7.3	6.8	7.4	6.9	7.3	6.3	9.1	7.8
Sp. Cond. (umho/cm)	152	264	242	670	642	785	600	402	350
Dissolved Oxygen (ppm)	4.5	4	3.5	1.2	1.3	2.4	1.8	0.8	0.9
Oxidation/Reduction (mV)	209	111	180	151	109	120	135	-80	26
MISCELLANEOUS PARAMETERS									
pH (pH units)	6.42	7.31	7.33	7.14	7.16	7.49	7.4	8.58	8.59
Sp. Cond. (umho/cm)	137.5	277	266	691	721	930	902	387	408
TDS (mg/L)	110	30	172	424	408	528	472	208	242
TSS (mg/L)	<1	<1	<1	17.5	4	3.5	21.5	<1	<1
Turbidity (NTU)	18.1	0.755	0.467	3.33	3.14	17.1	46	0.749	0.615

(CONTINUED)

Sampling Point	GW-079	GW-080	GW-084	GW-085	GW-095				
Program	CMP-B	CMP-B	CMP-B	SMP	SMP				
Location	BG	BG	OLF	OLF	BG				
Date Sampled	02/25/96	07/24/96	02/24/96	07/24/96	02/01/96	07/08/96	03/25/96	08/20/96	03/26/96
Sample Type									
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	980.5	980.5	980.31	980.31	996.6	996.6	982.87	982.87	910.87
Depth to Water (ft)	17.92	21.36	21.10	24.30	12.15	14.75	12.85	13.35	3.27
Water-Level Elev. (ft)	962.58	959.14	959.21	956.01	984.45	981.85	970.02	969.52	907.6
Water Temp (degrees C)	15.8	16	13.9	14.6	14.1	15.8	15.3	16.7	13.4
pH (pH units)	8.3	7.5	6.4	5.4	7.9	7.3	7	6.4	9.3
Sp. Cond. (umho/cm)	212	186	85	108	431	281	1681	1320	497
Dissolved Oxygen (ppm)	1.9	4.6	1.6	2	1.9	1.5	2.2	2.2	0.6
Oxidation/Reduction (mV)	-54	127	147	138	183	205	206	222	103
MISCELLANEOUS PARAMETERS									
pH (pH units)	8	8.06	6.39	6.17	7.73	7.64	7	6.93	9.1
Sp. Cond. (umho/cm)	229	224	113	109.5	316	317	1788	1547	505
TDS (mg/L)	126	202	68	140	204	194	1342	1506	324
TSS (mg/L)	<1	10.5	764	54	14	18.5	5	12.5	<1
Turbidity (NTU)	1.57	47.2	340	61.3	13.4	16.4	6.53	12.4	0.777

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	GW-095		GW-115		GW-162		GW-276		GW-287
Program	SMP		CMP-B		CMP-B		CMP-C		SMP
Location	BG		S3		BG		S3		BG
Date Sampled	08/27/96		01/31/96	07/02/96	02/26/96	07/24/96	02/29/96	07/08/96	03/26/96
Sample Type	DUP								
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	910.87	910.87	1054.4	1054.4	1040.4	1040.4	1001.3	1001.3	926.87
Depth to Water (ft)	5.00	5.00	6.73	9.90	18.10	20.60	5.79	6.80	8.89
Water-Level Elev. (ft)	905.87	905.87	1047.67	1044.5	1022.3	1019.8	995.51	994.5	917.98
Water Temp (degrees C)	15.5	15.1	15.6	17.8	16	19.2	8.7	18.1	11.2
pH (pH units)	8.8	8.8	7.5	6.3	8.4	7.3	5.4	4	7.2
Sp. Cond. (umho/cm)	440	441	487	468	279	211	1500	1527	273
Dissolved Oxygen (ppm)	1	1	1.6	1.5	6.8	5	6.5	3.4	3
Oxidation/Reduction (mV)	128	131	13	92	155	123	291	279	156
MISCELLANEOUS PARAMETERS									
pH (pH units)	9.14	9.16	7.58	7.52	8.1	8.04	4.4	4.55	7.04
Sp. Cond. (umho/cm)	505	504	495	507	269	266	1729	1676	272
TDS (mg/L)	316	338	324	306	142	208	1334	1372	194
TSS (mg/L)	<1	<1	<1	1	<1	12	<1	11	<1
Turbidity (NTU)	2.63	1.15	2.83	4.22	5.97	24.4	2.79	9.73	87

(CONTINUED)

Sampling Point	GW-287	GW-311		GW-315			GW-363	
Program	SMP	SMP		SMP			CMP-C	
Location	BG	RS		SPI			OLF	
Date Sampled	08/27/96	03/25/96	08/14/96	03/26/96		08/19/96		02/12/96
Sample Type					DUP		DUP	
FIELD MEASUREMENTS								
Top-of-Casing Elev. (ft)	926.87	999.35	999.35	1047.3	1047.3	1047.3	1047.3	957.91
Depth to Water (ft)	9.45	33.43	32.27	54.91	54.91	54.95	54.95	3.93
Water-Level Elev. (ft)	917.42	965.92	967.08	992.39	992.39	992.35	992.35	953.98
Water Temp (degrees C)	21.7	14.1	17.8	14.5	14.5	16.6	16.4	9.5
pH (pH units)	6.8	7.3	6.7	6.9	6.9	6.7	6.7	9.7
Sp. Cond. (umho/cm)	252	392	366	623	615	551	548	423
Dissolved Oxygen (ppm)	8	6.1	4.5	4	4	4.5	5.2	2.4
Oxidation/Reduction (mV)	200	190	188	168	168	230	240	106
MISCELLANEOUS PARAMETERS								
pH (pH units)	7.18	7.34	7.37	6.94	6.95	6.93	6.97	9.2
Sp. Cond. (umho/cm)	287	428	398	731	730	671	673	455
TDS (mg/L)	226	262	242	470	468	448	420	244
TSS (mg/L)	12.5	<1	<1	<1	189.5	<1	<1	5
Turbidity (NTU)	32.2	1.56	2.18	0.715	0.546	0.278	0.379	7.82

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	GW-363		GW-372			GW-373		GW-521	
Program	CMP-C		CMP-B			CMP-B		CMP-B	
Location	OLF		BG			BG		LIV	
Date Sampled	07/02/96		02/25/96		07/23/96		02/28/96	07/25/96	01/16/96
Sample Type	DUP		DUP		DUP				
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	957.91	957.91	983.53	983.53	983.53	983.53	982.8	982.8	1182.7
Depth to Water (ft)	5.16	5.16	17.79	17.79	22.41	22.41	17.55	17.30	81.62
Water-Level Elev. (ft)	952.75	952.75	965.74	965.74	961.12	961.12	965.25	965.5	1101.08
Water Temp (degrees C)	21.2	17.3	13.8	13.8	15.9	15.5	15.1	15.9	13.1
pH (pH units)	8.5	8.5	7.9	7.9	7.2	7.2	9.5	8.8	7.9
Sp. Cond. (umho/cm)	408	406	380	381	346	354	460	409	279
Dissolved Oxygen (ppm)	2.7	1.3	1.8	1.8	1.1	1.2	3.9	3	8.1
Oxidation/Reduction (mV)	75	83	85	86	133	140	117	153	171
MISCELLANEOUS PARAMETERS									
pH (pH units)	9.38	9.33	7.7	7.7	7.64	7.65	9.3	7.53	7.9
Sp. Cond. (umho/cm)	452	452	401	399	394	395	502	486	289
TDS (mg/L)	290	274	224	218	232	238	300	304	164
TSS (mg/L)	16.5	22	1.5	<1	<1	<1	5	1.5	<1
Turbidity (NTU)	11.5	14.3	1.47	1.36	1.09	1.11	13.4	6.38	13.5

(CONTINUED)

Sampling Point	GW-521	GW-537		GW-613		GW-614		GW-621	
Program	CMP-B	SMP		CMP-B		CMP-B		EXP	
Location	LIV	OLF		S3		S3		EXP-B	
Date Sampled	07/02/96	03/25/96	08/20/96	01/31/96	07/01/96	02/12/96	07/01/96	03/14/96	
Sample Type									DUP
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	1182.7	976.24	976.24	1013.4	1013.4	1012.2	1012.2	925.24	925.24
Depth to Water (ft)	81.85	5.75	6.92	11.28	14.15	1.81	4.88	10.98	10.98
Water-Level Elev. (ft)	1100.85	970.49	969.32	1002.12	999.25	1010.39	1007.32	914.26	914.26
Water Temp (degrees C)	17	15.2	16.4	13	15	11.5	15.4	14.1	14
pH (pH units)	6	6.8	6.6	7	5.7	8	7.1	7.8	7.7
Sp. Cond. (umho/cm)	248	5690	5130	185	154	330	312	301	301
Dissolved Oxygen (ppm)	4.7	3	1.2	4.1	3.5	1.5	0.6	5.9	5.6
Oxidation/Reduction (mV)	190	210	230	108	186	152	189	127	128
MISCELLANEOUS PARAMETERS									
pH (pH units)	7.96	6.7	6.79	7.09	7.11	7.73	7.71	7.77	7.75
Sp. Cond. (umho/cm)	282	6180	5910	183	186	349	346	362	363
TDS (mg/L)	146	5082	5214	132	136	190	194	176	164
TSS (mg/L)	2.5	2	<1	<1	<1	10	1.5	18	18
Turbidity (NTU)	7.18	3.94	1.03	1.55	0.105	7.14	1.49	42.9	30.5

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	GW-621		GW-627		GW-642		GW-653		GW-683
Program	EXP		SMP		CMP-B		SMP		EXP
Location	EXP-B		BG		BG		BG		EXP-A
Date Sampled	07/23/96		03/28/96	09/06/96	02/24/96	07/09/96	03/26/96	08/28/96	03/15/96
Sample Type	DUP								
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	925.24	925.24	942.85	942.85	1014.7	1014.7	931.6	931.6	972.06
Depth to Water (ft)	14.15	14.15	22.42	23.59	18.55	21.76	20.58	23.18	85.93
Water-Level Elev. (ft)	911.09	911.09	920.43	919.26	996.15	992.94	911.02	908.42	886.13
Water Temp (degrees C)	15	15	14.1	15.7	16.1	16.6	14.1	14.3	13
pH (pH units)	6.9	6.9	11	8.9	6.8	5.3	5.4	4.4	7.6
Sp. Cond. (umho/cm)	344	351	1132	1058	160	203	38	43	283
Dissolved Oxygen (ppm)	6.5	6.1	0.6	0.9	1	1.5	7.2	5.4	7.4
Oxidation/Reduction (mV)	131	129	30	108	-11	17	208	294	91
MISCELLANEOUS PARAMETERS									
pH (pH units)	7.7	7.64	9.09	9.14	6.64	6.55	5.52	5.57	7.44
Sp. Cond. (umho/cm)	414	406	1221	1214	165	164	36.3	35.6	328
TDS (mg/L)	254	248	730	760	72	124	68	70	190
TSS (mg/L)	<1	10.5	<1	<1	1.5	<1	16	67	<1
Turbidity (NTU)	26.1	29.4	0.941	2.51	11.7	2.12	10.4	33.9	1.21

(CONTINUED)

Sampling Point	GW-683	GW-684		GW-685		GW-694		GW-695	
Program	EXP	EXP		EXP		EXP		EXP	
Location	EXP-A	EXP-A		EXP-A		EXP-B		EXP-B	
Date Sampled	07/29/96	03/16/96	07/29/96	03/15/96	07/25/96	03/18/96	08/01/96	03/14/96	07/23/96
Sample Type									
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	972.06	898.66	898.66	891.51	891.51	941.38	941.38	939.37	939.37
Depth to Water (ft)	87.68	15.22	15.40	7.49	8.15	24.35	22.75	24.55	28.38
Water-Level Elev. (ft)	884.38	883.44	883.26	884.02	883.36	917.03	918.63	914.82	910.99
Water Temp (degrees C)	14.8	13.8	14.9	15	15.4	13.2	15.4	14	15
pH (pH units)	7.2	8.1	6.9	7.4	7	7.4	7.5	8.1	7.1
Sp. Cond. (umho/cm)	402	410	417	736	585	610	331	390	405
Dissolved Oxygen (ppm)	4.5	5.2	3.4	7.8	6	4.6	3.1	6.5	8
Oxidation/Reduction (mV)	130	217	163	72	81	7	139	138	152
MISCELLANEOUS PARAMETERS									
pH (pH units)	7.3	7.71	7.5	7.58	9.32	7.24	7.27	8.06	8.03
Sp. Cond. (umho/cm)	483	375	469	740	698	603	393	477	465
TDS (mg/L)	260	174	256	248	388	338	278	308	270
TSS (mg/L)	1	22	8	2	7	<1	<1	43	19
Turbidity (NTU)	3.86	16.1	9.75	27.3	55.3	5.15	20.5	40.8	15.6

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	GW-703		GW-704		GW-706		GW-710		GW-711
Program	EXP		EXP		EXP		CMP-E		CMP-E
Location	EXP-B		EXP-B		EXP-B		EXP-W		EXP-W
Date Sampled	03/16/96	07/31/96	03/17/96	08/01/96	03/19/96	08/06/96	01/29/96	07/16/96	01/26/96
Sample Type									
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	954.69	954.69	944.73	944.73	928.67	928.67	911.26	911.26	905.2
Depth to Water (ft)	37.85	41.76	28.95	29.83	12.22	11.46	65.10	67.22	63.30
Water-Level Elev. (ft)	916.84	912.93	915.78	914.9	916.45	917.21	846.16	844.04	841.9
Water Temp (degrees C)	13.2	15.3	13.3	15.4	11.5	16.6	12	19.6	12.1
pH (pH units)	6.5	7.5	7.8	7.2	7.8	6.3	6.6	5.9	7.7
Sp. Cond. (umho/cm)	533	445	557	586	657	527	3680	3630	7640
Dissolved Oxygen (ppm)	4.8	5	1.3	1.8	6.8	2.7	0.3	5.4	1.9
Oxidation/Reduction (mV)	132	159	101	192	130	147	-78	148	-30
MISCELLANEOUS PARAMETERS									
pH (pH units)	7.73	7.86	7.56	7.64	7.5	7.32	6.84	7.21	7.86
Sp. Cond. (umho/cm)	649	647	643	645	633	672	4010	3960	8220
TDS (mg/L)	310	330	370	330	338	390	3582	3510	5832
TSS (mg/L)	<1	1	9.5	<1	1.5	<1	17.5	34	12
Turbidity (NTU)	4.95	4.13	33.5	27.5	11	3.7	123	122	58.5

(CONTINUED)

Sampling Point	GW-711	GW-712		GW-713			GW-714		
Program	CMP-E	CMP-E		CMP-E			CMP-E		
Location	EXP-W	EXP-W		EXP-W			EXP-W		
Date Sampled	07/14/96	01/26/96	07/15/96	01/28/96		07/17/96		01/29/96	07/17/96
Sample Type				DUP		DUP			
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	905.2	877.09	877.09	880.63	880.63	880.63	880.63	875.08	875.08
Depth to Water (ft)	60.80	31.85	34.62	31.98	31.98	37.15	37.15	22.37	29.45
Water-Level Elev. (ft)	844.4	845.24	842.47	848.65	848.65	843.48	843.48	852.71	845.63
Water Temp (degrees C)	15.4	13.2	15.3	11.2	12.3	16.2	15.2	7.5	17.5
pH (pH units)	7.2	7.5	7.4	7.4	7.5	7.5	7.5	7	7.1
Sp. Cond. (umho/cm)	704	713	616	573	560	480	510	433	366
Dissolved Oxygen (ppm)	1.4	0.7	0.9	0.8	0.8	2.1	2	1	9.3
Oxidation/Reduction (mV)	1	72	122	35	9	66	57	-51	82
MISCELLANEOUS PARAMETERS									
pH (pH units)	7.33	7.95	7.65	7.59	7.63	7.68	7.63	7.63	7.68
Sp. Cond. (umho/cm)	8390	659	679	585	586	589	590	477	433
TDS (mg/L)	5806	416	438	342	296	378	366	254	234
TSS (mg/L)	11.5	5	<1	5	2.5	<1	<1	1.5	11
Turbidity (NTU)	95.1	54.1	13.7	10.5	8.68	7.83	7.91	15.8	80.7

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	GW-715		GW-723		GW-724			GW-725	
Program	CMP-E		EXP		EXP			EXP	
Location	EXP-W		EXP-C		EXP-C			EXP-C	
Date Sampled	01/29/96	07/18/96	03/21/96	08/09/96	03/21/96	08/14/96		03/22/96	
Sample Type						DUP		DUP	
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	874.72	874.72	1022.2	1022.2	979.27	979.27	979.27	979.27	961.05
Depth to Water (ft)	21.31	28.55	68.81	70.45	27.50	27.50	28.22	28.22	9.64
Water-Level Elev. (ft)	853.41	846.17	953.39	951.75	951.77	951.77	951.05	951.05	951.41
Water Temp (degrees C)	12.8	14.9	11.9	16.3	12.5	12.2	16.3	15.5	13.1
pH (pH units)	6.7	6.7	7	7.5	7.5	7.4	7.3	7.5	7
Sp. Cond. (umho/cm)	513	762	486	417	862	848	861	849	1169
Dissolved Oxygen (ppm)	5.9	2.3	1.5	2.2	3.1	3	2.2	2.2	2.3
Oxidation/Reduction (mV)	222	135	152	183	149	149	121	140	67
MISCELLANEOUS PARAMETERS									
pH (pH units)	6.94	7.27	7.76	7.55	7.47	7.48	7.45	7.47	6.94
Sp. Cond. (umho/cm)	542	688	513	538	946	948	959	963	1386
TDS (mg/L)	270	394	292	316	514	554	546	534	908
TSS (mg/L)	27	5.5	8.5	21	<1	<1	<1	<1	3
Turbidity (NTU)	61.4	25.3	31.2	113	0.801	0.795	1.95	1.95	13.2

(CONTINUED)

Sampling Point	GW-725	GW-738		GW-740		GW-793		GW-794	
Program	EXP	EXP		EXP		BMP		BMP	
Location	EXP-C	EXP-C		EXP-C		AGLLSF		AGLLSF	
Date Sampled	08/13/96	03/20/96	08/08/96	03/19/96	08/07/96	03/27/96	08/26/96	03/25/96	
Sample Type							DUP		
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	961.05	983.08	983.08	1019.6	1019.6	968.18	968.18	968.18	934.17
Depth to Water (ft)	9.71	26.95	25.61	67.70	67.59	6.29	6.29	8.40	10.05
Water-Level Elev. (ft)	951.34	956.13	957.47	951.9	952.01	961.89	961.89	959.78	924.12
Water Temp (degrees C)	15.9	11.2	17	11.3	17.4	14.3	14	16.5	13.4
pH (pH units)	6.4	7.2	6.9	7.4	5.6	7.7	7.8	6.8	7.6
Sp. Cond. (umho/cm)	1126	704	585	532	411	338	332	247	523
Dissolved Oxygen (ppm)	0.8	1.4	2.2	2.5	2.4	1.5	1.1	1.7	5.4
Oxidation/Reduction (mV)	21	172	168	40	72	165	166	137	183
MISCELLANEOUS PARAMETERS									
pH (pH units)	6.93	7.18	7.11	7.5	7.41	7.3	7.31	7.23	7.49
Sp. Cond. (umho/cm)	1276	766	739	550	549	306	308	304	506
TDS (mg/L)	892	514	448	244	310	204	196	210	304
TSS (mg/L)	<1	58	6	<1	<1	<1	<1	<1	5
Turbidity (NTU)	2.52	157	33.7	2.12	2.31	1.13	1.17	0.06	21.9

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Parameters, CY 1996

Sampling Point	GW-794	GW-795		GW-828		GW-829		NT-01	
Program	BMP	BMP		SMP		SMP		EXP	
Location	AGLLSF	AGLLSF		OLF		OLF		EXP-SW	
Date Sampled	08/26/96	03/25/96	08/26/96	03/26/96	08/21/96	03/27/96	08/22/96	03/18/96	08/13/96
Sample Type									
FIELD MEASUREMENTS									
Top-of-Casing Elev. (ft)	934.17	925.98	925.98	982.92	982.92	985.78	985.78	.	.
Depth to Water (ft)	17.31	3.60	6.53	0.00	2.52	11.74	13.00	.	.
Water-Level Elev. (ft)	916.86	922.38	919.45	982.92	980.4	974.04	972.78	.	.
Water Temp (degrees C)	14.8	13.2	16.6	14.5	17.5	14.3	18	11	21.5
pH (pH units)	6	7.4	5	9.3	8.5	8.9	7.5	7.1	6.9
Sp. Cond. (umho/cm)	400	409	363	656	748	618	726	799	460
Dissolved Oxygen (ppm)	3.5	1.3	1.1	4	2.4	2.5	0.8	2	1.9
Oxidation/Reduction (mV)	155	156	146	126	161	129	189	106	153
MISCELLANEOUS PARAMETERS									
pH (pH units)	7.39	7.22	7.13	9.32	9.27	8.99	8.67	6.85	7.29
Sp. Cond. (umho/cm)	507	400	459	776	724	669	697	830	468
TDS (mg/L)	366	252	316	474	492	486	484	432	368
TSS (mg/L)	2	<1	<1	2	<1	18	698.5	7	<1
Turbidity (NTU)	12.1	2.36	0.158	60.5	7.53	13.1	44.7	8.01	13.2

(CONTINUED)

Sampling Point	SS-1		SS-4		SS-5	
Program	EXP		EXP		EXP	
Location	EXP-SW		EXP-SW		EXP-SW	
Date Sampled	03/18/96	08/13/96	03/16/96	07/30/96	03/16/96	07/29/96
Sample Type						
FIELD MEASUREMENTS						
Top-of-Casing Elev. (ft)	.	.	.	.	.	.
Depth to Water (ft)	.	.	.	.	.	.
Water-Level Elev. (ft)	.	.	.	.	.	.
Water Temp (degrees C)	12.7	18.5	12.2	17.5	12	14.5
pH (pH units)	7.4	7	6.9	6.5	7.3	7.1
Sp. Cond. (umho/cm)	1028	1035	462	591	288	456
Dissolved Oxygen (ppm)	2	3	5.7	3.5	8.5	4.1
Oxidation/Reduction (mV)	87	171	126	155	200	131
MISCELLANEOUS PARAMETERS						
pH (pH units)	7.37	7.34	7.39	7.33	7.36	7.19
Sp. Cond. (umho/cm)	1042	1115	580	611	332	484
TDS (mg/L)	656	684	112	330	194	284
TSS (mg/L)	<1	<1	<1	19	<1	1
Turbidity (NTU)	1.3	2.76	5.51	16	1.98	3.15

APPENDIX D.2

INORGANIC ANALYTES

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	BCK-00.63		BCK-03.87				BCK-04.55			
Program	EXP		EXP				EXP			
Location	EXP-SW		EXP-SW				EXP-SW			
Date Sampled	08/06/96		01/30/96		07/14/96		01/30/96		07/14/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.16	<0.02	0.24	<0.02	0.1	<0.02	0.11	<0.02	0.15	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.061	0.057	0.041	0.036	0.057	0.054	0.041	0.038	0.059	0.055
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.035	0.035	0.027	0.026	0.058	0.057	0.026	0.035	0.05	0.073
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0076
Iron	0.22	0.039	0.26	0.028	0.086	0.0077	0.18	0.011	0.17	0.0087
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	0.0012	0.0014	.	.	0.0035	0.00074	.	.	0.0014	<0.0005
Lithium	<0.004	0.0069	0.0079	0.0068	0.0065	0.0076	0.0072	0.0085	0.0089	0.0082
Manganese	0.038	0.02	0.013	0.0084	0.017	0.011	0.013	0.0085	0.045	0.014
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.11	0.1	0.05	0.047	0.072	0.07	0.052	0.05	0.071	0.069
Thallium (PMS)	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.031	0.15	0.029	0.022	0.022	0.022	0.039	0.031	0.024	0.022
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.003	0.012	0.0061	0.0042	0.0028	0.017	0.0041	0.0069	0.0025	0.026
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	45	43	29	27	46	44	30	30	45	43
Magnesium	13	12	7.8	7.2	15	14	8.5	8.3	15	15
Potassium	<0.6	0.67	1.1	1.2	1.3	1.4	1.3	0.65	1.5	1.4
Sodium	4.2	4.1	3.3	3.4	3.6	3.8	3.5	3.4	3.7	3.8
Alkalinity-HCO3	137	.	86	.	158	.	92	.	162	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	5.7	.	5.21	.	6.56	.	5.54	.	6.52	.
Fluoride	0.15	.	<0.1	.	<0.1	.	<0.1	.	0.13	.
Nitrate-N	1.13	.	1.39	.	2.52	.	1.57	.	2.77	.
Sulfate	16.8	.	9.53	.	8.06	.	9.98	.	7.62	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point Program Location Date Sampled Sample Type	BCK-07.75				BCK-09.40				BCK-10.60	
	EXP				EXP				EXP	
	EXP-SW				EXP-SW				EXP-SW	
	01/30/96		07/14/96		03/16/96		07/29/96		03/17/96	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.21	<0.02	0.12	0.028	0.15	0.028	0.48	0.022	0.28	0.022
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.055	0.053	0.082	0.08	0.082	0.082	0.088	0.084	0.095	0.094
Beryllium	<0.0003	<0.0003	0.00033	0.00065	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.097	0.082	0.15	0.11	0.085	0.2	0.13	0.15	0.046	0.043
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	0.0045	<0.004	<0.004	<0.004	0.0079	0.0085	0.012	<0.004	<0.004
Iron	0.2	0.016	0.16	0.014	0.13	0.033	0.65	0.053	0.24	<0.005
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	.	.	<0.0005	<0.0005	.	.	0.00089	<0.0005	.	.
Lithium	0.017	0.018	0.018	0.018	0.051	0.053	0.026	0.025	0.0076	0.0081
Manganese	0.014	0.0082	0.055	0.029	0.034	0.035	0.044	0.023	0.076	0.071
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.083	0.083	0.13	0.13	0.14	0.14	0.16	0.17	0.16	0.16
Thallium (PMS)	.	.	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.011	0.075	0.058	0.057	0.096	0.088	0.081	<0.0005	0.11	0.11
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0075	0.007	0.0068	0.018	0.0097	0.028	0.0076	0.063	0.0067	0.015
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	40	39	59	59	57	58	61	62	57	60
Magnesium	9.7	9.5	16	16	11	11	9.8	10	9.5	9.9
Potassium	1.2	0.69	1.7	1.8	2.8	2.2	3	3.4	2.1	1.9
Sodium	4.7	4.9	6.9	6.9	8.7	8.7	8.7	9	10	11
Alkalinity-HCO3	108	.	179	.	131	.	143	.	115	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	7.39	.	13.3	.	14.6	.	14	.	15.8	.
Fluoride	0.16	.	0.16	.	0.27	.	0.3	.	0.35	.
Nitrate-N	4.11	.	10.5	.	9.29	.	7.98	.	13.2	.
Sulfate	15.7	.	14.3	.	19.9	.	19	.	23.9	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	BCK-10.60		BCK-11.97				GW-040			
Program	EXP		EXP				CMP-B			
Location	EXP-SW		EXP-SW				BG			
Date Sampled	07/30/96		03/17/96		08/13/96		03/26/96		07/18/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.37	0.037	0.18	0.055	0.25	0.058	6.5	0.09	3	0.082
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.24
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.1	0.098	0.19	0.18	0.12	0.12	0.12	0.048	0.08	0.042
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	<0.0003	<0.0003	<0.0003
Boron	0.056	0.057	0.047	0.029	0.091	0.081	0.033	0.028	0.039	0.073
Cadmium	<0.003	<0.003	0.0034	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0069	0.0058	<0.005	<0.005
Copper	0.0059	0.011	<0.004	<0.004	0.0048	0.006	<0.004	<0.004	0.0092	0.0051
Iron	0.5	0.066	<0.005	<0.005	0.27	<0.005	6.9	0.17	4	0.12
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)			<0.004	<0.004			0.0044	<0.004		
Lead (PMS)	0.00082	<0.0005			0.00086	<0.0005			0.0044	<0.0005
Lithium	0.016	0.016	<0.004	<0.004	<0.004	<0.004	0.035	0.034	0.033	0.027
Manganese	0.048	0.039	0.54	0.53	0.21	0.2	1.1	1.1	1	0.91
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.016	0.014
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.062
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.2	0.2	0.36	0.36	0.27	0.28	0.22	0.016	0.017	0.014
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.12	0.13	0.13	0.13	0.11	0.11	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0074	<0.005	0.0068	<0.005
Zinc	0.0068	0.012	0.0094	0.011	0.0064	0.13	0.033	0.004	0.022	0.0071
IONS (mg/L)										
Calcium	66	66	130	130	91	94	6.3	6.4	5.4	5.3
Magnesium	9.7	9.8	17	17	12	12	8.1	7.4	7.2	6.6
Potassium	3.3	3.4	4	3.1	2.4	2.2	5	2.8	2.9	2
Sodium	9.9	10	39	40	21	22	12	13	11	11
Alkalinity-HCO3	143		192		180		35		38	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	13.4		72.6		24.4		2.54		1.91	
Fluoride	0.43		0.61		0.46		0.27		0.32	
Nitrate-N	7.66		42.8		15.3		<0.2		<0.2	
Sulfate	28.2		43.9		33.1		29.2		29.5	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-042				GW-043				GW-044	
	CMP-B				CMP-B				CMP-B	
Program	BG				OLF				OLF	
Location	BG				OLF				OLF	
Date Sampled	03/26/96		07/18/96		02/01/96		07/08/96		01/31/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	<0.02	<0.02	<0.02	0.53	1.2	0.049	1.1	0.33	<0.02	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.14	0.12	0.15	0.13	0.025	0.019	0.019	0.015	0.25	0.25
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.013	0.0076	0.043	0.039	0.045	0.016	0.052	0.075	0.019	0.0089
Cadmium	0.0069	0.0087	0.01	0.016	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	0.031	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	0.0083	0.0079	0.0041	<0.004	0.0054	<0.004	<0.004	<0.004
Iron	0.8	0.63	1.8	0.92	1.2	0.32	0.74	0.041	0.013	0.0066
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	<0.004	<0.004			0.0059	<0.004			<0.004	<0.004
Lead (PMS)			0.012	<0.0005			0.0039	0.00054		
Lithium	0.022	0.021	0.02	0.019	0.009	0.0076	0.0062	0.0058	0.011	0.011
Manganese	0.29	0.28	0.31	0.3	0.02	0.0044	0.017	0.0017	0.0025	<0.001
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	0.01	0.016	0.023	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Sroutium	0.016	0.016	0.015	0.015	0.039	0.039	0.029	0.032	0.074	0.074
Thallium (PMS)			<0.0005	<0.0005			<0.0005	<0.0005		
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00056	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.012	0.013	0.025	0.046	0.0094	0.0064	0.011	0.0054	0.0034	0.0037
IONS (mg/L)										
Calcium	3.8	3.7	3.6	3.5	22	22	17	18	48	49
Magnesium	4.8	4.6	4.9	4.7	4.2	3.9	3	2.8	3.2	3.2
Potassium	1.6	2.2	0.61	1.3	0.66	<0.6	0.98	1	1	0.9
Sodium	3.4	3.4	3.5	3.4	7.2	7.1	6.9	6.8	5.2	5.2
Alkalinity-HCO3	30		30		75		53		134	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	2.26		1.61		1.84		1.06		1.95	
Fluoride	0.16		0.16		<0.1		<0.1		<0.1	
Nitrate-N	<0.2		<0.2		<0.2		<0.2		<0.2	
Sulfate	5.63		6.2		9.06		9.24		7.1	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-044		GW-053				GW-056			
Program	CMP-B		SMP				EXP			
Location	OLF		BG				EXP-A			
Date Sampled	07/08/96		03/26/96		08/28/96		03/14/96		07/23/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.035	0.082	0.088	<0.02	0.1	0.035	0.099	0.02	0.32	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.25	0.24	0.22	0.22	0.22	0.22	0.1	0.1	0.092	0.091
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.034	0.023	0.27	0.25	0.29	0.29	0.056	0.033	0.042	0.03
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	0.1	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	<0.005	<0.005	0.56	0.059	0.45	0.14	0.76	0.31	3.4	0.14
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)										
Lead (PMS)	<0.0005	<0.0005			0.0026	0.0023			0.0022	0.0007
Lithium	0.0062	0.0084	0.35	0.35	0.42	0.42	<0.004	<0.004	0.0059	0.0054
Manganese	0.0042	<0.001	0.087	0.085	0.089	0.1	0.3	0.3	0.098	0.08
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	0.02	0.018	0.025	0.023	0.12	0.11	0.61	0.59
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.073	0.07	0.43	0.44	0.41	0.41	0.16	0.16	0.15	0.16
Thallium (PMS)	<0.0005	<0.0005			0.00053	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	0.0015	0.0014	0.002	0.0022	0.0027	0.0026	0.0024	0.0024
Vanadium	<0.005	0.0053	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	<0.002	0.0027	0.011	0.0066	0.0032	0.07	0.0077	<0.002	0.011	0.0054
IONS (mg/L)										
Calcium	45	44	130	130	120	120	98	99	90	95
Magnesium	3.2	3	15	15	15	15	19	19	17	18
Potassium	<0.6	1	2.4	2.4	1.9	2.6	1.5	1.7	1.9	1.8
Sodium	5.4	5	7.9	7.9	8.3	8.5	71	72	59	63
Alkalinity-HCO3	135		316		321		266		267	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	1.04		25.6		27.3		122		125	
Fluoride	<0.1		<0.1		<0.1		0.11		0.12	
Nitrate-N	<0.2		<0.2		<0.03		<0.2		0.31	
Sulfate	7.45		23.3		22.6		30.6		30.6	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-069				GW-079				GW-080	
	CMP-C		CMP-C		CMP-B		CMP-B		CMP-B	
Location	BG		BG		BG		BG		BG	
Date Sampled	02/25/96		07/23/96		02/25/96		07/24/96		02/24/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.021	<0.02	<0.02	0.024	0.023	0.022	1.3	0.045	12	0.11
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.26	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.37	0.34	0.36	0.36	0.14	0.14	0.2	0.17	0.16	0.018
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0004	<0.0003
Boron	0.13	0.12	0.11	0.13	0.012	0.029	0.0094	0.041	0.025	0.019
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0042	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.028	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.013	<0.005
Copper	<0.004	<0.004	0.0066	0.0051	<0.004	<0.004	0.0045	0.0058	0.053	<0.004
Iron	0.016	0.021	0.035	0.04	0.036	0.0091	1.4	0.018	20	0.23
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	<0.004	<0.004	.	.	<0.004	<0.004	.	.	0.025	<0.004
Lead (PMS)	.	.	0.00061	0.0022	.	.	0.0027	<0.0005	.	.
Lithium	0.042	0.039	0.039	0.039	0.0061	0.0058	0.0088	0.0052	0.026	0.01
Manganese	0.0046	0.004	0.0089	0.0084	0.047	0.046	0.06	0.047	0.14	0.075
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.031	0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.051	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.015	<0.006
Strontium	0.86	0.78	0.76	0.78	0.13	0.12	0.12	0.12	0.03	0.015
Thallium (PMS)	.	.	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.016	<0.005
Zinc	0.005	0.0064	0.002	0.005	0.0061	0.0048	0.046	0.018	0.074	0.011
IONS (mg/L)										
Calcium	12	11	11	11	37	35	36	35	4.8	4
Magnesium	5.3	4.9	5.1	5.3	3.6	3.4	4	3.7	7.9	4.5
Potassium	4.4	4.2	4.8	4	1.1	1	1.2	0.8	4.3	1.4
Sodium	66	61	61	61	4.3	4.2	4.5	4.6	9.9	9.9
Alkalinity-HCO3	139	.	139	.	110	.	114	.	37	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	38	.	50.8	.	1.65	.	<1	.	1.76	.
Fluoride	<0.1	.	0.11	.	<0.1	.	0.13	.	0.14	.
Nitrate-N	<0.2	.	<0.2	.	<0.2	.	<0.2	.	<0.2	.
Sulfate	2.7	.	2.48	.	7.18	.	8.01	.	13.3	.

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APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-080		GW-084				GW-085			
	CMP-B		CMP-B				SMP			
Program	BG		OLF				OLF			
Location	BG		OLF				OLF			
Date Sampled	07/24/96		02/01/96		07/08/96		03/25/96		08/20/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	2.6	0.039	0.72	<0.02	0.91	0.03	0.38	0.023	0.38	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.054	0.024	0.18	0.16	0.17	0.16	0.74	0.82	0.69	0.69
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.025	0.032	0.0084	0.012	0.024	0.019	0.019	0.0089	<0.004	<0.004
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	0.026	0.021	<0.004	<0.004	0.0052	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	3.8	0.23	0.9	0.0061	1	<0.005	0.32	<0.005	0.18	<0.005
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)			<0.004	<0.004						
Lead (PMS)	0.007	0.00051			0.0017	<0.0005			0.0018	0.0015
Lithium	0.013	0.0083	0.0093	0.0091	0.0087	0.0076	0.02	0.019	0.014	0.014
Manganese	0.082	0.08	0.053	0.0089	0.052	0.0044	0.013	0.001	0.015	<0.001
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	0.017	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	0.0066	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.017	0.016	0.079	0.076	0.076	0.075	0.64	0.71	0.57	0.57
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	0.0051	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.028	0.017	0.0051	<0.002	0.0072	<0.002	0.0032	<0.002	0.0034	<0.002
IONS (mg/L)										
Calcium	3.8	4.2	57	55	54	53	280	310	270	270
Magnesium	4.9	4.8	4.3	4	4.2	3.9	19	21	17	17
Potassium	3.3	1.7	0.96	0.75	1.5	<0.6	2.8	2.5	2.1	1.6
Sodium	9.3	12	5.6	5.6	5.4	5.4	10	12	9.8	9.9
Alkalinity-HCO3	35		155		157		150		150	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	<1		1.92		<1		10.3		9.96	
Fluoride	0.19		<0.1		<0.1		<0.1		<0.1	
Nitrate-N	<0.2		<0.2		<0.2		184		144	
Sulfate	17.3		7.39		8.4		5.21		5.64	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-095						GW-115			
	SMP						CMP-B			
Program	BG						S3			
Location	BG						S3			
Date Sampled	03/26/96		08/27/96				01/31/96		07/02/96	
Sample Type	DUP									
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.021	0.026	0.078	0.026	0.026	0.052	<0.02	0.034	0.026	0.021
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.025	0.025	0.026	0.025	0.025	0.022	0.23	0.24	0.22	0.22
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.9	0.93	0.92	0.94	0.95	0.88	0.099	0.018	0.032	0.021
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	0.0089	<0.004	<0.004	0.0047	<0.004	<0.004	<0.004	<0.004
Iron	0.013	<0.005	0.12	<0.005	0.026	0.019	0.19	0.27	0.42	0.41
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	<0.004	<0.004	.	.
Lead (PMS)	.	.	0.00087	0.0016	0.00071	<0.0005	.	.	<0.0005	<0.0005
Lithium	0.067	0.068	0.07	0.067	0.071	0.062	0.017	0.016	0.015	0.013
Manganese	0.0013	0.0012	0.0023	0.0015	0.0012	0.0026	0.23	0.23	0.39	0.39
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.1	0.1	0.097	0.094	0.1	0.09	0.13	0.13	0.12	0.13
Thallium (PMS)	.	.	<0.0005	<0.0005	<0.0005	<0.0005	.	.	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0065	0.0049	0.0098	0.0045	<0.002	0.0029	0.0084	0.0078	0.003	<0.002
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	1.4	1.3	1.8	1.3	1.3	1.3	79	82	74	74
Magnesium	0.5	0.49	0.51	0.46	0.48	0.45	12	12	12	12
Potassium	2.2	2.1	2.3	1.9	2.4	1.7	1.5	1.6	1.6	2.2
Sodium	120	120	120	120	120	110	10	10	10	10
Alkalinity-HCO3	217	.	231	.	218	.	234	.	238	.
Alkalinity-CO3	30	.	32	.	30	.	<1	.	<1	.
Chloride	2.22	.	1.47	.	1.4	.	6.34	.	9.18	.
Fluoride	0.51	.	0.58	.	0.58	.	<0.1	.	<0.1	.
Nitrate-N	<0.2	.	0.03	.	0.03	.	0.27	.	<2	.
Sulfate	8.29	.	8.79	.	8.8	.	19	.	19.2	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-162				GW-276				GW-287	
	CMP-B		CMP-C		CMP-C		SMP			
Program	BG		S3		S3		BG			
Location	BG		S3		S3		BG			
Date Sampled	02/26/96		07/24/96		02/29/96		07/08/96		03/26/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.17	<0.02	0.11	<0.02	11	11	13	13	2.4	0.047
Antimony	<0.05	<0.05	0.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.29	0.24	0.31	0.28	0.5	0.48	0.52	0.49	0.14	0.14
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	0.009	0.0088	0.0094	0.0092	<0.0003	<0.0003
Boron	0.056	0.046	0.07	0.068	0.048	0.18	0.041	0.033	0.021	0.045
Cadmium	<0.003	<0.003	<0.003	<0.003	0.045	0.044	0.047	0.047	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.13	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	0.19	0.18	0.18	0.18	<0.005	<0.005
Copper	<0.004	<0.004	0.007	<0.004	<0.004	<0.004	0.03	0.028	<0.004	<0.004
Iron	0.86	0.018	4.1	0.081	<0.005	<0.005	0.37	<0.005	1.5	0.042
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	<0.004	<0.004			<0.004	<0.004				
Lead (PMS)			0.0039	<0.0005			0.0032	0.0024		
Lithium	0.042	0.037	0.039	0.033	0.025	0.023	0.033	0.032	0.0092	0.0087
Manganese	0.11	0.068	0.14	0.12	8.6	8.4	8.8	8.7	0.034	0.0066
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	0.5	0.48	0.51	0.5	0.084	0.018
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	0.0075	<0.006	<0.006	<0.006	<0.006
Strontium	0.86	0.77	0.79	0.76	0.35	0.35	0.32	0.32	0.087	0.098
Thallium (PMS)			<0.0005	<0.0005			<0.0005	<0.0005		
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	1.9	1.6	1.2	1.1	<0.00052	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0059	<0.005	<0.005	<0.005
Zinc	0.0024	0.0025	0.0072	0.0082	0.13	0.13	0.14	0.14	0.041	0.05
IONS (mg/L)										
Calcium	34	31	32	30	150	150	130	130	44	41
Magnesium	5.2	4.6	5.3	5.1	27	26	26	25	7.2	7.8
Potassium	3	2.7	4.1	3.1	11	11	14	13	1.5	1.5
Sodium	15	13	15	14	84	82	85	85	3.8	3.9
Alkalinity-HCO3	131		127		<1		<1		127	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	3.15		3.21		187		192		3.27	
Fluoride	<0.1		0.11		0.46		4.87		0.12	
Nitrate-N	<0.2		<0.2		129		129		<0.2	
Sulfate	8.7		9.77		30.4		40.1		6.21	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-287		GW-311				GW-315			
	SMP		SMP				SMP			
Program	BG		RS				SPI			
Location	BG		RS				SPI			
Date Sampled	08/27/96		03/25/96		08/14/96		03/26/96			
Sample Type							DUP			
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	1.9	0.09	0.022	<0.02	<0.02	<0.02	<0.02	<0.02	0.025	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	0.057	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.13	0.12	0.019	0.018	0.017	0.017	0.058	0.063	0.061	0.063
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.065	0.014	<0.004	<0.004	<0.004	<0.004	0.027	0.014	0.013	0.0083
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	0.043	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.7	0.038	0.023	<0.005	<0.005	<0.005	0.04	0.009	0.015	0.0075
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	0.0019	<0.0005	.	.	0.0039	<0.0005	.	.	.	.
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	0.018	0.0076	<0.001	<0.001	0.0029	0.0017	<0.001	<0.001	<0.001	<0.001
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	0.01	0.017	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.088	0.082	0.073	0.07	0.065	0.063	0.2	0.22	0.21	0.22
Thallium (PMS)	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.	.	.
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0019	0.0018	0.00059
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.022	0.019	0.0082	0.007	0.0062	0.0043	0.0041	0.0044	0.003	0.0047
IONS (mg/L)										
Calcium	45	39	79	76	79	78	120	130	120	130
Magnesium	5.7	5.7	5.9	5.7	5.1	5.1	13	14	14	14
Potassium	1.9	1.9	1.8	1.5	<0.6	1.4	4.3	4.3	3.9	4.4
Sodium	4.5	4.5	2.7	2.6	2.2	2.2	6.6	7	6.9	7.2
Alkalinity-HCO3	136	.	220	.	210	.	236	.	250	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	2.79	.	2.48	.	1.88	.	10.1	.	10.4	.
Fluoride	0.18	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.03	.	0.34	.	0.27	.	7.95	.	8.09	.
Sulfate	6.1	.	3.16	.	2.81	.	91.3	.	90.3	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-315				GW-363					
	SMP				CMP-C					
Location	SPI				OLF					
Date Sampled	08/19/96				02/12/96			07/02/96		
Sample Type	DUP				DUP					
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	<0.02	<0.02	0.5	0.034	0.16	0.055	0.49	0.037
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.056	0.055	0.055	0.055	0.06	0.05	0.05	0.054	0.066	0.058
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	<0.004	<0.004	<0.004	<0.004	0.34	0.31	0.33	0.28	0.29	0.28
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	0.0044	<0.004	0.0044	<0.004	<0.004
Iron	<0.005	<0.005	<0.005	<0.005	0.89	0.069	2.6	0.17	1.2	0.086
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	<0.004	<0.004	<0.004	<0.004	.	.
Lead (PMS)	<0.0005	0.0027	<0.0005	<0.0005	.	.	.	.	<0.0005	0.00098
Lithium	<0.004	<0.004	<0.004	<0.004	0.039	0.036	0.038	0.035	0.037	0.036
Manganese	<0.001	<0.001	0.0018	<0.001	0.0053	<0.001	0.007	<0.001	0.0082	<0.001
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.19	0.19	0.19	0.18	0.08	0.075	0.066	0.087	0.085	0.084
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	.	.	.	.	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.0018	0.0019	0.0019	0.0018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	0.0056	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0032	0.0055	0.004	0.0064	0.013	0.0091	0.0092	0.069	0.0054	<0.002
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	120	120	120	120	2.1	1.8	1.5	2.2	2.3	2
Magnesium	13	13	13	13	0.88	0.74	0.62	0.98	1	0.85
Potassium	3.3	3.4	3	3.3	1.8	1.4	1.4	1.7	2	2
Sodium	6.5	6.5	6.4	6.4	110	100	110	97	97	96
Alkalinity-HCO3	243	.	250	.	199	.	198	.	196	.
Alkalinity-CO3	<1	.	<1	.	34	.	34	.	38	.
Chloride	11.7	.	11	.	1.77	.	1.74	.	<1	.
Fluoride	<0.1	.	<0.1	.	0.2	.	0.2	.	0.2	.
Nitrate-N	8.56	.	8.44	.	<0.2	.	<0.2	.	<2	.
Sulfate	57.2	.	58.4	.	7.78	.	7.84	.	8.72	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-363				GW-372					
	CMP-C		CMP-B							
Location	OLF		BG							
Date Sampled	07/02/96		02/25/96				07/23/96			
Sample Type	DUP		DUP		DUP		DUP			
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.1	0.052	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.027	0.04
Antimony	<0.05	<0.05	<0.05	0.062	<0.05	<0.05	<0.05	0.15	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.067	0.06	0.066	0.067	0.069	0.065	0.065	0.067	0.068	0.068
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.2	0.3	0.033	0.027	0.031	0.021	0.053	0.037	0.13	0.077
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0051	0.0043	0.005	<0.004
Iron	0.74	0.082	0.15	0.13	0.14	0.12	0.12	0.11	0.12	0.099
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	<0.004	<0.004	<0.004	<0.004	.	.	.	.
Lead (PMS)	0.0011	<0.0005	.	.	.	.	<0.0005	<0.0005	0.00079	0.018
Lithium	0.036	0.035	0.015	0.015	0.015	0.015	0.012	0.017	0.014	0.011
Manganese	0.0056	0.0015	0.027	0.025	0.026	0.024	0.02	0.02	0.021	0.021
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.0073	<0.006	<0.006
Strontium	0.093	0.087	0.17	0.18	0.18	0.17	0.15	0.15	0.15	0.15
Thallium (PMS)	<0.0005	<0.0005	.	.	.	.	<0.0005	<0.0005	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0051	0.0054	0.0037	0.0062	0.004	0.0048	0.0027	0.0073	0.004	0.0025
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	2.6	2.1	62	63	64	60	53	54	54	55
Magnesium	1	0.88	11	11	11	11	10	10	10	11
Potassium	1.5	2.1	1.8	1.8	1.8	1.7	1.8	2	1.8	1.8
Sodium	97	98	9	9.1	9.4	8.8	8.7	8.9	8.9	9.3
Alkalinity-HCO3	204	.	180	.	181	.	176	.	181	.
Alkalinity-CO3	38	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.08	.	2.4	.	2.4	.	1.93	.	1.97	.
Fluoride	0.25	.	0.14	.	0.15	.	0.19	.	0.18	.
Nitrate-N	<2	.	<0.2	.	0.25	.	<0.2	.	<0.2	.
Sulfate	8.36	.	28	.	27.8	.	29.5	.	28.5	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point Program Location Date Sampled Sample Type	GW-373				GW-521				GW-537	
	CMP-B		CMP-B		CMP-B		CMP-B		SMP	
	BG		LIV		LIV		LIV		OLF	
	02/28/96		07/25/96		01/16/96		07/02/96		03/25/96	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.8	0.06	0.14	0.022	0.57	0.17	0.25	<0.02	0.13	0.06
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
Barium	0.05	0.039	0.046	0.04	0.0094	0.0089	0.008	0.0074	2.7	2.5
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0006	<0.0006
Boron	0.17	0.18	0.2	0.21	0.018	0.026	0.014	0.013	<0.008	0.016
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.006	<0.006
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
Copper	<0.004	<0.004	0.0076	0.01	<0.004	<0.004	<0.004	<0.004	<0.008	<0.008
Iron	1.6	0.07	0.66	0.074	0.43	<0.005	0.26	0.023	0.12	<0.1
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
Lead (AAS)	<0.004	<0.004			<0.004	<0.004				
Lead (PMS)			0.005	<0.0005			0.0017	<0.0005		
Lithium	0.033	0.032	0.035	0.032	<0.004	<0.004	<0.004	<0.004	0.042	0.04
Manganese	0.012	0.002	0.0074	0.0032	0.011	0.012	0.0093	0.0011	0.006	<0.002
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
Selenium	<0.05	<0.05	0.065	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
Silver	<0.006	<0.006	0.011	<0.006	<0.006	<0.006	<0.006	<0.006	<0.012	<0.012
Strontium	0.064	0.061	0.061	0.06	0.011	0.011	0.01	0.0097	3.1	2.9
Thallium (PMS)			<0.0005	<0.0005			<0.0005	<0.0005		
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.4
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.0013
Vanadium	<0.005	<0.005	0.0057	<0.005	<0.005	<0.005	0.0054	<0.005	<0.01	<0.01
Zinc	0.005	0.0029	0.0042	0.0026	0.015	0.0051	0.012	0.0048	<0.004	0.0052
IONS (mg/L)										
Calcium	1.4	1.2	1.2	1.1	32	31	31	30	1200	1100
Magnesium	0.31	0.12	0.15	0.12	20	20	19	18	83	76
Potassium	1.1	0.92	2.7	2.5	0.66	0.66	<0.6	0.68	5.1	4.1
Sodium	110	110	110	110	0.92	0.88	0.72	0.79	38	36
Alkalinity-HCO3	193		197		153		148		289	
Alkalinity-CO3	36		30		<1		<1		<1	
Chloride	2.12		1.5		1.82		1.31		34.4	
Fluoride	1.4		1.46		<0.1		<0.1		<0.1	
Nitrate-N	<0.2		<0.2		0.44		0.29		780	
Sulfate	28.9		31.5		1.36		2.33		4.46	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point Program Location Date Sampled Sample Type	GW-537		GW-613				GW-614			
	SMP		CMP-B				CMP-B			
	OLF		S3				S3			
	08/20/96		01/31/96		07/01/96		02/12/96		07/01/96	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.072	<0.04	<0.02	<0.02	<0.02	<0.02	0.36	<0.02	0.056	0.04
Antimony	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	2.3	2.3	0.056	0.058	0.056	0.057	0.14	0.14	0.15	0.15
Beryllium	<0.0006	<0.0006	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.019	<0.008	0.019	0.039	0.006	0.014	0.075	0.028	0.028	0.072
Cadmium	<0.006	<0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.008	<0.008	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	<0.01	<0.01	0.0065	<0.005	<0.005	<0.005	0.71	0.1	0.05	0.026
Lead	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)			<0.004	<0.004			<0.004	<0.004		
Lead (PMS)	<0.0005	0.00083			0.0007	<0.0005			<0.0005	<0.0005
Lithium	0.039	0.034	0.006	0.0048	0.0063	0.0053	0.011	0.011	0.011	0.011
Manganese	0.0039	0.0022	<0.001	<0.001	<0.001	<0.001	0.016	0.014	0.014	0.014
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.012	0.012	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	2.7	2.7	0.044	0.045	0.045	0.046	0.53	0.54	0.56	0.55
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.4	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.0012	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	<0.004	<0.004	0.0071	0.0051	<0.002	0.0037	0.0076	0.0058	0.0056	0.0078
IONS (mg/L)										
Calcium	1100	1100	28	29	28	29	45	45	47	46
Magnesium	70	71	2.8	2.9	2.8	2.8	9.3	9.4	9.9	9.7
Potassium	4.4	3.9	<0.6	<0.6	0.67	1.2	1.6	1.8	2	2.2
Sodium	32	33	3.4	3.6	3.3	3.4	9.4	9.6	9.7	9.5
Alkalinity-HCO3	270		85		94		171		174	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	35.2		1.8		1.2		1.65		<1	
Fluoride	<0.1		<0.1		0.11		<0.1		<0.1	
Nitrate-N	730		<0.2		<2		<0.2		<2	
Sulfate	4.34		5.68		6.44		12.1		12.3	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point Program Location Date Sampled Sample Type	GW-621								GW-627	
	EXP								SMP	
	EXP-B								BG	
	03/14/96				07/23/96				03/28/96	
	DUP				DUP				TOT	DIS
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS		
METALS (mg/L)										
Aluminum	1.4	<0.02	1.1	0.022	0.71	0.13	0.7	<0.02	0.039	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.028	0.019	0.026	0.019	0.03	0.022	0.032	0.022	0.047	0.047
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.022	0.022	0.017	0.064	0.036	0.038	0.027	0.038	0.55	0.52
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	0.032	<0.01	0.034	<0.01	0.03	<0.01	0.032	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	1.4	<0.005	1.2	<0.005	1.2	0.023	1.3	0.0082	0.095	0.022
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	.	.	.	.	0.0018	0.0008	0.0017	0.0019	.	.
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.087	0.086
Manganese	0.099	<0.001	0.083	<0.001	0.11	<0.001	0.14	<0.001	0.0043	0.0034
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	0.033	<0.01	0.037	<0.01	0.025	<0.01	0.033	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.064	0.065	0.061	0.061	0.073	0.072	0.073	0.072	0.082	0.082
Thallium (PMS)	.	.	.	.	<0.0005	<0.0005	<0.0005	<0.0005	.	.
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.0022	0.0021	0.0022	0.002	0.0062	0.0058	0.006	0.006	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0057	0.0024	0.0052	0.0033	0.0076	0.0026	0.0094	<0.002	0.017	0.0078
IONS (mg/L)										
Calcium	56	58	55	55	60	60	61	59	1	0.96
Magnesium	11	11	10	10	11	11	11	11	0.23	0.22
Potassium	1.4	1	1.3	1.1	1.3	1.1	1.2	1.1	1.7	1.7
Sodium	2	2	1.9	2	3.7	3.6	3.5	3.5	310	310
Alkalinity-HCO3	169	.	165	.	175	.	182	.	503	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	68	.
Chloride	3.89	.	3.81	.	7.98	.	7.58	.	29.9	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	5	.
Nitrate-N	4.45	.	4.43	.	5.47	.	5.24	.	<0.2	.
Sulfate	3.84	.	3.85	.	8.42	.	7.59	.	30.9	.

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APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-627		GW-642				GW-653			
	SMP		CMP-B		SMP		SMP			
Location	BG		BG		BG		BG			
Date Sampled	09/06/96		02/24/96		07/09/96		03/26/96		08/28/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.063	0.049	0.035	<0.02	<0.02	<0.02	0.52	<0.02	1.5	0.036
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.038	0.036	0.14	0.13	0.14	0.14	0.044	0.034	0.06	0.032
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.47	0.52	0.022	0.019	0.021	0.017	0.022	0.031	0.091	0.029
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.59	0.089	5	3.8	3.6	3.6	0.46	0.029	0.98	0.041
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)			<0.004	<0.004						
Lead (PMS)	0.0023	0.0037			0.0018	0.002			0.0022	<0.0005
Lithium	0.09	0.091	0.038	0.037	0.039	0.039	<0.004	<0.004	<0.004	<0.004
Manganese	0.013	0.0076	1.4	1.3	1.3	1.3	0.022	0.002	0.041	0.0029
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	0.0098	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.077	0.077	0.025	0.024	0.024	0.024	0.02	0.019	0.024	0.019
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.011	0.0036	0.0097	0.0059	0.0051	0.014	0.013	0.012	0.017	0.012
IONS (mg/L)										
Calcium	1.1	1.2	8	7.8	7.6	7.7	2.2	2.2	2.4	2.1
Magnesium	0.22	0.24	8.5	7.6	8.5	8.6	1.3	1.2	1.5	1.2
Potassium	0.81	0.74	3.1	2.9	1.7	2.2	0.8	0.72	1.8	0.88
Sodium	310	310	7.7	7.3	7.5	7.6	2.6	2.5	4.6	2.9
Alkalinity-HCO3	511		65		65		13		14	
Alkalinity-CO3	80		<1		<1		<1		<1	
Chloride	20.7		2.13		1.4		1.8		0.88	
Fluoride	5.32		0.35		0.47		<0.1		<0.1	
Nitrate-N	<0.03		<0.2		<0.2		<0.2		<0.03	
Sulfate	31.6		9.74		11		2.32		2.68	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point Program Location Date Sampled Sample Type	GW-683				GW-684				GW-685	
	EXP		EXP		EXP		EXP		EXP	
	EXP-A		EXP-A		EXP-A		EXP-A		EXP-A	
	03/15/96	07/29/96	03/16/96	07/29/96	03/15/96	07/29/96	03/15/96			
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	0.025	0.033	<0.02	0.61	<0.02	0.43	0.045	0.45	0.025
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.054	0.055	0.088	0.086	0.079	0.079	0.094	0.1	0.11	0.095
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.025	0.026	0.069	0.061	0.037	0.051	0.073	0.07	0.029	0.057
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	0.0044	0.0072	0.0041	<0.004	0.0054	0.0065	<0.004	<0.004
Iron	0.0056	<0.005	0.13	0.015	0.37	<0.005	0.39	0.12	1.5	<0.005
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	.	.	0.0016	0.00051	.	.	0.0017	<0.0005	.	.
Lithium	<0.004	<0.004	0.0055	0.0076	0.018	0.016	0.017	0.018	0.0075	0.0079
Manganese	<0.001	<0.001	0.0026	0.0011	0.0098	0.005	0.0093	0.0081	0.14	0.054
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.057	0.058	0.12	0.12	0.094	0.096	0.12	0.13	0.12	0.11
Thallium (PMS)	.	.	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.024	0.024	0.051	0.053	0.022	0.022	0.041	0.042	0.0037	0.0035
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0054	<0.005	<0.005
Zinc	0.0074	0.012	0.022	0.02	0.02	0.022	0.023	0.015	0.022	0.0087
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	40	40	65	64	42	43	58	61	82	80
Magnesium	14	14	17	16	14	15	16	18	25	24
Potassium	1.7	1.5	1.1	1.8	9.3	9.1	6.6	8.3	2.6	2.2
Sodium	3.8	4	7.5	7.4	5.3	5.4	7.3	8.5	27	27
Alkalinity-HCO3	141	.	186	.	150	.	177	.	274	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	6.65	.	14.3	.	11.3	.	19.7	.	57.7	.
Fluoride	0.12	.	0.18	.	0.16	.	0.2	.	<0.1	.
Nitrate-N	14.5	.	9.6	.	3.68	.	9.02	.	1.9	.
Sulfate	9.23	.	15.6	.	9.91	.	14.2	.	20.8	.

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APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point Program Location Date Sampled Sample Type	GW-685		GW-694				GW-695			
	EXP		EXP				EXP			
	EXP-A		EXP-B				EXP-B			
	07/25/96		03/18/96		08/01/96		03/14/96		07/23/96	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.38	<0.02	0.054	0.03	0.74	<0.02	1.2	0.025	0.27	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.1	0.091	0.1	0.092	0.097	0.082	0.03	0.027	0.033	0.03
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.058	0.045	0.083	0.095	0.078	0.036	0.049	0.035	0.053	0.045
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	0.015	0.019	0.012
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	0.069	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	4.5	0.012	0.31	<0.005	1.4	0.081	0.41	<0.005	0.14	0.0084
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	0.0028	0.00076	.	.	0.0012	0.00089	.	.	0.00098	0.0028
Lithium	0.0072	0.0072	0.017	0.014	0.015	0.012	0.013	0.012	0.013	0.012
Manganese	0.12	0.053	0.076	0.065	0.11	0.014	0.002	<0.001	0.0017	<0.001
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.12	0.12	0.18	0.17	0.13	0.12	0.06	0.055	0.067	0.063
Thallium (PMS)	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.0046	0.0041	0.12	0.12	0.062	0.058	0.0027	0.0016	0.0017	0.0013
Vanadium	<0.005	<0.005	<0.005	<0.005	0.0059	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.032	0.0069	0.044	0.042	0.12	0.0034	0.0059	<0.002	0.0079	0.0054
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	79	79	79	74	58	53	37	35	43	40
Magnesium	23	23	16	15	14	12	19	18	21	19
Potassium	1.7	1.9	2.6	2.5	2.4	1.8	7.3	7.1	5.3	4.9
Sodium	24	24	13	12	8.7	7.8	31	29	21	20
Alkalinity-HCO3	260	.	205	.	155	.	199	.	193	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	59.2	.	23.7	.	15.3	.	8.95	.	10	.
Fluoride	0.11	.	0.4	.	0.33	.	0.12	.	0.12	.
Nitrate-N	2.67	.	13.2	.	3.57	.	8.64	.	8.99	.
Sulfate	21.4	.	25.7	.	16.1	.	9.81	.	11	.

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APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-703				GW-704				GW-706	
	EXP		EXP		EXP		EXP		EXP	
Program	EXP-B				EXP-B				EXP-B	
Location	EXP-B				EXP-B				EXP-B	
Date Sampled	03/16/96		07/31/96		03/17/96		08/01/96		03/19/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.033	<0.02	<0.02	<0.02	0.029	0.023	0.034	<0.02	0.032	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.072	0.075	0.08	0.07	0.094	0.091	0.1	0.093	0.1	0.1
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.074	0.094	0.11	0.082	0.087	0.073	0.076	0.082	0.075	0.072
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0048	<0.004	<0.004	<0.004
Iron	0.23	<0.005	0.38	<0.005	4.3	0.045	3.8	0.028	0.78	<0.005
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	.	.	0.001	<0.0005	.	.	<0.0005	<0.0005	.	.
Lithium	0.015	0.014	0.018	0.015	0.018	0.017	0.018	0.018	0.018	0.017
Manganese	0.022	0.016	0.025	0.028	0.026	0.012	0.022	0.01	0.023	0.016
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.058	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.22	0.23	0.24	0.24	0.42	0.43	0.44	0.45	0.2	0.21
Thallium (PMS)	.	.	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.0035	0.0034	0.0043	0.0052	0.0012	0.0012	0.0011	0.001	0.12	0.12
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0076	0.0096	0.0037	0.0047	0.01	0.012	0.01	0.003	0.0082	0.0079
IONS (mg/L)										
Calcium	66	70	74	72	65	67	68	69	82	83
Magnesium	30	32	34	33	32	33	34	34	17	18
Potassium	2.4	1.7	1.6	2.9	2	2	1.5	2	3.2	3.2
Sodium	10	11	11	11	14	14	14	14	13	13
Alkalinity-HCO3	211	.	215	.	210	.	209	.	198	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	18.6	.	19.6	.	26.3	.	27.3	.	24.4	.
Fluoride	0.17	.	0.19	.	0.19	.	0.21	.	0.38	.
Nitrate-N	19.3	.	17.5	.	17.5	.	16.5	.	15.2	.
Sulfate	22.7	.	23.5	.	23.1	.	22.2	.	25.6	.

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APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-706		GW-710				GW-711			
	EXP		CMP-E		CMP-E		CMP-E			
Location	EXP-B		EXP-W		EXP-W		EXP-W			
Date Sampled	08/06/96		01/29/96		07/16/96		01/26/96		07/14/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.033	<0.02	<0.04	0.041	0.043	0.081	<0.1	<0.1	0.13	2.4
Antimony	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1
Arsenic	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1
Barium	0.13	0.13	0.0024	0.004	0.0051	0.0057	0.0094	0.0078	0.01	0.013
Beryllium	<0.0003	<0.0003	<0.0006	<0.0006	<0.0006	<0.0006	<0.0015	<0.0015	<0.0006	0.002
Boron	0.093	0.11	0.33	0.35	0.29	0.29	1.2	1.3	1.3	1.3
Cadmium	<0.003	<0.003	<0.006	<0.006	0.0066	<0.006	<0.015	<0.015	<0.006	<0.006
Chromium	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02
Cobalt	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	<0.025	<0.025	<0.01	<0.01
Copper	0.0042	<0.004	<0.008	<0.008	<0.008	<0.008	<0.02	<0.02	<0.008	<0.008
Iron	0.22	0.059	25	17	21	6.2	9.9	6.9	9.4	9
Lead	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1
Lead (AAS)			<0.004	<0.004			<0.004	<0.004		
Lead (PMS)	0.00068	<0.0005			0.0016	<0.0005			0.0012	<0.0005
Lithium	0.018	0.02	0.14	0.15	0.14	0.15	0.7	0.74	0.75	0.72
Manganese	0.015	0.013	0.63	0.64	0.43	0.4	0.056	0.041	0.059	0.057
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02
Nickel	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02
Selenium	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1
Silver	<0.006	<0.006	<0.012	<0.012	<0.012	<0.012	<0.03	<0.03	<0.012	<0.012
Strontium	0.26	0.25	8	8.3	7.9	8.1	12	13	13	13
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.4	<0.4	<0.4	<0.4	<1	<1	<0.4	<0.4
Uranium (PMS)	0.13	0.12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	<0.025	<0.025	<0.01	0.011
Zinc	0.0034	0.002	<0.004	<0.004	0.0048	0.0042	<0.01	<0.01	<0.004	0.033
IONS (mg/L)										
Calcium	95	94	500	530	520	530	490	530	490	480
Magnesium	20	20	180	190	180	180	230	250	210	210
Potassium	3.3	3.6	10	11	10	10	21	21	24	22
Sodium	15	14	230	240	210	210	1100	1200	1100	1100
Alkalinity-HCO3	220		91		121		156		160	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	22.6		346		388		1720		2130	
Fluoride	0.4		1.14		1.43		1.61		1.7	
Nitrate-N	16.8		<2		<2.8		<20		<2.8	
Sulfate	27.4		1900		2380		1740		2650	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-712				GW-713					
	CMP-E		EXP-W		CMP-E		EXP-W			
Program	EXP-W				EXP-W					
Location	EXP-W				EXP-W					
Date Sampled	01/26/96		07/15/96		01/28/96		07/17/96			
Sample Type	DUP									
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	0.026	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.045	0.044	0.051	0.054	0.051	0.052	0.047	0.046	0.053	0.054
Beryllium	<0.0003	<0.0003	0.0083	0.0099	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.11	0.099	0.099	0.11	0.12	0.1	0.092	0.083	0.033	0.14
Cadmium	<0.003	<0.003	0.0076	0.0098	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	0.0071	0.0057	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	0.0099	0.0076	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	4.9	0.32	0.99	0.36	1	0.5	0.79	0.44	1	0.55
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	<0.004	<0.004	.	.	<0.004	<0.004	<0.004	<0.004	.	.
Lead (PMS)	.	.	0.00067	<0.0005	.	.	.	.	0.0013	0.0035
Lithium	0.014	0.013	0.021	0.023	0.013	0.013	0.014	0.012	0.01	0.016
Manganese	0.028	0.017	0.031	0.033	0.013	0.012	0.011	0.011	0.013	0.0098
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	0.0083	0.0081	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	1.2	1.2	1.2	1.3	1.6	1.7	1.6	1.6	1.7	1.8
Thallium (PMS)	.	.	<0.0005	<0.0005	.	.	.	.	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.0006	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	0.0074	0.0081	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0035	<0.002	0.018	0.017	0.0088	0.0069	0.0067	0.0059	0.047	0.0077
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	71	71	68	71	60	64	57	57	62	64
Magnesium	36	36	35	37	31	34	30	30	34	35
Potassium	1.5	1.9	1.9	1.7	2.8	2.3	2.6	2.7	2.4	3.6
Sodium	16	17	17	18	14	15	13	14	15	16
Alkalinity-HCO3	190	.	196	.	190	.	191	.	192	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	14.1	.	17.3	.	12.3	.	12	.	14.6	.
Fluoride	0.49	.	0.46	.	0.54	.	0.54	.	0.58	.
Nitrate-N	0.4	.	<0.2	.	0.39	.	0.44	.	<0.2	.
Sulfate	124	.	153	.	88.7	.	88.4	.	97.4	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-713		GW-714				GW-715			
	CMP-E		CMP-E				CMP-E			
Location	EXP-W		EXP-W				EXP-W			
Date Sampled	07/17/96		01/29/96		07/17/96		01/29/96		07/18/96	
Sample Type	DUP									
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.051	0.067	0.18	<0.02	0.062	<0.02	3	<0.02	0.25	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.054	0.05	0.069	0.073	0.058	0.051	0.093	0.073	0.091	0.08
Beryllium	<0.0003	0.00044	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.12	0.093	0.082	0.17	0.047	0.1	0.053	0.034	0.035	0.028
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.099	<0.01	0.076	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	0.0073	<0.004	<0.004	<0.004	<0.004	<0.004	0.0055	<0.004	0.0077	<0.004
Iron	0.94	0.57	2.2	0.021	9.1	<0.005	4.2	0.0075	2.5	0.01
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)			<0.004	<0.004			0.0064	<0.004		
Lead (PMS)	0.0023	0.00079			<0.0005	<0.0005			0.0013	0.0011
Lithium	0.015	0.016	0.0076	0.008	0.0087	0.0065	0.0056	<0.004	<0.004	<0.004
Manganese	0.013	0.013	0.028	0.014	0.099	0.085	0.59	0.023	0.062	0.0054
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.047	0.019	0.12	0.085
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	1.7	1.6	0.2	0.21	0.16	0.16	0.085	0.092	0.13	0.12
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.0028	<0.0005	0.0029	0.0029	0.0015	0.0014	0.00059	0.00057	0.00072	0.00071
Vanadium	0.0078	<0.005	<0.005	<0.005	<0.005	<0.005	0.0054	<0.005	<0.005	<0.005
Zinc	0.009	0.02	0.0056	<0.002	0.0086	0.0038	0.022	0.0032	0.0097	0.0047
IONS (mg/L)										
Calcium	61	60	57	59	49	48	67	70	100	97
Magnesium	34	33	24	25	24	24	15	16	19	18
Potassium	4.7	3.1	1.2	1.4	2	<0.6	3.3	2.2	3	1.6
Sodium	15	15	4.2	4.4	3.9	3.8	17	15	22	20
Alkalinity-HCO3	198		199		199		206		266	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	14.1		8.63		8.79		42.8		<1	
Fluoride	0.56		0.12		0.16		<0.1		<0.1	
Nitrate-N	<0.2		3.56		1.29		0.61		0.57	
Sulfate	101		22.8		23.7		5.41		5.72	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point Program Location Date Sampled Sample Type	GW-723				GW-724							
	EXP				EXP							
	EXP-C				EXP-C							
	03/21/96		08/09/96		03/21/96		08/14/96					
Sample Type	TOT		DIS		TOT		DIS		TOT		DIS	
	METALS (mg/L)											
Aluminum	<0.02	<0.02	<0.02	0.068	<0.02	<0.02	0.021	0.045	0.04	0.02		
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Arsenic	<0.05	<0.05	0.065	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Barium	0.054	0.045	0.063	0.053	0.17	0.16	0.15	0.16	0.17	0.18		
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		
Boron	0.069	0.058	0.44	0.44	0.074	0.081	0.062	0.064	0.036	0.085		
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		
Chromium	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0092	<0.004	<0.004		
Iron	4.2	<0.005	10	0.019	0.067	0.008	0.059	0.074	0.23	0.071		
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Lead (AAS)												
Lead (PMS)			0.001	0.0055					0.0017	<0.0005		
Lithium	0.015	0.013	0.015	0.015	0.018	0.017	0.015	0.017	0.017	0.015		
Manganese	0.1	0.013	0.053	0.018	0.0058	0.0052	0.0052	0.0056	0.026	0.027		
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Selenium	<0.05	<0.05	0.06	0.087	<0.05	<0.05	<0.05	<0.05	0.078	<0.05		
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		
Strontium	1.3	1.3	1.1	1.2	1.2	1.2	1.1	1.2	1.2	1.3		
Thallium (PMS)			<0.0005	<0.0005					<0.0005	<0.0005		
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Uranium (PMS)	0.0015	0.0014	0.0027	0.0021	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005		
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Zinc	0.013	0.0063	0.044	0.0021	0.0037	<0.002	<0.002	0.0054	0.0097	0.013		
IONS (mg/L)												
Calcium	47	46	62	59	95	90	87	92	100	100		
Magnesium	29	28	28	31	42	39	38	40	43	43		
Potassium	2.3	1.8	3.2	2.2	1.8	2.2	1.8	2.1	1.7	2.1		
Sodium	7.3	7.1	7.7	8.1	24	23	22	23	25	26		
Alkalinity-HCO3	198		234		224		215		217			
Alkalinity-CO3	<1		<1		<1		<1		<1			
Chloride	6.24		8.4		62.6		61.5		61.2			
Fluoride	0.5		0.37		0.22		0.21		0.25			
Nitrate-N	3.36		5.61		38.8		38		35.1			
Sulfate	18.3		37.5		30		29.1		26.1			

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-724		GW-725				GW-738			
	EXP		EXP				EXP			
Program	EXP-C		EXP-C				EXP-C			
Location	EXP-C		EXP-C				EXP-C			
Date Sampled	08/14/96		03/22/96		08/13/96		03/20/96		08/08/96	
Sample Type	DUP									
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	<0.02	0.026	<0.02	<0.02	0.077	0.07	4.6	<0.02	1	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.054	<0.05
Barium	0.16	0.18	0.29	0.28	0.4	0.39	0.068	0.046	0.048	0.054
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00061	<0.0003	<0.0003	<0.0003
Boron	0.46	0.086	0.037	0.041	0.21	0.44	0.029	0.017	0.23	0.63
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	0.0056	0.024	<0.004	<0.004	0.0048	<0.004	0.0059	<0.004	<0.004	<0.004
Iron	0.17	0.035	1.4	0.18	0.58	0.36	5.9	<0.005	1	<0.005
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)										
Lead (PMS)	<0.0005	<0.0005			0.001	<0.0005			0.0037	<0.0005
Lithium	0.015	0.021	0.0059	0.0066	0.012	0.0098	0.0097	<0.004	0.0066	0.0055
Manganese	0.023	0.027	0.27	0.26	0.33	0.32	0.15	<0.001	0.026	<0.001
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	0.0094	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	1.1	1.3	0.72	0.69	0.98	0.94	0.1	0.11	0.1	0.12
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	0.0045	0.0039	0.0045	0.0043	0.0025	0.0023	0.0025	0.0024
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0087	<0.005	<0.005	<0.005
Zinc	0.005	0.028	<0.002	0.0041	0.0041	0.0085	0.035	0.0024	0.015	0.0098
IONS (mg/L)										
Calcium	88	100	180	170	240	230	110	110	100	120
Magnesium	38	44	36	34	48	46	24	24	22	26
Potassium	2	3.5	3	3	4.7	3.7	3	1.9	2.2	2.5
Sodium	23	26	23	22	31	30	6.3	6.6	6.3	8.2
Alkalinity-HCO3	219		301		293		311		299	
Alkalinity-CO3	<1		<1		<1		<1		<1	
Chloride	69		65.8		58.5		32.1		12.1	
Fluoride	0.24		<0.1		0.26		<0.1		<0.1	
Nitrate-N	34.9		67.9		51		14		12.7	
Sulfate	25.9		36.6		41.6		30.2		29.8	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-740				GW-793					
	EXP				BMP					
Program	EXP-C				AGLLSF					
Location	EXP-C				AGLLSF					
Date Sampled	03/19/96		08/07/96		03/27/96			08/26/96		
Sample Type					DUP					
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	0.029	0.1	0.02	<0.02	0.021	<0.02	0.023	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.079	0.083	0.091	0.093	0.15	0.15	0.14	0.14	0.12	0.12
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.014	0.01	0.65	0.2	0.013	0.013	0.026	0.028	<0.004	0.0067
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	0.0051	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.22	0.082	0.21	0.12	0.031	<0.005	<0.005	<0.005	0.07	0.0062
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	.	.	.	.	.	.	.	.	.	.
Lead (PMS)	.	.	<0.0005	<0.0005	.	.	.	.	<0.0005	<0.0005
Lithium	0.012	0.014	0.016	0.018	0.0082	0.0075	0.0085	0.008	<0.004	0.0043
Manganese	0.0072	0.006	0.0083	0.01	0.018	0.016	0.016	0.014	0.043	0.044
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	0.061	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.046	0.048	0.053	0.054	0.099	0.099	0.097	0.097	0.085	0.087
Thallium (PMS)	.	.	<0.0005	<0.0005	.	.	.	.	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0034	0.006	0.0038	0.0098	0.0047	0.0035	0.0045	0.0038	0.0022	0.0038
IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	59	63	67	70	59	59	58	57	49	50
Magnesium	29	31	33	34	5	5	4.9	4.8	4.3	4.4
Potassium	1.4	1.1	1.8	1.9	0.82	0.91	0.93	0.89	0.71	1.2
Sodium	2	2	3.2	2.7	3.9	3.9	3.9	3.9	3.6	3.8
Alkalinity-HCO3	253	.	259	.	153	.	156	.	154	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	6.7	.	6.55	.	1.55	.	1.56	.	0.78	.
Fluoride	0.18	.	0.2	.	<0.1	.	<0.1	.	0.11	.
Nitrate-N	3.99	.	3.48	.	<0.2	.	<0.2	.	<0.03	.
Sulfate	13.5	.	12.9	.	5.25	.	5.18	.	4.87	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-794				GW-795				GW-828	
	BMP		BMP		BMP		BMP		SMP	
Program	AGLLSF				AGLLSF				OLF	
Location	AGLLSF				AGLLSF				OLF	
Date Sampled	03/25/96		08/26/96		03/25/96		08/26/96		03/26/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.58	<0.02	0.37	0.026	<0.02	0.037	<0.02	<0.02	4	0.2
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.096	0.09	0.089	0.084	0.05	0.049	0.057	0.057	0.21	0.057
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00071	<0.0003
Boron	0.062	0.077	0.071	0.04	0.038	0.05	0.042	0.044	0.48	0.45
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.011	0.0054
Copper	0.74	0.0055	0.38	0.0073	<0.005	<0.005	<0.005	0.0094	2.7	0.064
Iron	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead									0.0043	<0.004
Lead (AAS)										
Lead (PMS)			0.00086	<0.0005			<0.0005	0.004		
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.062	0.053
Manganese	0.024	0.0013	0.02	0.0013	0.0015	0.0018	0.028	0.028	0.068	0.0053
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.069	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.17	0.16	0.16	0.16	0.13	0.13	0.14	0.14	0.29	0.12
Thallium (PMS)			<0.0005	<0.0005			0.00094	0.0012		
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	0.00072	0.00062	0.002	0.0022	0.0024	0.00097
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0058	0.0039	0.0038	0.0025	0.0078	0.01	<0.002	0.0022	0.02	0.014
IONS (mg/L)										
Calcium	94	91	88	88	81	82	87	85	6.3	2.6
Magnesium	9	8.7	8.2	8	3.3	3.3	3.6	3.6	1.9	0.51
Potassium	2.1	2.1	2.2	2.2	0.78	0.78	<0.6	1.1	3.3	3
Sodium	3.3	3.3	3.6	3.4	1.9	1.9	2.4	2.3	190	180
Alkalinity-HCO3	232		231		181		218		268	
Alkalinity-CO3	<1		<1		<1		<1		70	
Chloride	8.27		9.48		4		4.29		10.6	
Fluoride	<0.1		<0.1		<0.1		<0.1		1.6	
Nitrate-N	0.45		0.42		<0.2		<0.03		3.25	
Sulfate	22.3		23.3		20.3		22.2		25.6	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	GW-828		GW-829				NT-01			
	SMP		SMP		SMP		EXP			
Program	SMP		SMP		SMP		EXP			
Location	OLF		OLF		OLF		EXP-SW			
Date Sampled	08/21/96		03/27/96		08/22/96		03/18/96		08/13/96	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.35	0.27	0.26	0.074	2.7	0.061	0.6	0.052	0.67	0.048
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.077	0.064	0.56	0.58	0.84	0.66	0.29	0.29	0.14	0.12
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	0.00042	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.46	0.45	0.25	0.27	0.25	0.25	0.022	0.028	0.035	0.07
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.011	0.0094	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	0.0089	<0.005	<0.005	0.0053	<0.005	<0.005
Copper	<0.004	<0.004	0.0083	0.0057	<0.004	<0.004	<0.004	0.0051	0.0048	<0.004
Iron	0.11	0.055	0.24	0.01	3	0.025	0.16	<0.005	0.8	0.11
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)			<0.004	<0.004			<0.004	<0.004		
Lead (PMS)	0.0011	<0.0005			0.0045	<0.0005			0.00087	<0.0005
Lithium	0.057	0.055	0.058	0.061	0.067	0.059	0.005	0.0049	<0.004	<0.004
Manganese	0.0077	0.0043	0.0084	0.0024	0.12	0.0076	1.9	2	0.46	0.42
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.037	0.032	0.011	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.066	<0.05	0.15	0.06
Silver	<0.006	<0.006	<0.006	<0.006	0.0073	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.12	0.11	1.2	1.3	1.5	1.3	0.34	0.35	0.24	0.23
Thallium (PMS)	<0.0005	<0.0005			<0.0005	<0.0005			<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	0.00052	0.0012	0.0018	0.0012	0.014	0.01	0.012	0.011
Vanadium	<0.005	0.0076	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.013	0.0086	0.012	0.0034	0.019	0.09	0.021	0.022	0.014	0.016
IONS (mg/L)										
Calcium	2.1	1.7	20	21	37	25	110	120	68	65
Magnesium	0.53	0.44	7.9	8.4	10	8.3	16	16	11	10
Potassium	1.6	1.7	6.1	5.8	7.2	6.2	3.2	3.5	3.2	2.5
Sodium	170	170	110	120	120	120	15	15	8.7	8.4
Alkalinity-HCO3	272		163		172		86		105	
Alkalinity-CO3	60		24		<1		<1		<1	
Chloride	11		2.89		3		10.5		6.06	
Fluoride	1.7		0.41		0.42		0.6		0.34	
Nitrate-N	0.73		33.6		38.7		<0.2		24.7	
Sulfate	23.6		16.1		16.3		18.5		17.9	

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	SS-1				SS-4				SS-5	
	EXP				EXP				EXP	
Program	EXP				EXP				EXP	
Location	EXP-SW				EXP-SW				EXP-SW	
Date Sampled	03/18/96		08/13/96		03/16/96		07/30/96		03/16/96	
Sample Type	TOT		DIS		TOT		DIS		TOT	
METALS (mg/L)										
Aluminum	0.078	0.031	0.045	<0.02	0.18	<0.02	0.73	0.03	0.06	0.051
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	0.084	0.084	0.1	0.1	0.12	0.11	0.15	0.12	0.052	0.052
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.048	0.055	0.11	0.067	0.068	0.083	0.079	0.076	0.011	0.029
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	0.0063	<0.004	<0.004	<0.004	<0.004	0.0046	0.0047	0.0094	<0.004	0.0091
Iron	0.016	0.011	0.012	0.075	0.32	<0.005	1.2	<0.005	<0.005	<0.005
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (AAS)	<0.004	<0.004	.	.	.	.	.	.	.	.
Lead (PMS)	.	.	<0.0005	<0.0005	.	.	0.00075	<0.0005	.	.
Lithium	<0.004	<0.004	0.0044	<0.004	0.014	0.015	0.023	0.023	<0.004	<0.004
Manganese	0.0059	0.0011	0.076	0.075	0.19	0.011	0.62	0.0044	<0.001	0.0018
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	0.053	<0.05	0.054	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Strontium	0.46	0.45	0.6	0.59	0.18	0.18	0.25	0.24	0.064	0.065
Thallium (PMS)	.	.	<0.0005	<0.0005	.	.	<0.0005	<0.0005	.	.
Thorium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	0.028	0.029	0.041	0.041	0.12	0.12	0.031	0.16	0.031	0.032
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0055	<0.005	<0.005	<0.005
Zinc	0.018	0.0054	0.0067	0.034	0.0076	0.014	0.0097	0.012	0.0081	0.025
IONS (mg/L)										
Calcium	180	180	210	200	75	76	91	87	42	42
Magnesium	17	17	20	20	17	17	17	16	13	13
Potassium	3.6	4.1	4.4	3.4	1.9	2.3	2.3	3.4	1.4	1.2
Sodium	17	17	19	19	13	13	14	14	4.3	4.5
Alkalinity-HCO3	341	.	358	.	176	.	194	.	137	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	49.9	.	44.8	.	22.4	.	20.9	.	7.39	.
Fluoride	0.16	.	0.22	.	0.38	.	0.46	.	0.14	.
Nitrate-N	19.8	.	11.7	.	13.9	.	14.2	.	3.92	.
Sulfate	66.1	.	115	.	24	.	28.6	.	10.6	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1996

Sampling Point	SS-5	
Program	EXP	
Location	EXP-SW	
Date Sampled	07/29/96	
Sample Type		
	TOT	DIS
METALS (mg/L)	.	.
Aluminum	0.098	0.041
Antimony	<0.05	<0.05
Arsenic	<0.05	<0.05
Barium	0.08	0.092
Beryllium	<0.0003	<0.0003
Boron	0.12	0.055
Cadmium	<0.003	<0.003
Chromium	<0.01	<0.01
Cobalt	<0.005	<0.005
Copper	<0.004	0.012
Iron	0.094	<0.005
Lead	<0.05	<0.05
Lead (AAS)	.	.
Lead (PMS)	0.0062	0.0012
Lithium	0.0058	0.013
Manganese	0.0043	0.0026
Mercury (CVAA)	<0.0002	<0.0002
Molybdenum	<0.01	<0.01
Nickel	<0.01	<0.01
Selenium	<0.05	<0.05
Silver	<0.006	<0.006
Strontium	0.12	0.14
Thallium (PMS)	<0.0005	<0.0005
Thorium	<0.2	<0.2
Uranium (PMS)	0.086	<0.0005
Vanadium	<0.005	<0.005
Zinc	0.0032	0.11
IONS (mg/L)	.	.
Calcium	60	70
Magnesium	14	17
Potassium	1.2	1.9
Sodium	7.8	9.3
Alkalinity-HCO3	190	.
Alkalinity-CO3	<1	.
Chloride	14.9	.
Fluoride	0.22	.
Nitrate-N	8.6	.
Sulfate	16.3	.

APPENDIX D.3

ORGANIC ANALYTES

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	BCK-00.63	BCK-03.87		BCK-04.55		BCK-07.75	
Program	EXP	EXP		EXP		EXP	
Location	EXP-SW	EXP-SW		EXP-SW		EXP-SW	
Date Sampled	08/06/96	01/30/96	07/14/96	01/30/96	07/14/96	01/30/96	07/14/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	10U	10U	10U	10U	10U	2	10U
Trans-1,2-Dichloroethene			10U		10U		
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	BCK-09.40		BCK-10.60		BCK-11.97		GW-040
Program	EXP		EXP		EXP		CMP-B
Location	EXP-SW		EXP-SW		EXP-SW		BG
Date Sampled	03/16/96	07/29/96	03/17/96	07/30/96	03/17/96	08/13/96	03/26/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	14	4	10U	10U	10U	10U	10U
Trans-1,2-Dichloroethene							10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-040	GW-042		GW-043		GW-044	
Program	CMP-B	CMP-B		CMP-B		CMP-B	
Location	BG	BG		OLF		OLF	
Date Sampled	07/18/96	03/26/96	07/18/96	02/01/96	07/08/96	01/31/96	07/08/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene							
Trans-1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-053		GW-056		GW-069		GW-079
Program	SMP		EXP		CMP-C		CMP-B
Location	BG		EXP-A		BG		BG
Date Sampled	03/26/96	08/28/96	03/14/96	07/23/96	02/25/96	07/23/96	02/25/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	6	7	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	11	14	10U	10U			
Trans-1,2-Dichloroethene					10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	1	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	2	2	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	5	6	10U	10U	10U	2	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-079	GW-080		GW-084		GW-085	
Program	CMP-B	CMP-B		CMP-B		SMP	
Location	BG	BG		OLF		OLF	
Date Sampled	07/24/96	02/24/96	07/24/96	02/01/96	07/08/96	03/25/96	08/20/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene						10U	10U
Trans-1,2-Dichloroethene	10U	10U	10U	10U	10U		
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-095			GW-115		GW-162	
Program	SMP			CMP-B		CMP-B	
Location	BG			S3		BG	
Date Sampled	03/26/96	08/27/96		01/31/96	07/02/96	02/26/96	07/24/96
Sample Type			DUP				
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	11	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	10U	10U	10U				
Trans-1,2-Dichloroethene				10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-276		GW-287		GW-311		GW-315
Program	CMP-C		SMP		SMP		SMP
Location	S3		BG		RS		SPI
Date Sampled	02/29/96	07/08/96	03/26/96	08/27/96	03/25/96	08/14/96	03/26/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	11	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	1	1	10U	10U	10U	10U	1
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene			10U	10U	10U	10U	3
Trans-1,2-Dichloroethene	10U	10U					
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	18	22	10U	10U	10U	10U	9
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	8	5	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-315			GW-363			
	SMP			CMP-C			
Program	SMP			CMP-C			
Location	SPI			OLF			
Date Sampled	03/26/96	08/19/96		02/12/96		07/02/96	
Sample Type	DUP		DUP		DUP		DUP
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	13	9	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	9	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	1	1	1	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	3	4	4				
Trans-1,2-Dichloroethene				10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10	14	13	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	4	5	5	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-372				GW-373		GW-521
Program	CMP-B				CMP-B		CMP-B
Location	BG				BG		LIV
Date Sampled	02/25/96		07/23/96		02/28/96	07/25/96	01/16/96
Sample Type	DUP		DUP				
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene							
Trans-1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-521	GW-537		GW-613		GW-614	
Program	CMP-B	SMP		CMP-B		CMP-B	
Location	LIV	OLF		S3		S3	
Date Sampled	07/02/96	03/25/96	08/20/96	01/31/96	07/01/96	02/12/96	07/01/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	5	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	1	1	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
Trans-1,2-Dichloroethene	10U			10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	1	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-621				GW-627		GW-642
Program	EXP				SMP		CMP-B
Location	EXP-B				BG		BG
Date Sampled	03/14/96		07/23/96		03/28/96	09/06/96	02/24/96
Sample Type	DUP		DUP				
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	4	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	1	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	4	5	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	1	1	10U
1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
Trans-1,2-Dichloroethene						10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	47	56	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	1	1	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	1	1	8	9	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-642	GW-653		GW-683		GW-684	
Program	CMP-B	SMP		EXP		EXP	
Location	BG	BG		EXP-A		EXP-A	
Date Sampled	07/09/96	03/26/96	08/28/96	03/15/96	07/29/96	03/16/96	07/29/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	2	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	1	10U	10U	10U	10U	10U
1,2-Dichloroethene		31	13	10U	10U	10U	10U
Trans-1,2-Dichloroethene	10U						
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	4	2	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	2	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-685		GW-694		GW-695		GW-703
	EXP		EXP		EXP		EXP
Program							
Location	EXP-A		EXP-B		EXP-B		EXP-B
Date Sampled	03/15/96	07/25/96	03/18/96	08/01/96	03/14/96	07/23/96	03/16/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	10U	1	7	10U	4	3	9
Trans-1,2-Dichloroethene							
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	1	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	8	3	5	5	13
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-703	GW-704	GW-706	GW-710			
Program	EXP	EXP	EXP	CMP-E			
Location	EXP-B	EXP-B	EXP-B	EXP-W			
Date Sampled	07/31/96	03/17/96	08/01/96	03/19/96	08/06/96	01/29/96	07/16/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	7	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	2	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	7	5	10U	10U	10U	10U
1,2-Dichloroethene	4	6	3	6	8		
Trans-1,2-Dichloroethene						10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	2	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	9	97	70	8	7	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-711		GW-712		GW-713		
Program	CMP-E		CMP-E		CMP-E		
Location	EXP-W		EXP-W		EXP-W		
Date Sampled	01/26/96	07/14/96	01/26/96	07/15/96	01/28/96	07/17/96	
Sample Type	DUP						
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene							
Trans-1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-713	GW-714		GW-715		GW-723	
Program	CMP-E	CMP-E		CMP-E		EXP	
Location	EXP-W	EXP-W		EXP-W		EXP-C	
Date Sampled	07/17/96	01/29/96	07/17/96	01/29/96	07/18/96	03/21/96	08/09/96
Sample Type	DUP						
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
Trans-1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	5	8
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-724				GW-725		GW-738
	EXP				EXP		EXP
Program	EXP-C				EXP-C		EXP-C
Location	EXP-C				EXP-C		EXP-C
Date Sampled	03/21/96		08/14/96		03/22/96	08/13/96	03/20/96
Sample Type	DUP		DUP				
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	12	10U	10U	11	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	3	2	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	2	1	10U	10U	10U	10U	1
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	4	3	1	1	10U	10U	3
Trans-1,2-Dichloroethene							
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	4	3	1	1	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	1
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	160	120	40	40	17	12	50
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-738	GW-740		GW-793		GW-794
Program	EXP	EXP		BMP		BMP
Location	EXP-C	EXP-C		AGLLSF		AGLLSF
Date Sampled	08/08/96	03/19/96	08/07/96	03/27/96	08/26/96	03/25/96
Sample Type					DUP	
VOLATILE ORGANICS (ug/L)						
Acetone	10U	10U	10U	10U	4	10U
Benzene	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U
2-Butanone	10U	11	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	2	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U
Chloroform	1	1	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	2	3	2	10U	10U	10U
Trans-1,2-Dichloroethene						
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	1	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U
Trichloroethene	40	72	31	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	GW-794	GW-795		GW-828		GW-829	
Program	BMP	BMP		SMP		SMP	
Location	AGLLSF	AGLLSF		OLF		OLF	
Date Sampled	08/26/96	03/25/96	08/26/96	03/26/96	08/21/96	03/27/96	08/22/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
Trans-1,2-Dichloroethene							
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	10U	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	NT-01		SS-1		SS-4		SS-5
Program	EXP		EXP		EXP		EXP
Location	EXP-SW		EXP-SW		EXP-SW		EXP-SW
Date Sampled	03/18/96	08/13/96	03/18/96	08/13/96	03/16/96	07/30/96	03/16/96
Sample Type							
VOLATILE ORGANICS (ug/L)							
Acetone	10U	10U	10U	10U	10U	10U	10U
Benzene	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	10U	10U	10U	10U	10U	10U	10U
Bromoform	10U	10U	10U	10U	10U	10U	10U
Bromomethane	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U
Chlorobenzene	10U	10U	10U	10U	10U	10U	10U
Chlorodibromomethane	10U	10U	10U	10U	10U	10U	10U
Chloroethane	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U
Chloromethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethene	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloroethene	10U	10U	10U	10U	7	3	10U
Trans-1,2-Dichloroethene							
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U
Cis-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Trans-1,3-Dichloropropene	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-Pentanone	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U
Styrene	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U
Tetrachloroethene	4	1	10U	2	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
1,1,2-Trichloroethane	10U	10U	10U	10U	10U	10U	10U
Trichloroethene	2	10U	3	1	6	6	10U
Vinyl Acetate	10U	10U	10U	10U	10U	10U	10U
Vinyl Chloride	10U	10U	10U	10U	10U	10U	10U
Xylenes	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1996

Sampling Point	SS-5
Program	EXP
Location	EXP-SW
Date Sampled	07/29/96
Sample Type	
VOLATILE ORGANICS (ug/L)	
Acetone	10U
Benzene	10U
Bromodichloromethane	10U
Bromoform	10U
Bromomethane	10U
2-Butanone	10U
Carbon Disulfide	10U
Carbon Tetrachloride	10U
Chlorobenzene	10U
Chlorodibromomethane	10U
Chloroethane	10U
Chloroform	10U
Chloromethane	10U
1,1-Dichloroethane	10U
1,2-Dichloroethane	10U
1,1-Dichloroethene	10U
1,2-Dichloroethene	10U
Trans-1,2-Dichloroethene	
1,2-Dichloropropane	10U
Cis-1,3-Dichloropropene	10U
Trans-1,3-Dichloropropene	10U
Ethylbenzene	10U
2-Hexanone	10U
4-Methyl-2-Pentanone	10U
Methylene Chloride	10U
Styrene	10U
1,1,2,2-Tetrachloroethane	10U
Tetrachloroethene	10U
Toluene	10U
1,1,1-Trichloroethane	10U
1,1,2-Trichloroethane	10U
Trichloroethene	10U
Vinyl Acetate	10U
Vinyl Chloride	10U
xylenes	10U

APPENDIX D.4

RADIOLOGICAL ANALYTES

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	BCK-00.63			BCK-03.87					
	EXP			EXP					
Program	EXP-SW			EXP-SW					
Location	EXP-SW			EXP-SW					
Date Sampled	08/06/96			01/30/96			07/14/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	12.5	4.2	3.4	18.1	6.6	7.03	2.42	4.8	6.72
Gross Beta	8.62	5.5	7.2	6.21	5.4	8.38	8.93	5.3	8.69
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	BCK-04.55			BCK-07.75					
	EXP			EXP					
Program	EXP-SW			EXP-SW					
Location	EXP-SW			EXP-SW					
Date Sampled	01/30/96			07/14/96			01/30/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	14.4	6	7.05	5.81	5.3	6.67	29.3	8.1	7.12
Gross Beta	11.3	5.8	8.38	8.61	5.2	8.69	30.5	7.7	8.39
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	BCK-07.75			BCK-09.40					
	EXP			EXP					
Program	EXP-SW			EXP-SW					
Location	EXP-SW			EXP-SW					
Date Sampled	07/14/96			03/16/96			07/29/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	20.9	7.4	6.81	46.7	10	7.33	41.3	8.2	3.3
Gross Beta	21.9	6.6	8.71	33.4	8.1	8.88	28.5	7	7.29
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90	.	.	.	-1.58	1.1	2.89	0.29	1.3	2.88
Technetium 99	.	.	.	37	6	5.86	30.5	5.9	6.35
Tritium (X10)	.	.	.	80	200	222	.	.	.
Tritium	234	200	375
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	BCK-10.60			BCK-11.97					
	EXP			EXP					
Program	EXP-SW			EXP-SW					
Location	EXP-SW			EXP-SW					
Date Sampled	03/17/96			07/30/96			03/17/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	61.5	12	7.36	66.1	11	3.32	63.9	13	7.99
Gross Beta	38.5	8.6	8.89	27.8	6.4	6.67	113	18	8.99
Americium 241	.	.	.	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.	.	.	.
Radium (total)	.	.	.	.	.	.	.	.	.
Strontium 89/90	-1.88	1.1	2.81	-0.53	1.2	2.71	-0.12	1.2	2.85
Technetium 99	56	7.5	5.86	34.5	6.4	6.35	186	20	5.86
Tritium (X10)	40	200	222	.	.	.	180	200	222
Tritium	.	.	.	131	210	375	.	.	.
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

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Sampling Point	BCK-11.97			GW-040					
	EXP			CMP-B					
Location	EXP-SW			BG					
Date Sampled	08/13/96			03/26/96			07/18/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	49.5	9.2	2.21	2.33	4.6	8.24	0.19	4.2	7.49
Gross Beta	49.7	9.4	8.32	4.91	5.4	8.75	-1.65	0.05	8.56
Americium 241	.	.	.	-0.0385	0.11	0.335	0.0133	0.11	0.285
Iodine 129	.	.	.	0.1	1.1	0.7	18	22	37
Neptunium 237	.	.	.	-0.0712	0.14	0.675	0.0962	0.12	0.192
Plutonium 238	.	.	.	-0.0935	0.12	0.36	0.0945	0.13	0.226
Plutonium 239	.	.	.	0.018	0.11	0.242	0	0	0.0652
Radium (total)	.	.	.	0.43	0.93	2.09	0.9	1.3	2.35
Strontium 89/90	-1.35	1.3	2.9	-0.35	1.1	2.77	-0.86	1.6	3.33
Technetium 99	89.5	11	6.4	3	9.3	12.5	-2	5.2	12.7
Tritium (X10)	.	.	.	60	200	222	-41	177	222
Tritium	75.7	150	400	.	.	.	.	.	.
Uranium 234	.	.	.	0.09	0.15	0.257	-0.0301	0.06	0.286
Uranium 235	.	.	.	-0.0338	0.068	0.32	0	0	0.147
Uranium 238	.	.	.	0.156	0.16	0.106	0	0	0.118

(CONTINUED)

Sampling Point	GW-042			GW-043					
	CMP-B			CMP-B					
Location	BG			OLF					
Date Sampled	03/26/96			07/18/96			02/01/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0	0.22	7.56	-1.73	0.2	7.38	-1	0.24	7.02
Gross Beta	-3.1	0.05	8.64	-2.68	0.05	8.54	-0.52	0.06	7.7
Americium 241	0.214	0.18	0.0966	0.0673	0.17	0.342	0.0987	0.13	0.197
Iodine 129	0.01	0.87	0.6	-32	38	57	1	32	24
Neptunium 237	-0.137	0.24	0.984	0	0	0.0814	0.0156	0.15	0.337
Plutonium 238	-0.0172	0.12	0.362	0.115	0.19	0.327	0.508	0.65	1.01
Plutonium 239	-0.0785	0.15	0.462	0	0	0.135	-0.107	0.21	1.01
Radium (total)	1.6	1.2	1.46	-0.35	0.14	2.7	0.75	0.82	1.4
Strontium 89/90	-0.23	1.1	2.73	-1.2	1.5	3.26	-0.48	0.82	4.48
Technetium 99	-6	6.8	12.5	0	7.5	12.7	-1	7.9	11.9
Tritium (X10)	140	200	222	60	190	222	34	99	217
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0.076	0.12	0.217	0.0133	0.11	0.287	0.169	0.19	0.259
Uranium 235	0.0536	0.13	0.271	0	0	0.147	0.015	0.12	0.323
Uranium 238	-0.0587	0.11	0.345	0.057	0.14	0.288	0.288	0.23	0.259

(CONTINUED)

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Sampling Point	GW-043			GW-044					
	CMP-B			CMP-B					
Location	OLF			OLF					
Date Sampled	07/08/96			01/31/96			07/08/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	11	5.9	5.94	1.43	4.1	7.18	-1.61	0.2	6.04
Gross Beta	0.62	5.2	8.38	1.14	4.5	7.73	0.1	5.2	8.4
Americium 241	0.102	0.25	0.519	0.176	0.23	0.351	0.0883	0.15	0.285
Iodine 129	1	55	45	1	27	15	1	36	30
Neptunium 237	0.0428	0.1	0.216	-0.0213	0.043	0.202	-0.0946	0.11	0.428
Plutonium 238	0.074	0.11	0.1	0.0824	0.38	0.846	0	0	0.0955
Plutonium 239	0.0113	0.09	0.243	-0.125	0.18	0.735	0	0	0.0955
Radium (total)	0.7	1	2.09	0.67	0.9	1.8	-0.16	0.41	1.76
Strontium 89/90	-2.72	1.5	3.36	0.68	0.59	3.14	-1.28	2	4.06
Technetium 99	-5	6.3	13.1	4	7.6	11.9	-12	8.3	13.1
Tritium (X10)	100	190	215	150	200	217	60	190	215
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0.0441	0.089	0.12	0.14	0.18	0.28	0.145	0.21	0.197
Uranium 235	0	0	0.149	0.0162	0.13	0.349	0.0907	0.18	0.246
Uranium 238	0.0885	0.13	0.12	0.128	0.15	0.115	-0.0506	0.1	0.48

(CONTINUED)

Sampling Point	GW-053			GW-056					
	SMP			EXP					
Location	BG			EXP-A					
Date Sampled	03/26/96			08/28/96			03/14/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	5.55	4.5	8.32	0.857	3	4.47	2.51	5	8.4
Gross Beta	9.11	5	8.49	-0.87	3	7.94	-3.7	0.05	8.09
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

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Radiological Analytes, CY 1996

Sampling Point	GW-056			GW-069					
	EXP			CMP-C					
Program	EXP-A			BG					
Location	EXP-A			BG					
Date Sampled	07/23/96			02/25/96			07/23/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	3.66	2.6	3.2	1.03	4.6	6.98	-0.291	1.1	3.05
Gross Beta	-2	4.3	8.84	6.46	4.8	8.23	-4.69	6	8.17
Americium 241				0.152	0.25	0.433	0.0559	0.14	0.284
Iodine 129				1	32	22	-10	26	41
Neptunium 237				0.309	0.3	0.384	0.029	0.058	0.0785
Plutonium 238				0.0566	0.08	0.0767	-0.0307	0.16	0.413
Plutonium 239				0.00865	0.069	0.186	0	0	0.107
Radium (total)				-0.2	0.1	1.32	0.3	1.2	6.86
Strontium 89/90				1.62	0.63	3.14	-1.24	1.3	3.29
Technetium 99				3	7.5	11.7	0.5	4.2	6.26
Tritium (X10)				140	190	207	-60	210	235
Tritium									
Uranium 234				0.101	0.16	0.289	-0.0179	0.13	0.376
Uranium 235				0	0	0.148	-0.0398	0.08	0.377
Uranium 238				-0.0306	0.061	0.29	0.092	0.13	0.125

(CONTINUED)

Sampling Point	GW-079			GW-080					
	CMP-B			CMP-B					
Program	CMP-B			CMP-B					
Location	BG			BG					
Date Sampled	02/25/96			07/24/96			02/24/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-1.78	0.2	6.7	6.79	3.3	3.24	4.19	4.9	6.76
Gross Beta	1.55	4.4	8.18	7.72	4.4	7.98	7.47	4.9	8.19
Americium 241	0.0218	0.17	0.469	0.112	0.14	0.224	0.461	0.31	0.365
Iodine 129	1	23	16	-1	19	30	1	32	23
Neptunium 237	0.0634	0.13	0.172	0.0299	0.06	0.0811	0.248	0.22	0.134
Plutonium 238	-0.121	0.18	0.554	0.137	0.18	0.273	0.0103	0.082	0.221
Plutonium 239	-0.0677	0.096	0.399	-0.0161	0.12	0.339	0	0	0.0909
Radium (total)	0	0.013	1.81	0.42	0.62	1.11	3	1.6	2.16
Strontium 89/90	-1.67	0.54	2.83	-1.6	1.2	3.08	0.42	0.57	3.09
Technetium 99	1	7.8	11.7	3	4.6	6.26	2	6.3	11.7
Tritium (X10)	50	190	207	120	220	235	140	190	207
Tritium									
Uranium 234	0.0707	0.17	0.357	0.012	0.095	0.258	0.101	0.17	0.318
Uranium 235	0	0	0.183	0	0	0.132	0	0	0.131
Uranium 238	0.0543	0.11	0.147	0.169	0.19	0.258	0.0897	0.15	0.256

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-080			GW-084					
	CMP-B			CMP-B					
Location	BG			OLF					
Date Sampled	07/24/96			02/01/96			07/08/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	4.55	3	3.42	1.81	4.1	7.08	-1.02	0.2	6.12
Gross Beta	11.9	5.6	8.5	2.08	4.6	7.71	0.52	5.2	8.42
Americium 241	-0.0313	0.09	0.272	-0.0357	0.1	0.31	-0.0688	0.2	0.532
Iodine 129	-7.2	8.8	14	1	23	18	4	32	21
Neptunium 237	0	0	0.0778	0.104	0.12	0.0937	0	0	0.116
Plutonium 238	-0.083	0.12	0.382	1.54	1.2	1.22	-0.0151	0.11	0.317
Plutonium 239	-0.0028	0.12	0.316	0.483	0.83	1.52	0.167	0.18	0.255
Radium (total)	0	220	2.46	1.1	0.9	1.05	0.17	0.82	1.62
Strontium 89/90	-1.86	1.2	3.1	0.29	0.52	2.83	-1.95	1.5	3.15
Technetium 99	2.5	3.9	6.26	-2	7.9	11.9	-11	8.1	13.1
Tritium (X10)	70	220	235	100	200	217	240	200	215
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0.17	0.15	0.092	0.136	0.16	0.123	0.141	0.2	0.191
Uranium 235	0	0	0.115	0	0	0.153	0	0	0.238
Uranium 238	0.0104	0.083	0.224	0.073	0.18	0.371	0.163	0.27	0.465

(CONTINUED)

Sampling Point	GW-085			GW-095					
	SMP			SMP					
Location	OLF			BG					
Date Sampled	03/25/96			08/20/96			03/26/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	6.77	5.9	9.42	5.02	3	3.27	2.35	4	8.35
Gross Beta	100	16	8.91	95.6	14	7.63	5.45	4.6	8.5
Americium 241	.	.	.	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.	.	.	.
Radium (total)	.	.	.	.	.	.	.	.	.
Strontium 89/90	0.85	1.8	4.2	-0.57	1.3	3.1	.	.	.
Technetium 99	257	29	12.5	219	23	6.51	.	.	.
Tritium (X10)	120	200	222	.	.	.	.	.	.
Tritium	.	.	.	29.3	240	408	.	.	.
Uranium 234	.	.	.	.	.	.	.	.	.
Uranium 235	.	.	.	.	.	.	.	.	.
Uranium 238	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-095						GW-115		
	SMP						CMP-B		
Location	BG						S3		
Date Sampled	08/27/96						01/31/96		
Sample Type	Dup								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	-0.257	1.1	4.69	-1.69	1.5	4.77	2.12	4.3	7.43
Gross Beta	1.49	14	8.22	-2.6	5.3	7.45	1.88	4.6	7.76
Americium 241	0.105	0.14	0.239
Iodine 129	1	21	16
Neptunium 237	0.0487	0.069	0.066
Plutonium 238	-0.019	0.85	2.15
Plutonium 239	0	0	0.619
Radium (total)	1.1	1	2.08
Strontium 89/90	-1.12	0.66	3.57
Technetium 99	1	7.9	11.9
Tritium (X10)	210	210	217
Tritium
Uranium 234	0.23	0.23	0.336
Uranium 235	-0.0355	0.071	0.337
Uranium 238	0.161	0.23	0.388

(CONTINUED)

Sampling Point	GW-115			GW-162					
	CMP-B			CMP-B					
Location	S3			BG					
Date Sampled	07/02/96			02/26/96			07/24/96		
Sample Type	Dup								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-3.58	0.21	6.31	-1.41	0.21	6.82	1.69	2	2.97
Gross Beta	-0.73	0.05	8.45	2.8	4.5	8.2	-7.79	5.4	7.94
Americium 241	0.0821	0.14	0.257	0.164	0.28	0.513	0.0922	0.16	0.297
Iodine 129	1	28	24	1	25	16	3.5	9.2	15
Neptunium 237	0.0783	0.13	0.224	-0.0299	0.28	0.284	0.0403	0.097	0.203
Plutonium 238	0.0265	0.12	0.272	0.0518	0.13	0.261	0.121	0.14	0.109
Plutonium 239	-0.0112	0.081	0.237	0	0	0.108	0	0	0.109
Radium (total)	0.93	0.96	1.59	0.81	0.84	1.32	0.38	0.7	1.54
Strontium 89/90	-2.3	1.4	3.12	-1.54	0.66	3.54	-0.8	1.2	3.02
Technetium 99	-5	7.7	13.1	1	7.8	11.7	0.5	4.2	6.26
Tritium (X10)	130	190	215	10	180	207	10	210	235
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0.0782	0.19	0.394	0.0463	0.21	0.475	0.0945	0.11	0.0854
Uranium 235	0.0228	0.18	0.492	0.0629	0.13	0.171	-0.0272	0.055	0.259
Uranium 238	-0.065	0.19	0.565	0.0155	0.12	0.333	0.104	0.13	0.208

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-276						GW-287		
	CMP-C								
Program	S3						BG		
Location	02/29/96			07/08/96			03/26/96		
Date Sampled	Sample Type								
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	410	55	8.6	368	51	8.06	2.64	3.8	7.93
Gross Beta	810	110	8.1	575	75	8.74	6.76	4.7	8.44
Americium 241	0.2	0.17	0.2	-0.0137	0.099	0.288	.	.	.
Iodine 129	1	35	25	1	28	23	.	.	.
Neptunium 237	25	2.7	0.12	19.8	2.1	0.0903	.	.	.
Plutonium 238	0.037	0.09	0.19	0.0573	0.098	0.18	.	.	.
Plutonium 239	0.009	0.069	0.19	0	0	0.0595	.	.	.
Radium (total)	1.3	1	1.3	3.5	1.5	0.46	.	.	.
Strontium 89/90	2.2	0.52	0.89	3.38	1.8	3.09	.	.	.
Technetium 99	950	97	13	1020	100	13.1	.	.	.
Tritium (X10)	.	.	.	130	190	215	.	.	.
Tritium	200	180	390	.	.	.	.	.	.
Uranium 234	170	41	0.31	0.0229	0.18	0.493	.	.	.
Uranium 235	8.6	3	0.94	0	0	0.253	.	.	.
Uranium 238	410	96	0.94	0.075	0.15	0.203	.	.	.

(CONTINUED)

Sampling Point	GW-287			GW-311					
	SMP								
Program	BG			RS					
Location	08/27/96			03/25/96			08/14/96		
Date Sampled	Sample Type								
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	0.015	1.5	4.16	-0.41	0.28	7.91	0.984	1.3	2.11
Gross Beta	-0.629	9.7	7.28	4.89	4.5	8.44	-4.23	4.4	7.39
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-315								
	SMP								
Location	SPI								
Date Sampled	03/26/96						08/19/96		
Sample Type	Dup								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	3.47	4.2	8.47	4.97	4.5	8.42	1.43	2	3.09
Gross Beta	24.4	6.6	8.51	29.9	7.2	8.51	21.1	5.7	6.52
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-315						GW-363		
	SMP						CMP-C		
Location	SPI						OLF		
Date Sampled	08/19/96						02/12/96		
Sample Type	Dup						Dup		
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	1.66	1.9	2.95	-2.53	0.28	8.09	0.46	4.4	8.07
Gross Beta	16	5.5	6.8	3.7	4.8	7.86	0.32	4.5	7.85
Americium 241	.	.	.	0.0526	0.13	0.265	0.0424	0.1	0.214
Iodine 129	.	.	.	5	33	20	-7	29	16
Neptunium 237	.	.	.	0.0539	0.076	0.073	-0.0433	0.061	0.256
Plutonium 238	.	.	.	0.296	0.34	0.526	-0.0598	0.17	0.52
Plutonium 239	.	.	.	-0.0446	0.089	0.423	-0.0383	0.077	0.363
Radium (total)	.	.	.	0.24	0.64	1.27	1.3	1	1.16
Strontium 89/90	.	.	.	0.01	0.53	2.87	0.23	0.64	3.5
Technetium 99	.	.	.	7	7.6	11.9	3	8.1	11.9
Tritium (X10)	.	.	.	70	180	217	-20	170	217
Tritium
Uranium 234	.	.	.	0.0601	0.15	0.303	0.0915	0.15	0.261
Uranium 235	.	.	.	0.115	0.16	0.156	0	0	0.134
Uranium 238	.	.	.	0.153	0.2	0.304	0.0917	0.15	0.262

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-363						GW-372		
	CMP-C						CMP-B		
Location	OLF						BG		
Date Sampled	07/02/96						02/25/96		
Sample Type				Dup					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-5.97	0.4	15.3	-4.79	0.4	12	-0.41	0.21	6.92
Gross Beta	-2.49	0.1	17.2	-9.75	0.1	16.8	2.29	4.5	8.22
Americium 241	-0.0157	0.15	0.378	0.172	0.17	0.214	0.0866	0.21	0.44
Iodine 129	1	27	23	1	42	35	1	33	22
Neptunium 237	0.0124	0.099	0.268	-0.0224	0.045	0.213	0.0758	0.18	0.382
Plutonium 238	0.0611	0.24	0.523	-0.0664	0.099	0.305	0.0227	0.13	0.304
Plutonium 239	-0.0735	0.21	0.568	0.0268	0.054	0.0727	0	0	0.101
Radium (total)	1.7	1.1	0.45	0.68	0.8	1.4	1.3	1.1	1.74
Strontium 89/90	-1.74	1.5	3.12	-2.12	1.3	2.87	-0.07	0.56	3.09
Technetium 99	-7	7.5	13.1	-8	7.4	13.1	3	7.1	11.7
Tritium (X10)	50	190	215	40	190	215	90	190	207
Tritium	-	-	-	-	-	-	-	-	-
Uranium 234	0.238	0.41	0.748	0	0	0.217	0.0598	0.14	0.302
Uranium 235	0	0	0.308	-0.0694	0.14	0.658	0.171	0.2	0.155
Uranium 238	0	0	0.248	0	0	0.218	0.321	0.25	0.124

(CONTINUED)

Sampling Point	GW-372								
	CMP-B								
Location	BG								
Date Sampled	02/25/96			07/23/96					
Sample Type	Dup						Dup		
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-0.81	0.21	6.88	1.36	1.9	2.97	0.346	1.5	2.93
Gross Beta	4.57	4.7	8.21	-9.07	5.1	7.93	-6.4	5.3	8.29
Americium 241	0.064	0.15	0.323	0.118	0.16	0.283	0.196	0.21	0.342
Iodine 129	1	26	18	1	17	26	1	26	42
Neptunium 237	0.122	0.17	0.165	0	0	0.0762	0.0336	0.067	0.0911
Plutonium 238	-0.00344	0.15	0.391	-0.0705	0.082	0.319	-0.0593	0.17	0.458
Plutonium 239	0	0	0.112	-0.0235	0.047	0.223	0.0123	0.098	0.265
Radium (total)	0.34	0.47	0.46	-0.14	0.76	1.99	0.21	0.63	1.59
Strontium 89/90	0.49	0.47	2.96	0.48	1.3	3.15	-1.54	1.1	2.91
Technetium 99	0	7.1	11.7	1	3.9	6.26	1.5	3.8	6.26
Tritium (X10)	160	190	207	150	220	235	190	220	235
Tritium	-	-	-	-	-	-	-	-	-
Uranium 234	0.204	0.22	0.308	0.129	0.22	0.404	0.679	0.39	0.0142
Uranium 235	0	0	0.158	0	0	0.167	0.0199	0.16	0.0429
Uranium 238	-0.0977	0.11	0.442	0.361	0.29	0.325	0.0523	0.11	0.0142

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-373						GW-521		
	CMP-B								
Program	BG						LIV		
Location	02/28/96			07/25/96			01/16/96		
Date Sampled	Sample Type								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-3.66	0.22	7.29	20.3	31	54.2	1.16	6.5	15.3
Gross Beta	0.73	4.4	8.28	-147	95	171	-4.96	0.1	16.1
Americium 241	-0.0625	0.13	0.592	0.0678	0.12	0.212	0.155	0.16	0.105
Iodine 129	1	31	22	-1	13	21	-1	44	23
Neptunium 237	-0.0756	0.11	0.446	0.00823	0.066	0.177	0.0398	0.0797	0.108
Plutonium 238	-0.0848	0.12	0.5	-0.0151	0.11	0.319	-0.00413	0.18	0.467
Plutonium 239	-0.0848	0.12	0.5	-0.054	0.077	0.319	-0.0344	0.069	0.326
Radium (total)	-0.54	0.38	2.05	0.27	0.81	2.14	0.77	0.9	1.38
Strontium 89/90	-0.09	0.51	2.81	-2	1.3	3.44	1.65	0.77	4.11
Technetium 99	4	8.4	11.7	2	4	6.26	5	21	12.9
Tritium (X10)	-49	200	207	-90	210	235	190	170	260
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0.146	0.25	0.457	0.115	0.16	0.156	0.229	0.15	0.0622
Uranium 235	0	0	0.189	-0.0498	0.1	0.473	0	0	0.0775
Uranium 238	0.0171	0.14	0.368	0	0	0.156	0.03	0.073	0.151

(CONTINUED)

Sampling Point	GW-521			GW-537					
	CMP-B								
Program	LIV			OLF					
Location	07/02/96			03/25/96			08/20/96		
Date Sampled	Sample Type								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-1.59	0.2	5.94	3.7	5.5	9.63	16.7	19	29.7
Gross Beta	-3.11	0.05	8.38	168	24	8.94	401	81	72.5
Americium 241	-0.00454	0.2	0.513	.	.	.	.	.	.
Iodine 129	1	52	43	.	.	.	.	.	.
Neptunium 237	0.00882	0.07	0.19	.	.	.	.	.	.
Plutonium 238	0.00786	0.16	0.37	.	.	.	.	.	.
Plutonium 239	0.0461	0.11	0.233	.	.	.	.	.	.
Radium (total)	0.13	0.77	2.05	.	.	.	.	.	.
Strontium 89/90	-3.06	1.5	3.22	2.51	2.8	6.42	-1.65	2	4.59
Technetium 99	-11	8.1	13.1	1200	120	12.5	1060	110	6.51
Tritium (X10)	210	190	216	230	200	222	.	.	.
Tritium	.	.	.	.	.	.	103	230	408
Uranium 234	0.296	0.41	0.672	.	.	.	.	.	.
Uranium 235	0	0	0.277	.	.	.	.	.	.
Uranium 238	0	0	0.223	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-613						GW-614		
	CMP-B						CMP-B		
Location	S3						S3		
Date Sampled	01/31/96			07/01/96			02/12/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.78	3.8	6.87	-3.95	0.2	7.6	2.05	4.2	7.2
Gross Beta	0.62	4.4	7.68	-0.093	0.05	8.57	1.67	4.6	7.73
Americium 241	-0.022	0.22	0.53	-0.0598	0.12	0.32	0.163	0.15	0.0882
Iodine 129	1	27	15	1	25	23	7	51	32
Neptunium 237	0.0231	0.046	0.0627	0	0	0.0661	0.0268	0.054	0.0725
Plutonium 238	0.13	0.32	0.657	0.0128	0.1	0.276	0.817	1.1	1.63
Plutonium 239	0	0	0.27	0	0	0.114	0.494	0.7	0.669
Radium (total)	0.14	0.78	2.08	0.04	0.51	1.57	0.23	0.48	1.05
Strontium 89/90	-1.3	0.68	3.68	-3.59	1.7	3.67	-1.5	0.53	2.82
Technetium 99	0	7.9	11.9	-12	8.3	13.1	-6	11	11.9
Tritium (X10)	50	200	217	130	190	214	40	200	217
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0.136	0.16	0.123	0.0523	0.11	0.142	0.222	0.2	0.12
Uranium 235	0	0	0.153	0	0	0.177	-0.0769	0.11	0.454
Uranium 238	0.136	0.16	0.123	0	0	0.142	0	0	0.121

(CONTINUED)

Sampling Point	GW-614			GW-621					
	CMP-B			EXP					
Location	S3			EXP-B					
Date Sampled	07/01/96			03/14/96					
Sample Type				Dup					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-2.04	0.2	7.86	1.01	4.2	7.31	-0.4	0.23	7.45
Gross Beta	0	0.05	8.61	3.95	5.4	8.88	2.6	5.3	7.95
Americium 241	-0.0554	0.064	0.251	.	.	.	.	.	.
Iodine 129	1	35	31	.	.	.	.	.	.
Neptunium 237	0.008	0.064	0.172	.	.	.	.	.	.
Plutonium 238	-0.00389	0.17	0.44	.	.	.	.	.	.
Plutonium 239	0.0933	0.13	0.126	.	.	.	.	.	.
Radium (total)	1.3	1	0.96	.	.	.	.	.	.
Strontium 89/90	-1.53	1.5	3.2	.	.	.	.	.	.
Technetium 99	-9	7.8	13.1	.	.	.	.	.	.
Tritium (X10)	160	190	214	.	.	.	.	.	.
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0	0	0.214	.	.	.	.	.	.
Uranium 235	-0.0683	0.14	0.648	.	.	.	.	.	.
Uranium 238	0.0791	0.16	0.214	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-621						GW-627		
	EXP						SMP		
Program	EXP-B						BG		
Location	EXP-B						BG		
Date Sampled	07/23/96						03/28/96		
Sample Type	Dup								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	3.03	2.3	2.98	3.26	2.3	2.91	6.47	5.4	10.9
Gross Beta	11.9	6.1	8.81	-2.21	16	7.98	4.73	4.7	8.72
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-627			GW-642					
	SMP			CMP-B					
Program	SMP			CMP-B					
Location	BG			BG					
Date Sampled	09/06/96			02/24/96			07/09/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	1.23	6.7	5.33	0	0.2	6.71	-1.38	0.2	5.93
Gross Beta	14.7	7	8	7.98	5	8.18	-1.76	0.05	8.38
Americium 241	.	.	.	0.0646	0.16	0.328	0.0947	0.16	0.297
Iodine 129	.	.	.	1	24	17	1	28	23
Neptunium 237	.	.	.	0.185	0.24	0.368	-0.0208	0.042	0.197
Plutonium 238	.	.	.	-0.00043	0.019	0.0485	-0.0071	0.011	0.0327
Plutonium 239	.	.	.	0	0	0.0139	0	0	0.00778
Radium (total)	.	.	.	-0.13	0.36	1.51	0.89	0.92	1.46
Strontium 89/90	.	.	.	-0.83	0.65	3.54	-1.77	1.7	3.59
Technetium 99	.	.	.	2	7.8	11.7	-7	7.5	13.1
Tritium (X10)	.	.	.	90	190	207	130	190	215
Tritium
Uranium 234	.	.	.	0.0146	0.12	0.314	0.0604	0.12	0.164
Uranium 235	.	.	.	0	0	0.161	0	0	0.204
Uranium 238	.	.	.	-0.0332	0.067	0.315	0.0605	0.12	0.164

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-653						GW-683		
	SMP						EXP		
Location	BG						EXP-A		
Date Sampled	03/26/96			08/28/96			03/15/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	3.11	3.8	7.59	0.771	2.2	4.1	7.95	5.2	7.32
Gross Beta	3.51	4.4	8.39	0.364	1.4	7.36	5.7	5.5	7.93
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-683			GW-684					
	EXP			EXP					
Location	EXP-A			EXP-A					
Date Sampled	07/29/96			03/16/96			07/29/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	26.1	6.2	3.3	14.8	6.3	7.47	19.4	5.3	3.35
Gross Beta	34	7.4	7.15	14.6	6.3	7.96	31.1	6.5	6.37
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-685						GW-694		
	EXP						EXP		
Program	EXP-A						EXP-B		
Location	EXP-A						EXP-B		
Date Sampled	03/15/96			07/25/96			03/18/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	1.06	4.4	7.84	3.09	2.5	3.17	43.6	10	7.6
Gross Beta	-1.36	0.05	8.01	-1.95	3.2	7.82	41.7	9.1	7.98
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90	-0.063	1.2	2.87
Technetium 99	44.5	6.5	5.86
Tritium (X10)	-190	180	222
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-694			GW-695					
	EXP			EXP					
Program	EXP-B			EXP-B					
Location	EXP-B			EXP-B					
Date Sampled	08/01/96			03/14/96			07/23/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.188	1.9	3.35	9.09	5.7	7.79	4.22	2.6	3
Gross Beta	-0.664	3.4	6.6	17.5	6.6	8	14.4	4.9	7.68
Americium 241	.	.	.	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.	.	.	.
Radium (total)	.	.	.	.	.	.	.	.	.
Strontium 89/90	-1.07	1.2	2.71	.	.	.	.	.	.
Technetium 99	16	5.2	6.35	.	.	.	.	.	.
Tritium (X10)	.	.	.	.	.	.	.	.	.
Tritium	255	200	375	.	.	.	.	.	.
Uranium 234	.	.	.	.	.	.	.	.	.
Uranium 235	.	.	.	.	.	.	.	.	.
Uranium 238	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-703						GW-704		
	EXP						EXP		
Location	EXP-B						EXP-B		
Date Sampled	03/16/96			07/31/96			03/17/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	4.18	4.9	7.7	4.5	2.9	3.47	2.28	4.5	7.63
Gross Beta	33.4	8.2	7.99	32.9	6.9	6.69	4.9	5.5	7.98
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-704			GW-706					
	EXP			EXP					
Location	EXP-B			EXP-B					
Date Sampled	08/01/96			03/19/96			08/06/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	31.3	7	3.48	53.7	12	7.75	62.8	11	3.64
Gross Beta	16.9	5.1	6.45	52.8	10	8	44.4	81	6.64
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90	.	.	.	-1.02	1.2	3.17	-1.42	1.4	3.57
Technetium 99	.	.	.	56	7.6	5.86	65.5	8.5	6.36
Tritium (X10)	.	.	.	-40	180	222	.	.	.
Tritium	60.9	190	375
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-710						GW-711		
	CMP-E						CMP-E		
Location	EXP-W						EXP-W		
Date Sampled	01/29/96			07/16/96			01/26/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-2	1.2	35.7	16.3	92	135	-17.2	2.8	87.5
Gross Beta	6.22	18	29.6	20.8	92	174	10.7	51	86.3
Americium 241	0.0801	0.16	0.217	-0.181	0.21	0.819	1.34	0.77	0.748
Iodine 129	1	28	15	1	42	35	11	37	23
Neptunium 237	-0.0552	0.078	0.326	0.0215	0.17	0.463	0.0373	0.075	0.101
Plutonium 238	-0.00235	0.1	0.265	0.0571	0.14	0.289	-0.0453	0.064	0.267
Plutonium 239	-0.0196	0.039	0.186	-0.0489	0.069	0.289	-0.0353	0.1	0.307
Radium (total)	2.1	1.2	1	3.5	2.6	3.11	5.4	2.2	1.6
Strontium 89/90	-1.11	0.5	2.81	-1.48	1.1	2.71	-1.41	0.56	3.09
Technetium 99	-7	12	12.8	5	21	12.7	-2	8.5	12.8
Tritium (X10)	170	190	203	-140	170	222	82	180	203
Tritium	-	-	-	-	-	-	-	-	-
Uranium 234	0.0314	0.026	0.0142	0.0225	0.18	0.485	0.0157	0.13	0.338
Uranium 235	-0.00453	0.0091	0.0429	0	0	0.249	0	0	0.174
Uranium 238	0.0157	0.018	0.0142	0.0738	0.15	0.2	0.103	0.15	0.139

(CONTINUED)

Sampling Point	GW-711			GW-712					
	CMP-E			CMP-E					
Location	EXP-W			EXP-W					
Date Sampled	07/14/96			01/26/96			07/15/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-43.1	4.4	143	0.66	4.4	7.88	-1.32	0.22	7.72
Gross Beta	0	1.1	175	-4.21	0.05	8.51	3.26	4.8	8.8
Americium 241	-0.25	0.38	1.15	0.0149	0.12	0.319	0.094	0.23	0.478
Iodine 129	2	80	67	3	27	16	-11	13	21
Neptunium 237	0.0575	0.12	0.156	0.052	0.13	0.264	0	0	0.222
Plutonium 238	-0.0908	0.14	0.42	0.0105	0.084	0.226	-0.0186	0.14	0.396
Plutonium 239	0	0	0.1002	0	0	0.093	-0.0335	0.0672	0.319
Radium (total)	4.1	2.4	2.76	0.68	0.8	1.4	0.14	0.72	2.27
Strontium 89/90	-1.01	1.2	2.9	-0.29	0.57	3.28	-0.03	1.6	3.52
Technetium 99	-5	7.6	12.7	-1	2	12.8	-1	8.5	12.7
Tritium (X10)	-120	180	222	230	190	203	-100	180	222
Tritium	-	-	-	-	-	-	-	-	-
Uranium 234	0.0131	0.1	0.283	0.441	0.36	0.466	0.221	0.3	0.501
Uranium 235	0.0535	0.11	0.145	-0.0428	0.086	0.406	0	0	0.207
Uranium 238	-0.0299	0.06	0.283	0	0	0.134	0.491	0.36	0.166

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-713								
	CMP-E								
Location	EXP-W								
	01/28/96						07/17/96		
Sample Type	Dup								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-0.43	0.25	7.62	4.26	4.8	7.6	-1.04	0.21	8.7
Gross Beta	2.51	5.1	8.47	0.73	5	8.47	-2.92	0.05	8.36
Americium 241	-0.00485	0.22	0.549	0.176	0.23	0.351	0.0391	0.156	0.334
Iodine 129	2	29	16	1	27	16	1	28	23
Neptunium 237	0.11	0.13	0.0989	0.0103	0.082	0.221	0	0	0.0767
Plutonium 238	-0.0259	0.187	0.545	0.267	0.21	0.253	0.134	0.16	0.122
Plutonium 239	0.0406	0.23	0.545	-0.043	0.061	0.253	0	0	0.122
Radium (total)	1.3	1	1.3	0.85	0.78	1	0.3	1.2	4.78
Strontium 89/90	-1.22	0.57	3.22	2.81	0.95	4.79	-2.16	1.3	2.81
Technetium 99	-9	11	12.8	1	8.5	12.8	5	9.1	12.7
Tritium (X10)	120	180	203	240	190	203	-18	178	222
Tritium	-	-	-	-	-	-	-	-	-
Uranium 234	0.85	0.46	0.154	0.364	0.24	0.257	0.375	0.28	0.297
Uranium 235	0	0	0.191	0.0391	0.078	0.106	0	0	0.153
Uranium 238	0.131	0.21	0.374	0.189	0.16	0.0852	-0.0628	0.089	0.37

(CONTINUED)

Sampling Point	GW-713			GW-714					
	CMP-E			CMP-E					
Location	EXP-W			EXP-W					
	07/17/96			01/29/96			07/17/96		
Sample Type	Dup								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-1.02	0.21	8.55	3.7	-4.6	7.33	-1	0.21	8.43
Gross Beta	1.25	4.9	8.34	4.58	5.3	8.43	1.56	4.9	8.32
Americium 241	-0.0537	0.076	0.317	-0.0312	0.063	0.296	0.108	0.19	0.348
Iodine 129	2	60	49	1	37	21	-7	34	55
Neptunium 237	0	0	0.128	-0.044	0.062	0.259	0.0435	0.087	0.118
Plutonium 238	0.0628	0.089	0.085	0.271	0.21	0.105	-0.0391	0.11	0.343
Plutonium 239	-0.0217	0.043	0.204	0	0	0.105	0.0364	0.073	0.0987
Radium (total)	1.3	1.4	1.89	0.63	0.95	2	0.16	0.76	2.4
Strontium 89/90	-1.87	1.3	2.91	1.09	0.65	3.57	-0.48	1.6	3.2
Technetium 99	4	8.2	12.7	0	-	12.8	2	9.2	12.7
Tritium (X10)	-112	174	222	150	190	203	-41	176	222
Tritium	-	-	-	-	-	-	-	-	-
Uranium 234	0.595	0.34	0.124	1.42	0.54	0.281	0.345	0.22	0.0935
Uranium 235	0.571	0.11	0.155	0.0694	0.17	0.35	0	0	0.117
Uranium 238	0.0459	0.092	0.124	0.726	0.37	0.116	0.692	0.32	0.0937

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-715						GW-723		
	CMP-E						EXP		
Program	EXP-W						EXP-C		
Location	EXP-W						EXP-C		
Date Sampled	01/29/96			07/18/96			03/21/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	2.76	4.6	7.57	0.21	4.5	8.66	0.41	4.2	8.22
Gross Beta	3.87	5.2	8.46	0.73	4.9	8.36	6.77	5.4	8.81
Americium 241	0.488	0.27	0.0944	0.0358	0.19	0.41	.	.	.
Iodine 129	1	29	16	1	30	26	.	.	.
Neptunium 237	0.0609	0.086	0.083	0	0	0.0921	.	.	.
Plutonium 238	1.24	0.48	0.311	-0.049	0.07	0.29	.	.	.
Plutonium 239	0	0	0.103	0	0	0.0961	.	.	.
Radium (total)	1.1	0.9	1.1	-5.9	1.6	32.81	.	.	.
Strontium 89/90	-0.91	49	2.81	-1.88	1.3	2.83	.	.	.
Technetium 99	12	18	12.8	1	8.5	12.7	.	.	.
Tritium (X10)	270	190	203	-96	175	222	.	.	.
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	0.423	0.24	0.0882	0.274	0.21	0.106	.	.	.
Uranium 235	0.0812	0.12	0.11	0.0487	0.098	0.132	.	.	.
Uranium 238	0.226	0.21	0.307	0.196	0.18	0.106	.	.	.

(CONTINUED)

Sampling Point	GW-723			GW-724					
	EXP			EXP					
Program	EXP-C			EXP-C					
Location	EXP-C			EXP-C					
Date Sampled	08/09/96			03/21/96					
Sample Type				Dup					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	1.84	1.7	2.15	4.75	5.1	8.63	8.48	5.7	8.7
Gross Beta	8.65	5.2	7.71	36.9	8.4	8.87	39.6	8.7	8.88
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-724						GW-725		
	EXP								
Program	EXP-C						EXP-C		
Location	08/14/96						03/22/96		
Date Sampled	Dup								
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	2.83	2.1	2.27	3.72	2.3	2.28	3.46	5.3	9.24
Gross Beta	29.5	6.9	7.58	33.5	7.1	7.41	34.3	8.2	8.95
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-725			GW-738					
	EXP								
Program	EXP-C			EXP-C					
Location	08/13/96			03/20/96			08/08/96		
Date Sampled	Dup								
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	1.13	1.5	2.35	3.14	5.1	8.98	5.11	2.6	2.2
Gross Beta	25.4	6.8	7.94	33.2	8	8.92	22.2	5.9	7.22
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-740						GW-793		
	EXP						BMP		
Program	EXP-C						AGLLSF		
Location	EXP-C						AGLLSF		
Date Sampled	03/19/96			08/07/96			03/27/96		
Sample Type	ACT			ERR			MDA		
ACTIVITY (pCi/L)	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
Gross Alpha	2.05	4.5	8.2	1.66	1.6	2.14	3.6	4	7.79
Gross Beta	4.89	5.2	8.81	12.9	6.3	8.22	3.63	4.4	8.42
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-793						GW-794		
	BMP						BMP		
Program	AGLLSF						AGLLSF		
Location	AGLLSF						AGLLSF		
Date Sampled	03/27/96			08/26/96			03/25/96		
Sample Type	Dup			Dup			Dup		
ACTIVITY (pCi/L)	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
Gross Alpha	2.21	3.7	7.83	-1.57	1.6	4.23	4.14	4.2	8.07
Gross Beta	6.96	4.7	8.42	-4.75	5.4	7.01	5.63	4.6	8.46
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-794			GW-795					
	BMP			BMP					
Location	AGLLSF			AGLLSF					
Date Sampled	08/26/96			03/25/96			08/26/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	-0.726	1.7	4.33	3.07	3.9	7.98	-0.93	1.8	4.19
Gross Beta	-3.06	5.9	7.23	5.2	4.6	8.45	-5.21	4.8	7.24
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90
Technetium 99
Tritium (X10)
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

Sampling Point	GW-828			GW-829					
	SMP			SMP					
Location	OLF			OLF					
Date Sampled	03/26/96			08/21/96			03/27/96		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)
Gross Alpha	18	7.2	9.88	3.12	2.7	3.53	3.36	5	8.74
Gross Beta	15.5	5.7	8.7	7.92	6	7.33	0.74	5.2	8.82
Americium 241
Iodine 129
Neptunium 237
Plutonium 238
Plutonium 239
Radium (total)
Strontium 89/90	-0.09	1.4	3.38
Technetium 99	4	19	12.5
Tritium (X10)	-160	180	222
Tritium
Uranium 234
Uranium 235
Uranium 238

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1996

Sampling Point	GW-829			NT-01					
	SMP			EXP					
Location	OLF			EXP-SW					
Date Sampled	08/22/96			03/18/96			08/13/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	6.62	3.2	3.17	11.7	5.8	7.7	11.5	4	2.26
Gross Beta	4.17	5.1	6.82	173	25	8.94	67.8	11	7.71
Americium 241	.	.	.	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.	.	.	.
Radium (total)	.	.	.	.	.	.	.	.	.
Strontium 89/90	-0.42	1.3	3	-0.35	1.2	2.81	-1.38	1.4	3.02
Technetium 99	4	10	6.51	313	32	5.86	107	12	6.4
Tritium (X10)	.	.	.	280	210	222	.	.	.
Tritium	-192	200	408	.	.	.	-106	170	400
Uranium 234	.	.	.	.	.	.	.	.	.
Uranium 235	.	.	.	.	.	.	.	.	.
Uranium 238	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	SS-1			SS-4					
	EXP			EXP					
Location	EXP-SW			EXP-SW					
Date Sampled	03/18/96			08/13/96			03/16/96		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	16.3	6.7	8.12	12.5	4.2	2.37	51	11	7.51
Gross Beta	32.4	8	9.01	28.1	7.6	8.51	53.2	10	8.91
Americium 241	.	.	.	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.	.	.	.
Radium (total)	.	.	.	.	.	.	.	.	.
Strontium 89/90	-1.21	1.1	2.82	1.35	1.5	2.82	-0.049	1.1	2.82
Technetium 99	67	8.4	5.86	48	7	6.4	52	7.1	5.86
Tritium (X10)	-110	180	222	.	.	.	-20	190	222
Tritium	.	.	.	15.4	237	400	.	.	.
Uranium 234	.	.	.	.	.	.	.	.	.
Uranium 235	.	.	.	.	.	.	.	.	.
Uranium 238	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX E
CY 1996 DATA FOR
QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

EXPLANATION

SAMPLING POINT:

- BCK - Bear Creek Kilometer
- GW - Monitoring Well
- NT - Northern Tributary
- SS - Spring
- D - Field Duplicate Sample

LOCATION:

- AGLLSF - Above Grade Low-Level Storage Facility
- BG - Bear Creek Burial Grounds WMA
- EXP - Exit Pathway Monitoring Location:
Maynardville Limestone Picket (-A, -B, -C, -W)
Spring or Surface Water Sampling Location (-SW)
- LIV - Industrial Landfill IV (Chestnut Ridge Regime)
- OLF - Oil Landfarm WMA
- RS - Rust Spoil Area
- S3 - S-3 Site
- SPI - Spoil Area I

UNITS:

- ug/L - micrograms per liter (organic analytes)
- mg/L - milligrams per liter (inorganic analytes)
- pCi/L - picoCuries per liter (radiological analytes)

SAMPLE TYPE (Radiological):

- ACT - Activity
- ERR - Counting Error (two standard deviations)
- MDA - Minimum Detectable Activity

NOTES:

- .
- U - Not analyzed
- U - Organic compound not detected at the reported minimum attainable detection limit.

Organic Compounds Detected in QA/QC Samples, CY 1996

Trip Blank Samples	Quarter of CY 1996		Annual Total
	First	Third	
Total Number of Samples	37	38	75
Samples With VOCs	13	28	41
Percent Contaminated	35	74	55
Acetone	1	0	1
2-Butanone	6	0	6
Chloroform	2	20	21
1,2-Dichloropropane	1	23	23
1,1,1-Trichloroethane	4	0	4

Laboratory Blank Samples	Quarter of CY 1996		Annual Total
	First	Third	
Total Number of Samples	23	28	51
Samples With VOCs	7	0	7
Percent Contaminated	30	0	14
Acetone	6	0	6
2-Butanone	6	0	6

Equipment Rinsate Samples	Quarter of CY 1996		Annual Total
	First	Third	
Total Number of Samples	11	11	22
Samples With VOCs	7	11	18
Percent Contaminated	64	100	82
Acetone	7	11	18
2-Butanone	3	5	8
Chloroform	1	10	11
1,2-Dichloropropane	0	3	3
2-Hexanone	1	1	2

Field Blank Samples	Quarter of CY 1996		Annual Total
	First	Third	
Total Number of Samples	1	1	2
Samples With VOCs	1	1	2
Percent Contaminated	100	100	100
Acetone	1	1	2
2-Butanone	1	0	1
1,2-Dichloropropane	1	0	1

APPENDIX E.1

**CORRELATION OF GROUNDWATER AND SURFACE WATER
SAMPLES TO ASSOCIATED BLANKS**

APPENDIX E.1
Correlation of Samples to Associated Blanks
First Quarter 1996

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
BCK-03.87	EXP-SW	01/30/96	960130-267	960130-269	960201-001
BCK-04.55	EXP-SW	01/30/96	960130-263	960130-269	960201-001
BCK-07.75	EXP-SW	01/30/96	960130-265	960130-269	960201-001
BCK-09.40	EXP-SW	03/16/96	960319-018	960319-022	960321-026
BCK-10.60	EXP-SW	03/17/96	960320-038	960320-040	960321-078
BCK-11.97	EXP-SW	03/17/96	960320-036	960320-040	960321-078
GW-040	BG	03/26/96	960327-011	960327-017	960412-001
GW-042	BG	03/26/96	960327-013	960327-017	960412-001
GW-043	OLF	02/01/96	960205-010	960205-012	960206-011
GW-044	OLF	01/31/96	960131-061	960131-067	960201-036
GW-053	BG	03/26/96	960327-026	960327-021	960328-006
GW-056	EXP-A	03/14/96	960314-097	960314-099	960320-014
GW-069	BG	02/25/96	960226-103	960226-111	960228-147
GW-079	BG	02/25/96	960226-105	960226-111	960228-147
GW-080	BG	02/24/96	960225-025	960225-027	960227-066
GW-084	OLF	02/01/96	960205-013	960205-012	960206-011
GW-085	OLF	03/25/96	960325-068	960325-074	960328-006
GW-095	BG	03/26/96	960327-019	960327-021	960328-006
GW-115	S3	01/31/96	960131-065	960131-067	960201-036
GW-162	BG	02/26/96	960227-037	960227-039	960228-147
GW-276	S3	02/29/96	960301-008	960301-011	960306-038
GW-287	BG	03/26/96	960327-022	960327-021	960328-006
GW-311	RS	03/25/96	960325-072	960325-074	960408-069
GW-315	SPI	03/26/96	960327-030	960327-032	960412-001
GW-315 D	SPI	03/26/96	960327-033	960327-032	960415-034
GW-363	OLF	02/12/96	960213-040	960213-042	960213-015
GW-363 D	OLF	02/12/96	960213-043	960213-042	960213-015
GW-372	BG	02/25/96	960226-107	960226-111	960228-147
GW-372 D	BG	02/25/96	960226-109	960226-111	960228-147
GW-373	BG	02/28/96	960229-069	960229-071	960304-007
GW-521	LIV	01/16/96	960116-045	960116-047	960117-014
GW-537	OLF	03/25/96	960325-070	960325-074	960328-006
GW-613	S3	01/31/96	960131-063	960131-067	960201-036
GW-614	S3	02/12/96	960213-045	960213-042	960214-011
GW-621	EXP-B	03/14/96	960314-091	960314-099	960320-014
GW-621 D	EXP-B	03/14/96	960314-093	960314-099	960320-014
GW-627	BG	03/28/96	960328-066	960328-068	960401-004
GW-642	BG	02/24/96	960225-028	960225-027	960227-066
GW-653	BG	03/26/96	960327-024	960327-021	960328-006
GW-683	EXP-A	03/15/96	960318-009	960318-011	960321-026
GW-684	EXP-A	03/16/96	960319-020	960319-022	960321-026
GW-685	EXP-A	03/15/96	960320-090	960320-092	960321-078
GW-694	EXP-B	03/18/96	960319-010	960319-012	960322-046
GW-695	EXP-B	03/14/96	960314-095	960314-099	960320-014
GW-703	EXP-B	03/16/96	960320-093	960320-095	960321-078
GW-704	EXP-B	03/17/96	960318-012	960318-014	960322-046
GW-706	EXP-B	03/19/96	960320-049	960320-051	960325-001
GW-710	EXP-W	01/29/96	960130-128	960130-130	960131-011
GW-711	EXP-W	01/26/96	960126-031	960126-033	960129-065
GW-712	EXP-W	01/26/96	960126-029	960126-033	960129-065
GW-713	EXP-W	01/28/96	960129-059	960129-063	960129-065
GW-713 D	EXP-W	01/28/96	960129-061	960129-063	960129-065
GW-714	EXP-W	01/29/96	960129-096	960129-098	960131-011
GW-715	EXP-W	01/29/96	960129-099	960129-098	960131-011

APPENDIX E.1
Correlation of Samples to Associated Blanks
First Quarter 1996

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
GW-723	EXP-C	03/21/96	960322-021	960322-023	960327-018
GW-724	EXP-C	03/21/96	960322-001	960322-003	960408-069
GW-724 D	EXP-C	03/21/96	960322-004	960322-003	960327-018
GW-725	EXP-C	03/22/96	960322-038	960322-040	960327-018
GW-738	EXP-C	03/20/96	960321-057	960321-059	960408-069
GW-740	EXP-C	03/19/96	960320-103	960320-105	960325-001
GW-793	AGLLSF	03/27/96	960328-001	960328-003	960412-001
GW-793 D	AGLLSF	03/27/96	960328-004	960328-003	960401-004
GW-794	AGLLSF	03/25/96	960326-009	960326-011	960408-069
GW-795	AGLLSF	03/25/96	960326-007	960326-011	960408-069
GW-828	OLF	03/26/96	960327-028	960327-032	960412-001
GW-829	OLF	03/27/96	960328-009	960328-011	960401-004
NT-01	EXP-SW	03/18/96	960319-006	960319-012	960322-046
SS-1	EXP-SW	03/18/96	960319-008	960319-012	960322-046
SS-4	EXP-SW	03/16/96	960320-096	960320-098	960321-078
SS-5	EXP-SW	03/16/96	960319-016	960319-022	960321-026

APPENDIX E.1
Correlation of Samples to Associated Blanks
Third Quarter 1996

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
BCK-00.63	EXP-SW	08/06/96	960807-072	960807-075	960809-013
BCK-03.87	EXP-SW	07/14/96	960715-009	960715-017	960716-030
BCK-04.55	EXP-SW	07/14/96	960715-011	960715-017	960716-030
BCK-07.75	EXP-SW	07/14/96	960715-013	960715-017	960716-030
BCK-09.40	EXP-SW	07/29/96	960730-002	960730-008	960730-014
BCK-10.60	EXP-SW	07/30/96	960730-077	960730-081	960731-005
BCK-11.97	EXP-SW	08/13/96	960813-093	960813-102	960814-004
GW-040	BG	07/18/96	960719-003	960719-005	960722-013
GW-042	BG	07/18/96	960719-001	960719-005	960722-013
GW-043	OLF	07/08/96	960708-049	960708-044	960709-032
GW-044	OLF	07/08/96	960708-042	960708-044	960709-032
GW-053	BG	08/28/96	960828-046	960828-045	960829-011
GW-056	EXP-A	07/23/96	960723-074	960723-082	960724-007
GW-069	BG	07/23/96	960723-067	960723-073	960724-007
GW-079	BG	07/24/96	960724-060	960724-064	960725-012
GW-080	BG	07/24/96	960724-062	960724-064	960725-012
GW-084	OLF	07/08/96	960708-045	960708-044	960709-032
GW-085	OLF	08/20/96	960820-085	960820-087	960821-002
GW-095	BG	08/27/96	960828-008	960828-012	960828-013
GW-095 D	BG	08/27/96	960828-010	960828-012	960828-013
GW-115	S3	07/02/96	960702-101	960702-103	960705-017
GW-162	BG	07/24/96	960724-058	960724-064	960725-012
GW-276	S3	07/08/96	960708-047	960708-044	960709-032
GW-287	BG	08/27/96	960828-006	960828-012	960828-013
GW-311	RS	08/14/96	960815-004	960815-006	960815-003
GW-315	SPI	08/19/96	960820-010	960820-009	960821-002
GW-315 D	SPI	08/19/96	960820-007	960820-009	960821-002
GW-363	OLF	07/02/96	960702-095	960702-103	960705-017
GW-363 D	OLF	07/02/96	960702-097	960702-103	960705-017
GW-372	BG	07/23/96	960723-069	960723-073	960724-007
GW-372 D	BG	07/23/96	960723-071	960723-073	960724-007
GW-373	BG	07/25/96	960725-043	960725-045	960726-012
GW-521	LIV	07/02/96	960702-104	960702-112	960705-017
GW-537	OLF	08/20/96	960820-083	960820-087	960821-002
GW-613	S3	07/01/96	960702-001	960702-005	960702-006
GW-614	S3	07/01/96	960702-003	960702-005	960702-006
GW-621	EXP-B	07/23/96	960723-080	960723-082	960724-007
GW-621 D	EXP-B	07/23/96	960723-078	960723-082	960724-007
GW-627	BG	09/06/96	960906-074	960906-076	960909-002
GW-642	BG	07/09/96	960709-095	960709-097	960710-003
GW-653	BG	08/28/96	960828-043	960828-045	960829-011
GW-683	EXP-A	07/29/96	960730-006	960730-008	960730-014
GW-684	EXP-A	07/29/96	960730-009	960730-011	960730-014
GW-685	EXP-A	07/25/96	960725-047	960725-049	960729-001
GW-694	EXP-B	08/01/96	960802-007	960802-009	960802-010
GW-695	EXP-B	07/23/96	960723-076	960723-082	960724-007
GW-703	EXP-B	07/31/96	960731-091	960731-093	960801-001
GW-704	EXP-B	08/01/96	960802-011	960802-013	960802-010
GW-706	EXP-B	08/06/96	960807-073	960807-075	960809-013
GW-710	EXP-W	07/16/96	960717-001	960717-003	960717-004
GW-711	EXP-W	07/14/96	960715-015	960715-017	960716-030
GW-712	EXP-W	07/15/96	960715-090	960715-092	960717-004
GW-713	EXP-W	07/17/96	960717-071	960717-073	960718-003
GW-713 D	EXP-W	07/17/96	960717-074	960717-073	960718-003

APPENDIX E.1
Correlation of Samples to Associated Blanks
Third Quarter 1996

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
GW-714	EXP-W	07/17/96	960718-006	960718-008	960718-003
GW-715	EXP-W	07/18/96	960718-100	960718-102	960719-018
GW-723	EXP-C	08/09/96	960809-117	960809-119	960813-013
GW-724	EXP-C	08/14/96	960814-041	960814-043	960815-003
GW-724 D	EXP-C	08/14/96	960814-038	960814-043	960815-003
GW-725	EXP-C	08/13/96	960813-100	960813-102	960814-004
GW-738	EXP-C	08/08/96	960808-055	960808-057	960812-001
GW-740	EXP-C	08/07/96	960808-004	960808-006	960809-013
GW-793	AGLLSF	08/26/96	960827-027	960827-029	960828-013
GW-794	AGLLSF	08/26/96	960827-025	960827-029	960828-013
GW-795	AGLLSF	08/26/96	960827-023	960827-029	960828-013
GW-828	OLF	08/21/96	960821-054	960821-056	960822-001
GW-829	OLF	08/22/96	960822-041	960822-043	960823-011
NT-01	EXP-SW	08/13/96	960813-097	960813-102	960814-004
SS-1	EXP-SW	08/13/96	960813-095	960813-102	960814-004
SS-4	EXP-SW	07/30/96	960730-079	960730-081	960731-005
SS-5	EXP-SW	07/29/96	960730-004	960730-008	960730-014

APPENDIX E.2

TRIP BLANK DATA SUMMARY

APPENDIX E.2
Organics Detected in Trip Blank Samples, First Quarter 1996

Sample Number	960116-047	960126-033	960129-063	960129-098	960130-130	960130-269	960131-067	960205-012
ORGANICS (ug/L)	-	-	-	-	-	-	-	-
Acetone	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	3	10U	3	10U	3	10U	3

(CONTINUED)

Sample Number	960213-042	960225-027	960226-111	960227-039	960229-071	960301-011	960314-099	960318-011
ORGANICS (ug/L)	-	-	-	-	-	-	-	-
Acetone	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U ¹¹	10	10U	10U	10U
Chloroform	10U	10U	10U	10U	1	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

Sample Number	960318-014	960319-012	960319-022	960320-040	960320-051	960320-092	960320-095	960320-098
ORGANICS (ug/L)	-	-	-	-	-	-	-	-
Acetone	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U ¹¹	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

Sample Number	960320-105	960321-059	960322-003	960322-023	960322-040	960325-074	960326-011	960327-017
ORGANICS (ug/L)	-	-	-	-	-	-	-	-
Acetone	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10	10U	10U	10	10U	10U	10U	10U
Chloroform	10U	10U	1	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	1	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

Sample Number	960327-021	960327-032	960328-003	960328-011	960328-068
ORGANICS (ug/L)	-	-	-	-	-
Acetone	10U	10U	10U	10U	5
2-Butanone	11	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	10U	10U	10U	10U	10U

APPENDIX E.2
Organics Detected in Trip Blank Samples, Third Quarter 1996

Sample Number	960702-005	960702-103	960702-112	960708-044	960709-097	960715-017	960715-092	960717-003
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Chloroform	1	10U	10U	10U	10U	10U	3	1
1,2-Dichloropropane	1	10U	10U	10U	2	10U	1	1

(CONTINUED)

Sample Number	960717-073	960718-008	960718-102	960719-005	960723-073	960723-082	960724-064	960725-045
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Chloroform	10U	10U	3	2	1	1	3	1
1,2-Dichloropropane	10U	10U	2	2	1	2	2	1

(CONTINUED)

Sample Number	960725-049	960730-008	960730-011	960730-081	960731-093	960802-009	960802-013	960807-075
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Chloroform	2	2	1	7	2	1	10U	10U
1,2-Dichloropropane	1	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

Sample Number	960808-006	960808-057	960809-119	960813-102	960814-043	960815-006	960820-009	960820-087
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Chloroform	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	2	2	10U	1	2	2	2	2

(CONTINUED)

Sample Number	960821-056	960822-043	960827-029	960828-012	960828-045	960906-076
ORGANICS (ug/L)	.	.	.	.	.	.
Chloroform	5	5	2	1	10U	4
1,2-Dichloropropane	2	2	1	1	10U	1

APPENDIX E.3

LABORATORY BLANK DATA SUMMARY

APPENDIX E.3
Organics Detected in Laboratory Blank Samples, First Quarter 1996

Sample Number	960117-014	960129-065	960131-011	960201-001	960201-036	960206-011	960213-015	960214-011
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Acetone	10U	10U	10U	11	10U	10U	10U	12
2-Butanone	10U	10U	10U	10U	10U	10U	10	12

(CONTINUED)

Sample Number	960227-066	960228-147	960304-007	960306-038	960320-014	960321-026	960321-078	960322-046
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Acetone	10U	10U	10U	8	10U	10U	10U	10U
2-Butanone	10U	10U	10U	11	10U	10U	10U	10U

(CONTINUED)

Sample Number	960325-001	960327-018	960328-006	960401-004	960408-069	960412-001	960415-034
ORGANICS (ug/L)	.	.	.	.	.	.	.
Acetone	5	8	7	10U	10U	10U	10U
2-Butanone	10	11	11	10U	10U	10U	10U

APPENDIX E.3
Organics Detected in Laboratory Blank Samples, Third Quarter 1996

Sample Number	960702-006	960705-017	960709-032	960710-003	960716-030	960717-004	960718-003	960719-018
ORGANICS (ug/L)	:	:	:	:	:	:	:	:
None Detected	:	:	:	:	:	:	:	:

(CONTINUED)

Sample Number	960722-013	960724-007	960725-012	960726-012	960729-001	960730-014	960731-005	960801-001
ORGANICS (ug/L)	:	:	:	:	:	:	:	:
None Detected	:	:	:	:	:	:	:	:

(CONTINUED)

Sample Number	960802-010	960809-013	960812-001	960813-013	960814-004	960815-003	960821-002	960822-001
ORGANICS (ug/L)	:	:	:	:	:	:	:	:
None Detected	:	:	:	:	:	:	:	:

(CONTINUED)

Sample Number	960823-011	960828-013	960829-011	960909-002
ORGANICS (ug/L)	:	:	:	:
None Detected	:	:	:	:

APPENDIX E.4

EQUIPMENT RINSATE DATA SUMMARY

APPENDIX E.4
Organic and Inorganic Analytes Detected in Equipment Rinsate Samples, CY 1996

Associated Well	GW-363		GW-373		GW-627		GW-694	GW-704	GW-706	
Date Sampled	02/12/96	07/02/96	02/28/96	07/25/96	03/28/96	09/06/96	03/18/96	08/01/96	03/19/96	08/06/96
Pump Number	7	5	8	7	7	4	8	8	11	6
ORGANICS (ug/L)										
Acetone	10	24	22	36	12	28	10U	16	26	46
2-Butanone	10U	10U	20	18	12	10U	10U	10U	23	10U
Chloroform	10U	10U	10U	2	10U	3	10U	3	10U	4
1,2-Dichloropropane	10U	10U	10U	10U	10U	1	10U	1	10U	10U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U	4	10U
METALS (mg/L)										
Aluminum	0.049	0.21	<0.02	<0.02	.	.	0.13	<0.02	<0.02	0.05
Barium	0.029	<0.0011	0.02	0.039	.	.	0.0086	0.0066	<0.001	0.0097
Boron	0.016	0.042	<0.004	0.0074	.	.	0.0098	0.034	0.079	0.011
Chromium	<0.01	<0.011	<0.01	<0.01	.	.	<0.01	<0.01	<0.01	<0.01
Copper	<0.004	<0.0043	<0.004	0.0074	.	.	0.0045	0.0047	<0.004	<0.004
Iron	0.22	<0.0054	0.03	0.11	.	.	1.5	0.67	<0.005	3.6
Lead (PMS)	.	<0.0005	.	0.00068	.	.	.	0.00074	.	0.00087
Manganese	0.0011	<0.0011	0.0011	0.013	.	.	0.012	0.0031	<0.001	0.014
Silver	<0.006	<0.0064	<0.006	<0.006	.	.	0.0067	<0.006	<0.006	<0.006
Strontium	0.02	0.0033	0.015	0.0071	.	.	0.0065	0.011	0.00043	0.0059
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	.	.	0.0021	<0.0005	<0.0005	0.00091
Zinc	0.0033	0.0026	0.0037	0.052	.	.	0.027	0.013	0.012	0.012
IONS (MG/L)										
Calcium	0.31	0.6	0.23	0.083	.	.	1.9	1.2	0.18	1.1
Magnesium	0.07	0.013	0.018	0.019	.	.	0.21	0.4	0.0045	0.13
Nitrate (as N)	.	.	.	.	.	.	<0.2	<0.125	<0.2	0.09
Potassium	1.3	0.72	<0.6	<0.6	.	.	0.75	<0.6	<0.6	<0.6
Sodium	0.44	0.29	0.04	0.3	.	.	0.14	0.28	0.22	0.22

(CONTINUED)

APPENDIX E.4
Organic and Inorganic Analytes Detected in Equipment Rinsate Samples, CY 1996

Associated Well	GW-710	GW-712	GW-713	GW-714	GW-715	GW-724	GW-725			
Date Sampled	01/29/96	02/12/96	07/17/96	07/18/96	01/29/96	07/18/96	03/21/96	08/14/96	03/25/96	08/13/96
Pump Number	2	8	6	2	7	4	7	4	2	2
ORGANICS (ug/L)										
Acetone	10U	12	74	51	10U	48	8	39	10U	18
2-Butanone	10U	10U	38	28	10U	26	10U	10U	10U	10U
Chloroform	10U	10U	1	2	10U	2	1	4	10U	3
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U	10U	10U	1
2-Hexanone	10U	10U	7	10U	10U	10U	10U	10U	10U	10U
METALS (mg/L)										
Aluminum	<0.02	<0.02	<0.02	<0.02	1.3	<0.02				
Barium	<0.001	0.0028	0.0055	0.0061	0.016	0.0061				
Boron	0.0045	0.029	0.011	0.0056	0.01	0.02				
Chromium	<0.01	<0.01	<0.01	<0.01	0.012	0.046				
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004				
Iron	0.3	1.9	1.7	0.078	2.4	0.81				
Lead (PMS)			0.0032	<0.0005		<0.0005				
Manganese	0.0021	0.0026	0.004	<0.001	0.14	0.0068				
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006				
Strontium	0.015	0.0086	0.031	0.0045	0.0048	0.0022				
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005				
Zinc	0.0039	0.032	0.0089	0.0056	0.011	0.0098				
IONS (MG/L)										
Calcium	0.51	0.41	0.71	0.45	2.6	0.33				
Magnesium	0.039	0.03	0.098	0.034	0.45	0.026				
Nitrate (as N)										
Potassium	<0.6	1.6	<0.6	<0.6	<0.6	<0.6				
Sodium	0.15	1.3	0.35	0.3	0.29	0.64				

(CONTINUED)

APPENDIX E.4
 Organic and Inorganic Analytes Detected in Equipment Rinsate Samples, CY 1996

Associated Well	GW-829	
	03/27/96	08/21/96
Date Sampled	03/27/96	08/21/96
Pump Number	4	11
ORGANICS (ug/L)	.	.
Acetone	5	26
2-Butanone	10U	15
Chloroform	10U	2
1,2-Dichloropropane	10U	10U
2-Hexanone	10U	10U
METALS (mg/L)	.	.
Aluminum	.	.
Barium	.	.
Boron	.	.
Chromium	.	.
Copper	.	.
Iron	.	.
Lead (PMS)	.	.
Manganese	.	.
Silver	.	.
Strontium	.	.
Uranium (PMS)	.	.
Zinc	.	.
IONS (MG/L)	.	.
Calcium	.	.
Magnesium	.	.
Nitrate (as N)	.	.
Potassium	.	.
Sodium	.	.

APPENDIX E.4
Radiological Analytes in Equipment Rinsate Samples, CY 1996

Associated Well	GW-363						GW-373		
	02/12/96			07/02/96			02/28/96		
Date Sampled									
Pump Number	7			5			8		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	0	0.23	6.63	1.33	4.5	5.69	-1.71	0.2	6.44
Gross Beta	3.19	4.6	7.64	0.1	5.1	8.33	-1.13	0.06	8.14
Americium 241	-0.0158	0.11	0.333	0.191	0.15	0.737	0.103	0.47	1.06
Iodine 129	-5	38	22	1	27	25	1	23	16
Neptunium 237	-0.0209	0.042	0.198	-0.0186	0.037	0.176	0.0181	0.14	0.39
Plutonium 238	0.49	0.8	1.4	0.0098	0.078	0.211	-0.0546	0.16	0.422
Plutonium 239	0.425	0.6	0.575	0	0	0.0869	0	0	0.1
Radium (total)	0.9	1	1.89	-0.35	0.39	1.89	0.69	0.8	0.62
Strontium 89/90	-1.51	0.54	2.85	-0.49	1.6	3.19	1.38	0.56	2.81
Technetium 99	3	8.6	11.9	-10	8.8	13.1	8	8.1	11.7
Tritium (X10)	430	200	217	570	210	215	400	200	207
Uranium 234	0	0	0.116	0	0	0.213	0.0114	0.091	0.245
Uranium 235	-0.037	0.074	0.35	-0.136	0.19	0.802	0	0	0.126
Uranium 238	0.0855	0.12	0.116	-0.0306	0.22	0.645	0.0973	0.17	0.305

(CONTINUED)

Associated Well	GW-373			GW-694			GW-704		
	07/25/96			03/18/96			08/01/96		
Date Sampled									
Pump Number	7			8			8		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	-	-	-	-	-	-	-	-	-
Gross Alpha	-0.0309	0.89	2.76	-0.97	0.22	7.11	0.0857	0.86	3.09
Gross Beta	-9.75	5.2	7.74	-0.31	0.05	7.9	2.38	6.1	6.99
Americium 241	0.0616	0.15	0.29	.	.	.	.	.	.
Iodine 129	-12	21	33	.	.	.	.	.	.
Neptunium 237	0	0	0.0878	.	.	.	.	.	.
Plutonium 238	0.0827	0.2	0.42	.	.	.	.	.	.
Plutonium 239	-0.0713	0.1	0.42	.	.	.	.	.	.
Radium (total)	-0.43	0.81	3.76	.	.	.	.	.	.
Strontium 89/90	-1.98	1.4	3.5	.	.	.	.	.	.
Technetium 99	-0.5	4.2	6.36	.	.	.	.	.	.
Tritium (X10)	110	220	235	.	.	.	.	.	.
Uranium 234	0	0	0.124	.	.	.	.	.	.
Uranium 235	0.0174	0.14	0.376	.	.	.	.	.	.
Uranium 238	0.0599	0.14	0.302	.	.	.	.	.	.

(CONTINUED)

APPENDIX E.4
Radiological Analytes in Equipment Rinsate Samples, CY 1996

Associated Well	GW-706						GW-710		
	03/19/96			08/06/96			01/29/96		
Date Sampled									
Pump Number	11			6			2		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	2.12	4.2	7.1	0.266	1.5	3.25	2.28	4.1	6.77
Gross Beta	-5.16	0.05	7.9	3.61	4.3	6.65	-0.82	0.05	8.33
Americium 241	.	.	.	.	.	.	-0.00582	0.26	0.659
Iodine 129	.	.	.	.	.	.	-6	28	15
Neptunium 237	.	.	.	.	.	.	0.0259	0.052	0.0703
Plutonium 238	.	.	.	.	.	.	0.255	0.23	0.232
Plutonium 239	.	.	.	.	.	.	0.051	0.1	0.102
Radium (total)	.	.	.	.	.	.	2.3	1.3	1.5
Strontium 89/90	.	.	.	.	.	.	0.46	0.49	2.83
Technetium 99	.	.	.	.	.	.	-4	10	12.8
Tritium (X10)	.	.	.	.	.	.	500	200	203
Uranium 234	.	.	.	.	.	.	0.171	0.23	0.39
Uranium 235	.	.	.	.	.	.	0	0	0.161
Uranium 238	.	.	.	.	.	.	0.0477	0.096	0.129

(CONTINUED)

Associated Well	GW-712			GW-713			GW-714		
	02/12/96			07/17/96			07/18/96		
Date Sampled									
Pump Number	8			6			2		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.94	3.7	6.63	0.19	4.1	7.92	15.1	5.9	7.06
Gross Beta	-0.51	0.06	7.64	-4.22	0.05	8.25	56.4	10	8.38
Americium 241	0.0488	0.12	0.248	0.0944	0.15	0.27	0.0346	0.16	0.356
Iodine 129	12	51	31	2	62	52	7	36	60
Neptunium 237	0	0	0.0737	-0.0161	0.12	0.339	0.026	0.052	0.0702
Plutonium 238	0.488	0.79	1.39	-0.0448	0.13	0.392	-0.0264	0.052	0.249
Plutonium 239	0.212	0.42	0.574	-0.0288	0.058	0.274	0	0	0.103
Radium (total)	0.6	0.77	1.44	-0.22	0.1	2.3	-0.49	0.19	3.78
Strontium 89/90	-3.69	4.1	22.8	-1.58	1.4	3.09	-0.08	1.6	3.15
Technetium 99	3	11	11.9	3	8.1	1.27	3	8.2	12.7
Tritium (X10)	320	200	217	330	200	222	290	200	222
Uranium 234	0.0391	0.078	0.106	-0.0284	0.057	0.27	0	0	0.113
Uranium 235	0	0	0.132	0	0	0.138	0	0	0.141
Uranium 238	0	0	0.106	0.136	0.17	0.27	0	0	0.114

(CONTINUED)

APPENDIX E.4
 Radiological Analytes in Equipment Rinsate Samples, CY 1996

Associated Well	GW-715					
	01/29/96			07/18/96		
Date Sampled						
Pump Number	7			4		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.
Gross Alpha	0.95	3.9	6.81	-1.89	0.2	7.27
Gross Beta	1.55	5	8.34	-2.57	0.05	8.52
Americium 241	0.513	0.28	0.221	0.208	0.29	0.501
Iodine 129	0.29	0.98	0.57	7	13	26
Neptunium 237	0.166	0.14	0.0747	-0.0305	0.086	0.357
Plutonium 238	-0.0652	0.093	0.384	0.0225	0.13	0.299
Plutonium 239	-0.0651	0.38	0.384	-0.0252	0.051	0.24
Radium (total)	0.5	0.55	2.3	0.5	1.4	3.49
Strontium 89/90	0.27	0.5	2.81	-1.97	1.3	2.9
Technetium 99	-2	8.5	12.8	3	9.8	12.7
Tritium (X10)	660	200	203	340	200	222
Uranium 234	0.0835	0.21	0.424	0.0495	0.12	0.25
Uranium 235	0.0197	0.16	0.425	0.0473	0.095	0.128
Uranium 238	0.224	0.25	0.342	0.0613	0.15	0.311

APPENDIX E.5

FIELD BLANK DATA SUMMARY

APPENDIX E.5
Field Blank Organic Data Summary, 1996

Associated Well	GW-363	
Date Sampled	02/12/96	07/02/96
Lab Blank Number	960213-015	960705-017
ORGANICS (ug/L)	.	.
Acetone	7	22
2-Butanone	12	10U
1,2-Dichloropropane	2	10U

APPENDIX F
DATA SCREENING PROCESS AND DQO CRITERIA

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List of Acronyms and Abbreviations

BMP Monitoring	Best Management Practice Monitoring (program)
BQR	blank qualification result
DOE	U.S. Department of Energy
DQO	data quality objective
GWPP	Groundwater Protection Program
GWPS	Groundwater Protection Standard
MDA	minimum detectable activity
$\mu\text{g/L}$	micrograms per liter
pCi/L	picoCuries per liter
RCRA	Resource Conservation and Recovery Act
RCRA Monitoring	RCRA Post Closure Corrective Action Monitoring (program)
RPD	relative percent difference
VOC	volatile organic compound

F.1 INTRODUCTION

The following sections describe the data screening process used to identify groundwater and surface water quality data that do not meet data quality objectives (DQOs) of the Y-12 Plant Groundwater Protection Program (GWPP). The DQOs apply to the groundwater and surface water quality data obtained under the auspices of the Y-12 Plant GWPP for the purposes of: (1) Resource Conservation and Recovery Act (RCRA) post-closure corrective action monitoring (RCRA monitoring), (2) U.S. Department of Energy (DOE) Order 5400.1 surveillance monitoring and exit pathway/perimeter monitoring (DOE Order 5400.1 monitoring), and (3) monitoring performed as a best management practice (BMP) of the Y-12 Plant GWPP (BMP monitoring). Table F-1 shows the DQO criteria applicable to analytical results for principal ions, trace metals, volatile organic compounds (VOCs), radiological analytes (gross alpha, gross beta, and radionuclides), and miscellaneous laboratory analytes (total suspended solids, total dissolved solids, and turbidity); see Table 3 in Appendix B for complete list of analytes.

Table F-1. DQO Criteria for Groundwater and Surface Water Quality Data

DQO Criteria	Principal Ions		Trace Metals	VOCs	Radioanalytes	Misc. Analytes
	Anions	Cations				
Duplicate Sample Results	●	●	●	●	●	●
Filtered/Unfiltered Sample	.	●	●	.	.	.
Ion Charge Balance Errors	●	●
False Positive Results	.	.	.	●	.	.
Counting Errors	●	.

Analytical results for the specified groups of analytes, including results for RCRA groundwater protection standard (GWPS) constituents, that did not meet the specified DQO criteria were screened (i.e., replaced with a designated surrogate value or considered qualitative) for data evaluation purposes. Details regarding the data screening process and summary tables of screened CY 1996 groundwater and surface water quality data are provided in the following sections.

F.2 SCREENED RESULTS FOR DUPLICATE SAMPLES

As shown in Table F-2, a total of 14 duplicate groundwater samples were collected from eight monitoring wells, including three wells (GW-363, GW-372, and GW-713) used for RCRA monitoring.

Table F-2. Duplicate Sampling Locations and Dates

Monitoring Program ¹		RCRA Post-Closure Corrective Action Monitoring							
		DOE Order 5400.1 Exit Pathway/Perimeter Monitoring							
Sampling Point ²		Sampling Location ³		Sampling Equipment ⁴		Sampling Date ⁵			
				Dedicated	Portable	1st Quarter	3rd Quarter		
GW-095	BG		●			NS	08/27/96	●	
GW-315	SPI	●				03/26/96	08/19/96	●	
GW-363	OLF		●			02/12/96	07/02/96		●
GW-372	BG	●				02/25/96	07/23/96		●
GW-621	EXP-B	●				03/14/96	07/23/96		●
GW-713	EXP-W		●			01/28/96	07/17/96		●
GW-724	EXP-C		●			03/21/96	08/14/96		●
GW-793	AGLLSF	●				03/27/96	NS	●	

Duplicate samples were analyzed for the same suite of laboratory analytes required by the applicable monitoring program. Corresponding results for duplicate samples that differed by an order-of-magnitude or more were screened; each screened result was replaced with a missing value (i.e., no analytical result). Such differences occurred between the original sample and the duplicate results shown in Table F-3.

Table F-3. Screened Results for Duplicate Groundwater Samples

RCRA Monitoring					
DOE Order 5400.1 Monitoring					
BMP Monitoring					
Sampling Location	Date Sampled	Analyte	Concentration (mg/L)		
			Original Sample	Duplicate Sample	
GW-315	03/15/96	Total Suspended Solids	<1	189.5	●
GW-621	07/23/96	Total Suspended Solids	<1	10.5	●
GW-724	08/14/96	Boron	0.036	0.46	●

F.3 SCREENED RESULTS FOR FILTERED/UNFILTERED SAMPLES

Filtered and unfiltered groundwater and surface water samples were analyzed for the principal cations and trace metals (see Table 3 in Appendix B). Results were screened if the dissolved (filtered) concentration exceeded the corresponding total (unfiltered) concentration by an order-of-magnitude or more. Screened results were replaced with missing values. Such differences occurred between the filtered and unfiltered sample results shown in Table F-4.

Table F-4. Screened Results for Filtered/Unfiltered Groundwater Samples.

RCRA Monitoring					
DOE Order 5400.1 Monitoring					
BMP Monitoring					
Sampling Location	Date Sampled	Analyte	Concentration (mg/L)		
			Unfiltered Sample	Filtered Sample	
BCK-04.55	07/14/96	Zinc	0.0025	0.026	●
BCK-11.97	08/13/96	Zinc	0.0064	0.13	●
GW-042	07/18/96	Aluminum	<0.02	0.53	●
GW-053	08/28/96	Zinc	0.0032	0.07	●
GW-711	07/14/96	Aluminum	0.13	2.4	●
SS-5	07/29/96	Zinc	0.0032	0.11	●

Screened results that were reported for samples collected from wells used for RCRA monitoring were not for GWPS constituents.

F.4 SCREENED RESULTS FOR PRINCIPAL IONS

Data for the principal anions (bicarbonate alkalinity, carbonate alkalinity, chloride, fluoride, nitrate, and sulfate) and cations (calcium, magnesium, potassium, and sodium) were screened based on the calculated ion charge balance. If the relative percent difference (RPD) between respective summed milliequivalent concentrations (i.e., molecular weight of the ion divided by the net ionic charge) of the dissolved cations (which exclude digested cations), and the total anions exceeded 10%, results for all the principal ions were considered qualitative. As summarized below in Table F-5, ion charge balance RPDs for six groundwater samples and one surface water sample exceed 10%.

Table F-5. Samples with Unacceptable Charge Balance Errors

RCRA Monitoring			
DOE Order 5400.1 Monitoring			
BMP Monitoring			
Sampling Location	Date Sampled	Charge Balance RPD	Comments
GW-276	07/08/96	-11%	High fluoride: 4.87 mg/L
GW-683	03/15/96	-12%	Elevated nitrate (as N): 14.5 mg/L
GW-710	07/16/96	-11%	High sulfate: 2,380 mg/L
GW-711	07/14/96	-14%	High chloride (2,130 mg/L) and sulfate
GW-715	07/18/96	14%	Unusually low chloride: <1 mg/L
GW-725	08/13/96	16%	High magnesium: 46 mg/L
NT-01	03/18/96	+54%	Unusually low nitrate (as N): <0.2 mg/L

All the principal ion results reported for these samples were qualitative because, although the potential source of the charge balance error for each sample (noted in the comments column of Table F-4) is indicated by comparison with historical data, the actual source of the error cannot be determined conclusively. Nitrate, a GWPS constituent, is a principal ion affected by this screening process. The third quarter nitrate results for the S-3 Site point-of-compliance well (GW-276) and three plume boundary wells (GW-710, GW-711, and GW-715) are considered qualitative

F.5 SCREENED RESULTS FOR VOLATILE ORGANIC COMPOUNDS

Results for the laboratory blank and trip blank samples associated with each groundwater and surface water sample were used to screen false positive results (i.e., sampling and/or analytical artifacts) for VOCs (see Table 3 in Appendix B). A false positive result was defined as a VOC concentration (in micrograms per liter [$\mu\text{g/L}$]) reported for the groundwater/surface water sample that was less than the blank qualification result (BQR) for the respective compound. The BQRs for acetone, methylene chloride, toluene, and 2-butanone (common laboratory reagents) represented the highest concentration in either associated blank sample multiplied by a factor of 10; BQRS for all other VOCs were similarly calculated using a factor of 5 (U.S. Environmental Protection Agency 1988). Zero served as the surrogate value for false positive VOC results.

As summarized in Table F-6, the CY 1996 groundwater and surface water quality data included a total of 13 false positive results for 3 VOCs, including 2 common laboratory reagents (acetone and 2-butanone), and one compound (chloroform) that is a minor component of VOC plumes in the Bear Creek Regime.

Table F-6. False Positive Results for VOCs

RCRA Monitoring							
DOE Order 5400.1 Monitoring							
BMP Monitoring							
Compound	Reporting Limit (µg/L)	Sampling Location	Date Sampled	Result (µg/L)	BQR		
					Lab. Blank	Trip Blank	
2-Butanone	10	GW-085	03/25/96	10	110	.	●
2-Butanone	10	GW-095	03/26/96	11	110	.	●
2-Butanone	10	GW-287	03/26/96	11	110	.	●
★ 2-Butanone	10	GW-363	02/12/96	9	100	.	●
Acetone	10	GW-537	03/25/96	5	70	.	●
Acetone	10	GW-627	03/28/96	4	.	50	●
Acetone	10	GW-706	03/19/96	7	50	.	●
2-Butanone	10	GW-706	03/19/96	10	.	110	●
Chloroform	10	GW-724	03/21/96	2	.	5	●
2-Butanone	10	GW-724D	03/21/96	12	110	.	●
Chloroform	10	GW-724D	03/21/96	1	.	5	●
2-Butanone	10	GW-725	03/22/96	11	110	.	●
2-Butanone	10	GW-740	03/19/96	11	100	.	●

Note: ★ = RCRA GWPS Constituent; D = Duplicate Sample

All of these wells are located downgradient of primary VOC source areas or in the Maynardville Limestone; however, none of the wells have a prior history of contamination with these compounds. Well GW-363 is a designated point-of-compliance well for RCRA monitoring at the Oil Landfarm WMA. The probable source of the false positive results for acetone and 2-butanone is laboratory contamination; both of these compounds are common laboratory reagents.

F.6 SCREENED RESULTS FOR RADIOANALYTES

Results for radioanalytes were screened based on comparison of the reported activity to the associated counting error. The counting error, reported in picoCuries per liter (pCi/L), expresses the degree of analytical uncertainty and is defined as twice the sample standard deviation. Results for gross alpha, gross beta, and radionuclides were screened and replaced with missing values if the reported activity exceeded the specified minimum detectable activity (MDA), and was less than the reported counting error. These screened results are summarized in Table F-7.

Table F-7. Screened Results for Radioanalytes

RCRA Monitoring						
DOE Order 5400.1 Monitoring						
BMP Monitoring						
Radioanalyte	Sampling Location	Date Sampled	MDA (pCi/L)	Activity ± Counting Error (pCi/L)		
Uranium-238	GW-040	03/26/96	0.106	0.156 ± 0.16		●
Uranium-238	GW-044	01/31/96	0.115	0.128 ± 0.15		●
Neptunium-237	GW-084	02/01/96	0.0937	0.104 ± 0.12		●
Uranium-234	GW-084	02/01/96	0.123	0.136 ± 0.16		●
Plutonium 238	GW-162	07/24/96	0.109	0.121 ± 0.14		●
Uranium 234	GW-162	07/24/96	0.0854	0.0945 ± 0.11		●
Uranium-235	GW-372	02/25/96	0.155	0.171 ± 0.20		●
Uranium-238	GW-372 D	07/23/96	0.0142	0.0523 ± 0.11		●
Americium-241	GW-521	01/16/96	0.105	0.155 ± 0.16		●
Uranium-234	GW-613	01/31/96	0.123	0.136 ± 0.16		●
Uranium-238	GW-613	01/31/96	0.123	0.136 ± 0.16		●
Gross Beta	GW-706	08/06/96	6.64	44.4 ± 81	●	
Uranium-238	GW-710	01/29/96	0.0142	0.0157 ± 0.018		●
Neptunium-237	GW-713	01/28/96	0.0989	0.11 ± 0.13		●
Plutonium-238	GW-713	07/17/96	0.122	0.134 ± 0.16		●

D = Duplicate sample

All except one of the screened results were for RCRA GWPS constituents reported for samples collected from wells used for RCRA monitoring. However, the bulk of these results were for RCRA background wells. Three results were for RCRA plume boundary wells (GW-710 and GW-713).

F.7 SUMMARY AND CONCLUSIONS

The overwhelming majority of analytical results reported for the CY 1996 groundwater and surface water samples met applicable DQOs of the Y-12 Plant GWPP. Screened data included three duplicate sample results and six total/dissolved trace metal concentrations that differed by an order-of-magnitude or more; 13 false positive results for VOCs, most of which probably reflect contamination from the laboratory environment; and 15 radioisotope results that exceeded MDAs but were less than the associated counting errors. Additionally, principal ion data for seven groundwater samples are not suitable for qualitative evaluation because of charge balance errors. However, the outcome of the data screening process resulted in minimal loss of data quality with respect to RCRA post-closure corrective action monitoring in the Bear Creek Regime.

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