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OAK RIDGE Y-12 PLANT

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CALENDAR YEAR 1997 ANNUAL GROUNDWATER MONITORING REPORT FOR THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME AT THE U.S. DEPARTMENT OF ENERGY Y-12 PLANT, OAK RIDGE, TENNESSEE

RCRA Post-Closure Permit No. TNHW-088
EPA Identification No. TN3 89 009 0001

February 1998

Prepared by

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

for the

Surveillance and Maintenance Program at the Oak Ridge Y-12 Plant, Project Execution, Environmental Management and Enrichment Facilities

Managed by

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

MANAGED BY
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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List of Acronyms and Abbreviations

ASO	Analytical Services Organization
BCV	Bear Creek Valley
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CY	calendar year
DOE	U.S. Department of Energy
DNAPL	dense, nonaqueous phase liquids
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ETTP	East Tennessee Technology Park (formerly the Oak Ridge K-25 Site)
ft	feet
ft/d	feet per day
GWPP	Groundwater Protection Program
IWQP	Integrated Water Quality Program (CERCLA)
MCL	maximum contaminant level (for drinking water)
MDA	minimum detectable activity
µg/L	micrograms per liter
mg/L	milligrams per liter
msl	mean sea level
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	operable unit
PCE	tetrachloroethene
PCP	post-closure permit
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RER	Remedial Effectiveness Report
ROD	record of decision
Security Pits	Chestnut Ridge Security Pits
Sediment Disposal Basin	Chestnut Ridge Sediment Disposal Basin
SWDF	solid waste disposal facility (non-RCRA)
TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TDS	total dissolved solids
TSD	treatment, storage, or disposal (unit)
TSS	total suspended solids
UTL	upper tolerance limit
VOC	volatile organic compound
1,2-DCE	1,2-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane

Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or 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.

Lockheed Martin Energy Systems, Inc. Co-Operator	2/25/98 Date Signed

RCRA Facility Information

Facility:	U.S. Department of Energy Oak Ridge Y-12 Plant
EPA Identification No.:	TN3 89 009 0001
Tennessee Permit No.:	TNHW-088
Address:	P.O. Box 2001 Oak Ridge, Tennessee 37831

Executive Summary

This report contains the groundwater monitoring data obtained during calendar year (CY) 1997 in compliance with the Resource Conservation and Recovery Act (RCRA) post-closure permit (PCP) for the Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime). In July 1997, the Tennessee Department of Environment and Conservation (TDEC) approved modifications to several of the permit conditions that address RCRA post-closure corrective action groundwater monitoring at the Chestnut Ridge Security Pits (Security Pits), and RCRA post-closure detection groundwater monitoring at the Chestnut Ridge Sediment Disposal Basin (Sediment Disposal Basin) and Kerr Hollow Quarry. This report has been prepared in accordance with these modified permit requirements. Also included in this report are the groundwater and surface water monitoring data obtained during CY 1997 for the purposes of: (1) detection monitoring at nonhazardous solid waste disposal facilities (SWDFs) in accordance with operating permits and applicable regulations, (2) monitoring in accordance with Comprehensive Environmental Response, Compensation, and Recovery Act Records of Decision (now performed under the Integrated Water Quality Program for the Oak Ridge Reservation), and (3) monitoring needed to comply with U.S. Department of Energy Order 5400.1.

Groundwater and surface water samples were collected during CY 1997 from a total of 39 monitoring wells, two springs, and Outfall 301 at Kerr Hollow Quarry. Sampling was performed during each quarter of the year at the frequency specified by the governing monitoring program. During the fourth quarter of CY 1997, all groundwater samples were collected using the low-flow minimal drawdown method described in the updated sampling procedure approved by the TDEC in June 1997 for SWDF detection monitoring and in July 1997 for RCRA post-closure monitoring (detection and corrective action). Instead of collecting samples after purging at least three well-volumes of groundwater from the well, samples were collected immediately after field measurements showed stable levels of selected parameters in the groundwater purged at a very low flow rate (<300 milliliters per minute) with minimal water-level drawdown (less than 0.1 foot per quarter-hour) in the well. Beginning in January 1998, the low-flow minimal drawdown method will be used to collect groundwater samples from all of the wells that serve the above-listed monitoring programs.

Most of the groundwater and surface water samples collected during CY 1997 were analyzed for a standard suite of inorganic, organic, and radiological analytes, including the RCRA groundwater target compounds listed in site-specific attachments to the PCP. In July 1997 the TDEC removed boron and strontium from the list of RCRA groundwater target compounds for Kerr Hollow Quarry because these trace metals: (1) are not regulated under RCRA, (2) are present at similar concentrations in groundwater upgradient and downgradient of the site, and (3) often exhibit erroneous temporal trends related to analytical variability.

Site-specific conditions of the PCP require annual evaluation of the groundwater flow direction and rate in the uppermost aquifer at the Security Pits, the Sediment Disposal Basin, and Kerr Hollow Quarry. The evaluation for each site was based on groundwater surface elevations in selected monitoring wells determined from depth-to-water measurements recorded during April and October 1997. Flow directions at the Security Pits, based also on the elongated geometry of the contaminant plume at the site, are primarily from west to east, with lesser components of flow to the north and

south. Groundwater elevations in monitoring wells at the Sediment Disposal Basin indicate flow to the east and northeast, and flow directions at Kerr Hollow Quarry are generally south toward Melton Hill Reservoir. Rates of groundwater flow in the Knox Group at each site, estimated using the modified Darcy equation, are representative of the range of diffuse flow (0.0004 feet per year) and conduit flow (>1,000 feet per day) typical of karst aquifers.

As required under the permit modifications approved by the TDEC in July 1997, evaluation of the semiannual RCRA post-closure corrective action monitoring results for Security Pits point-of-compliance wells GW-609 and GW-796 was based on temporal trend analysis of results for selected RCRA groundwater target compounds. Based on this evaluation, the CY 1997 monitoring results for each well do not indicate a significant change in the performance of the low permeability cap at the site. The results for well GW-609 show that tetrachloroethene (PCE) concentrations within the plume of dissolved volatile organic compounds (VOCs) in groundwater 800 feet (ft) east of the eastern disposal trenches continue the decreasing and seasonally fluctuating trend evident after closure of the site in CY 1988. Also, the PCE concentrations are often highest when water levels in the well are highest, which suggests greater flux of VOCs during seasonally and/or episodically high groundwater flow conditions. A very low (estimated) concentration of 1,1,1-trichloroethane (1,1,1-TCA), which is the primary component of the dissolved VOC plume originating from the western disposal trenches, was detected in the groundwater sample collected in July 1997 from well GW-796. Over half of the samples collected from the well since May 1993 have contained similar 1,1,1-TCA concentrations, and these results do not appear to be increasing with time. Sporadic detection of 1,1,1-TCA in the groundwater at well GW-796, which is located about 400 ft south of the site, may reflect occasional volatilization during sampling and/or episodic groundwater transport via "quickflow" conduits oriented perpendicular to geologic strike.

The CY 1997 RCRA post-closure corrective action monitoring results for the designated plume delineation wells (GW-301, GW-557, GW-798, GW-799, GW-801, and GW-831) were evaluated to determine if they continue to monitor the leading edge of the dissolved VOC plume in groundwater at the Security Pits. As required under the permit modification approved by the TDEC in July 1997, this evaluation was based on results for PCE and 1,1,1-TCA, neither of which was detected in any of the samples from the plume delineation wells. These wells therefore remain effective for groundwater monitoring beyond the boundary of the contaminant plume originating from the Security Pits.

Statistical evaluation of the second CY 1997 semiannual sampling results for the Sediment Disposal Basin indicates a statistically significant increase in total uranium concentrations at point-of-compliance well GW-732. However, because these uranium results may not reflect concentrations in the groundwater at the well and are at least an order-of-magnitude less than the U.S. Environmental Protection Agency risk-based action level for drinking water, and there are no receptors to groundwater at the site, a request was submitted to the TDEC to delay sampling to confirm the increasing concentration uranium trend until the next scheduled semiannual sampling event (April 1998).

1.0 INTRODUCTION

This annual monitoring report contains groundwater and surface water monitoring data obtained in the Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime) during calendar year (CY) 1997. The Chestnut Ridge Regime encompasses a section of Chestnut Ridge west (unless otherwise noted, directions are in reference to the Y-12 Plant administrative grid) of Scarboro Road and east of an unnamed drainage feature located southwest of the U.S. Department of Energy (DOE) Oak Ridge Y-12 Plant (Figure 1).

This report contains the groundwater monitoring data obtained during CY 1997 in compliance with the Resource Conservation and Recovery Act (RCRA) post-closure permit (PCP) for the Chestnut Ridge Regime (permit number TNHW-088). Issued by the Tennessee Department of Environment and Conservation (TDEC), the PCP defines the post-closure maintenance and groundwater monitoring requirements for three closed RCRA hazardous waste treatment, storage, or disposal (TSD) units: the Chestnut Ridge Sediment Disposal Basin (Sediment Disposal Basin), the Chestnut Ridge Security Pits (Security Pits), and Kerr Hollow Quarry (Figure 2). Results of RCRA post-closure detection monitoring at the Sediment Disposal Basin and Kerr Hollow Quarry and results of RCRA post-closure corrective action monitoring at the Security Pits are reported to the TDEC semiannually. The monitoring results obtained at each site during the first 180-day reporting period for CY 1997 were submitted to the TDEC in July and August 1997. In addition to this previously submitted data, this report contains the monitoring data obtained at each site during the second 180-day reporting period for CY 1997. Also included in this report are the signed certification statement (Page vi), the RCRA facility information (Page vii), and the annual monitoring data evaluations (Section 4.0) that must be submitted to the TDEC before the March 1 deadline specified under condition II.C.6 of the PCP (Table 1).

Site-specific conditions of the PCP define the requirements for groundwater monitoring at the Sediment Disposal Basin, Kerr Hollow Quarry, and the Security Pits (Table 1). Based on implementation of these groundwater monitoring requirements during CY 1996, editorial and technical modifications to several of these permit conditions were requested in May 1997 (GRAM, Inc. and AJA Technical Services, Inc. 1997). These modifications: (1) clarify the groundwater

sampling protocol for RCRA post-closure detection monitoring, (2) clarify the annual reporting requirements and revise the data reporting schedule for Kerr Hollow Quarry, (3) modify the suite of constituents included in the list of RCRA groundwater target compounds specified for Kerr Hollow Quarry, (4) revise the technical approach used to evaluate the RCRA post-closure detection monitoring results for Kerr Hollow Quarry, (5) clarify and revise the technical approach used to evaluate the RCRA post-closure corrective action monitoring results for the Security Pits, and (6) update the technical field procedures included as attachments to the PCP (Table 2). These technical permit modifications were approved by the TDEC and became effective in July 1997 (Tennessee Department of Environment and Conservation 1997).

In addition to RCRA information required by the PCP for the Chestnut Ridge Regime, this report contains the CY 1997 groundwater and surface water monitoring data obtained for the purposes of: (1) detection monitoring per applicable requirements of the operating permits issued by the TDEC for several nonhazardous solid waste disposal facilities (SWDFs), (2) site-specific monitoring performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) records of decision (RODs) for the United Nuclear Corporation Site and Kerr Hollow Quarry, and (3) regime-wide DOE Order 5400.1 surveillance monitoring and exit pathway/perimeter monitoring (collectively referenced as DOE Order 5400.1 monitoring).

The following narrative sections of the report provide background information regarding the waste management sites in the Chestnut Ridge Regime, the hydrogeologic framework, and the extent of groundwater contamination (Section 2.0); summarize the CY 1997 groundwater and surface water sampling and analysis activities, including quality assurance/quality control (QA/QC) sampling and data management (Section 3.0); and present results of the RCRA monitoring data evaluations required annually by respective conditions of the PCP applicable to the Security Pits, Sediment Disposal Basin, and Kerr Hollow Quarry (Section 4.0). Documents cited for more detailed operational, regulatory, or technical information regarding the waste management sites and associated monitoring programs are listed in Section 5.0.

Narrative sections of the report reference a series of appendices. Illustrations (maps and trend graphs), 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). 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 identify CY 1997 groundwater and surface water data that do not meet applicable data quality objectives (DQOs). Respective subsections of Appendix G contain detailed statistical information supporting the statistical evaluations of the CY 1997 RCRA post-closure detection monitoring results for the Sediment Disposal Basin and Kerr Hollow Quarry.

2.0 BACKGROUND INFORMATION

The following sections contain background information for the Chestnut Ridge Regime, including brief descriptions of the waste management sites within the regime and their current regulatory status, the characteristics of the groundwater flow system and the extent of groundwater contamination, and the surface water drainage system. This information provides a conceptual framework for the RCRA post-closure monitoring data evaluations described in Section 4.0.

2.1 Site Descriptions

Groundwater quality monitoring in the Chestnut Ridge Regime is performed at three general classes of waste management facilities: (1) RCRA hazardous waste TSD units, some of which also are subject to regulation under CERCLA, (2) sites regulated as operable units (OUs) or low-priority Study Areas under CERCLA, as designated in the *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program* (U.S. Department of Energy 1995a), and (3) nonhazardous SWDFs (Table 3). General descriptions of each site are provided in the following sections.

2.1.1 RCRA Treatment, Storage, or Disposal Facilities

The Security Pits, Sediment Disposal Basin, Kerr Hollow Quarry, and East Chestnut Ridge Waste Pile are RCRA TSD units (Table 3). All but the East Chestnut Ridge Waste Pile were formerly granted RCRA interim status, which ended when site-specific requirements of the PCP became effective for the Sediment Disposal Basin (September 18, 1995), the Security Pits (March 8, 1996), and Kerr Hollow Quarry (June 11, 1996). In addition to RCRA requirements of the PCP, the Security Pits are regulated as an OU under CERCLA, and the Sediment Disposal Basin and Kerr Hollow Quarry are Study Areas under CERCLA (U.S. Department of Energy 1995a). The CERCLA ROD for Kerr Hollow Quarry, approved by the U.S. Environmental Protection Agency (EPA) in August 1995, contains monitoring requirements in addition to those specified in the PCP (U.S. Department of Energy 1995b).

The Security Pits are located on the crest of Chestnut Ridge directly south of the central portion of the Y-12 Plant (Figure 2), and consist of two areas, each containing a series of east-west oriented trenches that are about 8 to 10 feet (ft) wide, 10 to 18 ft deep, and 700 to 800 ft long. This site was used for disposal of hazardous waste until December 1984, and for disposal of nonhazardous waste until the site was closed in November 1988. Closure was completed in CY 1989 per RCRA interim status requirements, and involved installation of a low-permeability cap over the disposal trenches (Martin Marietta Energy Systems, Inc. 1988a).

The Sediment Disposal Basin is located on Chestnut Ridge about 1,500-ft southeast of the east end of the Y-12 Plant (Figure 2). It was used between 1973 and 1987 for the disposal of contaminated soils and sediments removed from various areas within the Y-12 Plant. Closure of the site was completed in CY 1989 per the TDEC-approved RCRA closure plan.

Kerr Hollow Quarry is located in the southeast corner of the Chestnut Ridge Regime (Figure 2) and served as a source of stone construction material until it filled with water and was abandoned in the late 1940's. From the early 1950's until November 1988, the quarry was used for the disposal of reactive materials from the Y-12 Plant and the Oak Ridge National Laboratory (ORNL). Wastes were removed from the quarry between mid-1990 and late-1993 to obtain certified clean-closure status from the TDEC, but the site was finally closed with some wastes remaining in place.

The East Chestnut Ridge Waste Pile is a lined, RCRA-regulated TSD unit constructed in CY 1987 to serve as a storage facility for contaminated soils from the Y-12 Plant. This site is located in the northeastern corner of the Chestnut Ridge Regime near the Sediment Disposal Basin (Figure 2) and is exempt from groundwater monitoring requirements.

2.1.2 CERCLA Operable Units and Study Areas

The United Nuclear Corporation Site and the Filled Coal Ash Pond (formerly known as the Ash Disposal Basin) are former RCRA solid waste management units currently designated as OUs under CERCLA. Rogers Quarry and the Chestnut Ridge Borrow Area Waste Pile are lower priority Study Areas to be investigated under CERCLA (Table 3). Brief descriptions of these sites are provided below.

The United Nuclear Corporation Site lies on the crest of Chestnut Ridge southeast of the west end of the Y-12 Plant (Figure 2). Before waste disposal ceased in 1984, the site received 11,000 drums (55-gallon) of sludge fixed in cement, 18,000 drums of contaminated soil, and 288 boxes of contaminated process and demolition materials (Grutzeck 1987; U.S. Department of Energy 1993). The site was capped and closed in CY 1992 in accordance with a RCRA closure plan and the CERCLA ROD approved by the EPA in June 1991 (U.S. Department of Energy 1991).

The Filled Coal Ash Pond is located on the southern flank of Chestnut Ridge about one-half mile south of the Y-12 Plant (Figure 2). Construction of an earthen dam across a northern tributary of McCoy Branch created the pond in 1955, which by 1967 had filled with fly-ash slurry pumped from the Y-12 Steam Plant (Battelle Columbus Division 1988). Closure of the site was performed in accordance with the CERCLA ROD approved by the EPA in October 1995 (U.S. Department of Energy 1995c).

Rogers Quarry is located in the south-central portion of the Chestnut Ridge Regime about three miles west of Kerr Hollow Quarry (Figure 2). The site served as a source of stone construction material from the 1940's through the late 1950's, and was abandoned in the early 1960's when it filled with water. Beginning in 1967, the site received fly-ash slurry from the Y-12 Steam Plant that bypassed the Filled Coal Ash Pond through an emergency spillway and discharged directly into McCoy Branch (King et al. 1989). Disposal of fly ash in Rogers Quarry ceased in July 1993 per agreement with the TDEC.

The Chestnut Ridge Borrow Area Waste Pile is located in the northeastern portion of the Chestnut Ridge Regime (Figure 2). This site was built in 1980 as a temporary storage area for contaminated soils removed from the Oak Ridge Civic Center properties and the Oak Ridge Sewer Line Beltway.

2.1.3 Solid Waste Disposal and Storage Facilities

Five nonhazardous waste landfills are located in the Chestnut Ridge Regime: Industrial Landfills II, IV, and V, and Construction/Demolition Landfills VI and VII (Figure 2). These sites are classified as either Class II or Class IV facilities, as defined in *Rules of the Tennessee Department of Environment and Conservation, Division of Solid Waste Management, Chapter*

1200-1-7, Solid Waste Processing and Disposal, and have been issued operating permits by the TDEC Division of Solid Waste Management (Table 3). Each landfill except Construction/Demolition Landfill VII and Industrial Landfill II (which was closed and replaced by Industrial Landfill V) is currently used for disposal of combustible, decomposable solid wastes generated at the Y-12 Plant and elsewhere on the DOE Oak Ridge Reservation (ORR).

2.2 Topography and Bedrock Geology

The Chestnut Ridge Regime encompasses a section of Chestnut Ridge bordered by the Y-12 Plant in Bear Creek Valley (BCV) to the north, Scarboro Road to the east, Bethel Valley Road to the south, and an unnamed surface drainage feature to the west (Figure 1). The northern flank of the ridge forms a steep slope rising more than 200 ft above the floor of BCV. The ridge crest slopes toward the east from an elevation of about 1,200 ft above mean sea level (msl) west of Industrial Landfill IV, to about 1,060 ft msl east of the Sediment Disposal Basin (Figure 3). A series of prominent hills dominates the central part of the broad southern flank of Chestnut Ridge, which is dissected by several tributaries, including McCoy Branch in the middle of the regime.

Bedrock geology within the ORR is generally characterized by thrust-faulted sequences of southeast-dipping, clastic (primarily shale and siltstone) and carbonate (limestone and dolostone) strata of Lower Cambrian to Upper Ordovician age. Interbedded limestone and shale formations of the Conasauga Group directly underlie the Y-12 Plant in BCV, primarily dolostone strata of the Knox Group form Chestnut Ridge, and the argillaceous limestones and interbedded shales of the Chickamauga Group underlie Bethel Valley (Figure 3). Strike and dip of bedding in the area is generally N55°E and 45°SE, respectively (as referenced to true north).

All the waste management sites in the Chestnut Ridge Regime except Kerr Hollow Quarry and Rogers Quarry are directly underlain by red-brown to yellow-orange residuum overlying the Knox Group. The residuum is characteristically acidic, predominantly composed of clays and iron sesquioxides, and contains semi-continuous, relict beds of fractured chert and other lithologic inhomogeneities (such as silt bodies) that provide a weakly connected network through which saturated flow can occur (Solomon et al. 1992). The residuum is thin or nonexistent near karst features such as dolines (sink holes), swallets (sinking streams), and solution pan features (Ketelle

and Huff 1984). Depth to bedrock varies throughout the Chestnut Ridge Regime, but is usually less than 100 ft below ground surface (bgs).

Residuum throughout all but the southernmost portion of the Chestnut Ridge Regime is underlain by the Knox Group (Figure 3). The Knox Group, which consists of about 2,600 to 3,300 ft of gray to blue-gray, thin- to thick-bedded cherty dolostone with interbedded limestone, is divided into five formations (listed from oldest to youngest): Copper Ridge Dolomite, Chepultepec Dolomite, Longview Dolomite, Kingsport Formation, and Mascot Dolomite (Figure 3). Topographic and stratigraphic relationships suggest that the Copper Ridge Dolomite underlies the steep northern flank of the ridge, the Longview Dolomite forms the series of prominent hills across the middle of the southern flank of the ridge, and the Mascot Dolomite disconformably underlies the Chickamauga Group along the southern boundary of the regime (Hatcher et al. 1992).

The most pervasive structural features in the Chestnut Ridge Regime are extensional, hybrid, and shear fractures (Solomon et al. 1992). Three major fracture orientations are evident: one that roughly parallels bedding, one steeply dipping set that parallels geologic strike, and one steeply dipping set oriented perpendicular to strike (Dreier et al. 1987). Most fractures are short, ranging from tenths of inches to a few feet in length (Solomon et al. 1992). Dissolution of carbonates along fractures has produced many surface karst features on Chestnut Ridge, including a series of sinkholes along the crest of the ridge that show a prominent alignment parallel to strike. This linear trend may result from dissolution along a bedding plane or fracture set (Ketelle and Huff 1984; Smith et al. 1983).

2.3 Groundwater System

The Knox Aquifer, consisting of the Knox Group and the underlying Maynardville Limestone formation (Conasauga Group), is the principal hydrogeologic unit in the Chestnut Ridge Regime and is the uppermost aquifer at each waste management site except Rogers Quarry. The groundwater flow system in the Knox Aquifer generally consists of three vertically gradational subsystems: (1) the stormflow zone, (2) the vadose zone, and (3) the groundwater zone. The subsystems are distinguished by groundwater flux, which decreases with depth (Solomon et al. 1992).

Although detailed studies have not been conducted in the Chestnut Ridge Regime, investigations in Bethel Valley and Melton Valley near ORNL show that groundwater occurs intermittently above the water table in a shallow "stormflow zone" that extends to a depth of about 6 ft bgs (Moore 1989). Macropores and mesopores provide the primary channels for lateral flow in the stormflow zone, which lasts only a few days or weeks after rainfall. Most groundwater within the stormflow zone is either lost to evapotranspiration or recharge to the water table, and the remaining water discharges at nearby seeps, springs, or streams (Moore 1989).

The vadose zone occurs between the stormflow zone and the water table, which typically occurs near the bedrock/residuum interface. The vadose zone is unsaturated except in the capillary fringe above the water table and within wetting fronts during periods of vertical percolation from the stormflow zone (Moore 1989). Most recharge through the vadose zone is episodic and occurs along discrete permeable fractures that become saturated, although surrounding micropores remain unsaturated (Solomon et al. 1992). Moore (1988) determined a geometric mean hydraulic conductivity of about 0.006 feet per day (ft/d) for residuum on Chestnut Ridge based on results of infiltrometer studies near ORNL reported by Watson and Luxmoore (1986) and Wilson and Luxmoore (1988).

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

The water table in the Chestnut Ridge Regime is a subdued replica of surface topography and occurs at the greatest depth (>100 ft bgs) along the crest of Chestnut Ridge, which is a groundwater flow divide and a recharge area. Groundwater generally flows from west to east parallel to the flow divide across the northern part of the regime, with radial components of flow north into BCV and

south toward tributary headwaters on the southern flank of the ridge (Figure 4). The central part of the regime is characterized by radial flow directions from local groundwater flow divides along hilltops between tributaries. Groundwater flow directions in the southern part of the regime are generally south toward Melton Hill Reservoir. The overall directions of groundwater flow throughout the Chestnut Ridge Regime do not significantly change during seasonal groundwater flow conditions (Figure 4). Seasonal horizontal hydraulic gradients are highest along the steep northern flank of Chestnut Ridge (i.e., across geologic strike) and in the upper reaches of tributaries on the southern ridge flank, and are nearly flat along the southern boundary of the regime.

Available data indicate that hydraulic conductivity in the Knox Group varies over multiple orders-of-magnitude, which is typical of karst aquifers. Results of straddle packer tests in core holes located near the Sediment Disposal Basin and Industrial Landfill IV indicate hydraulic conductivity ranging from 0.0002 to 3.1 ft/d at depths generally less than 600 ft bgs in the lower Knox Group (King and Haase 1988). Average hydraulic conductivity values calculated from results of 122 falling-head slug tests performed between July 1994 and October 1997 in 17 monitoring wells completed at shallow depths (60 to 195 ft bgs) in the middle Knox Group range from about 0.0027 ft/d at Industrial Landfill II (GW-539) to 13.8 ft/d at Construction/Demolition Landfill VII (GW-560) (Jones 1997). Findings of a preliminary dye-tracer test at the Security Pits indicate flow rates of about 100 to 300 ft/d (Geraghty & Miller, Inc. 1990). Although not confirmed by a second test using different tracers (Science Applications International Corporation 1993), these findings are supported by the range of flow rates (490 to 1,250 ft/d) indicated by results of a dye-tracer test performed on Chestnut Ridge near ORNL (Ketelle and Huff 1984).

The geochemistry of the groundwater in the Knox Aquifer is fairly homogeneous. Most wells yield calcium-magnesium bicarbonate groundwater with pH of 7.5 to 8.0; total dissolved solids (TDS) above 150 milligrams per liter (mg/L); equal or nearly equal molar concentrations of calcium and magnesium; low proportions (<5%) of chloride, sodium, sulfate, and potassium; and very low (i.e., <1 mg/L) carbonate alkalinity and nitrate (as N) concentrations. Some wells yield groundwater with enriched chloride and sulfate concentrations that probably reflect the geochemical influence of locally disseminated sulfides (e.g., pyrite) or evaporites (e.g., gypsum). Additionally, groundwater within low permeability (matrix) intervals in the upper Knox Group (e.g., Mascot Dolomite), as

indicated by data for several wells at Kerr Hollow Quarry, has greater proportions of sulfate and potassium, and higher trace metal concentrations (e.g., strontium) than typical of the groundwater from low yield intervals within the lower Knox Group formations (e.g., Copper Ridge Dolomite). These geochemical differences potentially reflect corresponding differences between carbonate mineralogies in the upper and lower sections of the Knox Group, or the proximity to and types of disseminated secondary minerals (AJA Technical Services, Inc. 1996a).

2.4 Groundwater Contamination

Monitoring data obtained since the mid-1980s indicate that groundwater contamination is fairly limited in the Chestnut Ridge Regime, with volatile organic compounds (VOCs) being the most common groundwater contaminant. Dissolved VOCs (primarily chloroethanes and chloroethenes) have been detected in the groundwater samples collected from monitoring wells at the Security Pits, Filled Coal Ash Pond, Industrial Landfills IV and V, and Kerr Hollow Quarry. However, a clearly distinct plume of dissolved VOCs is indicated only by the data for wells at the Security Pits. Total boron and sodium concentrations reported for groundwater samples from a few wells at Industrial Landfill IV also potentially indicate contamination. Brief descriptions of groundwater contamination at these waste management sites are provided below.

Chestnut Ridge Security Pits

Data obtained from monitoring wells at the Security Pits indicate that a narrow, elongated plume of dissolved VOCs extends parallel with geologic strike for at least 2,600 ft downgradient to the east, and perpendicular to strike for at least 500 ft downgradient to the north and south (Figure 5). The primary components of the plume include 1,1-dichloroethene, 1,1-dichloroethane, and 1,1,1-trichloroethane (1,1,1-TCA) in the western trench area; and tetrachloroethene (PCE), trichloroethene (TCE), and 1,2-dichloroethene (1,2-DCE) in the eastern trench area. The distribution of the plume constituents relative to the respective source areas and elongation of the plume along the axis of Chestnut Ridge despite steeper hydraulic gradients toward the ridge flanks, suggest primarily strike-parallel horizontal transport (west to east) in the groundwater. The maximum depth of vertical transport has not been conclusively determined, but is at least 150 ft bgs in the western

trench area, 250 ft bgs near the middle of the site, and 270 ft bgs downgradient of the eastern trench area (AJA Technical Services, Inc. 1996a).

Summed concentrations of VOCs in the groundwater at the Security Pits exceed 500 micrograms per liter (μg/L), and maximum concentrations of PCE, TCE, and 1,1,1-TCA exceed respective federal maximum contaminant levels (MCLs) for drinking water. However, concentrations of all plume constituents show decreasing temporal trends evident since the disposal trenches were closed and capped in 1989. Additionally, VOC concentrations in groundwater at several wells frequently show distinctive fluctuations with seasonal groundwater elevations. Decreasing temporal trends after closure of the site coupled with seasonal concentration fluctuations suggest that the source of the VOCs is within the residuum and/or bedrock underlying the disposal trenches, possibly in the form of residual dense non-aqueous phase liquids (DNAPL) (AJA Technical Services, Inc. 1996a).

Filled Coal Ash Pond and Industrial Landfill V

Data obtained since the early 1990s indicate very low concentrations (1 to 2 μg/L) of 1,1,1-TCA in the groundwater at two wells downgradient of the western disposal trenches at the Security Pits (Figure 5): well GW-796 at Industrial Landfill V (about 400 ft south of the disposal trenches), and well GW-514 at the Filled Coal Ash Pond (about 900 ft south of the disposal trenches). Although the concentrations are estimated (i.e., less than the analytical reporting limit) and are substantially below the MCL for 1,1,1-TCA (200 μg/L), the repeated detection of this compound in the groundwater samples from both wells probably reflects southward migration from the Security Pits, possibly along "quickflow" conduits oriented perpendicular to geologic strike (HSW Environmental Consultants, Inc. 1995).

Industrial Landfill IV

Low levels of 1,1,1-TCA occur in the groundwater at well GW-305, located on the eastern (downgradient) side of Industrial Landfill IV, about 4,500 ft west (upgradient) of the Security Pits (Figure 5). Groundwater samples have been collected from the well since early 1988, and low concentrations of 1,1,1-TCA first detected in January 1992 (0.6 μg/L) subsequently increased by an

order-of-magnitude by July 1995 (6 μg/L). The source of the 1,1,1-TCA in the groundwater at the well is uncertain. Data obtained in CY 1992 indicated potential cross contamination of the well during sampling, but this explanation was discounted by subsequent results (HSW Environmental Consultants, Inc. 1993 and 1994). Transport along strike from the western disposal trenches at the Security Pits is unlikely because the water-table elevation near Industrial Landfill IV is more than 20 ft higher than at the Security Pits during both seasonally high and low groundwater flow conditions (Figure 4). Groundwater transport downgradient from Industrial Landfill IV is possible, assuming the waste stream included chlorinated organic solvents, although 1,1,1-TCA has not been detected in any of the groundwater samples collected from the other downgradient wells at the site (AJA Technical Services, Inc. 1996a).

Results for several wells indicate elevated total boron and sodium concentrations in the groundwater downgradient to the east (along strike) of Industrial Landfill IV (Figure 5). For example, data for well GW-217 show increasing boron levels after a conspicuous concentration spike in January 1992, and a corresponding trend of increasing sodium concentrations. Elevated boron and sodium concentrations in the groundwater east of Industrial Landfill IV potentially reflect downgradient transport of inorganic wastes such as borax (i.e., hydrated sodium borate) cleaning fluids, assuming the site received such wastes (AJA Technical Services, Inc. 1996a).

Kerr Hollow Quarry

Low levels (<5 μg/L) of carbon tetrachloride, chloroform, and PCE occur in the groundwater at monitoring wells located to the south (GW-144) and southeast (GW-142) of Kerr Hollow Quarry (Figure 5). All three compounds (particularly carbon tetrachloride) have been detected in many of the groundwater samples collected from well GW-144 since March 1991. Either chloroform (a degradation product of carbon tetrachloride) or PCE has been detected in about a third of the groundwater samples collected from well GW-142 over the same period, although this well is typically upgradient of the quarry. Each of these VOCs are probably present at low concentrations in the groundwater downgradient of the site, possibly as a consequence of wastes being disturbed during attempts to obtain clean closure of the site in the early 1990s. Because of the low

concentrations, the apparently sporadic detection of VOCs in the groundwater samples from these wells potentially reflects volatilization during sampling (AJA Technical Services, Inc. 1996a).

2.5 Surface Water System

Surface streams in the Chestnut Ridge Regime include four primary drainage basins on the southern flank of Chestnut Ridge: two unnamed tributaries located west and east of Industrial Landfill II in the western part of the regime; the McCoy Branch drainage basin in the central part of the regime; and an unnamed drainage basin in the eastern part of the regime (Figure 3). These tributaries are mainly intermittent above an elevation of 900 ft msl and receive flow via surface runoff, stormflow discharge, and groundwater baseflow. Baseflow contributions increase downstream along the length of the streams, and spring discharge represents substantial contributions to the total flow in most of the tributaries (Lockheed Martin Energy Systems, Inc. 1996). All of the tributaries discharge into Melton Hill Reservoir (Clinch River) south of the Chestnut Ridge Regime.

Available data indicate that surface water contamination in the Chestnut Ridge Regime is generally restricted to the stream channel in McCoy Branch immediately downstream of the Filled Coal Ash Pond. Monitoring data obtained for other tributaries in the regime have not shown conclusive evidence of contamination from upstream sources, although elevated concentrations of some constituents (primarily barium) infrequently occur in water discharged from Kerr Hollow Quarry (Lockheed Martin Energy Systems, Inc. 1996).

3.0 CY 1997 GROUNDWATER MONITORING

Groundwater and surface water sampling in the Chestnut Ridge Regime was performed in accordance with the *Sampling and Analysis Plan for Groundwater and Surface Water Monitoring at the Y-12 Plant during Calendar Year 1997* (AJA Technical Services, Inc. 1996b), as modified by applicable addenda, most of which involved adjustments to the monitoring well networks and analytical parameters required by approved changes to the operating permits for several of the SWDFs (Table 4). The following sections provide an overview of the sampling and analysis activities that were performed during CY 1997, including the sampling locations and frequency; sample collection, transportation, and chain-of-custody control; field measurements and laboratory analytical parameters; QA/QC sampling; and data management.

3.1 Sampling Locations and Frequency

Groundwater and surface water samples were collected from 39 of the monitoring wells located at the waste management sites in the Chestnut Ridge Regime, two springs located on the southern flank of Chestnut Ridge, and Outfall 301 located on the southwest side of Kerr Hollow Quarry (Figure 6). Sampling was performed during each quarter of the year: January 7 - February 27, April 1 - May 1, July 9 - August 7, and October 14 - November 14, 1997 (Table 5). The following sections provide descriptions of the respective sampling locations and frequencies for RCRA post-closure corrective action monitoring, RCRA post-closure detection monitoring, SWDF detection monitoring, CERCLA ROD monitoring, and DOE Order 5400.1 monitoring.

3.1.1 RCRA Post-Closure Corrective Action Monitoring

The network of monitoring wells used for RCRA post-closure corrective action monitoring at the Security Pits during CY 1997 includes one upgradient/background well (GW-521), two point-of-compliance wells (GW-609 and GW-796), and six plume delineation wells (GW-301, GW-557, GW-798, GW-799, GW-801, and GW-831) (Table 6). As shown on Figure 6, upgradient/background well GW-521 is located at Industrial Landfill IV about one mile west

(upgradient) of the site; point-of-compliance wells GW-609 and GW-796 are located about 800 ft east (along geologic strike) and 400-ft south (across geologic strike) of the site, respectively. The plume delineation wells are located as follows: about 3,000 ft east of the site at the Chestnut Ridge Borrow Area Waste Pile (GW-301); about 2,000 ft southeast of the site at Industrial Landfill V (GW-557, GW-789, GW-799, GW-801); and about 1,500 ft southwest of the site (GW-831) at the Filled Coal Ash Pond. Depths to the top and bottom of the screened or open-hole interval for each well are summarized on Table 6; complete well construction details are provided in Appendix C.

Semiannual groundwater sampling for RCRA post-closure corrective action monitoring was performed during the first quarter (January 7 - February 2, 1997) and third quarter (July 9-24, 1997) of the year (Table 5). Monitoring data from the first semiannual sampling event (water-level elevations and results of laboratory analyses) were submitted to the TDEC before the reporting deadline (September 1) specified in the PCP (Lockheed Martin Energy Systems, Inc. 1997a). This report contains the monitoring data from both CY 1997 semiannual sampling events that must be reported annually to the TDEC before the corresponding deadline (March 1).

3.1.2 RCRA Post-Closure Detection Monitoring

The RCRA post-closure detection monitoring well network at the Sediment Disposal Basin includes one upgradient well (GW-159) and three point-of-compliance wells (GW-156, GW-731, and GW-732). Two upgradient/background wells (GW-142 and GW-231) and three point-of-compliance wells (GW-143, GW-144, and GW-145) comprise the detection monitoring network at Kerr Hollow Quarry. Figure 6 shows the locations of these wells. Depths to the top and bottom of the screened or open-hole interval for each well are summarized on Table 6; complete well construction details are provided in Appendix C.

Semiannual groundwater sampling for RCRA post-closure detection monitoring was performed April 21-24 and October 20-28, 1997 at the Sediment Disposal Basin, and April 28-May 1 and November 10-14, 1997 at Kerr Hollow Quarry. To provide the data needed for statistical evaluation, four replicate groundwater samples were collected from each well. Replicate samples were collected over as many as nine consecutive days during each sampling event (Table 5). Effective October 1, 1997, the time interval between replicate samples was changed from four

consecutive days to a time interval that allows the water level in each well to recover to at least 70% of the pre-sampling level (Table 4, Addendum 97-19). Because statistical evaluation of the data from the first semiannual sampling event at Kerr Hollow Quarry indicated a statistically significant increasing trend for boron in well GW-145, sampling to confirm the increasing trend was performed in August 1997 (Table 4, Addendum 97-16). Results of the resampling, reported to the TDEC in October 1997, did not indicate a release of boron to the groundwater at the site (see Section 4.4).

The semiannual RCRA detection monitoring results for the Sediment Disposal Basin and Kerr Hollow Quarry were submitted to the TDEC in accordance with the reporting requirements specified by the PCP (see Section 4.4). In July 1997, the TDEC approved the request to remove the September 1 semiannual reporting requirement originally specified for Kerr Hollow Quarry under permit condition VI.H.1 (Table 2). This change was proposed because a corresponding semiannual reporting deadline is not required for the Sediment Disposal Basin. Compliance with the annual reporting requirements under permit conditions II.C.6, IV.H.2, and VI.H.2 ensures timely submittal of all applicable groundwater monitoring data for the Sediment Disposal Basin and Kerr Hollow Quarry (GRAM, Inc. and AJA Technical Services, Inc. 1997).

3.1.3 SWDF Detection Monitoring

Groundwater samples were collected from 21 monitoring wells and spring SCR4.3SP for the purposes of SWDF detection monitoring (Table 5). The wells are located upgradient and downgradient of Industrial Landfills II, IV, and V, and Construction/Demolition Landfills VI and VII; spring SCR4.3SP is located in an unnamed tributary approximately 1,200 ft directly south of Construction/Demolition Landfill VII (Figure 6). Some of the wells serve multiple monitoring purposes. For instance, well GW-796 is an upgradient/background well for SWDF detection monitoring at Industrial Landfill IV and a point-of-compliance well for RCRA post-closure corrective action monitoring at the Security Pits.

Semiannual sampling for SWDF detection monitoring at each site was performed during the first and third, or second and fourth quarters of the year (Table 5). Additionally, wells GW-141 at Industrial Landfill IV and GW-539 at Industrial Landfill II were resampled to confirm elevated concentrations of some constituents reported during the first and second semiannual sampling events,

respectively. Well GW-141 was resampled in February 1997 (Table 4, Addendum 97-13) to confirm the elevated lead, beryllium, and gross alpha concentrations reported for the sample collected in January 1997, and well GW-539 was resampled in December 1997 (Table 4, Addendum 97-20) to confirm the elevated nickel concentrations reported for the sample collected in October 1997. Groundwater samples were not collected from well GW-542 during the second semiannual sampling event (October 1997) at Construction Demolition Landfill VI because the well was dry. Monitoring data obtained during each sampling event were reported to the TDEC Division of Solid Waste Management per applicable regulatory requirements and operating permit conditions (Lockheed Martin Energy Systems, Inc. 1997b, 1997c, 1997d, 1997e, 1997f, 1997g, 1997h, 1997i, and 1997j).

3.1.4 CERCLA Record of Decision Monitoring

In April 1997, groundwater samples were collected from wells 1090, GW-203, GW-205, GW-221, GW-302, and GW-339 as part of the post-closure surveillance and maintenance activities specified in the CERCLA ROD for the United Nuclear Corporation Site (Figure 6). In September 1997, the Integrated Water Quality Program (IWQP) assumed responsibility for groundwater sampling at the site (Table 4, Addendum 97-17). Monitoring results obtained in April 1997 were provided to the IWQP and are incorporated into the annual Remedial Effectiveness Report (RER) for the ORR.

The CERCLA ROD for Kerr Hollow Quarry requires sampling of surface water discharging from Outfall 301, which is located on the southwest side of the quarry (Figure 6). Sampling was performed April 30, 1997 (Table 5) in coordination with RCRA post-closure detection monitoring at the site. As with the groundwater monitoring at the United Nuclear Corporation Site, the IWQP is now responsible for monitoring at Outfall 301 (Table 4, Addendum 97-18) and evaluating the results in the annual RER.

3.1.5 DOE Order 5400.1 Monitoring

Groundwater samples were collected semiannually from spring SCR2.2SP for the purposes of DOE Order 5400.1 exit pathway monitoring in the Chestnut Ridge Regime. This monitoring program is intended to provide data needed to evaluate groundwater and surface water quality where

contaminants are most likely to migrate beyond the boundaries of the ORR. Spring SCR2.2SP is located in Bethel Valley about 2,500 ft south of Industrial Landfill II (Figure 6), and samples of the groundwater discharging from the spring were collected in January and July 1997 (Table 5). Additional springs on the south side of the ridge are scheduled for semiannual sampling for the purposes of DOE Order 5400.1 monitoring in CY 1998 .

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

Personnel from the Sampling and Environmental Support Department of the Analytical Service Organization (ASO) at the East Tennessee Technology Park (ETTP), formerly the Oak Ridge K-25 Site, were responsible for collection, transportation, and chain-of-custody control of the groundwater and surface water samples. Sampling was performed in accordance with the *Technical Procedure for Groundwater Sampling* (Lockheed Martin Energy Systems, Inc. 1995), a copy of which is included as Attachment 6 to the PCP. As noted in Section 1.0, the TDEC approved updating Attachment 6 with a revised version of the sampling procedure. In addition to technical updates and modifications, the revised version describes the low-flow minimal drawdown groundwater sampling method. Approved by the TDEC in June 1997 for SWDF detection monitoring and in July 1997 for RCRA post-closure monitoring (detection and corrective action), this method was used to collect samples from wells at the Sediment Disposal Basin (GW-156, GW-159, GW-731, and GW-732), and Kerr Hollow Quarry (GW-142, GW-143, GW-144, GW-145, and GW-231) during the fourth quarter of CY 1997. Beginning in January 1998, the low-flow minimal-drawdown method will be used to collect groundwater samples from all of the wells that serve the above-listed monitoring programs.

Dedicated bladder pumps (Well Wizards™), portable gas-piston pumps (Bennet Pumps™), and disposable bailers were used to collect groundwater samples from the monitoring wells, and grab sample bottles were used to collect samples from springs (SCR2.2SP and SCR4.3SP) and Outfall 301. Each type of monitoring well sampling equipment was used for conventional purging and sampling, whereby at least three well-volumes of groundwater were purged from the well (if the well did not go dry) before samples were collected. The Well Wizards™ also enable low-flow minimal drawdown sampling, whereby samples were collected immediately after field measurements

showed stable pH, conductivity, and temperature values (<10% variation over three consecutive readings) in groundwater purged at a very low flow rate (<300 milliliters per minute) with minimal water-level drawdown (less than 0.1 foot per quarter-hour) in the well.

Filtered and unfiltered samples were collected from each monitoring well and spring; only unfiltered samples were collected from Outfall 301. Samples collected with a Well Wizard™ or Bennet Pump™ were filtered in the field using in-line 0.45 micron filters, and samples collected with a bailer were filtered in the laboratory, as were samples collected with grab sample bottles. All the groundwater and surface water samples were collected in appropriate containers, labeled, logged, placed in ice-filled coolers, and transported to the appropriate ASO laboratory in accordance with chain-of-custody control requirements.

3.3 Field Measurements and Laboratory Analytes

Field personnel measured the depth to water before purging and sampling the groundwater in each monitoring well; the depth-to-water measurements and calculated water-level elevations are presented in Appendix D.1. This protocol addresses corresponding PCP conditions for RCRA post-closure corrective action monitoring and RCRA post-closure detection monitoring (Table 1). Sampling personnel also recorded field measurements of pH, temperature, conductivity, and dissolved oxygen for each groundwater and surface water sample (Table 7). Applicable measurements recorded for each sampling location are included in Appendix D.1.

Laboratory analyses of all groundwater samples include the following standard suite of analytes: (1) pH, conductivity, turbidity, total suspended solids (TSS), 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) a comprehensive suite of VOCs; and (4) gross alpha and gross beta activity (Table 7). Unfiltered samples were analyzed for all of the standard laboratory analytes; filtered samples were analyzed only for principal cations and trace metals. Surface water samples from Outfall 301 were analyzed only for the principal cations, trace metals, radioanalytes, and TSS to support the five-year evaluation specified by the CERCLA ROD for Kerr Hollow Quarry (Table 7).

In addition to the standard suite of analytes, groundwater samples collected at a few locations were analyzed for other parameters, depending on the requirements of the governing monitoring program. For example, groundwater samples from wells at the United Nuclear Corporation Site also were analyzed for strontium-89/90.

The standard suite of laboratory analytes include the RCRA groundwater target compounds listed in the following site-specific attachments to the PCP (Table 8): Attachment 2, Section E (Sediment Disposal Basin); Attachment 3, Section E (Security Pits); and Attachment 4, Section E (Kerr Hollow Quarry). As required under applicable site-specific conditions of the PCP (Table 1), laboratory analyses for these inorganic, organic, and radiological constituents were completed within 90-days after each semiannual sampling event.

Laboratory analyses of the groundwater and surface water samples were performed in accordance with the analytical methods listed in Table 7. Inorganic and miscellaneous laboratory analyses were performed by the ASO laboratories at the ETTP, with organic and radiochemical analyses performed by the Y-12 Plant ASO laboratories. Analytical results are presented in Appendix D.1 (miscellaneous laboratory analytes), 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 include a total of 31 laboratory blanks, 54 trip blanks, two field blanks, and 20 equipment rinsate samples (six of these were only analyzed for inorganic analytes). 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 to be analyzed for organic compounds. 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 Bennet Pumps™, and were collected after a sampling team had completed sampling at a site or finished each administrative sampling group (a series of sampling locations grouped 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 trace metals and radiological analytes. 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 14 monitoring wells (Table 5), including at least one well in each administrative sampling group. Duplicate samples were analyzed for the constituents and parameters specified for the well from which they were collected; analytical results are included with the corresponding well data presented in Appendix D.

3.5 Data Management

Analytical results for the groundwater and surface water samples were downloaded directly into a SAS® groundwater database from data files provided by the ASO laboratories at the ETTP and the Y-12 Plant. The groundwater database management subcontractor also manually input some data from field data sheets. Downloaded and manually input data were verified in accordance with the *Y-12 Plant Groundwater Protection Program - Groundwater Monitoring Program Data Management Plan* (Martin Marietta Energy Systems, Inc. 1993). The groundwater database 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 1997 analytical results that do not meet the appropriate DQOs defined in the above referenced data management plan. As described in Appendix F, results that do not meet the applicable DQOs include: zinc results for duplicate samples from well GW-144 that differ by more than an order-of-magnitude (Section F.2); total and dissolved boron (GW-564), lead (GW-231 and spring SCR2.2SP), and iron (GW-231) results for corresponding filtered/unfiltered samples that differ more than an order-of-magnitude (Section F.3); 149 false- positive results for VOCs, primarily results for common laboratory reagents (Section F.5); and one gross alpha result for well GW-231 that exceeds the minimum detectable activity (MDA), but is less than the associated counting error (Section F.6).

4.0 DATA EVALUATION

This section presents data evaluations required for RCRA post-closure corrective action monitoring at the Security Pits, and RCRA post-closure detection monitoring at the Sediment Disposal Basin and Kerr Hollow Quarry. General and site-specific conditions of the PCP require annual evaluations of applicable monitoring data regarding: (1) the groundwater flow direction and rate in the uppermost aquifer (Knox Aquifer) at each site, (2) concentrations of RCRA groundwater target compounds in the groundwater at the point-of-compliance for the Security Pits, and (3) concentrations of RCRA groundwater target compounds at the plume delineation wells designated for the Security Pits. Also included in this section are descriptions of the applicable statistical evaluations and quantitative trend analyses performed on the RCRA post-closure detection monitoring data for wells at the Sediment Disposal Basin and Kerr Hollow Quarry.

4.1 Groundwater Flow Direction and Rate

Groundwater surface elevations determined from depth-to-water measurements obtained from 79 monitoring wells during March 31 to April 4, 1997 (the seasonally high water table) and 82 monitoring wells during October 6 - 9, 1997 (the seasonally low water table) were used to evaluate groundwater flow directions in the Knox Aquifer (Table 9). Depth-to-water measurements recorded during groundwater sampling events were not used to determine flow directions because they were less contemporaneous and may have been influenced by sampling activities (i.e., purging/sampling nearby monitoring wells).

The rate of groundwater flow (V) in the Knox Aquifer was estimated using the modified Darcy equation: $V = \mathbf{K}I/\eta$, where $\mathbf{K}$ is the hydraulic conductivity of the medium, η is the effective porosity, and I is the horizontal hydraulic gradient. The calculated flow rates represent average velocities in fractured rock, assuming the Knox Aquifer functions as an equivalent porous medium. 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 assumed for the Knox Aquifer would produce an inversely proportional variation in the calculated Darcy flow velocity.

Groundwater Flow Directions

Groundwater elevations in monitoring wells at the Security Pits (Figure 4), in conjunction with the elongated geometry of the dissolved VOC plume in the groundwater at the site, indicate flow primarily from west to east (parallel with geologic strike) with lesser components of flow to the north and south (perpendicular to geologic strike). Groundwater elevations in monitoring wells at the Sediment Disposal Basin indicate flow to the east and northeast, and flow directions at Kerr Hollow Quarry are generally south toward Melton Hill Reservoir, or southwest toward the unnamed tributary adjacent to the site (Figure 4).

Water-level elevations determined from depth-to-water measurements obtained at the Sediment Disposal Basin (Figure 7) and Kerr Hollow Quarry (Figure 8) prior to purging indicate concurrent, seasonal water-table fluctuations upgradient and downgradient of each site. In accordance with conditions IV.G.3 (Sediment Disposal Basin) and VI.G.3 (Kerr Hollow Quarry) of the PCP, these data also demonstrate that the designated point-of-compliance wells were hydraulically downgradient of each respective site during each semiannual sampling event. The point-of-compliance wells for the Security Pits (GW-609 and GW-796) were also hydraulically downgradient of the site throughout the year (Figure 4).

Groundwater Flow Rates

The modified Darcy equation was used to estimate the rate of groundwater flow in matrix and water-producing intervals within the uppermost aquifer (Knox Group) at the Security Pits, Sediment Disposal Basin, and Kerr Hollow Quarry. These estimated flow rates are based on: (1) the range of hydraulic conductivity values (0.0002 to 13.8 ft/d) indicated by straddle packer tests (King and Haase 1988) and falling-head permeability tests (Jones 1997), (2) effective porosity ranging from 0.0006 to 0.0813 (Dorsch 1997), and (3) the following range of horizontal hydraulic gradients indicated by groundwater elevations in the specified monitoring wells at each site.

Site/Monitoring Well No.			Groundwater Elevation (ft above msl)		Lateral Distance (ft)	Horizontal Hydraulic Gradient (*I*)	
			April 1997	October 1997		April 1997	October 1997
Security Pits	Strike	GW-178	1,053.90	1,049.30	.	.	.
	Normal	GW-611	950.10	942.10	394	0.263	**0.272**
		GW-511	1,011.30	984.70	512	**0.083**	0.126
	Strike	GW-178	1,053.90	1,049.30	.	.	.
	Parallel	GW-179	1,011.80	1,011.60	1,076	**0.039**	0.035
		GW-609	947.90	941.50	2,272	**0.028**	0.031
Sediment Disposal Basin		GW-159	934.80	933.20	.	.	.
		GW-156	906.70	905.50	552	**0.051**	**0.050**
Kerr Hollow Quarry		GW-231	837.17	832.37	.	.	.
		GW-144	835.24	831.64	480	**0.004**	0.002
		GW-142	837.25	831.85	.	.	.
		GW-144	835.24	831.64	592	0.003	**0.0004**

Note: Bold typeface denotes gradients used to calculate range of groundwater flow rates.

As shown in the following summary, groundwater flow rates in the uppermost aquifer at each site, based on the input values and inherent assumptions associated with the modified Darcy equation, range from about 0.0004 ft per year (1 x 10^{-6} ft/d) at Kerr Hollow Quarry to more than 1,000 ft/d at the Security Pits and the Sediment Disposal Basin.

Groundwater Flow Rates ($V = KI/\eta$)				
Security Pits	*V* (ft/d)	K (ft/d)	*I*	η
Strike-normal flow:	Min: 0.0002	0.0002	0.083	0.0813
	Max: 6,256	13.8	0.272	0.0006
Strike-parallel flow:	Min: 0.00007	0.0002	0.028	0.0813
	Max: 897	13.8	0.039	0.0006
Sediment Disposal Basin	Min: 0.0001	0.0002	0.051	0.0813
	Max: 1,150	13.8	0.05	0.0006
Kerr Hollow Quarry	Min: 0.000001	0.0002	0.0004	0.0813
	Max: 92	13.8	0.004	0.0006

Estimated flow rates at the lower end of the range are reasonable for diffuse flow in matrix intervals. The upper values are within the range of flow rates typical of highly permeable conduits in karst terrains (Quinlan and Ewers 1985) and are generally supported by the flow rates (490 to 1,250 ft/d)

indicated by the dye-tracer study performed on Chestnut Ridge near ORNL (Ketelle and Huff 1984). However, considering the relatively limited extent of the dissolved VOC plume in the groundwater at the Security Pits, the lower flow rates may dominate and attenuation processes (e.g., matrix diffusion) significantly reduce contaminant migration relative to the groundwater flow rate.

4.2 Point-of-Compliance Concentration Trends

This section describes the results of the evaluation of the RCRA post-closure corrective action groundwater monitoring data for the Security Pits point-of-compliance wells GW-609 and GW-796. Evaluation of the monitoring results for these wells was performed in accordance with the modified requirements of the PCP that were approved by the TDEC in July 1997 (Table 2). The approved permit modifications clarify the purpose for and objective of the data evaluation (permit condition V.D.3), and define quantitative trend analysis as the technical approach for data evaluation (permit condition V.G.6), including the option for statistical outlier testing to exclude results for inorganic constituents that differ significantly (either too high or too low) from historical data (GRAM, Inc. and AJA Technical Services, Inc. 1997). Using this technical approach, the trend analyses are based on time-series plots of the results for selected VOCs included in the RCRA groundwater target compound list, and results for the inorganic RCRA groundwater target compounds that exceed analytical reporting limits.

Analytical results for the unfiltered and filtered groundwater samples collected from point-of-compliance wells GW-609 and GW-796 during CY 1997 show that both yield calcium-magnesium-bicarbonate groundwater with low proportions (<10%) of chloride, potassium, sodium, and sulfate; low levels (<1.5 mg/L) of nitrate; pH of about 6.5 to 8.5, and TDS of about 120 to 480 mg/L (see Appendix D). These results are consistent with respective historical data for each well.

Lead (total and dissolved), gross alpha, PCE, TCE, and 1,1,1-TCA were the only RCRA groundwater target compounds specified for the Security Pits that were detected in the unfiltered and filtered groundwater samples collected from the point-of-compliance wells during CY 1997 (Table 10). All of these results meet applicable DQOs. Lead was detected in the filtered groundwater sample collected from well GW-609 in January 1997, and the filtered and unfiltered groundwater samples collected from wells GW-609 and GW-796 during July 1997. Total (and

dissolved) lead concentrations reported for these samples are at least an order-of-magnitude below the 0.05 mg/L MCL for drinking water; the highest concentrations (0.0019 and 0.003 mg/L) were reported for unfiltered samples collected from each well in July 1997 (seasonally low groundwater flow conditions). Neither well consistently yields filtered or unfiltered samples with detectable lead concentrations. Lead was not detected in any of the samples collected from well GW-796 before July 1997, and was detected in only two of the 28 unfiltered samples collected from well GW-609 between February 1990 and January 1997. In light of the sporadic detection of lead in the groundwater samples from these wells, quantitative trend analysis of the lead results is not appropriate.

Tetrachloroethene and TCE were detected in the groundwater samples collected from well GW-609 (Table 10). Concentrations range from 1 μg/L (estimated value below the analytical reporting limit) for TCE to 13 μg/L for PCE, with the higher PCE concentration reported for the sample collected in January 1997. These results are consistent with historical data for the well. Tetrachloroethene was selected for quantitative trend analysis because it is a primary component of the dissolved plume of VOCs in the groundwater at the Security Pits, and the concentrations exceed the MCL for drinking water (5 μg/L). A clearly decreasing long-term concentration trend is indicated by the PCE results (Figure 9). Results for PCE also show short term temporal concentration fluctuations that generally correspond with seasonal groundwater elevations (i.e., concentrations are often highest when water levels are highest). Such relationships suggest greater flux of PCE (and other VOCs) during seasonally and episodically high groundwater flow conditions. Conversely, VOC results for other wells at the site (e.g., GW-177) show an inverse correlation with pre-sampling water level elevations (i.e., concentrations are highest when water levels are lowest) suggesting dilution from seasonal recharge of uncontaminated groundwater. Dissolution of DNAPL within the residuum and bedrock underlying the Security Pits (as well as matrix diffusion processes) may explain the dilution-related concentration fluctuations, and cyclic flushing by seasonal and episodic recharge/discharge may explain the flux-related concentration fluctuations (AJA Technical Services, Inc. 1997).

A very low (estimated) concentration of 1,1,1-TCA (1 μg/L) was detected in the groundwater sample collected from well GW-796 in July 1997. Similarly low concentrations of 1,1,1-TCA

(2 μg/L or less) have been detected in more than half of the samples collected from the well since May 1993, including several results that are potential false positives related to 1,1,1-TCA contamination in the associated trip blank samples. The data show a generally decreasing long-term concentration trend (Figure 9). As noted in Section 2.4, the repeated detection of 1,1,1-TCA in the groundwater at well GW-796 may indicate transport from the Security Pits along groundwater flowpaths oriented perpendicular to strike. Also, because the concentrations are so low, failure to consistently detect 1,1,1-TCA in the groundwater samples from this well potentially reflects volatilization during sampling rather than the absence of the compound in the groundwater.

Based on the preceding evaluation, the CY 1997 RCRA post-closure corrective action monitoring point-of-compliance wells GW-609 and GW-796 do not indicate significant changes in the overall effectiveness of the multi-layer low-permeability cap at the Security Pits.

4.3 Plume Delineation Evaluation

This section describes the results of the evaluation of the RCRA post-closure corrective action groundwater monitoring data for the Security Pits plume delineation wells: GW-301, GW-557, GW-798, GW-799, GW-801, and GW-831. Evaluation of the monitoring results for these wells was performed in accordance with the modified requirements of the PCP (Table 2). Changes to applicable permit conditions were proposed to remove the background-comparison data evaluation approach originally referenced by permit condition V.D.2 (this approach proved technically inappropriate and prone to erroneous indications of groundwater contamination); clarify the purpose for and objective of the data evaluation (permit condition V.D.4); define quantitative trend analysis of PCE and 1,1,1-TCA results as the technical approach for data evaluation (permit condition V.G.4); and clarify the action required if the evaluation indicates that the plume delineation wells no longer monitor the downgradient boundary of the dissolved VOC plume originating from the Security Pits (permit condition V.G.5) (GRAM, Inc. and AJA Technical Services, Inc. 1997).

Analytical results reported for the unfiltered and filtered groundwater samples collected from the plume delineation wells during CY 1997 show that these wells typically yield calcium-magnesium-bicarbonate groundwater characterized by equal or nearly equal molar concentrations of calcium and magnesium; low proportions (<5%) of chloride, potassium, sodium, and sulfate;

carbonate alkalinity and fluoride levels below respective analytical reporting limits; low levels (<1.5 mg/L) of nitrate; pH of about 6.5 to 8; and TDS of about 120 to 200 mg/L (see Appendix D). These results are consistent with historical data for each of the plume delineation wells.

Chloroform, lead (total and dissolved), nickel (dissolved), and uranium (total and dissolved) were the only RCRA groundwater target compounds specified for the Security Pits that were detected in the unfiltered and/or filtered groundwater samples collected from the plume delineation wells during CY 1997 (Table 11). Lead was detected in at least one filtered or unfiltered sample from each of the wells, but the concentrations are at least an order-of-magnitude below the 0.05 mg/L MCL for drinking water: dissolved concentrations range from 0.00057 mg/L (GW-301) to 0.0022 mg/L (GW-557), and total concentrations range from 0.00058 mg/L (GW-798) to 0.0033 mg/L (GW-557). Chloroform (1 μg/L) and nickel (0.015 mg/L) were detected only in the unfiltered and filtered samples, respectively, collected from well GW-301 in July 1997. Uranium was detected at concentrations of 0.00058 to 0.00078 mg/L (i.e., just slightly above the 0.0005 mg/L analytical reporting limit) only in the groundwater samples collected from well GW-831. All of these results meet applicable DQO criteria.

Neither PCE nor 1,1,1-TCA were detected in any of the groundwater samples collected from the plume delineation wells (Table 11). Both of these RCRA groundwater target compounds are primary components of the VOC plume in the groundwater at the Security Pits, are relatively mobile in groundwater, and are reliable indicators of contaminant migration from the Security Pits (GRAM, Inc. and AJA Technical Services, Inc. 1997). Thus, the CY 1997 RCRA post-closure corrective action monitoring data for the plume delineation wells do not indicate migration of groundwater contaminants from the Security Pits.

Based on the preceding evaluation of the CY 1997 semiannual RCRA post-closure corrective action monitoring data, plume delineation monitoring wells GW-301, GW-557, GW-798, GW-799, GW-801, and GW-831 continue to effectively monitor the edge of the groundwater contaminant plume at the Security Pits.

4.4 Statistical Evaluations and Quantitative Trend Analyses

Statistical evaluations of the CY 1997 semiannual RCRA post-closure detection monitoring data for the point-of-compliance wells and upgradient (background) wells at the Sediment Disposal Basin and Kerr Hollow Quarry were performed in accordance with site-specific conditions of the PCP; quantitative trend analysis of the boron , gross alpha, gross beta, and strontium results for wells at Kerr Hollow Quarry were also performed as required under permit condition VI.F (Table 1). The applicable statistical evaluations and trend analyses were completed within 90 days after each semiannual sampling event at each site, and results of the evaluations were reported to the TDEC in July 1997 and January/February 1998 (Lockheed Martin Energy Systems, Inc. 1997k, 1997l, 1998a, and 1998b). Copies of these semiannual reports are included in Appendix G.1 (Sediment Disposal Basin) and G.2 (Kerr Hollow Quarry).

Attachment 2, Section H (Sediment Disposal Basin) and Attachment 4, Section H (Kerr Hollow Quarry) of the PCP specify the following technical approach for statistical evaluation of the semiannual RCRA post-closure detection monitoring results. For each applicable RCRA groundwater target compound, the mean (or median) value determined from the replicate sample results for each point-of-compliance well is statistically compared (using parametric or nonparametric analysis of variance) to the corresponding mean (or median) value determined from the replicate sample results for each upgradient/background well. If the variance test shows that the mean (or median) value for a point-of-compliance well is significantly higher than the mean (or median) value for the upgradient/background well(s), then the individual replicate results for the compound are compared to: (1) the corresponding background upper tolerance limit (UTL) statistically derived from the historical data for each upgradient well, and (2) the historical data set for the applicable point-of-compliance well. If a replicate sample result exceeds the UTL and is statistically higher than historical data for the point-of-compliance well, all the RCRA monitoring wells at the site must be resampled to confirm the concentration increase. Descriptions of the statistical evaluation procedure and detailed statistical information for each site are provided in Appendix G.1 (Sediment Disposal Basin) and G.2 (Kerr Hollow Quarry).

4.4.1 Sediment Disposal Basin

Statistical evaluations of the CY 1997 semiannual RCRA post-closure detection monitoring results for cadmium, chromium, lead, mercury, nickel, silver, and uranium were performed for upgradient background well GW-159, and downgradient point-of-compliance wells GW-156, GW-731, and GW-732. The statistical evaluation results for each sampling event are summarized below.

Based on evaluation of the monitoring results for the first semiannual sampling event at the Sediment Disposal Basin, the median uranium value determined from the replicate sample results for point-of-compliance well GW-156 is statistically higher than the median uranium value for upgradient/background well GW-159. However, intrawell statistical comparisons show that the replicate uranium results for well GW-156 are within the range of historical values for the well. These uranium results are also less than the uranium UTL (0.0076 mg/L) determined from data for well GW-159. Because the intrawell and UTL comparisons do not indicate a statistically significant concentration increase, a release of uranium from the site is not evident (Lockheed Martin Energy Systems, Inc. 1997k).

Based on evaluation of the monitoring results for the second semiannual sampling event at the Sediment Disposal Basin, the median lead and uranium values determined from the replicate sample results for point-of-compliance well GW-732 are statistically higher than the corresponding median values for upgradient/background well GW-159. Intrawell statistical comparisons show that the replicate lead results are less than maximum historical values for well GW-732, but total uranium concentrations for the first (0.0054 mg/L) and fourth (0.0067 mg/L) replicate samples exceed the range of historical values for the well. These uranium levels also exceed the revised UTL for uranium (0.0051 mg/L) calculated from the pooled data for several wells located upgradient of the Sediment Disposal Basin. However, resampling all of the monitoring wells at the site to confirm the increasing concentration trend within thirty days of the statistical evaluation, as required under condition IV.H.2(b) of the PCP, may not be appropriate because of questions regarding the elevated uranium results (Lockheed Martin Energy Systems, Inc. 1998a).

Several considerations question the significance of the elevated uranium concentrations reported for well GW-732. Concentrations in each replicate sample are less than the background

UTL (0.0076 mg/L) formerly used for comparison (derived from data for well GW-159 alone) and are substantially less than the EPA risk-based action level for uranium salts in drinking water (0.110 mg/L). Additionally, these uranium results were obtained using the low-flow minimal drawdown sampling method and intrawell statistical comparison with the historical uranium data obtained using conventional purging and sampling may not be appropriate. Moreover, the high pH (>8.8) of each replicate sample and relationships between total trace metal concentrations and TSS suggest potential bias from sampling and/or analysis. Because the uranium concentrations do not pose a risk to human health or the environment and may not accurately reflect concentrations in the groundwater at the well, and because there are no receptors to groundwater from the site, a request to delay confirmatory sampling until the next semiannual sampling event scheduled for April 1998 was submitted to the TDEC (Lockheed Martin Energy Systems, Inc. 1998a). This delay will provide sufficient time to redevelop well GW-732 and further evaluate the monitoring data, the potential effects of the low-flow minimal drawdown sampling protocol on the statistical evaluation, and whether the statistical evaluation method is appropriate for detection monitoring in a karst aquifer.

4.4.2 Kerr Hollow Quarry

Attachment 4 Section H of the PCP requires statistical evaluation and quantitative trend analysis of the semiannual RCRA post-closure detection monitoring data for the upgradient/background wells (GW-142 and GW-231) and point-of-compliance wells (GW-143, GW-144, and GW-145) at Kerr Hollow Quarry. Statistical evaluation is specified for carbon tetrachloride, cadmium, chromium, lead, mercury, nickel, PCE, and uranium (total) results, and quantitative trend analysis is specified for boron, strontium, gross alpha, and gross beta results. As summarized below, results of the statistical evaluations and quantitative trend analyses for each sampling event do not confirm a release of RCRA groundwater target compounds to the groundwater at Kerr Hollow Quarry (Lockheed Martin Energy Systems, Inc. 1997l and 1998b).

Statistical evaluation of the monitoring data from the first and second semiannual sampling events did not show statistically significant increases in the concentrations of the applicable RCRA groundwater target compounds in the point-of-compliance wells (Lockheed Martin Energy Systems, Inc. 1997l and 1998b).

Quantitative trend analysis (Kendall-Tau B Test) of the boron results obtained for downgradient well GW-145 during the first semiannual sampling event indicated a statistically significant increasing trend. As required under condition VI.H.2(b) of the PCP, all the wells at the site were subsequently resampled within 30 days of receipt of the trend analysis results. The resampling results, submitted to the TDEC in October 1997, did not confirm the increasing boron trend, but did indicate an increasing strontium concentration trend in upgradient/background well GW-142 (Lockheed Martin Energy Systems, Inc. 1997m). Because boron and strontium are not regulated under RCRA and similar concentrations of both metals occur in groundwater upgradient and downgradient of the site, and to avoid resampling based on erroneous temporal trends caused by analytical variability, the TDEC approved the request (effective July 1997) to remove boron and strontium from the list of RCRA groundwater target compounds specified for Kerr Hollow Quarry.

Statistically significant increasing trends are not indicated by quantitative trend analysis of the gross alpha and gross beta results from each semiannual sampling event. Additionally, the TDEC approved modifying the trend analysis procedure to allow excluding statistical outliers from the evaluation of the gross alpha and gross beta results. Excluding statistical outliers from the trend analysis is appropriate because gross alpha and gross beta results are summary statistics that exhibit substantial temporal variability.

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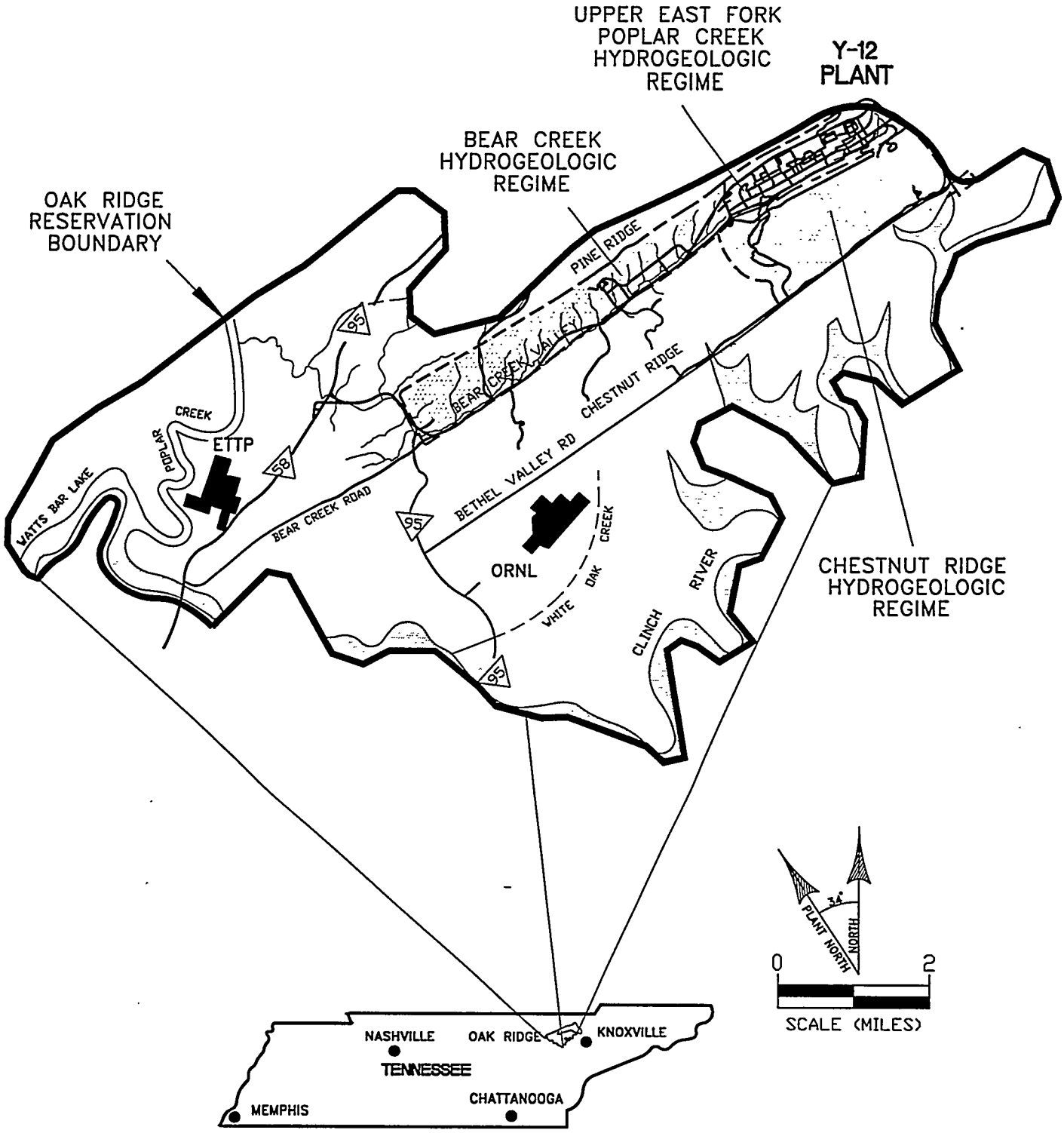
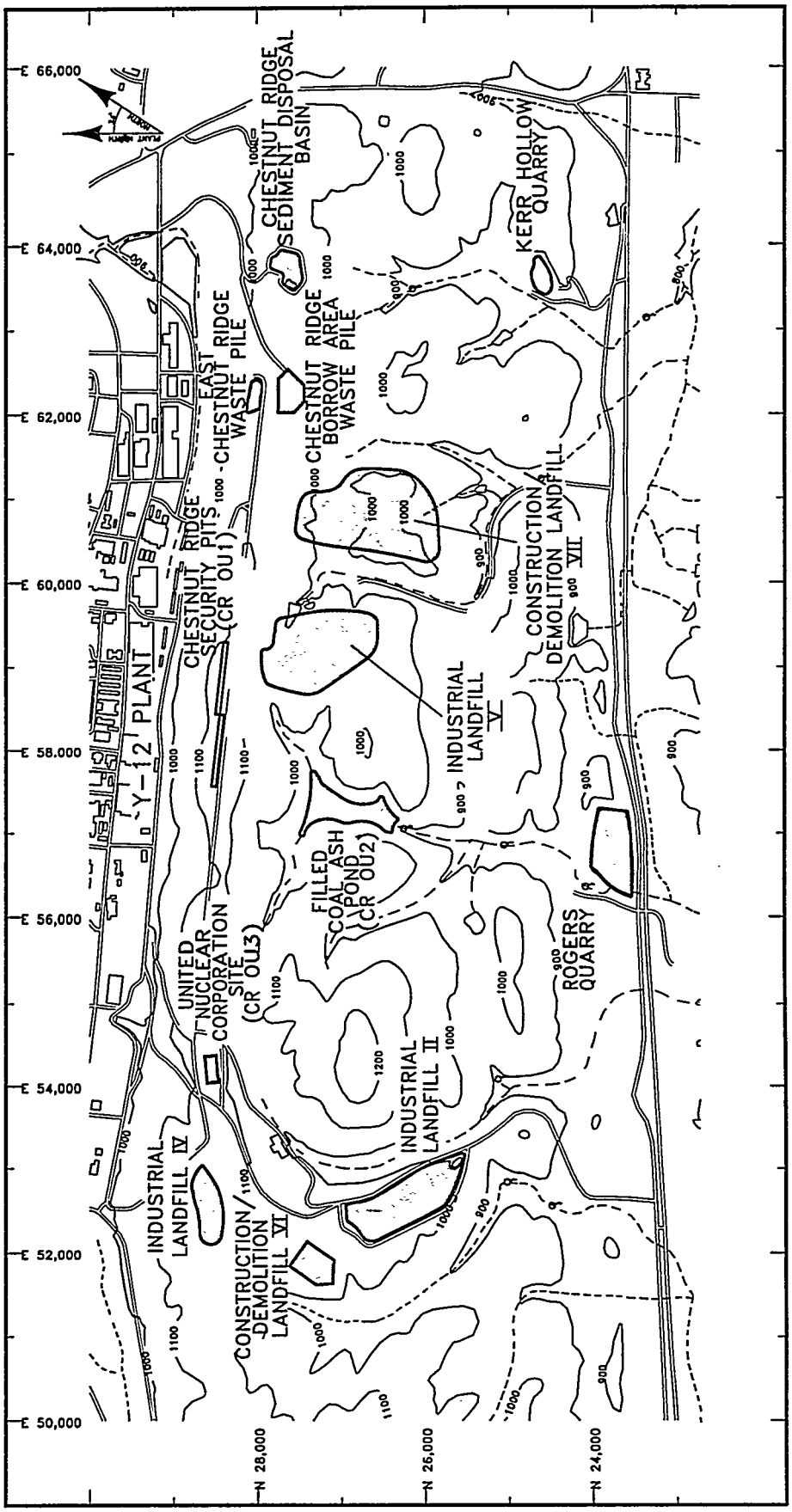
APPENDIX A

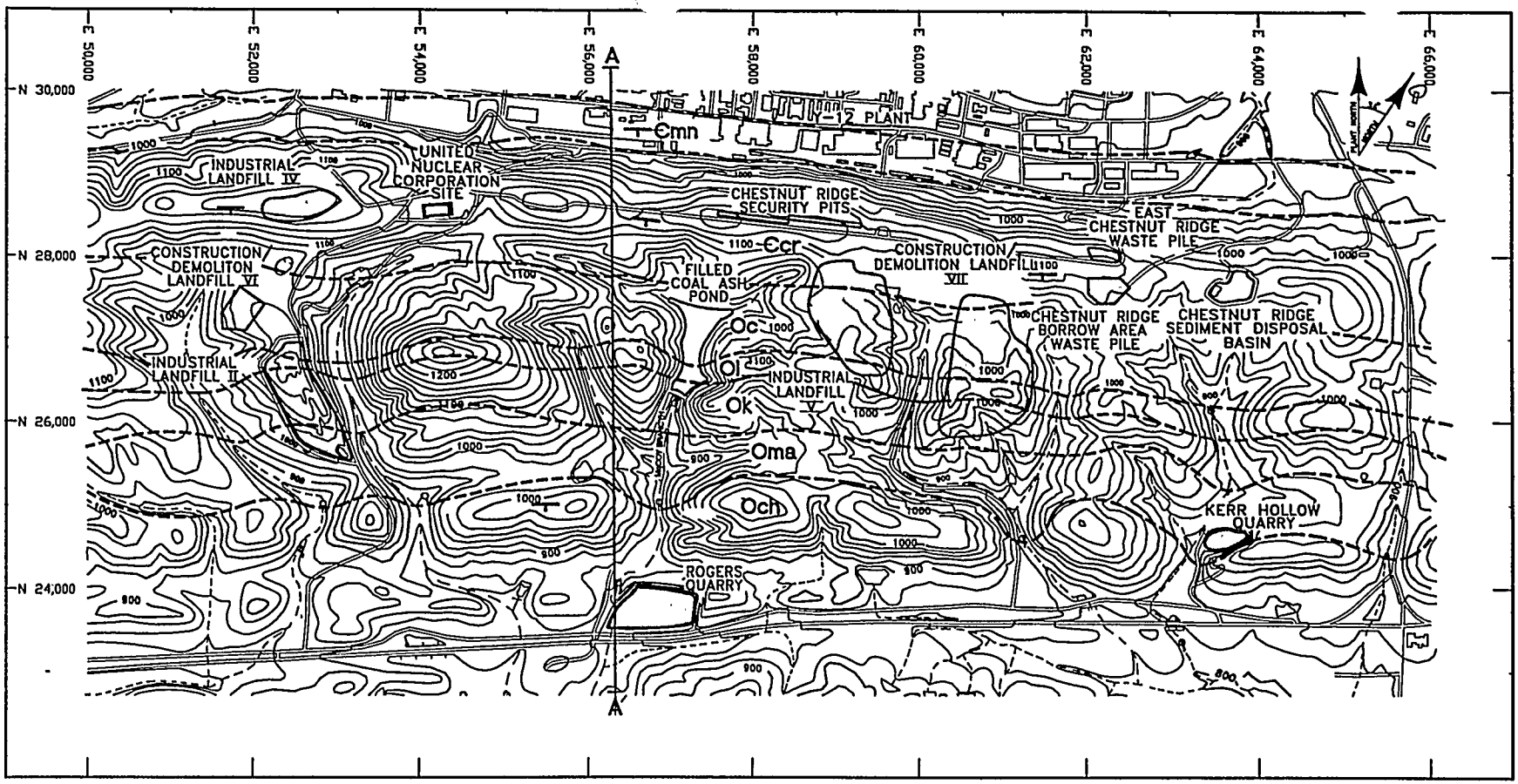
FIGURES



PREPARED FOR: *LOCKHEED MARTIN ENERGY SYSTEMS, INC.*	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 1
PREPARED BY: *AJA TECHNICAL SERVICES, INC.*	DOC NUMBER:	98-D001	HYDROGEOLOGIC REGIMES AT THE Y-12 PLANT
	DWG ID.:	97-007	
	DATE:	8-10-97	

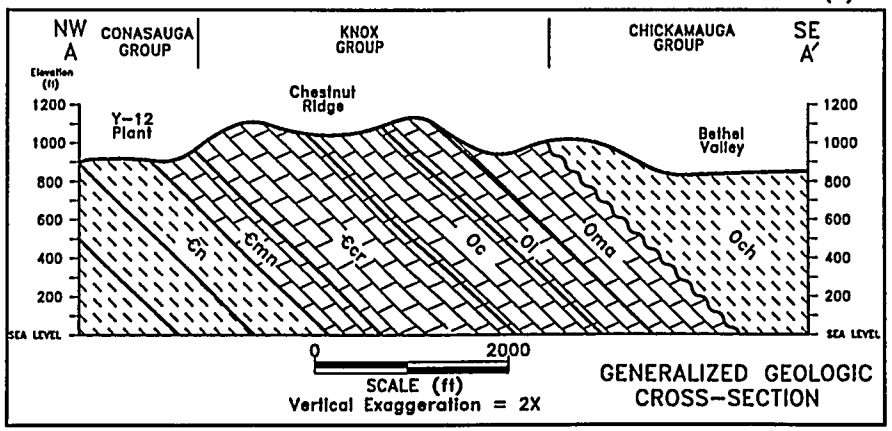


PREPARED FOR: *LOCKHEED MARTIN ENERGY SYSTEMS, INC.*	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 2
PREPARED BY: *AJA TECHNICAL SERVICES, INC.*	DOC NUMBER:	98-D002	WASTE MANAGEMENT SITES IN THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
	DWG ID.:	97-006	
	DATE:	2-9-98	



SOURCES: King and Haase, 1987
Hatcher et al, 1992

0 2000
SCALE (ft)



ORR AQUITARDS KNOX AQUIFER

SYSTEM		HYDRO UNIT	GROUP	FORMATION	MAP SYMBOL	THICKNESS (FT)
ORDOVICIAN	UPPER	ORR AQUITARDS	CHICKA-MAUGA	UNDIFFERENTIATED	Och	1500 TO 2000
	MIDDLE	KNOX AQUIFER	KNOX	MISSING SECTION (Subaerial Erosion)		
	LOWER			MASCOT DOLOMITE	Oma	250–400
				KINGSPORT FORMATION	Ok	300–500
				LONGVIEW DOLOMITE	Ol	130–200
				CHEPULTEPEC DOLOMITE	Oc	500–700
CAMBRIAN	UPPER			COPPER RIDGE DOLOMITE	Єcr	800–1,100
			CONASAUGA	MAYNARDVILLE LIMESTONE	Єmn	418–450
	MIDDLE	ORR AQUITARDS		NOLICHUCKY SHALE	Єn	490–590

PREPARED FOR:
LOCKHEED MARTIN ENERGY SYSTEMS, INC.

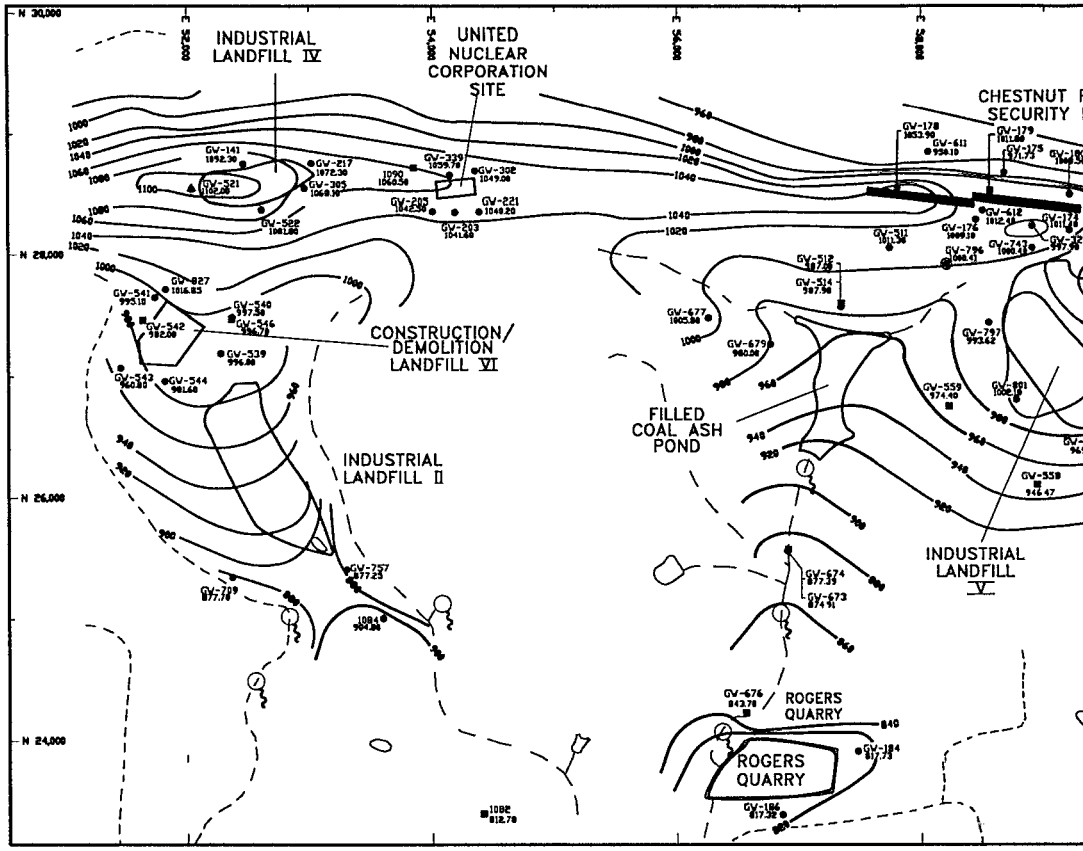
PREPARED BY:
AJA TECHNICAL SERVICES, INC.

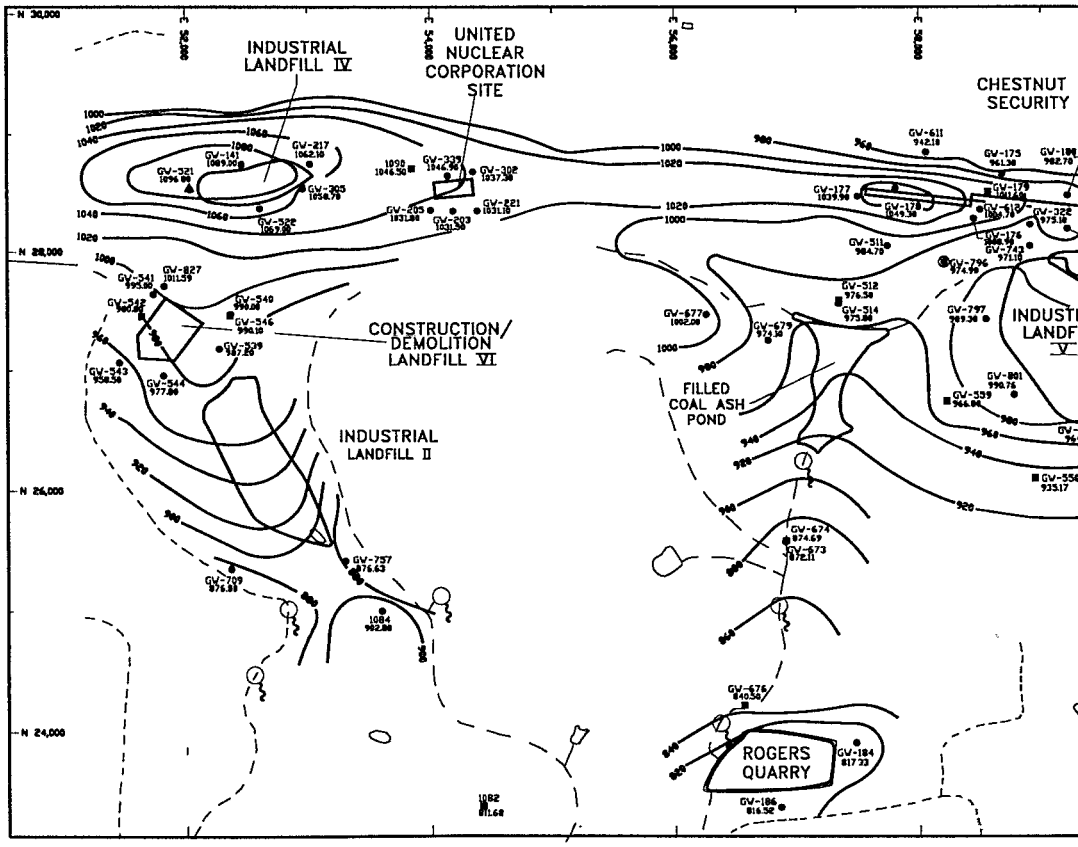
LOCATION: Y-12 PLANT OAK RIDGE, TN.

DOC NUMBER: 98-D002
DWG ID.: 96-023
DATE: 2-9-98

FIGURE 3

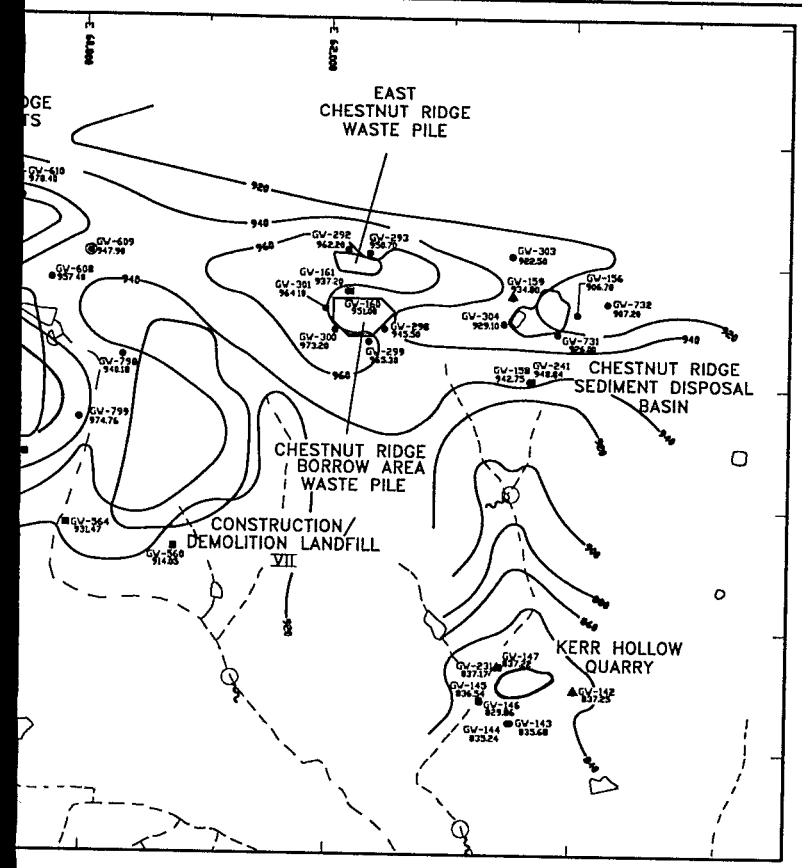
TOPOGRAPHY AND BEDROCK GEOLOGY IN THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME



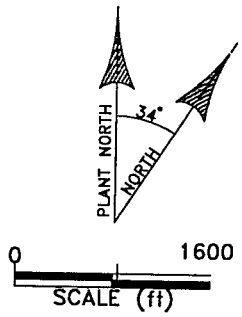


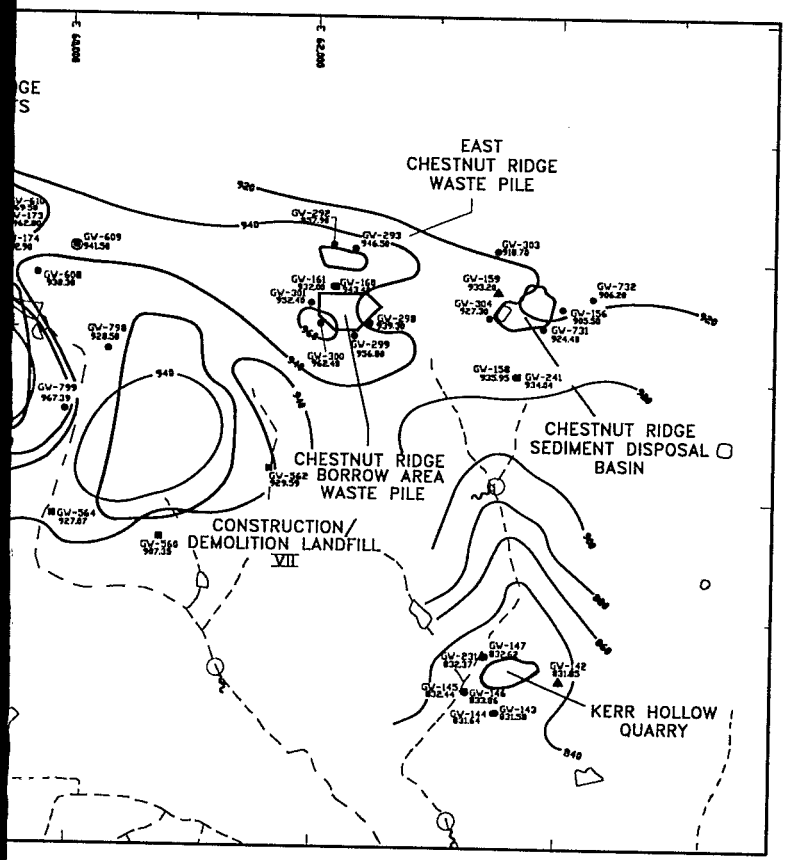
EXPLANATION

- ■ WATER TABLE MONITORING WELL
- • BEDROCK INTERVAL MONITORING WELL
- ⊛ RCRA POINT-OF-COMPLIANCE MONITORING WELL
- ▲ RCRA BACKGROUND/UPGRADIENT MONITORING WELL
- —920— WATER-LEVEL ISOPLETH (ft msl)
- - - - - SURFACE DRAINAGE FEATURE
- ♀ SPRING



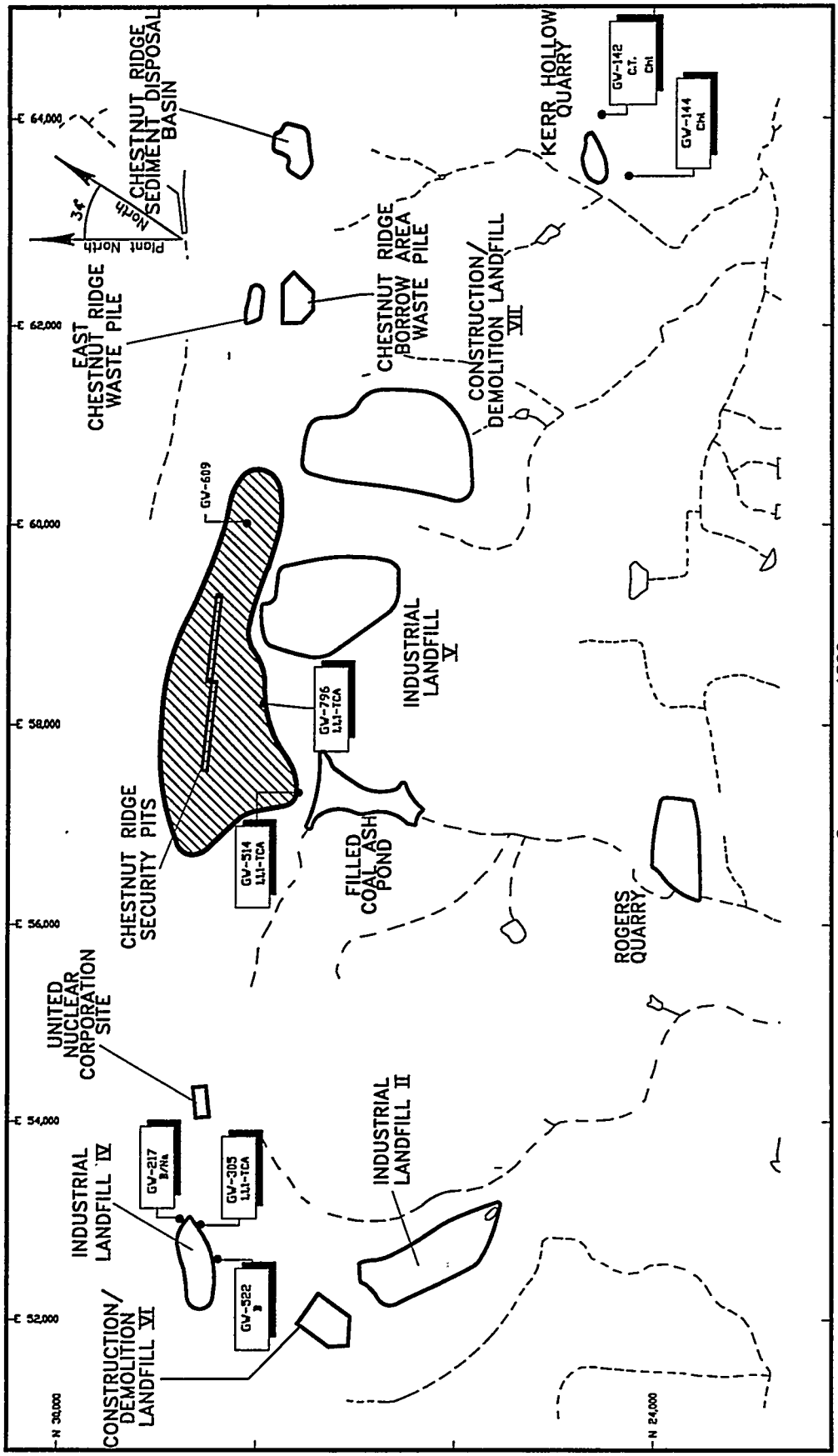
GROUNDWATER ELEVATIONS
MARCH 31 - APRIL 4, 1997



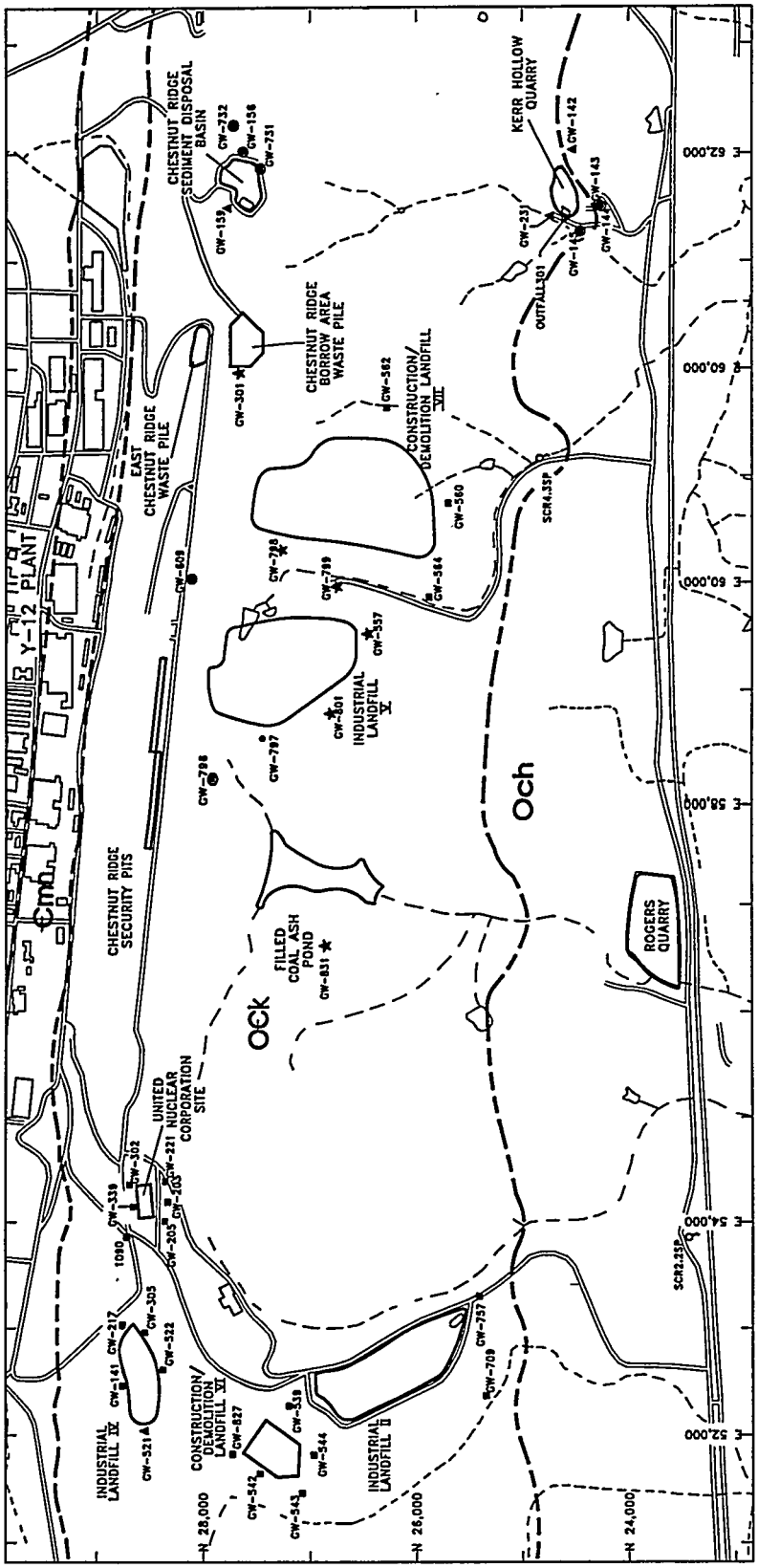


GROUNDWATER ELEVATIONS
OCTOBER 6 - 9, 1997

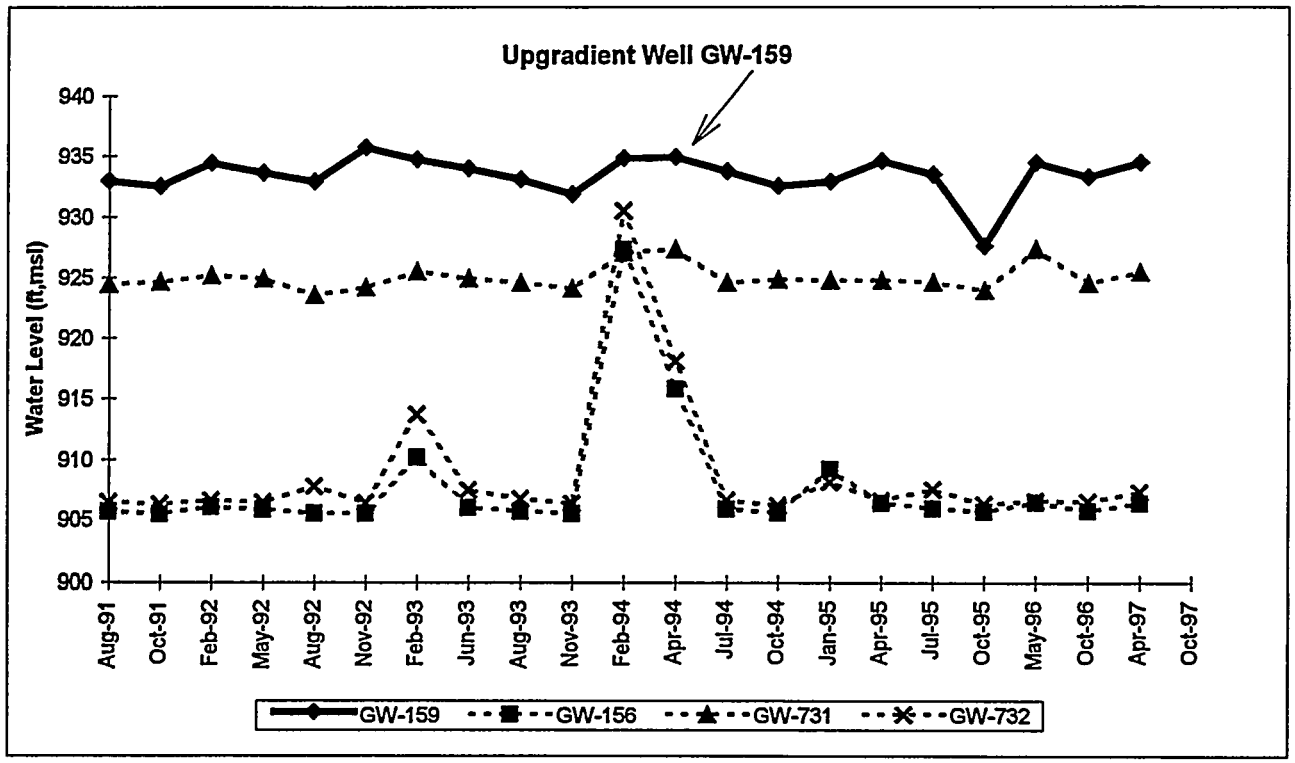
PREPARED FOR: *LOCKHEED MARTIN ENERGY SYSTEMS, INC.*	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 4
PREPARED BY: *AJA TECHNICAL SERVICES, INC.*	DOC NUMBER:	98-D002	SEASONAL GROUNDWATER ELEVATIONS IN THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME, CY 1997
	DWG ID.:	97-002	
	DATE:	2-9-98	



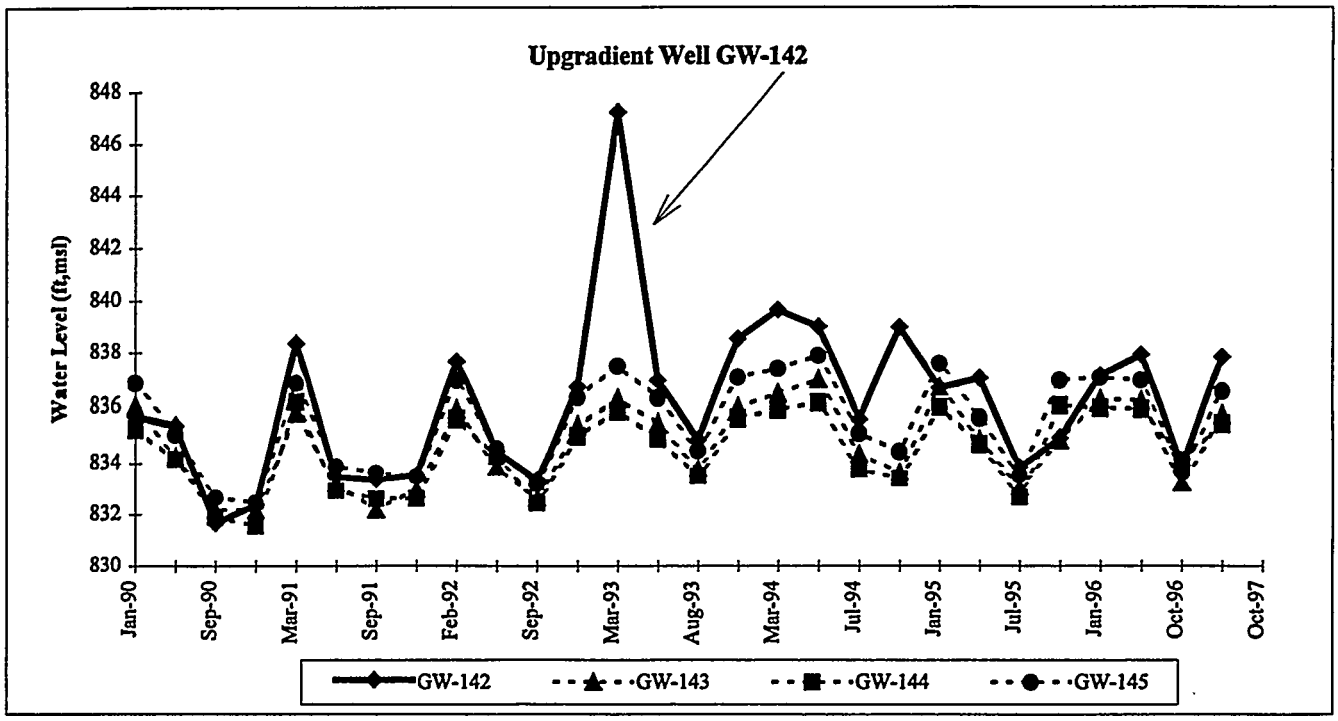
PREPARED FOR: *LOCKHEED MARTIN ENERGY SYSTEMS, INC.*	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 5
PREPARED BY: *AJA TECHNICAL SERVICES, INC.*	DOC NUMBER:	97-001	GROUNDWATER CONTAMINATION IN THE CHESTNUT RIDGE HYDROGEOLOGIC REGIME
	DWG ID.:	97-004	
	DATE:	2-9-98	

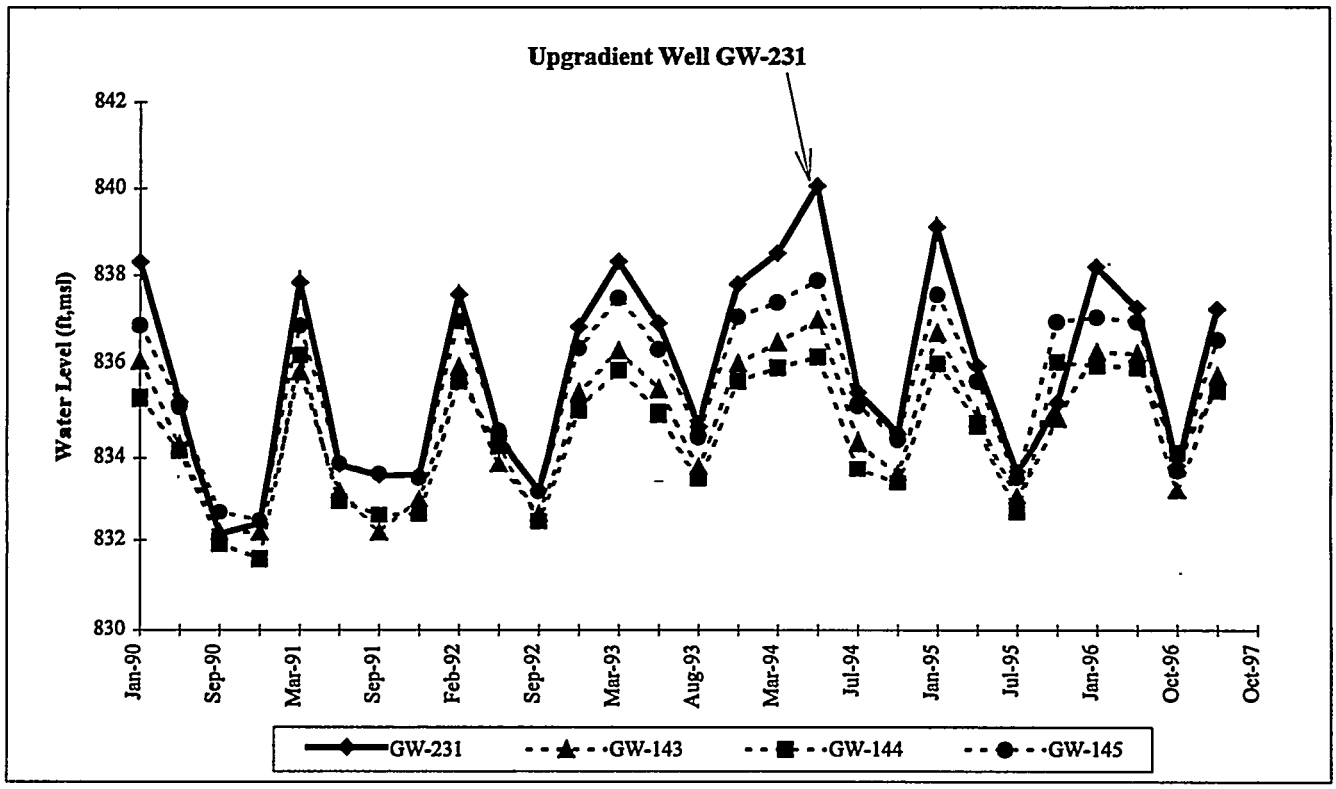


PREPARED FOR: LOCKHEED MARTIN ENERGY SYSTEMS, INC.	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 6
PREPARED BY: AJA TECHNICAL SERVICES, INC.	DOC NUMBER:	98-D002	CY 1997 GROUNDWATER AND SURFACE WATER SAMPLING LOCATIONS
	DWG ID.:	97-001	
	DATE:	2-9-98	

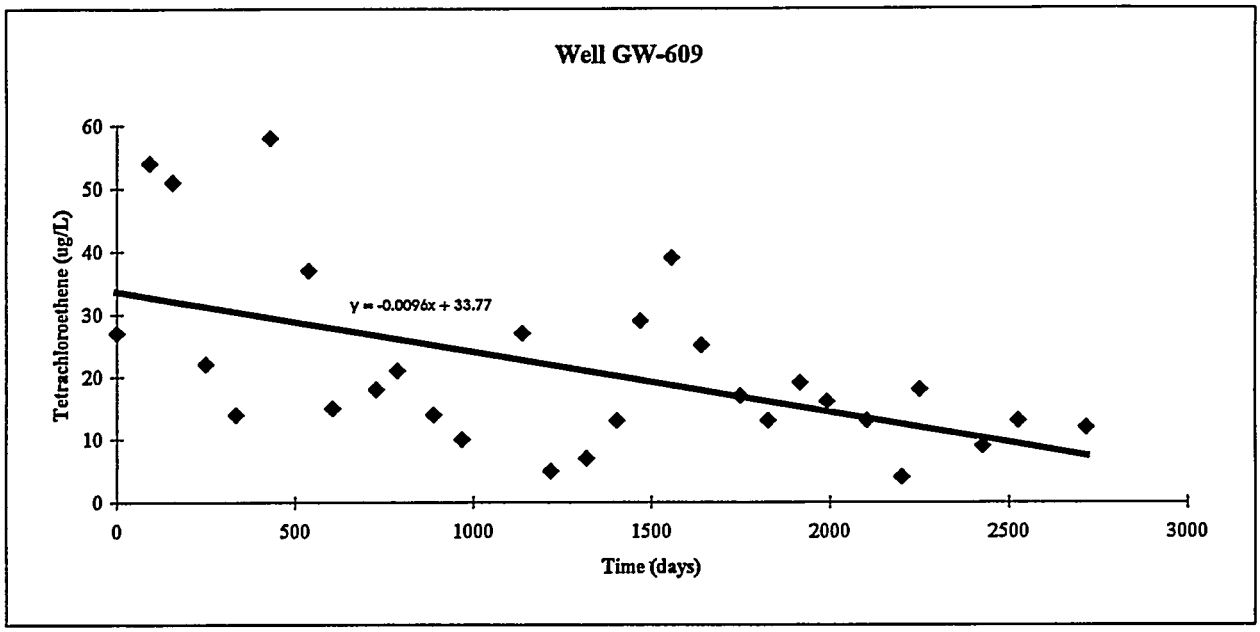


PREPARED FOR: *LOCKHEED MARTIN ENERGY SYSTEMS, INC.*	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 7
PREPARED BY: *AJA TECHNICAL SERVICES, INC.*	DOC No.:	98-D002	WATER-LEVEL HYDROGRAPHS FOR RCRA POST-CLOSURE DETECTION MONITORING WELLS AT THE CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN
	DWG ID.:	CR PT197	
	DATE:	12/15/97	

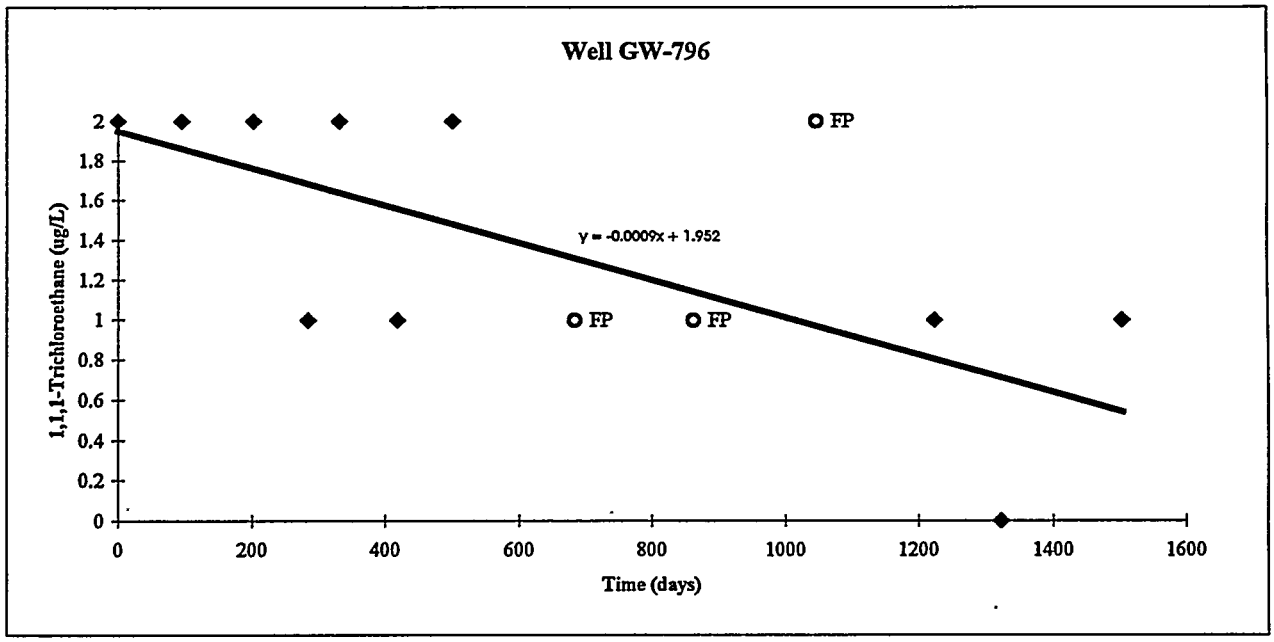




PREPARED FOR: *LOCKHEED MARTIN ENERGY SYSTEMS, INC.*	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 8
PREPARED BY: *AJA TECHNICAL SERVICES, INC.*	DOC No.:	98-D002	WATER-LEVEL HYDROGRAPHS FOR RCRA POST-CLOSURE DETECTION MONITORING WELLS AT KERR HOLLOW QUARRY
	DWG ID.:	CR PT197	
	DATE:	12/15/97	



Note: Time 0 = 02/14/90



Notes: Time 0 = 05/27/93.
FP = False Positive result, not used in trend analysis.
All results shown are estimated values below the quantitation limit (5ug/L); non-detected results (5U) are shown as 0.

PREPARED FOR: *LOCKHEED MARTIN ENERGY SYSTEMS, INC.*	LOCATION:	Y-12 PLANT OAK RIDGE, TN.	FIGURE 9
PREPARED BY: *AJA TECHNICAL SERVICES, INC.*	DOC No.:	98-D002	CONCENTRATIONS OF SELECTED VOCs REPORTED FOR GROUNDWATER SAMPLES FROM RCRA POINT-OF-COMPLIANCE WELLS GW-609 AND GW-796, 1990-1997
	DWG ID.:	CR_PT197	
	DATE:	12/15/97	

APPENDIX B

TABLES

Table 1.
Index of Post-Closure Permit Requirements for Groundwater Monitoring at the Chestnut Ridge Security Pits, Chestnut Ridge Sediment Disposal Basin, and Kerr Hollow Quarry

Groundwater Monitoring Requirement	RCRA Post-Closure Corrective Action Monitoring	RCRA Post-Closure Detection Monitoring		SECTION OF ANNUAL MONITORING REPORT
	Security Pits	Sediment Disposal Basin	Kerr Hollow Quarry	
Well Network/Sampling Frequency	V.A; V.C; V.G.2	IV.A; IV.C	VI.A; VI.C	3.0
Well Installation	V.B.4	Not Applicable	Not Applicable	3.1.1
Upgradient Wells	V.C.1	IV.C.1	VI.C.1	3.1.1 3.1.2
Point-of-Compliance Wells	V.C.2	IV.C.1	VI.C.1	3.1.1 3.1.2
Plume Delineation Wells	V.C.1	Not Applicable	Not Applicable	3.1.1
Sampling and Analysis	V.E; V.G.1	IV.D; IV.G.1	VI.D; VI.G.1	3.0
Sample Collection	V.E.1	IV.D.1	VI.D.1	3.2
Sample Preservation	V.E.2	IV.D.2	VI.D.2	3.2
Sample Transportation	V.E.3	IV.D.3	VI.D.3	3.2
Chain-of-Custody Control	V.E.4	IV.D.4	VI.D.4	3.2
Analytical Parameters	V.C.1 and 2	IV.C.1	VI.C.1	3.3
Analytical Methods	V.E.5	IV.D.5	VI.D.5	3.3
Groundwater Surface Elevation	V.F	IV.E	VI.E	3.2
Data Evaluation	V.D; V.G	IV.F; IV.G	VI.F; VI.G	4.0
Groundwater Flow Direction/Rate	V.G.3	IV.G.3	VI.G.3	4.1
Plume Delineation Trend Evaluation	V.D.2 and 3; V.G.4	Not Applicable	Not Applicable	4.3
Point-of-Compliance Trend Evaluation	V.D.5 and 6; V.G.6	Not Applicable	Not Applicable	4.2
Statistical Evaluation	Not Applicable	IV.F Attachment 2, Sect. H	VI.F Attachment 4, Sect. H	4.4.1
Quantitative Trend Analysis	Not Applicable	Not Applicable	VI.F Attachment 4, Sect. H	4.4.2

Table 2.
Summary of Approved Modifications to the Post-Closure Permit for the Chestnut Ridge Hydrogeologic Regime[1]

PERMIT MODIFICATION[2]		CLASSIFICATION OF MODIFICATION[3]				Class 1	Class 2
		40 CFR § 270.42 Appendix I Citation					
Type	Description	Permit Condition					
		CRSDB	CRSP	KHQ			
Editorial	Revise reference to the Groundwater Sampling Procedure.	II.A	II.A	II.A	A.1	●	
Editorial	Reference annual reporting of groundwater monitoring data and applicable statistical analysis results.	II.C.6(c)	II.C.6(c)	II.C.6(c)	A.1	●	
Technical	Specify replicate sampling protocol for RCRA detection monitoring at the CRSDB and KHQ.	IV.D.6 (New)	—	VI.D.6 (New)	A.1	●	
Editorial	Revise reference to point-of-compliance wells and Groundwater Target Compound List.	IV.F.2	—	—	A.1	●	
Editorial	Clarify time frame for completion of statistical evaluation.	IV.F.3	—	VI.F.3	A.1	●	
Editorial	Clarify statistical evaluation performance and reporting requirements.	IV.G.5	—	VI.G.5	A.1	●	
Technical	Remove September 1 reporting requirement.	—	—	VI.H.1	A.4.b		●
Editorial	Consolidate and clarify annual reporting requirements.	IV.H.3 (New)	V.H.5 (New)	VI.H.3 (New)	A.1	●	
Editorial	Revise reference to the components of the RCRA post-closure corrective action monitoring well network for the CRSPs.	—	V.A	—	A.1	●	
Editorial	Clarify criteria for selection of the point-of-compliance well(s) for semiannual sampling.	—	V.C.2	—	A.1	●	
Technical	Clarify planned integration of RCRA post-closure corrective action monitoring and CERCLA ROD-driven groundwater monitoring.	—	V.D.2	—	A.1	●	
Editorial/ Technical	Clarify the purpose for and objective of the groundwater monitoring data evaluation for point-of-compliance wells.	—	V.D.3	—	A.1	●	

Table 2 (cont'd)

PERMIT MODIFICATION[2]		CLASSIFICATION OF MODIFICATION[3]			Class 2		
					Class 1		
		40 CFR § 270.42 Appendix I Citation					
Type	Description	Permit Condition					
		CRSDB	CRSP	KHQ			
Editorial	Renumber Permit Condition V.D.4 to V.D.5	—	V.D.4	—	A.1	●	
Editorial	Clarify the purpose for and objective of the groundwater monitoring data evaluation for the plume delineation wells	—	V.D.4 (New)	—	A.1	●	
Editorial	Clarify reporting requirements.	—	V.G.3	—	A.1	●	
Technical	Define the trend analysis approach for evaluation of groundwater monitoring data for the plume delineation wells.	—	V.G.4	—	C.3	●	
Editorial	Clarify the action required if plume delineation wells no longer monitor downgradient plume boundary.	—	V.G.5	—	A.1	●	
Technical	Define the trend analysis approach for evaluation of groundwater monitoring data for point-of-compliance wells.	—	V.G.6 (New)	—	C.3	●	
Editorial	Clarify the performance of specified laboratory analyses.	—	V.H.4	—	A.1	●	
Technical	Change security requirements at the Security Pits.	—	Attach. 3 Section B	—	A.1	●	
Technical	Replace the well inspection and well depth measurement procedure with more recent versions issued by the Y-12 Plant GWPP.	Attach. 2 Section C	Attach. 3 Section C	Attach. 4 Section C	C.2	●	
Editorial/ Technical	Remove reference to daily replicate sampling.	Attach. 2 Section H	—	Attach. 4 Section H	A.1	●	
Editorial/ Technical	Insert option for statistical outlier testing of gross alpha and gross beta results prior to trending. Delete reference to boron and strontium.	—	—	Attach. 4 Section H	C.3	●	
Technical	Delete boron and strontium from the Groundwater Target Compound List.	—	—	Attach. 4 Section E	C.5.b		●
Technical	Rename title of Attachment 6 and replace the groundwater sampling procedure.	Attach. 6	Attach. 6	Attach. 6	A.1 C.2	● ●	
Technical	Replace the well plugging and abandonment procedure.	Attach. 7	Attach. 7	Attach. 7	C.2	●	

Table 2 (cont'd)

Notes:

1. Modified from: *Proposed Modifications to the RCRA Post-Closure Permit for the Chestnut Ridge Hydrogeologic Regime at the U.S. Department of Energy Y-12 Plant, Oak Ridge, Tennessee* (GRAM, Inc. and AJA Technical Services, Inc. 1997).

2 CRSDB = Chestnut Ridge Sediment Disposal Basin
CRSP = Chestnut Ridge Security Pits
KHQ = Kerr Hollow Quarry

3. As specified in the Title 40 Code of Federal Regulations (40 CFR) § 270.42 Appendix I - Classification of Permit Modifications.

   Editorial Class 1 permit modifications approved upon request in May 1997. Technical Class 1[1] and Class 2 permit modifications approved by the Tennessee Department of Environment and Conservation effective July 23, 1997 and December 18, 1997.

Table 3.
Waste Management Sites and Associated Groundwater Monitoring Programs in the Chestnut Ridge Hydrogeologic Regime

GROUNDWATER MONITORING PROGRAM						RCRA Post-Closure Corrective Action Monitoring [1]	RCRA Post-Closure Detection Monitoring [2]	SWDF Detection Monitoring [3]	CERCLA Record of Decision Monitoring [4]	DOE Order 5400.1 Monitoring [5]
Waste Management Site	**Regulatory Classification**	**General Waste Inventory**	**Status**							
			Operation	**Active**	**Closed**					
Chestnut Ridge Sediment Disposal Basin	RCRA/ CERCLA	Approximately 11,100 yd^3 of sediments and soils from the Y-12 Plant containing heavy metals; approximately 100,000 gallons of methanol-brine waste (70/30% water/methyl alcohol); and 55-110 gallons of toluene.	1973-1987		●				●	
East Chestnut Ridge Waste Pile	RCRA/ CERCLA	Contaminated soil from the Y-12 Plant.	1987	●		●				
Kerr Hollow Quarry	RCRA/ CERCLA	Approximately 50 tons of water-reactive materials (alkali metals, metal hydrides); unstable organic materials (picric acid, ethers, peroxides, and hydrazone); reactive metals (phosphorous and magnesium); potentially explosive materials (e.g., gas cylinders); ammonia; and inorganic acids.	1951-1988		●		●		●	
Chestnut Ridge Security Pits	RCRA/ CERCLA	Metals (lead); reactive materials (lithium hydride, lithium deuteride, zirconium); corrosive materials (acids); ignitable materials (alcohols); and chlorinated solvents.	1973-1988		●					●
Filled Coal Ash Pond (formerly the Ash Disposal Basin)	CERCLA	Coal fly-ash slurry from the Y-12 Steam Plant.	1955-1967		●		●			
United Nuclear Corporation Site	CERCLA	Approximately 11,000 drums (55-gallon) of sludge fixed in cement, 18,000 drums of contaminated soil, and 288 boxes of contaminated process and demolition material.	1982-1984		●		●			

Table 3 (cont'd)

GROUNDWATER MONITORING PROGRAM						RCRA Post-Closure Corrective Action Monitoring [1]	RCRA Post-Closure Detection Monitoring [2]	SWDF Detection Monitoring [3]	CERCLA Record of Decision Monitoring [4]	DOE Order 5400.1 Monitoring [5]
Waste Management Site	Regulatory Classification	General Waste Inventory	Status							
			Operation	Active	Closed					
Rogers Quarry	CERCLA	Coal fly-ash slurry that bypassed the Ash Disposal Basin via spillway into McCoy Branch.	1967-1993		●	●				
Chestnut Ridge Borrow Area Waste Pile	CERCLA	Soils removed from the Oak Ridge Civic Center properties and the Oak Ridge Sewer Line Beltway contaminated with mercury and other metals, and possibly some organic compounds, that originated from the Y-12 Plant.	Mid-1980	●		●				
Industrial Landfill II	SWDF	Combustible and decomposable solid waste and construction spoil material including scrap metal, glass, paper products, plastics, wood, organic garbage, textile products, asphalt roofing materials, and special wastes such as asbestos and beryllium oxide.	1986-1996		●			●		
Industrial Landfill IV	SWDF	Approximately 12,000 ft^3 per year of non-hazardous, nonradioactive industrial wastes including: cardboard, plastics, rubber, scrap metal, wood, paper, and special waste.	1989-	●				●		
Industrial Landfill V	SWDF	Combustible/decomposable solid wastes.	1994-	●				●		
Construction/Demolition Landfill VI	SWDF	Construction spoil: concrete, wood, metal, plastic, roofing materials; soil.	1994-	●				●		
Construction/Demolition Landfill VII	SWDF	No wastes emplaced to date.	1994-					●		
Receptor Media	Not Regulated	Groundwater and surface water exiting the Chesnut Ridge Hydrogeologic Regime.	Not Applicable			●				

Table 3 (cont'd)

Notes:

1 Resource Conservation and Recovery Act (RCRA) post-closure corrective action monitoring per the requirements specified in the RCRA post-closure permit for the Chestnut Ridge Regime (Permit No. TNHW-088).

2 RCRA post-closure detection monitoring per the applicable requirements of the RCRA post-closure permit for the Chestnut Ridge Regime (Permit No. TNHW-088).

3 Detection monitoring in accordance with operating permits issued by the Tennessee Department of Environment and Conservation for the specified non-hazardous solid waste disposal facility (SWDF) and applicable TDEC solid waste management regulations.

4 Monitoring in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision for the specified facility.

5 Monitoring performed in accordance with U.S. Department of Energy Order 5400.1 Surveillance Monitoring and Exit-Pathway/Perimeter Monitoring.

Table 4.
Summary of CY 1997 Sampling and Analysis Plan Addenda that Affect Groundwater Monitoring in the Chestnut Ridge Hydrogeologic Regime

Addendum No.	Effective Date	Modification to the CY 1997 Sampling and Analysis Plan[1]
97-02	01/01/97	Modified the suite of volatile organic compounds (VOCs) listed in analytical parameter group VOC1 to include those listed analytical parameter group VOC2; renamed analytical parameter group VOC3 to VOC2.
97-03	01/01/97	Created a new administrative sampling group (CR-11) to include all sampling locations associated with Construction Demolition Landfill VI that were previously assigned to administrative sampling group CR-8. Redefined analytical parameters for both sample groups to reflect modifications to the operating permit for the site.
97-04	01/01/97	Redefined the analytical parameters for wells included in administrative sampling group CR-1 to reflect modifications to the operating permit for the Industrial Landfill IV.
97-05	01/01/97	Redefined the analytical parameters for wells included in administrative sampling group CR-6 to reflect modifications to the operating permit for the Industrial Landfill II.
97-06	01/01/97	Removed wells GW-540, GW-541, and GW-546 from administrative well group CR-7, and redefined the analytical parameters for the remaining wells to reflect modifications to the operating permit for Construction/Demolition Landfill VI.
97-07	01/01/97	Created a separate administrative sampling group (CR-5A) for Outfall 301 at Kerr Hollow Quarry.
97-10	04/01/97	Superseded Addendum 97-02 and created a single comprehensive suite of VOCs (EPA Method 8260).
97-13	02/27/97	Required resampling well GW-141 at Industrial Landfill IV because concentrations of lead, beryllium, and gross alpha reported for the sample collected January 7, 1997 exceed the maximum contaminant level (MCL) for drinking water.
97-16	08/04/97	Required resampling wells at Kerr Hollow Quarry to confirm the increasing boron concentration trend indicated by results for samples collected in April/May 1997.
97-17	10/01/97	Transfered monitoring of all wells at the United Nuclear Corporation Site to the Integrated Water Quality Program.
97-18	10/01/97	Transfered monitoring of Outfall 301at Kerr Hollow Quarry to the Integrated Water Quality Program.
97-19	10/01/97	Changed the time interval between replicate samples from four consecutive daily samples to a time interval that allows 70% water-level recovery at each well in RCRA detection monitoring at the Sediment Disposal Basin and Kerr Hollow Quarry.
97-20	12/04/97	Required resampling well GW-539 at Industrial Landfill II because the nickel concentration reported in the sample collected on October 14, 1997 exceeded the MCL.

Note:

1 Modification to the *Sampling and Analysis Plan for Groundwater and Surface Water Monitoring at the Y-12 Plant During Calendar Year 1997* (AJA Technical Services, Inc. 1996b). The addenda listed are those which resulted in modifications to the sampling and analysis activities in the Chestnut Ridge Hydrogeologic Regime.

Table 5.
CY 1997 Groundwater and Surface Water Sampling Dates

Groundwater Monitoring Program[1]		RCRA Post-Closure Corrective Action Monitoring	RCRA Post-Closure Detection Monitoring	SWDF Detection Monitoring	CERCLA Record of Decision Monitoring	DOE Order 5400.1 Monitoring				
Sampling Point	Sampling Location[2]	Sampling Date[3]								
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter					
1090	UNCS	.	04/16/97D	.	.		●			
GW-141	LIV	01/07/97D 02/27/97	.	07/23/97D	.			●		
GW-142	KHQ	.	04/29-05/01/97	08/04-07/97	11/10-14/97D				●	
GW-143	KHQ	.	04/28-05/01/97	08/04-07/97	11/10-13/97				●	
GW-144	KHQ	.	04/28-05/01/97D	08/04-07/97D	11/10-13/97				●	
GW-145	KHQ	.	04/28-05/01/97	08/04-07/97	11/10-13/97				●	
GW-156	CRSDB	.	04/21-24/97	.	10/20-28/97D				●	
GW-159	CRSDB	.	04/21-24/97	.	10/20-23/97				●	
GW-203	UNCS	.	04/14/97	.	.		●			
GW-205	UNCS	.	04/14/97	.	.		●			
GW-217	LIV	01/06/97	.	07/17/97	.			●		
GW-221	UNCS	.	04/15/97	.	.		●			
GW-231	KHQ	.	04/28-05/01/97	08/04-07/97	11/10 - 13/97D				●	
GW-301	CRBAWP	01/07/97	.	07/24/97	.					●
GW-302	UNCS	.	04/15/97	.	.		●			
GW-305	LIV	01/08/97	.	07/22/97	.			●		
GW-339	UNCS	.	04/15/97	.	.		●			
GW-521	LIV	01/07/97	.	07/21/97	.			●		●
GW-522	LIV	01/08/97	.	07/21/97	.			●		
GW-539	LII	.	04/02/97	.	10/16/97 12/04/97			●		
GW-542	CDLVI	.	04/01/97	.	DRY			●		
GW-543	CDLVI	.	04/01/97D	.	10/15/97			●		
GW-544	CDLVI	.	04/02/97	.	10/16/97			●		
GW-557	LV	01/08/97D	.	07/09/97	.			●		●
GW-560	CDLVII	01/15/97	.	07/14/97	.			●		
GW-562	CDLVII	01/15/97	.	07/14/97D	.			●		
GW-564	CDLVII	01/16/97D	.	07/15/97	.			●		
GW-609	CRSP	01/14/97	.	07/24/97	.					●
GW-709	LII	.	04/02/97	.	10/16/97			●		
GW-731	CRSDB	.	04/21-24/97D	.	10/20-23/97D				●	
GW-732	CRSDB	.	04/21-24/97	.	10/20-23/97				●	

Table 5 (cont'd)

Groundwater Monitoring Program[1]						RCRA Post-Closure Corrective Action Monitoring	RCRA Post-Closure Detection Monitoring	SWDF Detection Monitoring	CERCLA Record of Decision Monitoring	DOE Order 5400.1 Monitoring
Sampling Point	Sampling Location[2]	Sampling Date[3]								
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter					
GW-757	LII	.	04/03/97D	.	10/16/97			●		
GW-796	LV	01/09/97	.	07/10/97	.			●		●
GW-797	LV	01/09/97	.	07/09/97	.			●		
GW-798	CDLVII	01/16/97	.	07/15/97	.			●		●
GW-799	CDLVII	01/08/97	.	07/09/97	.			●		●
GW-801	LV	01/15/97	.	07/10/97D	.			●		●
GW-827	CDLVI	.	04/01/97	.	10/14/97D			●		
GW-831	FCAP	01/06/97	.	07/23/97	.					●
SCR2.2SP	EXP	01/16/97	.	07/31/97	.	●				
SCR4.3SP	CDLVII	01/15/97	.	07/14/97	.			●		
Outfall 301	KHQ	.	04/30/97	.	.		●			

Notes:

1 See Table 7 for the list of field measurements and laboratory analytes associated with each monitoring program.

2
- CDLVI = Construction/Demolition Landfill VI
- CDLVII = Construction/Demolition Landfill VII
- CRBAWP = Chestnut Ridge Borrow Area Waste Pile
- CRSDB = Chestnut Ridge Sediment Disposal Basin
- CRSP = Chestnut Ridge Security Pits
- EXP = Exit Pathway
- FCAP = Filled Coal Ash Pond
- KHQ = Kerr Hollow Quarry
- LII = Industrial Landfill II
- LIV = Industrial Landfill IV
- LV = Industrial Landfill V
- UNCS = United Nuclear Corporation Site

3 See Table 4 for addenda to the CY 1997 Sampling and Analysis Plan that affect monitoring in the Chestnut Ridge Regime. Shaded dates show samples that were collected with dedicated sampling equipment (Well Wizard™).

"." = Not Sampled.
D = Duplicate sample collected on specified date.

Table 6.
Well Networks Used for RCRA Post-Closure Detection Monitoring and RCRA Post-Closure Corrective Action Monitoring During CY 1997

Component of Monitoring Well Network[1]				Background Well	Point-of-Compliance Well	Plume Delineation Well
Monitoring Program/Site	Well Number	Monitored Interval[2] Depth (ft bgs)	Monitored Interval[2] Type			
RCRA Post-Closure Corrective Action Monitoring/Chestnut Ridge Security Pits	GW-301	148.5 - 163.5	Screen	●		
	GW-521	123.2 - 136.0	Screen			●
	GW-557	112.9 - 138.0	Screen	●		
	GW-609	256.4 - 269.0	Screen		●	
	GW-796	122.9 - 136.5	Screen		●	
	GW-798	122.0 - 135.4	Screen	●		
	GW-799	78.7 - 92.0	Screen	●		
	GW-801	175.8 - 188.9	Screen	●		
	GW-831	182.0 - 199.6	Screen	●		
RCRA Post-Closure Detection Monitoring/ Chestnut Ridge Sediment Disposal Basin	GW-156	146.0 - 157.0	Screen		●	
	GW-159	146.0 - 157.0	Screen			●
	GW-731	164.0 - 178.7	Screen		●	
	GW-732	178.3 - 190.0	Screen		●	
RCRA Post-Closure Detection Monitoring/ Kerr Hollow Quarry	GW-142	248.5 - 295.0	Open-Hole			●
	GW-143	205.0 - 253.0	Open-Hole		●	
	GW-144	148.0 - 195.0	Screen		●	
	GW-145	86.0 - 110.0	Screen		●	
	GW-231	22.8 - 35.0	Screen			●

Note:

1 Components of the RCRA post-closure detection/corrective action monitoring well networks defined in site-specific conditions of the post-closure permit for the Chestnut Ridge Regime (see Table 1).

2 Depth of the top and bottom of the monitored interval in feet below ground surface (bgs). See Appendix C for complete well construction details.

Table 7.
Laboratory Analytes and Field Measurements for CY 1997
Groundwater and Surface Water Samples

GROUNDWATER MONITORING PROGRAM					RCRA Post-Closure Corrective Action Monitoring [1]	RCRA Post-Closure Detection Monitoring	SWDF Detection Monitoring	CERCLA Record of Decision Monitoring [2]	DOE Order 5400.1 Monitoring
PRINCIPAL IONS	**Analytical Method [3]**	**RCRA Target List [4]**	**Sample Type [5]**						
			Filtered	**Unfiltered**					
Alkalinity - bicarbonate	EPA-310.1	.	.	●	●	●	●	●	●
Alkalinity - carbonate	EPA-310.1	.	.	●	●	●	●	●	●
Calcium	EPA-6010A	.	●	●	●	●	●	●	●
Chloride	EPA-300.0	.	.	●	●	●	●	●	●
Fluoride	EPA-340.2	.	.	●	●	●	●	●	●
Magnesium	EPA-6010A	.	●	●	●	●	●	●	●
Nitrate (as N)	EPA-300.0	.	.	●	●	●	●	●	●
Potassium	EPA-6010A	.	●	●	●	●	●	●	●
Sodium	EPA-6010A	.	●	●	●	●	●	●	●
Sulfate	EPA-300.0	.	.	●	●	●	●	●	●
TRACE METALS	**Analytical Method [3]**	**RCRA Target List [4]**	**Sample Type [5]**						
			Filtered	**Unfiltered**					
Aluminum	EPA-6010A	.	●	●	●	●	●	●	●
Antimony	EPA-6010A	.	●	●	●	●	●	●	●
Arsenic	EPA-200.8	.	●	●	●	●	●	●	●
Barium	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Beryllium	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Boron	EPA-6010A	●	●	●	●	●	●	●	●
Cadmium	EPA-6010A	●	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Cerium	EPA-200.8	.	.	●	.	●	.	.	.
Chromium	EPA-6010A	●	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Cobalt	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Copper	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Gallium	EPA-200.8	.	.	●	.	●	.	.	.
Iron	EPA-6010A	.	●	●	●	●	●	●	●
Lead	EPA-200.8	●	●	●	●	●	●	●	●

Table 7 (cont'd)

GROUNDWATER MONITORING PROGRAM					RCRA Post-Closure Corrective Action Monitoring [1]	RCRA Post-Closure Detection Monitoring	SWDF Detection Monitoring	CERCLA Record of Decision Monitoring [2]	DOE Order 5400.1 Monitoring
TRACE METALS (cont'd)	**Analytical Method [3]**	**RCRA Target List [4]**	**Sample Type [5]**						
			Filtered	**Unfiltered**					
Lithium	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Manganese	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Mercury	EPA-7470	●	●	●	●	●	●	●	●
Molybdenum	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Nickel	EPA-6010A	●	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Selenium	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Silver	EPA-6010A	●	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Strontium	EPA-6010A	●	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Thallium	EPA-200.8	.	●	●	●	●	●	●	●
Thorium	EPA-6010A	.	●	●	●	●	●	●	●
	EPA-200.8	.	.	●	.	●	.	.	.
Titanium	EPA-200.8	.	.	●	.	●	.	.	.
Uranium	EPA-200.8	●	●	●	●	●	●	●	●
Vanadium	EPA-6010A	.	●	●	●	●	●	●	●
Zinc	EPA-6010A	.	●	●	●	●	●	●	●
Zirconium	EPA-6010A	.	.	●	.	●	.	.	.
VOLATILE ORGANIC COMPOUNDS	**Analytical Method [3]**	**RCRA Target List [4]**	**Sample Type [5]**						
			Filtered	**Unfiltered**					
Acetone	EPA-8260	.	.	●	●	●	●	●	●
Acrolein	EPA-8260	.	.	●	●	●	●	●	●
Acrylonitrile	EPA-8260	.	.	●	●	●	●	●	●
Benzene	EPA-8260	●	.	●	●	●	●	●	●
Bromochloromethane	EPA-8260	.	.	●	●	●	●	●	●
Bromodichloromethane	EPA-8260	.	.	●	●	●	●	●	●
Bromoform	EPA-8260	●	.	●	●	●	●	●	●
Bromomethane	EPA-8260	.	.	●	●	●	●	●	●

Table 7 (cont'd)

GROUNDWATER MONITORING PROGRAM					RCRA Post-Closure Corrective Action Monitoring [1]	RCRA Post-Closure Detection Monitoring	SWDF Detection Monitoring	CERCLA Record of Decision Monitoring [2]	DOE Order 5400.1 Monitoring
VOLATILE ORGANIC COMPOUNDS (cont'd)	Analytical Method [3]	RCRA Target List [4]	Sample Type [5]						
			Filtered	Unfiltered					
2-Butanone	EPA-8260	.	.	●	●	●	●	●	●
Carbon Disulfide	EPA-8260	.	.	●	●	●	●	●	●
Carbon Tetrachloride	EPA-8260	●	.	●	●	●	●	●	●
Chlorobenzene	EPA-8260	.	.	●	●	●	●	●	●
Chloroethane	EPA-8260	.	.	●	●	●	●	●	●
2-Chloroethyl vinyl ether	EPA-8260	.	.	●	●	●	●	●	●
Chloroform	EPA-8260	●	.	●	●	●	●	●	●
Chloromethane	EPA-8260	.	.	●	●	●	●	●	●
Dibromochloromethane	EPA-8260	.	.	●	●	●	●	●	●
1,2-Dibromo-3-chloropropane	EPA-8260	.	.	●	●	●	●	●	●
1,2-Dibromoethane	EPA-8260	.	.	●	●	●	●	●	●
Dibromomethane	EPA-8260	.	.	●	●	●	●	●	●
1,2-Dichlorobenzene	EPA-8260	.	.	●	●	●	●	●	●
1,4-Dichlorobenzene	EPA-8260	.	.	●	●	●	●	●	●
1,4-Dichloro-2-butene	EPA-8260	.	.	●	●	●	●	●	●
trans-1,4-Dichloro-2-butene	EPA-8260	.	.	●	●	●	●	●	●
Dichlorodifluoromethane	EPA-8260	.	.	●	●	●	●	●	●
1,1-Dichloroethane	EPA-8260	●	.	●	●	●	●	●	●
1,2-Dichloroethane	EPA-8260	●	.	●	●	●	●	●	●
1,1-Dichloroethene	EPA-8260	●	.	●	●	●	●	●	●
1,2-Dichloroethene	EPA-8260	●	.	●	●	●	●	●	●
cis-1,2-Dichloroethene	EPA-8260	.	.	●	●	●	●	●	●
trans-1,2-Dichloroethene	EPA-8260	●	.	●	●	●	●	●	●
1,2-Dichloropropane	EPA-8260	.	.	●	●	●	●	●	●
cis-1,3-Dichloropropene	EPA-8260	.	.	●	●	●	●	●	●
trans-1,3-Dichloropropene	EPA-8260	.	.	●	●	●	●	●	●
Dimethylbenzene	EPA-8260	.	.	●	●	●	●	●	●
Ethanol	EPA-8260	.	.	●	●	●	●	●	●
Ethylbenzene	EPA-8260	.	.	●	●	●	●	●	●
Ethyl methacrylate	EPA-8260	.	.	●	●	●	●	●	●
2-Hexanone	EPA-8260	.	.	●	●	●	●	●	●
Iodomethane	EPA-8260	.	.	●	●	●	●	●	●
4-Methyl-2-Pentanone	EPA-8260	.	.	●	●	●	●	●	●
Methylene Chloride	EPA-8260	.	.	●	●	●	●	●	●
Styrene	EPA-8260	.	.	●	●	●	●	●	●

Table 7 (cont'd)

GROUNDWATER MONITORING PROGRAM					RCRA Post-Closure Corrective Action Monitoring [1]	RCRA Post-Closure Detection Monitoring	SWDF Detection Monitoring	CERCLA Record of Decision Monitoring [2]	DOE Order 5400.1 Monitoring
VOLATILE ORGANIC COMPOUNDS (cont'd)	**Analytical Method [3]**	**RCRA Target List [4]**	**Sample Type [5]**						
			Filtered	**Unfiltered**					
1,1,1,2-Tetrachloroethane	EPA-8260	.	.	●	●	●	●	●	●
1,1,2,2-Tetrachloroethane	EPA-8260	.	.	●	●	●	●	●	●
Tetrachloroethene	EPA-8260	●	.	●	●	●	●	●	●
Toluene	EPA-8260	.	.	●	●	●	●	●	●
1,1,1-Trichloroethane	EPA-8260	●	.	●	●	●	●	●	●
1,1,2-Trichloroethane	EPA-8260	.	.	●	●	●	●	●	●
Trichloroethene	EPA-8260	●	.	●	●	●	●	●	●
Trichlorofluoromethane	EPA-8260	.	.	●	●	●	●	●	●
1,2,3-Trichloropropane	EPA-8260	.	.	●	●	●	●	●	●
Vinyl Acetate	EPA-8260	.	.	●	●	●	●	●	●
Vinyl Chloride	EPA-8260	.	.	●	●	●	●	●	●
RADIOLOGICAL ANALYTES	**Analytical Method [3]**	**RCRA Target List [4]**	**Sample Type [5]**						
			Filtered	**Unfiltered**					
Gross Alpha	EPA-900.0	●	.	●	●	●	●	●	●
Gross Beta	EPA-900.0	●	.	●	●	●	●	●	●
Americium-241	AC-MM-2-22012	.	.	●	.	●	.	.	●
Iodine-129	EPA-901.1	.	.	●	.	.	.	.	●
Neptunium-237	Y/P65-7206	.	.	●	.	●	.	.	●
Plutonium-238	AC-MM-2-22012	.	.	●	.	.	.	.	●
Plutonium-239/240	AC-MM-2-22012	.	.	●	.	.	.	.	●
Radium-223/224/226	Y/P65-7163	.	.	●	.	●	.	.	.
Radium-228	Y/P65-7165	.	.	●	.	●	.	.	.
Strontium- 89/90	EPA-905.0	.	.	●	.	●	.	.	●
Technetium-99	Y/P65-7154	.	.	●	.	●	.	.	●
Tritium	EPA-906.0	.	.	●	.	●	.	.	●
Thorium-(228,230,232,234)	Y/P65-7160	.	.	●	.	●	.	.	.
Uranium-(234,235,238)	AC-MM-2-22012	.	.	●	.	●	.	●	●
MISC. LABORATORY ANALYTES	**Analytical Method [3]**	**RCRA Target List [4]**	**Sample Type [5]**						
			Filtered	**Unfiltered**					
pH	EPA-9040	.	.	●	●	●	●	●	●
Conductivity	EPA-9050	.	.	●	●	●	●	●	●
Total Dissolved Solids	EPA-160.1	.	.	●	●	●	●	●	●
Total Suspended Solids	EPA-160.2	.	.	●	●	●	●	●	●
Turbidity	EPA-180.1	.	.	●	●	●	●	●	●

Table 7 (cont'd)

GROUNDWATER MONITORING PROGRAM					RCRA Post-Closure Corrective Action Monitoring [1]	RCRA Post-Closure Detection Monitoring	SWDF Detection Monitoring	CERCLA Record of Decision Monitoring [2]	DOE Order 5400.1 Monitoring
FIELD MEASUREMENTS	Analytical Method [3]	RCRA Target List [4]	Sample Type [5]						
			Filtered	Unfiltered					
Depth-to-Water	ESP 302-1	.	.	.	.	●	●	●	●
Water Temperature	ESP 307-1	.	.	●	●	●	●	●	●
pH	ESP 307-2	.	.	●	●	●	●	●	●
Conductivity	ESP 307-8	.	.	●	●	●	●	●	●
Dissolved Oxygen	ESP 307-5	.	.	●	●	●	●	●	●

Notes:

1 Only the groundwater samples collected from well GW-521 at Industrial Landfill IV were analyzed for radionuclides because this well also serves as a background well for the Bear Creek Hydrogeologic Regime. These radionuclides are required by the RCRA post-closure permit for the Bear Creek Hydrogeologic Regime (Permit No. TNHW-087). Gross alpha activity and gross beta activity are the only radiological analytes required by the RCRA post-closure permit for the Chestnut Ridge Hydrogeologic Regime (Permit No. TNHW-088).

2 Groundwater samples collected from wells at the United Nuclear Corporation Site (see Table 5) were analyzed for specified trace metals (unfiltered and filtered samples) using Inductively Coupled Plasma (ICP) Spectroscopy (EPA-6010A), all the specified principal ions and VOCs, gross alpha, gross beta, and strontium-89/90. Surface water samples collected from Outfall 301 at Kerr Hollow Quarry were analyzed only for specific trace metals (unfiltered samples only) using Plasma Mass Spectroscopy (EPA-200.8) and ICP to achieve very low detection limits, the principal cations, and radiological analytes.

3 Analytical/field methods and 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. 1988b)
- Analytical Services Organization homepage (radiological methods)

4 Target compound required by the RCRA post-closure-permit (Permit No. TNHW-088), as specified individually for the Chestnut Ridge Sediment Disposal Basin, Kerr Hollow Quarry, and the Chestnut Ridge Security Pits (see Table 8).

5 Groundwater samples collected with a Bennett Pump™ or Well Wizard ™ were filtered in the field; groundwater samples collected with bailers were filtered in the laboratory.

Table 8.
RCRA Groundwater Target Compounds for the Chestnut Ridge Security Pits, Chestnut Ridge Sediment Disposal Basin, and Kerr Hollow Quarry

RCRA Target Compound		Chestnut Ridge Security Pits[1]	Chestnut Ridge Sediment Disposal Basin[2]	Kerr Hollow Quarry[3]
Trace Metals	Boron	.	.	●
	Cadmium	●	●	●
	Chromium	●	●	●
	Lead	●	●	●
	Mercury	●	●	●
	Nickel	●	●	●
	Silver	.	●	.
	Strontium (total)	.	.	●
	Uranium (total)	●	●	●
Volatile Organic Compounds	Benzene	●	.	.
	Bromoform	●	.	.
	Carbon Tetrachloride	●	.	●
	Chloroform	●	.	●
	1,1-Dichloroethane	●	.	.
	1,2-Dichloroethane	●	.	.
	1,1-Dichloroethene	●	.	.
	1,2-Dichloroethene	●	.	.
	Tetrachloroethene	●	.	●
	1,1,1-Trichloroethane	●	.	.
	Trichloroethene	●	.	.
Radiochemical Parameters	Gross Alpha	●	.	●
	Gross Beta	●	.	●

Notes:

1 Specified in Attachment 3, Section E of the post-closure permit for the Chestnut Ridge Hydrogeologic Regime (Permit No. TNHW-088).

2 Specified in Attachment 2, Section E of the post-closure permit for the Chestnut Ridge Hydrogeologic Regime (Permit No. TNHW-088).

3 Specified in Attachment 4, Section E of the post-closure permit for the Chestnut Ridge Hydrogeologic Regime (Permit No. TNHW-088). Boron and strontium were removed from the list per TDEC approval effective July 23, 1997.

Table 9.
Depth-to-Water Measurements and Water-Level Elevations for Selected Monitoring Wells in the Chestnut Ridge Hydrogeologic Regime

Water-Level Elevation (ft above mean sea level)						October 6 - 9, 1997	
				March 31 - April 4, 1997			
					Seasonal Fluctuation (+/- ft)		
Depth-to-Water (ft below Top of Well Casing)			October 6 - 9, 1997				
			March 31 - April 4, 1997				
Well No.[1]	Location[2]	Measuring Point Elevation[3] (ft msl)					
1082	ORSF	837.28	24.5	25.6	-1.1	812.78	811.68
1084	ORSF	965.40	60.6	62.6	-2.0	904.80	902.80
1090	UNCS	1103.90	43.4	57.4	-14.0	1060.50	1046.50
GW-141	LIV	1186.10	93.8	97.1	-3.3	1092.30	1089.00
GW-142	KHQ	970.35	133.1	138.5	-5.4	837.25	831.85
GW-143	KHQ	913.18	77.5	81.6	-4.1	835.68	831.58
GW-144	KHQ	913.34	78.1	81.7	-3.6	835.24	831.64
GW-145	KHQ	840.04	3.5	7.6	-4.1	836.54	832.44
GW-146	KHQ	838.16	8.3	4.3	4.0	829.86	833.86
GW-147	KHQ	851.62	14.4	19.0	-4.6	837.22	832.62
GW-156	CRSDB	1049.10	142.4	143.6	-1.2	906.70	905.50
GW-158	CRSDB	983.05	40.3	47.1	-6.8	942.75	935.95
GW-159	CRSDB	1051.20	116.4	118.0	-1.6	934.80	933.20
GW-160	CRBAWP	1093.10	142.1	149.7	-7.6	951.00	943.40
GW-161	CRBAWP	1093.50	156.3	161.5	-5.2	937.20	932.00
GW-173	CRSP	1115.00	NM[4]	152.2	NA[5]	NA	962.80
GW-174	CRSP	1116.50	105.1	123.6	-18.5	1011.40	992.90
GW-175	CRSP	1084.00	112.3	122.7	-10.4	971.73	961.30
GW-176	CRSP	1125.30	116.2	116.4	-0.2	1009.10	1008.90
GW-177	CRSP	1158.00	NM	118.1	NA	NA	1039.90
GW-178	CRSP	1143.50	89.6	94.2	-4.6	1053.90	1049.30
GW-179	CRSP	1128.00	116.2	116.4	-0.2	1011.80	1011.60
GW-180	CRSP	1104.00	95.5	121.3	-25.8	1008.50	982.70
GW-184	RQ	927.63	109.9	110.3	-0.4	817.73	817.33
GW-186	RQ	831.32	14.0	14.8	-0.8	817.32	816.52
GW-203	UNCS	1105.30	63.7	73.8	-10.1	1041.60	1031.50
GW-205	UNCS	1104.00	61.5	72.2	-10.7	1042.50	1031.80
GW-217	LIV	1176.90	104.6	114.8	-10.2	1072.30	1062.10
GW-221	UNCS	1106.00	65.8	74.9	-9.1	1040.20	1031.10
GW-231	KHQ	849.47	12.3	17.1	-4.8	837.17	832.37
GW-241	CRSDB	982.64	33.8	48.6	-14.8	948.84	934.04
GW-292	ECRWP	1073.00	110.8	115.1	-4.3	962.20	957.90

Table 9 (cont'd)

Water-Level Elevation (ft above mean sea level)						October 6 - 9, 1997	
				March 31 - April 4, 1997			
					Seasonal Fluctuation (+/- ft)		
Depth-to-Water (ft below Top of Well Casing)			October 6 - 9, 1997				
			March 31 - April 4, 1997				
Well No.[1]	Location[2]	Measuring Point Elevation[3] (ft msl)					
GW-293	ECRWP	1063.90	113.2	117.4	-4.2	950.70	946.50
GW-298	CRBAWP	1049.00	103.5	109.7	-6.2	945.50	939.30
GW-299	CRBAWP	1053.90	88.6	97.1	-8.5	965.30	956.80
GW-300	CRBAWP	1073.10	99.9	110.7	-10.8	973.20	962.40
GW-301	CRBAWP	1086.40	122.3	134.0	-11.7	964.10	952.40
GW-302	UNCS	1141.70	92.7	104.4	-11.7	1049.00	1037.30
GW-303	CRSDB	1007.20	84.7	88.5	-3.8	922.50	918.70
GW-304	CRSDB	1045.50	116.4	118.2	-1.8	929.10	927.30
GW-305	LIV	1183.60	115.5	124.9	-9.4	1068.10	1058.70
GW-322	CRSP	1134.30	136.0	159.2	-23.2	998.30	975.10
GW-339	UNCS	1124.60	64.9	77.7	-12.8	1059.70	1046.90
GW-511	CRSP	1093.20	81.9	108.5	-26.6	1011.30	984.70
GW-512	FCAP	1001.50	14.5	25.0	-10.5	987.00	976.50
GW-514	FCAP	1001.20	13.3	25.4	-12.1	987.90	975.80
GW-521	LIV	1182.70	80.7	85.9	-5.2	1102.00	1096.80
GW-522	LIV	1175.30	93.5	106.3	-12.8	1081.80	1069.00
GW-539	LII	1093.00	97.0	105.8	-8.8	996.00	987.20
GW-540	CDLVI	1072.10	74.6	82.1	-7.5	997.50	990.00
GW-541	CDLVI	1058.40	63.3	63.4	-0.1	995.10	995.00
GW-542	CDLVI	1051.60	69.6	70.8	-1.2	982.00	980.80
GW-543	CDLVI	1023.80	63.0	65.3	-2.3	960.80	958.50
GW-544	CDLVI	1045.00	63.4	67.2	-3.8	981.60	977.80
GW-546	CDLVI	1072.20	75.5	82.1	-6.6	996.70	990.10
GW-557	LV	1081.20	112.2	117.0	-4.8	969.00	964.20
GW-558	SSCR	983.97	37.5	48.8	-11.3	946.47	935.17
GW-559	SSCR	1102.80	128.4	136.0	-7.6	974.40	966.80
GW-560	CDLVII	948.85	34.8	41.5	-6.7	914.05	907.35
GW-562	CDLVII	934.49	NM	4.9	NA	NA	929.59
GW-564	CDLVII	937.77	6.3	10.7	-4.4	931.47	927.07
GW-608	CRSP	1074.00	116.6	135.7	-19.1	957.40	938.30
GW-609	CRSP	1112.10	164.2	170.6	-6.4	947.90	941.50
GW-610	CRSP	1059.40	81.0	89.9	-8.9	978.40	969.50
GW-611	CRSP	1048.40	98.3	106.3	-8.0	950.10	942.10
GW-612	CRSP	1131.00	118.6	126.3	-7.7	1012.40	1004.70

Table 9 (cont'd)

Water-Level Elevation (ft above mean sea level)						October 6 - 9, 1997	March 31 - April 4, 1997
					Seasonal Fluctuation (+/- ft)		
Depth-to-Water (ft below Top of Well Casing)			October 6 - 9, 1997	March 31 - April 4, 1997			
Well No.[1]	Location[2]	Measuring Point Elevation[3] (ft msl)					
GW-673	FCAP	882.01	7.1	9.9	-2.8	874.91	872.11
GW-674	FCAP	883.79	6.4	9.1	-2.7	877.39	874.69
GW-676	FCAP	846.50	2.8	6.0	-3.2	843.70	840.50
GW-677	FCAP	1030.40	24.6	28.4	-3.8	1005.80	1002.00
GW-679	FCAP	1026.90	46.9	52.8	-5.9	980.00	974.10
GW-709	LII	906.60	28.9	29.8	-0.9	877.70	876.80
GW-731	CRSDB	1049.20	123.2	124.8	-1.6	926.00	924.40
GW-732	CRSDB	1064.10	156.9	157.9	-1.0	907.20	906.20
GW-743	CRSP	1100.40	100.0	129.3	-29.3	1000.40	971.10
GW-757	LII	961.43	84.2	84.8	-0.6	877.25	876.63
GW-796	LV	1052.40	52.0	77.5	-25.5	1000.41	974.90
GW-797	LV	1059.80	66.2	70.5	-4.3	993.62	989.30
GW-798	CDLVII	1005.80	65.6	77.3	-11.7	940.18	928.50
GW-799	CDLVII	981.09	6.3	13.7	-7.4	974.76	967.39
GW-801	LV	1096.96	94.9	106.2	-11.3	1002.10	990.76
GW-827	CDLVI	1051.39	34.5	39.8	-5.3	1016.85	1011.59

Notes:

1 Wells sampled during CY 1997 are denoted with bold typface and shading.

2
- CDLVI = Construction/Demolition Landfill VI
- CDLVII = Construction/Demolition Landfill VII
- CRBAWP = Chestnut Ridge Borrow Area Waste Pile
- CRSDB = Chestnut Ridge Sediment Disposal Basin
- CRSP = Chestnut Ridge Security Pits
- ECRWP = East Chestnut Ridge Waste Pile
- FCAP = Filled Coal Ash Pond (formerly known as Ash Disposal Basin)
- KHQ = Kerr Hollow Quarry
- LII = Industrial Landfill II
- LIV = Industrial Landfill IV
- LV = Industrial Landfill V
- ORSF = Oak Ridge Sludge Farm
- RQ = Rogers Quarry
- SSCR = South Side Chestnut Ridge
- UNCS = United Nuclear Corporation Site

Table 9 (cont'd)

Notes: (cont'd)

3 Measuring point (top of well casing) elevation (ft above mean sea level) as reported in Jones et al. (1995).

4 NM = Not Measured
NA = Not Applicable

Table 10.
Summary of CY 1997 RCRA Post-Closure Corrective Action Monitoring Results for Point-of-Compliance Wells GW-609 and GW-796

RCRA GROUNDWATER TARGET COMPOUNDS[1]									
Inorganic Analytes (mg/L)	Reporting Limit[2] (mg/L)	GW-609				GW-796			
		01/14/97		07/24/97		01/09/97		07/10/97	
		TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
Cadmium	0.003	.	.	.	.	.	.	.	.
Chromium	0.01	.	.	.	.	.	.	.	.
Lead	0.0005	.	0.00052	0.0019	0.0016	.	.	0.003	0.0018
Mercury	0.0002	.	.	.	.	.	.	.	.
Nickel	0.01	.	.	.	.	.	.	.	.
Uranium	0.0005	.	.	.	.	.	.	.	.
Organic Analytes (µg/L)	Reporting Limit[3] (µg/L)								
Benzene	5	.		.		.		.	
Bromoform	5	.		.		.		.	
Carbon Tetrachloride	5	.		.		.		.	
Chloroform	5	.		.		.		.	
1,1-Dichloroethene	5	.		.		.		.	
1,2-Dichloroethene	5	.		.		.		.	
1,1-Dichloroethane	5	.		.		.		.	
1,2-Dichloroethane	5	.		.		.		.	
Tetrachloroethene	5	13		12		.		.	
Trichloroethene	5	1J		1J		.		.	
1,1,1-Trichlorothane	5	.		.		.		1J	
Radiological Analytes[4] (pCi/L)									
Gross Alpha		<MDA		2.7 ± 2.1		<MDA		<MDA	
Gross Beta		<MDA		<MDA		<MDA		<MDA	

Table 10 (cont'd)

Notes:

1 As specified in Attachment 3, Section E, of the RCRA post-closure permit for the Chestnut Ridge Hydrogeologic Regime (Permit No. TNHW-088).

2 Total (TOT) and dissolved (DIS) concentrations in milligrams per liter (mg/L) reported for unfiltered and filtered groundwater samples, respectively; "." = not detected above the specified analytical reporting limit (analytical detection limit).

3 Concentrations in micrograms per liter (μg/L) reported for unfiltered groundwater samples; "." = not detected above the specified analytical reporting limit (contract required quantitation limit); J = estimated value below quantitation limit.

4 Concentrations in picoCuries per liter (pCi/L) ± counting error reported for unfiltered groundwater samples; <MDA = less than minimum detectable activity (see Appendix D.4).

Table 11.
Summary of CY 1997 RCRA Post-Closure Corrective Action Monitoring Results for Plume Delineation Wells GW-301, GW-557, GW-798, GW-799, GW-801, and GW-831

RCRA GROUNDWATER TARGET COMPOUNDS[1]									
Inorganic Analytes (mg/L)	Reporting Limit[2] (mg/L)	GW-301				GW-557			
		01/07/97		07/24/97		01/08/97		07/09/97	
		TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
Cadmium	0.003	.	.	.	.	.	.	.	.
Chromium	0.01	.	.	.	.	.	.	.	.
Lead	0.0005	0.002	0.00057	0.0023	0.0016	.	.	0.0033	0.0022
Mercury	0.0002	.	.	.	.	.	.	.	.
Nickel	0.01	.	.	.	0.015	.	.	.	.
Uranium	0.0005	.	.	.	.	.	.	.	.
Organic Analytes (µg/L)	Reporting Limit[3] (µg/L)								
Benzene	5	.		.		.		.	
Bromoform	5	.		.		.		.	
Carbon Tetrachloride	5	.		.		.		.	
Chloroform	5	.		1J		.		.	
1,1-Dichloroethene	5	.		.		.		.	
1,2-Dichloroethene	5	.		.		.		.	
1,1-Dichloroethane	5	.		.		.		.	
1,2-Dichloroethane	5	.		.		.		.	
Tetrachloroethene	5	.		.		.		.	
Trichloroethene	5	.		.		.		.	
1,1,1-Trichlorothane	5	.		.		.		.	
Radiological Analytes[4] (pCi/L)									
Gross Alpha		<MDA		<MDA		<MDA		<MDA	
Gross Beta		<MDA		<MDA		<MDA		<MDA	

Table 11 (cont'd)

RCRA GROUNDWATER TARGET COMPOUNDS[1]									
Inorganic Analytes (mg/L)	Reporting Limit[2] (mg/L)	GW-798				GW-799			
		01/16/97		07/15/97		01/08/97		07/09/97	
		TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
Cadmium	0.003	.	.	.	.	.	.	.	.
Chromium	0.01	.	.	.	.	.	.	.	.
Lead	0.0005	0.00058	.	.	.	.	.	0.003	0.002
Mercury	0.0002	.	.	.	.	.	.	.	.
Nickel	0.01	.	.	.	.	.	.	.	.
Uranium	0.0005	.	.	.	.	.	.	.	.
Organic Analytes (µg/L)	Reporting Limit[3] (µg/L)								
Benzene	5	.		.		.		.	
Bromoform	5	.		.		.		.	
Carbon Tetrachloride	5	.		.		.		.	
Chloroform	5	.		.		.		.	
1,1-Dichloroethene	5	.		.		.		.	
1,2-Dichloroethene	5	.		.		.		.	
1,1-Dichloroethane	5	.		.		.		.	
1,2-Dichloroethane	5	.		.		.		.	
Tetrachloroethene	5	.		.		.		.	
Trichloroethene	5	.		.		.		.	
1,1,1-Trichlorothane	5	.		.		.		.	
Radiological Analytes[4] (pCi/L)									
Gross Alpha		<MDA		<MDA		<MDA		<MDA	
Gross Beta		<MDA		<MDA		<MDA		<MDA	

Table 11 (cont'd)

RCRA GROUNDWATER TARGET COMPOUNDS[1]									
Inorganic Analytes (mg/L)	Reporting Limit[2] (mg/L)	GW-801				GW-831			
		01/15/97		07/10/97		01/06/97		07/23/97	
		TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
Cadmium	0.003	.	.	.	.	.	.	.	.
Chromium	0.01	.	.	.	.	.	.	.	.
Lead	0.0005	.	.	0.0017	0.0012	0.0015	.	0.0032	0.0021
Mercury	0.0002	.	.	.	.	.	.	.	.
Nickel	0.01	.	.	.	.	.	.	.	.
Uranium	0.0005	.	.	.	.	0.00078	.	0.00072	0.00058
Organic Analytes (µg/L)	Reporting Limit[3] (µg/L)								
Benzene	5	.		.		.		.	
Bromoform	5	.		.		.		.	
Carbon Tetrachloride	5	.		.		.		.	
Chloroform	5	.		.		.		.	
1,1-Dichloroethene	5	.		.		.		.	
1,2-Dichloroethene	5	.		.		.		.	
1,1-Dichloroethane	5	.		.		.		.	
1,2-Dichloroethane	5	.		.		.		.	
Tetrachloroethene	5	.		.		.		.	
Trichloroethene	5	.		.		.		.	
1,1,1-Trichlorothane	5	.		.		.		.	
Radiological Analytes[4] (pCi/L)									
Gross Alpha		<MDA		<MDA		<MDA		<MDA	
Gross Beta		<MDA		<MDA		<MDA		<MDA	

Table 11 (cont'd)

Notes:

1 As specified in Attachment 3, Section E, of the RCRA post-closure permit for the Chestnut Ridge Hydrogeologic Regime (Permit No. TNHW-088).

2 Total (TOT) and dissolved (DIS) concentrations in milligrams per liter (mg/L) reported for unfiltered and filtered groundwater samples, respectively; "." = not detected above the specified analytical reporting limit (analytical detection limit).

3 Concentrations in micrograms per liter (μg/L) reported for unfiltered groundwater samples; "." = not detected above the specified analytical reporting limit (contract required quantitation limit). J = estimated value below the quantitation limit.

4 Concentrations in picoCuries per liter (pCi/L) ± counting error reported for unfiltered groundwater samples; <MDA = less than minimum detectable activity (see Appendix D.4).

APPENDIX C

MONITORING WELL CONSTRUCTION DETAILS

EXPLANATION

LOCATION:

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

PROGRAM:

CMP	-	RCRA Post-Closure Corrective Action Monitoring
RDM	-	RCRA Post-Closure Detection Monitoring
ROD	-	CERCLA Record of Decision Monitoring
SDM	-	SWDF Detection Monitoring
SDM/C	-	Used for SDM and CMP

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
Och	-	Chickamauga Group
.	-	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
F25/J55	-	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/sl/.01	-	Stainless steel, slotted, 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 Number	1090	GW-141	GW-142	GW-143	GW-144	GW-145	GW-156
Location	UNCS	LIV	KHQ	KHQ	KHQ	KHQ	CRSDB
Program	ROD	SDM	RDM	RDM	RDM	RDM	RDM
GENERAL INFORMATION	.	.	.	.	.	.	.
East Coordinate	53853.02	52463.00	64030.00	63522.00	63502.00	63266.00	64020.00
North Coordinate	28718.02	28755.00	24524.00	24257.00	24255.00	24441.00	27626.00
Measuring Pt. Elevation	1103.90	1186.10	970.35	913.18	913.34	840.04	1049.10
Surface Elevation	1101.60	1183.50	968.29	911.04	910.48	837.29	1046.90
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	OCk	OCk	OCk	OCk	OCk
Aquifer Zone	WT	BDR	BDR	BDR	BDR	WT	BDR
Weathered Rock - Depth	.	.	.	.	.	.	84.0
Weathered Rock - Elevation	.	.	.	.	.	.	962.90
Fresh Rock - Depth	.	57.0	.	18.0	.	.	93.0
Fresh Rock - Elevation	.	1126.50	.	893.04	.	.	953.90
Total Depth Drilled	96.7	156.0	295.0	253.0	195.0	110.0	157.0
SURFACE/CONDUCTOR CASING	.	.	.	.	.	.	.
Casing Depth	.	65.0	20.0	20.0	40.0	12.0	94.0
Casing Diameter	.	10.75	12.50	10.63	12.50	12.50	10.75
Casing Material	none	Steel/F25	PVC/#40	PVC/#40	PVC/#40	PVC/#40	Steel/F25
WELL CASING	.	.	.	.	.	.	.
Borehole Depth	96.7	156.0	250.0	205.0	195.0	110.0	157.0
Borehole Diameter	8.00	10.00	11.00	10.00	11.00	11.00	8.50
Well Casing Depth	0.5	144.5	248.5	205.0	150.0	88.5	147.0
Well Casing Diameter	6.50	4.50	6.62	6.62	4.50	4.50	4.50
Well Casing Material	PVC/#40	SS/#304	Steel/F25	Steel/F25	PVC/#40	PVC/#40	PVC/#40
MONITORED INTERVAL	.	.	.	.	.	.	.
Top - Depth	0.0	141.0	248.5	205.0	148.0	86.0	146.0
Top - Elevation	.	1042.50	719.79	706.04	762.48	751.29	900.90
Midpoint - Depth	0.0	148.5	271.8	229.0	171.5	98.0	151.5
Midpoint - Elevation	.	1035.00	696.54	682.04	738.98	739.29	895.40
Bottom - Depth	0.0	156.0	295.0	253.0	195.0	110.0	157.0
Bottom - Elevation	.	1027.50	673.29	658.04	715.48	727.29	889.90
Screen Material	PVC/sl	SS/sw/.01	.	.	PVC/sw/.01	PVC/sw/.01	PVC/sw/.01
Screen Length	.	10.7	.	.	40.0	20.0	10.0
Open-Hole Length	.	.	46.5	48.0	.	.	.
Open-Hole Diameter	.	.	6.00	6.00	.	.	.

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well Number	GW-159	GW-203	GW-205	GW-217	GW-221	GW-231	GW-301
Location	CRSDB	UNCS	UNCS	LIV	UNCS	KHQ	CRBAWP
Program	RDM	ROD	ROD	SDM	ROD	RDM	CMP
GENERAL INFORMATION	.	.	.	.	.	.	.
East Coordinate	63496.00	54190.48	54008.30	53020.00	54388.57	63410.00	61964.00
North Coordinate	27764.00	28355.82	28362.98	28758.00	28359.44	24725.00	27662.00
Measuring Pt. Elevation	1051.20	1105.30	1104.00	1176.90	1106.00	849.47	1086.40
Surface Elevation	1048.80	1102.30	1101.50	1174.30	1103.40	846.90	1083.90
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	OCk	OCk	OCk	OCk	OCk
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock - Depth	.	86.0	100.0	55.0	36.0	.	94.0
Weathered Rock - Elevation	.	1016.30	1001.50	1119.30	1067.40	.	989.90
Fresh Rock - Depth	100.0	93.0	146.0	75.0	90.0	10.5	136.0
Fresh Rock - Elevation	948.80	1009.30	955.50	1099.30	1013.40	836.40	947.90
Total Depth Drilled	157.0	156.0	164.0	180.0	158.0	35.0	163.5
SURFACE/CONDUCTOR CASING	.	.	.	.	.	.	.
Casing Depth	123.0	94.0	154.0	81.7	92.0	11.0	105.0
Casing Diameter	.10.75	10.75	10.75	10.75	6.63	10.63	10.75
Casing Material	Steel/F25	Steel/F25	Steel/F25	Steel/F25	Steel/F25	PVC/#40	Steel/F25
WELL CASING	.	.	.	.	.	.	.
Borehole Depth	157.0	156.0	164.0	180.0	158.0	35.0	163.5
Borehole Diameter	8.50	8.50	10.00	10.00	6.00	11.00	10.00
Well Casing Depth	147.0	146.0	154.0	166.8	148.0	24.5	151.0
Well Casing Diameter	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Well Casing Material	PVC/#40	PVC/#40	PVC/#40	SS/#304	PVC/#40	PVC/#40	SS/#304
MONITORED INTERVAL	.	.	.	.	.	.	.
Top - Depth	146.0	144.0	154.0	165.2	147.0	22.8	148.5
Top - Elevation	902.80	958.30	947.50	1009.10	956.40	824.10	935.40
Midpoint - Depth	151.5	150.0	159.0	172.6	152.5	28.9	156.0
Midpoint - Elevation	897.30	952.30	942.50	1001.70	950.90	818.00	927.90
Bottom - Depth	157.0	156.0	164.0	180.0	158.0	35.0	163.5
Bottom - Elevation	891.80	946.30	937.50	994.30	945.40	811.90	920.40
Screen Material	PVC/sw/.01	PVC/sw/.01	PVC/sw/.01	SS/sw/.01	PVC/sw/.01	PVC/sw/.01	SS/sw/.01
Screen Length	10.0	10.0	10.0	10.6	10.0	10.0	10.0
Open-Hole Length	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well Number	GW-302	GW-305	GW-339	GW-521	GW-522	GW-539	GW-542
Location	UNCS	LIV	UNCS	LIV	LIV	LII	CDLVI
Program	ROD	SDM	ROD	SDM/C	SDM	SDM	SDM
GENERAL INFORMATION	.	.	.	.	.	.	.
East Coordinate	54353.40	52962.00	54146.52	52040.00	52612.00	52278.26	51641.74
North Coordinate	28693.55	28548.00	28658.72	28541.00	28377.00	27192.53	27466.22
Measuring Pt. Elevation	1141.70	1183.60	1124.60	1182.70	1175.30	1093.00	1051.60
Surface Elevation	1139.60	1181.10	1122.20	1179.50	1172.00	1090.40	1049.00
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	OCk	OCk	OCk	OCk	OCk
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	BDR	WT
Weathered Rock - Depth	63.0	53.0	45.0	.	85.0	.	.
Weathered Rock - Elevation	1076.60	1128.10	1077.20	.	1087.00	.	.
Fresh Rock - Depth	102.0	84.0	91.0	54.0	130.0	74.0	.
Fresh Rock - Elevation	1037.60	1097.10	1031.20	1125.50	1042.00	1016.40	.
Total Depth Drilled	136.0	179.6	114.0	136.0	195.5	156.0	77.5
SURFACE/CONDUCTOR CASING	.	.	.	.	.	.	.
Casing Depth	63.8	64.0	91.0	60.5	90.0	79.0	.
Casing Diameter	10.75	10.75	10.75	10.75	10.75	10.75	.
Casing Material	Steel	Steel/F25	Steel	unknown	unknown	Steel	none
WELL CASING	.	.	.	.	.	.	.
Borehole Depth	136.0	179.6	114.0	136.0	195.5	156.0	76.5
Borehole Diameter	9.50	10.00	9.50	9.50	9.50	9.25	9.25
Well Casing Depth	124.5	168.9	103.7	124.9	184.6	139.8	60.8
Well Casing Diameter	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Well Casing Material	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304
MONITORED INTERVAL	.	.	.	.	.	.	.
Top - Depth	121.5	165.3	101.0	123.2	183.0	136.4	59.0
Top - Elevation	1018.10	1015.80	1021.20	1056.30	989.00	954.00	990.00
Midpoint - Depth	128.2	172.5	107.5	129.6	189.2	146.2	67.8
Midpoint - Elevation	1011.45	1008.65	1014.70	1049.90	982.85	944.20	981.25
Bottom - Depth	134.8	179.6	114.0	136.0	195.3	156.0	76.5
Bottom - Elevation	1004.80	1001.50	1008.20	1043.50	976.70	934.40	972.50
Screen Material	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sl/.01	SS/sl/.01
Screen Length	10.3	10.7	10.3	10.3	10.4	15.9	15.7
Open-Hole Length	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well Number	GW-543	GW-544	GW-557	GW-560	GW-562	GW-564	GW-609
Location	CDLVI	CDLVI	LV	CDLVII	CDLVII	CDLVII	CRSP
Program	SDM	SDM	SDM/C	SDM	SDM	SDM	CMP
GENERAL INFORMATION	.	.	.	.	.	.	.
East Coordinate	51458.48	51819.56	59519.59	60743.42	61640.17	59865.28	60039.73
North Coordinate	27072.06	26963.22	26450.11	25692.28	26276.29	25872.94	28109.43
Measuring Pt. Elevation	1023.80	1045.00	1081.20	938.92	934.49	937.77	1112.10
Surface Elevation	1021.20	1042.50	1078.60	936.17	931.86	935.12	1109.70
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	OCk	OCk	OCk	OCk	OCk
Aquifer Zone	BDR	BDR	WT	WT	WT	WT	BDR
Weathered Rock - Depth	16.0	47.0	.	.	.	.	.
Weathered Rock - Elevation	1005.20	995.50	.	.	.	.	.
Fresh Rock - Depth	37.0	52.5	.	.	52.0	72.0	107.0
Fresh Rock - Elevation	984.20	990.00	.	.	879.86	863.12	1002.70
Total Depth Drilled	94.0	110.0	139.0	117.0	133.0	88.0	269.0
SURFACE/CONDUCTOR CASING	.	.	.	.	.	.	.
Casing Depth	29.3	54.5	85.0	.	.	.	107.0
Casing Diameter	10.75	10.75	10.75	.	.	.	10.75
Casing Material	Steel	Steel	Steel	none	none	none	Steel/J55
WELL CASING	.	.	.	.	.	.	.
Borehole Depth	93.6	109.3	138.0	117.0	60.0	81.0	269.0
Borehole Diameter	9.25	9.25	9.50	9.50	9.50	9.50	9.50
Well Casing Depth	78.0	93.4	115.8	49.0	38.0	55.3	258.7
Well Casing Diameter	4.50	4.50	4.00	4.00	4.00	4.00	4.50
Well Casing Material	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304
MONITORED INTERVAL	.	.	.	.	.	.	.
Top - Depth	76.2	91.0	112.9	45.2	36.0	52.0	256.4
Top - Elevation	945.00	951.50	965.70	890.97	895.86	883.12	853.30
Midpoint - Depth	84.9	100.2	125.5	57.1	48.0	66.5	262.7
Midpoint - Elevation	936.30	942.35	953.15	879.07	883.86	868.62	847.00
Bottom - Depth	93.6	109.3	138.0	69.0	60.0	81.0	269.0
Bottom - Elevation	927.60	933.20	940.60	867.17	871.86	854.12	840.70
Screen Material	SS/sl/.01	SS/sl/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01
Screen Length	15.6	15.9	20.0	20.0	20.0	20.0	10.3
Open-Hole Length	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well Number	GW-709	GW-731	GW-732	GW-757	GW-796	GW-797	GW-798
Location	LII	CRSDB	CRSDB	LII	LV	LV	CDLVII
Program	SDM	RDM	RDM	SDM	SDM	SDM	SDM/C
GENERAL INFORMATION	.	.	.	.	.	.	.
East Coordinate	52371.88	63863.14	64267.74	53302.52	58206.40	58550.40	60309.95
North Coordinate	25344.08	27463.65	27716.72	25409.50	27923.90	27446.60	27264.85
Measuring Pt. Elevation	906.60	1049.20	1064.10	961.43	1052.40	1059.80	1005.80
Surface Elevation	903.84	1045.80	1060.70	958.65	1048.80	1056.10	1002.42
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	OCk	OCk	OCk	OCk	OCk
Aquifer Zone	BDR	BDR	BDR	BDR	BDR	BDR	BDR
Weathered Rock - Depth	39.0	95.4	85.0	29.5	102.0	67.1	94.4
Weathered Rock - Elevation	864.84	950.40	975.70	929.15	946.80	989.00	908.02
Fresh Rock - Depth	43.0	129.4	96.0	48.0	103.0	89.0	95.8
Fresh Rock - Elevation	860.84	916.40	964.70	910.65	945.80	967.10	906.62
Total Depth Drilled	80.6	180.4	190.6	166.5	139.7	134.1	135.5
SURFACE/CONDUCTOR CASING	.	.	.	.	.	.	.
Casing Depth	50.0	122.0	100.7	46.8	107.6	95.0	99.7
Casing Diameter	11.75	11.75	11.75	10.75	10.75	10.75	10.75
Casing Material	Steel/J55	Steel/J55	Steel/J55	Steel/J55	Steel/J55	Steel/J55	Steel/J55
WELL CASING	.	.	.	.	.	.	.
Borehole Depth	80.6	175.4	189.5	166.5	139.7	134.1	135.5
Borehole Diameter	10.60	10.60	10.60	9.62	9.50	9.50	9.50
Well Casing Depth	70.4	165.2	179.3	135.5	126.5	123.5	124.5
Well Casing Diameter	4.25	4.50	4.50	4.50	4.50	4.50	4.50
Well Casing Material	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304	SS/#304
MONITORED INTERVAL	.	.	.	.	.	.	.
Top - Depth	68.7	164.0	178.3	134.0	122.9	118.0	122.0
Top - Elevation	835.14	881.80	882.40	824.65	925.90	938.10	880.42
Midpoint - Depth	74.7	171.4	184.2	150.4	129.7	126.1	128.7
Midpoint - Elevation	829.19	874.45	876.55	808.30	919.10	930.05	873.72
Bottom - Depth	80.6	178.7	190.0	166.7	136.5	134.1	135.4
Bottom - Elevation	823.24	867.10	870.70	791.95	912.30	922.00	867.02
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	10.0	10.0	10.0	30.0	10.0	10.0	10.0
Open-Hole Length	.	.	.	.	.	.	.
Open-Hole Diameter	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX C
Monitoring Well Construction Details

Well Number	GW-799	GW-801	GW-827	GW-831
Location	CDLVII	LV	CDLVI	ADB
Program	SDM/C	SDM/C	SDM	CMP
GENERAL INFORMATION	.	.	.	.
East Coordinate	59961.20	58779.90	51826.32	56593.48
North Coordinate	26745.50	26807.80	27721.42	26653.53
Measuring Pt. Elevation	981.09	1096.96	1051.39	1091.09
Surface Elevation	978.10	1093.82	1048.13	1088.04
Hydrostratigraphic Unit	AQF	AQF	AQF	AQF
Geologic Formation	OCk	OCk	OCk	OCk
Aquifer Zone	BDR	BDR	BDR	BDR
Weathered Rock - Depth	60.8	112.5	.	134.8
Weathered Rock - Elevation	917.30	981.32	.	953.24
Fresh Rock - Depth	62.8	113.4	40.5	140.8
Fresh Rock - Elevation	915.30	980.42	1007.63	947.24
Total Depth Drilled	92.0	188.9	135.0	200.0
SURFACE/CONDUCTOR CASING	.	.	.	.
Casing Depth	65.0	115.4	43.4	138.3
Casing Diameter	10.75	10.75	10.75	10.75
Casing Material	Steel/J55	Steel/J55	Steel	Steel
WELL CASING	.	.	.	.
Borehole Depth	92.0	188.9	135.0	200.0
Borehole Diameter	9.50	9.87	9.87	9.87
Well Casing Depth	81.0	178.1	124.1	183.2
Well Casing Diameter	4.50	4.50	4.50	4.50
Well Casing Material	SS/#304	SS/#304	SS/#304	SS/#304
MONITORED INTERVAL	.	.	.	.
Top - Depth	78.7	175.8	122.1	182.0
Top - Elevation	899.40	918.02	926.03	906.04
Midpoint - Depth	85.4	182.4	128.5	190.8
Midpoint - Elevation	892.75	911.47	919.68	897.24
Bottom - Depth	92.0	188.9	134.8	199.6
Bottom - Elevation	886.10	904.92	913.33	888.44
Screen Material	SS/sw/.01	SS/sw/.01	SS/sw/.01	SS/sw/.01
Screen Length	10.0	10.0	10.0	10.4
Open-Hole Length	.	.	.	.
Open-Hole Diameter	.	.	.	.

APPENDIX D

CY 1997 DATA FOR GROUNDWATER AND SURFACE WATER SAMPLES

EXPLANATION

LOCATION:

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

PROGRAM:

CMP	-	RCRA Post-Closure Corrective Action Monitoring
RDM	-	RCRA Post-Closure Detection Monitoring
ROD	-	CERCLA Record of Decision Monitoring
SDM	-	SWDF Detection Monitoring
SDM/C	-	Used for SDM and CMP

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
Och	-	Chickamauga Group
.	-	Not Applicable or not available

EXPLANATION (cont'd)

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

NOTES:

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

All trace metal and cation analyses were performed using the inductively coupled plasma spectroscopy method unless otherwise noted.

.	-	Not analyzed
CVAA	-	Cold Vapor Atomic Absorption
PMS	-	Plasma Mass Spectroscopy
TDS	-	Total Dissolved Solids
TSS	-	Total Suspended Solids

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
ppm	-	parts per million

ADDITIONAL DATA:

The results for radiological analytes in samples collected from well GW-521 at LIV and Outfall301 at KHQ are presented at the end of Appendix D.4 rather than in alphanumeric sequence. Additional radioanalytes reported for these samples were not analyzed at other locations in the regime.

EXPLANATION (cont'd)

DATA QUALIFICATION:

The following laboratory qualifiers are presented with results in this appendix:

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

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

Inorganic Analytes:

PMS - All samples are diluted before analysis to obtain an optimal matrix; reporting limits were set with a five-fold dilution.

Organic Analytes:

One hundred twenty-nine results were reported with a "B" qualifier, indicating that a compound also was detected in the associated laboratory blank. These results were reported for acetone (54 results), 2-butanone (48 results), methylene chloride (26 results), and tetrachloroethene (one result). All false positive results that were screened by data reported for the laboratory blanks or the associated trip blanks (not indicated by a qualifier) are summarized in Appendix F.

Results that are estimated values below the analytical reporting limit were assigned a "J" qualifier by the laboratory. The standard reporting limits for the 54 organic analytes are 5 ug/L (for 37 compounds), 10 ug/L (for 16 compounds), or 500 ug/L (for one compound). Therefore, all results less than 5 ug/L are estimated values. Results that were estimated values greater than or equal to 5 ug/L were reported primarily for acetone (24 results) and 2-butanone (20 results). All of the estimated values reported for these compounds were screened as false-positive results (see Appendix F). The following results were estimated values greater than or equal to 5 ug/L that were not identified as false-positive results.

Compound	Reporting Limit (ug/L)	Sampling Location	Date Sampled	Result (ug/L)
Chloromethane	10	GW-143	11/10/97	8
Trichlorofluoromethane	10	GW-609	01/14/97	5
Trichlorofluoromethane	10	GW-609	07/24/97	5

APPENDIX D.1

FIELD MEASUREMENTS AND MISCELLANEOUS ANALYTES

APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	1090		GW-141					GW-142		
Program	ROD		SDM					RDM		
Location	UNCS		LIV					KHQ		
Date Sampled	04/16/97		01/07/97		02/27/97	07/23/97		04/29/97	04/29/97	04/30/97
Sample Type		DUP		DUP			DUP			
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1103.90	1103.90	1186.10	1186.10	1186.10	1186.10	1186.10	970.35	970.35	970.35
Depth to Water (ft)	48.67	48.67	91.36	91.36	91.50	89.88	89.88	132.55	203.26	188.10
Water-Level Elev. (ft)	1055.23	1055.23	1094.74	1094.74	1094.6	1096.22	1096.22	837.8	767.09	782.25
Water Temp (degrees C)	16.5	15.9	12.7	12.5	14.9	15.8	15.4	13.7	15.9	23.7
pH (pH units)	7.6	7.7	6.8	6.8	6.9	7	6.9	7.8	7.8	7.9
Conductivity (umho/cm)	468	502	344	337	634	380	399	505	453	466
Dissolved Oxygen (ppm)	1.4	1.4	6.5	6.5	6	6.1	6.3	3.2	2.8	8.5
Oxidation/Reduction (mV)	162	170	219	218	196	198	176	188	142	215
MISCELLANEOUS ANALYTES										
pH (pH units)	7.35	7.33	7.2	7.19	.	7.17	7.16	7.45	7.6	7.65
Conductivity (umho/cm)	577	577	429	426	.	432	433	439	449	452
TDS (mg/L)	312	313	246	272	.	261	263	240	234	252
TSS (mg/L)	2	2	590	562.5	<1	10.8	11.2	8	3	4
Turbidity (NTU)	1.93	2.14	1394	1368	21.9	42.1	39.9	45.7	24	46

(CONTINUED)

Sampling Point	GW-142									
Program	RDM									
Location	KHQ									
Date Sampled	05/01/97	08/04/97	08/05/97	08/06/97	08/07/97	11/10/97		11/11/97	11/12/97	11/14/97
Sample Type							DUP			
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	970.35	970.35	970.35	970.35	970.35	970.35	970.35	970.35	970.35	970.35
Depth to Water (ft)	186.98	133.95	192.60	190.90	188.35	138.45	138.45	139.60	139.55	139.15
Water-Level Elev. (ft)	783.37	836.4	777.75	779.45	782	831.9	831.9	830.75	830.8	831.2
Water Temp (degrees C)	17.1	20.6	18.8	18.5	18.1	12.9	12.9	11.6	10.8	11.7
pH (pH units)	7.6	7.6	7.7	7.4	7.5	7.7	7.8	7.6	7.7	7.7
Conductivity (umho/cm)	467	369	373	359	359	1770	1768	331	341	391
Dissolved Oxygen (ppm)	6.4	1.9	2.5	6.9	2.8	1	1	1.6	2	4
Oxidation/Reduction (mV)	168	180	201	122	181	-119	-121	-114	-21	128
MISCELLANEOUS ANALYTES										
pH (pH units)	7.61	.	.	.	.	7.84	7.85	7.79	7.85	7.84
Conductivity (umho/cm)	449	.	.	.	.	439	440	436	446	440
TDS (mg/L)	245	.	.	.	.	254	251	242	242	259
TSS (mg/L)	8	134	62	19.5	4	4	5	4	1	4
Turbidity (NTU)	26.8	133	120	61.9	5.41	47.4	47.5	26.6	26.2	38.9

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-143									
Program	RDM									
Location	KHQ									
Date Sampled	04/28/97	04/29/97	04/30/97	05/01/97	08/04/97	08/05/97	08/06/97	08/07/97	11/10/97	11/11/97
Sample Type										
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	913.18	913.18	913.18	913.18	913.18	913.18	913.18	913.18	913.18	913.18
Depth to Water (ft)	77.48	176.75	173.59	176.84	78.06	183.35	184.53	181.31	81.56	81.98
Water-Level Elev. (ft)	835.7	736.43	739.59	736.34	835.12	729.83	728.65	731.87	831.62	831.2
Water Temp (degrees C)	14.9	15.3	16.2	16	17	16.5	15.5	16	13.2	13.3
pH (pH units)	8.2	7.9	7.9	7.8	7.1	7.7	7.8	7.4	8.5	8.3
Conductivity (umho/cm)	490	486	465	485	409	441	435	430	445	444
Dissolved Oxygen (ppm)	0.9	0.9	1.1	1.4	1.8	1.5	2	2.4	4.9	3.11
Oxidation/Reduction (mV)	12	40	44	94	-57	42	110	141	30	23
MISCELLANEOUS ANALYTES										
pH (pH units)	7.96	7.82	7.79	7.79	.	.	.	.	7.94	7.87
Conductivity (umho/cm)	483	485	485	486	.	.	.	.	492	488
TDS (mg/L)	257	261	275	273	.	.	.	.	294	284
TSS (mg/L)	1	<1	7	4	<1	2.5	<1	<1	<1	<1
Turbidity (NTU)	12.3	7.93	2.42	5.29	6.99	3.84	3	1.14	6.49	2.97

(CONTINUED)

Sampling Point	GW-143		GW-144							
Program	RDM		RDM							
Location	KHQ		KHQ							
Date Sampled	11/12/97	11/13/97	04/28/97		04/29/97		04/30/97		05/01/97	
Sample Type				DUP		DUP		DUP		DUP
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	913.18	913.18	913.34	913.34	913.34	913.34	913.34	913.34	913.34	913.34
Depth to Water (ft)	82.20	82.20	77.95	77.95	77.69	77.69	77.53	77.53	77.58	77.58
Water-Level Elev. (ft)	830.98	830.98	835.39	835.39	835.65	835.65	835.81	835.81	835.76	835.76
Water Temp (degrees C)	12.4	12.5	15.1	15	14.6	14.6	15.4	15.5	14.8	14.7
pH (pH units)	8.3	8.3	7.8	7.9	7.9	7.9	7.9	7.9	7.8	7.7
Conductivity (umho/cm)	441	449	483	485	347	361	353	353	368	368
Dissolved Oxygen (ppm)	4.65	4.58	4.8	4.9	5	5	5.3	5.3	5.5	5.5
Oxidation/Reduction (mV)	-29	-60	215	220	206	209	218	218	235	237
MISCELLANEOUS ANALYTES										
pH (pH units)	7.98	7.94	7.73	7.77	7.77	7.82	7.71	7.73	7.74	7.73
Conductivity (umho/cm)	486	483	319	321	317	315	319	319	329	321
TDS (mg/L)	272	284	134	153	171	172	179	174	188	188
TSS (mg/L)	1	1	<1	<1	<1	<1	1	1	2	2
Turbidity (NTU)	8.72	11	2.19	3.21	1.15	1.92	0.169	0.222	2.48	0.804

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-144									
Program	RDM									
Location	KHQ									
Date Sampled	08/04/97		08/05/97		08/06/97		08/07/97		11/10/97	11/11/97
Sample Type		DUP		DUP		DUP		DUP		
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	913.34	913.34	913.34	913.34	913.34	913.34	913.34	913.34	913.34	913.34
Depth to Water (ft)	79.00	79.00	79.05	79.05	79.63	79.63	79.33	79.33	81.53	81.07
Water-Level Elev. (ft)	834.34	834.34	834.29	834.29	833.71	833.71	834.01	834.01	831.81	832.27
Water Temp (degrees C)	17.2	16.9	15.8	15.8	15.3	15.4	15.2	15.3	14.1	13.9
pH (pH units)	7.6	7.3	7.6	7.6	7.6	7.5	7.5	7.5	7.62	7.56
Conductivity (umho/cm)	275	283	339	341	294	297	283	285	294	291
Dissolved Oxygen (ppm)	5.7	5.9	4.5	4.5	4.6	4.7	4.6	4.6	4.52	4
Oxidation/Reduction (mV)	185	199	179	188	211	213	232	230	355	289
MISCELLANEOUS ANALYTES										
pH (pH units)									7.79	7.75
Conductivity (umho/cm)									321	317
TDS (mg/L)									187	180
TSS (mg/L)	2	2.5	<1	<1	<1	<1	<1	<1	16	3
Turbidity (NTU)	1.1	1.03	0.169	0.164	0.574	0.604	0.281	0.329	6.37	1.66

(CONTINUED)

Sampling Point	GW-144		GW-145							
Program	RDM		RDM							
Location	KHQ		KHQ							
Date Sampled	11/12/97	11/13/97	04/28/97	04/29/97	04/30/97	05/01/97	08/04/97	08/05/97	08/06/97	08/07/97
Sample Type										
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	913.34	913.34	840.04	840.04	840.04	840.04	840.04	840.04	840.04	840.04
Depth to Water (ft)	81.49	81.51	3.51	29.76	26.23	36.73	4.29	40.11	33.25	29.99
Water-Level Elev. (ft)	831.85	831.83	836.53	810.28	813.81	803.31	835.75	799.93	806.79	810.05
Water Temp (degrees C)	13.9	14	14.9	18	17.6	17.8	19.5	16.3	16.3	16.2
pH (pH units)	7.42	7.36	7.9	8	8	7.9	7.8	7.7	7.7	7.4
Conductivity (umho/cm)	279	268	709	543	543	529	478	537	481	451
Dissolved Oxygen (ppm)	3.89	3.98	7	6.9	6.5	5.4	9.3	7.1	8.2	9.4
Oxidation/Reduction (mV)	270	251	224	215	224	216	238	241	235	229
MISCELLANEOUS ANALYTES										
pH (pH units)	7.79	7.7	7.9	7.71	7.79	7.69				
Conductivity (umho/cm)	325	323	544	542	540	541				
TDS (mg/L)	186	183	309	299	300	313				
TSS (mg/L)	<1	4	13	4	31	6	11	27	3.5	63
Turbidity (NTU)	3.04	1.93	7.53	12.1	25.6	6.94	4.27	21.8	7.48	39.5

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-145				GW-156					
Program	RDM				RDM					
Location	KHQ				CRSDB					
Date Sampled	11/10/97	11/11/97	11/12/97	11/13/97	04/21/97	04/22/97	04/23/97	04/24/97	10/20/97	10/22/97
Sample Type										
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	840.04	840.04	840.04	840.04	1049.10	1049.10	1049.10	1049.10	1049.10	1049.10
Depth to Water (ft)	7.51	8.00	8.13	7.86	142.72	142.98	142.77	142.88	143.66	143.65
Water-Level Elev. (ft)	832.53	832.04	831.91	832.18	906.38	906.12	906.33	906.22	905.44	905.45
Water Temp (degrees C)	11.9	12.1	10.8	10.5	13.6	15.1	13.9	15.6	15.4	14.5
pH (pH units)	7.8	7.77	7.71	7.81	7.3	7.6	7.5	7.5	7.3	7.3
Conductivity (umho/cm)	495	487	462	440	700	633	690	618	632	635
Dissolved Oxygen (ppm)	7.05	7.3	7.52	6.82	7	6	6	5.6	8.2	7.8
Oxidation/Reduction (mV)	355	296	286	239	284	256	240	221	251	294
MISCELLANEOUS ANALYTES										
pH (pH units)	7.8	7.67	7.76	7.75	7.39	7.37	7.2	7.37	7.35	7.43
Conductivity (umho/cm)	546	543	553	550	676	642	656	627	662	649
TDS (mg/L)	327	316	327	317	368	330	345	343	334	370
TSS (mg/L)	1	<1	<1	<1	28	<1	1	3	<1	<1
Turbidity (NTU)	0.482	1.53	0.959	0.542	74.8	3.48	2.36	8.32	0.286	1.15

(CONTINUED)

Sampling Point	GW-156			GW-159						
Program	RDM			RDM						
Location	CRSDB			CRSDB						
Date Sampled	10/27/97	10/28/97		04/21/97	04/22/97	04/23/97	04/24/97	10/20/97	10/21/97	10/22/97
Sample Type			DUP							
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1049.10	1049.10	1049.10	1051.20	1051.20	1051.20	1051.20	1051.20	1051.20	1051.20
Depth to Water (ft)	143.63	143.96	143.96	116.74	139.77	144.38	144.20	118.12	119.27	120.29
Water-Level Elev. (ft)	905.47	905.14	905.14	934.46	911.43	906.82	907	933.08	931.93	930.91
Water Temp (degrees C)	13.7	14	14	13.4	14.1	12.5	11.4	14.3	14	12.4
pH (pH units)	6.9	7.3	7.2	7.8	7.9	7.5	7.6	8	7.9	8.1
Conductivity (umho/cm)	608	596	598	382	391	403	378	342	342	353
Dissolved Oxygen (ppm)	7.2	7.2	7.3	5.3	5.9	6.5	8.9	8.15	8.25	8.62
Oxidation/Reduction (mV)	283	213	206	231	238	219	203	189	213	198
MISCELLANEOUS ANALYTES										
pH (pH units)	7.57	7.41	7.42	7.88	7.71	7.65	7.92	7.74	7.84	7.79
Conductivity (umho/cm)	643	642	639	382	382	369	379	383	375	375
TDS (mg/L)	351	325	336	191	186	195	205	177	207	207
TSS (mg/L)	1	4	4	1	36	2	3	<1	<1	1
Turbidity (NTU)	0.735	9.13	9.31	8.21	35.3	7.08	8.78	1.4	0.183	0.322

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APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-159	GW-203	GW-205	GW-217		GW-221	GW-231			
Program	RDM	ROD	ROD	SDM		ROD	RDM			
Location	CRSDB	UNCS	UNCS	LIV		UNCS	KHQ			
Date Sampled	10/23/97	04/14/97	04/14/97	01/06/97	07/17/97	04/15/97	04/28/97	04/29/97	04/30/97	05/01/97
Sample Type										
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1051.20	1105.30	1104.00	1176.90	1176.90	1106.00	849.47	849.47	849.47	849.47
Depth to Water (ft)	120.20	64.34	64.07	104.75	109.33	66.46	12.24	11.94	11.74	11.70
Water-Level Elev. (ft)	931	1040.96	1039.93	1072.15	1067.57	1039.54	837.23	837.53	837.73	837.77
Water Temp (degrees C)	11.1	14.3	14.8	12.1	17.6	15.3	12.8	12.6	12.7	13.2
pH (pH units)	7.9	8.3	7.9	8	7.2	8	7.5	7.7	7.5	7.4
Conductivity (umho/cm)	317	271	290	308	284	267	319	310	313	314
Dissolved Oxygen (ppm)	8.11	5.5	3.8	8.6	8	6.3	1.2	1.3	1.3	1.3
Oxidation/Reduction (mV)	200	155	183	211	149	189	182	213	204	198
MISCELLANEOUS ANALYTES										
pH (pH units)	7.78	7.9	7.83	8.27	8.1	7.83	7.43	7.57	7.51	7.47
Conductivity (umho/cm)	376	280	310	324	323	293	310	309	308	309
TDS (mg/L)	215	160	190	172	180	156	177	169	166	170
TSS (mg/L)	<1	<1	34	21.5	4	<1	<1	<1	<1	1
Turbidity (NTU)	0.4	2.26	83.1	20.7	2.35	0.98	0.451	0.242	0.272	0.423

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Sampling Point	GW-231									GW-301
Program	RDM									CMP
Location	KHQ									CRBAWP
Date Sampled	08/04/97	08/05/97	08/06/97	08/07/97	11/10/97	11/11/97		11/12/97	11/13/97	01/07/97
Sample Type							DUP			
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	849.47	849.47	849.47	849.47	849.47	849.47	849.47	849.47	849.47	1086.40
Depth to Water (ft)	13.48	13.65	13.85	14.05	16.98	17.00	17.00	17.03	17.06	125.96
Water-Level Elev. (ft)	835.99	835.82	835.62	835.42	832.49	832.47	832.47	832.44	832.41	960.44
Water Temp (degrees C)	13.9	13.6	13.5	13.8	14.2	14.2	14.2	14.2	14.1	8.6
pH (pH units)	7.2	7.3	7.3	7.2	7.6	7.7	7.7	7.6	7.3	6.5
Conductivity (umho/cm)	285	298	297	295	362	362	360	362	373	283
Dissolved Oxygen (ppm)	1.8	1.8	1.8	2	1	3.4	3.32	2.9	2.5	9
Oxidation/Reduction (mV)	142	174	210	196	209	193	194	140	197	186
MISCELLANEOUS ANALYTES										
pH (pH units)	.	.	.	.	7.36	7.35	7.36	7.4	7.27	8.08
Conductivity (umho/cm)	.	.	.	.	391	384	383	395	398	330
TDS (mg/L)	.	.	.	.	223	208	206	222	223	174
TSS (mg/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1	14
Turbidity (NTU)	0.174	0.112	0.189	0.177	0.258	0.092	0.089	0.205	0.208	17

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APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-301	GW-302	GW-305		GW-339	GW-521		GW-522		GW-539
Program	CMP	ROD	SDM		ROD	SDM/C		SDM		SDM
Location	CRBAWP	UNCS	LIV		UNCS	LIV		LIV		LII
Date Sampled	07/24/97	04/15/97	01/08/97	07/22/97	04/15/97	01/07/97	07/21/97	01/08/97	07/21/97	04/02/97
Sample Type										
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1086.40	1141.70	1183.60	1183.60	1124.60	1182.70	1182.70	1175.30	1175.30	1093.00
Depth to Water (ft)	126.86	94.54	114.90	120.95	69.00	80.54	82.09	93.50	100.41	97.00
Water-Level Elev. (ft)	959.54	1047.16	1068.7	1062.65	1055.6	1102.16	1100.61	1081.8	1074.89	996
Water Temp (degrees C)	16.3	15.7	12	18	15.8	12.4	17.5	12	16.5	14.1
pH (pH units)	7.8	7.5	7.8	7.9	7.8	7.7	7.5	7.5	7.3	7.3
Conductivity (umho/cm)	263	486	233	228	525	252	242	229	229	780
Dissolved Oxygen (ppm)	7.3	4.7	9.8	8.8	4.1	8	7.9	8.3	8.3	11
Oxidation/Reduction (mV)	214	92	147	165	140	220	173	201	183	206
MISCELLANEOUS ANALYTES										
pH (pH units)	7.88	7.41	8.08	8.05	7.41	7.96	7.86	7.92	7.88	7.99
Conductivity (umho/cm)	304	527	275	273	567	288	274	272	250	342
TDS (mg/L)	171	286	128	150	306	146	176	168	149	154
TSS (mg/L)	3	4	7	<1	<1	<1	<1	63	18	4
Turbidity (NTU)	3.32	19.8	13.7	2.24	5.05	6.68	7.47	42.9	17.3	4.73

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Sampling Point	GW-539		GW-542	GW-543		GW-544		GW-557		
Program	SDM		SDM	SDM		SDM		SDM/C		
Location	LII		CDLVI	CDLVI		CDLVI		LV		
Date Sampled	10/16/97	12/04/97	04/01/97	04/01/97		10/15/97	04/02/97	10/16/97	01/08/97	
Sample Type					DUP					DUP
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1093.00	1093.00	1051.60	1023.80	1023.80	1023.80	1045.00	1045.00	1081.20	1081.20
Depth to Water (ft)	106.82	106.05	69.34	63.11	63.11	65.49	63.67	67.36	116.51	116.51
Water-Level Elev. (ft)	986.18	986.95	982.26	960.69	960.69	958.31	981.33	977.64	964.69	964.69
Water Temp (degrees C)	15.7	12	13.6	15.1	15.2	15.7	14.4	14.3	11.5	12.4
pH (pH units)	8.5	7.9	6.9	7.6	7.6	7.2	7.6	7.8	7.5	7.6
Conductivity (umho/cm)	321	242	191	385	381	346	414	455	278	274
Dissolved Oxygen (ppm)	9.6	10.06	5.3	5.6	5.7	6.9	6.7	7.6	8	7.9
Oxidation/Reduction (mV)	251	197	222	186	177	169	201	237	162	168
MISCELLANEOUS ANALYTES										
pH (pH units)	8.12	.	6.9	7.4	7.39	7.57	7.62	7.65	7.7	7.81
Conductivity (umho/cm)	338	.	238	439	443	399	468	456	325	325
TDS (mg/L)	193	.	125	223	239	244	203	257	166	166
TSS (mg/L)	<1	<1	6	<1	<1	<1	<1	<1	<1	1
Turbidity (NTU)	1.36	0.468	13.9	3.79	3.98	0.693	3.66	1.53	1.5	1.52

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-557	GW-560		GW-562			GW-564			GW-609
Program	SDM/C	SDM		SDM			SDM			CMP
Location	LV	CDLVII		CDLVII			CDLVII			CRSP
Date Sampled	07/09/97	01/15/97	07/14/97	01/15/97	07/14/97		01/16/97		07/15/97	01/14/97
Sample Type						DUP		DUP		
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1081.20	938.92	938.92	934.49	934.49	934.49	937.77	937.77	937.77	1112.10
Depth to Water (ft)	112.97	35.24	37.05	1.57	1.00	1.00	7.57	7.57	8.44	161.20
Water-Level Elev. (ft)	968.23	903.68	901.87	932.92	933.49	933.49	930.2	930.2	929.33	950.9
Water Temp (degrees C)	16.1	13.1	16.5	13.3	17.3	17.5	12.8	13	15.9	11.2
pH (pH units)	7.1	7.8	4.3	7.9	3.9	4	6.9	6.9	7.2	7.6
Conductivity (umho/cm)	289	244	264	290	331	333	205	203	231	340
Dissolved Oxygen (ppm)	7.6	7	6.4	5.7	5	5	8.4	8.3	7.2	6.6
Oxidation/Reduction (mV)	192	199	131	175	204	201	188	188	237	128
MISCELLANEOUS ANALYTES										
pH (pH units)	7.33	7.33	7.59	7.27	7.63	7.62	7.26	7.34	7.46	7.48
Conductivity (umho/cm)	326	289	291	356	357	356	251	248	271	385
TDS (mg/L)	199	168	168	204	209	209	148	152	160	484
TSS (mg/L)	1.2	<1	<1	1	6	4.8	<1	<1	<1	<1
Turbidity (NTU)	0.302	0.387	0.182	6.93	12.2	11.9	2.32	1.95	0.295	0.211

(CONTINUED)

Sampling Point	GW-609	GW-709		GW-731						
Program	CMP	SDM		RDM						
Location	CRSP	LII		CRSDB						
Date Sampled	07/24/97	04/02/97	10/16/97	04/21/97		04/22/97		04/23/97		04/24/97
Sample Type					DUP		DUP		DUP	
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1112.10	906.60	906.60	1049.20	1049.20	1049.20	1049.20	1049.20	1049.20	1049.20
Depth to Water (ft)	163.76	29.00	29.80	123.70	123.70	122.00	122.00	123.15	123.15	123.35
Water-Level Elev. (ft)	948.34	877.6	876.8	925.5	925.5	927.2	927.2	926.05	926.05	925.85
Water Temp (degrees C)	16.3	15.5	13.8	13.7	13.8	14.2	14.2	13.9	14	13.6
pH (pH units)	6.5	8.5	9.6	8.4	8.1	8.4	8.4	8.4	8.4	8.4
Conductivity (umho/cm)	314	223	227	257	250	241	239	240	240	229
Dissolved Oxygen (ppm)	6.5	1	3.2	4.7	4.8	2.5	2.5	3.7	3.7	5
Oxidation/Reduction (mV)	200	154	139	194	198	102	88	221	224	199
MISCELLANEOUS ANALYTES										
pH (pH units)	7.57	7.91	9.29	7.9	8.25	8.24	8.3	8.07	8.2	8.14
Conductivity (umho/cm)	385	343	243	253	254	243	244	252	242	242
TDS (mg/L)	211	179	139	126	125	118	121	126	120	122
TSS (mg/L)	<1	<1	<1	3	3	4	4	3	4	10
Turbidity (NTU)	0.234	3.21	1.38	8.06	8.59	3.43	3.2	7.69	3.96	7.48

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-731						GW-732			
Program	RDM						RDM			
Location	CRSDB						CRSDB			
Date Sampled	04/24/97	10/20/97		10/21/97	10/22/97	10/23/97	04/21/97	04/22/97	04/23/97	04/24/97
Sample Type	DUP		DUP							
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1049.20	1049.20	1049.20	1049.20	1049.20	1049.20	1064.10	1064.10	1064.10	1064.10
Depth to Water (ft)	123.35	124.87	124.87	124.98	124.97	124.91	156.80	154.50	155.75	156.60
Water-Level Elev. (ft)	925.85	924.33	924.33	924.22	924.23	924.29	907.3	909.6	908.35	907.5
Water Temp (degrees C)	13.7	15.2	15.1	14.4	14.2	14	13.7	14.3	13.7	13.6
pH (pH units)	8.4	10	10	10.1	10	9.9	8.3	7.5	7.6	7.4
Conductivity (umho/cm)	228	268	268	273	269	243	298	302	303	294
Dissolved Oxygen (ppm)	5	5.72	5.8	6.58	5.99	6.09	9.8	2.8	3.6	6.6
Oxidation/Reduction (mV)	199	135	139	158	160	172	175	217	224	222
MISCELLANEOUS ANALYTES										
pH (pH units)	8.39	9.56	9.57	9.75	9.62	9.54	8.31	7.64	7.69	7.66
Conductivity (umho/cm)	240	295	294	301	292	286	299	306	309	314
TDS (mg/L)	121	141	135	175	164	157	187	151	166	181
TSS (mg/L)	4	<1	<1	<1	<1	2	86	10	10	8
Turbidity (NTU)	4.45	0.301	0.343	0.277	0.266	0.432	57.7	7.26	5.45	3.97

(CONTINUED)

Sampling Point	GW-732				GW-757		GW-796		GW-797
Program	RDM				SDM		SDM/C		SDM
Location	CRSDB				LII		LV		LV
Date Sampled	10/20/97	10/21/97	10/22/97	10/23/97	04/03/97		10/16/97	01/09/97	07/10/97	01/09/97
Sample Type						DUP				
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1064.10	1064.10	1064.10	1064.10	961.43	961.43	961.43	1052.40	1052.40	1059.80
Depth to Water (ft)	157.85	153.30	157.85	157.86	84.22	84.22	84.72	64.25	64.97	66.30
Water-Level Elev. (ft)	906.25	910.8	906.25	906.24	877.21	877.21	876.71	988.15	987.43	993.5
Water Temp (degrees C)	13.6	13.8	13.3	13.2	14.1	14	16.1	12.2	15.8	11
pH (pH units)	8.9	10.7	8.9	9.5	7.9	7.8	9	8.6	7.6	7.9
Conductivity (umho/cm)	254	255	252	238	742	402	283	228	191	302
Dissolved Oxygen (ppm)	5.9	7.4	7.2	5.9	5.4	5.4	6.1	8.6	8.3	9.2
Oxidation/Reduction (mV)	192	123	192	196	218	193	161	157	139	188
MISCELLANEOUS ANALYTES										
pH (pH units)	9.22	10.13	9.01	8.96	7.97	8.02	8.84	6.47	8.8	8.17
Conductivity (umho/cm)	228	216	244	251	317	316	300	229	221	286
TDS (mg/L)	228	207	233	526	187	182	168	116	132	164
TSS (mg/L)	391	134	72	47	<1	<1	1	<1	1.6	1.5
Turbidity (NTU)	146	100	49	110	1.5	1.31	3.46	3.71	0.723	452

(CONTINUED)

APPENDIX D.1
Field Measurements and Miscellaneous Analytes, CY 1997

Sampling Point	GW-797	GW-798		GW-799		GW-801			GW-827	
Program	SDM	SDM/C		SDM/C		SDM/C			SDM	
Location	LV	CDLVII		CDLVII		LV			CDLVI	
Date Sampled	07/09/97	01/16/97	07/15/97	01/08/97	07/09/97	01/15/97	07/10/97		04/01/97	10/14/97
Sample Type								DUP		
FIELD MEASUREMENTS										
Top-of-Casing Elev. (ft)	1059.80	1005.80	1005.80	981.09	981.09	1096.96	1096.96	1096.96	1051.39	1051.39
Depth to Water (ft)	66.92	71.20	70.76	7.32	8.74	97.48	99.16	99.16	34.76	40.17
Water-Level Elev. (ft)	992.88	934.6	935.04	973.77	972.35	999.48	997.8	997.8	1016.63	1011.22
Water Temp (degrees C)	16.2	12.8	16.8	12.6	15.6	13.2	15.2	15	13.7	13.9
pH (pH units)	8.1	7.5	6.9	7.7	7.5	7.9	8	8	7.7	7.8
Conductivity (umho/cm)	246	219	208	213	228	280	234	238	257	261
Dissolved Oxygen (ppm)	9.4	8.2	6.6	8.6	8.1	7.7	7.7	7.9	3.5	5.1
Oxidation/Reduction (mV)	167	176	107	170	192	168	219	216	180	152
MISCELLANEOUS ANALYTES										
pH (pH units)	8.18	7.67	7.72	7.21	8.1	7.6	7.94	7.93	7.84	7.88
Conductivity (umho/cm)	305	257	255	256	260	275	272	271	285	288
TDS (mg/L)	171	144	152	118	159	156	155	160	161	148
TSS (mg/L)	2.4	<1	<1	<1	13.2	3	<1	<1	<1	<1
Turbidity (NTU)	5.14	0.901	0.256	5.12	18.6	7.05	2.4	1.74	0.241	1.45

(CONTINUED)

Sampling Point	GW-827	GW-831		OUTFALL-301	SCR2.2SP		SCR4.3SP	
Program	SDM	CMP		ROD	EXP		SDM	
Location	CDLVI	FCAP		KHQ	EXP		CDLVII	
Date Sampled	10/14/97	01/06/97	07/23/97	04/30/97	01/16/97	07/31/97	01/15/97	07/14/97
Sample Type	DUP							
FIELD MEASUREMENTS								
Top-of-Casing Elev. (ft)	1051.39	1091.09	1091.09	.	.	.	.	.
Depth to Water (ft)	40.17	124.15	123.95	.	.	.	.	.
Water-Level Elev. (ft)	1011.22	966.94	967.14	.	.	.	.	.
Water Temp (degrees C)	14	11.6	16.4	15.2	11.8	15.9	11.9	16.1
pH (pH units)	7.9	7.8	6.9	8.1	6.9	6.7	6.7	6.5
Conductivity (umho/cm)	262	342	317	266	664	300	166	205
Dissolved Oxygen (ppm)	5.1	7.5	3.8	10.1	7.7	7	5.6	4.7
Oxidation/Reduction (mV)	155	165	225	197	224	65	154	200
MISCELLANEOUS ANALYTES								
pH (pH units)	7.86	7.79	7.91	.	7.2	7.5	6.7	6.7
Conductivity (umho/cm)	288	373	371	.	297	340	186.3	207
TDS (mg/L)	144	186	207	.	194	206	164	137
TSS (mg/L)	<1	5.6	<1	<1	1	10	<1	2
Turbidity (NTU)	1.44	1.26	4.79	.	21.9	3.55	91.2	10.3

APPENDIX D.2

INORGANIC ANALYTES

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	1090				GW-141					
Program	ROD				SDM					
Location	UNCS				LIV					
Date Sampled	04/16/97				01/07/97				02/27/97	
Sample Type			DUP				DUP			
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.027	0.025	0.026	0.049	26	<0.02	36	<0.02	1.3	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	0.0084	<0.005	0.034	<0.005	.	.
Barium	0.029	0.028	0.029	0.029	0.075	0.017	0.081	0.017	0.02	0.018
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	0.014	<0.0003	0.015	<0.0003	<0.0003	<0.0003
Boron	<0.004	<0.004	<0.004	<0.004	0.0044	<0.004	0.0093	<0.004	0.022	0.02
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	0.022	<0.01	0.031	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	0.01	<0.005	0.013	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	0.032	<0.004	0.037	<0.004	0.0092	<0.004
Iron	0.02	0.0057	0.0089	<0.005	15	0.016	19	<0.005	0.69	<0.005
Lead (PMS)	0.00096	0.00083	0.00084	0.0011	0.075	<0.0005	0.084	0.00073	0.0013	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	0.037	<0.004	0.047	<0.004	<0.004	<0.004
Manganese	0.0058	0.0029	0.0054	0.0024	0.69	<0.001	0.72	<0.001	0.015	0.0021
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002	0.00034	<0.0002	0.00038	<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	0.053	<0.01	0.065	<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	0.025	0.025	0.025	0.025	0.031	0.016	0.03	0.017	0.018	0.018
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	0.00067	<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	0.0014	<0.0005	0.0015	<0.0005	.	.
Vanadium	<0.005	<0.005	<0.005	<0.005	0.064	<0.005	0.081	<0.005	<0.005	<0.005
Zinc	0.0034	<0.002	<0.002	<0.002	0.59	0.0055	0.66	0.0066	0.032	0.015
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	57	56	57	56	77	44	71	45	46	44
Magnesium	33	33	33	33	47	26	44	27	28	28
Potassium	<0.6	0.96	<0.6	0.91	3.2	1.1	3.4	0.97	0.64	<0.6
Sodium	12	12	12	12	0.97	0.78	0.89	0.79	0.95	0.94
Alkalinity-HCO3	264	.	264	.	238	.	240	.	.	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	.	.
Chloride	28.1	.	28.7	.	1.76	.	1.85	.	.	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	.	.
Nitrate-N	0.958	.	1.02	.	0.669	.	0.666	.	.	.
Sulfate	4.93	.	5.19	.	3.25	.	3.27	.	.	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-141				GW-142					
Program	SDM				RDM					
Location	LIV				KHQ					
Date Sampled	07/23/97				04/29/97		04/29/97		04/30/97	
Sample Type			DUP							
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	1.9	<0.02	1.8	0.021	0.027	0.025	0.024	0.023	0.027	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.02	0.017	0.02	0.018	0.46	0.47	0.43	0.4	0.48	0.47
Beryllium	0.00053	<0.0003	0.00059	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.017	0.017	0.018	0.017	0.051	0.052	0.052	0.052	0.052	0.053
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	0.0061	<0.004	0.0087	<0.004	0.01	<0.004
Iron	1	0.0083	1.1	0.0082	5.5	0.22	2.5	0.011	4.3	0.043
Lead (PMS)	0.00097	<0.0005	0.00097	<0.0005	0.0023	0.00053	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	0.022	0.023	0.021	0.022	0.023	0.023
Manganese	0.019	<0.001	0.019	<0.001	0.056	0.054	0.029	0.032	0.031	0.024
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	0.02	0.019	0.02	0.019	0.52	0.52	0.52	0.52	0.57	0.59
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.02	0.013	0.021	0.025	0.017	0.018
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.031	0.012	0.032	0.011	0.0056	0.0043	0.0097	0.0044	0.0034	0.0028
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	49	48	48	48	46	46	45	46	45	47
Magnesium	31	30	30	30	31	32	31	31	31	32
Potassium	0.86	0.81	0.88	0.79	3.7	3.7	3.5	3.6	3.7	3.7
Sodium	0.97	0.94	0.96	0.98	0.87	0.86	0.9	0.86	0.85	0.88
Alkalinity-HCO3	234	.	238	.	240	.	248	.	240	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.25	.	1.26	.	1.37	.	1.24	.	1.12	.
Fluoride	<0.1	.	<0.1	.	0.62	.	0.63	.	0.63	.
Nitrate-N	0.62	.	0.62	.	0.06	.	0.48	.	0.594	.
Sulfate	3.05	.	2.82	.	5.49	.	5.31	.	4.85	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-142									
Program	RDM									
Location	KHQ									
Date Sampled	05/01/97		08/04/97		08/05/97		08/06/97		08/07/97	
Sample Type	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	0.12	0.023	0.12	0.021	0.021	<0.02	0.035	0.024
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.45	0.45	0.48	0.43	0.51	0.51	0.48	0.42	0.43	0.44
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.057	0.053	0.049	0.048	0.048	0.05	0.04	0.033	0.031	0.033
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	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	0.0056	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	0.023	0.0091	0.077	<0.004	0.034	<0.004	0.0049	<0.004	0.0044	<0.004
Iron	1.4	1.1	32	0.052	32	0.016	2.2	<0.005	5.6	<0.005
Lead (PMS)	0.001	0.0012	0.019	0.00051	0.0073	<0.0005	0.0011	<0.0005	0.00057	<0.0005
Lithium	0.026	0.024	0.027	0.025	0.026	0.027	0.024	0.02	0.018	0.019
Manganese	0.025	0.027	0.22	0.082	0.15	0.046	0.035	0.035	0.047	0.036
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	0.015	<0.01	0.013	<0.01	<0.01	<0.01	0.011	<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	0.69	0.58	0.55	0.54	0.58	0.59	0.54	0.48	0.49	0.5
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.021	0.02	0.014	0.011	0.024	0.022	0.017	0.015	0.014	0.014
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	<0.002	<0.002	0.037	0.0025	0.015	<0.002	0.011	0.0027	0.011	0.008
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	46	46	45	43	49	49	45	40	39	40
Magnesium	31	31	31	31	34	34	31	27	26	27
Potassium	3.7	3.5	3.7	3.8	4	4	3.8	3	3.1	3.2
Sodium	0.88	0.82	1	1	0.99	1	1	0.8	0.78	0.8
Alkalinity-HCO3	236	.	.	.	.	.	.	.	.	.
Alkalinity-CO3	<1	.	.	.	.	.	.	.	.	.
Chloride	1.21	.	.	.	.	.	.	.	.	.
Fluoride	0.62	.	.	.	.	.	.	.	.	.
Nitrate-N	0.805	.	.	.	.	.	.	.	.	.
Sulfate	5.62	.	.	.	.	.	.	.	.	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-142									
Program	RDM									
Location	KHQ									
Date Sampled	11/10/97				11/11/97		11/12/97		11/14/97	
Sample Type			DUP							
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	<0.02	<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 (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.49	0.48	0.49	0.47	0.49	0.48	0.52	0.51	0.48	0.47
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.052	0.053	0.051	0.051	0.051	0.051	0.053	0.051	0.033	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	<0.01	<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	0.006	<0.004	<0.004	<0.004
Iron	5.1	1.7	4.3	1.8	2	1.5	1.9	1.2	2.5	0.71
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	0.026	0.028	0.027	0.027	0.027	0.027	0.028	0.025	0.026	0.026
Manganese	0.079	0.076	0.08	0.074	0.072	0.072	0.071	0.071	0.071	0.069
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	0.59	0.59	0.58	0.58	0.6	0.6	0.6	0.6	0.58	0.59
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0065	0.0055	0.0057	0.0055	0.0055	0.0055	0.0058	0.0055	0.0059	0.0058
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0024	0.0029	0.0055	0.0033	0.02	0.0022	0.0035	0.0035	<0.002	<0.002
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	44	45	44	44	44	44	45	46	45	45
Magnesium	31	32	31	31	32	32	32	32	31	31
Potassium	4	4.1	4.1	4.1	4.1	4.2	4.3	4.1	4.2	4.1
Sodium	1	1.1	1	1	1.1	1.1	1.2	1.2	1	1.1
Alkalinity-HCO3	238	.	240	.	244	.	242	.	244	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.34	.	1.41	.	1.38	.	1.28	.	1.41	.
Fluoride	0.62	.	0.64	.	0.64	.	0.63	.	0.64	.
Nitrate-N	<0.028	.	<0.028	.	<0.028	.	0.028	.	<0.028	.
Sulfate	6.8	.	6.68	.	6.29	.	6.43	.	6.44	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-143									
Program	RDM									
Location	KHQ									
Date Sampled	04/28/97		04/29/97		04/30/97		05/01/97		08/04/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.027	0.025	0.049	0.039	0.045	<0.02	0.041	0.029	0.026	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.027	0.027	0.029	0.028	0.028	0.028	0.029	0.028	0.031	0.031
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.91	0.91	0.92	0.91	0.9	0.91	0.91	0.92	0.95	0.97
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	0.01	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	1.1	0.31	0.69	0.068	0.26	0.025	0.34	0.059	0.79	0.14
Lead (PMS)	0.00059	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00068	<0.0005
Lithium	0.29	0.29	0.28	0.28	0.28	0.29	0.29	0.3	0.32	0.32
Manganese	0.028	0.028	0.013	0.012	0.0062	0.0077	0.0091	0.0084	0.022	0.022
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	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.8	2.9
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.00093	0.00081	0.0023	0.0024	0.002	0.0021	0.0019	0.0019	0.0014	0.0014
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0087	0.0092	0.013	0.0033	0.003	0.012	0.0025	0.004	0.0022	0.0026
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	30	30	31	30	30	30	31	30	30	32
Magnesium	24	24	24	24	24	24	24	24	26	26
Potassium	17	17	17	17	17	17	17	18	19	19
Sodium	25	25	24	24	24	25	25	25	26	27
Alkalinity-HCO3	214	.	208	.	204	.	204	.	.	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	.	.
Chloride	6.79	.	6.97	.	6.88	.	6.75	.	.	.
Fluoride	3.22	.	3.12	.	3.08	.	3.02	.	.	.
Nitrate-N	<0.028	.	<0.028	.	0.04	.	0.04	.	.	.
Sulfate	34.2	.	35.2	.	35.7	.	35.4	.	.	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-143									
Program	RDM									
Location	KHQ									
Date Sampled	08/05/97		08/06/97		08/07/97		11/10/97		11/11/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.031	<0.02	<0.02	<0.02	<0.02	0.028	<0.02	<0.02	0.036	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.047	0.047	0.035	0.027	0.032	0.034	0.045	0.043	0.046	0.045
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.82	0.84	0.88	0.92	0.66	0.84	0.86	0.84	0.84	0.82
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	1.3	0.057	0.31	<0.005	0.11	0.0096	0.57	0.12	0.4	0.13
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	0.28	0.29	0.28	0.3	0.22	0.28	0.28	0.27	0.27	0.27
Manganese	0.01	0.0078	0.0067	0.0093	0.0043	0.0058	0.023	0.023	0.022	0.022
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	3.5	3.5	2.9	2.6	2.5	2.9	3.2	3.1	3.1	3
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0016	0.0017	0.0022	0.0028	0.0016	0.0019	0.0012	0.0012	0.0013	0.0012
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0024	0.0026	0.0024	0.0066	0.0057	0.0072	0.0032	0.0021	0.0072	0.0035
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	34	34	29	31	26	32	33	32	32	32
Magnesium	27	27	26	24	21	25	26	26	26	25
Potassium	18	19	18	17	14	18	18	18	19	18
Sodium	22	22	24	27	18	23	23	23	24	24
Alkalinity-HCO3	.	.	.	.	.	.	208	.	214	.
Alkalinity-CO3	.	.	.	.	.	.	<1	.	<1	.
Chloride	.	.	.	.	.	.	7	.	7.58	.
Fluoride	.	.	.	.	.	.	3.1	.	3.18	.
Nitrate-N	.	.	.	.	.	.	<0.028	.	<0.028	.
Sulfate	.	.	.	.	.	.	44.5	.	45.3	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-143				GW-144					
Program	RDM				RDM					
Location	KHQ				KHQ					
Date Sampled	11/12/97		11/13/97		04/28/97				04/29/97	
Sample Type							DUP			
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	0.024	0.028	0.039	0.025	0.028	0.054	0.029	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.036	0.034	0.032	0.03	0.044	0.042	0.044	0.042	0.041	0.04
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.9	0.88	0.89	0.87	0.024	0.024	0.023	0.022	0.019	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	<0.004	<0.004	0.014	0.0047	0.0075	<0.004	<0.004	<0.004
Iron	0.97	0.84	1.1	0.76	0.0081	0.0081	0.037	0.016	0.0059	<0.005
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00053
Lithium	0.29	0.29	0.29	0.29	0.025	0.024	0.025	0.025	0.021	0.022
Manganese	0.041	0.044	0.045	0.046	<0.001	<0.001	<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	<0.01	<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	2.9	2.7	2.8	2.7	0.097	0.092	0.096	0.092	0.074	0.18
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.001	0.0009	0.001	0.0009	0.0013	0.0013	0.0013	0.0013	0.0013	0.0017
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.002	0.0032	<0.002	0.0021	0.016	0.018	0.01	0.029	0.0039	<0.002
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	32	30	31	31	43	41	42	41	41	40
Magnesium	25	24	24	24	15	15	15	15	15	15
Potassium	19	19	18	17	1.7	1.5	1.7	1.5	1.5	1.4
Sodium	27	26	25	24	1.2	1.1	1.2	1.1	0.91	0.93
Alkalinity-HCO3	214	.	210	.	152	.	154	.	154	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	6.17	.	6.19	.	2.21	.	2.21	.	2	.
Fluoride	2.92	.	2.76	.	0.1	.	0.12	.	0.11	.
Nitrate-N	<0.028	.	<0.028	.	2.99	.	3.12	.	3.03	.
Sulfate	37.1	.	39.4	.	6.17	.	6.24	.	5.62	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-144									
Program	RDM									
Location	KHQ									
Date Sampled	04/29/97		04/30/97				05/01/97			
Sample Type	DUP				DUP				DUP	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.03	<0.02	0.042	0.033	<0.02	<0.02	0.043	<0.02	0.028	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.04	0.039	0.042	0.044	0.041	0.041	0.043	0.038	0.043	0.04
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.018	0.017	0.019	0.02	0.019	0.019	0.021	0.017	0.02	0.018
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	0.01	<0.005	0.013	0.031	0.012	0.021	0.0076	0.0063	0.013	<0.005
Lead (PMS)	<0.0005	0.00064	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	0.021	0.021	0.02	0.019	0.018	0.019	0.021	0.02	0.021	0.021
Manganese	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<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	<0.01	<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	0.075	0.079	0.072	0.072	0.069	0.068	0.075	0.077	0.074	0.073
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0013	0.0016	0.0013	0.0013	0.0013	0.0013	0.0013	0.0015	0.0013	0.0015
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0051	<0.002	0.0025	0.0044	0.039	0.0021	0.0021	<0.002	0.0021	<0.002
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	40	40	41	41	40	40	41	39	41	41
Magnesium	15	15	16	16	15	15	15	15	16	15
Potassium	1.5	1.4	1.3	1.5	1.4	1.4	1.4	1.3	1.4	1.3
Sodium	0.9	0.89	0.86	0.88	0.84	0.83	0.91	0.83	0.91	0.88
Alkalinity-HCO3	154	.	156	.	154	.	152	.	148	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	2	.	1.94	.	1.95	.	1.94	.	1.92	.
Fluoride	0.11	.	<0.1	.	0.11	.	0.1	.	0.1	.
Nitrate-N	3.08	.	2.93	.	2.95	.	2.99	.	2.88	.
Sulfate	5.75	.	5.61	.	5.54	.	5.74	.	5.74	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-144									
Program	RDM									
Location	KHQ									
Date Sampled	08/04/97				08/05/97				08/06/97	
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	<0.02	<0.02	0.028	<0.02	0.026	0.026
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.037	0.049	0.049	0.047	0.043	0.046	0.022	0.041	0.047	0.044
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.016	0.021	0.02	0.02	0.016	0.0093	0.0073	0.0074	0.0099	0.015
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	0.0078	<0.005	<0.005	0.018	<0.005	0.0075	<0.005	<0.005	0.011	0.0079
Lead (PMS)	<0.0005	<0.0005	0.0036	0.00067	0.00074	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	0.022	0.03	0.029	0.029	0.025	0.025	0.013	0.021	0.024	0.021
Manganese	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<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	<0.01	<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	0.11	0.1	0.1	0.082	0.085	0.043	0.075	0.084	0.082
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0011	0.0015	0.0014	0.0014	0.0013	0.0015	0.00075	0.0013	0.0015	0.0015
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0024	0.0026	0.0058	0.005	0.0022	0.0034	<0.002	0.0027	0.0036	0.0093
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	34	44	43	43	39	44	20	38	45	43
Magnesium	12	16	16	16	14	16	7.6	14	16	15
Potassium	1.3	1.8	1.8	1.9	1.6	1.5	0.73	1.4	1.6	1.8
Sodium	0.98	1.3	1.3	1.4	1	1.1	0.52	0.98	1.1	1.1
Alkalinity-HCO3	.	.	.	.	.	.	.	.	.	.
Alkalinity-CO3	.	.	.	.	.	.	.	.	.	.
Chloride	.	.	.	.	.	.	.	.	.	.
Fluoride	.	.	.	.	.	.	.	.	.	.
Nitrate-N	.	.	.	.	.	.	.	.	.	.
Sulfate	.	.	.	.	.	.	.	.	.	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-144									
Program	RDM									
Location	KHQ									
Date Sampled	08/06/97		08/07/97				11/10/97		11/11/97	
Sample Type	DUP				DUP					
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.032	<0.02	0.034	0.028	0.029	0.024	<0.02	<0.02	0.026	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.045	0.044	0.046	0.045	0.042	0.043	0.047	0.044	0.046	0.044
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.0091	0.011	0.0077	0.016	0.0092	0.015	0.019	0.019	0.018	0.017
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	0.0084	<0.005	0.0053	<0.005	<0.005	<0.005	0.017	0.0063	0.0063	0.016
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	<0.0005
Lithium	0.023	0.022	0.023	0.023	0.021	0.022	0.023	0.022	0.022	0.023
Manganese	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0025	0.0015	<0.001	0.0011
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	0.081	0.081	0.083	0.088	0.077	0.08	0.093	0.077	0.08	0.074
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0015	0.0016	0.0015	0.0015	0.0014	0.0015	0.0017	0.0017	0.0018	0.0016
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0022	0.0082	0.0087	0.01	0.0085	0.0079	0.0034	0.0025	0.0026	0.008
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	43	42	44	43	41	42	51	42	44	41
Magnesium	16	15	16	16	15	16	16	16	16	16
Potassium	1.4	1.8	1.4	1.8	1.5	1.8	1.6	1.6	1.5	1.6
Sodium	1	1	1.1	1	0.95	1	0.94	0.91	0.91	0.98
Alkalinity-HCO3	.	.	.	.	.	.	164	.	164	.
Alkalinity-CO3	.	.	.	.	.	.	<1	.	<1	.
Chloride	.	.	.	.	.	.	1.74	.	1.88	.
Fluoride	.	.	.	.	.	.	<0.1	.	<0.1	.
Nitrate-N	.	.	.	.	.	.	1.96	.	2.01	.
Sulfate	.	.	.	.	.	.	5.24	.	5.46	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-144				GW-145					
Program	RDM				RDM					
Location	KHQ				KHQ					
Date Sampled	11/12/97		11/13/97		04/28/97		04/29/97		04/30/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.046	0.027	0.038	<0.02	0.39	0.053	0.03	<0.02	0.56	0.028
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.05	0.047	0.048	0.048	0.08	0.076	0.075	0.079	0.081	0.072
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.019	0.018	0.017	0.017	0.24	0.24	0.25	0.25	0.25	0.24
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	0.0048	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.012	0.0096	0.0064	0.0093	0.23	0.031	0.037	0.0084	0.46	0.0087
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	0.00083	0.0012	0.0011	<0.0005
Lithium	0.023	0.023	0.024	0.023	0.097	0.097	0.097	0.1	0.1	0.097
Manganese	0.0024	<0.001	<0.001	<0.001	0.019	0.0042	0.0099	0.01	0.03	0.0022
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	0.015	0.014	<0.01	0.011	0.011	<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	0.076	0.077	0.077	7	7	7.1	7.4	7.1	6.9
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0017	0.0018	0.0016	0.0016	0.014	0.014	0.013	0.014	0.013	0.013
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0035	0.003	<0.002	0.0026	0.0086	0.0066	<0.002	<0.002	0.023	0.037
MAJOR IONS (mg/L)										
Calcium	46	42	43	42	46	43	44	44	50	43
Magnesium	17	17	17	17	37	35	36	36	39	36
Potassium	1.6	1.6	1.4	1.6	12	12	11	11	12	12
Sodium	1	1	0.94	0.99	7.5	8.1	4.8	5.1	4.9	4.7
Alkalinity-HCO3	160	.	162	.	242	.	222	.	218	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.79	.	1.83	.	12	.	12.6	.	12.7	.
Fluoride	<0.1	.	<0.1	.	2.52	.	2.44	.	2.52	.
Nitrate-N	1.99	.	1.83	.	0.113	.	0.04	.	0.03	.
Sulfate	5.36	.	5.67	.	52.4	.	44.2	.	42.7	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-145									
Program	RDM									
Location	KHQ									
Date Sampled	05/01/97		08/04/97		08/05/97		08/06/97		08/07/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.047	0.036	0.064	0.026	0.21	<0.02	0.076	0.031	0.39	0.032
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.073	0.076	0.11	0.11	0.065	0.063	0.084	0.088	0.081	0.079
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.24	0.25	0.26	0.25	0.12	0.17	0.24	0.24	0.22	0.25
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	0.011	<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	0.0058	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.055	<0.005	0.047	0.0065	0.26	0.0073	0.065	0.012	0.34	<0.005
Lead (PMS)	0.00092	<0.0005	0.00096	<0.0005	0.0018	<0.0005	0.0015	<0.0005	0.0011	<0.0005
Lithium	0.096	0.1	0.11	0.1	0.056	0.074	0.1	0.1	0.093	0.1
Manganese	0.016	0.016	0.0096	0.0074	0.028	0.01	0.011	0.018	0.032	0.0013
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	0.015	0.013	<0.01	<0.01	0.011	<0.01	0.014	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	7	7.2	8.5	8.2	4.1	5.4	7.3	7.5	7	8.5
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.012	0.012	0.011	0.011	0.0055	0.0083	0.013	0.012	0.012	0.012
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	<0.002	<0.002	0.0031	0.0041	0.0098	0.0033	0.0042	0.0092	0.0089	0.0082
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	43	44	46	44	24	29	45	44	50	44
Magnesium	35	36	37	36	19	25	37	36	38	36
Potassium	11	11	13	13	6.2	8.2	12	12	11	12
Sodium	4.2	4.3	8.2	7.6	2.6	3.9	4.8	4.7	4.3	4.7
Alkalinity-HCO3	230	.	.	.	.	.	.	.	.	.
Alkalinity-CO3	<1	.	.	.	.	.	.	.	.	.
Chloride	12.3	.	.	.	.	.	.	.	.	.
Fluoride	2.38	.	.	.	.	.	.	.	.	.
Nitrate-N	0.06	.	.	.	.	.	.	.	.	.
Sulfate	42	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-145								GW-156	
Program	RDM								RDM	
Location	KHQ								CRSDB	
Date Sampled	11/10/97		11/11/97		11/12/97		11/13/97		04/21/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	10	0.2
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.012	<0.005
Barium	0.085	0.087	0.087	0.085	0.091	0.089	0.087	0.088	0.062	0.039
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00094	<0.0003
Boron	0.24	0.25	0.25	0.25	0.25	0.24	0.23	0.24	0.066	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	0.0073	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0046	0.029	<0.004
Iron	0.018	0.0085	0.0065	0.064	<0.005	0.018	<0.005	<0.005	12	0.34
Lead (PMS)	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.044	0.0017
Lithium	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0081	<0.004
Manganese	<0.001	<0.001	<0.001	0.0011	<0.001	0.0011	<0.001	<0.001	0.28	0.015
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	0.011	0.011	0.012	0.011	0.013	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.027	<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	7.2	7.4	7.5	7.3	7.4	7.1	7	7.1	0.077	0.032
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.012	0.012	0.011	0.012	0.012	0.012	0.012	0.012	0.0027	0.0014
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.025	<0.005
Zinc	0.0039	0.0038	0.0027	0.0066	0.0034	0.0034	0.0031	0.0035	0.18	0.02
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	45	45	45	45	46	44	43	44	210	70
Magnesium	37	37	37	37	37	36	35	36	120	43
Potassium	12	13	13	13	13	13	13	13	21	17
Sodium	5.8	6	6.1	6	6.4	6.2	6.1	6.3	5.4	5.2
Alkalinity-HCO3	236	.	236	.	234	.	238	.	366	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	13.7	.	13.7	.	13.3	.	13.4	.	3.2	.
Fluoride	2.48	.	2.32	.	2.2	.	2.58	.	<0.1	.
Nitrate-N	0.17	.	0.17	.	0.17	.	0.17	.	0.395	.
Sulfate	49.2	.	47	.	47.9	.	51.5	.	11.6	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-156									
Program	RDM									
Location	CRSDB									
Date Sampled	04/22/97		04/23/97		04/24/97		10/20/97		10/22/97	
Sample Type	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.11	0.057	0.049	0.036	0.083	<0.02	<0.02	<0.02	0.031	0.032
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.042	0.046	0.037	0.041	0.026	0.028	0.035	0.034	0.031	0.03
Beryllium	<0.0003	<0.0003	0.0012	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.056	0.027	0.042	0.036	0.022	0.019	0.013	0.012	0.018	0.018
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	0.008	<0.004	<0.004	0.0045	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.056	0.019	0.033	0.0068	0.091	0.014	<0.005	0.012	0.021	0.012
Lead (PMS)	0.0025	0.00098	0.0011	0.0012	0.0016	0.00097	<0.0005	<0.0005	0.0014	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0043	<0.004	0.0064	0.0053
Manganese	0.0031	0.0033	0.0017	0.0018	0.0037	0.0016	<0.001	<0.001	0.0019	0.0016
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	0.033	0.034	0.031	0.031	0.028	0.028	0.03	0.029	0.03	0.029
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	0.00066	<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)	0.0021	0.0029	0.002	0.0027	0.0019	0.0018	0.0023	0.0021	0.0019	0.0018
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.018	0.015	0.0071	0.011	0.0077	0.0055	0.0093	0.014	0.02	0.015
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	70	71	69	67	66	66	69	67	68	66
Magnesium	43	44	43	42	39	39	41	40	41	40
Potassium	19	26	15	20	9.9	11	21	20	18	18
Sodium	5.4	7.6	4.3	5.8	2.9	3.4	6.2	6.1	5.1	5
Alkalinity-HCO3	344	.	340	.	340	.	346	.	346	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	0.88	.	2.06	.	2.24	.	2.68	.	2.38	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.352	.	0.36	.	0.31	.	0.48	.	0.34	.
Sulfate	7.22	.	7	.	6.21	.	9.28	.	8.32	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-156						GW-159			
Program	RDM						RDM			
Location	CRSDB						CRSDB			
Date Sampled	10/27/97		10/28/97				04/21/97		04/22/97	
Sample Type					DUP					
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	0.085	<0.02	0.06	<0.02	0.12	0.055	0.18	0.059
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.028	0.028	0.027	0.026	0.026	0.026	0.019	0.02	0.024	0.023
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.01	0.01	0.011	0.0092	0.0098	0.0093	0.034	0.027	0.042	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	<0.01	<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	0.019	<0.004	<0.004
Iron	0.043	0.011	0.11	0.021	0.099	0.016	0.14	0.028	0.47	0.017
Lead (PMS)	<0.0005	<0.0005	0.0009	<0.0005	0.0008	<0.0005	0.002	0.0019	0.0021	0.002
Lithium	0.0042	0.0041	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	0.0015	0.0038	0.001	0.0034	0.0011	0.0071	0.0033	0.017	0.0022
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	0.028	0.028	0.029	0.028	0.028	0.028	0.027	0.03	0.027	0.026
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0017	0.0016	0.0015	0.0014	0.0015	0.0015	0.0013	0.0014	0.0011	0.0011
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.015	0.014	0.023	0.019	0.024	0.015	0.0066	0.0075	0.007	0.0059
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	66	66	69	66	68	67	37	38	41	38
Magnesium	40	40	42	40	41	41	26	28	31	28
Potassium	17	17	14	13	13	13	2.6	3.4	3	3.2
Sodium	4.4	4.4	3.6	3.6	3.6	3.6	0.63	0.79	0.64	0.73
Alkalinity-HCO3	340	.	332	.	336	.	196	.	200	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	2.2	.	2.13	.	2.14	.	1.13	.	1.15	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.34	.	0.32	.	0.33	.	0.176	.	0.187	.
Sulfate	7.91	.	6.45	.	6.54	.	9.89	.	10.2	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-159									
Program	RDM									
Location	CRSDB									
Date Sampled	04/23/97		04/24/97		10/20/97		10/21/97		10/22/97	
Sample Type	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.089	0.029	0.18	<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 (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.018	0.02	0.018	0.013	0.017	0.018	0.016	0.016	0.016	0.016
Beryllium	0.00037	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.029	0.021	0.02	0.011	0.0067	0.0073	0.0059	0.0054	0.0061	0.0062
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	0.0045	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.12	0.0053	0.27	0.019	0.0072	<0.005	0.0055	0.034	0.021	0.044
Lead (PMS)	0.0021	0.00053	0.00096	0.00065	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	0.0076	0.0023	0.012	<0.001	<0.001	0.001	<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	0.011	<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	0.024	0.025	0.023	0.019	0.024	0.025	0.021	0.021	0.022	0.021
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0015	0.0014	0.0014	0.0014	0.0016	0.0016	0.0015	0.0014	0.0016	0.0015
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	<0.002	<0.002	<0.002	<0.002	0.0025	<0.002	<0.002	0.0059	<0.002	0.0055
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	39	42	42	39	39	40	40	40	40	41
Magnesium	27	29	28	24	25	26	25	25	25	25
Potassium	2.3	2.7	2.1	1.6	1.8	2.1	1.7	1.7	1.7	1.7
Sodium	0.69	0.85	0.7	0.47	0.5	0.54	0.52	0.55	0.51	0.57
Alkalinity-HCO3	198	.	196	.	194	.	190	.	192	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1	.	1.15	.	1.01	.	0.99	.	1	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.21	.	0.181	.	0.18	.	0.2	.	0.18	.
Sulfate	9.04	.	9.25	.	9.69	.	11.2	.	9.62	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-159		GW-203		GW-205		GW-217			
Program	RDM		ROD		ROD		SDM			
Location	CRSDB		UNCS		UNCS		LIV			
Date Sampled	10/23/97		04/14/97		04/14/97		01/06/97		07/17/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	0.026	<0.02	0.43	<0.02	0.32	0.068	0.021	0.03
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.017	0.016	0.0075	0.0072	0.02	0.016	0.027	0.025	0.027	0.028
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.0068	0.0054	<0.004	<0.004	<0.004	<0.004	0.13	0.13	0.15	0.15
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	0.0086	<0.004	<0.004	<0.004
Iron	0.0088	0.012	0.015	<0.005	1.7	<0.005	0.17	0.016	0.018	<0.005
Lead (PMS)	<0.0005	<0.0005	0.00092	0.0013	0.0056	<0.0005	0.0013	<0.0005	<0.0005	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	0.0014	<0.001	0.093	0.0024	0.0077	<0.001	0.0011	<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	0.022	0.021	0.011	0.011	0.013	0.011	0.015	0.015	0.013	0.015
Thallium (PMS)	<0.0005	<0.0005	0.00062	<0.0005	<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)	0.0013	0.0013	<0.0005	<0.0005	0.00093	0.00084	<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	0.004	0.0025	<0.002	0.002	0.0077	0.0034	0.038	0.0074	0.013	0.016
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	41	41	30	29	38	33	31	30	30	32
Magnesium	26	26	17	16	22	19	19	18	19	20
Potassium	1.8	1.7	<0.6	<0.6	<0.6	<0.6	3.8	4	2.9	3.1
Sodium	0.55	0.56	0.47	0.46	0.74	0.7	4.7	5.4	4.9	5.6
Alkalinity-HCO3	192	.	146	.	162	.	172	.	166	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	0.98	.	1.28	.	2.4	.	2.24	.	2.01	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.16	.	1.32	.	0.285	.	0.409	.	0.39	.
Sulfate	9.45	.	1.08	.	5	.	7.84	.	6.42	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-221		GW-231							
Program	ROD		RDM							
Location	UNCS		KHQ							
Date Sampled	04/15/97		04/28/97		04/29/97		04/30/97		05/01/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.035	<0.02	0.042	0.033	0.028	0.044	0.022	0.036	0.1	0.027
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0077	0.0075	0.07	0.068	0.067	0.066	0.067	0.068	0.069	0.069
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	0.016	0.013	0.013	0.018	0.015	0.016	0.017	0.013
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	0.0077	0.0041	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.034	0.0099	0.017	0.0062	0.022	0.012	0.025	0.011	0.076	<0.005
Lead (PMS)	0.0012	0.0011	0.00072	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0051
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	0.0011	0.0011	<0.001	<0.001	0.0015	<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	<0.01	<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	0.01	0.0098	0.035	0.035	0.036	0.045	0.034	0.034	0.034	0.035
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	<0.002	0.0022	0.011	0.0068	0.024	0.0076	<0.002	0.0037	0.0046	0.0027
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	30	31	36	35	36	35	35	35	35	34
Magnesium	18	18	18	18	18	18	18	18	18	18
Potassium	0.66	<0.6	0.93	0.87	0.95	1.1	0.98	0.95	0.91	0.91
Sodium	0.51	0.49	0.74	0.7	0.71	0.81	0.66	0.68	0.68	0.71
Alkalinity-HCO3	162	.	178	.	160	.	158	.	162	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.35	.	1.7	.	1.64	.	1.7	.	1.6	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.628	.	0.933	.	0.974	.	0.866	.	0.963	.
Sulfate	1.26	.	3.88	.	3.97	.	3.54	.	3.81	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-231									
Program	RDM									
Location	KHQ									
Date Sampled	08/04/97		08/05/97		08/06/97		08/07/97		11/10/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.023	<0.02	<0.02	<0.02	0.033	0.024	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 (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.082	0.083	0.085	0.083	0.082	0.081	0.08	0.079	0.091	0.092
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.013	0.013	0.013	0.012	0.0075	0.0091	0.0092	0.0096	0.017	0.018
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	<0.005	<0.005	<0.005	0.0061	0.0082	<0.005	<0.005	<0.005	0.014	0.027
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0089	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.044	0.043
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	0.038	0.038	0.038	0.038	0.037	0.038	0.037	0.037	0.044	0.045
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.002	0.0022	<0.002	0.0023	0.0075	0.0075	0.0084	0.0077	0.0027	0.003
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	40	39	39	39	39	39	39	39	47	48
Magnesium	20	20	20	20	20	20	20	20	24	24
Potassium	0.93	1.1	1	1.1	0.92	1.1	1.5	1.1	1.3	1.4
Sodium	0.81	0.83	0.86	0.83	0.79	0.78	0.78	0.76	0.88	0.87
Alkalinity-HCO3	.	.	.	.	.	.	.	.	216	.
Alkalinity-CO3	.	.	.	.	.	.	.	.	<1	.
Chloride	.	.	.	.	.	.	.	.	1.7	.
Fluoride	.	.	.	.	.	.	.	.	<0.1	.
Nitrate-N	.	.	.	.	.	.	.	.	0.1	.
Sulfate	.	.	.	.	.	.	.	.	4.03	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-231								GW-301	
Program	RDM								CMP	
Location	KHQ								CRBAWP	
Date Sampled	11/11/97				11/12/97		11/13/97		01/07/97	
Sample Type			DUP							
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	<0.02	<0.02	0.021	<0.02	<0.02	<0.02	0.24	0.049
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.094	0.098	0.097	0.1	0.098	0.098	0.091	0.092	0.021	0.021
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.015	0.015	0.017	0.016	0.016	0.016	<0.004	<0.004	0.0089	0.011
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	0.0083	0.016
Iron	<0.005	0.013	0.0074	0.016	0.011	0.017	0.0069	0.076	0.55	0.025
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	0.0006	<0.0005	0.002	0.00057
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	0.03	0.029	0.029	0.028	0.029	0.027	0.033	0.034	0.017	0.0016
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	0.042	0.043	0.043	0.044	0.043	0.043	0.043	0.044	0.02	0.019
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	<0.002	0.0037	0.0027	0.0024	0.0025	0.0026	<0.002	0.0022	0.04	0.046
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	45	46	46	46	46	45	46	47	35	33
Magnesium	23	24	23	24	24	23	23	23	23	22
Potassium	1.2	1.3	1.3	1.2	1.3	1.4	1.7	1.3	<0.6	0.94
Sodium	0.82	0.9	0.88	0.89	0.9	0.91	0.82	0.89	0.47	0.55
Alkalinity-HCO3	214	.	216	.	212	.	212	.	182	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.71	.	1.69	.	1.62	.	1.65	.	0.88	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.13	.	0.12	.	0.12	.	0.11	.	0.398	.
Sulfate	3.96	.	3.99	.	3.83	.	3.95	.	2.52	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-301		GW-302		GW-305				GW-339	
Program	CMP		ROD		SDM				ROD	
Location	CRBAWP		UNCS		LIV				UNCS	
Date Sampled	07/24/97		04/15/97		01/08/97		07/22/97		04/15/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.069	0.022	0.14	<0.02	0.039	<0.02	0.039	0.033	<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 (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.019	0.019	0.023	0.021	0.0096	0.0087	0.0091	0.0091	0.019	0.017
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.0095	0.011	<0.004	<0.004	0.0049	0.0083	0.019	0.018	<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	0.42	<0.01	0.013	<0.01	<0.01	<0.01	0.033	<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	0.11	<0.005	2	0.023	0.18	<0.005	0.0085	<0.005	0.18	<0.005
Lead (PMS)	0.0023	0.0016	0.0018	0.0015	0.0013	0.0013	<0.0005	<0.0005	0.00068	0.00077
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	0.0047	0.0013	0.041	0.0056	0.0097	0.0025	<0.001	<0.001	0.0077	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	0.015	0.19	0.14	0.029	0.016	0.014	0.015	0.055	0.045
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	0.018	0.018	0.019	0.019	0.013	0.012	0.012	0.013	0.023	0.023
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.0029	0.0036	0.0027	0.0036	0.023	0.021	0.013	0.0091	0.0052	0.0052
MAJOR IONS (mg/L)										
Calcium	32	30	51	51	28	27	28	28	56	56
Magnesium	20	21	31	31	17	16	18	18	32	32
Potassium	0.61	0.61	<0.6	<0.6	0.89	1.1	<0.6	0.71	0.63	<0.6
Sodium	0.66	0.65	9.9	10	1.2	1.1	1.2	1.2	12	12
Alkalinity-HCO3	170	.	240	.	148	.	146	.	278	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	0.93	.	25.5	.	2.26	.	1.96	.	27.5	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.34	.	0.983	.	0.287	.	0.27	.	0.928	.
Sulfate	2.09	.	3.47	.	1.1	.	0.78	.	4.59	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-521				GW-522				GW-539	
Program	SDM/C				SDM				SDM	
Location	LIV				LIV				LII	
Date Sampled	01/07/97		07/21/97		01/08/97		07/21/97		04/02/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.031	<0.02	0.13	0.053	0.85	0.052	0.39	<0.02	0.044	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0076	0.0063	0.0075	0.0081	0.0081	0.0073	0.0088	0.0073	0.013	0.016
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	0.00047	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	<0.004	<0.004	0.013	0.012	0.0041	0.0074	0.018	0.015	0.011	0.012
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	0.006	<0.004
Iron	<0.005	<0.005	0.1	0.013	0.48	0.01	0.35	0.016	0.26	0.0094
Lead (PMS)	0.00054	<0.0005	<0.0005	<0.0005	0.0055	<0.0005	0.00096	<0.0005	0.00094	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	0.0029	<0.001	0.023	<0.001	0.011	<0.001	0.006	0.0045
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	0.1	0.13
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	0.0099	0.0097	0.01	0.01	0.013	0.01	0.012	0.01	0.022	0.022
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.00051	0.00054
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.003	<0.002	0.0086	0.0048	0.034	0.0044	0.02	0.0071	0.015	0.0065
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	29	29	27	27	39	28	33	26	37	36
Magnesium	18	17	18	18	23	16	20	16	22	22
Potassium	1	1	0.69	<0.6	1.4	1.2	0.79	0.75	1	1.4
Sodium	0.73	0.67	0.86	0.68	0.46	0.51	0.49	0.48	2.3	3
Alkalinity-HCO3	158	.	146	.	144	.	136	.	166	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.3	.	1.18	.	1.89	.	1.31	.	14.6	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.251	.	0.2	.	0.497	.	0.4	.	0.508	.
Sulfate	1.41	.	1.06	.	0.56	.	0.53	.	6.6	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-539				GW-542		GW-543			
Program	SDM				SDM		SDM			
Location	LII				CDLVI		CDLVI			
Date Sampled	10/16/97		12/04/97		04/01/97		04/01/97			
Sample Type									DUP	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	<0.02	<0.02	0.31	0.043	0.077	0.027	0.075	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	.	.	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0099	0.0094	0.01	0.013	0.018	0.017	0.0097	0.0096	0.0096	0.0094
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.012	0.011	<0.004	<0.004	0.017	0.027	0.02	0.029	0.021	0.02
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	0.0046	<0.004	0.0041	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.049	0.016	0.021	0.042	0.34	0.012	0.099	0.016	0.1	0.0073
Lead (PMS)	<0.0005	0.0005	.	.	0.00082	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	0.0013	0.0015	<0.001	0.0013	0.11	0.11	0.0017	<0.001	0.0014	<0.001
Mercury (CVAA)	<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	0.17	0.16	0.17	0.16	<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	0.02	0.019	0.019	0.02	0.033	0.032	0.024	0.025	0.024	0.025
Thallium (PMS)	<0.0005	<0.0005	.	.	<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
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0034	0.02	0.0072	0.011	0.023	0.013	0.012	0.01	0.012	0.0097
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	36	35	35	36	27	27	46	49	47	49
Magnesium	22	21	21	21	12	13	27	29	28	29
Potassium	1.4	1.4	1.9	1.8	2.3	2.2	0.76	0.67	0.71	0.64
Sodium	2.6	2.5	2.4	2.5	1.1	1.1	0.93	0.94	0.94	0.94
Alkalinity-HCO3	160	.	.	.	114	.	240	.	236	.
Alkalinity-CO3	<1	.	.	.	<1	.	<1	.	<1	.
Chloride	12.5	.	9.95	.	1.13	.	2.15	.	1.88	.
Fluoride	<0.1	.	.	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.55	.	0.51	.	0.271	.	0.255	.	0.251	.
Sulfate	7.75	.	7	.	5.32	.	3.73	.	3.78	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-543		GW-544				GW-557			
Program	SDM		SDM				SDM/C			
Location	CDLVI		CDLVI				LV			
Date Sampled	10/15/97		04/02/97		10/16/97		01/08/97			
Sample Type									DUP	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.025	<0.02	0.037	0.031	<0.02	<0.02	0.038	0.035	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 (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0092	0.0095	0.0096	0.011	0.01	0.01	0.011	0.011	0.011	0.011
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00044
Boron	0.014	0.014	0.016	0.017	0.014	0.014	0.013	<0.004	0.018	0.022
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	0.0052	0.0081	0.0075	0.0065
Iron	0.014	0.0093	0.16	0.044	0.012	0.0063	0.045	<0.005	0.02	0.033
Lead (PMS)	<0.0005	<0.0005	0.00051	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	0.0043	0.0029	<0.001	<0.001	<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	<0.01	<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	0.023	0.023	0.024	0.024	0.023	0.023	0.017	0.016	0.018	0.018
Thallium (PMS)	<0.0005	<0.0005	<0.0005	0.0005	<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	0.00076	0.00069	0.0006	0.0006	<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	0.0099	0.0073	0.03	0.022	0.0077	0.0055	0.017	0.012	0.013	0.01
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	42	43	47	47	48	48	36	35	35	35
Magnesium	25	26	28	28	28	27	20	20	21	21
Potassium	1.4	1.5	1	1.2	1.5	1.4	1.3	1.7	2.2	1.7
Sodium	1.1	1.2	4.6	4.6	4.9	4.8	0.56	0.65	0.61	0.59
Alkalinity-HCO3	218	.	226	.	220	.	178	.	172	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.68	.	13.6	.	11.6	.	1.39	.	1.34	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.27	.	0.709	.	0.87	.	0.985	.	0.962	.
Sulfate	5.23	.	10.3	.	10.6	.	1.57	.	1.39	.

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APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-557		GW-560				GW-562			
Program	SDM/C		SDM				SDM			
Location	LV		CDLVII				CDLVII			
Date Sampled	07/09/97		01/15/97		07/14/97		01/15/97		07/14/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.076	<0.02	0.048	0.04	0.028	<0.02	0.19	0.039	0.08	0.024
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.011	0.01	0.21	0.21	0.23	0.23	0.012	0.01	0.011	0.011
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.0095	0.014	<0.004	0.0045	0.0082	0.0095	0.0054	<0.004	0.011	0.015
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	0.0042	0.011	<0.004	<0.004	<0.004	<0.004
Iron	0.13	0.0067	0.012	0.068	0.016	0.072	0.24	<0.005	0.076	0.0068
Lead (PMS)	0.0033	0.0022	0.0006	0.0025	0.001	<0.0005	0.00088	<0.0005	<0.0005	0.00069
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0066	<0.001	0.0067	<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	0.017	0.017	0.022	0.022	0.025	0.025	0.018	0.018	0.02	0.02
Thallium (PMS)	0.00087	<0.0005	<0.0005	<0.0005	<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	0.0068	0.0036	0.019	0.023	0.046	0.018	0.012	0.0038	0.0051	0.0031
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	38	37	34	34	38	38	37	37	41	41
Magnesium	22	22	14	14	15	15	21	21	24	24
Potassium	1.4	1.3	1.9	1.7	1.3	1.4	0.96	1.1	<0.6	0.64
Sodium	0.54	0.53	0.48	0.4	0.46	0.48	0.64	0.59	0.68	0.76
Alkalinity-HCO3	176	.	160	.	160	.	192	.	190	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.13	.	1.13	.	0.92	.	1.75	.	1.61	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.69	.	0.14	.	0.13	.	0.384	.	0.34	.
Sulfate	1.43	.	2.22	.	1.85	.	2.08	.	1.74	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-562		GW-564						GW-609	
Program	SDM		SDM						CMP	
Location	CDLVII		CDLVII						CRSP	
Date Sampled	07/14/97		01/16/97				07/15/97		01/14/97	
Sample Type	DUP				DUP					
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)										
Aluminum	0.068	0.039	0.093	0.044	0.1	0.12	0.025	0.027	0.037	0.044
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.011	0.01	0.012	0.011	0.012	0.012	0.012	0.012	0.012	0.013
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.012	0.014	0.005	0.0073	0.0054	0.058	0.011	0.0085	0.0073	<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	<0.004	<0.004	0.0042	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.049	0.009	0.045	0.039	0.064	0.03	0.014	0.0076	0.02	0.012
Lead (PMS)	<0.0005	<0.0005	0.00084	0.00075	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00052
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	0.0056	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0015
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	0.02	0.019	0.017	0.016	0.017	0.017	0.02	0.02	0.013	0.014
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.0044	0.0082	0.021	0.021	0.017	0.015	0.016	0.015	0.01	0.012
MAJOR IONS (mg/L)										
Calcium	41	40	28	26	28	28	33	33	38	41
Magnesium	24	23	13	12	13	13	15	15	24	26
Potassium	<0.6	<0.6	1.9	1.5	1.9	1.4	1.2	1.4	1	0.84
Sodium	0.69	0.73	0.54	0.5	0.49	0.5	0.53	0.52	0.55	0.49
Alkalinity-HCO3	192	.	132	.	136	.	142	.	206	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.63	.	1.16	.	1.17	.	1.11	.	1.73	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.34	.	0.377	.	0.382	.	0.41	.	1.3	.
Sulfate	1.86	.	1.14	.	1.09	.	0.9	.	2.89	.

(CONTINUED)

Sampling Point	GW-609		GW-709				GW-731			
Program	CMP		SDM				RDM			
Location	CRSP		LII				CRSDB			
Date Sampled	07/24/97		04/02/97		10/16/97		04/21/97			
Sample Type									DUP	
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	0.045	<0.02	0.025	0.035	0.057	0.034	0.32	0.032
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.012	0.012	0.27	0.29	0.19	0.18	0.0074	0.0074	0.0071	0.0071
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.013	0.018	0.014	0.015	0.015	0.015	0.035	0.012	0.0084	0.025
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	0.012	<0.005	0.071	0.0075	0.0086	0.021	0.029	0.012	0.16	<0.005
Lead (PMS)	0.0019	0.0016	<0.0005	<0.0005	<0.0005	<0.0005	0.0027	0.0012	0.0023	0.0011
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	0.0015	<0.001	<0.001	<0.001	0.0049	<0.001	0.0057	<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	0.015	0.015	0.033	0.032	0.018	0.018	0.021	0.023	0.02	0.022
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.0049	0.0063	0.0063	0.0036	0.0028	0.0033	0.0081	0.0038	0.0057	0.0049
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	42	41	37	35	10	10	25	26	25	25
Magnesium	25	25	23	22	28	29	15	16	15	16
Potassium	0.81	0.79	0.79	0.79	1	1	2.9	3.3	2.8	3.3
Sodium	0.75	0.75	0.48	0.45	0.65	0.69	1.8	2	1.7	1.9
Alkalinity-HCO3	202	.	178	.	102	.	134	.	130	.
Alkalinity-CO3	<1	.	<1	.	40	.	<1	.	<1	.
Chloride	1.6	.	1.74	.	1.59	.	0.94	.	0.97	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	1.2	.	0.153	.	0.15	.	0.235	.	0.235	.
Sulfate	2.22	.	2.44	.	2.42	.	4.68	.	4.69	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-731									
Program	RDM									
Location	CRSDB									
Date Sampled	04/22/97				04/23/97				04/24/97	
Sample Type			DUP				DUP			
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.088	0.097	0.062	0.069	0.1	0.038	0.057	0.074	0.067	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0082	0.0079	0.009	0.008	0.0085	0.008	0.0085	0.0096	0.011	0.0084
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00041	<0.0003	<0.0003
Boron	0.033	0.24	0.029	0.049	0.0093	0.0085	0.0091	0.011	0.021	0.008
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0037	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.017	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0051	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.011	0.0048	<0.004
Iron	0.03	0.0095	0.039	0.0098	0.039	<0.005	0.046	0.007	0.074	<0.005
Lead (PMS)	0.0016	0.0013	0.0012	0.0013	0.0031	0.0014	0.0017	0.00081	0.0009	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0055	<0.004	<0.004
Manganese	0.0016	<0.001	0.0017	<0.001	0.0026	<0.001	0.0027	<0.001	0.0033	<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	0.011	<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	0.01	<0.006	<0.006	<0.006	<0.006	0.0078	<0.006	<0.006
Strontium	0.027	0.026	0.028	0.025	0.026	0.026	0.027	0.027	0.033	0.028
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00073	<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	0.00054	<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	0.0031	0.0053	0.0062	0.0035	<0.002	<0.002	<0.002	<0.002	0.0041	<0.002
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	25	23	26	24	25	24	25	24	30	24
Magnesium	15	14	16	15	14	14	14	15	17	15
Potassium	3.2	3	3.2	2.9	3.1	2.9	2.8	3.4	3.7	3.1
Sodium	1.8	2.1	1.9	1.7	1.5	1.6	1.5	1.8	2	1.7
Alkalinity-HCO3	132	.	134	.	128	.	128	.	130	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	0.98	.	0.94	.	0.6	.	0.92	.	0.872	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.239	.	0.235	.	0.23	.	0.23	.	0.23	.
Sulfate	4.64	.	4.62	.	4.68	.	4.61	.	4.39	.

(CONTINUED)

Sampling Point	GW-731									
Program	RDM									
Location	CRSDB									
Date Sampled	04/24/97		10/20/97				10/21/97		10/22/97	
Sample Type	DUP				DUP					
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.059	0.026	<0.02	0.023	<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 (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.01	0.0084	0.0033	0.0038	0.0034	0.0033	0.0045	0.0029	0.0029	0.0032
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.018	0.029	0.0041	0.0054	0.0051	0.005	<0.004	<0.004	<0.004	0.0048
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	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	0.088	0.019	0.0068	0.0092	<0.005	<0.005	0.14	0.041	0.02	0.0069
Lead (PMS)	0.00088	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0046
Lithium	<0.004	<0.004	0.035	0.037	0.037	0.038	0.036	0.039	0.036	0.037
Manganese	0.0033	<0.001	<0.001	<0.001	<0.001	<0.001	<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	<0.01	<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	0.032	0.027	0.0054	0.0054	0.0051	0.0052	0.0051	0.0045	0.0047	0.005
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.0041	<0.002	0.0026	0.002	<0.002	<0.002	0.0033	0.0026	0.0021	<0.002
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	29	24	12	12	12	12	11	10	11	11
Magnesium	16	15	17	18	17	18	17	17	18	18
Potassium	3.2	3	36	36	35	37	38	39	36	36
Sodium	1.8	1.8	6.6	6.7	6.6	6.9	7	7.2	6.7	6.6
Alkalinity-HCO3	124	.	92	.	94	.	88	.	94	.
Alkalinity-CO3	<1	.	52	.	52	.	72	.	56	.
Chloride	0.864	.	0.96	.	0.94	.	1.04	.	1.02	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.234	.	0.21	.	0.21	.	0.21	.	0.21	.
Sulfate	4.33	.	4.36	.	4.31	.	4.45	.	4.47	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-731		GW-732							
Program	RDM		RDM							
Location	CRSDB		CRSDB							
Date Sampled	10/23/97		04/21/97		04/22/97		04/23/97		04/24/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	1	0.07	0.42	0.044	0.79	0.063	0.11	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0036	0.0037	0.027	0.024	0.014	0.014	0.015	0.015	0.016	0.01
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.0043	0.0043	0.02	0.027	0.053	0.015	0.01	0.011	0.021	0.011
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	0.065	0.018	0.54	0.022	0.2	0.013	0.24	0.0099	0.041	0.0088
Lead (PMS)	<0.0005	<0.0005	0.0044	0.0014	0.002	0.0012	0.0016	0.0017	0.0009	0.00065
Lithium	0.032	0.033	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	0.0077	0.0017	0.0023	0.0013	0.0017	<0.001	0.0015	<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	0.0054	0.0057	0.063	0.063	0.025	0.026	0.029	0.027	0.027	0.021
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.0018	<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	<0.002	0.0029	0.011	0.0053	0.0044	0.0058	<0.002	<0.002	0.0049	<0.002
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	12	13	31	30	33	33	32	32	35	32
Magnesium	18	19	19	19	21	21	20	20	22	19
Potassium	32	33	2.4	2.9	1.4	1.3	1.2	1.8	2	1.5
Sodium	6	6.2	3.1	3.4	0.98	1.1	1.1	1.3	1.3	0.9
Alkalinity-HCO3	96	.	162	.	174	.	168	.	168	.
Alkalinity-CO3	48	.	<1	.	<1	.	<1	.	<1	.
Chloride	0.98	.	0.84	.	0.82	.	0.91	.	0.873	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.2	.	0.262	.	0.203	.	0.2	.	0.206	.
Sulfate	4.22	.	2.61	.	1.58	.	1.53	.	1.47	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-732								GW-757	
Program	RDM								SDM	
Location	CRSDB								LII	
Date Sampled	10/20/97		10/21/97		10/22/97		10/23/97		04/03/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	4.9	0.062	1.8	0.088	7.1	0.053	6.7	0.026	0.053	<0.02
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.098	0.042	0.11	0.044	0.043	0.032	0.061	0.04	0.23	0.23
Beryllium	0.00079	<0.0003	0.00043	<0.0003	<0.0003	<0.0003	0.00092	<0.0003	<0.0003	<0.0003
Boron	0.0042	<0.004	<0.004	<0.004	0.017	0.0097	0.0069	<0.004	0.016	0.0083
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.011
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	0.031	0.52	0.036	1.7	0.036	1.8	0.018	0.04	0.0053
Lead (PMS)	0.0064	<0.0005	0.004	<0.0005	0.0026	<0.0005	0.0083	<0.0005	<0.0005	<0.0005
Lithium	0.018	0.018	0.032	0.026	0.012	0.01	0.015	0.0098	0.014	<0.004
Manganese	0.014	0.0013	0.0054	0.0044	0.0057	<0.001	0.015	0.0012	0.0014	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	<0.05	<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	0.23	0.13	0.22	0.12	0.11	0.088	0.17	0.12	0.7	0.71
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0054	<0.0005	0.0023	<0.0005	0.0025	<0.0005	0.0067	<0.0005	0.0037	0.0036
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.0071	0.0023	0.0036	<0.002	0.0041	<0.002	0.012	<0.002	0.0059	0.0054
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	35	16	34	17	27	22	21	19	30	30
Magnesium	16	11	12	11	18	15	16	13	19	20
Potassium	10	12	19	16	6.4	6	7.4	6.3	6.2	5.5
Sodium	18	17	16	15	9.5	9	19	16	6.7	6.6
Alkalinity-HCO3	108	.	58	.	132	.	132	.	154	.
Alkalinity-CO3	20	.	96	.	16	.	<1	.	<1	.
Chloride	0.77	.	0.99	.	0.83	.	0.89	.	2	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	1.81	.
Nitrate-N	0.41	.	0.39	.	0.33	.	0.4	.	0.059	.
Sulfate	4.74	.	4.47	.	3.47	.	4.86	.	9.9	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-757				GW-796				GW-797	
Program	SDM				SDM/C				SDM	
Location	LII				LV				LV	
Date Sampled	04/03/97		10/16/97		01/09/97		07/10/97		01/09/97	
Sample Type	DUP									
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.049	<0.02	<0.02	<0.02	0.075	0.056	<0.02	0.056	2.1	0.041
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.23	0.23	0.19	0.19	0.0098	0.0096	0.013	0.014	0.015	0.0093
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.017	0.018	0.017	0.018	0.047	0.039	0.011	0.018	0.0066	0.016
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	0.014	0.015	<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	0.011	<0.004	<0.004	0.006	<0.004
Iron	0.067	0.011	0.014	0.012	0.095	0.026	0.016	0.037	1.8	<0.005
Lead (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	0.0018	0.0012	<0.0005
Lithium	0.013	0.013	0.018	0.019	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	0.036	<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	0.69	0.7	0.58	0.59	0.018	0.016	0.032	0.032	0.025	0.02
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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)	0.0037	0.0036	0.0041	0.0041	<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	0.0048	0.0029	<0.002	0.0037	0.0077	0.03	0.0021	0.0046	0.026	0.01
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	30	30	19	20	24	24	21	21	37	33
Magnesium	19	20	18	18	15	15	14	14	22	20
Potassium	6.1	6	9.1	9.5	1.6	2.1	4	3.7	2.3	1.6
Sodium	6.7	6.8	14	15	0.89	0.94	1.1	1.2	1.3	1.3
Alkalinity-HCO3	154	.	150	.	122	.	124	.	164	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.94	.	2.22	.	1.63	.	2.26	.	1.53	.
Fluoride	1.75	.	1.62	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.058	.	0.11	.	0.061	.	0.06	.	0.219	.
Sulfate	10	.	11.4	.	1.38	.	1.2	.	5.91	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-797		GW-798				GW-799			
Program	SDM		SDM/C				SDM/C			
Location	LV		CDLVII				CDLVII			
Date Sampled	07/09/97		01/16/97		07/15/97		01/08/97		07/09/97	
Sample Type										
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.21	0.034	0.16	0.077	0.024	<0.02	0.098	0.024	0.65	0.083
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0089	0.0081	0.011	0.0095	0.0091	0.0089	0.0055	0.0056	0.0063	0.0053
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.013	0.037	0.014	0.0055	0.0079	0.0071	0.013	<0.004	0.0099	0.019
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	0.0096	<0.004	<0.004	<0.004	0.01	0.0087	<0.004	<0.004
Iron	0.28	0.032	0.06	0.014	0.0089	0.024	0.17	<0.005	0.87	0.092
Lead (PMS)	0.0042	0.0027	0.00058	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	0.002
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	0.0079	<0.001	<0.001	<0.001	<0.001	<0.001	0.0033	<0.001	0.027	<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	0.011	<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	0.021	0.02	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015
Thallium (PMS)	<0.0005	0.00099	<0.0005	<0.0005	<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	0.0077	0.0044	0.014	0.0028	0.0039	0.0082	0.0073	0.0092	0.0097	0.0096
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	34	29	27	27	26	26	28	28	27	26
Magnesium	20	19	15	15	16	16	15	15	17	16
Potassium	1.4	1.4	2.2	2	1.3	1.3	1.6	1.3	0.99	0.88
Sodium	0.64	0.75	0.57	0.51	0.56	0.56	0.6	0.51	0.45	0.47
Alkalinity-HCO3	166	.	138	.	134	.	130	.	136	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	0.93	.	0.743	.	0.79	.	1.04	.	1	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.09	.	0.721	.	0.67	.	1.2	.	1	.
Sulfate	1.05	.	2.7	.	1.84	.	0.99	.	1	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-801						GW-827			
Program	SDM/C						SDM			
Location	LV						CDLVI			
Date Sampled	01/15/97		07/10/97				04/01/97		10/14/97	
Sample Type					DUP					
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.21	<0.02	0.042	0.047	0.38	0.17	<0.02	<0.02	<0.02	0.032
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0028	0.0022	0.0014	0.0025	0.0047	0.0028	0.008	0.008	0.0077	0.0077
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.024	0.0096	0.017	0.013	0.012	0.011	0.011	0.012	0.011	0.01
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	0.013	<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	0.0048	<0.004	0.016	0.006	<0.004	<0.004	<0.004	<0.004
Iron	0.16	<0.005	0.043	0.03	0.35	0.26	0.0052	0.0094	0.021	0.0068
Lead (PMS)	<0.0005	<0.0005	0.0017	0.0012	0.0022	0.0013	<0.0005	<0.0005	<0.0005	<0.0005
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	<0.001	<0.001	0.0022	<0.001	<0.001	<0.001	0.0021	<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	0.016	0.016	0.015	0.015	0.015	0.015	0.017	0.017	0.016	0.016
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.00051	0.00052	<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	0.006	0.0054	0.0029	0.0032	0.015	0.008	0.0025	0.0034	0.0047	0.0038
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	30	29	28	27	27	28	30	30	30	29
Magnesium	18	18	18	18	18	18	18	18	19	19
Potassium	1.5	0.83	0.64	0.74	0.86	0.78	0.98	1	1.2	1.2
Sodium	0.69	0.54	0.52	0.52	0.58	0.55	0.57	0.56	0.72	0.78
Alkalinity-HCO3	154	.	146	.	148	.	168	.	158	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	1.39	.	1.1	.	1.11	.	0.72	.	0.7	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.097	.	0.08	.	0.08	.	0.08	.	0.06	.
Sulfate	3.47	.	2.94	.	2.94	.	1.56	.	1.66	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	GW-827		GW-831				SCR2.2SP			
Program	SDM		CMP				EXP			
Location	CDLVI		FCAP				EXP			
Date Sampled	10/14/97		01/06/97		07/23/97		01/16/97		07/31/97	
Sample Type	DUP									
	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.048	<0.02	0.047	0.11	0.077	<0.02	0.54	0.39	0.21	0.033
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.051	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	0.0078	0.0077	0.018	0.018	0.019	0.019	0.022	0.021	0.031	0.03
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00032	<0.0003	<0.0003	<0.0003
Boron	0.011	0.01	0.011	0.014	0.012	0.0093	0.011	0.015	0.016	0.015
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0037
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015
Cobalt	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0051	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	<0.004	<0.004	0.0069	<0.004	<0.0041	0.0041	0.0066	<0.004	<0.004
Iron	0.023	0.0081	0.015	0.09	0.14	0.0099	0.6	0.37	0.13	0.021
Lead (PMS)	<0.0005	<0.0005	0.0015	<0.0005	0.0032	0.0021	0.0006	0.00055	<0.0005	0.13
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0041	<0.004	<0.004	<0.004	<0.004
Manganese	0.0024	<0.001	0.019	0.017	0.087	0.071	0.012	0.012	0.0079	0.0082
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	<0.051	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006	<0.006	<0.0061	<0.006	<0.006	<0.006	<0.006
Strontium	0.017	0.017	0.02	0.019	0.026	0.024	0.054	0.055	0.071	0.069
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	0.00087	0.00068	<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	0.00078	<0.0005	0.00072	0.00058	<0.0005	<0.0005	0.00099	0.001
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0051	<0.005	<0.005	<0.005	<0.005
Zinc	0.0065	0.0039	0.021	0.029	<0.002	0.0021	0.011	0.019	<0.002	0.0046
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	30	32	37	36	40	41	45	44	53	51
Magnesium	19	19	22	22	24	24	4.8	4.8	11	10
Potassium	1.2	1.1	1.2	1.1	1.7	1.6	1.2	1.4	0.89	0.83
Sodium	0.76	0.77	0.43	0.43	0.7	0.66	2.8	3.1	2.2	2.1
Alkalinity-HCO3	152	.	202	.	200	.	136	.	174	.
Alkalinity-CO3	<1	.	<1	.	<1	.	<1	.	<1	.
Chloride	0.7	.	0.7	.	0.694	.	7.74	.	3.61	.
Fluoride	<0.1	.	<0.1	.	<0.1	.	<0.1	.	<0.1	.
Nitrate-N	0.07	.	0.072	.	0.04	.	1.75	.	1.1	.
Sulfate	1.55	.	2.67	.	2.24	.	9.46	.	1.59	.

(CONTINUED)

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point	SCR4.3SP			
Program	SDM			
Location	CDLVII			
Date Sampled	01/15/97		07/14/97	
Sample Type				
	TOT	DIS	TOT	DIS
METALS (mg/L)	.	.	.	.
Aluminum	5.2	5.6	0.13	0.16
Antimony	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005
Barium	0.074	0.074	0.071	0.074
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003
Boron	0.037	0.04	0.021	0.021
Cadmium	<0.003	<0.003	<0.003	<0.003
Chromium	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.005	<0.005	<0.005	<0.005
Copper	<0.004	0.0048	<0.004	<0.004
Iron	3	3.1	0.1	0.16
Lead (PMS)	<0.0005	0.0005	0.0012	0.0011
Lithium	<0.004	0.0046	<0.004	<0.004
Manganese	0.025	0.026	0.0052	0.0083
Mercury (CVAA)	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	<0.01
Selenium	<0.05	<0.05	<0.05	<0.05
Silver	<0.006	<0.006	<0.006	<0.006
Strontium	0.048	0.049	0.058	0.06
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005
Thorium	<0.2	<0.2	<0.2	<0.2
Uranium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	0.0071	0.0075	<0.005	<0.005
Zinc	0.039	0.04	0.013	0.014
MAJOR IONS (mg/L)	.	.	.	.
Calcium	22	22	24	24
Magnesium	8.4	8.5	8.4	8.6
Potassium	3.1	3.2	1.7	1.8
Sodium	1.9	1.8	1.5	1.6
Alkalinity-HCO3	76	.	98	.
Alkalinity-CO3	<1	.	<1	.
Chloride	6.33	.	2.78	.
Fluoride	<0.1	.	<0.1	.
Nitrate-N	1.48	.	0.48	.
Sulfate	8.72	.	7.08	.

APPENDIX D.2
Inorganic Analytes, CY 1997

Sampling Point		OUTFALL301
Program		ROD
Location		KHQ
Date Sampled		04/30/97
Sample Type		TOT
Metals (mg/L)	Method	
Aluminum	ICP	0.076
Arsenic	PMS	<0.005
Barium	PMS	0.049
Beryllium	PMS	<0.0005
Boron	ICP	0.014
Cadmium	PMS	<0.0005
Cerium	PMS	<0.0005
Chromium	PMS	<0.001
Cobalt	PMS	<0.0005
Copper	PMS	<0.005
Gallium	PMS	<0.0005
Iron	ICP	0.045
Lead	PMS	<0.0005
Lithium	PMS	<0.01
Manganese	PMS	0.0033
Mercury	CVAA	<0.0002
Molybdenum	PMS	<0.0005
Nickel	PMS	<0.005
Selenium	PMS	<0.01
Silver	PMS	<0.0005
Strontium	PMS	0.024
Thallium	PMS	<0.0005
Thorium	PMS	<0.0005
Titanium	PMS	<0.0005
Uranium	PMS	<0.0005
Vanadium	ICP	<0.005
Zinc	ICP	0.014
Zirconium	ICP	<0.005
Ions (mg/L)		
Calcium	ICP	30
Magnesium	ICP	14
Potassium	ICP	1.1
Sodium	ICP	0.64

APPENDIX D.3

ORGANIC ANALYTES

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	1090		GW-141				GW-142	
Program	ROD		SDM				RDM	
Location	UNCS		LIV				KHQ	
Date Sampled	04/16/97		01/07/97		07/23/97		04/29/97	04/29/97
		DUP		DUP		DUP		
ORGANIC COMPOUNDS (ug/L)								
Acetone	10U	10U	10U	10U	5	11	8	20
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	8	8	11	11
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	1	1
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	1	1
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	1	1
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-142							GW-143
Program	RDM							RDM
Location	KHQ							KHQ
Date Sampled	04/30/97	05/01/97	11/10/97		11/11/97	11/12/97	11/14/97	04/28/97
				DUP				
ORGANIC COMPOUNDS (ug/L)								
Acetone	9	160	2	1	1	12	1	10
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	7	4	10U	10U	10U	12	10U	8
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	2	5U	5U	5U	5U	5U	5U	1
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	1	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	2	5U	50U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	1	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	3	5U	1
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	2	5U	5U	1	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	1	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-143							GW-144
Program	RDM							RDM
Location	KHQ							KHQ
Date Sampled	04/29/97	04/30/97	05/01/97	11/10/97	11/11/97	11/12/97	11/13/97	04/28/97
ORGANIC COMPOUNDS (ug/L)								
Acetone	28	100	7	7	10U	7	10U	71
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	4	10U	10U	10U	10U
2-Butanone	14	11	7	10U	10U	14	1	10
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	2	2	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	2	2	2	5U	5U	5U	5U	1
Chloromethane	10U	10U	10U	8	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	1	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	1	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	2	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	1	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	1	1	1	5U	5U	3	5U	1
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	1	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	2	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-144							
Program	RDM							
Location	KHQ							
Date Sampled	04/28/97	04/29/97		04/30/97		05/01/97		11/10/97
	DUP		DUP		DUP		DUP	
ORGANIC COMPOUNDS (ug/L)								
Acetone	34	8	9	10	10	7	10	10U
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	15	11	11	15	9	10	10	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	2	2	1	1	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	1	1	1	2	1	1	1	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	1	1	1	1	1	1	1	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	2	1	1	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-144			GW-145				
Program	RDM			RDM				
Location	KHQ			KHQ				
Date Sampled	11/11/97	11/12/97	11/13/97	04/28/97	04/29/97	04/30/97	05/01/97	11/10/97
ORGANIC COMPOUNDS (ug/L)								
Acetone	10U	7	10U	9	13	10	3	1
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	14	10U	8	9	11	4	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	3	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	2	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	2	5U	1	1	1	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	1	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	2	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-145			GW-203	GW-205	GW-217		GW-221
Program	RDM			ROD	ROD	SDM		ROD
Location	KHQ			UNCS	UNCS	LIV		UNCS
Date Sampled	11/11/97	11/12/97	11/13/97	04/14/97	04/14/97	01/06/97	07/17/97	04/15/97
ORGANIC COMPOUNDS (ug/L)								
Acetone	10U	6	3	10U	10U	10U	2	10U
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	15	10U	10U	10U	10U	2	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	3	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-231							
Program	RDM							
Location	KHQ							
Date Sampled	04/28/97	04/29/97	04/30/97	05/01/97	11/10/97	11/11/97	11/11/97 DUP	11/12/97
ORGANIC COMPOUNDS (ug/L)								
Acetone	16	8	9	9	2	1	10U	10U
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10	9	9	10	10U	1	10U	15
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	1	1	1	1	5U	5U	5U	3
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-231	GW-301		GW-302	GW-305		GW-339	GW-521
Program	RDM	CMP		ROD	SDM		ROD	SDM/C
Location	KHQ	CRBAWP		UNCS	LIV		UNCS	LIV
Date Sampled	11/13/97	01/07/97	07/24/97	04/15/97	01/08/97	07/22/97	04/15/97	01/07/97
ORGANIC COMPOUNDS (ug/L)								
Acetone	1	10U	12	10U	10U	12	10U	10U
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U		10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	7	10U	10U	9	10U	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	1	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U		10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U		5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U		5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	2	3	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	1	2	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U		10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	12	15	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-521	GW-522		GW-539		GW-542	GW-543	
Program	SDM/C	SDM		SDM		SDM	SDM	
Location	LIV	LIV		LII		CDLVI	CDLVI	
Date Sampled	07/21/97	01/08/97	07/21/97	04/02/97	10/16/97	04/01/97	04/01/97	
								DUP
ORGANIC COMPOUNDS (ug/L)								
Acetone	4	10U	36	15	5	10U	10U	10U
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	6	10U	7	10U	10U	10U	10U	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-543	GW-544		GW-557			GW-560	
Program	SDM	SDM		SDM/C			SDM	
Location	CDLVI	CDLVI		LV			CDLVII	
Date Sampled	10/15/97	04/02/97	10/16/97	01/08/97		07/09/97	01/15/97	07/14/97
					DUP			
ORGANIC COMPOUNDS (ug/L)								
Acetone	5	20	10U	10U	10U	82	10U	4
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-562			GW-564			GW-609	
Program	SDM			SDM			CMP	
Location	CDLVII			CDLVII			CRSP	
Date Sampled	01/15/97	07/14/97		01/16/97		07/15/97	01/14/97	07/24/97
			DUP		DUP			
ORGANIC COMPOUNDS (ug/L)								
Acetone	10U	2	6	10U	10U	8	10U	5
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U		10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	2	2	10U	10U	3	10U	8
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U		10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U		5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U		5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U		5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	9	10
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	9	10
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U		10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	13	12
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	1	1
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5	5
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-709		GW-757			GW-796		GW-797
Program	SDM		SDM			SDM/C		SDM
Location	LII		LII			LV		LV
Date Sampled	04/02/97	10/16/97	04/03/97		10/16/97	01/09/97	07/10/97	01/09/97
				DUP				
ORGANIC COMPOUNDS (ug/L)								
Acetone	10U	76	10U	10U	18	4	4	2
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	3	10U	10U	3	10U	10U	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	1	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-797	GW-798		GW-799		GW-801		
Program	SDM	SDM/C		SDM/C		SDM/C		
Location	LV	CDLVII		CDLVII		LV		
Date Sampled	07/09/97	01/16/97	07/15/97	01/08/97	07/09/97	01/15/97	07/10/97	
								DUP
ORGANIC COMPOUNDS (ug/L)								
Acetone	10U	10U	3	3	23	10U	7	4
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	3	10U	10U	10U	2	1
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	GW-827			GW-831		SCR2.2SP		SCR4.3SP
Program	SDM			CMP		EXP		SDM
Location	CDLVI			FCAP		EXP		CDLVII
Date Sampled	04/01/97	10/14/97		01/06/97	07/23/97	01/16/97	07/31/97	01/15/97
			DUP					
ORGANIC COMPOUNDS (ug/L)								
Acetone	10U	1	1	10U	10	10U	5	10U
Acrolein	10U	10U	10U	10U	10U	10U	10U	10U
Acrylonitrile	10U	10U	10U	10U	10U	10U	10U	10U
Benzene	5U	5U	5U	5U	5U	5U	5U	5U
Bromochloromethane	10U	10U	10U		10U		10U	10U
Bromodichloromethane	5U	5U	5U	5U	5U	5U	5U	5U
Bromoform	5U	5U	5U	5U	5U	5U	5U	5U
Bromomethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10	10U	10	10U
Carbon disulfide	5U	5U	5U	5U	5U	5U	5U	5U
Carbon tetrachloride	5U	5U	5U	5U	5U	5U	5U	5U
Chlorobenzene	5U	5U	5U	5U	5U	5U	5U	5U
Chloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Chloroethyl vinyl ether	10U	10U	10U	10U	10U	10U	10U	10U
Chloroform	5U	5U	5U	5U	5U	5U	5U	5U
Chloromethane	10U	10U	10U	10U	10U	10U	10U	10U
Dibromochloromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dibromo-3-chloropropane	10U	10U	10U		10U		10U	10U
1,2-Dibromoethane	5U	5U	5U	5U	5U	5U	5U	5U
Dibromomethane	10U	10U	10U	10U	10U	10U	10U	10U
1,2-Dichlorobenzene	5U	5U	5U		5U		5U	5U
1,4-Dichlorobenzene	5U	5U	5U		5U		5U	5U
1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,4-Dichloro-2-butene	5U	5U	5U	5U	5U	5U	5U	5U
Dichlorodifluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
cis-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
trans-1,3-Dichloropropene	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U	500U	500U
Ethylbenzene	5U	5U	5U	5U	5U	5U	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	5U	5U	5U	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1,2-Tetrachloroethane	10U	10U	10U		10U		10U	10U
1,1,2,2-Tetrachloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Trichloroethene	5U	5U	5U	5U	5U	5U	5U	5U
Trichlorofluoromethane	5U	5U	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	5U	5U	5U	5U
Vinyl acetate	10U	10U	10U	10U	10U	10U	10U	10U
Vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U

(CONTINUED)

APPENDIX D.3
Organic Analytes, CY 1997

Sampling Point	SCR4.3SP
Program	SDM
Location	CDLVII
Date Sampled	07/14/97
ORGANIC COMPOUNDS (ug/L)	
Acetone	10U
Acrolein	10U
Acrylonitrile	10U
Benzene	5U
Bromochloromethane	10U
Bromodichloromethane	5U
Bromoform	5U
Bromomethane	10U
2-Butanone	10U
Carbon disulfide	5U
Carbon tetrachloride	5U
Chlorobenzene	5U
Chloroethane	10U
2-Chloroethyl vinyl ether	10U
Chloroform	5U
Chloromethane	10U
Dibromochloromethane	5U
1,2-Dibromo-3-chloropropane	10U
1,2-Dibromoethane	5U
Dibromomethane	10U
1,2-Dichlorobenzene	5U
1,4-Dichlorobenzene	5U
1,4-Dichloro-2-butene	5U
trans-1,4-Dichloro-2-butene	5U
Dichlorodifluoromethane	5U
1,1-Dichloroethane	5U
1,2-Dichloroethane	5U
1,1-Dichloroethene	5U
1,2-Dichloroethene	5U
cis-1,2-Dichloroethene	5U
trans-1,2-Dichloroethene	5U
1,2-Dichloropropane	5U
cis-1,3-Dichloropropene	5U
trans-1,3-Dichloropropene	5U
Dimethylbenzene	5U
Ethanol	500U
Ethylbenzene	5U
Ethyl methacrylate	5U
2-Hexanone	10U
Iodomethane	5U
4-Methyl-2-pentanone	10U
Methylene chloride	5U
Styrene	5U
1,1,1,2-Tetrachloroethane	10U
1,1,2,2-Tetrachloroethane	5U
Tetrachloroethene	5U
Toluene	5U
1,1,1-Trichloroethane	5U
1,1,2-Trichloroethane	5U
Trichloroethene	5U
Trichlorofluoromethane	5U
1,2,3-Trichloropropane	5U
Vinyl acetate	10U
Vinyl chloride	10U

APPENDIX D.4

RADIOLOGICAL ANALYTES

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	1090						GW-141		
Program	ROD						SDM		
Location	UNCS						LIV		
Date Sampled	04/16/97						01/07/97		
Sample Type				DUP					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	4.1	3.7	5.5	150	20	5	17	8.1	7.5
Gross Beta	-1.1	6.3	25	90	14	25	35	11	13
Strontium 89/90	-0.9	2.3	4.2	-0.5	3.7	6.7	.	.	.

(CONTINUED)

Sampling Point	GW-141								
Program	SDM								
Location	LIV								
Date Sampled	01/07/97			02/27/97			07/23/97		
Sample Type	DUP								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	17	8.1	7.6	2.6	5	7.5	1.4	1.6	2.8
Gross Beta	37	12	14	3.6	4.9	8.1	-1.9	3.4	16
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-141			GW-142					
Program	SDM			RDM					
Location	LIV			KHQ					
Date Sampled	07/23/97			04/29/97			04/29/97		
Sample Type	DUP								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	2.2	1.8	1	10	4	3.3	15	5	3.2
Gross Beta	2.2	3.4	14	4.4	4	16	11	4	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-142								
Program	RDM								
Location	KHQ								
Date Sampled	04/30/97			05/01/97			11/10/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	15	4.9	3	11	4	5	7.3	3.4	2.9
Gross Beta	10	4.4	16	8.7	4.2	13	6.8	4.2	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-142								
Program	RDM								
Location	KHQ								
Date Sampled	11/10/97			11/11/97			11/12/97		
Sample Type	DUP								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	2.8	2.5	4.4	3.3	2.4	2.9	5.7	3.2	4.4
Gross Beta	8	4.5	16	3.9	3.8	14	2.7	3.5	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-142			GW-143					
Program	RDM			RDM					
Location	KHQ			KHQ					
Date Sampled	11/14/97			04/28/97			04/29/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	3.6	2.8	4.5	1.6	2.6	5.7	0.7	2	4.8
Gross Beta	7.9	3.9	13	6.8	4.5	14	7.3	3.9	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-143								
Program	RDM								
Location	KHQ								
Date Sampled	04/30/97			05/01/97			11/10/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	5.5	3.1	3.1	3.2	2.4	3.1	5.7	3.3	4.1
Gross Beta	21	5.1	13	5.7	3.7	13	12	4.6	15
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-143								
Program	RDM								
Location	KHQ								
Date Sampled	11/11/97			11/12/97			11/13/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	4	2.9	4.2	1.2	1.7	3.4	3.3	2.4	3
Gross Beta	16	4.7	12	16	5	13	44	7	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-144								
Program	RDM								
Location	KHQ								
Date Sampled	04/28/97						04/29/97		
Sample Type				DUP					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	1.3	2	4.3	2.1	1.9	2.8	1.4	1.6	2.8
Gross Beta	3.1	3.1	11	4.9	3.4	11	-3.7	3.6	18
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-144								
Program	RDM								
Location	KHQ								
Date Sampled	04/29/97			04/30/97					
Sample Type	DUP						DUP		
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-1.1	1.8	5.9	1.5	1.8	3.2	2.2	1.8	0.98
Gross Beta	5.2	4.2	16	1	3	13	2.8	2.9	12
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-144								
Program	RDM								
Location	KHQ								
Date Sampled	05/01/97						11/10/97		
Sample Type				DUP					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	1.4	1.6	2.8	3.9	2.8	4.4	2.9	2.4	3.9
Gross Beta	2.8	3.5	13	3.7	3.4	13	1.4	3.5	16
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-144								
Program	RDM								
Location	KHQ								
Date Sampled	11/11/97			11/12/97			11/13/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	4.2	2.6	2.8	2.1	1.9	2.8	-0.3	1.6	4.9
Gross Beta	-2.5	3.2	16	2.8	3.7	15	1.7	3.6	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-145								
Program	RDM								
Location	KHQ								
Date Sampled	04/28/97			04/29/97			04/30/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	16	5	4.3	16	5	4.9	9.7	3.8	2.8
Gross Beta	7	4.4	15	11	4	14	12	4.1	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-145								
Program	RDM								
Location	KHQ								
Date Sampled	05/01/97			11/10/97			11/11/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	8.7	4	4.2	12	4.5	3.4	8.7	3.8	3
Gross Beta	22	6	14	14	4.5	15	14	4.7	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-145						GW-203		
Program	RDM						ROD		
Location	KHQ						UNCS		
Date Sampled	11/12/97			11/13/97			04/14/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	11	4	5	12	5	5	0	2.4	7.3
Gross Beta	17	5	14	16	5	15	-0.4	7.3	28
Strontium 89/90	.	.	.	.	.	.	0.8	3.6	6.4

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-205			GW-217					
Program	ROD			SDM					
Location	UNCS			LIV					
Date Sampled	04/14/97			01/06/97			07/17/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.1	2	6	0.99	3.1	5.7	0.65	1.3	2.8
Gross Beta	8.2	6.9	23	10	7.5	12	3	3.6	13
Strontium 89/90	3.8	5.4	9	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-221			GW-231					
Program	ROD			RDM					
Location	UNCS			KHQ					
Date Sampled	04/15/97			04/28/97			04/29/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.1	2	6	-0.1	2	5.5	0.8	1.4	3.1
Gross Beta	-2.1	6.3	26	-2.3	4.2	17	0.1	3	13
Strontium 89/90	-1.1	4.9	8.9	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-231								
Program	RDM								
Location	KHQ								
Date Sampled	04/30/97			05/01/97			11/10/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	1.1	1.2	0.96	0.36	0.72	0.97	1.5	1.8	3.2
Gross Beta	1.4	3.1	14	-5.3	2.9	14	4.3	3.3	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-231								
Program	RDM								
Location	KHQ								
Date Sampled	11/11/97						11/12/97		
Sample Type				DUP					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	1	2	4.5	2.1	1.9	2.8	1.8	2.1	3.9
Gross Beta	-0.18	3.3	12	1.2	3.6	14	3.9	3.8	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-231			GW-301					
Program	RDM			CMP					
Location	KHQ			CRBAWP					
Date Sampled	11/13/97			01/07/97			07/24/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	4.3	2.8	3.8	1.6	3.2	5.6	0.43	1.8	4.6
Gross Beta	5.1	4	15	-1.9	6.6	12	4	3.8	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-302			GW-305					
Program	ROD			SDM					
Location	UNCS			LIV					
Date Sampled	04/15/97			01/08/97			07/22/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.8	2.3	5.7	1	3.2	5.8	2.1	1.7	0.94
Gross Beta	6.6	6	23	5.8	14	14	-1.4	3.4	16
Strontium 89/90	-1.6	5	9	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-339			GW-522					
Program	ROD			SDM					
Location	UNCS			LIV					
Date Sampled	04/15/97			01/08/97			07/21/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.
Gross Alpha	1.3	2.6	5.7	1.7	3.4	5.8	0.6	1.2	2.7
Gross Beta	11	7	23	0.57	23	13	-1.3	2.8	15
Strontium 89/90	1.6	4.9	8.4	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-539						GW-542		
Program	SDM						SDM		
Location	LII						CDLVI		
Date Sampled	04/02/97			10/16/97			04/01/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.
Gross Alpha	-0.1	1.5	5.6	1.9	1.9	3.2	3.9	4.6	9.1
Gross Beta	-0.3	5.9	22	3.5	3.5	12	3.2	6.3	24
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-543								
Program	SDM								
Location	CDLVI								
Date Sampled	04/01/97						10/15/97		
Sample Type				DUP					
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.
Gross Alpha	0.2	2.1	6.2	6.4	4.2	1.9	2.2	2.2	3.9
Gross Beta	-1.2	5.6	24	9.1	6.8	22	5.3	3.9	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-544						GW-557		
Program	SDM						SDM/C		
Location	CDLVI						LV		
Date Sampled	04/02/97			10/16/97			01/08/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	2.9	2.9	2	3.6	2.6	3.8	-0.54	2	6
Gross Beta	-0.2	6.3	25	2.9	3.4	12	-3.2	5.9	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-557						GW-560		
Program	SDM/C						SDM		
Location	LV						CDLVII		
Date Sampled	01/08/97			07/09/97			01/15/97		
Sample Type	DUP								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-0.54	2	6	2.8	3.3	6	3.9	3.8	5.5
Gross Beta	7.1	7.7	12	-1.6	6.6	30	-1.3	6.2	12
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-560			GW-562					
Program	SDM			SDM					
Location	CDLVII			CDLVII					
Date Sampled	07/14/97			01/15/97			07/14/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	2.5	1.9	1	-1.5	3.1	7.2	1.4	1.4	1
Gross Beta	10	4.2	13	-15	8.4	15	-0.1	3.2	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-562			GW-564					
Program	SDM			SDM					
Location	CDLVII			CDLVII					
Date Sampled	07/14/97			01/16/97					
Sample Type	DUP						DUP		
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.8	1.5	3.2	-0.9	3.2	7.3	0.68	4.1	7.4
Gross Beta	4.3	3.7	13	1.5	15	17	-14	8.6	15
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-564			GW-609					
Program	SDM			CMP					
Location	CDLVII			CRSP					
Date Sampled	07/15/97			01/14/97			07/24/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.55	1.4	3.4	0.95	2.9	5.6	2.7	2.1	2.7
Gross Beta	3	3.5	13	2.5	7.4	12	0.6	3.5	14
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-709						GW-757		
Program	SDM						SDM		
Location	LII						LII		
Date Sampled	04/02/97			10/16/97			04/03/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	3.1	3.5	6.3	1.8	1.9	3.1	2.5	3.3	6.4
Gross Beta	11	7	21	4.2	3.9	12	7.7	6.9	26
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-757						GW-796		
Program	SDM						SDM/C		
Location	LII						LV		
Date Sampled	04/03/97			10/16/97			01/09/97		
Sample Type	DUP								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	7.4	4.7	2	3.5	2.6	3.8	-0.72	2.6	7.9
Gross Beta	14	8	24	9.2	4.5	13	-6.7	11	15
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-796			GW-797					
Program	SDM/C			SDM					
Location	LV			LV					
Date Sampled	07/10/97			01/09/97			07/09/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	1.1	1.6	3.1	0.97	4	7.3	0.7	2.7	7.2
Gross Beta	4.1	3.4	13	-9.5	9.3	15	9.1	7.1	26
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-798						GW-799		
Program	SDM/C						SDM/C		
Location	CDLVII						CDLVII		
Date Sampled	01/16/97			07/15/97			01/08/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-0.88	3.1	7.4	-1.1	0.32	3.8	-0.007	1.8	5.5
Gross Beta	-1.2	20	15	-0.61	3.6	15	10	7.5	12
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-799			GW-801					
Program	SDM/C			SDM/C					
Location	CDLVII			LV					
Date Sampled	07/09/97			01/15/97			07/10/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-0.8	2.5	8.4	0.025	1.8	5.6	0.4	1.2	3.1
Gross Beta	9	8.3	31	6.1	13	14	2.6	3.3	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-801			GW-827					
Program	SDM/C			SDM					
Location	LV			CDLVI					
Date Sampled	07/10/97			04/01/97			10/14/97		
Sample Type	DUP								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	-1.1	0.8	4.3	-0.6	2.2	7.6	0.3	1	2.7
Gross Beta	-2.7	3.2	15	2.5	6.4	24	7.9	4	12
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	GW-827			GW-831					
Program	SDM			CMP					
Location	CDLVI			FCAP					
Date Sampled	10/14/97			01/06/97			07/23/97		
Sample Type	DUP								
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.1	2.1	5.5	0.07	1.8	5.8	1	1.4	2.7
Gross Beta	3.9	3.5	12	4.7	6.8	12	3.7	3.6	13
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	SCR2.2SP						SCR4.3SP		
Program	EXP						SDM		
Location	EXP						CDLVII		
Date Sampled	01/16/97			07/31/97			01/15/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.
Gross Alpha	4.1	4.8	7.4	1.4	1.6	2.8	0.66	3	5.7
Gross Beta	-3.4	5.4	17	3.9	3.7	14	6.4	7.1	12
Strontium 89/90	.	.	.	.	.	.	.	.	.

(CONTINUED)

Sampling Point	SCR4.3SP		
Program	SDM		
Location	CDLVII		
Date Sampled	07/14/97		
Sample Type			
	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.
	.	.	.
Gross Alpha	0.98	1.4	2.7
Gross Beta	-0.2	2.9	13
Strontium 89/90	.	.	.

APPENDIX D.4
Radiological Analytes, CY 1997

Sampling Point	GW-521						OUTFALL301		
Program	SDM/C						ROD		
Location	LIV						KHQ		
Date Sampled	01/07/97			07/21/97			04/30/97		
Sample Type									
	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.
Gross Alpha	-0.56	2.1	5.9	0.8	1.4	3.1	0.28	1	2.8
Gross Beta	4.7	19	14	1.5	3.4	15	0.86	3.5	14
Americium 241	0.11	0.15	0.25	-0.01	0.07	0.2	-0.038	0.11	0.29
Iodine 129	1	11	18	-14	12	18	.	.	.
Neptunium 237	-0.056	0.08	0.33	0	0	0.089	-0.021	0.043	0.2
Plutonium 238	0	0	0.11	0.026	0.063	0.13	.	.	.
Plutonium 239	-0.28	0.056	0.26	-0.028	0.039	0.16	.	.	.
Radium 223/224/226	0.61	0.86	1.7	0.5	0.84	1.8	0.42	0.42	0.28
Radium 228	.	.	.	.	.	.	-40	70	80
Strontium 89/90	3.5	5.7	13	3	4.4	7.4	-0.07	1.8	3.2
Technetium 99	9	7.9	13	0.5	4.2	6.3	-11	9.6	13
Thorium 228	.	.	.	.	.	.	0.21	0.18	0.23
Thorium 230	.	.	.	.	.	.	0.36	0.2	0.074
Thorium 232	.	.	.	.	.	.	0.025	0.12	0.26
Thorium 234	.	.	.	.	.	.	0.34	0.24	0.26
Tritium	26	54	370	80	530	850	100	450	600
Uranium 234	0.093	0.23	0.47	0.35	0.22	0.086	0.56	0.28	0.21
Uranium 235	0	0	0.19	-0.04	0.079	0.29	0	0	0.11
Uranium 238	0.058	0.12	0.16	0.29	0.21	0.23	0.34	0.24	0.26

APPENDIX E

CY 1997 DATA FOR
QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

EXPLANATION

SAMPLING POINT:

1090	-	Monitoring Well at the United Nuclear Corporation Site
GW	-	Monitoring Well
SCR	-	Spring Sampling Location: South Chestnut Ridge
OUTFALL301	-	Surface Water Sampling Location at Kerr Hollow Quarry
D	-	Field Duplicate Sample

LOCATION:

CDLVI	-	Construction/Demolition Landfill VI
CDLVII	-	Construction/Demolition Landfill VII
CRBAWP	-	Chestnut Ridge Borrow Area Waste Pile
CRSDB	-	Chestnut Ridge Sediment Disposal Basin
CRSP	-	Chestnut Ridge Security Pits
EXP	-	Exit Pathway
FCAP	-	Filled Coal Ash Pond
KHQ	-	Kerr Hollow Quarry
LII	-	Industrial Landfill II
LIV	-	Industrial Landfill IV
LV	-	Industrial Landfill V
RQ	-	Rogers Quarry
UNCS	-	United Nuclear Corporation Site

UNITS:

ug/L	-	micrograms per liter (all samples)
umho/cm	-	micromhos per centimeter (equipment rinsates)
mg/L	-	milligrams per liter (equipment rinsates)
NTU	-	Nephelometric Turbidity Units (equipment rinsates)
pCi/L	-	picoCuries per liter (equipment rinsates)

SAMPLE TYPE (radiological results in equipment rinsates):

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

NOTES:

All trace metal and cation analyses were performed using inductively coupled plasma spectroscopy unless otherwise noted.

.	-	Not analyzed
U	-	Organic compound not detected at the reporting limit.
<	-	Inorganic compound not detected at the reporting limit.
CVAA	-	Cold Vapor Atomic Absorption
PMS	-	Plasma Mass Spectroscopy
TDS	-	Total Dissolved Solids
TSS	-	Total Suspended Solids

Organic Compounds Detected in QA/QC Samples, CY 1997

Trip Blank Samples	Quarter of CY 1997				Annual
	First	Second	Third	Fourth	Total
Total Number of Samples	12	16	10	16	54
Samples With VOCs	4	14	9	16	43
Percent Contaminated	33	88	90	100	80
Acetone	1	9	9	15	34
Bromochloromethane	0	1	0	0	1
2-Butanone	0	9	7	6	22
Chloroform	4	9	0	5	18
1,2-Dichloroethane	0	0	1	3	4
2-Hexanone	0	1	0	0	1
4-Methyl-2-pentanone	0	1	0	0	1
Methylene chloride	0	8	0	2	10
Toluene	0	1	1	0	2

Laboratory Blank Samples	Quarter of CY 1997				Annual
	First	Second	Third	Fourth	Total
Total Number of Samples	7	9	8	7	31
Samples With VOCs	3	5	7	4	19
Percent Contaminated	43	56	88	57	61
Acetone	2	5	7	3	17
Acrolein	0	0	0	1	1
Acrylonitrile	0	0	0	1	1
Bromoform	1	0	0	0	1
2-Butanone	0	5	7	4	16
Chlorobenzene	0	0	0	1	1
1,4-Dichloro-2-butene	1	0	0	0	1
Trans-1,4-Dichloro-2-butene	1	0	0	0	1
1,2-Dichloroethene	0	0	0	1	1
Cis-1,2-Dichloroethene	0	0	0	1	1
trans-1,2-Dichloroethene	0	0	0	1	1
Dimethylbenzene	0	0	0	1	1
Ethanol	0	0	1	0	1
Ethylbenzene	1	0	0	1	2
Ethyl methacrylate	0	0	0	1	1
2-Hexanone	1	0	0	1	2
4-Methyl-2-pentanone	1	0	0	1	2
Methylene chloride	0	4	0	1	5
Styrene	0	0	0	1	1
1,1,2,2-Tetrachloroethane	1	0	0	0	1
Tetrachloroethene	0	0	0	2	2
Toluene	0	0	0	1	1
1,1,2-Trichloroethane	0	0	0	1	1
1,2,3-Trichloropropane	1	0	0	1	2

Equipment Rinsate Samples	Quarter of CY 1997				Annual
	First	Second	Third	Fourth	Total
Total Number of Samples	4	6	4	0	14
Samples With VOCs	3	6	4	0	13
Percent Contaminated	75	100	100	.	93
Acetone	1	5	4	0	10
Acrylonitrile	0	1	0	0	1
2-Butanone	0	3	3	0	6
Chloroform	2	6	3	0	11
1,2-Dibromo-3-chloropropane	0	1	0	0	1
Dimethylbenzene	1	0	0	0	1
Ethanol	0	1	0	0	1
2-Hexanone	0	1	0	0	1
4-Methyl-2-pentanone	0	1	0	0	1
Methylene chloride	0	1	0	0	1
Tetrachloroethene	0	1	0	0	1

Field Blank Samples	Quarter of CY 1997				Annual
	First	Second	Third	Fourth	Total
Total Number of Samples	1	0	1	0	2
Samples With VOCs	1	0	1	0	2
Percent Contaminated	100	.	100	.	100
Acetone	0	0	1	0	1
Chloroform	1	0	1	0	2

APPENDIX E.1

CORRELATION OF GROUNDWATER AND SURFACE WATER SAMPLES TO ASSOCIATED BLANKS

APPENDIX E.1
Correlation of Samples to Associated Blanks
First Quarter 1997

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
GW-141	LIV	01/07/97	A970080002	A970080004	Q970370011
GW-141 D	LIV	01/07/97	A970080005	A970080004	Q970370011
GW-217	LIV	01/06/97	A970070000	A970070047	Q970370011
GW-301	CRBAWP	01/07/97	A970070049	A970070051	Q970370011
GW-305	LIV	01/08/97	A970090007	A970090011	Q970350028
GW-521	LIV	01/07/97	A970080000	A970080004	Q970370011
GW-522	LIV	01/08/97	A970090009	A970090011	Q970350022
GW-557	LV	01/08/97	A970090002	A970090004	Q970350022
GW-557 D	LV	01/08/97	A970090005	A970090004	Q970350022
GW-560	CDLVII	01/15/97	A970150033	A970150035	Q970370017
GW-562	CDLVII	01/15/97	A970150029	A970150035	Q970370017
GW-564	CDLVII	01/16/97	A970160020	A970160022	Q970370007
GW-564 D	CDLVII	01/16/97	A970160023	A970160022	Q970370021
GW-609	CRSP	01/14/97	A970140034	A970140036	Q970350034
GW-796	LV	01/09/97	A970090030	A970090034	Q970350028
GW-797	LV	01/09/97	A970090032	A970090034	Q970350028
GW-798	CDLVII	01/16/97	A970160025	A970160022	Q970370021
GW-799	CDLVII	01/08/97	A970090000	A970090004	Q970350028
GW-801	LV	01/15/97	A970150021	A970150023	Q970370017
GW-831	ADB	01/06/97	A970070003	A970070005	Q970370011
SCR2.2SP	EXP	01/16/97	A970160007	A970160009	Q970370007
SCR4.3SP	CDLVII	01/15/97	A970150024	A970150023	Q970370017

APPENDIX E.1
Correlation of Samples to Associated Blanks
Second Quarter 1997

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
1090	UNCS	04/16/97	A971060086	A971060084	Q971110053
1090 D	UNCS	04/16/97	A971060087	A971060084	Q971110053
GW-142	KHQ	04/29/97	A971190065	A971190062	Q971250043
GW-142	KHQ	04/30/97	A971210038	A971210034	Q971250063
GW-142	KHQ	05/01/97	A971210085	A971210084	Q971430037
GW-143	KHQ	04/28/97	A971190012	A971190010	Q971210004
GW-143	KHQ	04/29/97	A971190064	A971190062	Q971250043
GW-143	KHQ	04/30/97	A971210007	A971210005	Q971250063
GW-143	KHQ	05/01/97	A971210068	A971210066	Q971270006
GW-144	KHQ	04/28/97	A971190016	A971190015	Q971210004
GW-144 D	KHQ	04/28/97	A971190017	A971190015	Q971210004
GW-144	KHQ	04/29/97	A971190076	A971190075	Q971250043
GW-144 D	KHQ	04/29/97	A971190077	A971190075	Q971250043
GW-144	KHQ	04/30/97	A971210035	A971210034	Q971250063
GW-144 D	KHQ	04/30/97	A971210036	A971210034	Q971250063
GW-144	KHQ	05/01/97	A971210077	A971210076	Q971270006
GW-144 D	KHQ	05/01/97	A971210078	A971210076	Q971270006
GW-145	KHQ	04/28/97	A971190018	A971190015	Q971210004
GW-145	KHQ	04/29/97	A971190078	A971190075	Q971250043
GW-145	KHQ	04/30/97	A971210037	A971210034	Q971250063
GW-145	KHQ	05/01/97	A971210079	A971210076	Q971430037
GW-203	UNCS	04/14/97	A971050006	A971050004	Q971110050
GW-205	UNCS	04/14/97	A971050007	A971050004	Q971110050
GW-221	UNCS	04/15/97	A971060001	A971060000	Q971110050
GW-231	KHQ	04/28/97	A971190011	A971190010	Q971210004
GW-231	KHQ	04/29/97	A971190063	A971190062	Q971250043
GW-231	KHQ	04/30/97	A971210006	A971210005	Q971250063
GW-231	KHQ	05/01/97	A971210067	A971210066	Q971250063
GW-302	UNCS	04/15/97	A971060003	A971060000	Q971110053
GW-339	UNCS	04/15/97	A971060002	A971060000	Q971110053
GW-539	LII	04/02/97	A970930003	A970930000	Q970980026
GW-542	CDLVI	04/01/97	A970920002	A970920000	Q970940069
GW-543	CDLVI	04/01/97	A970920003	A970920000	Q970940069
GW-543 D	CDLVI	04/01/97	A970920004	A970920000	Q970940069
GW-544	CDLVI	04/02/97	A970920105	A970920104	Q970940069
GW-709	LII	04/02/97	A970930004	A970930000	Q970980026
GW-757	LII	04/03/97	A970930018	A970930017	Q970980026
GW-757 D	LII	04/03/97	A970930019	A970930017	Q970980026
GW-827	CDLVI	04/01/97	A970920001	A970920000	Q970940069

APPENDIX E.1
Correlation of Samples to Associated Blanks
Third Quarter 1997

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
GW-141	LIV	07/23/97	A972040099	A972040098	Q972110061
GW-141 D	LIV	07/23/97	A972040100	A972040098	Q972110061
GW-217	LIV	07/17/97	A971980103	A971980102	Q972030001
GW-301	CRBAWP	07/24/97	A972050176	A972050175	Q972160010
GW-305	LIV	07/22/97	A972030064	A972030063	Q972110061
GW-521	LIV	07/21/97	A972030004	A972030001	Q972060080
GW-522	LIV	07/21/97	A972030002	A972030001	Q972060080
GW-557	LV	07/09/97	A971910007	A971910006	Q971920033
GW-560	CDLVII	07/14/97	A971950056	A971950055	Q972040038
GW-562	CDLVII	07/14/97	A971950057	A971950055	Q972040038
GW-562 D	CDLVII	07/14/97	A971950058	A971950055	Q972040038
GW-564	CDLVII	07/15/97	A971960081	A971960080	Q972030001
GW-609	CRSP	07/24/97	A972050177	A972050175	Q972160010
GW-796	LV	07/10/97	A971920001	A971920000	Q972020030
GW-797	LV	07/09/97	A971910009	A971910006	Q971920033
GW-798	CDLVII	07/15/97	A971960082	A971960080	Q972030001
GW-799	CDLVII	07/09/97	A971910008	A971910006	Q971920033
GW-801	LV	07/10/97	A971920011	A971920000	Q972020030
GW-801 D	LV	07/10/97	A971920012	A971920000	Q972020030
GW-831	ADB	07/23/97	A972050008	A972040098	Q972110061
SCR2.2SP	EXP	07/31/97	A972120267	A972120261	Q972200091
SCR4.3SP	CDLVII	07/14/97	A971950062	A971950055	Q972040038

APPENDIX E.1
Correlation of Samples to Associated Blanks
Fourth Quarter 1997

Sampling Point	Location	Date Sampled	Sample No.	Trip Blank No.	Lab Blank No.
GW-142	KHQ	11/10/97	A973150002	A973150001	Q973380053
GW-142 D	KHQ	11/10/97	A973150003	A973150001	Q973380053
GW-142	KHQ	11/11/97	A973150151	A973150150	Q973380056
GW-142	KHQ	11/12/97	A973160233	A973160232	Q973370118
GW-142	KHQ	11/14/97	A973180082	A973180084	Q973380114
GW-143	KHQ	11/10/97	A973140187	A973140321	Q973380053
GW-143	KHQ	11/11/97	A973160001	A973160000	Q973380056
GW-143	KHQ	11/12/97	A973170005	A973170009	Q973370118
GW-143	KHQ	11/13/97	A973170171	A973170175	Q973380059
GW-144	KHQ	11/10/97	A973150007	A973150006	Q973380053
GW-144	KHQ	11/11/97	A973150180	A973150179	Q973380056
GW-144	KHQ	11/12/97	A973170001	A973170000	Q973370118
GW-144	KHQ	11/13/97	A973170167	A973170166	Q973380059
GW-145	KHQ	11/10/97	A973150008	A973150006	Q973380053
GW-145	KHQ	11/11/97	A973150181	A973150179	Q973380056
GW-145	KHQ	11/12/97	A973170002	A973170000	Q973370118
GW-145	KHQ	11/13/97	A973170168	A973170166	Q973380059
GW-231	KHQ	11/10/97	A973140186	A973140321	Q973380053
GW-231	KHQ	11/11/97	A973160002	A973160000	Q973380056
GW-231 D	KHQ	11/11/97	A973160003	A973160000	Q973380056
GW-231	KHQ	11/12/97	A973170006	A973170009	Q973370118
GW-231	KHQ	11/13/97	A973170172	A973170175	Q973380114
GW-539	LII	10/16/97	A972890154	A972890158	Q972950071
GW-543	CDLVI	10/15/97	A972880096	A972880098	Q972930120
GW-544	CDLVI	10/16/97	A972900006	A972890158	Q972950071
GW-709	LII	10/16/97	A972890149	A972890153	Q972930120
GW-757	LII	10/16/97	A972890150	A972890153	Q972930120
GW-827	CDLVI	10/14/97	A972890047	A972890051	Q972930120
GW-827 D	CDLVI	10/14/97	A972890048	A972890051	Q972930120

APPENDIX E.2

TRIP BLANK DATA SUMMARY

APPENDIX E.2
Organic Analytes Detected in Trip Blank Samples, First Quarter 1997

Sample Number	A970070005	A970070047	A970070051	A970080004	A970090004	A970090011	A970090034	A970140036
ORGANICS (ug/L)								
Acetone	10U	10U	10U	10U	10U	10U	3	10U
Chloroform	5U	5U	5U	5U	5U	5U	5	11

(CONTINUED)

Sample Number	A970150023	A970150035	A970160009	A970160022
ORGANICS (ug/L)				
Acetone	10U	10U	10U	10U
Chloroform	5U	13	11	5U

APPENDIX E.2
Organic Analytes Detected in Trip Blank Samples, Second Quarter 1997

Sample Number	A970920000	A970920104	A970930000	A970930017	A971050004	A971060000	A971060084	A971190010
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Acetone	10U	10U	10U	10U	10U	10U	10U	11
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U	10U	7
Chloroform	5U	2	5U	1	5U	2	7	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	10U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	1
Toluene	5U	5U	1	5U	5U	5U	5U	5U

(CONTINUED)

Sample Number	A971190015	A971190062	A971190075	A971210005	A971210034	A971210066	A971210076	A971210084
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Acetone	10	7	9	9	23	11	9	32
Bromochloromethane	10U	10U	10U	10U	10U	10U	10U	1
2-Butanone	13	12	7	7	9	12	11	8
Chloroform	5U	5U	1	25	25	1	4	5U
2-Hexanone	10U	10U	10U	10U	10U	10U	10U	4
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	1
Methylene chloride	1	1	1	1	1	1	1	5U
Toluene	5U	5U	5U	5U	5U	5U	5U	5U

APPENDIX E.2
Organic Analytes Detected in Trip Blank Samples, Third Quarter 1997

Sample Number	A971910006	A971920000	A971950055	A971960080	A971980102	A972030001	A972030063	A972040098
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Acetone	10U	3	4	4	3	7	5	6
2-Butanone	10U	10U	10U	3	3	6	8	9
1,2-Dichloroethane	5U	5U	5U	5U	2	5U	5U	5U
Toluene	5U	5U	5U	5U	5U	2	5U	5U

(CONTINUED)

Sample Number	A972050175	A972120261
ORGANICS (ug/L)	.	.
Acetone	6	3
2-Butanone	7	6
1,2-Dichloroethane	5U	5U
Toluene	5U	5U

APPENDIX E.2
Organic Analytes Detected in Trip Blank Samples, Fourth Quarter 1997

Sample Number	A972880098	A972890051	A972890153	A972890158	A973140321	A973150001	A973150006	A973150150
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Acetone	3	4	3	8	2	1	1	2
2-Butanone	10U	10U	3	10U	10U	10U	10U	1
Chloroform	2	1	5U	5U	5U	5U	5U	5U
1,2-Dichloroethane	5U	5U	5U	5U	5U	5U	5U	5U
Methylene chloride	5U	5U	5U	5U	5U	5U	5U	5U

(CONTINUED)

Sample Number	A973150179	A973160000	A973160232	A973170000	A973170009	A973170166	A973170175	A973180084
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
Acetone	10U	1	10	6	16	2	3	2
2-Butanone	10U	10U	13	12	13	1	10U	10U
Chloroform	5U	5U	5U	5U	5U	7	7	9
1,2-Dichloroethane	2	7	5U	5U	5U	5U	5U	3
Methylene chloride	5U	5U	3	5U	3	5U	5U	5U

APPENDIX E.3

LABORATORY BLANK DATA SUMMARY

APPENDIX E.3
Organic Analytes Detected in Laboratory Blank Samples, First Quarter 1997

Sample Number	Q970350022	Q970350028	Q970350034	Q970370007	Q970370011	Q970370017	Q970370021
ORGANICS (ug/L)	.	.	.	.	.	.	.
	.	.	.	.	.	.	.
Acetone	4	7	10U	10U	10U	10U	10U
Bromoform	1	5U	5U	5U	5U	5U	5U
1,4-Dichloro-2-butene	2	5U	5U	5U	5U	5U	5U
Trans-1,4-Dichloro-2-butene	1	5U	5U	5U	5U	5U	5U
Ethylbenzene	5U	5U	5U	1	5U	5U	5U
2-Hexanone	1	10U	10U	10U	10U	10U	10U
4-Methyl-2-pentanone	1	10U	10U	10U	10U	10U	10U
1,1,2,2-Tetrachloroethane	2	5U	5U	5U	5U	5U	5U
1,2,3-Trichloropropane	1	5U	5U	5U	5U	5U	5U

APPENDIX E.3
Organic Analytes Detected in Laboratory Blank Samples, Second Quarter 1997

Sample Number	Q970940069	Q970980026	Q971110050	Q971110053	Q971210004	Q971250043	Q971250063	Q971270006
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.
Acetone	10U	10U	10U	10U	6	7	7	5
2-Butanone	10U	10U	10U	10U	10	10	11	10
Methylene chloride	5U	5U	5U	5U	1	1	1	1

(CONTINUED)

Sample Number	Q971430037
ORGANICS (ug/L)	.
	.
Acetone	3
2-Butanone	4
Methylene chloride	5U

APPENDIX E.3
Organic Analytes Detected in Laboratory Blank Samples, Third Quarter 1997

Sample Number	Q971920033	Q972020030	Q972030001	Q972040038	Q972060080	Q972110061	Q972160010	Q972200091
ORGANICS (ug/L)	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.
Acetone	10U	3	2	10	4	5	4	6
2-Butanone	10U	1	3	3	7	9	7	6
Ethanol	500U	500U	500U	500U	500U	170	500U	500U

APPENDIX E.3
Organic Analytes Detected in Laboratory Blank Samples, Fourth Quarter 1997

Sample Number	Q972930120	Q972950071	Q973370118	Q973380053	Q973380056	Q973380059	Q973380114
ORGANICS (ug/L)							
Acetone	1	10U	10U	10U	5	10U	1
Acrolein	10U	10U	10U	10U	3	10U	10U
Acrylonitrile	10U	10U	10U	10U	2	10U	10U
2-Butanone	3	10U	12	10U	3	10U	4
Chlorobenzene	5U	5U	5U	5U	1	5U	5U
1,2-Dichloroethene	5U	5U	5U	5U	2	5U	5U
cis-1,2-Dichloroethene	5U	5U	5U	5U	1	5U	5U
trans-1,2-Dichloroethene	5U	5U	5U	5U	1	5U	5U
Dimethylbenzene	5U	5U	5U	5U	4	5U	5U
Ethylbenzene	5U	5U	5U	5U	4	5U	5U
Ethyl methacrylate	5U	5U	5U	5U	2	5U	5U
2-Hexanone	10U	10U	10U	10U	4	10U	10U
4-Methyl-2-pentanone	10U	10U	10U	10U	2	10U	10U
Methylene chloride	5U	5U	2	5U	5U	5U	5U
Styrene	5U	5U	5U	5U	1	5U	5U
Tetrachloroethene	5U	5U	5U	5U	2	5U	1
Toluene	5U	5U	5U	5U	1	5U	5U
1,1,2-Trichloroethane	5U	5U	5U	5U	1	5U	5U
1,2,3-Trichloropropane	5U	5U	5U	5U	1	5U	5U

APPENDIX E.4

EQUIPMENT RINSATE DATA SUMMARY

APPENDIX E.4
Organic Analytes Detected in Equipment Rinsate Samples, CY 1997

Associated Well	1090	GW-141	GW-142	GW-143	GW-145	GW-305	GW-544	GW-609
Date Sampled	04/16/97	07/23/97	05/01/97	05/01/97	05/01/97	01/08/97	04/02/97	01/14/97
Pump Number	11	11	2	11	6	6	6	5
ORGANICS (ug/L)								
Acetone	10U	6	26	7	89	3	12	10U
Acrylonitrile	10U	10U	10U	10U	3	10U	10U	10U
2-Butanone	10U	10	4	9	38	10U	10U	10U
Chloroform	5	1	4	4	7	5U	16	10
Iodomethane	5U	5U	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5	5U	5U
Ethanol	500U	500U	500U	500U	270	500U	500U	500U
2-Hexanone	10U	10U	10U	10U	3	10U	10U	10U
4-Methyl-2-pentanone	10U	10U	10U	10U	2	10U	10U	10U
Methylene chloride	5U	5U	5U	1	5U	5U	5U	5U
Tetrachloroethene	2	5U	5U	5U	5U	5U	5U	5U

(CONTINUED)

Associated Well	GW-609	GW-709	GW-798		GW-801	
Date Sampled	07/24/97	04/02/97	01/16/97	07/15/97	01/15/97	07/10/97
Pump Number	8	4	4	11	7	11
ORGANICS (ug/L)						
Acetone	4	14	10U	8	10U	13
Acrylonitrile	10U	10U	10U	10U	10U	10U
2-Butanone	8	10U	10U	3	10U	10U
Chloroform	5U	13	5U	1	13	1
Iodomethane	5U	5U	5U	5U	5U	5U
Dimethylbenzene	5U	5U	5U	5U	5U	5U
Ethanol	500U	500U	500U	500U	500U	500U
2-Hexanone	10U	10U	10U	10U	10U	10U
4-Methyl-2-pentanone	10U	10U	10U	10U	10U	10U
Methylene chloride	5U	5U	5U	5U	5U	5U
Tetrachloroethene	5U	5U	5U	5U	5U	5U

APPENDIX E.4
Inorganic Analytes in Equipment Rinsate Samples, CY 1997

Associated Well	1090	GW-141	GW-142		GW-143		GW-145		GW-156	GW-305
Date Sampled	04/16/97	07/23/97	05/01/97	08/07/97	05/01/97	08/07/97	05/01/97	08/07/97	04/24/97	01/08/97
Pump Number	11	11	2	2	11	8	6	7	8	6
METALS (mg/L)	.	.	.	.	.	.	.	.	.	.
Aluminum	0.032	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.044
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.001	<0.001	0.023	0.11	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001
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	<0.004	<0.004	<0.004	<0.004	<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	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	<0.005	0.023	0.12	0.14	0.078	<0.005	<0.005	0.0068	0.073	<0.005
Lead (PMS)	0.0012	0.0014	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	0.0012
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	0.0012	0.005	<0.001	<0.001	<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	<0.01	<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	<0.0004	<0.0004	0.029	0.013	0.022	<0.0004	0.15	0.021	0.00092	0.0004
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.0013	<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	<0.002	0.009	<0.002	0.0029	0.0022	0.0033	<0.002	0.0033	<0.002	<0.002
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.	.
Calcium	0.38	0.14	1.4	<5	0.19	0.071	0.97	<5	1.7	0.46
Magnesium	0.2	0.03	0.72	0.061	0.043	0.013	0.7	0.075	0.8	0.27
Potassium	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Sodium	<0.02	<0.02	0.021	<0.02	<0.02	0.025	0.063	<0.02	0.055	<0.02
Alkalinity-HCO3	6	4	.	.	.	.	.	.	.	2
Alkalinity-CO3	<1	<1	.	.	.	.	.	.	.	<1
Chloride	<0.05	<0.05	.	.	.	.	.	.	.	<0.05
Fluoride	<0.1	<0.1	.	.	.	.	.	.	.	<0.1
Nitrate-N	<0.028	<0.028	.	.	.	.	.	.	.	<0.028
Sulfate	<0.25	<0.25	.	.	.	.	.	.	.	<0.25
MISC. ANALYTES	.	.	.	.	.	.	.	.	.	.
Conductivity (umho/cm)	1	1.1	.	.	.	.	.	.	.	1.3
pH (pH units)	7.22	6.89	.	.	.	.	.	.	.	7.19
TDS (mg/L)	13	8	.	.	.	.	.	.	.	20
TSS (mg/L)	<1	<1	.	<1	.	<1	.	<1	.	<1
Turbidity (NTU)	0.343	0.288	.	2.45	.	0.109	.	0.945	.	1.58

(CONTINUED)

APPENDIX E.4
Inorganic Analytes in Equipment Rinsate Samples, CY 1997

Associated Well	GW-544	GW-609		GW-709	GW-732	GW-798		GW-801	
Date Sampled	04/02/97	01/14/97	07/24/97	04/02/97	04/24/97	01/16/97	07/15/97	01/15/97	07/10/97
Pump Number	6	5	8	4	6	4	11	7	11
METALS (mg/L)	.	.	.	.	.	.	.	.	.
Aluminum	<0.02	<0.02	<0.02	<0.02	<0.02	0.08	<0.02	0.021	0.068
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic (PMS)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.001	<0.001	<0.001	0.0036	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Boron	<0.004	0.0045	<0.004	<0.004	<0.004	<0.004	<0.004	0.005	<0.004
Cadmium	<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
Cobalt	<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
Iron	0.021	<0.005	<0.005	<0.005	0.25	0.008	0.0058	<0.005	0.053
Lead (PMS)	<0.0005	<0.0005	0.002	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	0.0015
Lithium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Manganese	<0.001	<0.001	<0.001	<0.001	0.0011	<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
Molybdenum	<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
Selenium	<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
Strontium	<0.0004	<0.0004	<0.0004	<0.0004	0.0011	0.00057	0.00054	0.00052	0.00073
Thallium (PMS)	<0.0005	<0.0005	<0.0005	<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
Uranium (PMS)	<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
Zinc	0.0042	0.011	<0.002	0.0039	<0.002	0.0087	<0.002	0.011	0.0068
MAJOR IONS (mg/L)	.	.	.	.	.	.	.	.	.
Calcium	0.23	0.2	0.19	0.15	1.5	0.36	0.06	0.11	0.18
Magnesium	0.06	0.06	0.072	0.054	0.81	0.077	0.009	0.021	0.059
Potassium	<0.6	<0.6	<0.6	<0.6	<0.6	0.73	<0.6	<0.6	<0.6
Sodium	<0.02	<0.02	0.056	0.022	0.043	0.089	<0.02	<0.02	<0.02
Alkalinity-HCO3	4	4	6	4	.	4	2	4	4
Alkalinity-CO3	<1	<1	<1	<1	.	<1	<1	<1	<1
Chloride	<0.05	<0.05	<0.05	<0.05	.	0.052	<0.05	<0.05	<0.05
Fluoride	<0.1	<0.1	<0.1	<0.1	.	<0.1	<0.1	<0.1	<0.1
Nitrate-N	<0.028	<0.028	<0.028	<0.028	.	<0.028	<0.028	<0.028	<0.028
Sulfate	<0.25	<0.25	<0.25	<0.25	.	<0.25	<0.25	<0.25	<0.25
MISC. ANALYTES	.	.	.	.	.	.	.	.	.
Conductivity (umho/cm)	2.6	1.7	1.7	3.1	.	1.5	2.2	3.1	1.4
pH (pH units)	5.82	7.12	7.03	7.13	.	8.07	5.43	7.68	6.13
TDS (mg/L)	7	164	<1	<1	.	28	18	8	29
TSS (mg/L)	<1	<1	<1	<1	.	1	<1	<1	<1
Turbidity (NTU)	0.799	2.36	0.227	0.87	.	1.08	0.074	0.425	0.173

APPENDIX E.4
Radiological Analytes in Equipment Rinsate Samples, 1997

Associated Well	1090			GW-141			GW-305		
Date Sampled	04/16/97			07/23/97			01/08/97		
Pump Number	11			11			6		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0	2.3	6.9	-0.27	0.7	3	0.17	1.8	5.6
Gross Beta	0.4	5.8	22	-2.7	2.8	14	-0.21	4.1	12
Americium 241	.	.	.	-0.042	0.12	0.32	-0.078	0.15	0.46
Iodine 129	.	.	.	-7.5	12	18	-3	11	17
Neptunium 237	.	.	.	-0.02	0.11	0.31	-0.042	0.059	0.25
Plutonium 238	.	.	.	0.064	0.1	0.18	0.17	0.22	0.34
Plutonium 239	.	.	.	-0.011	0.078	0.23	0.12	0.2	0.34
Radium 223/224/226	.	.	.	0.035	0.52	1.6	-0.16	0.48	1.8
Strontium 89/90	0	1.8	3.1	1.6	5.4	9.3	11	7.2	15
Technetium 99	.	.	.	-2	3.9	6.3	8	9	13
Tritium	.	.	.	-230	500	850	-52	220	370
Uranium 234	.	.	.	0.098	0.11	0.089	-0.022	0.16	0.46
Uranium 235	.	.	.	.	.	.	-0.039	0.079	0.37
Uranium 238	.	.	.	0.13	0.21	0.35	-0.039	0.079	0.37

(CONTINUED)

Associated Well	GW-544			GW-609					
Date Sampled	04/02/97			01/14/97			07/24/97		
Pump Number	6			5			8		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	0.3	3.4	9.3	-0.64	2.4	5.4	-0.33	0.97	3.5
Gross Beta	5.1	8.4	28	5	6	12	2.6	3.4	12
Americium 241	.	.	.	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.	.	.	.
Radium 223/224/226	.	.	.	.	.	.	.	.	.
Strontium 89/90	.	.	.	.	.	.	.	.	.
Technetium 99	.	.	.	.	.	.	.	.	.
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	.	.	.	.	.	.	.	.	.
Uranium 235	.	.	.	.	.	.	.	.	.
Uranium 238	.	.	.	.	.	.	.	.	.

(CONTINUED)

APPENDIX E.4
Radiological Analytes in Equipment Rinsate Samples, 1997

Associated Well	GW-709			GW-798					
Date Sampled	04/02/97			01/16/97			07/15/97		
Pump Number	4			4			11		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.	.	.	.
Gross Alpha	1.5	3.1	7.2	-0.99	3.5	7	-0.33	0.98	3.6
Gross Beta	3.2	6.4	23	-8.3	9.3	15	-2.6	2.9	14
Americium 241	.	.	.	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.	.	.	.
Radium 223/224/226	.	.	.	.	.	.	.	.	.
Strontium 89/90	.	.	.	.	.	.	.	.	.
Technetium 99	.	.	.	.	.	.	.	.	.
Tritium	.	.	.	.	.	.	.	.	.
Uranium 234	.	.	.	.	.	.	.	.	.
Uranium 235	.	.	.	.	.	.	.	.	.
Uranium 238	.	.	.	.	.	.	.	.	.

(CONTINUED)

Associated Well	GW-801					
Date Sampled	01/15/97			07/10/97		
Pump Number	7			11		
Sample Type	ACT	ERR	MDA	ACT	ERR	MDA
ACTIVITY (pCi/L)	.	.	.	.	.	.
Gross Alpha	0.91	2.8	5.5	-0.66	0.72	3.6
Gross Beta	-4.6	6.6	12	0.5	3.7	15
Americium 241	.	.	.	.	.	.
Iodine 129	.	.	.	.	.	.
Neptunium 237	.	.	.	.	.	.
Plutonium 238	.	.	.	.	.	.
Plutonium 239	.	.	.	.	.	.
Radium 223/224/226	.	.	.	.	.	.
Strontium 89/90	.	.	.	.	.	.
Technetium 99	.	.	.	.	.	.
Tritium	.	.	.	.	.	.
Uranium 234	.	.	.	.	.	.
Uranium 235	.	.	.	.	.	.
Uranium 238	.	.	.	.	.	.

APPENDIX E.5

FIELD BLANK DATA SUMMARY

APPENDIX E.5
Organic Analytes Detected in Field Blank Samples, CY 1997

Associated Well	GW-796	GW-801
Date Sampled	07/10/97	01/15/97
ORGANICS (ug/L)	.	.
Acetone	8	10U
Chloroform	1	14

APPENDIX F
DATA SCREENING PROCESS AND DQO CRITERIA

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List of Acronyms and Abbreviations

BQR	blank qualification result
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CY	calendar year
DQO	data quality objective
MDA	minimum detectable activity
μg/L	micrograms per liter
mg/L	milligrams per liter
pCi/L	picoCuries per liter
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
VOC	volatile organic compound

F.1 INTRODUCTION

The following sections describe the process used to identify groundwater and surface water quality data that do not meet data quality objectives (DQOs) of the Resource Conservation and Recovery Act (RCRA) monitoring program in the Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime), as defined in the *Y-12 Plant Groundwater Protection Program - Groundwater Monitoring Program Data Management Plan* (Martin Marietta Energy Systems, Inc. 1993). The DQOs apply to the groundwater and surface water quality data obtained during calendar year (CY) 1997 for the purposes of: (1) RCRA post-closure corrective action monitoring and RCRA post-closure detection monitoring, (2) detection monitoring per applicable requirements of the operating permits issued by the TDEC for several nonhazardous solid waste disposal facilities, (3) site-specific monitoring performed in accordance with the applicable Comprehensive Environmental Response, Compensation, and Liability Act Record of Decision, and (4) regime-wide DOE Order 5400.1 surveillance monitoring and exit pathway/perimeter 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 6 in Appendix B for the 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 Results	.	●	●	.	.	.
Ion Charge Balance Errors	●	●	.	.	.	.
False-Positive Results	.	.	.	●	.	.
MDAs/Counting Errors	.	.	.	.	●	.

Analytical results for the specified groups of analytes that do not meet the specified DQO criteria are replaced with a designated surrogate value (i.e., screened) for data evaluation purposes. Details

regarding the data screening process, and summary tables of the CY 1997 groundwater and surface water quality data that do not meet applicable DQOs, are provided in the following sections.

F.2 SCREENED RESULTS FOR DUPLICATE SAMPLES

Duplicate groundwater samples were collected from 14 monitoring wells during CY 1997, including six wells (GW-144, GW-156, GW-231, GW-557, GW-731, and GW-801) used for RCRA Monitoring. Duplicate samples were analyzed for the suite of laboratory analytes required by the applicable monitoring program. Corresponding results for duplicate samples that differ by an order-of-magnitude or more were replaced with a missing value (i.e., no analytical result). Total zinc concentrations reported for the original and duplicate unfiltered groundwater samples collected from well GW-144 in April 1997 show such a difference: 0.0025 milligrams per liter (mg/L) and 0.039 mg/L, respectively (Appendix D.1).

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. Results were replaced with missing values if the dissolved (filtered) concentration exceeded the corresponding total (unfiltered) concentration by an order-of-magnitude or more. Such differences occur between the total and dissolved lead concentrations reported for the samples collected from well GW-231 (<0.0005 and 0.0051 mg/L) on May 1, 1997 and the samples collected from spring SCR2.2SP (<0.0005 and 0.13 mg/L) in July 1997; the total and dissolved iron concentrations reported for well GW-231 (0.0069 and 0.076 mg/L) on November 13, 1997; and the total and dissolved boron concentrations reported for the duplicate samples collected from well GW-564 (0.0054 and 0.058 mg/L) in January 1997 (Appendix D.1).

F.4 SCREENED RESULTS FOR PRINCIPAL IONS

Analytical results 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 (filtered sample) cations (which exclude digested cations)

and the total (unfiltered sample) anions is equal to or greater than 20%, results for all the principal ions were considered qualitative (i.e., excluded from quantitative evaluation). Charge balance RPDs determined for all the groundwater samples collected during CY 1997 in the Chestnut Ridge Regime were less than 20%.

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 calculate blank qualification results (BQRs) and identify false-positive results (i.e., sampling and/or analytical artifacts) for VOCs; these results were replaced with zero as a surrogate value. A false-positive result is defined as a VOC concentration, reported in micrograms per liter (μg/L), that is less than the BQR for the respective compound. The BQRs for acetone, methylene chloride, toluene, and 2-butanone (common laboratory reagents) represent the highest concentration in either associated blank sample multiplied by a factor of 10; BQRS for all other VOCs are similarly calculated using a factor of 5 (U.S. Environmental Protection Agency 1988).

As shown in Table F-2, a total of 149 false-positive VOCs results were reported for the groundwater and surface water samples collected in the Chestnut Ridge Regime during CY 1997, most of which (92%) are for acetone, 2-butanone, and methylene chloride (i.e., common laboratory reagents).

Table F-2. False-Positive VOC Results in the Chestnut Ridge Regime

Compound	Number of Detected Results	Number of False Positives
Acetone	69	63
2-Butanone	49	48
Methylene chloride	26	26
Chloroform	17	9
1,2-Dichloroethane	1	1
2-Hexanone	1	1
Tetrachloroethene	11	1

The preponderance of false-positive results for laboratory reagents suggest contamination during laboratory analysis. However, all of the false-positive results for chloroform reflect contamination

of the trip blank samples and not the laboratory blank samples. This suggests systemic contamination of the source of deionized water used to prepare many of the trip blank samples during CY 1997.

A total of 105 false-positive results for the VOCs listed above were reported for groundwater samples collected for RCRA monitoring purposes. However, only chloroform, 1,2-dichloroethane, and tetrachloroethene are RCRA groundwater target compounds (see Table 8 in Appendix B). All of these false-positive results were reported for samples collected from wells at Kerr Hollow Quarry for RCRA post-closure detection monitoring. Only chloroform and tetrachloroethene are RCRA constituents at this site and these results are shown on Table F-3.

Table F-3. False-Positive VOC Results for RCRA Constituents at Kerr Hollow Quarry

Compound	Well Number	Date Sampled	Result (µg/L)	BQR	
				Lab. Blank	Trip Blank
Chloroform	GW-142	04/30/97	2 J	.	125
Tetrachloroethene	GW-142	11/14/97	1 J	5	.
Chloroform	GW-143	04/30/97	2 J	.	125
Chloroform	GW-143	05/01/97	2 J	.	5
Chloroform	GW-144	04/29/97	1 J	.	5
Chloroform	GW-144	04/30/97	2 J	.	125
Chloroform	GW-144	05/01/97	1 J	.	20
Chloroform	GW-144	04/29/97 D	1 J	.	5
Chloroform	GW-144	04/30/97 D	1 J	.	125
Chloroform	GW-144	05/01/97 D	1 J	.	20

J = Estimated value below reporting limit; D = Duplicate sample

None of these false-positive results impacted the required evaluations of the RCRA post-closure detection monitoring data for Kerr Hollow Quarry.

F.6 SCREENED RESULTS FOR RADIOANALYTES

Results for radioanalytes (gross alpha, gross beta, and radioisotopes) were screened based on the counting error reported with each result. The counting error, reported in picoCuries per liter (pCi/L), expresses the degree of analytical uncertainty, and is defined as twice the standard deviation of the sample activity. Results were replaced with missing values if the reported activity for each radioanalyte exceeds the specified minimum detectable activity (MDA), but is less than the reported

counting error. Only the gross alpha result reported for the groundwater sample collected April 30, 1997 from Kerr Hollow Quarry upgradient/background well GW-231 does not meet this DQO criteria; the gross alpha activity (1.1 pCi/L) exceeds the MDA (0.96 pCi/L) but is less than the counting error (1.2 pCi/L).

F.7 REFERENCES

Martin Marietta Energy Systems, Inc. 1993. *Y-12 Plant Groundwater Protection Program-Groundwater Monitoring Program Data Management Plan.* (Y/SUB/93-TK532C/1).

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

APPENDIX G

CY 1997 SEMIANNUAL RCRA POST-CLOSURE DETECTION MONITORING STATISTICAL EVALUATIONS

APPENDIX G.1

CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN
First 180-Day Reporting Period, CY 1997

LOCKHEED MARTIN ENERGY SYSTEMS, INC.

Post Office Box 2009
Oak Ridge, Tennessee 37831

July 18, 1997

Mr. Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
Fifth Floor, L&C Tower
401 Church Street
Nashville, Tennessee 37243-1535

Dear Mr. Tiesler:

Semiannual Post-Closure Statistical Evaluation of Groundwater Quality Data from the Chestnut Ridge Sediment Disposal Basin (CRSDB), Oak Ridge Y-12 Plant (TN3 89 009 0001), First, Semiannual Reporting Period for Calendar Year (CY) 1997

Condition IV.F.1 of the Resource Conservation and Recovery Act post-closure permit for the CRSDB (Permit TNHW-088) requires the permittee to determine, on a semiannual basis, whether there is a statistically significant increase over background values for specified parameters at the point of compliance. Sampling activities at the CRSDB for the first semiannual monitoring event of CY 1997 were completed on April 24, 1997, as part of the second quarter CY 1997 sampling schedule. Analyses of target list constituents and a statistical evaluation of analytical results were performed in accordance with permit Conditions IV.D and IV.G. Personnel from the Clean Water Department of the Environmental Compliance Organization received verified data and statistical evaluation results for the second semiannual sampling event from their data analysis subcontractor on July 16, 1997. The evaluations were completed in accordance with permit Condition IV.F.3, which requires that statistical analyses must be completed within 90 days after completion of semiannual sampling.

Analysis of variance calculations conducted for the first semiannual sampling event of CY 1997 indicated that one of the downgradient facility monitoring wells (Well GW-156) had statistically higher levels of total uranium than the upgradient well (Well GW-159). As required by the post-closure permit statistical method, intrawell comparisons of the second quarter CY 1997 total uranium results with historical levels were performed. This evaluation indicated that the second quarter CY 1997 total uranium results were actually less than historical values observed within the well. Also, comparison of the second quarter CY 1997 total uranium results with background upper tolerance limits was performed. This comparison showed that the total uranium levels in Well GW-156 were not greater than the upper tolerance limit. Because the intrawell and upper tolerance limit statistical tests did not confirm a statistical increase for total uranium in Well GW-156, a release is not evident.

Condition IV.H.2.(a) of Permit TNHW-088 requires notification to the Tennessee Department of Environment and Conservation Commissioner within seven days if post-closure statistical evaluations indicate a release of contaminants to groundwater. Because the statistical evaluations did not confirm a release of a target list constituent to groundwater, a formal seven-day notification is not required. This report and the synopsis of statistical results contained in Enclosure 1 are provided for informational and recordkeeping purposes. Also, for your information, Enclosure 2 contains the results of all analyses conducted during the first semiannual CY 1997 sampling event.

As discussed initially in the semiannual report for the first reporting period of CY 1996 (reference my letter to you dated August 27, 1996, entitled "Semiannual Post-Closure Statistical Determinations of Groundwater Quality Data from the Chestnut Ridge Sediment Disposal Basin [CRSDB], Oak Ridge Y-12 Plant [TN3 89 009 0001], First, 180-Day Reporting Period for Calendar Year [CY] 1996"), samples collected from upgradient Well GW-159 often exhibit a high level of total suspended solids, which can interfere with analyses of target list constituents. Also, sampling and redevelopment data indicate that water levels in Well GW-159 do not recover between the four consecutive, daily duplicate sampling events. Turbidity and suspended solids levels typically show large increases over the four-day sampling period and sample quality is adversely impacted. Accordingly, a post-closure permit modification proposal to use low-flow sampling methods and lengthen the interval between consecutive, duplicate samples has been prepared and presented to your staff. Future detection monitoring evaluations will be conducted according to any modifications negotiated as a result of this proposal.

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.

If you have any questions, please contact W. K. Jago at (423) 241-2572 or L. O. Vaughan at (423) 576-8108.

Very truly yours,

T. R. Butz
Y-12 Plant Manager

TRB:wkj

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SUMMARY OF POST-CLOSURE DETECTION MONITORING
AT THE CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN (CRSDB)
FIRST, SEMIANNUAL REPORTING PERIOD OF CALENDAR YEAR (CY) 1997

Conditions IV.D and IV.F of post-closure Permit TNHW-088 require specific sample collection protocols and a statistical evaluation of semiannual post-closure detection monitoring data. The required target list compounds are cadmium, chromium, lead, mercury, nickel, silver, and total uranium. Statistical evaluations are as follows:

1. Four replicate samples are collected at a suitable time interval to account for chemical variability in the groundwater system. Four replicate samples collected over four consecutive days (not more than 24 hours apart) are specified to comply with this requirement.

2. Statistical comparisons of target list compound concentrations at each groundwater monitoring well at the point of compliance with background values derived from the upgradient well (Well GW-159) are performed using a variance test. Analysis of variance (ANOVA) is specified for parametric data distribution. Alternately, a nonparametric variance test may be employed for non-normal data distribution.

3. If the variance test indicates that target list constituent concentrations are higher in downgradient wells as compared with the upgradient well, then comparison of target compound concentrations at each groundwater monitoring well with historical background data (upper tolerance limits [UTLs]) and data within each well (intrawell comparisons) will be conducted to establish whether the variance also exceeds the normal range of concentrations over time.

The two-part test is denoted in the post-closure permit to account for the considerable natural geochemical variability in the karst groundwater system that exists beneath the CRSDB. Both parts of the test must show a statistical increase for the test to be considered valid. The variance test compares the mean value of each target list compound concentration (calculated from the four replicate samples) at each downgradient well with the mean result at the upgradient well; the test is limited to data for the current sampling event. The UTL test compares individual downgradient well results with the maximum expected value (the UTL) for a constituent based on historical variability upgradient of the site. The within-well comparisons determine whether a particular result from a well is statistically greater than the range of historical concentrations observed within that particular well.

For the first semiannual sampling event of CY 1997, a high proportion of nondetected constituents resulted in nonparametric data distributions for all target list parameters. As a result, parametric ANOVA tests could not be conducted; rather, a nonparametric variance test (Kruskal-Wallis Test) was used. As shown in the summary table, the variance test indicated that no statistical differences exist among the four facility monitoring wells for any indicator parameter except total uranium. In the case of total uranium concentrations, downgradient Well GW-156 was significantly higher than the upgradient well (Well GW-159).

Because the variance test indicated that a downgradient well had a statistically higher indicator parameter concentration than the upgradient well, intrawell comparisons and comparisons with UTLs were performed. Results of these evaluations are presented on the attached summary tables. The intrawell comparisons showed that the questionable total uranium results for Well GW-156 were actually significantly less than historical values within the well. In addition, the total uranium

levels observed during the second quarter CY 1997 sampling event did not exceed background upper tolerance limit (0.0076 milligrams per liter). Based on these evaluations, total uranium concentrations do not exceed the levels observed historically either upgradient or downgradient of the CRSDB.

For the purposes of statistical evaluations, the following baseline assumptions were used:

1. As a conservative assumption for calculations conducted for the Kruskal-Wallis Test, the detection limit was substituted for analytical measurements reported as less than the detection limit.

2. As a conservative assumption for calculations conducted for the Wilcoxon Rank-Sum Test, the detection limit was substituted for analytical measurements reported as less than the detection limit.

3. Measurements reported at detection limits higher than those in the baseline period (1991 through 1994) were deleted from the ranking process.

4. Measurements reported at detection limits lower than those in the baseline period (1991 through 1994) were converted to the baseline (higher) detection limit in the ranking process.

5. The background total uranium upper tolerance limit was calculated at a 95 percent confidence factor and a 95 percent coverage using all available interim status data collected from upgradient Well GW-159 between CY 1986 and the third quarter of CY 1995.

KRUSKAL-WALLIS TEST RESULTS
(NONPARAMETRIC PROCEDURE USED INSTEAD OF 1-WAY ANOVA)
AND FOLLOW UP MULTIPLE COMPARISON TESTS,
IF INDICATED BY KRUSKAL WALLIS TEST RESULT

4 replicate measurements collected
at 1 upgradient and 3 downgradient wells during 2nd Quarter 1997

COMPARISON OF DOWNGRADIENT WELLS TO UPGRADIENT WELL

MEASURMENTS REPORTED AS <#, CONVERTED TO # FOR CALCULATIONS

SUMMARY OF KRUSKAL-WALLIS TEST RESULTS
AND MULTIPLE COMPARISON TESTS
CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN

PARAMETER	KRUSKAL-WALLIS TEST RESULT	MULTIPLE COMPARISON TEST RESULTS	
		(Iso-lines indicate "no difference")	Conclusion
Cadmium (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Chromium (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Lead (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Mercury (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Nickel (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Silver (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Uranium (mg/L)	There are statistical differences in the location parameter across 4 monitoring wells	GW-731 GW-732 GW-159 GW-156 ----------	GW-731 = GW-732 = GW-159 GW-156 > GW-731, > GW-732 > GW-159

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RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CADMIUM ICAP (MG/L)	RANK
1	GW-156	21APR97	<0.003	4
		22APR97	<0.003	8
		23APR97	<0.003	12
		24APR97	<0.003	16
2	GW-159	21APR97	<0.003	3
		22APR97	<0.003	7
		23APR97	<0.003	11
		24APR97	<0.003	15
3	GW-731	21APR97	<0.003	1
		22APR97	<0.003	6
		23APR97	<0.003	9
		24APR97	<0.003	13
4	GW-732	21APR97	<0.003	2
		22APR97	<0.003	5
		23APR97	<0.003	10
		24APR97	<0.003	14

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N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M7
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-156	4	34.0	34.0	0.0	8.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 3 Prob > CHISQ= 0.9999

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RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CHROMIUM ICAP (MG/L)	RANK
1	GW-156	21APR97	<0.01	4
		22APR97	<0.01	8
		23APR97	<0.01	12
		24APR97	<0.01	16
2	GW-159	21APR97	<0.01	3
		22APR97	<0.01	7
		23APR97	<0.01	11
		24APR97	<0.01	15
3	GW-731	21APR97	<0.01	1
		22APR97	<0.01	6
		23APR97	<0.01	9
		24APR97	<0.01	13
4	GW-732	21APR97	<0.01	2
		22APR97	<0.01	5
		23APR97	<0.01	10
		24APR97	<0.01	14

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N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M9
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-156	4	34.0	34.0	0.0	8.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 3 Prob > CHISQ= 0.9999

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RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	LEAD PMS (MG/L)	RANK
1	GW-732	24APR97	0.0009	2
		23APR97	0.0016	6
		22APR97	0.002	9
		21APR97	0.0044	15
2	GW-159	24APR97	0.00096	3
		21APR97	0.002	8
		22APR97	0.0021	10
		23APR97	0.0021	11
3	GW-731	24APR97	0.0009	1
		22APR97	0.0016	5
		21APR97	0.0027	13
		23APR97	0.0031	14
4	GW-156	23APR97	0.0011	4
		24APR97	0.0016	7
		22APR97	0.0025	12
		21APR97	0.044	16

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N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	34.5000000	34.0	8.20365772	8.62500000
GW-732	4	31.0000000	34.0	8.20365772	7.75000000
GW-159	4	32.5000000	34.0	8.20365772	8.12500000
GW-156	4	38.0000000	34.0	8.20365772	9.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.30646 DF= 3 Prob > CHISQ= 0.9588

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RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	MERCURY CVAA (MG/L)	RANK
1	GW-156	21APR97	<0.0002	4
		22APR97	<0.0002	8
		23APR97	<0.0002	12
		24APR97	<0.0002	16
2	GW-159	21APR97	<0.0002	3
		22APR97	<0.0002	7
		23APR97	<0.0002	11
		24APR97	<0.0002	15
3	GW-731	21APR97	<0.0002	1
		22APR97	<0.0002	6
		23APR97	<0.0002	9
		24APR97	<0.0002	13
4	GW-732	21APR97	<0.0002	2
		22APR97	<0.0002	5
		23APR97	<0.0002	10
		24APR97	<0.0002	14

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Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable HG
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-156	4	34.0	34.0	0.0	8.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 3 Prob > CHISQ= 0.9999

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Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	NICKEL ICAP (MG/L)	RANK
1	GW-159	21APR97	<0.01	3
		22APR97	<0.01	6
		23APR97	<0.01	10
		24APR97	<0.01	14
2	GW-731	21APR97	<0.01	1
		22APR97	<0.01	5
		23APR97	<0.01	8
		24APR97	<0.01	12
3	GW-732	21APR97	<0.01	2
		22APR97	<0.01	4
		23APR97	<0.01	9
		24APR97	<0.01	13
4	GW-156	22APR97	<0.01	7
		23APR97	<0.01	11
		24APR97	<0.01	15
		21APR97	0.027	16

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Anderson County, Tennessee

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M18
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	32.0	34.0	3.46410162	8.0
GW-732	4	32.0	34.0	3.46410162	8.0
GW-159	4	32.0	34.0	3.46410162	8.0
GW-156	4	40.0	34.0	3.46410162	10.0

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 3.0000 DF= 3 Prob > CHISQ= 0.3916

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RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	SILVER ICAP (MG/L)	RANK
1	GW-156	21APR97	<0.006	4
		22APR97	<0.006	8
		23APR97	<0.006	12
		24APR97	<0.006	16
2	GW-159	21APR97	<0.006	3
		22APR97	<0.006	7
		23APR97	<0.006	11
		24APR97	<0.006	15
3	GW-731	21APR97	<0.006	1
		22APR97	<0.006	6
		23APR97	<0.006	9
		24APR97	<0.006	13
4	GW-732	21APR97	<0.006	2
		22APR97	<0.006	5
		23APR97	<0.006	10
		24APR97	<0.006	14

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N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M21
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-156	4	34.0	34.0	0.0	8.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 3 Prob > CHISQ= 0.9999

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RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	URANIUM PMS (MG/L)	RANK
1	GW-731	21APR97	<0.0005	1
		22APR97	<0.0005	3
		24APR97	<0.0005	5
		23APR97	0.00054	7
2	GW-732	22APR97	<0.0005	2
		23APR97	<0.0005	4
		24APR97	<0.0005	6
		21APR97	0.0018	12
3	GW-159	22APR97	0.0011	8
		21APR97	0.0013	9
		24APR97	0.0014	10
		23APR97	0.0015	11
4	GW-156	24APR97	0.0019	13
		23APR97	0.002	14
		22APR97	0.0021	15
		21APR97	0.0027	16

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N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	17.5000000	34.0	8.03118920	4.3750000
GW-732	4	22.5000000	34.0	8.03118920	5.6250000
GW-159	4	38.0000000	34.0	8.03118920	9.5000000
GW-156	4	58.0000000	34.0	8.03118920	14.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 11.587 DF= 3 Prob > CHISQ= 0.0089

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Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee

Wells 731, 732, and 159

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	17.5000000	26.0	5.51581748	4.37500000
GW-732	4	22.5000000	26.0	5.51581748	5.62500000
GW-159	4	38.0000000	26.0	5.51581748	9.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 5.0070 DF= 2 Prob > CHISQ= 0.0818

1997 Groundwater Monitoring Report
Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee

Wells 732, 159, and 156

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-732	4	14.0	26.0	5.84652189	3.5000000
GW-159	4	22.0	26.0	5.84652189	5.5000000
GW-156	4	42.0	26.0	5.84652189	10.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 8.1135 DF= 2 Prob > CHISQ= 0.0173

1997 Groundwater Monitoring Report
Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee

Wells 731, and 732

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-731	4	17.5000000	18.0	2.64575131	4.37500000
GW-732	4	18.5000000	18.0	2.64575131	4.62500000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 17.5000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.03571 DF= 1 Prob > CHISQ= 0.8501

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Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee

Wells 732, and 159

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-732	4	14.0	18.0	3.38061702	3.50000000
GW-159	4	22.0	18.0	3.38061702	5.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 14.0000 Z= -1.03531 Prob > |Z| = 0.3005

T-Test approx. Significance = 0.3350

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 1.4000 DF= 1 Prob > CHISQ= 0.2367

1997 Groundwater Monitoring Report
Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee

Wells 159, and 156

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-159	4	10.0	18.0	3.46410162	2.50000000
GW-156	4	26.0	18.0	3.46410162	6.50000000

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 10.0000 Z= -2.16506 Prob > |Z| = 0.0304

T-Test approx. Significance = 0.0671

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 5.3333 DF= 1 Prob > CHISQ= 0.0209

COMPARISONS TO NON-PARAMETRIC UPPER TOLERANCE LIMITS

Summary of Upper Tolerance Limit Comparison Test for Total Uranium[1]

STATION NAME	RESULT in mg/L[2]	SAMPLE DATE	COMMENT
GW-156	0.0027	04/21/97	Doesn't Exceed UTL
GW-156	0.0021	04/22/97	Doesn't Exceed UTL
GW-156	0.002	04/23/97	Doesn't Exceed UTL
GW-156	0.0019	04/24/97	Doesn't Exceed UTL
GW-159	0.0013	04/21/97	Doesn't Exceed UTL
GW-159	0.0011	04/22/97	Doesn't Exceed UTL
GW-159	0.0015	04/23/97	Doesn't Exceed UTL
GW-159	0.0014	04/24/97	Doesn't Exceed UTL
GW-731	<0.0005	04/21/97	Doesn't Exceed UTL
GW-731	<0.0005	04/22/97	Doesn't Exceed UTL
GW-731	0.00054	04/23/97	Doesn't Exceed UTL
GW-731	<0.0005	04/24/97	Doesn't Exceed UTL
GW-732	0.0018	04/21/97	Doesn't Exceed UTL
GW-732	<0.0005	04/22/97	Doesn't Exceed UTL
GW-732	<0.0005	04/23/97	Doesn't Exceed UTL
GW-732	<0.0005	04/24/97	Doesn't Exceed UTL

(1) Parametric Upper Tolerance Limit=0.0076 mg/L, Coverage=95 percent, Confidence Coefficient=95 percent.

(2) mg/L = milligrams per liter.

WILCOXON RANK-SUM TEST
(NONPARAMETRIC PROCEDURE USED INSTEAD OF T-TEST)

INTRAWELL COMPARISONS OF 2ND QUARTER 1997 WELL MEASUREMENTS
TO HISTORIC MEASUREMENTS

MEASUREMENTS REPORTED AS <#
WERE CONVERTED TO # FOR CALCULATIONS

MEASUREMENTS REPORTED AT ELEVATED DETECTION LIMITS
WERE DELETED

MEASUREMENTS FOR ANALYTES REPORTED
AT MULTIPLE DETECTION LIMITS
WERE CONVERTED TO THE HIGHER DETECTION LIMIT

SUMMARY OF WILCOXON RANK-SUM TEST RESULTS
CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN

PARAMETER	WILCOXON RANK-SUM TEST	WELL	CONCLUSION
Cadmium (mg/L)	There are no statistical differences in the location parameter within wells		
Chromium (mg/L)	There are no statistical differences in the location parameter within wells		
Lead (mg/L)	There are no statistical differences in the location parameter within wells		
Mercury (mg/L)	There are no statistical differences in the location parameter within wells		
Nickel (mg/L)	There are no statistical differences in the location parameter within wells		
Silver (mg/L)	There are no statistical differences in the location parameter within wells		
Uranium (mg/L)	There are statistical differences in the location parameter within wells	GW-156	1997 Q2 < Historic

WELL	PERIOD	SAMPLE DATE	CADMIUM (MG/L)
GW-156	1997 Q2	04/21/97	<0.003
		04/22/97	<0.003
		04/23/97	<0.003
		04/24/97	<0.003
GW-156	Historic	08/20/92	.
		08/23/91	<0.003
		10/30/91	<0.003
		02/14/92	<0.003
		05/09/92	<0.003
		08/17/92	<0.003
		11/13/92	<0.003
		02/24/93	<0.003
		06/15/93	<0.003
		08/12/93	<0.003
		11/30/93	<0.003
		02/12/94	<0.003
		04/07/94	<0.003
		07/09/94	<0.003
		10/20/94	<0.003
GW-159	1997 Q2	04/21/97	<0.003
		04/22/97	<0.003
		04/23/97	<0.003
		04/24/97	<0.003
GW-159	Historic	08/20/92	.
		04/05/94	.
		08/23/91	<0.003
		10/29/91	<0.003
		02/13/92	<0.003
		05/09/92	<0.003
		08/15/92	<0.003
		11/09/92	<0.003
		02/22/93	<0.003
		06/14/93	<0.003
		08/10/93	<0.003
		11/29/93	<0.003
		02/10/94	<0.003
		04/04/94	<0.003
		07/08/94	<0.003
		10/17/94	<0.003
GW-731	1997 Q2	04/21/97	<0.003
		04/22/97	<0.003

WELL	PERIOD	SAMPLE DATE	CADMIUM (MG/L)
GW-731	1997 Q2	04/23/97	<0.003
		04/24/97	<0.003
GW-731	Historic	08/20/92	.
		09/27/91	<0.003
		10/31/91	<0.003
		02/15/92	<0.003
		05/09/92	<0.003
		08/16/92	<0.003
		11/11/92	<0.003
		02/23/93	<0.003
		06/15/93	<0.003
		08/11/93	<0.003
		11/29/93	<0.003
		02/11/94	<0.003
		04/04/94	<0.003
		07/09/94	<0.003
		10/18/94	<0.003
GW-732	1997 Q2	04/21/97	<0.003
		04/22/97	<0.003
		04/23/97	<0.003
		04/24/97	<0.003
GW-732	Historic	08/20/92	.
		09/27/91	<0.003
		10/30/91	<0.003
		02/14/92	<0.003
		05/09/92	<0.003
		08/16/92	<0.003
		11/12/92	<0.003
		02/23/93	<0.003
		06/15/93	<0.003
		08/12/93	<0.003
		11/30/93	<0.003
		02/12/94	<0.003
		04/06/94	<0.003
		07/09/94	<0.003
		10/19/94	<0.003

WELL	PERIOD	SAMPLE DATE	CHROMIUM (MG/L)
GW-156	1997 Q2	04/21/97	<0.01
		04/22/97	<0.01
		04/23/97	<0.01
		04/24/97	<0.01
GW-156	Historic	08/20/92	.
		08/23/91	<0.01
		10/30/91	<0.01
		02/14/92	<0.01
		08/17/92	<0.01
		11/13/92	<0.01
		02/24/93	<0.01
		06/15/93	<0.01
		08/12/93	<0.01
		11/30/93	<0.01
		02/12/94	<0.01
		04/07/94	<0.01
		07/09/94	<0.01
		10/20/94	<0.01
		05/09/92	0.01
GW-159	1997 Q2	04/21/97	<0.01
		04/22/97	<0.01
		04/23/97	<0.01
		04/24/97	<0.01
GW-159	Historic	08/20/92	.
		04/05/94	.
		08/23/91	<0.01
		10/29/91	<0.01
		02/13/92	<0.01
		05/09/92	<0.01
		08/15/92	<0.01
		11/09/92	<0.01
		02/22/93	<0.01
		06/14/93	<0.01
		08/10/93	<0.01
		11/29/93	<0.01
		02/10/94	<0.01
		04/04/94	<0.01
		07/08/94	<0.01
		10/17/94	<0.01
GW-731	1997 Q2	04/21/97	<0.01
		04/22/97	<0.01

WELL	PERIOD	SAMPLE DATE	CHROMIUM (MG/L)
GW-731	1997 Q2	04/23/97	<0.01
		04/24/97	<0.01
GW-731	Historic	08/20/92	.
		09/27/91	<0.01
		10/31/91	<0.01
		02/15/92	<0.01
		08/11/93	<0.01
		11/29/93	<0.01
		02/11/94	<0.01
		04/04/94	<0.01
		07/09/94	<0.01
		10/18/94	<0.01
		02/23/93	0.01
		11/11/92	0.012
		06/15/93	0.013
		05/09/92	0.016
		08/16/92	0.022
GW-732	1997 Q2	04/21/97	<0.01
		04/22/97	<0.01
		04/23/97	<0.01
		04/24/97	<0.01
GW-732	Historic	08/20/92	.
		09/27/91	<0.01
		10/30/91	<0.01
		02/14/92	<0.01
		05/09/92	<0.01
		08/16/92	<0.01
		11/12/92	<0.01
		02/23/93	<0.01
		06/15/93	<0.01
		08/12/93	<0.01
		11/30/93	<0.01
		02/12/94	<0.01
		04/06/94	<0.01
		07/09/94	<0.01
		10/19/94	<0.01

WELL	PERIOD	SAMPLE DATE	LEAD (MG/L)
GW-156	1997 Q2	04/22/97	<0.004
		04/23/97	<0.004
		04/24/97	<0.004
		04/21/97	0.044
GW-156	Historic	08/20/92	.
		08/23/91	<0.004
		10/30/91	<0.004
		02/14/92	<0.004
		02/24/93	<0.004
		06/15/93	<0.004
		11/30/93	<0.004
		02/12/94	<0.004
		04/07/94	<0.004
		07/09/94	<0.004
		10/20/94	<0.004
		11/13/92	0.005
		08/12/93	0.0054
		08/17/92	0.0099
		05/09/92	0.027
GW-159	1997 Q2	04/21/97	<0.004
		04/22/97	<0.004
		04/23/97	<0.004
		04/24/97	<0.004
GW-159	Historic	08/20/92	.
		04/05/94	.
		08/23/91	<0.004
		10/29/91	<0.004
		02/13/92	<0.004
		05/09/92	<0.004
		11/09/92	<0.004
		02/22/93	<0.004
		06/14/93	<0.004
		08/10/93	<0.004
		11/29/93	<0.004
		02/10/94	<0.004
		04/04/94	<0.004
		07/08/94	<0.004
		10/17/94	<0.004
		08/15/92	0.0058
GW-731	1997 Q2	04/21/97	<0.004
		04/22/97	<0.004

WELL	PERIOD	SAMPLE DATE	LEAD (MG/L)
GW-731	1997 Q2	04/23/97	<0.004
		04/24/97	<0.004
GW-731	Historic	08/20/92	.
		09/27/91	<0.004
		10/31/91	<0.004
		02/15/92	<0.004
		11/29/93	<0.004
		02/11/94	<0.004
		04/04/94	<0.004
		07/09/94	<0.004
		10/18/94	<0.004
		08/11/93	0.0078
		11/11/92	0.021
		06/15/93	0.032
		02/23/93	0.036
		05/09/92	0.066
		08/16/92	0.068
GW-732	1997 Q2	04/22/97	<0.004
		04/23/97	<0.004
		04/24/97	<0.004
		04/21/97	0.0044
GW-732	Historic	08/20/92	.
		09/27/91	<0.004
		10/30/91	<0.004
		02/14/92	<0.004
		05/09/92	<0.004
		08/16/92	<0.004
		11/12/92	<0.004
		02/23/93	<0.004
		08/12/93	<0.004
		02/12/94	<0.004
		04/06/94	<0.004
		06/15/93	0.012
		07/09/94	0.013
		10/19/94	0.019
		11/30/93	0.022

WELL	PERIOD	SAMPLE DATE	MERCURY CVAA (MG/L)
GW-156	1997 Q2	04/21/97	<0.0002
		04/22/97	<0.0002
		04/23/97	<0.0002
		04/24/97	<0.0002
GW-156	Historic	08/20/92	.
		08/23/91	<0.0002
		10/30/91	<0.0002
		02/14/92	<0.0002
		05/09/92	<0.0002
		08/17/92	<0.0002
		11/13/92	<0.0002
		02/24/93	<0.0002
		06/15/93	<0.0002
		08/12/93	<0.0002
		11/30/93	<0.0002
		02/12/94	<0.0002
		04/07/94	<0.0002
		07/09/94	<0.0002
		10/20/94	<0.0002
GW-159	1997 Q2	04/21/97	<0.0002
		04/22/97	<0.0002
		04/23/97	<0.0002
		04/24/97	<0.0002
GW-159	Historic	08/20/92	.
		04/05/94	.
		10/29/91	<0.0002
		02/13/92	<0.0002
		05/09/92	<0.0002
		08/15/92	<0.0002
		11/09/92	<0.0002
		02/22/93	<0.0002
		06/14/93	<0.0002
		08/10/93	<0.0002
		11/29/93	<0.0002
		02/10/94	<0.0002
		04/04/94	<0.0002
		07/08/94	<0.0002
		10/17/94	<0.0002
		08/23/91	0.00037
GW-731	1997 Q2	04/21/97	<0.0002
		04/22/97	<0.0002

WELL	PERIOD	SAMPLE DATE	MERCURY CVAA (MG/L)
GW-731	1997 Q2	04/23/97	<0.0002
		04/24/97	<0.0002
GW-731	Historic	08/20/92	.
		09/27/91	<0.0002
		10/31/91	<0.0002
		02/15/92	<0.0002
		05/09/92	<0.0002
		08/16/92	<0.0002
		11/11/92	<0.0002
		06/15/93	<0.0002
		08/11/93	<0.0002
		11/29/93	<0.0002
		02/11/94	<0.0002
		04/04/94	<0.0002
		07/09/94	<0.0002
		10/18/94	<0.0002
		02/23/93	0.00023
GW-732	1997 Q2	04/21/97	<0.0002
		04/22/97	<0.0002
		04/23/97	<0.0002
		04/24/97	<0.0002
GW-732	Historic	08/20/92	.
		09/27/91	<0.0002
		10/30/91	<0.0002
		02/14/92	<0.0002
		05/09/92	<0.0002
		08/16/92	<0.0002
		11/12/92	<0.0002
		02/23/93	<0.0002
		06/15/93	<0.0002
		08/12/93	<0.0002
		11/30/93	<0.0002
		02/12/94	<0.0002
		04/06/94	<0.0002
		07/09/94	<0.0002
		10/19/94	<0.0002

WELL	PERIOD	SAMPLE DATE	NICKEL ICAP (MG/L)
GW-156	1997 Q2	04/22/97	<0.01
		04/23/97	<0.01
		04/24/97	<0.01
		04/21/97	0.027
GW-156	Historic	08/20/92	.
		10/30/91	<0.01
		02/14/92	<0.01
		05/09/92	<0.01
		08/17/92	<0.01
		06/15/93	<0.01
		11/30/93	<0.01
		02/12/94	<0.01
		04/07/94	<0.01
		07/09/94	<0.01
		10/20/94	<0.01
		11/13/92	0.013
		08/23/91	0.016
		02/24/93	0.018
		08/12/93	0.018
GW-159	1997 Q2	04/21/97	<0.01
		04/22/97	<0.01
		04/23/97	<0.01
		04/24/97	<0.01
GW-159	Historic	08/20/92	.
		04/05/94	.
		08/23/91	<0.01
		10/29/91	<0.01
		02/13/92	<0.01
		05/09/92	<0.01
		08/15/92	<0.01
		11/09/92	<0.01
		02/22/93	<0.01
		06/14/93	<0.01
		08/10/93	<0.01
		11/29/93	<0.01
		02/10/94	<0.01
		04/04/94	<0.01
		07/08/94	<0.01
		10/17/94	<0.01
GW-731	1997 Q2	04/21/97	<0.01
		04/22/97	<0.01

WELL	PERIOD	SAMPLE DATE	NICKEL ICAP (MG/L)
GW-731	1997 Q2	04/23/97	<0.01
		04/24/97	<0.01
GW-731	Historic	08/20/92	.
		09/27/91	<0.01
		10/31/91	<0.01
		02/15/92	<0.01
		11/29/93	<0.01
		02/11/94	<0.01
		04/04/94	<0.01
		07/09/94	<0.01
		10/18/94	<0.01
		11/11/92	0.013
		05/09/92	0.015
		08/11/93	0.023
		02/23/93	0.029
		06/15/93	0.029
		08/16/92	0.058
GW-732	1997 Q2	04/21/97	<0.01
		04/22/97	<0.01
		04/23/97	<0.01
		04/24/97	<0.01
GW-732	Historic	08/20/92	.
		09/27/91	<0.01
		10/30/91	<0.01
		02/14/92	<0.01
		05/09/92	<0.01
		08/16/92	<0.01
		02/23/93	<0.01
		06/15/93	<0.01
		08/12/93	<0.01
		11/30/93	<0.01
		02/12/94	<0.01
		04/06/94	<0.01
		07/09/94	<0.01
		10/19/94	<0.01
		11/12/92	0.024

WELL	PERIOD	SAMPLE DATE	SILVER ICAP (MG/L)
GW-156	1997 Q2	04/21/97	<0.006
		04/22/97	<0.006
		04/23/97	<0.006
		04/24/97	<0.006
GW-156	Historic	08/20/92	.
		08/23/91	<0.006
		10/30/91	<0.006
		02/14/92	<0.006
		05/09/92	<0.006
		08/17/92	<0.006
		11/13/92	<0.006
		02/24/93	<0.006
		06/15/93	<0.006
		08/12/93	<0.006
		11/30/93	<0.006
		02/12/94	<0.006
		04/07/94	<0.006
		07/09/94	<0.006
		10/20/94	<0.006
GW-159	1997 Q2	04/21/97	<0.006
		04/22/97	<0.006
		04/23/97	<0.006
		04/24/97	<0.006
GW-159	Historic	08/20/92	.
		04/05/94	.
		08/23/91	<0.006
		10/29/91	<0.006
		02/13/92	<0.006
		05/09/92	<0.006
		08/15/92	<0.006
		11/09/92	<0.006
		02/22/93	<0.006
		06/14/93	<0.006
		08/10/93	<0.006
		11/29/93	<0.006
		02/10/94	<0.006
		04/04/94	<0.006
		07/08/94	<0.006
		10/17/94	0.0064
GW-731	1997 Q2	04/21/97	<0.006
		04/22/97	<0.006

WELL	PERIOD	SAMPLE DATE	SILVER ICAP (MG/L)
GW-731	1997 Q2	04/23/97	<0.006
		04/24/97	<0.006
GW-731	Historic	08/20/92	.
		09/27/91	<0.006
		10/31/91	<0.006
		02/15/92	<0.006
		05/09/92	<0.006
		08/16/92	<0.006
		11/11/92	<0.006
		02/23/93	<0.006
		06/15/93	<0.006
		08/11/93	<0.006
		11/29/93	<0.006
		02/11/94	<0.006
		04/04/94	<0.006
		07/09/94	<0.006
		10/18/94	<0.006
GW-732	1997 Q2	04/21/97	<0.006
		04/22/97	<0.006
		04/23/97	<0.006
		04/24/97	<0.006
GW-732	Historic	08/20/92	.
		09/27/91	<0.006
		10/30/91	<0.006
		02/14/92	<0.006
		05/09/92	<0.006
		08/16/92	<0.006
		11/12/92	<0.006
		02/23/93	<0.006
		06/15/93	<0.006
		08/12/93	<0.006
		11/30/93	<0.006
		02/12/94	<0.006
		04/06/94	<0.006
		07/09/94	<0.006
		10/19/94	<0.006

WELL	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-156	1997 Q2	04/24/97	0.0019
		04/23/97	0.002
		04/22/97	0.0021
		04/21/97	0.0027
GW-156	Historic	08/20/92	.
		10/20/94	.
		08/12/93	0.002
		11/30/93	0.002
		02/12/94	0.002
		08/23/91	0.003
		10/30/91	0.003
		05/09/92	0.003
		08/17/92	0.003
		11/13/92	0.003
		06/15/93	0.003
		02/24/93	0.004
		02/14/92	0.005
		04/07/94	0.005
		07/09/94	0.007
GW-159	1997 Q2	04/22/97	0.0011
		04/21/97	0.0013
		04/24/97	0.0014
		04/23/97	0.0015
GW-159	Historic	08/20/92	.
		04/05/94	.
		10/17/94	.
		04/04/94	<0.001
		10/29/91	0.001
		02/13/92	0.001
		02/22/93	0.001
		08/10/93	0.001
		11/29/93	0.001
		02/10/94	0.001
		07/08/94	0.001
		08/23/91	0.002
		05/09/92	0.002
		08/15/92	0.002
		11/09/92	0.002
		06/14/93	0.002
GW-731	1997 Q2	04/21/97	<0.001
		04/22/97	<0.001

WELL	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-731	1997 Q2	04/23/97	<0.001
		04/24/97	<0.001
GW-731	Historic	08/20/92	.
		10/18/94	.
		09/27/91	<0.001
		11/29/93	<0.001
		02/11/94	<0.001
		04/04/94	<0.001
		10/31/91	0.001
		11/11/92	0.001
		02/23/93	0.001
		06/15/93	0.001
		08/11/93	0.001
		05/09/92	0.002
		08/16/92	0.002
		07/09/94	0.004
		02/15/92	0.01
GW-732	1997 Q2	04/22/97	<0.001
		04/23/97	<0.001
		04/24/97	<0.001
		04/21/97	0.0018
GW-732	Historic	08/20/92	.
		10/19/94	.
		10/30/91	<0.001
		02/14/92	<0.001
		05/09/92	<0.001
		08/16/92	<0.001
		11/12/92	<0.001
		02/23/93	<0.001
		04/06/94	<0.001
		09/27/91	0.001
		06/15/93	0.002
		08/12/93	0.002
		11/30/93	0.002
		02/12/94	0.002
		07/09/94	0.005

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M7_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M9_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	39.0	38.0	7.44039496	9.75000000
Historic	14	132.0	133.0	7.44039496	9.42857143

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 39.0000 Z= 0.067201 Prob > |Z| = 0.9464

T-Test approx. Significance = 0.9472

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.01806 DF= 1 Prob > CHISQ= 0.8931

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable HG
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M18
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	39.0	38.0	7.43424333	9.75000000
Historic	14	132.0	133.0	7.43424333	9.42857143

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 39.0000 Z= 0.067256 Prob > |Z| = 0.9464

T-Test approx. Significance = 0.9472

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.01809 DF= 1 Prob > CHISQ= 0.8930

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M21
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	17.500000	36.0	8.57921565	4.3750000
Historic	13	135.500000	117.0	8.57921565	10.4230769

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 17.5000 Z= -2.09809 Prob > |Z| = 0.0359

T-Test approx. Significance = 0.0521

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 4.6500 DF= 1 Prob > CHISQ= 0.0311

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M7_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M9_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 36.0000 Z= -.400892 Prob > |Z| = 0.6885

T-Test approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.28571 DF= 1 Prob > CHISQ= 0.5930

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable HG
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 36.0000 Z= -.400892 Prob > |Z| = 0.6885

T-Test approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.28571 DF= 1 Prob > CHISQ= 0.5930

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M18
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M21
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 36.0000 Z= -.400892 Prob > |Z| = 0.6885

T-Test approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.28571 DF= 1 Prob > CHISQ= 0.5930

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	42.0	36.0	8.24977718	10.5000000
Historic	13	111.0	117.0	8.24977718	8.5384615

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 42.0000 Z= 0.666685 Prob > |Z| = 0.5050

T-Test approx. Significance = 0.5145

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.52895 DF= 1 Prob > CHISQ= 0.4670

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M7_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M9_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	30.0	38.0	6.85803760	7.5000000
Historic	14	141.0	133.0	6.85803760	10.0714286

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 30.0000 Z= -1.09361 Prob > |Z| = 0.2741

T-Test approx. Significance = 0.2894

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 1.3608 DF= 1 Prob > CHISQ= 0.2434

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	26.0	38.0	7.90548746	6.5000000
Historic	14	145.0	133.0	7.90548746	10.3571429

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 26.0000 Z= -1.45469 Prob > |Z| = 0.1458

T-Test approx. Significance = 0.1640

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 2.3041 DF= 1 Prob > CHISQ= 0.1290

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable HG
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 36.0000 Z= -.400892 Prob > |Z| = 0.6885

T-Test approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.28571 DF= 1 Prob > CHISQ= 0.5930

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M18
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	26.0	38.0	7.89969802	6.5000000
Historic	14	145.0	133.0	7.89969802	10.3571429

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 26.0000 Z= -1.45575 Prob > |Z| = 0.1455

T-Test approx. Significance = 0.1637

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 2.3075 DF= 1 Prob > CHISQ= 0.1288

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M21
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	28.0	36.0	6.56584299	7.00000000
Historic	13	125.0	117.0	6.56584299	9.61538462

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 28.0000 Z= -1.14228 Prob > |Z| = 0.2533

T-Test approx. Significance = 0.2701

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 1.4846 DF= 1 Prob > CHISQ= 0.2231

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M7_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M9_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	35.0	38.0	7.44039496	8.75000000
Historic	14	136.0	133.0	7.44039496	9.71428571

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 35.0000 Z= -.336004 Prob > |Z| = 0.7369

T-Test approx. Significance = 0.7410

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.16257 DF= 1 Prob > CHISQ= 0.6868

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable HG
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M18
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 36.0000 Z= -.400892 Prob > |Z| = 0.6885

T-Test approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.28571 DF= 1 Prob > CHISQ= 0.5930

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M21
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 38.0000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 1 Prob > CHISQ= 0.9999

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	30.0	36.0	7.48429729	7.50000000
Historic	13	123.0	117.0	7.48429729	9.46153846

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 30.0000 Z= -.734872 Prob > |Z| = 0.4624

T-Test approx. Significance = 0.4731

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.64269 DF= 1 Prob > CHISQ= 0.4227

APPENDIX G.1

CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN
Second 180-Day Reporting Period, CY 1997

LOCKHEED MARTIN ENERGY SYSTEMS, INC.

Post Office Box 2009
Oak Ridge, Tennessee 37831

January 21, 1998

Mr. Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
Fifth Floor, L&C Tower
401 Church Street
Nashville, Tennessee 37243-1535

Dear Mr. Tiesler:

Semiannual Post-Closure Statistical Evaluation of Groundwater Quality Data from the Chestnut Ridge Sediment Disposal Basin (CRSDB), Oak Ridge Y-12 Plant (TN3 89 009 0001), Second, Semiannual Reporting Period for Calendar Year (CY) 1997

Condition IV.F.1 of the Resource Conservation and Recovery Act (RCRA) post-closure permit for the CRSDB (Permit Number TNHW-088) requires the permittee to determine, on a semiannual basis, whether there is a statistically significant increase over background values for specified parameters at the point of compliance. Sampling activities at the CRSDB for the second semiannual monitoring event of CY 1997 were completed on October 28, 1997, as part of the fourth quarter CY 1997 sampling schedule. Analyses of target list constituents and a statistical evaluation of analytical results were performed in accordance with permit Conditions IV.D and IV.G. Personnel from Lockheed Martin Energy Systems, Inc., co-operator of the facility, received verified data and statistical evaluation results for the second semiannual sampling event from their data analysis subcontractor on January 15, 1998. The evaluations were completed in accordance with permit Conditions IV.F.3 and IV.G.5, which require that statistical analyses must be completed within 90 days after completion of semiannual sampling. A summary of the statistical evaluations is included in Enclosure 1, and Enclosure 2 contains the results of all analyses conducted during the second semiannual CY 1997 sampling event at the CRSDB.

Condition IV.H.2(a) of Permit TNHW-088 requires notification to the Commissioner of the Tennessee Department of Environment and Conservation (TDEC) within seven days if data evaluations indicate a statistically significant increase above the background values for a parameter or constituent specified in Condition IV.C at the point of compliance. As denoted in Enclosure 1, statistical evaluations indicate a significant increase in total uranium concentrations detected in a downgradient well (Well GW-732) above background values. This report and the results contained within the stated enclosures are provided to meet this reporting requirement. Statistically significant increases were not observed for any other target list constituent.

Analysis of variance calculations on data obtained during the second semiannual sampling event of CY 1997 indicated that groundwater from one of the downgradient monitoring wells (Well GW-732) contained statistically higher levels of lead and total uranium than the upgradient well (Well GW-159). As required by the statistical procedure specified in Permit Condition IV.F.4, fourth quarter CY 1997 lead and total uranium results obtained for Well GW-732 were compared with historical levels for the same well. This evaluation indicated that the fourth quarter CY 1997 lead results were actually less than historical values observed within the well, but the total uranium

results were higher. Therefore, the fourth quarter CY 1997 total uranium results for Well GW-732 were compared with background upper tolerance limits (UTLs). This comparison showed that the total uranium levels in the first and fourth samples (0.0054 milligrams per liter [mg/L] and 0.0067 mg/L, respectively) obtained from Well GW-732 during the fourth quarter of CY 1997 were greater than the UTL (0.0051 mg/L) for total uranium. Thus, according to the results of the statistical analysis conducted in accordance with the procedure prescribed in Attachment 2, Section H of Permit Number TNHW-088, a potential release from the facility has occurred.

However, the statistically significant increase in total uranium concentrations may not represent a release of contaminants from the CRSDB. Reasons for this conclusion include changes in sampling protocol, the procedure for calculating UTLs, and geochemical inconsistencies in the sampling results for the fourth quarter CY 1997.

On July 22, 1997, the TDEC approved a Class [1]1 modification to Permit Number TNHW-088 to allow use of a low-flow minimal drawdown method of sampling. Beginning in the fourth quarter of CY 1997, this method was used to purge and sample all of the wells within the detection monitoring well network at the CRSDB. Prior to this change, all wells within the Chestnut Ridge Hydrogeologic Regime were sampled using conventional purging methods (pumping or bailing) that did not utilize low-flow rates. Thus, comparison of data obtained using conventional purging and sampling methods with data obtained using only low-flow methods may not be appropriate in a karst aquifer.

In addition, UTLs were recalculated using historical data from additional upgradient wells that were obtained using only conventional purging and sampling methods. In the July 18, 1997, letter report titled "Semiannual Post-Closure Statistical Evaluation of Groundwater Quality Data from the Chestnut Ridge Sediment Disposal Basin (CRSDB), Oak Ridge Y-12 Plant (TN3 89 009 0001), First, Semiannual Reporting Period for Calendar Year (CY) 1997," the UTL for total uranium was reported as 0.0076 mg/L. This UTL was determined using only data from Well GW-159, thus meeting the requirements of Condition IV.F and Attachment 2, Section H of Permit TNHW-088, which requires a sufficient population of historical upgradient results with a 95 percent confidence coefficient and 95 percent coverage. However, due to the large number of nondetected results in all other target compound list constituents (cadmium, chromium, lead, mercury, nickel, and silver) from Well GW-159, a 95 percent confidence coefficient and 95 percent coverage were not achievable for data obtained during the fourth quarter CY 1997. In order to meet these data requirements to calculate UTLs which represent the geochemical variability of the aquifer, historical data from additional upgradient wells (wells GW-160, GW-298, GW-299, GW-300, GW-301, and GW-304) were included. The UTLs for all target compound list constituents were recalculated. For consistency, this recalculation included total uranium which resulted in the change in the UTL from 0.0076 mg/L to 0.0051 mg/L. If fourth quarter CY 1997 analytical results had been compared with the former UTL, a statistically significant increase in uranium would not have occurred.

Also, several aspects of the results from the four consecutive samples obtained from Well GW-732 during the fourth quarter of CY 1997 sampling event suggest that the data for metals may be questionable: (1) values for total uranium (ranging from 0.0023 mg/L to 0.0067 mg/L); aluminum (ranging from 1.8 mg/L to 7.1 mg/L); total suspended solids (ranging from 47 mg/L to 391 mg/L), pH (ranging from 8.9 to 10.7); and metals such as lead, manganese, and mercury exhibit

significant intersample variability when compared with data previously obtained from well GW-732 (Enclosure 3); (2) the range of pH values, with most values greater than 9.0, is outside the range typically observed for Knox Group groundwaters; and (3) there is an inverse correlation between aluminum concentrations versus total suspended solids values, such that the highest aluminum concentrations were obtained from the samples with the lowest total suspended solids values. Such a trend is the reverse of what is typically observed for most Oak Ridge groundwaters due to the low solubility of aluminum at typical groundwater pH values, although, at the pH range of the samples in question, aluminum solubility increases somewhat. Most typically, aluminum concentrations above 1.0 mg/L in Oak Ridge groundwaters are associated with increases in total suspended solids. These factors suggest that metals results are questionable and may have been impacted by sampling and/or analytical artifacts. Therefore, the certainty of a contaminant release from the site is suspect.

Permit Condition IV.H.2(b) requires resampling of all facility monitoring wells for the target list constituents which indicate a significant increase above background values within 30 days of receipt of the statistical evaluations for the monitoring event. However, because the uranium data are suspect based on the above discussions, do not pose a risk to human health (Environmental Protection Agency, Region III, risk-based action level for uranium salts in drinking water is approximately 0.110 mg/L), and there are no receptors to groundwater from the site, it is requested that resampling at the facility be deferred until the next scheduled semiannual detection monitoring event in April 1998. This would provide sufficient time to redevelop Well GW-732 and further evaluate the analytical data, the potential effects of the low-flow sampling procedure on statistical analyses, and whether the statistical method for detection of a contaminant release is appropriate for a karst aquifer. Please indicate your concurrence with this request to defer the confirmatory sampling until April 1998 by your signature below (page 5) prior to February 3, 1998.

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.

If you have any questions, please contact H. L. King at (423) 241-5257 or S. B. Jones at (423) 574-7536.

Very truly yours,

T. R. Butz
Y-12 Plant Manager

TRB:sbj/hlk

Enclosures: As Stated

cc/encs:

W. P. Carlton
J. A. Darby, DOE-ORO
J. P. Donnelly, DOE-ORO
P. J. Gross, DOE-ORO
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L. O. Vaughan/S. B. Jones
File-EMEFDMC-RC
GWPP-File-RC

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C. L. Stair/J. E. Powell

SUMMARY OF POST-CLOSURE DETECTION MONITORING
AT THE CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN (CRSDB)
FIRST, SEMIANNUAL REPORTING PERIOD OF CALENDAR YEAR (CY) 1997

Conditions IV.D and IV.F of post-closure Permit TNHW-088 require specific sample collection protocols and a statistical evaluation of semiannual post-closure detection monitoring data. The required target list compounds are cadmium, chromium, lead, mercury, nickel, silver, and total uranium. Statistical evaluations are as follows:

1. Four replicate samples are collected at a suitable time interval to account for chemical variability in the groundwater system. Using the low-flow minimal drawdown sampling method, four replicate samples were collected over four consecutive days from Wells GW-159, GW-731, and GW-732. Due to technical difficulties in the field, four replicate samples were collected from Well GW-156 over a period of nine days.

2. Statistical comparisons of target list compound concentrations at each groundwater monitoring well at the point of compliance with background values derived from the upgradient well (Well GW-159) are performed using a variance test. Analysis of variance (ANOVA) is specified for parametric data distribution. Alternately, a nonparametric variance test may be employed for non-normal data distribution.

3. If the variance test indicates that target list constituent concentrations are higher in downgradient wells as compared with the upgradient well, then comparison of target compound concentrations at each groundwater monitoring well with historical background data (upper tolerance limits [UTLs]) and data within each well (within-well comparisons) will be conducted to establish whether the variance also exceeds the normal range of concentrations over time.

The two-part test is denoted in the post-closure permit to account for the considerable natural geochemical variability in the karst groundwater system that exists beneath the CRSDB. Both parts of the test must show a statistical increase for the test to be considered valid. The variance test compares the mean value of each target list compound concentration (calculated from the four replicate samples) at each downgradient well with the mean result at the upgradient well; the test is limited to data for the current sampling event. The UTL test compares individual downgradient well results with the maximum expected value (the UTL) for a constituent based on historical variability upgradient of the site. The within-well comparisons determine whether a particular result from a well is statistically greater than the range of historical concentrations observed within that particular well.

For the second semiannual sampling event of CY 1997, a high proportion of nondetected constituents resulted in nonparametric data distributions for all target list parameters. As a result, parametric ANOVA tests could not be conducted; rather, a nonparametric variance test (Kruskal-Wallis Test) was used. As shown in the summary table, the variance test indicated that no statistical differences exist among the four facility monitoring wells for any indicator parameter except lead and total uranium. In the case of lead and total uranium concentrations, downgradient Well GW-732 was significantly higher than the upgradient well (Well GW-159).

Because the variance test indicated that a downgradient well had statistically higher indicator parameter concentrations than the upgradient well, within-well comparisons and comparisons with UTLs were performed. Results of these evaluations are presented on the attached summary tables. The within-well comparisons showed that the questionable lead results for Well GW-732 were actually significantly less than historical values within the well, but the total uranium results were higher. In addition, the total uranium levels observed during the second quarter CY 1997 sampling

event did exceed the background UTL (0.0051 mg/L). Based on these evaluations, total uranium concentrations in Well GW-732 were significantly higher than levels observed historically either upgradient or downgradient of the CRSDB.

For the purposes of statistical evaluations, the following baseline assumptions were used:

1. As a conservative assumption for calculations conducted for the Kruskal-Wallis Test, the detection limit was substituted for analytical measurements reported as less than the detection limit.

2. As a conservative assumption for calculations conducted for the Wilcoxon Rank-Sum Test, the detection limit was substituted for analytical measurements reported as less than the detection limit.

3. Measurements reported at detection limits higher than those in the baseline period (1991 through 1994) were deleted from the ranking process.

4. Measurements reported at detection limits lower than those in the baseline period (1991 through 1994) were converted to the baseline (higher) detection limit in the ranking process.

5. The background total uranium upper tolerance limit was calculated at a 95 percent confidence factor and a 95 percent coverage using all available data collected from upgradient wells GW-159, GW-160, GW-298, GW-299, GW-300, GW-301, and GW-304, between CY 1986 and the fourth quarter of CY 1997.

KRUSKAL-WALLIS TEST RESULTS
(NONPARAMETRIC PROCEDURE USED INSTEAD OF 1-WAY ANOVA)
AND FOLLOW UP MULTIPLE COMPARISON TESTS,
IF INDICATED BY KRUSKAL WALLIS TEST RESULT

4 replicate measurements collected
at 1 upgradient and 3 downgradient wells during 4th Quarter 1997

COMPARISON OF DOWNGRADIENT WELLS TO UPGRADIENT WELL

MEASURMENTS REPORTED AS <#, CONVERTED TO # FOR CALCULATIONS

SUMMARY OF KRUSKAL-WALLIS TEST RESULTS
AND MULTIPLE COMPARISON TESTS
CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN

PARAMETER	KRUSKAL-WALLIS TEST RESULT	MULTIPLE COMPARISON TEST RESULTS	
		(Iso-lines indicate "no difference")	Conclusion
Cadmium (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Chromium (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Lead (mg/L)	There are statistical differences in the location parameter across 4 monitoring wells	GW-159 GW-731 GW-156 GW-732 ---------- ----------	GW-732 > GW-159 > GW-731
Mercury (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Nickel (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Silver (mg/L)	There are no statistical differences in the location parameter across 4 monitoring wells		
Uranium (mg/L)	There are statistical differences in the location parameter across 4 monitoring wells	GW-731 GW-159 GW-156 GW-732 ---------- ----------	GW-732 > GW-731 > GW-159 GW-156 > GW-731 GW-159 > GW-731

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CADMIUM ICAP (MG/L)	RANK
1	GW-156	20OCT97	<0.003	1
		22OCT97	<0.003	11
		27OCT97	<0.003	15
		28OCT97	<0.003	16
2	GW-159	20OCT97	<0.003	3
		21OCT97	<0.003	7
		22OCT97	<0.003	8
		23OCT97	<0.003	14
3	GW-731	20OCT97	<0.003	4
		21OCT97	<0.003	6
		22OCT97	<0.003	9
		23OCT97	<0.003	13
4	GW-732	20OCT97	<0.003	2
		21OCT97	<0.003	5
		22OCT97	<0.003	10
		23OCT97	<0.003	12

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CADMIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-731	4	34.0	34.0	0.0	8.50000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 3 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CHROMIUM ICAP (MG/L)	RANK
1	GW-156	20OCT97	<0.01	1
		22OCT97	<0.01	11
		27OCT97	<0.01	15
		28OCT97	<0.01	16
2	GW-159	20OCT97	<0.01	3
		21OCT97	<0.01	7
		22OCT97	<0.01	8
		23OCT97	<0.01	14
3	GW-731	20OCT97	<0.01	4
		21OCT97	<0.01	6
		22OCT97	<0.01	9
		23OCT97	<0.01	13
4	GW-732	20OCT97	<0.01	2
		21OCT97	<0.01	5
		22OCT97	<0.01	10
		23OCT97	<0.01	12

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CHROMIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-731	4	34.0	34.0	0.0	8.50000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 3 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	LEAD PMS (MG/L)	RANK
1	GW-159	20OCT97	<0.0005	2
		21OCT97	<0.0005	4
		22OCT97	<0.0005	5
		23OCT97	<0.0005	8
2	GW-731	21OCT97	<0.0005	3
		22OCT97	<0.0005	6
		23OCT97	<0.0005	7
		20OCT97	0.0009	10
3	GW-156	20OCT97	<0.0005	1
		27OCT97	<0.0005	9
		28OCT97	0.0009	11
		22OCT97	0.0014	12
4	GW-732	22OCT97	0.0026	13
		21OCT97	.0.004	14
		20OCT97	0.0064	15
		23OCT97	0.0083	16

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	32.5000000	34.0	7.47663026	8.1250000
GW-732	4	58.0000000	34.0	7.47663026	14.5000000
GW-159	4	20.0000000	34.0	7.47663026	5.0000000
GW-731	4	25.5000000	34.0	7.47663026	6.3750000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 11.357 DF = 3 Prob > CHISQ = 0.0099

Wells 159, 731, and 156

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	32.5000000	26.0	4.47213595	8.12500000
GW-159	4	20.0000000	26.0	4.47213595	5.00000000
GW-731	4	25.5000000	26.0	4.47213595	6.37500000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 2.6167 DF = 2 Prob > CHISQ = 0.2703

Wells 731, 156, and 732

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	20.5000000	26.0	5.66755786	5.1250000
GW-732	4	42.0000000	26.0	5.66755786	10.5000000
GW-731	4	15.5000000	26.0	5.66755786	3.8750000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 8.2292 DF = 2 Prob > CHISQ = 0.0163

Wells 159, and 731

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-159	4	16.0	18.0	2.0	4.0
GW-731	4	20.0	18.0	2.0	5.0

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 16.0000 Z = -.750000 Prob > |Z| = 0.4533

T-Test Approx. Significance = 0.4777

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 1.0000 DF = 1 Prob > CHISQ = 0.3173

Wells 731, and 156

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	20.5000000	18.0	3.0	5.12500000
GW-731	4	15.5000000	18.0	3.0	3.87500000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 20.5000 Z = 0.666667 Prob > |Z| = 0.5050

T-Test Approx. Significance = 0.5263

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.69444 DF = 1 Prob > CHISQ = 0.4047

Wells 156, and 732

P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	10.0	18.0	3.44342023	2.50000000
GW-732	4	26.0	18.0	3.44342023	6.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 10.0000 Z = -2.17807 Prob > |Z| = 0.0294

T-Test Approx. Significance = 0.0658

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 5.3976 DF = 1 Prob > CHISQ = 0.0202

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	MERCURY CVAA (MG/L)	RANK
1	GW-156	20OCT97	<0.0002	1
		22OCT97	<0.0002	11
		27OCT97	<0.0002	15
		28OCT97	<0.0002	16
2	GW-159	20OCT97	<0.0002	3
		21OCT97	<0.0002	7
		22OCT97	<0.0002	8
		23OCT97	<0.0002	14
3	GW-731	20OCT97	<0.0002	4
		21OCT97	<0.0002	6
		22OCT97	<0.0002	9
		23OCT97	<0.0002	13
4	GW-732	20OCT97	<0.0002	2
		21OCT97	<0.0002	5
		22OCT97	<0.0002	10
		23OCT97	<0.0002	12

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable MERCURY
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-731	4	34.0	34.0	0.0	8.50000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 3 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	NICKEL ICAP (MG/L)	RANK
1	GW-156	20OCT97	<0.01	1
		22OCT97	<0.01	11
		27OCT97	<0.01	15
		28OCT97	<0.01	16
2	GW-159	20OCT97	<0.01	3
		21OCT97	<0.01	7
		22OCT97	<0.01	8
		23OCT97	<0.01	14
3	GW-731	20OCT97	<0.01	4
		21OCT97	<0.01	6
		22OCT97	<0.01	9
		23OCT97	<0.01	13
4	GW-732	20OCT97	<0.01	2
		21OCT97	<0.01	5
		22OCT97	<0.01	10
		23OCT97	<0.01	12

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable NICKEL
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-731	4	34.0	34.0	0.0	8.50000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 3 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	SILVER ICAP (MG/L)	RANK
1	GW-156	20OCT97	<0.006	1
		22OCT97	<0.006	11
		27OCT97	<0.006	15
		28OCT97	<0.006	16
2	GW-159	20OCT97	<0.006	3
		21OCT97	<0.006	7
		22OCT97	<0.006	8
		23OCT97	<0.006	14
3	GW-731	20OCT97	<0.006	4
		21OCT97	<0.006	6
		22OCT97	<0.006	9
		23OCT97	<0.006	13
4	GW-732	20OCT97	<0.006	2
		21OCT97	<0.006	5
		22OCT97	<0.006	10
		23OCT97	<0.006	12

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable SILVER
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	34.0	34.0	0.0	8.50000000
GW-732	4	34.0	34.0	0.0	8.50000000
GW-159	4	34.0	34.0	0.0	8.50000000
GW-731	4	34.0	34.0	0.0	8.50000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 3 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	URANIUM PMS (MG/L)	RANK
1	GW-731	20OCT97	<0.0005	1
		21OCT97	<0.0005	2
		22OCT97	<0.0005	3
		23OCT97	<0.0005	4
2	GW-159	23OCT97	0.0013	5
		21OCT97	0.0015	6
		20OCT97	0.0016	8
		22OCT97	0.0016	9
3	GW-156	28OCT97	0.0015	7
		27OCT97	0.0017	10
		22OCT97	0.0019	11
		20OCT97	0.0023	12
4	GW-732	21OCT97	0.0023	13
		22OCT97	0.0025	14
		20OCT97	0.0054	15
		23OCT97	0.0067	16

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	40.0000000	34.0	8.16700680	10.0000000
GW-732	4	57.5000000	34.0	8.16700680	14.3750000
GW-159	4	28.5000000	34.0	8.16700680	7.1250000
GW-731	4	10.0000000	34.0	8.16700680	2.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 13.431 DF = 3 Prob > CHISQ = 0.0038

Wells 731, 159, and 156

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	39.5000000	26.0	5.76299585	9.87500000
GW-159	4	28.5000000	26.0	5.76299585	7.12500000
GW-731	4	10.0000000	26.0	5.76299585	2.50000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 8.9224 DF = 2 Prob > CHISQ = 0.0115

Wells 159, 156, and 732

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	24.0000000	26.0	5.85687889	6.0000000
GW-732	4	41.5000000	26.0	5.85687889	10.3750000
GW-159	4	12.5000000	26.0	5.85687889	3.1250000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 8.2889 DF = 2 Prob > CHISQ = 0.0159

Wells 731, and 159

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-159	4	26.0	18.0	3.22932987	6.50000000
GW-731	4	10.0	18.0	3.22932987	2.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 26.0000 Z = 2.32246 Prob > |Z| = 0.0202

T-Test Approx. Significance = 0.0532

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 6.1370 DF = 1 Prob > CHISQ = 0.0132

Wells 159, and 156

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	23.5000000	18.0	3.42261387	5.87500000
GW-159	4	12.5000000	18.0	3.42261387	3.12500000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 23.5000 Z = 1.46087 Prob > |Z| = 0.1441

T-Test Approx. Significance = 0.1874

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 2.5823 DF = 1 Prob > CHISQ = 0.1081

Wells 156, and 732

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-156	4	10.5000000	18.0	3.44342023	2.62500000
GW-732	4	25.5000000	18.0	3.44342023	6.37500000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 10.5000 Z = -2.03286 Prob > |Z| = 0.0421

T-Test Approx. Significance = 0.0816

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 4.7440 DF = 1 Prob > CHISQ = 0.0294

COMPARISONS TO NON-PARAMETRIC UPPER TOLERANCE LIMITS

1997 Groundwater Monitoring Report
Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee
Non-Parametric Upper Tolerance Limit=0.0051 mg/L
Coverage=95%, Confidence Coefficient=95%

STATION NAME	URANIUM PMS (MG/L)	SAMPLE DATE	COMMENT
GW-156	0.0023	10/20/97	Doesn't Exceed UTL
GW-156	0.0019	10/22/97	Doesn't Exceed UTL
GW-156	0.0017	10/27/97	Doesn't Exceed UTL
GW-156	0.0015	10/28/97	Doesn't Exceed UTL
GW-159	0.0016	10/20/97	Doesn't Exceed UTL
GW-159	0.0015	10/21/97	Doesn't Exceed UTL
GW-159	0.0016	10/22/97	Doesn't Exceed UTL
GW-159	0.0013	10/23/97	Doesn't Exceed UTL
GW-731	<0.0005	10/20/97	Doesn't Exceed UTL
GW-731	<0.0005	10/21/97	Doesn't Exceed UTL
GW-731	<0.0005	10/22/97	Doesn't Exceed UTL
GW-731	<0.0005	10/23/97	Doesn't Exceed UTL
GW-732	0.0054	10/20/97	****** Exceeds UTL
GW-732	0.0023	10/21/97	Doesn't Exceed UTL
GW-732	0.0025	10/22/97	Doesn't Exceed UTL
GW-732	0.0067	10/23/97	****** Exceeds UTL

1997 Groundwater Monitoring Report
Chestnut Ridge Sediment Disposal Basin
Anderson County, Tennessee
Non-Parametric Upper Tolerance Limit=0.079 mg/L
Coverage=95%, Confidence Coefficient=95%

STATION NAME	LEAD PMS (MG/L)	SAMPLE DATE	COMMENT
GW-156	<0.0005	10/20/97	Doesn't Exceed UTL
GW-156	0.0014	10/22/97	Doesn't Exceed UTL
GW-156	<0.0005	10/27/97	Doesn't Exceed UTL
GW-156	0.0009	10/28/97	Doesn't Exceed UTL
GW-159	<0.0005	10/20/97	Doesn't Exceed UTL
GW-159	<0.0005	10/21/97	Doesn't Exceed UTL
GW-159	<0.0005	10/22/97	Doesn't Exceed UTL
GW-159	<0.0005	10/23/97	Doesn't Exceed UTL
GW-731	0.0009	10/20/97	Doesn't Exceed UTL
GW-731	<0.0005	10/21/97	Doesn't Exceed UTL
GW-731	<0.0005	10/22/97	Doesn't Exceed UTL
GW-731	<0.0005	10/23/97	Doesn't Exceed UTL
GW-732	0.0064	10/20/97	Doesn't Exceed UTL
GW-732	0.004	10/21/97	Doesn't Exceed UTL
GW-732	0.0026	10/22/97	Doesn't Exceed UTL
GW-732	0.0083	10/23/97	Doesn't Exceed UTL

WILCOXON RANK-SUM TEST
(NONPARAMETRIC PROCEDURE USED INSTEAD OF T-TEST)

INTRAWELL COMPARISONS OF 4TH QUARTER 1997 WELL MEASUREMENTS TO HISTORIC MEASUREMENTS

MEASUREMENTS REPORTED AS <#
WERE CONVERTED TO # FOR CALCULATIONS

MEASUREMENTS REPORTED AT ELEVATED DETECTION LIMITS
WERE DELETED

MEASUREMENTS FOR ANALYTES REPORTED
AT MULTIPLE DETECTION LIMITS
WERE CONVERTED TO THE HIGHER DETECTION LIMIT

SUMMARY OF WILCOXON RANK-SUM TEST RESULTS
CHESTNUT RIDGE SEDIMENT DISPOSAL BASIN

PARAMETER	WILCOXON RANK-SUM TEST	WELL	CONCLUSION
Cadmium (mg/L)	There are no statistical differences in the location parameter within wells		
Chromium (mg/L)	There are no statistical differences in the location parameter within wells		
Lead (mg/L)	There are no statistical differences in the location parameter within wells		
Mercury (mg/L)	There are no statistical differences in the location parameter within wells		
Nickel (mg/L)	There are no statistical differences in the location parameter within wells		
Silver (mg/L)	There are no statistical differences in the location parameter within wells		
Uranium (mg/L)	There are statistical differences in the location parameter within wells	GW-156 GW-732	1997 Q4 < Historic 1997 Q4 > Historic

WELL	PERIOD	SAMPLE DATE	CADMIUM AAS (MG/L)	CADMIUM (MG/L)
GW-156	1997 Q4	10/20/97	.	<0.003
		10/22/97	.	<0.003
		10/27/97	.	<0.003
		10/28/97	.	<0.003
GW-156	Historic	08/20/92	.	.
		08/23/91	<0.002	<0.003
		10/30/91	<0.002	<0.003
		02/14/92	<0.002	<0.003
		05/09/92	<0.002	<0.003
		08/17/92	<0.002	<0.003
		11/13/92	<0.002	<0.003
		02/24/93	<0.002	<0.003
		06/15/93	<0.002	<0.003
		08/12/93	<0.002	<0.003
		11/30/93	<0.002	<0.003
		02/12/94	<0.002	<0.003
		04/07/94	<0.002	<0.003
		07/09/94	<0.002	<0.003
		10/20/94	<0.002	<0.003
GW-159	1997 Q4	10/20/97	.	<0.003
		10/21/97	.	<0.003
		10/22/97	.	<0.003
		10/23/97	.	<0.003
GW-159	Historic	08/20/92	.	.
		04/05/94	.	.
		08/23/91	<0.002	<0.003
		10/29/91	<0.002	<0.003
		02/13/92	<0.002	<0.003
		05/09/92	<0.002	<0.003
		08/15/92	<0.002	<0.003
		11/09/92	<0.002	<0.003
		02/22/93	<0.002	<0.003
		06/14/93	<0.002	<0.003
		08/10/93	<0.002	<0.003
		11/29/93	<0.002	<0.003
		02/10/94	<0.002	<0.003
		04/04/94	<0.002	<0.003
		07/08/94	<0.002	<0.003
		10/17/94	<0.002	<0.003
GW-731	1997 Q4	10/20/97	.	<0.003
		10/21/97	.	<0.003

WELL	PERIOD	SAMPLE DATE	CADMIUM AAS (MG/L)	CADMIUM (MG/L)
GW-731	1997 Q4	10/22/97	.	<0.003
		10/23/97	.	<0.003
GW-731	Historic	08/20/92	.	.
		09/27/91	<0.002	<0.003
		10/31/91	<0.002	<0.003
		02/15/92	<0.002	<0.003
		05/09/92	<0.002	<0.003
		08/16/92	<0.002	<0.003
		11/11/92	<0.002	<0.003
		02/23/93	<0.002	<0.003
		06/15/93	<0.002	<0.003
		08/11/93	<0.002	<0.003
		11/29/93	<0.002	<0.003
		02/11/94	<0.002	<0.003
		04/04/94	<0.002	<0.003
		07/09/94	<0.002	<0.003
		10/18/94	<0.002	<0.003
GW-732	1997 Q4	10/20/97	.	<0.003
		10/21/97	.	<0.003
		10/22/97	.	<0.003
		10/23/97	.	<0.003
GW-732	Historic	08/20/92	.	.
		09/27/91	<0.002	<0.003
		10/30/91	<0.002	<0.003
		02/14/92	<0.002	<0.003
		05/09/92	<0.002	<0.003
		08/16/92	<0.002	<0.003
		11/12/92	<0.002	<0.003
		02/23/93	<0.002	<0.003
		06/15/93	<0.002	<0.003
		08/12/93	<0.002	<0.003
		11/30/93	<0.002	<0.003
		02/12/94	<0.002	<0.003
		04/06/94	<0.002	<0.003
		07/09/94	<0.002	<0.003
		10/19/94	<0.002	<0.003

WELL	PERIOD	SAMPLE DATE	CHROMIUM AAS (MG/L)	CHROMIUM (MG/L)
GW-156	1997 Q4	10/20/97	.	<0.01
		10/22/97	.	<0.01
		10/27/97	.	<0.01
		10/28/97	.	<0.01
GW-156	Historic	08/20/92	.	.
		08/23/91	<0.01	<0.01
		10/30/91	<0.01	<0.01
		02/14/92	<0.01	<0.01
		08/17/92	<0.01	<0.01
		11/13/92	<0.01	<0.01
		02/24/93	<0.01	<0.01
		06/15/93	<0.01	<0.01
		08/12/93	<0.01	<0.01
		11/30/93	<0.01	<0.01
		02/12/94	<0.01	<0.01
		04/07/94	<0.01	<0.01
		07/09/94	<0.01	<0.01
		10/20/94	<0.01	<0.01
		05/09/92	0.01	0.01
GW-159	1997 Q4	10/20/97	.	<0.01
		10/21/97	.	<0.01
		10/22/97	.	<0.01
		10/23/97	.	<0.01
GW-159	Historic	08/20/92	.	.
		04/05/94	.	.
		08/23/91	<0.01	<0.01
		10/29/91	<0.01	<0.01
		02/13/92	<0.01	<0.01
		05/09/92	<0.01	<0.01
		08/15/92	<0.01	<0.01
		11/09/92	<0.01	<0.01
		02/22/93	<0.01	<0.01
		06/14/93	<0.01	<0.01
		08/10/93	<0.01	<0.01
		11/29/93	<0.01	<0.01
		02/10/94	<0.01	<0.01
		04/04/94	<0.01	<0.01
		07/08/94	<0.01	<0.01
		10/17/94	<0.01	<0.01
GW-731	1997 Q4	10/20/97	.	<0.01
		10/21/97	.	<0.01

WELL	PERIOD	SAMPLE DATE	CHROMIUM AAS (MG/L)	CHROMIUM (MG/L)
GW-731	1997 Q4	10/22/97	.	<0.01
		10/23/97	.	<0.01
GW-731	Historic	08/20/92	.	.
		09/27/91	<0.01	<0.01
		10/31/91	<0.01	<0.01
		02/15/92	<0.01	<0.01
		08/11/93	<0.01	<0.01
		11/29/93	<0.01	<0.01
		02/11/94	<0.01	<0.01
		04/04/94	<0.01	<0.01
		07/09/94	<0.01	<0.01
		10/18/94	<0.01	<0.01
		02/23/93	0.01	0.01
		11/11/92	0.012	0.012
		06/15/93	0.013	0.013
		05/09/92	0.016	0.016
		08/16/92	0.022	0.022
GW-732	1997 Q4	10/20/97	.	<0.01
		10/21/97	.	<0.01
		10/22/97	.	<0.01
		10/23/97	.	<0.01
GW-732	Historic	08/20/92	.	.
		09/27/91	<0.01	<0.01
		10/30/91	<0.01	<0.01
		02/14/92	<0.01	<0.01
		05/09/92	<0.01	<0.01
		08/16/92	<0.01	<0.01
		11/12/92	<0.01	<0.01
		02/23/93	<0.01	<0.01
		06/15/93	<0.01	<0.01
		08/12/93	<0.01	<0.01
		11/30/93	<0.01	<0.01
		02/12/94	<0.01	<0.01
		04/06/94	<0.01	<0.01
		07/09/94	<0.01	<0.01
		10/19/94	<0.01	<0.01

WELL	PERIOD	SAMPLE DATE	LEAD AAS (MG/L)	LEAD (MG/L)
GW-156	1997 Q4	10/20/97	.	<0.004
		10/22/97	.	<0.004
		10/27/97	.	<0.004
		10/28/97	.	<0.004
GW-156	Historic	08/20/92	.	.
		08/23/91	<0.004	<0.004
		10/30/91	<0.004	<0.004
		02/14/92	<0.004	<0.004
		02/24/93	<0.004	<0.004
		06/15/93	<0.004	<0.004
		11/30/93	<0.004	<0.004
		02/12/94	<0.004	<0.004
		04/07/94	<0.004	<0.004
		07/09/94	<0.004	<0.004
		10/20/94	<0.004	<0.004
		11/13/92	0.005	0.005
		08/12/93	0.0054	0.0054
		08/17/92	0.0099	0.0099
		05/09/92	0.027	0.027
GW-159	1997 Q4	10/20/97	.	<0.004
		10/21/97	.	<0.004
		10/22/97	.	<0.004
		10/23/97	.	<0.004
GW-159	Historic	08/20/92	.	.
		04/05/94	.	.
		08/23/91	<0.004	<0.004
		10/29/91	<0.004	<0.004
		02/13/92	<0.004	<0.004
		05/09/92	<0.004	<0.004
		11/09/92	<0.004	<0.004
		02/22/93	<0.004	<0.004
		06/14/93	<0.004	<0.004
		08/10/93	<0.004	<0.004
		11/29/93	<0.004	<0.004
		02/10/94	<0.004	<0.004
		04/04/94	<0.004	<0.004
		07/08/94	<0.004	<0.004
		10/17/94	<0.004	<0.004
		08/15/92	0.0058	0.0058
GW-731	1997 Q4	10/20/97	.	<0.004
		10/21/97	.	<0.004

WELL	PERIOD	SAMPLE DATE	LEAD AAS (MG/L)	LEAD (MG/L)
GW-731	1997 Q4	10/22/97	.	<0.004
		10/23/97	.	<0.004
GW-731	Historic	08/20/92	.	.
		09/27/91	<0.004	<0.004
		10/31/91	<0.004	<0.004
		02/15/92	<0.004	<0.004
		11/29/93	<0.004	<0.004
		02/11/94	<0.004	<0.004
		04/04/94	<0.004	<0.004
		07/09/94	<0.004	<0.004
		10/18/94	<0.004	<0.004
		08/11/93	0.0078	0.0078
		11/11/92	0.021	0.021
		06/15/93	0.032	0.032
		02/23/93	0.036	0.036
		05/09/92	0.066	0.066
		08/16/92	0.068	0.068
GW-732	1997 Q4	10/22/97	.	<0.004
		10/21/97	.	0.004
		10/20/97	.	0.0064
		10/23/97	.	0.0083
GW-732	Historic	08/20/92	.	.
		09/27/91	<0.004	<0.004
		10/30/91	<0.004	<0.004
		02/14/92	<0.004	<0.004
		05/09/92	<0.004	<0.004
		08/16/92	<0.004	<0.004
		11/12/92	<0.004	<0.004
		02/23/93	<0.004	<0.004
		08/12/93	<0.004	<0.004
		02/12/94	<0.004	<0.004
		04/06/94	<0.004	<0.004
		06/15/93	0.012	0.012
		07/09/94	0.013	0.013
		10/19/94	0.019	0.019
		11/30/93	0.022	0.022

WELL	PERIOD	SAMPLE DATE	MERCURY CVAA (MG/L)
GW-156	1997 Q4	10/20/97	<0.0002
		10/22/97	<0.0002
		10/27/97	<0.0002
		10/28/97	<0.0002
GW-156	Historic	08/20/92	.
		08/23/91	<0.0002
		10/30/91	<0.0002
		02/14/92	<0.0002
		05/09/92	<0.0002
		08/17/92	<0.0002
		11/13/92	<0.0002
		02/24/93	<0.0002
		06/15/93	<0.0002
		08/12/93	<0.0002
		11/30/93	<0.0002
		02/12/94	<0.0002
		04/07/94	<0.0002
		07/09/94	<0.0002
		10/20/94	<0.0002
GW-159	1997 Q4	10/20/97	<0.0002
		10/21/97	<0.0002
		10/22/97	<0.0002
		10/23/97	<0.0002
GW-159	Historic	08/20/92	.
		04/05/94	.
		10/29/91	<0.0002
		02/13/92	<0.0002
		05/09/92	<0.0002
		08/15/92	<0.0002
		11/09/92	<0.0002
		02/22/93	<0.0002
		06/14/93	<0.0002
		08/10/93	<0.0002
		11/29/93	<0.0002
		02/10/94	<0.0002
		04/04/94	<0.0002
		07/08/94	<0.0002
		10/17/94	<0.0002
		08/23/91	0.00037
GW-731	1997 Q4	10/20/97	<0.0002
		10/21/97	<0.0002

WELL	PERIOD	SAMPLE DATE	MERCURY CVAA (MG/L)
GW-731	1997 Q4	10/22/97	<0.0002
		10/23/97	<0.0002
GW-731	Historic	08/20/92	.
		09/27/91	<0.0002
		10/31/91	<0.0002
		02/15/92	<0.0002
		05/09/92	<0.0002
		08/16/92	<0.0002
		11/11/92	<0.0002
		06/15/93	<0.0002
		08/11/93	<0.0002
		11/29/93	<0.0002
		02/11/94	<0.0002
		04/04/94	<0.0002
		07/09/94	<0.0002
		10/18/94	<0.0002
		02/23/93	0.00023
GW-732	1997 Q4	10/20/97	<0.0002
		10/21/97	<0.0002
		10/22/97	<0.0002
		10/23/97	<0.0002
GW-732	Historic	08/20/92	.
		09/27/91	<0.0002
		10/30/91	<0.0002
		02/14/92	<0.0002
		05/09/92	<0.0002
		08/16/92	<0.0002
		11/12/92	<0.0002
		02/23/93	<0.0002
		06/15/93	<0.0002
		08/12/93	<0.0002
		11/30/93	<0.0002
		02/12/94	<0.0002
		04/06/94	<0.0002
		07/09/94	<0.0002
		10/19/94	<0.0002

WELL	PERIOD	SAMPLE DATE	NICKEL ICAP (MG/L)
GW-156	1997 Q4	10/20/97	<0.01
		10/22/97	<0.01
		10/27/97	<0.01
		10/28/97	<0.01
GW-156	Historic	08/20/92	.
		10/30/91	<0.01
		02/14/92	<0.01
		05/09/92	<0.01
		08/17/92	<0.01
		06/15/93	<0.01
		11/30/93	<0.01
		02/12/94	<0.01
		04/07/94	<0.01
		07/09/94	<0.01
		10/20/94	<0.01
		11/13/92	0.013
		08/23/91	0.016
		02/24/93	0.018
		08/12/93	0.018
GW-159	1997 Q4	10/20/97	<0.01
		10/21/97	<0.01
		10/22/97	<0.01
		10/23/97	<0.01
GW-159	Historic	08/20/92	.
		04/05/94	.
		08/23/91	<0.01
		10/29/91	<0.01
		02/13/92	<0.01
		05/09/92	<0.01
		08/15/92	<0.01
		11/09/92	<0.01
		02/22/93	<0.01
		06/14/93	<0.01
		08/10/93	<0.01
		11/29/93	<0.01
		02/10/94	<0.01
		04/04/94	<0.01
		07/08/94	<0.01
		10/17/94	<0.01
GW-731	1997 Q4	10/20/97	<0.01
		10/21/97	<0.01

WELL	PERIOD	SAMPLE DATE	NICKEL ICAP (MG/L)
GW-731	1997 Q4	10/22/97	<0.01
		10/23/97	<0.01
GW-731	Historic	08/20/92	.
		09/27/91	<0.01
		10/31/91	<0.01
		02/15/92	<0.01
		11/29/93	<0.01
		02/11/94	<0.01
		04/04/94	<0.01
		07/09/94	<0.01
		10/18/94	<0.01
		11/11/92	0.013
		05/09/92	0.015
		08/11/93	0.023
		02/23/93	0.029
		06/15/93	0.029
		08/16/92	0.058
GW-732	1997 Q4	10/20/97	<0.01
		10/21/97	<0.01
		10/22/97	<0.01
		10/23/97	<0.01
GW-732	Historic	08/20/92	.
		09/27/91	<0.01
		10/30/91	<0.01
		02/14/92	<0.01
		05/09/92	<0.01
		08/16/92	<0.01
		02/23/93	<0.01
		06/15/93	<0.01
		08/12/93	<0.01
		11/30/93	<0.01
		02/12/94	<0.01
		04/06/94	<0.01
		07/09/94	<0.01
		10/19/94	<0.01
		11/12/92	0.024

WELL	PERIOD	SAMPLE DATE	ICAP	SILVER (MG/L)
GW-156	1997 Q4	10/20/97		<0.006
		10/22/97		<0.006
		10/27/97		<0.006
		10/28/97		<0.006
GW-156	Historic	08/20/92		.
		08/23/91		<0.006
		10/30/91		<0.006
		02/14/92		<0.006
		05/09/92		<0.006
		08/17/92		<0.006
		11/13/92		<0.006
		02/24/93		<0.006
		06/15/93		<0.006
		08/12/93		<0.006
		11/30/93		<0.006
		02/12/94		<0.006
		04/07/94		<0.006
		07/09/94		<0.006
		10/20/94		<0.006
GW-159	1997 Q4	10/20/97		<0.006
		10/21/97		<0.006
		10/22/97		<0.006
		10/23/97		<0.006
GW-159	Historic	08/20/92		.
		04/05/94		.
		08/23/91		<0.006
		10/29/91		<0.006
		02/13/92		<0.006
		05/09/92		<0.006
		08/15/92		<0.006
		11/09/92		<0.006
		02/22/93		<0.006
		06/14/93		<0.006
		08/10/93		<0.006
		11/29/93		<0.006
		02/10/94		<0.006
		04/04/94		<0.006
		07/08/94		<0.006
		10/17/94		0.0064
GW-731	1997 Q4	10/20/97		<0.006
		10/21/97		<0.006

WELL	PERIOD	SAMPLE DATE	SILVER ICAP (MG/L)
GW-731	1997 Q4	10/22/97	<0.006
		10/23/97	<0.006
GW-731	Historic	08/20/92	.
		09/27/91	<0.006
		10/31/91	<0.006
		02/15/92	<0.006
		05/09/92	<0.006
		08/16/92	<0.006
		11/11/92	<0.006
		02/23/93	<0.006
		06/15/93	<0.006
		08/11/93	<0.006
		11/29/93	<0.006
		02/11/94	<0.006
		04/04/94	<0.006
		07/09/94	<0.006
		10/18/94	<0.006
GW-732	1997 Q4	10/20/97	<0.006
		10/21/97	<0.006
		10/22/97	<0.006
		10/23/97	<0.006
GW-732	Historic	08/20/92	.
		09/27/91	<0.006
		10/30/91	<0.006
		02/14/92	<0.006
		05/09/92	<0.006
		08/16/92	<0.006
		11/12/92	<0.006
		02/23/93	<0.006
		06/15/93	<0.006
		08/12/93	<0.006
		11/30/93	<0.006
		02/12/94	<0.006
		04/06/94	<0.006
		07/09/94	<0.006
		10/19/94	<0.006

WELL	PERIOD	SAMPLE DATE	URANIUM FLUORIMETRIC (MG/L)	URANIUM (MG/L)
GW-156	1997 Q4	10/28/97	.	0.0015
		10/27/97	.	0.0017
		10/22/97	.	0.0019
		10/20/97	.	0.0023
GW-156	Historic	08/20/92	.	.
		10/20/94	<0.015	.
		08/12/93	0.002	0.002
		11/30/93	0.002	0.002
		02/12/94	0.002	0.002
		08/23/91	0.003	0.003
		10/30/91	0.003	0.003
		05/09/92	0.003	0.003
		08/17/92	0.003	0.003
		11/13/92	0.003	0.003
		06/15/93	0.003	0.003
		02/24/93	0.004	0.004
		02/14/92	0.005	0.005
		04/07/94	0.005	0.005
		07/09/94	0.007	0.007
GW-159	1997 Q4	10/23/97	.	0.0013
		10/21/97	.	0.0015
		10/20/97	.	0.0016
		10/22/97	.	0.0016
GW-159	Historic	08/20/92	.	.
		04/05/94	.	.
		10/17/94	<0.015	.
		04/04/94	<0.001	<0.001
		10/29/91	0.001	0.001
		02/13/92	0.001	0.001
		02/22/93	0.001	0.001
		08/10/93	0.001	0.001
		11/29/93	0.001	0.001
		02/10/94	0.001	0.001
		07/08/94	0.001	0.001
		08/23/91	0.002	0.002
		05/09/92	0.002	0.002
		08/15/92	0.002	0.002
		11/09/92	0.002	0.002
		06/14/93	0.002	0.002

WELL	PERIOD	SAMPLE DATE	URANIUM FLUORIMETRIC (MG/L)	URANIUM (MG/L)
GW-731	1997 Q4	10/20/97	.	<0.001
		10/21/97	.	<0.001
		10/22/97	.	<0.001
		10/23/97	.	<0.001
GW-731	Historic	08/20/92	.	.
		10/18/94	<0.015	.
		09/27/91	<0.001	<0.001
		11/29/93	<0.001	<0.001
		02/11/94	<0.001	<0.001
		04/04/94	<0.001	<0.001
		10/31/91	0.001	0.001
		11/11/92	0.001	0.001
		02/23/93	0.001	0.001
		06/15/93	0.001	0.001
		08/11/93	0.001	0.001
		05/09/92	0.002	0.002
		08/16/92	0.002	0.002
		07/09/94	0.004	0.004
		02/15/92	0.01	0.01
GW-732	1997 Q4	10/21/97	.	0.0023
		10/22/97	.	0.0025
		10/20/97	.	0.0054
		10/23/97	.	0.0067
GW-732	Historic	08/20/92	.	.
		10/19/94	<0.015	.
		10/30/91	<0.001	<0.001
		02/14/92	<0.001	<0.001
		05/09/92	<0.001	<0.001
		08/16/92	<0.001	<0.001
		11/12/92	<0.001	<0.001
		02/23/93	<0.001	<0.001
		04/06/94	<0.001	<0.001
		09/27/91	0.001	0.001
		06/15/93	0.002	0.002
		08/12/93	0.002	0.002
		11/30/93	0.002	0.002
		02/12/94	0.002	0.002
		07/09/94	0.005	0.005

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CADMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CHROMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	30.0	38.0	6.85803760	7.5000000
Historic	14	141.0	133.0	6.85803760	10.0714286

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 30.0000 Z = -1.09361 Prob > |Z| = 0.2741

T-Test Approx. Significance = 0.2894

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 1.3608 DF = 1 Prob > CHISQ = 0.2434

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable MERCURY
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable NICKEL
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	30.0	38.0	6.85136311	7.5000000
Historic	14	141.0	133.0	6.85136311	10.0714286

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 30.0000 Z = -1.09467 Prob > |Z| = 0.2737

T-Test Approx. Significance = 0.2889

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 1.3634 DF = 1 Prob > CHISQ = 0.2429

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable SILVER
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-156 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	13.0	36.0	8.61257630	3.2500000
Historic	13	140.0	117.0	8.61257630	10.7692308

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 13.0000 Z = -2.61246 Prob > |Z| = 0.0090

T-Test Approx. Significance = 0.0189

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 7.1316 DF = 1 Prob > CHISQ = 0.0076

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CADMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CHROMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 36.0000 Z = -.400892 Prob > |Z| = 0.6885

T-Test Approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.28571 DF = 1 Prob > CHISQ = 0.5930

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable MERCURY
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 36.0000 Z = -.400892 Prob > |Z| = 0.6885

T-Test Approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.28571 DF = 1 Prob > CHISQ = 0.5930

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable NICKEL
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable SILVER
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 36.0000 Z = -.400892 Prob > |Z| = 0.6885

T-Test Approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.28571 DF = 1 Prob > CHISQ = 0.5930

---------- WELL=GW-159 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	42.0	36.0	8.24398176	10.5000000
Historic	13	111.0	117.0	8.24398176	8.5384615

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 42.0000 Z = 0.667153 Prob > |Z| = 0.5047

T-Test Approx. Significance = 0.5142

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.52970 DF = 1 Prob > CHISQ = 0.4667

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CADMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CHROMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	30.0	38.0	6.85803760	7.5000000
Historic	14	141.0	133.0	6.85803760	10.0714286

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 30.0000 Z = -1.09361 Prob > |Z| = 0.2741

T-Test Approx. Significance = 0.2894

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 1.3608 DF = 1 Prob > CHISQ = 0.2434

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	26.0	38.0	7.90548746	6.5000000
Historic	14	145.0	133.0	7.90548746	10.3571429

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 26.0000 Z = -1.45469 Prob > |Z| = 0.1458

T-Test Approx. Significance = 0.1640

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 2.3041 DF = 1 Prob > CHISQ = 0.1290

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable MERCURY
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 36.0000 Z = -.400892 Prob > |Z| = 0.6885

T-Test Approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.28571 DF = 1 Prob > CHISQ = 0.5930

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable NICKEL
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	26.0	38.0	7.89969802	6.5000000
Historic	14	145.0	133.0	7.89969802	10.3571429

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 26.0000 Z = -1.45575 Prob > |Z| = 0.1455

T-Test Approx. Significance = 0.1637

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 2.3075 DF = 1 Prob > CHISQ = 0.1288

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable SILVER
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-731 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	28.0	36.0	6.56584299	7.00000000
Historic	13	125.0	117.0	6.56584299	9.61538462

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 28.0000 Z = -1.14228 Prob > |Z| = 0.2533

T-Test Approx. Significance = 0.2701

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 1.4846 DF = 1 Prob > CHISQ = 0.2231

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CADMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CHROMIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	40.0	38.0	7.90548746	10.0000000
Historic	14	131.0	133.0	7.90548746	9.3571429

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 40.0000 Z = 0.189742 Prob > |Z| = 0.8495

T-Test Approx. Significance = 0.8518

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.06400 DF = 1 Prob > CHISQ = 0.8003

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable MERCURY
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable NICKEL
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	36.0	38.0	3.74165739	9.00000000
Historic	14	135.0	133.0	3.74165739	9.64285714

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 36.0000 Z = -.400892 Prob > |Z| = 0.6885

T-Test Approx. Significance = 0.6935

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.28571 DF = 1 Prob > CHISQ = 0.5930

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable SILVER
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	38.0	38.0	0.0	9.50000000
Historic	14	133.0	133.0	0.0	9.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 38.0000 Z = 0 Prob > |Z| = 1.0000

T-Test Approx. Significance = 1.0000

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 1 Prob > CHISQ = 1.0000

---------- WELL=GW-732 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	60.0	36.0	8.30750901	15.0000000
Historic	13	93.0	117.0	8.30750901	7.1538462

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 60.0000 Z = 2.82877 Prob > |Z| = 0.0047

T-Test Approx. Significance = 0.0121

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 8.3460 DF = 1 Prob > CHISQ = 0.0039

APPENDIX G.2

KERR HOLLOW QUARRY
First 180-Day Reporting Period, CY 1997

LOCKHEED MARTIN ENERGY SYSTEMS, INC.

Post Office Box 2009
Oak Ridge, Tennessee 37831

July 30, 1997

Mr. Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
Fifth Floor, L&C Tower
401 Church Street
Nashville, Tennessee 37243-1535

Dear Mr. Tiesler:

Semiannual Post-Closure Statistical Determinations of Groundwater Quality Data from the Kerr Hollow Quarry (KHQ), Oak Ridge Y-12 Plant (TN3 89 009 0001), First, 180-Day Reporting Period for Calendar Year (CY) 1997

Condition VI.F.1 of the Resource Conservation and Recovery Act post-closure permit for the KHQ (Permit TNHW-088) requires the permittee to determine, on a semiannual basis, whether there is a statistically significant increase over background values for specified parameters at the point of compliance. Sampling activities at the KHQ for the first, semiannual monitoring event of CY 1997 were completed on May 1, 1997, as part of the second quarter CY 1997 sampling schedule.

Analyses of target list constituents and a statistical evaluation of analytical results were performed in accordance with permit Conditions VI.D and VI.G. Personnel from the Water Compliance Department of the Environmental Compliance Organization received verified data and statistical evaluation results for the first, semiannual sampling event from their data analysis subcontractor on July 24, 1997. The evaluations were completed in accordance with permit Conditions VI.F.3 and VI.G.5, which require that statistical analyses must be completed within 90 days after completion of semiannual sampling. Summary data for the statistical evaluations are included in Enclosure 1. Enclosure 2 contains the results of all analyses conducted during the first, semiannual CY 1997 sampling event at the KHQ.

Condition VI.H.2(a) of Permit TNHW-088 requires notification to the Tennessee Department of Environment and Conservation Commissioner within seven days if post-closure statistical evaluations indicate a release of contaminants to groundwater. As denoted in Enclosure 1, statistical evaluations indicated a significant increasing trend for boron in a downgradient well (Well GW-145); therefore, a seven-day notification is required. This report and the synopsis of statistical results contained in Enclosure 1 are provided to meet this requirement. A significant increasing trend for boron was also observed in the second semiannual reporting period of CY 1996, along with an increasing trend in one of the upgradient wells (Well GW-231). Statistically significant increases were not confirmed for any other target list constituent.

In accordance with Condition VI.H.2(b), confirmatory sampling of all facility monitoring wells for boron will be conducted within 30-days of receipt of the statistical evaluations for the first semiannual monitoring event. The statistical evaluation will be conducted again to confirm whether a release of boron has occurred. A decision to implement a corrective action monitoring program will be based on results of the confirmatory sampling and resolution of the pending post-closure permit modification request to remove boron from the list of target constituents for KHQ.

The statistical method for KHQ (permit attachment 4, section H) specifies that replicate samples be collected over four consecutive days. A total of four replicates were collected from upgradient well GW-142 during the first semiannual sampling event for CY 1997; however, only three represented consecutive daily replicates because two samples were collected on April 29, 1997. The well was purged initially on April 28, 1997, with a sample scheduled to be collected on that date. Water levels did not recover sufficiently to obtain representative samples; therefore, samples were collected during the morning of April 29, 1997, following an overnight recovery period. The well was subsequently purged again, allowed to stabilize, and another sample was collected during the afternoon of April 29, 1997. It is anticipated that poor sample quality due to inadequate recharge rates will be resolved by the proposed sampling protocol changes in the pending post-closure permit modification.

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.

If you have any questions, please contact W. K. Jago at (423) 241-2572 or H. L. King at (423) 241-2572.

Very truly yours,

T. R. Butz
Y-12 Plant Manager

TRB:wkj

Enclosures: As Stated

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SUMMARY OF POST-CLOSURE DETECTION MONITORING
AT THE KERR HOLLOW QUARRY (KHQ),
FIRST, 180-DAY REPORTING PERIOD OF CALENDAR YEAR (CY) 1997

1.0 Statistical Methods

Conditions VI.D and VI.F of post-closure Permit TNHW-088 require specific sample collection protocols and a statistical evaluation of semiannual post-closure detection monitoring data. The required target list compounds are cadmium, chromium, lead, mercury, nickel, total uranium, carbon tetrachloride, tetrachloroethene, chloroform, boron, total strontium, gross alpha, and gross beta. The statistical evaluation methods specified in Permit TNHW-088 are as follows:

1. Four replicate samples are collected at a suitable time interval to account for chemical variability in the groundwater system. Four replicate samples collected over four consecutive days (not more than 24 hours apart) are specified to comply with this requirement.

2. Statistical comparisons are performed for all target list compound concentrations (except boron, total strontium, gross alpha, and gross beta) between each groundwater monitoring well at the point of compliance and the upgradient wells (Wells GW-142 and GW-231) using a variance test. Analysis of variance (ANOVA) is specified for parametric data distribution. Alternately, a nonparametric variance test may be employed for nonnormal data distribution.

3. If the variance test indicates that target list constituent concentrations are higher in downgradient wells as compared with the upgradient wells, then comparison of target compound concentrations at each groundwater monitoring well to historical background data (upper tolerance limits [UTLs]) and data within each well (intrawell comparisons) will be conducted to establish whether the variance also exceeds the normal range of concentrations over time. Practical quantitation limits (PQLs) are used where UTLs could not be calculated from the pool of historical data (1986 through 1994) due to a high proportion of nondetected results. For a water matrix, PQLs are set at ten times the instrument detection limit.

4. Boron and total strontium are nonregulated compounds of concern, and both exhibit a high degree of variability in concentration distribution over time. Because of these two factors, quantitative trend analysis is conducted for these parameters to determine if a statistically positive trend exists over time. Gross alpha and gross beta measurements are statistical summary results with associated error; therefore, application of statistical calculations is not feasible. Accordingly, quantitative trending is used to evaluate these two target list parameters.

The two-part test is denoted in the post-closure permit to account for the considerable natural geochemical variability in the karst groundwater system that exists beneath the KHQ.
Both parts of the test must show a statistical increase for the test to be considered valid. The variance test compares the mean value of each target list compound concentration (calculated from the four replicate samples) at each downgradient well with the mean result at the upgradient well; the test is limited to data from a single sampling event. Comparison of individual downgradient well results with the UTL (or PQL) determines if a constituent concentration is higher than expected based on historical variability upgradient of the site. The within-well comparisons determine whether a particular result from a well is statistically greater than the range of historical concentrations observed within that particular well.

2.0 Results for the First, 180-Day Reporting Period for CY 1997

A. Total Uranium

A high proportion of nondetected constituents resulted in nonparametric data distributions for all target list parameters. As a result, parametric ANOVA tests could not be conducted; rather, a nonparametric variance test (Kruskal-Wallis Test) was used. As shown in the summary table, the variance test indicated that statistical differences existed among the five facility monitoring wells for total uranium. In the case of total uranium concentrations, all downgradient wells and upgradient Well GW-142 were statistically higher than upgradient Well GW-231. However, total uranium levels in downgradient were statistically less than (Wells GW-143 and GW-144) or statistically equal to (Well GW-145) upgradient Well GW-142. Two of the downgradient wells were also statistically different from each other (Well GW-144 < Well GW-145). Because the variance test indicated that total uranium levels were statistically higher in the downgradient wells as compared with one of the upgradient wells, comparisons to UTLs and intrawell comparisons were performed for this parameter.

The total uranium UTL of 0.019 milligrams per liter (mg/L) was established in the post-closure permit application for the KHQ using available interim status historical data collected between 1986 and 1994 from the two upgradient wells (SAIC, Inc., 1995). As demonstrated in the summary table, total uranium results in any downgradient well did not exceed the UTL. Three of the four values obtained during the first semiannual monitoring period from upgradient Well GW-142 did exceed the UTL.

The intrawell comparisons (Wilcoxon Rank-Sum Test) showed that the total uranium results within Well GW-142 were significantly higher than past results. This result was expected considering that the upgradient well exceeded its own UTL during the first, semiannual monitoring event. In downgradient Well GW-144, total uranium results for the first, semiannual CY 1996 sampling event were actually statistically lower than historical results. Accordingly, a release of total uranium was determined not to have occurred.

B. Lead

As shown in the summary table, the variance test indicated that statistical differences existed among the five facility monitoring wells for lead. In the case of lead concentrations, the variance test indicated that lead concentrations in one downgradient well (Well GW-145) ranked statistically higher than both upgradient wells, but statistical differences among all of the wells could not be discerned. Because the variance test indicated that a downgradient well had potentially higher lead levels than the upgradient wells, the total lead data were also compared with upper tolerance limits and intrawell comparisons were performed.

The lead UTL of 0.035 mg/L was established in the post-closure permit application for the KHQ using available interim status historical data collected between 1986 and 1994 from the two upgradient wells (SAIC, Inc., 1995). As demonstrated in the summary table, no lead exceeded the UTL. The intrawell comparisons (Wilcoxon Rank-Sum Test) showed that the lead results for the first, semiannual reporting period of CY 1997 were not significantly different than historical results. Accordingly, a release of lead was determined not to have occurred.

C. Trend Test

Quantitative trend analysis (Kendall-Tau B Test) was performed for boron, total strontium, gross alpha, and gross beta using data collected during the period CY 1990 through the first semiannual reporting period of CY 1997. Results of the trending analyses indicated that only boron results exhibited a significant trend over this time period. A positive (upward) trend for boron was observed in downgradient Well GW-145. An upward trend was observed for the previous semiannual reporting period in Well GW-145 and in upgradient Well GW-231. Given that the upgradient well did not have a repeat of the upward trend in the first, semiannual reporting period of CY 1997, confirmatory sampling for boron must be conducted.

The statistical trend test denoted above does not exclude outliers nor does it assign weighting factors to any data point. Outliers may produce false positive trends or false negative trends. Statistical outliers may be identified by a formal outlier test. Performance of an outlier test and screening of statistical outliers are currently being evaluated as a possible future components of the trend analysis in the context of a post-closure permit modification proposal.

3.0 Assumptions for Statistical Evaluations

For the purposes of statistical evaluations, the following baseline assumptions were used.

A. Kruskal-Wallis Test.

1. As a conservative assumption for calculations, the detection limit was substituted for analytical measurements reported as less than the detection limit.

B. Wilcoxon Rank-Sum Test.

1. As a conservative assumption for calculations, the detection limit was substituted for analytical measurements reported as less than the detection limit.

2. The baseline period for the intrawell comparisons included interim status monitoring results collected during the period CY 1990 through CY 1995.

3. Measurements reported at multiple detection limits during the baseline period were converted to the highest detection limit in the ranking process.

4. Current measurements reported at detection limits higher than those in the baseline period were deleted from the ranking process.

C. Kendall-Tau B Test. The data set used to conduct trending analyses included all data collected since the first quarter of CY 1990.

KRUSKAL-WALLIS TEST RESULTS
(NONPARAMETRIC PROCEDURE USED INSTEAD OF 1-WAY ANOVA)
AND FOLLOW UP MULTIPLE COMPARISON TESTS,
IF INDICATED BY KRUSKAL WALLIS TEST RESULT

4 replicate measurements collected
at 2 upgradient and 3 downgradient wells during 2nd Quarter 1997

COMPARISON OF DOWNGRADIENT WELLS TO UPGRADIENT WELL

MEASUREMENTS REPORTED AS <#, CONVERTED TO # FOR CALCULATIONS

SUMMARY OF KRUSKAL-WALLIS TEST RESULTS AND MULTIPLE COMPARISON TESTS
KERR HOLLOW QUARRY

PARAMETER	KRUSKAL-WALLIS TEST RESULT	MULTIPLE COMPARISON TEST RESULTS	
Cadmium (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Chromium (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Lead (mg/L)	There are statistical differences in the location parameter across 5 monitoring wells	GW-144 GW-143 GW-231 GW-142 GW-145	Although differences exist, there is insufficient data to distinguish which wells are different from the others.
Mercury (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Nickel (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Uranium (mg/L)	There are statistical differences in the location parameter across 5 monitoring wells	GW-231 GW-144 GW-143 GW-145 GW-142 ---------- ---------- ----------	Uranium results in all downgradient wells and in upgradient well GW-142 are statistically greater than those in upgradient well GW-231. GW-144 results are statistically less than those in GW-145 & GW-142. GW-143 results are statistically less than those in GW-142.
Carbon tetrachloride (ug/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Tetrachloroethene (ug/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Chloroform (ug/L)	There are no statistical differences in the location parameter across 5 monitoring wells		

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CADMIUM ICAP (MG/L)	RANK
1	GW-142	29APR97	<0.003	7
		29APR97	<0.003	8
		30APR97	<0.003	15
		01MAY97	<0.003	20
2	GW-143	28APR97	<0.003	2
		29APR97	<0.003	6
		30APR97	<0.003	12
		01MAY97	<0.003	17
3	GW-144	28APR97	<0.003	3
		29APR97	<0.003	9
		30APR97	<0.003	13
		01MAY97	<0.003	18
4	GW-145	28APR97	<0.003	4
		29APR97	<0.003	10
		30APR97	<0.003	14
		01MAY97	<0.003	19
5	GW-231	28APR97	<0.003	1
		29APR97	<0.003	5
		30APR97	<0.003	11
		01MAY97	<0.003	16

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M7
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-142	4	42.0	42.0	0.0	10.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 4 Prob > CHISQ= 0.9999

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CHROMIUM ICAP (MG/L)	RANK
1	GW-142	29APR97	<0.01	7
		29APR97	<0.01	8
		30APR97	<0.01	15
		01MAY97	<0.01	20
2	GW-143	28APR97	<0.01	2
		29APR97	<0.01	6
		30APR97	<0.01	12
		01MAY97	<0.01	17
3	GW-144	28APR97	<0.01	3
		29APR97	<0.01	9
		30APR97	<0.01	13
		01MAY97	<0.01	18
4	GW-145	28APR97	<0.01	4
		29APR97	<0.01	10
		30APR97	<0.01	14
		01MAY97	<0.01	19
5	GW-231	28APR97	<0.01	1
		29APR97	<0.01	5
		30APR97	<0.01	11
		01MAY97	<0.01	16

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M9
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-142	4	42.0	42.0	0.0	10.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 4 Prob > CHISQ= 0.9999

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	LEAD PMS (MG/L)	RANK
1	GW-144	28APR97	<0.0005	1
		29APR97	<0.0005	5
		30APR97	<0.0005	8
		01MAY97	<0.0005	12
2	GW-143	29APR97	<0.0005	3
		30APR97	<0.0005	7
		01MAY97	<0.0005	11
		28APR97	0.00059	13
3	GW-231	29APR97	<0.0005	2
		30APR97	<0.0005	6
		01MAY97	<0.0005	10
		28APR97	0.00072	14
4	GW-142	29APR97	<0.0005	4
		30APR97	<0.0005	9
		01MAY97	0.001	17
		29APR97	0.0023	20
5	GW-145	29APR97	0.00083	15
		01MAY97	0.00092	16
		28APR97	0.0011	18
		30APR97	0.0011	19

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	33.5000000	42.0	9.37185035	8.3750000
GW-143	4	32.5000000	42.0	9.37185035	8.1250000
GW-144	4	26.0000000	42.0	9.37185035	6.5000000
GW-145	4	68.0000000	42.0	9.37185035	17.0000000
GW-142	4	50.0000000	42.0	9.37185035	12.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 10.552 DF= 4 Prob > CHISQ= 0.0321

Wells 144, 143, 231 and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	33.5000000	34.0	6.27694193	8.3750000
GW-143	4	32.5000000	34.0	6.27694193	8.1250000
GW-144	4	26.0000000	34.0	6.27694193	6.5000000
GW-142	4	44.0000000	34.0	6.27694193	11.0000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 3.1694 DF= 3 Prob > CHISQ= 0.3662

Wells 143, 231, 142 and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	23.5000000	34.0	7.71362431	5.8750000
GW-143	4	22.5000000	34.0	7.71362431	5.6250000
GW-145	4	52.0000000	34.0	7.71362431	13.0000000
GW-142	4	38.0000000	34.0	7.71362431	9.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 7.3424 DF= 3 Prob > CHISQ= 0.0617

Wells 144, 143, and 231

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	28.5000000	26.0	3.82970843	7.12500000
GW-143	4	27.5000000	26.0	3.82970843	6.87500000
GW-144	4	22.0000000	26.0	3.82970843	5.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 1.1136 DF= 2 Prob > CHISQ= 0.5730

Wells 143, 231, and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	23.5000000	26.0	4.94821670	5.87500000
GW-143	4	22.5000000	26.0	4.94821670	5.62500000
GW-142	4	32.0000000	26.0	4.94821670	8.00000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 1.4839 DF= 2 Prob > CHISQ= 0.4762

Wells 231, 142, and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	15.0	26.0	5.66755786	3.75000000
GW-145	4	36.0	26.0	5.66755786	9.00000000
GW-142	4	27.0	26.0	5.66755786	6.75000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 4.6075 DF= 2 Prob > CHISQ= 0.0999

Wells 144, and 143

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	20.0	18.0	2.0	5.0
GW-144	4	16.0	18.0	2.0	4.0

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 20.0000 Z= 0.750000 Prob > |Z| = 0.4533

T-Test approx. Significance = 0.4777

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 1.0000 DF= 1 Prob > CHISQ= 0.3173

Wells 143, and 231

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	18.5000000	18.0	2.64575131	4.62500000
GW-143	4	17.5000000	18.0	2.64575131	4.37500000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 18.5000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.03571 DF= 1 Prob > CHISQ= 0.8501

Wells 231, and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	15.0	18.0	3.02371578	3.75000000
GW-142	4	21.0	18.0	3.02371578	5.25000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 15.0000 Z= -.826797 Prob > |Z| = 0.4084

T-Test approx. Significance = 0.4356

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.98438 DF= 1 Prob > CHISQ= 0.3211

Wells 142, and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13P
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-145	4	20.0	18.0	3.42261387	5.0
GW-142	4	16.0	18.0	3.42261387	4.0

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 20.0000 Z= 0.438262 Prob > |Z| = 0.6612

T-Test approx. Significance = 0.6744

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.34146 DF= 1 Prob > CHISQ= 0.5590

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	MERCURY CVAA (MG/L)	RANK
1	GW-142	29APR97	<0.0002	7
		29APR97	<0.0002	8
		30APR97	<0.0002	15
		01MAY97	<0.0002	20
2	GW-143	28APR97	<0.0002	2
		29APR97	<0.0002	6
		30APR97	<0.0002	12
		01MAY97	<0.0002	17
3	GW-144	28APR97	<0.0002	3
		29APR97	<0.0002	9
		30APR97	<0.0002	13
		01MAY97	<0.0002	18
4	GW-145	28APR97	<0.0002	4
		29APR97	<0.0002	10
		30APR97	<0.0002	14
		01MAY97	<0.0002	19
5	GW-231	28APR97	<0.0002	1
		29APR97	<0.0002	5
		30APR97	<0.0002	11
		01MAY97	<0.0002	16

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable HG
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-142	4	42.0	42.0	0.0	10.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 4 Prob > CHISQ= 0.9999

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	NICKEL ICAP (MG/L)	RANK
1	GW-142	29APR97	<0.01	7
		29APR97	<0.01	8
		30APR97	<0.01	15
		01MAY97	<0.01	20
2	GW-143	28APR97	<0.01	2
		29APR97	<0.01	6
		30APR97	<0.01	12
		01MAY97	<0.01	17
3	GW-144	28APR97	<0.01	3
		29APR97	<0.01	9
		30APR97	<0.01	13
		01MAY97	<0.01	18
4	GW-145	28APR97	<0.01	4
		29APR97	<0.01	10
		30APR97	<0.01	14
		01MAY97	<0.01	19
5	GW-231	28APR97	<0.01	1
		29APR97	<0.01	5
		30APR97	<0.01	11
		01MAY97	<0.01	16

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M18
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-142	4	42.0	42.0	0.0	10.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0 DF= 4 Prob > CHISQ= 0.9999

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	URANIUM PMS (MG/L)	RANK
1	GW-231	28APR97	<0.0005	1
		29APR97	<0.0005	2
		30APR97	<0.0005	3
		01MAY97	<0.0005	4
2	GW-144	28APR97	0.0013	6
		29APR97	0.0013	7
		30APR97	0.0013	8
		01MAY97	0.0013	9
3	GW-143	28APR97	0.00093	5
		01MAY97	0.0019	10
		30APR97	0.002	11
		29APR97	0.0023	12
4	GW-145	01MAY97	0.012	13
		29APR97	0.013	14
		30APR97	0.013	15
		28APR97	0.014	16
5	GW-142	30APR97	0.017	17
		29APR97	0.02	18
		29APR97	0.021	19
		01MAY97	0.021	20

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	10.0	42.0	10.4951116	2.5000000
GW-143	4	38.0	42.0	10.4951116	9.5000000
GW-144	4	30.0	42.0	10.4951116	7.5000000
GW-145	4	58.0	42.0	10.4951116	14.5000000
GW-142	4	74.0	42.0	10.4951116	18.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 17.896 DF= 4 Prob > CHISQ= 0.0013

Wells 231, 144, 143 and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	10.0	34.0	8.11788150	2.5000000
GW-143	4	38.0	34.0	8.11788150	9.5000000
GW-144	4	30.0	34.0	8.11788150	7.5000000
GW-145	4	58.0	34.0	8.11788150	14.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 13.475 DF= 3 Prob > CHISQ= 0.0037

Wells 144, 143, 145 and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	22.0	34.0	8.17312670	5.5000000
GW-144	4	14.0	34.0	8.17312670	3.5000000
GW-145	4	42.0	34.0	8.17312670	10.5000000
GW-142	4	58.0	34.0	8.17312670	14.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 13.293 DF= 3 Prob > CHISQ= 0.0040

Wells 231, 144, and 143

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	10.0	26.0	5.67824130	2.50000000
GW-143	4	38.0	26.0	5.67824130	9.50000000
GW-144	4	30.0	26.0	5.67824130	7.50000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 8.6015 DF= 2 Prob > CHISQ= 0.0136

Wells 144, 143, and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	22.0	26.0	5.77350269	5.5000000
GW-144	4	14.0	26.0	5.77350269	3.5000000
GW-145	4	42.0	26.0	5.77350269	10.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 8.3200 DF= 2 Prob > CHISQ= 0.0156

Wells 143, 145, and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	10.0	26.0	5.86721760	2.5000000
GW-145	4	26.0	26.0	5.86721760	6.5000000
GW-142	4	42.0	26.0	5.86721760	10.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 9.9155 DF= 2 Prob > CHISQ= 0.0070

Wells 231, and 144

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	10.0	18.0	3.02371578	2.50000000
GW-144	4	26.0	18.0	3.02371578	6.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 10.0000 Z= -2.48039 Prob > |Z| = 0.0131

T-Test approx. Significance = 0.0422

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 7.0000 DF= 1 Prob > CHISQ= 0.0082

Wells 144, and 143

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	22.0	18.0	3.25137334	5.50000000
GW-144	4	14.0	18.0	3.25137334	3.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 22.0000 Z= 1.07647 Prob > |Z| = 0.2817

T-Test approx. Significance = 0.3174

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 1.5135 DF= 1 Prob > CHISQ= 0.2186

Wells 143, and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	10.0	18.0	3.44342023	2.50000000
GW-145	4	26.0	18.0	3.44342023	6.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 10.0000 Z= -2.17807 Prob > |Z| = 0.0294

T-Test approx. Significance = 0.0658

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 5.3976 DF= 1 Prob > CHISQ= 0.0202

Wells 145, and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable UT
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-145	4	10.0	18.0	3.42261387	2.50000000
GW-142	4	26.0	18.0	3.42261387	6.50000000

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 10.0000 Z= -2.19131 Prob > |Z| = 0.0284

T-Test approx. Significance = 0.0646

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 5.4634 DF= 1 Prob > CHISQ= 0.0194

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CARBON TETRACHLORIDE (UG/L)	QUALIFIER	RANK
1	GW-142	29APR97	5	U	11
		29APR97	5	U	12
		30APR97	5	U	16
		01MAY97	5	U	20
2	GW-145	28APR97	5	U	8
		29APR97	5	U	13
		30APR97	5	U	15
		01MAY97	5	U	19
3	GW-231	28APR97	5	U	5
		29APR97	5	U	9
		30APR97	5	U	14
		01MAY97	5	U	17
4	GW-144	30APR97	1	J	1
		29APR97	2	J	2
		28APR97	5	U	7
		01MAY97	5	U	18
5	GW-143	30APR97	2	J	3
		01MAY97	2	J	4
		28APR97	5	U	6
		29APR97	5	U	10

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable V5
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	34.0	42.0	7.37563557	8.5000000
GW-143	4	55.0	42.0	7.37563557	13.7500000
GW-144	4	53.0	42.0	7.37563557	13.2500000
GW-145	4	34.0	42.0	7.37563557	8.5000000
GW-142	4	34.0	42.0	7.37563557	8.5000000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 7.0882 DF= 4 Prob > CHISQ= 0.1313

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CHLOROFORM (UG/L)	QUALIFIER	RANK
1	GW-231	28APR97	5	U	13
		29APR97	5	U	14
		30APR97	5	U	16
		01MAY97	5	U	18
2	GW-145	28APR97	3	J	12
		29APR97	5	U	15
		30APR97	5	U	17
		01MAY97	5	U	19
3	GW-142	29APR97	1	J	3
		29APR97	1	J	4
		30APR97	2	J	10
		01MAY97	5	U	20
4	GW-144	28APR97	1	J	2
		29APR97	1	J	5
		01MAY97	1	J	6
		30APR97	2	J	9
5	GW-143	28APR97	1	J	1
		29APR97	2	J	7
		30APR97	2	J	8
		01MAY97	2	J	11

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable V10
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	18.0000000	42.0	10.0147260	4.5000000
GW-143	4	62.5000000	42.0	10.0147260	15.6250000
GW-144	4	51.5000000	42.0	10.0147260	12.8750000
GW-145	4	33.5000000	42.0	10.0147260	8.3750000
GW-142	4	44.5000000	42.0	10.0147260	11.1250000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 9.2926 DF= 4 Prob > CHISQ= 0.0542

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	TETRACHLOROETHENE (UG/L)	QUALIFIER	RANK
1	GW-143	28APR97	5	U	7
		29APR97	5	U	10
		30APR97	5	U	14
		01MAY97	5	U	18
2	GW-231	28APR97	5	U	6
		29APR97	5	U	9
		30APR97	5	U	13
		01MAY97	5	U	17
3	GW-145	28APR97	1	J	1
		29APR97	5	U	12
		30APR97	5	U	15
		01MAY97	5	U	19
4	GW-142	29APR97	1	J	2
		29APR97	1	J	3
		30APR97	5	U	16
		01MAY97	5	U	20
5	GW-144	01MAY97	1	J	4
		30APR97	2	J	5
		28APR97	5	U	8
		29APR97	5	U	11

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable V24
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-231	4	32.0000000	42.0	8.0	8.0000000
GW-143	4	32.0000000	42.0	8.0	8.0000000
GW-144	4	53.5000000	42.0	8.0	13.3750000
GW-145	4	41.5000000	42.0	8.0	10.3750000
GW-142	4	51.0000000	42.0	8.0	12.7500000

Average Scores were used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 5.1688 DF= 4 Prob > CHISQ= 0.2704

COMPARISON TO UPPER TOLERANCE LIMITS

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	URANIUM PMS (MG/L)	EXCEEDS UTL (0.019 MG/L)	RANK
2	GW-144	28APR97	0.0013	No	6
		29APR97	0.0013	No	7
		30APR97	0.0013	No	8
		01MAY97	0.0013	No	9
3	GW-143	28APR97	0.00093	No	5
		01MAY97	0.0019	No	10
		30APR97	0.002	No	11
		29APR97	0.0023	No	12
4	GW-142	30APR97	0.017	No	17
		29APR97	0.02	Yes	18
		29APR97	0.021	Yes	19
		01MAY97	0.021	Yes	20
5	GW-145	01MAY97	0.012	No	13
		29APR97	0.013	No	14
		30APR97	0.013	No	15
		28APR97	0.014	No	16
5	GW-231	28APR97	<0.0005	No	1
		29APR97	<0.0005	No	2
		30APR97	<0.0005	No	3
		01MAY97	<0.0005	No	4

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	LEAD PMS (MG/L)	EXCEEDS UTL (0.035 MG/L)	RANK
1	GW-144	28APR97	<0.0005	No	6
		29APR97	<0.0005	No	7
		30APR97	<0.0005	No	8
		01MAY97	<0.0005	No	9
2	GW-143	29APR97	<0.0005	No	3
		30APR97	<0.0005	No	4
		01MAY97	<0.0005	No	5
		28APR97	0.00059	No	13
4	GW-142	29APR97	<0.0005	No	1
		30APR97	<0.0005	No	2
		01MAY97	0.001	No	17
		29APR97	0.0023	No	20
5	GW-145	29APR97	0.00083	No	15
		01MAY97	0.00092	No	16
		28APR97	0.0011	No	18
		30APR97	0.0011	No	19
5	GW-231	29APR97	<0.0005	No	10
		30APR97	<0.0005	No	11
		01MAY97	<0.0005	No	12
		28APR97	0.00072	No	14

WILCOXON RANK-SUM TEST
(NONPARAMETRIC PROCEDURE USED INSTEAD OF T-TEST)

INTRAWELL COMPARISONS OF 2ND QUARTER 1997 WELL MEASUREMENTS
TO HISTORIC MEASUREMENTS

MEASUREMENTS REPORTED AS <#
WERE CONVERTED TO # FOR CALCULATIONS

MEASUREMENTS REPORTED AT ELEVATED DETECTION LIMITS
WERE DELETED

MEASUREMENTS FOR ANALYTES REPORTED
AT MULTIPLE DETECTION LIMITS
WERE CONVERTED TO THE HIGHER DETECTION LIMIT

SUMMARY OF WILCOXON RANK-SUM TEST RESULTS
KERR HOLLOW QUARRY BASIN

PARAMETER	WILCOXON RANK-SUM TEST	WELL	CONCLUSION
Lead	There are no statistical differences in the location parameter within wells.		
Uranium	There are statistical differences in the location parameter within wells.	**GW-142** **GW-144**	1997 Q2 > Historic 1997 Q2 < Historic

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-142	1997 Q2	04/30/97	0.017
		04/29/97	0.02
		04/29/97	0.021
		05/01/97	0.021
GW-142	Historic	10/22/94	.
		03/20/95	.
		06/11/90	<0.001
		02/20/92	<0.001
		09/17/90	0.001
		11/05/95	0.0018
		09/14/92	0.003
		07/21/94	0.003
		11/04/91	0.004
		05/28/92	0.004
		03/05/93	0.004
		11/30/92	0.005
		07/14/95	0.0095
		08/03/91	0.01
		04/12/94	0.01
		04/20/95	0.01
		01/10/95	0.011
		03/15/91	0.014
		11/26/90	0.016
		06/11/93	0.019
		12/15/93	0.019
		06/13/91	0.02
		02/16/94	0.024
		08/25/93	0.032
GW-143	1997 Q2	04/28/97	<0.001
		05/01/97	0.0019
		04/30/97	0.002
		04/29/97	0.0023
GW-143	Historic	06/13/93	.
		10/24/94	.
		06/14/90	<0.001
		09/17/90	0.001
		11/27/90	0.001
		03/16/91	0.001
		06/16/91	0.001
		11/07/91	0.001
		02/21/92	0.001
		05/29/92	0.001

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-143	Historic	12/01/92	0.001
		04/18/94	0.001
		01/17/95	0.0012
		04/24/95	0.0012
		07/16/95	0.0017
		06/12/93	0.002
		12/15/93	0.002
		03/03/94	0.002
		07/24/94	0.002
		11/09/95	0.0022
		09/05/91	0.003
		03/06/93	0.003
		08/27/93	0.003
		09/28/92	0.006
GW-144	1997 Q2	04/28/97	0.0013
		04/29/97	0.0013
		04/30/97	0.0013
		05/01/97	0.0013
GW-144	Historic	10/25/94	.
		03/22/95	.
		07/16/95	<0.001
		06/13/90	0.001
		09/17/90	0.001
		11/27/90	0.001
		03/16/91	0.002
		03/10/94	0.002
		04/19/94	0.002
		07/26/94	0.002
		04/25/95	0.002
		11/14/95	0.0023
		01/18/95	0.0025
		06/12/93	0.003
		08/26/93	0.003
		06/15/91	0.004
		02/21/92	0.004
		05/29/92	0.004
		12/01/92	0.004
		03/06/93	0.004
		12/15/93	0.004
		11/06/91	0.005
		09/15/92	0.005
		09/05/91	0.007

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-145	1997 Q2	05/01/97	0.012
		04/29/97	0.013
		04/30/97	0.013
		04/28/97	0.014
GW-145	Historic	10/26/94	.
		03/24/95	.
		07/17/95	<0.001
		08/25/93	0.008
		07/26/94	0.01
		03/16/91	0.011
		09/04/91	0.011
		06/14/91	0.012
		06/12/93	0.012
		04/26/95	0.012
		11/15/95	0.012
		11/30/92	0.013
		12/14/93	0.013
		03/11/94	0.013
		01/18/95	0.013
		11/26/90	0.014
		05/29/92	0.014
		09/15/92	0.014
		03/06/93	0.014
		04/20/94	0.014
		06/12/90	0.015
		11/05/91	0.015
		10/08/90	0.016
		02/20/92	0.016
GW-231	1997 Q2	04/28/97	<0.001
		04/29/97	<0.001
		04/30/97	<0.001
		05/01/97	<0.001
GW-231	Historic	10/23/94	.
		06/12/90	<0.001
		10/08/90	<0.001
		11/26/90	<0.001
		03/14/91	<0.001
		07/19/91	<0.001
		09/04/91	<0.001
		11/05/91	<0.001
		02/21/92	<0.001
		05/28/92	<0.001

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-231	Historic	03/05/93	<0.001
		06/11/93	<0.001
		12/14/93	<0.001
		02/28/94	<0.001
		04/13/94	<0.001
		01/15/95	<0.001
		04/21/95	<0.001
		07/15/95	<0.001
		11/06/95	<0.001
		11/30/92	0.001
		08/24/93	0.001
		09/15/92	0.002
		07/23/94	0.002

---------- STATION NAME=GW-142 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	86.500000	54.0	14.0327090	21.6250000
Historic	22	264.500000	297.0	14.0327090	12.0227273

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 86.5000 Z= 2.28039 Prob > |Z| = 0.0226

T-Test approx. Significance = 0.0314

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 5.3639 DF= 1 Prob > CHISQ= 0.0206

---------- STATION NAME=GW-143 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	61.0	54.0	13.4690528	15.2500000
Historic	22	290.0	297.0	13.4690528	13.1818182

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 61.0000 Z= 0.482588 Prob > |Z| = 0.6294

T-Test approx. Significance = 0.6336

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.27010 DF= 1 Prob > CHISQ= 0.6033

---------- STATION NAME=GW-144 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	26.0	54.0	13.8848008	6.5000000
Historic	22	325.0	297.0	13.8848008	14.7727273

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 26.0000 Z= -1.98058 Prob > |Z| = 0.0476

T-Test approx. Significance = 0.0587

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 4.0666 DF= 1 Prob > CHISQ= 0.0437

---------- STATION NAME=GW-145 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	54.500000	54.0	13.8457436	13.6250000
Historic	22	296.500000	297.0	13.8457436	13.4772727

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 54.5000 Z= 0 Prob > |Z| = 0.9999

T-Test approx. Significance = 0.9999

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.00130 DF= 1 Prob > CHISQ= 0.9712

---------- STATION NAME=GW-231 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	50.0	54.0	6.49923072	12.5000000
Historic	22	301.0	297.0	6.49923072	13.6818182

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 50.0000 Z= -.538525 Prob > |Z| = 0.5902

T-Test approx. Significance = 0.5950

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.37879 DF= 1 Prob > CHISQ= 0.5383

STATION NAME	PERIOD	SAMPLE DATE	LEAD (MG/L)
GW-142	1997 Q2	04/29/97	<0.004
		04/29/97	<0.004
		04/30/97	<0.004
		05/01/97	<0.004
GW-142	Historic	01/10/95	.
		03/20/95	.
		04/20/95	.
		07/14/95	.
		11/05/95	.
		06/11/90	<0.004
		03/15/91	<0.004
		06/13/91	<0.004
		08/03/91	<0.004
		11/04/91	<0.004
		02/20/92	<0.004
		05/28/92	<0.004
		09/14/92	<0.004
		11/30/92	<0.004
		03/05/93	<0.004
		06/11/93	<0.004
		08/25/93	<0.004
		12/15/93	<0.004
		02/16/94	<0.004
		04/12/94	<0.004
		07/21/94	<0.004
		10/22/94	<0.004
		11/26/90	0.0077
		09/17/90	0.0097
GW-143	1997 Q2	04/28/97	<0.004
		04/29/97	<0.004
		04/30/97	<0.004
		05/01/97	<0.004
GW-143	Historic	06/13/93	.
		01/17/95	.
		04/24/95	.
		07/16/95	.
		11/09/95	.
		09/17/90	<0.004
		11/27/90	<0.004
		03/16/91	<0.004
		06/16/91	<0.004
		09/05/91	<0.004

STATION NAME	PERIOD	SAMPLE DATE	LEAD (MG/L)
GW-143	Historic	11/07/91	<0.004
		02/21/92	<0.004
		05/29/92	<0.004
		09/28/92	<0.004
		12/01/92	<0.004
		06/12/93	<0.004
		08/27/93	<0.004
		12/15/93	<0.004
		03/03/94	<0.004
		04/18/94	<0.004
		07/24/94	<0.004
		10/24/94	<0.004
		06/14/90	0.0042
		03/06/93	0.035
GW-144	1997 Q2	04/28/97	<0.004
		04/29/97	<0.004
		04/30/97	<0.004
		05/01/97	<0.004
GW-144	Historic	01/18/95	.
		03/22/95	.
		04/25/95	.
		07/16/95	.
		11/14/95	.
		06/13/90	<0.004
		09/17/90	<0.004
		11/27/90	<0.004
		06/15/91	<0.004
		09/05/91	<0.004
		11/06/91	<0.004
		02/21/92	<0.004
		05/29/92	<0.004
		09/15/92	<0.004
		12/01/92	<0.004
		03/06/93	<0.004
		06/12/93	<0.004
		08/26/93	<0.004
		12/15/93	<0.004
		03/10/94	<0.004
		04/19/94	<0.004
		07/26/94	<0.004
		10/25/94	<0.004
		03/16/91	0.0049

STATION NAME	PERIOD	SAMPLE DATE	LEAD (MG/L)
GW-145	1997 Q2	04/28/97	<0.004
		04/29/97	<0.004
		04/30/97	<0.004
		05/01/97	<0.004
GW-145	Historic	01/18/95	.
		03/24/95	.
		04/26/95	.
		07/17/95	.
		11/15/95	.
		10/08/90	<0.004
		11/26/90	<0.004
		03/16/91	<0.004
		06/14/91	<0.004
		09/04/91	<0.004
		11/05/91	<0.004
		05/29/92	<0.004
		09/15/92	<0.004
		11/30/92	<0.004
		03/06/93	<0.004
		06/12/93	<0.004
		12/14/93	<0.004
		03/11/94	<0.004
		04/20/94	<0.004
		07/26/94	<0.004
		02/20/92	0.0045
		10/26/94	0.0049
		08/25/93	0.0081
		06/12/90	0.094
GW-231	1997 Q2	04/28/97	<0.004
		04/29/97	<0.004
		04/30/97	<0.004
		05/01/97	<0.004
GW-231	Historic	01/15/95	.
		04/21/95	.
		07/15/95	.
		11/06/95	.
		06/12/90	<0.004
		10/08/90	<0.004
		11/26/90	<0.004
		07/19/91	<0.004
		09/04/91	<0.004
		11/05/91	<0.004

STATION NAME	PERIOD	SAMPLE DATE	LEAD (MG/L)
GW-231	Historic	02/21/92	<0.004
		05/28/92	<0.004
		09/15/92	<0.004
		11/30/92	<0.004
		03/05/93	<0.004
		06/11/93	<0.004
		08/24/93	<0.004
		12/14/93	<0.004
		02/28/94	<0.004
		04/13/94	<0.004
		07/23/94	<0.004
		10/23/94	<0.004
		03/14/91	0.0043

---------- STATION NAME=GW-142 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	44.0	48.0	6.02891583	11.0000000
Historic	19	232.0	228.0	6.02891583	12.2105263

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 44.0000 Z= -.580536 Prob > |Z| = 0.5616

T-Test approx. Significance = 0.5675

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.44019 DF= 1 Prob > CHISQ= 0.5070

---------- STATION NAME=GW-143 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	44.0	48.0	6.02891583	11.0000000
Historic	19	232.0	228.0	6.02891583	12.2105263

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 44.0000 Z= -.580536 Prob > |Z| = 0.5616

T-Test approx. Significance = 0.5675

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.44019 DF= 1 Prob > CHISQ= 0.5070

---------- STATION NAME=GW-144 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	46.0	48.0	4.35889894	11.5000000
Historic	19	230.0	228.0	4.35889894	12.1052632

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 46.0000 Z= -.344124 Prob > |Z| = 0.7308

T-Test approx. Significance = 0.7340

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.21053 DF= 1 Prob > CHISQ= 0.6464

---------- STATION NAME=GW-145 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	40.0	48.0	8.14784338	10.0000000
Historic	19	236.0	228.0	8.14784338	12.4210526

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 40.0000 Z= -.920489 Prob > |Z| = 0.3573

T-Test approx. Significance = 0.3673

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.96404 DF= 1 Prob > CHISQ= 0.3262

---------- STATION NAME=GW-231 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable M13_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q2	4	46.0	48.0	4.35889894	11.5000000
Historic	19	230.0	228.0	4.35889894	12.1052632

Average Scores were used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S= 46.0000 Z= -.344124 Prob > |Z| = 0.7308

T-Test approx. Significance = 0.7340

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ= 0.21053 DF= 1 Prob > CHISQ= 0.6464

KENDALL TAU B STATISTIC
TEST FOR STATISTICALLY SIGNIFICANT POSITIVE RELATIONSHIP BETWEEN INDICATOR PARAMETER CONCENTRATIONS AND TIME

SUMMARY OF KENDALL TAU B TEST RESULTS
KERR HOLLOW QUARRY

PARAMETER	KENDALL TAU B TEST RESULT	
Boron (mg/L)	There is a statistically significant increase in boron concentrations over time for the following wells:	GW-145
Strontium (mg/L)	There is no statistically significant increase in strontium concentrations over time for any well.	
Gross alpha (pCi/L)	There is no statistically significant increase in strontium concentrations over time for any well.	
Gross beta (pCi/L)	There is no statistically significant increase in strontium concentrations over time for any well.	

---------- STATION NAME=GW-142 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	28	12347	776.766987	12346
M6	28	0.055782	0.025681	0.051500
M23	28	0.520357	0.050294	0.520000
GAA	27	8.085556	4.916351	6.620000
GBA	27	9.728148	7.629590	8.960000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11119.0	13635.0	SAMPLE DATE	
M6	0.00790	0.1500	BORON	ICAP (MG/L)
M23	0.4300	0.6900	STRONTIUM	ICAP (MG/L)
GAA	1.5300	15.8200	GROSS ALPHA	(PCI/L)
GBA	-6.7900	38.8000	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	M6	M23	GAA	GBA
SAMPLEDT	0.21449	0.19353	0.03725	-0.27389
SAMPLE DATE	0.1132	0.1584	0.7862	0.0453
	28	28	27	27

---------- STATION NAME=GW-143 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	28	12328	769.065017	12255
M6	27	0.887407	0.096181	0.900000
M23	27	2.548148	0.240785	2.500000
GAA	27	3.983481	2.712485	3.790000
GBA	27	16.037037	5.921068	16.700000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11122.0	13635.0	SAMPLE DATE	
M6	0.5700	1.1000	BORON	ICAP (MG/L)
M23	2.2000	3.3000	STRONTIUM	ICAP (MG/L)
GAA	0.5520	12.0000	GROSS ALPHA	(PCI/L)
GBA	5.7000	33.4000	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	M6	M23	GAA	GBA
SAMPLEDT	0.21679	0.10177	-0.13960	-0.24536
SAMPLE DATE	0.1170	0.4735	0.3070	0.0729
	27	27	27	27

---------- STATION NAME=GW-144 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	28	12351	776.022967	12347
M6	27	0.029963	0.009452	0.028000
M23	27	0.096741	0.016498	0.097000
GAA	27	2.633074	2.375038	2.070000
GBA	27	3.162963	2.662585	3.030000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11121.0	13635.0	SAMPLE DATE	
M6	0.0160	0.0490	BORON	ICAP (MG/L)
M23	0.0720	0.1400	STRONTIUM	ICAP (MG/L)
GAA	-4.2900	8.4300	GROSS ALPHA	(PCI/L)
GBA	-3.7000	7.4900	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	M6	M23	GAA	GBA
SAMPLEDT	-0.21679	-0.59024	-0.07989	-0.02564
SAMPLE DATE	0.1170	0.0001	0.5593	0.8512
	27	27	27	27

---------- STATION NAME=GW-145 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

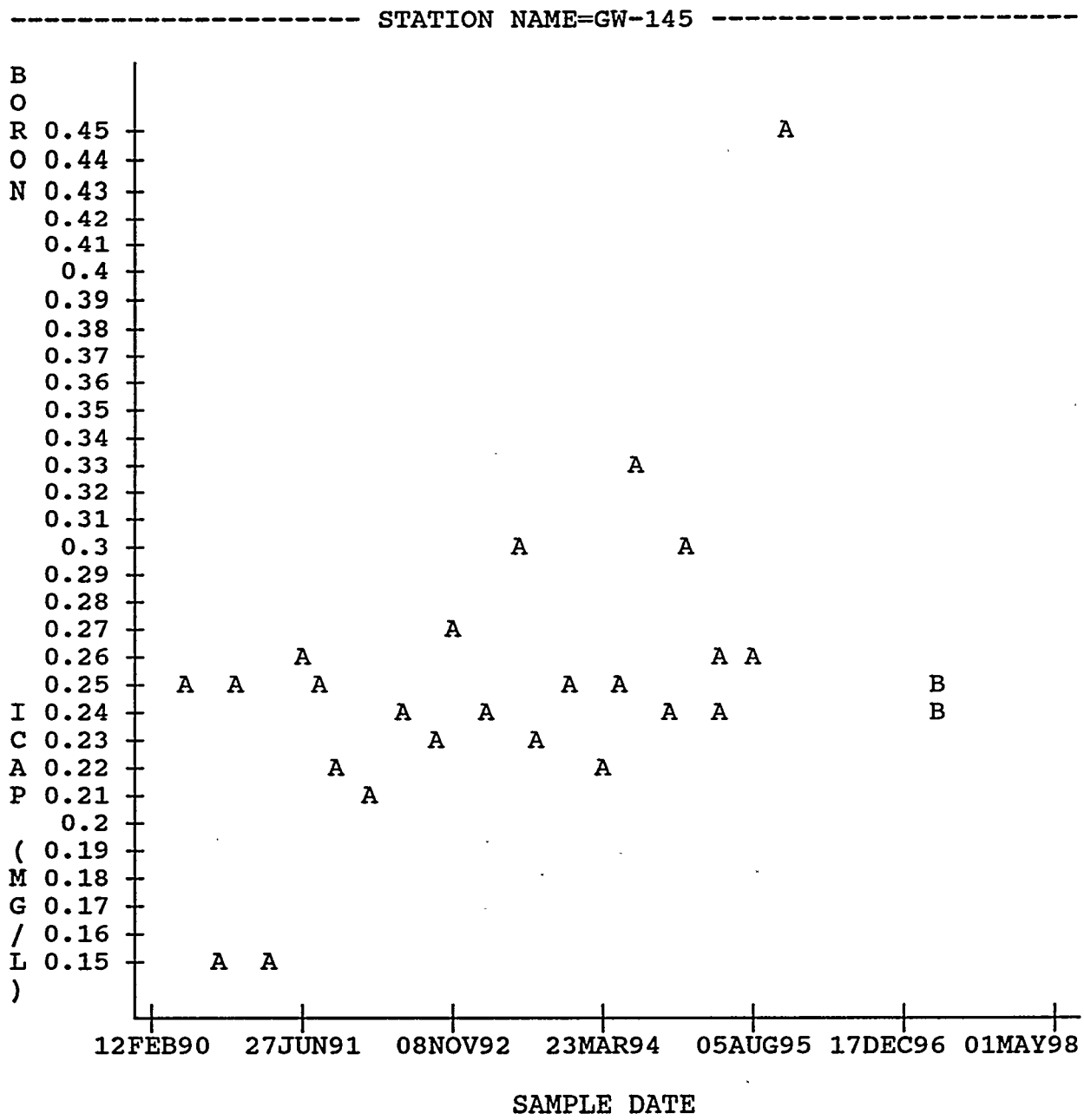
Variable	N	Mean	Std Dev	Median
SAMPLEDT	28	12351	775.337786	12346
M6	28	0.251071	0.053357	0.250000
M23	28	7.425000	0.544756	7.300000
GAA	27	11.870000	4.605390	11.700000
GBA	27	15.910630	6.668612	16.700000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11120.0	13635.0	SAMPLE DATE	
M6	0.1500	0.4500	BORON	ICAP (MG/L)
M23	6.7000	9.4000	STRONTIUM	ICAP (MG/L)
GAA	-0.3500	28.0000	GROSS ALPHA	(PCI/L)
GBA	-3.2900	24.4400	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	M6	M23	GAA	GBA
SAMPLEDT	0.23886	-0.10508	0.04006	-0.18830
SAMPLE DATE	0.0880	0.4477	0.7703	0.1688
	28	28	27	27


STATION NAME=GW-145
BORON ICAP (MG/L)
0.45
0.44
0.43
0.42
0.41
0.4
0.39
0.38
0.37
0.36
0.35
0.34
0.33
0.32
0.31
0.3
0.29
0.28
0.27
0.26
0.25
0.24
0.23
0.22
0.21
0.2
0.19
0.18
0.17
0.16
0.15
12FEB90
27JUN91
08NOV92
23MAR94
05AUG95
17DEC96
01MAY98
SAMPLE DATE

---------- STATION NAME=GW-231 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	27	12332	781.218035	12289
M6	27	0.020967	0.015650	0.016000
M23	27	0.036481	0.006357	0.036000
GAA	27	0.610485	1.371327	0.486000
GBA	27	0.553481	2.912045	1.060000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11120.0	13635.0	SAMPLE DATE	
M6	0	0.0550	BORON	ICAP (MG/L)
M23	0.0190	0.0470	STRONTIUM	ICAP (MG/L)
GAA	-2.3500	5.7400	GROSS ALPHA	(PCI/L)
GBA	-5.3000	5.2300	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / N = 27

	M6	M23	GAA	GBA
SAMPLEDT	0.12894	-0.21935	0.01425	-0.12251
SAMPLE DATE	0.3478	0.1124	0.9170	0.3700

LOCKHEED MARTIN ENERGY SYSTEMS, INC.

Post Office Box 2009
Oak Ridge, Tennessee 37831

October 17, 1997

Mr. Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
Fifth Floor, L&C Tower
401 Church Street
Nashville, Tennessee 37243-1535

Dear Mr. Tiesler:

Confirmatory Resampling Event and Post-Closure Statistical Determinations of Groundwater Quality Data from the Kerr Hollow Quarry (KHQ), Oak Ridge Y-12 Plant (TN3 89 009 0001), Following the First, 180-Day Reporting Period for Calendar Year (CY) 1997

As reported to you in the letter dated July 30, 1997, entitled "Semiannual Post-Closure Statistical Determinations of Groundwater Quality Data from the Kerr Hollow Quarry (KHQ), Oak Ridge Y-12 Plant (TN3 89 009 0001), First, 180-Day Reporting Period for Calendar Year (CY) 1997," statistical evaluations indicated a statistically significant increasing trend for boron in a downgradient well (Well GW-145). In accordance with Permit Condition VI.H.2(b), confirmatory sampling of all facility monitoring wells for boron was conducted between August 4, 1997, and August 7, 1997, within 30-days of receipt of the statistical evaluations for the first semiannual monitoring event. Enclosure 1 presents the confirmatory sampling analytical results for boron and strontium. The statistical evaluation of the data was conducted and indicates that no release of boron has occurred. Enclosure 2 presents summary information of the statistical evaluation. Therefore, in accordance with Permit Condition VI.H.2(d) detection monitoring shall be continued.

Additionally, after the facility wells were resampled it was discovered that data obtained during CY 1996 were not included in the initial statistical evaluation presented and reported to you in the previously mentioned letter. These data were included in the trend evaluation of the confirmatory sampling results. Because the method for metals analyses included strontium, the evaluation was also applied to this constituent. The results of this evaluation showed a significantly increasing trend for strontium in an upgradient well (Well GW-142). Because this trend was observed in an upgradient well, a strontium release was determined not to have occurred.

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.

If you have any questions, please contact S. B. Jones at (423) 574-7536 or H. L. King at (423) 241-2572.

Very truly yours,

T. R. Butz
Y-12 Plant Manager

TRB:sbj

Enclosures: As Stated

cc/encs: W. P. Carlton
J. P. Donnelly, DOE-ORO
P. J. Gross, DOE-ORO
H. L. King
P. A. Hofmann, DOE-ORO
E. C. Leming, TDEC/DOE-O
W. B. Mansel, DOE-ORO
C. T. Rightmire
L. O. Vaughan/S. B. Jones
File-EMEF-DMC
GWPP-File-RC

cc: T. R. Butz
H. T. Connor
C. D. Goins Jr.
F. P. Gustavson
C. C. Hill
J. D. Jackson, DOE-ORO
T. W. Morris/T. W. Burwinkle
M. K. Morrow
R. C. Sleeman, DOE-ORO
C. L. Stair/J. E. Powell

---------- STATION NAME=GW-142 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	38	12653	849.304502	12753
M6	38	0.055655	0.023545	0.051500
M23	38	0.522368	0.044928	0.520000
GAA	33	7.968182	4.869916	6.790000
GBA	33	8.692667	7.337286	7.560000

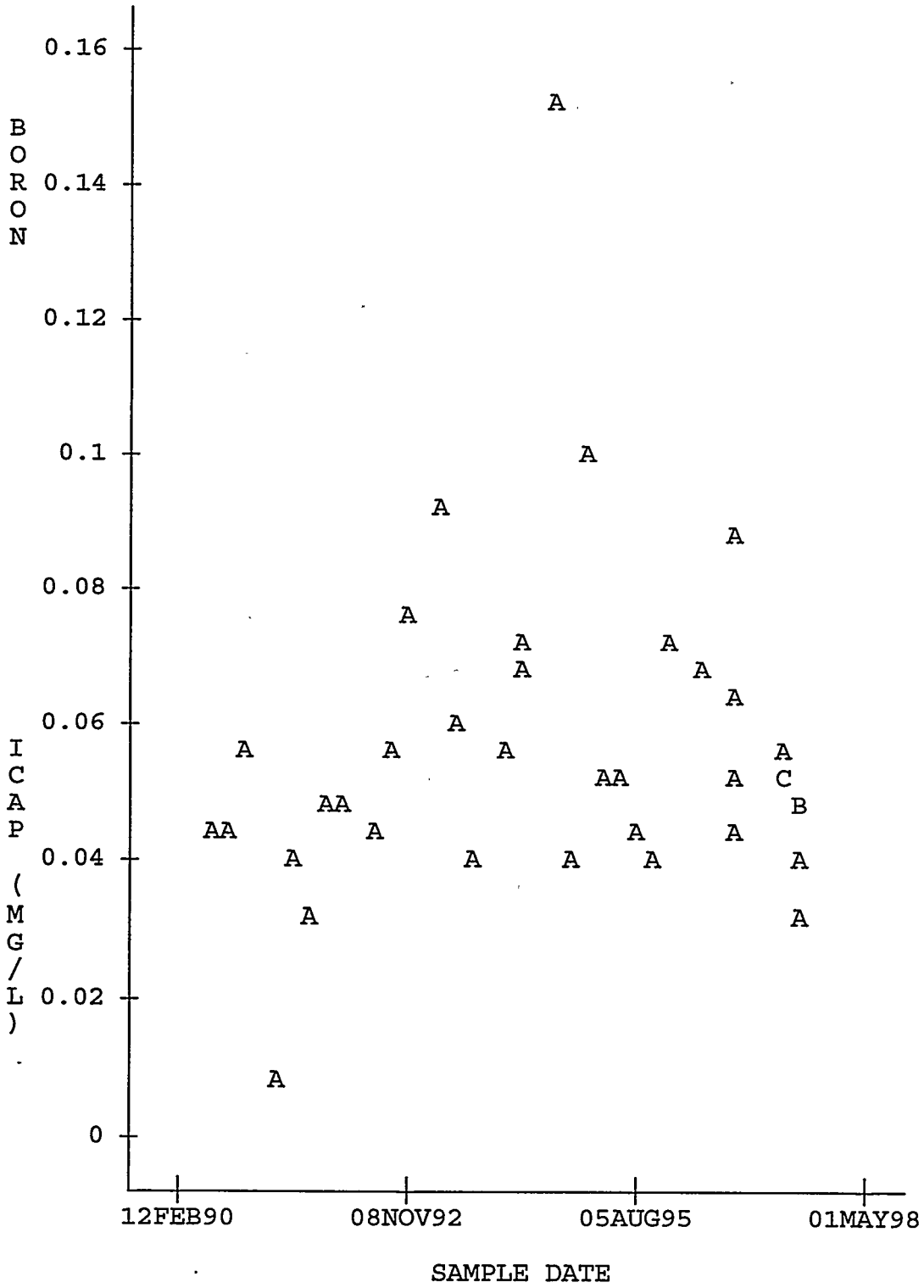
Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11119.0	13733.0	SAMPLE DATE	
M6	0.00790	0.1500	BORON	ICAP (MG/L)
M23	0.4300	0.6900	STRONTIUM	ICAP (MG/L)
GAA	1.5300	16.8000	GROSS ALPHA	(PCI/L)
GBA	-6.7900	38.8000	GROSS BETA	(PCI/L)

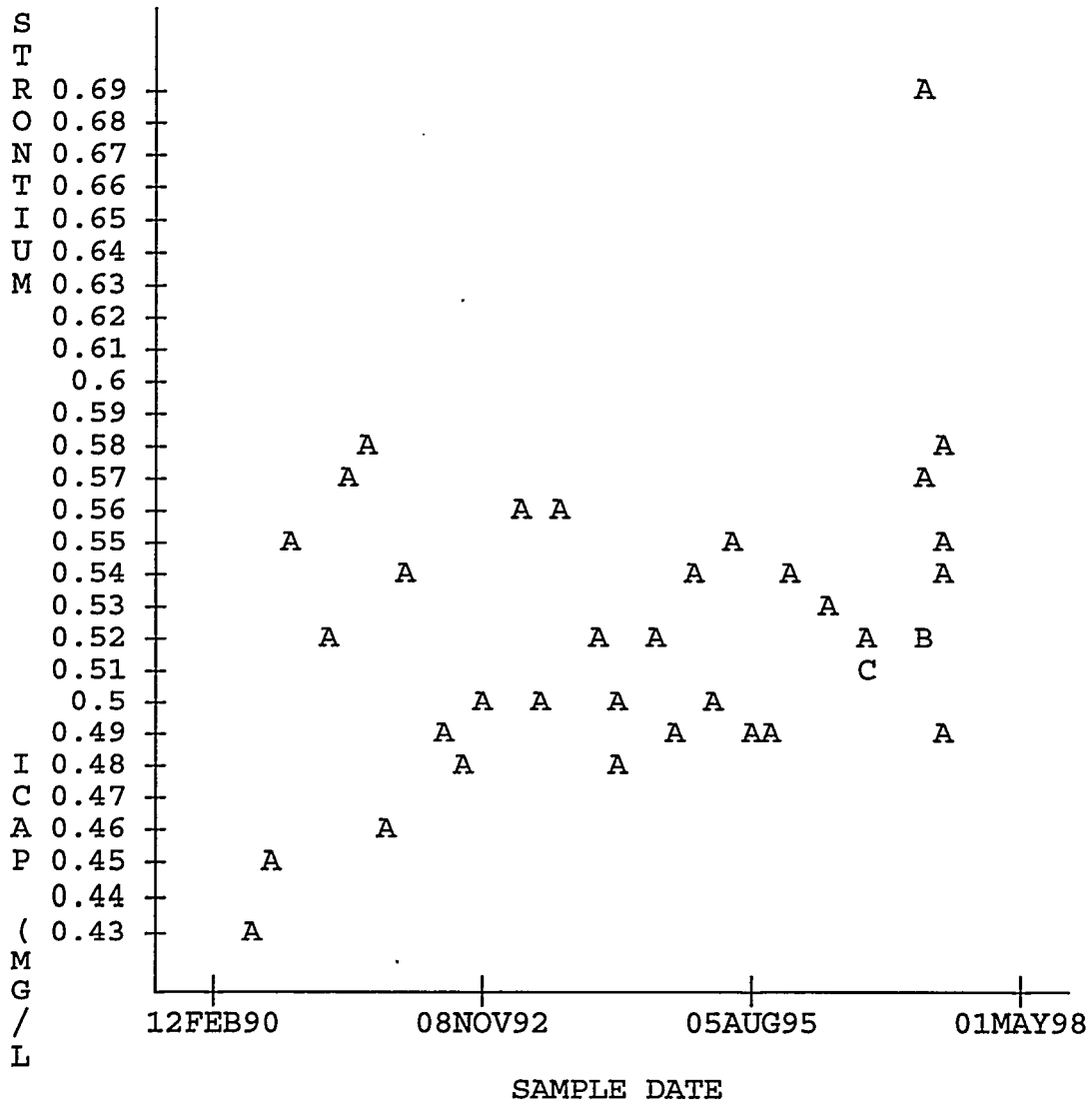
Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	M6	M23	GAA	GBA
SAMPLEDT	0.05169	0.22875	0.08365	-0.30142
SAMPLE DATE	0.6504	0.0476	0.4952	0.0137
	38	38	33	33

---------- STATION NAME=GW-142 ----------



---------- STATION NAME=GW-142 ----------



---------- STATION NAME=GW-143 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	36	12608	862.230273	12575
M6	35	0.886571	0.096770	0.900000
M23	35	2.577143	0.279796	2.500000
GAA	31	3.992387	2.602941	3.790000
GBA	31	15.977419	5.567245	16.700000

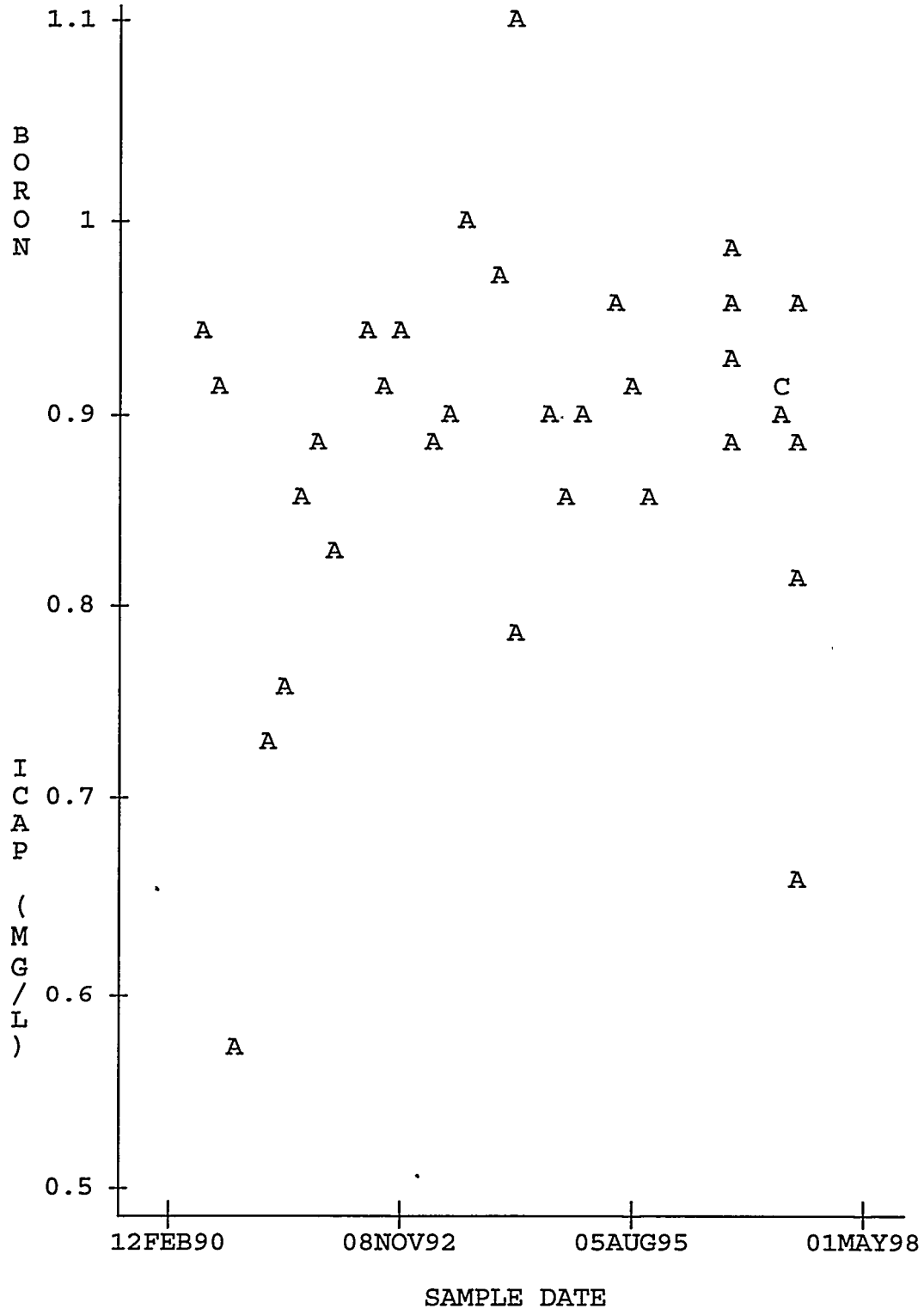
Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11122.0	13733.0	SAMPLE DATE	
M6	0.5700	1.1000	BORON	ICAP (MG/L)
M23	2.2000	3.5000	STRONTIUM	ICAP (MG/L)
GAA	0.5520	12.0000	GROSS ALPHA	(PCI/L)
GBA	5.7000	33.4000	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

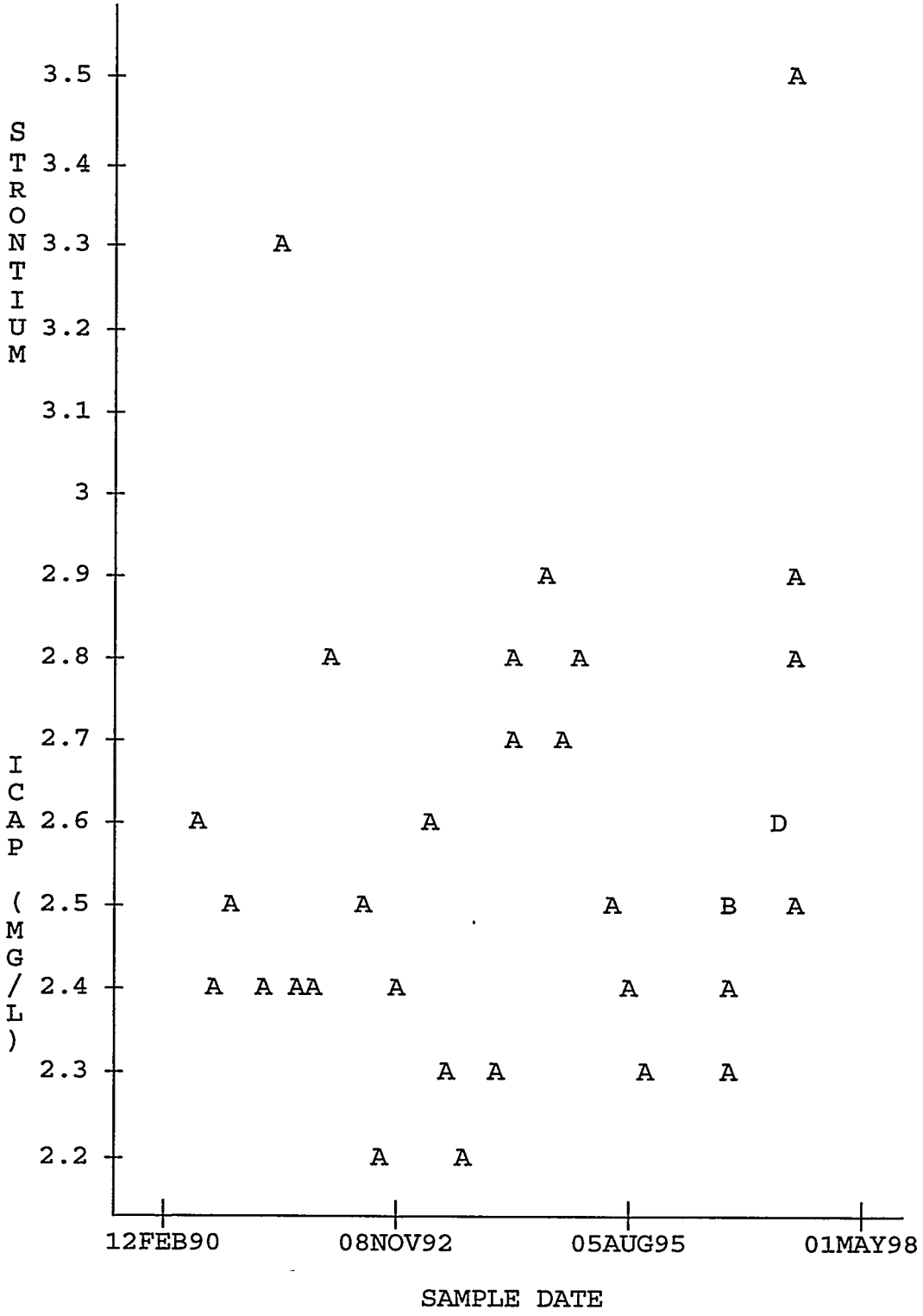
	M6	M23	GAA	GBA
SAMPLEDT	0.09678	0.19283	-0.09247	-0.26695
SAMPLE DATE	0.4176	0.1178	0.4649	0.0350
	35	35	31	31

---------- STATION NAME=GW-143 ----------



NOTE: 1 obs had missing values.

---------- STATION NAME=GW-143 ----------



NOTE: 1 obs had missing values.

---------- STATION NAME=GW-144 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	38	12657	848.159913	12759
M6	37	0.034368	0.032902	0.028000
M23	37	0.093514	0.015224	0.091000
GAA	33	2.496333	2.195533	2.020000
GBA	33	2.564424	2.817450	2.460000

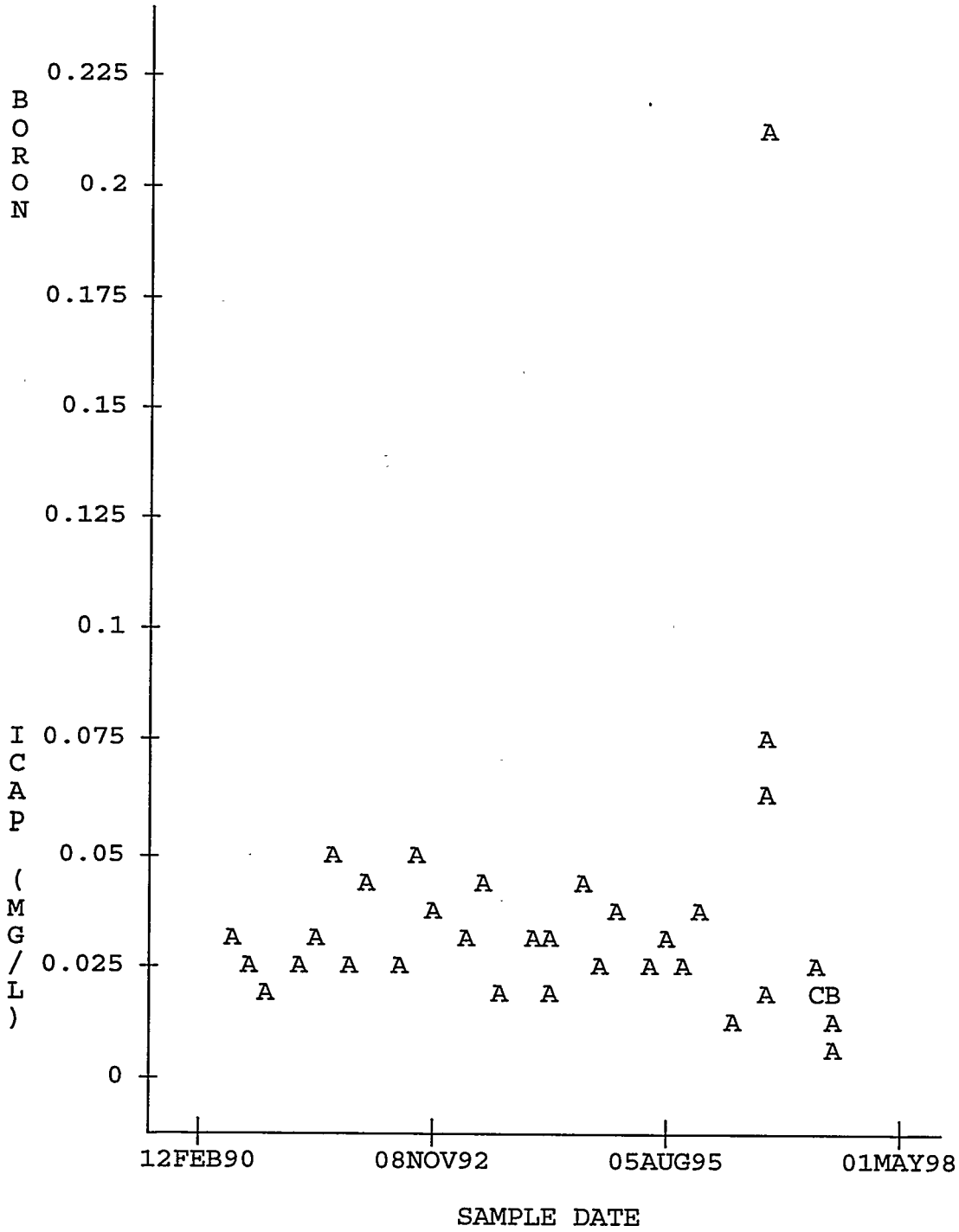
Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11121.0	13733.0	SAMPLE DATE	
M6	0.00770	0.2100	BORON	ICAP (MG/L)
M23	0.0720	0.1400	STRONTIUM	ICAP (MG/L)
GAA	-4.2900	8.4300	GROSS ALPHA	(PCI/L)
GBA	-3.7000	7.4900	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

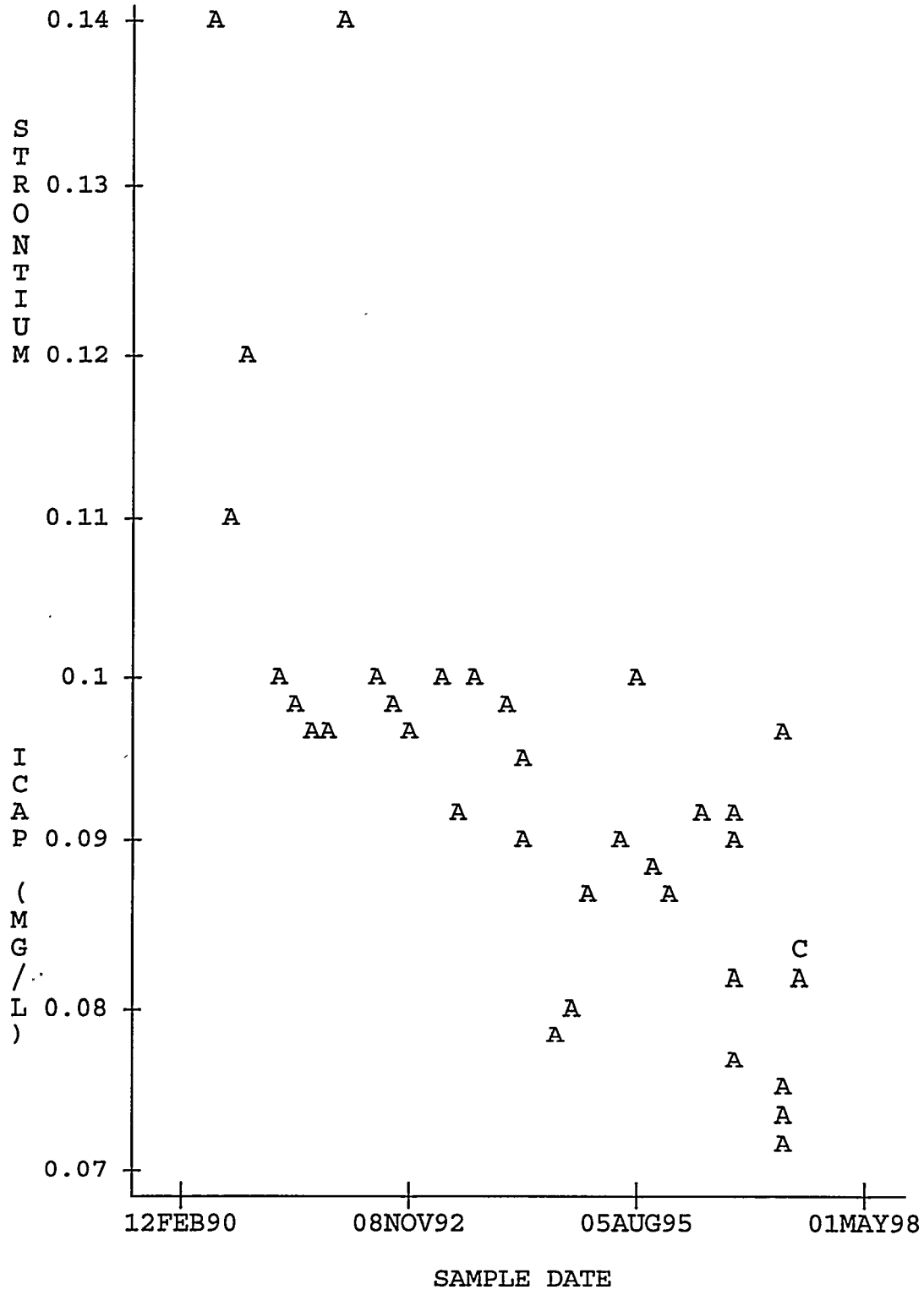
	M6	M23	GAA	GBA
SAMPLEDT	-0.25020	-0.58955	-0.16144	-0.20076
SAMPLE DATE	0.0307	0.0001	0.1876	0.1005
	37	37	33	33

---------- STATION NAME=GW-144 ----------



NOTE: 1 obs had missing values.

---------- STATION NAME=GW-144 ----------



NOTE: 1 obs had missing values.

---------- STATION NAME=GW-145 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	38	12657	847.543092	12759
M6	38	0.247895	0.051735	0.250000
M23	38	7.342105	0.764281	7.300000
GAA	33	11.683636	4.289290	11.600000
GBA	33	15.583848	6.369177	16.300000

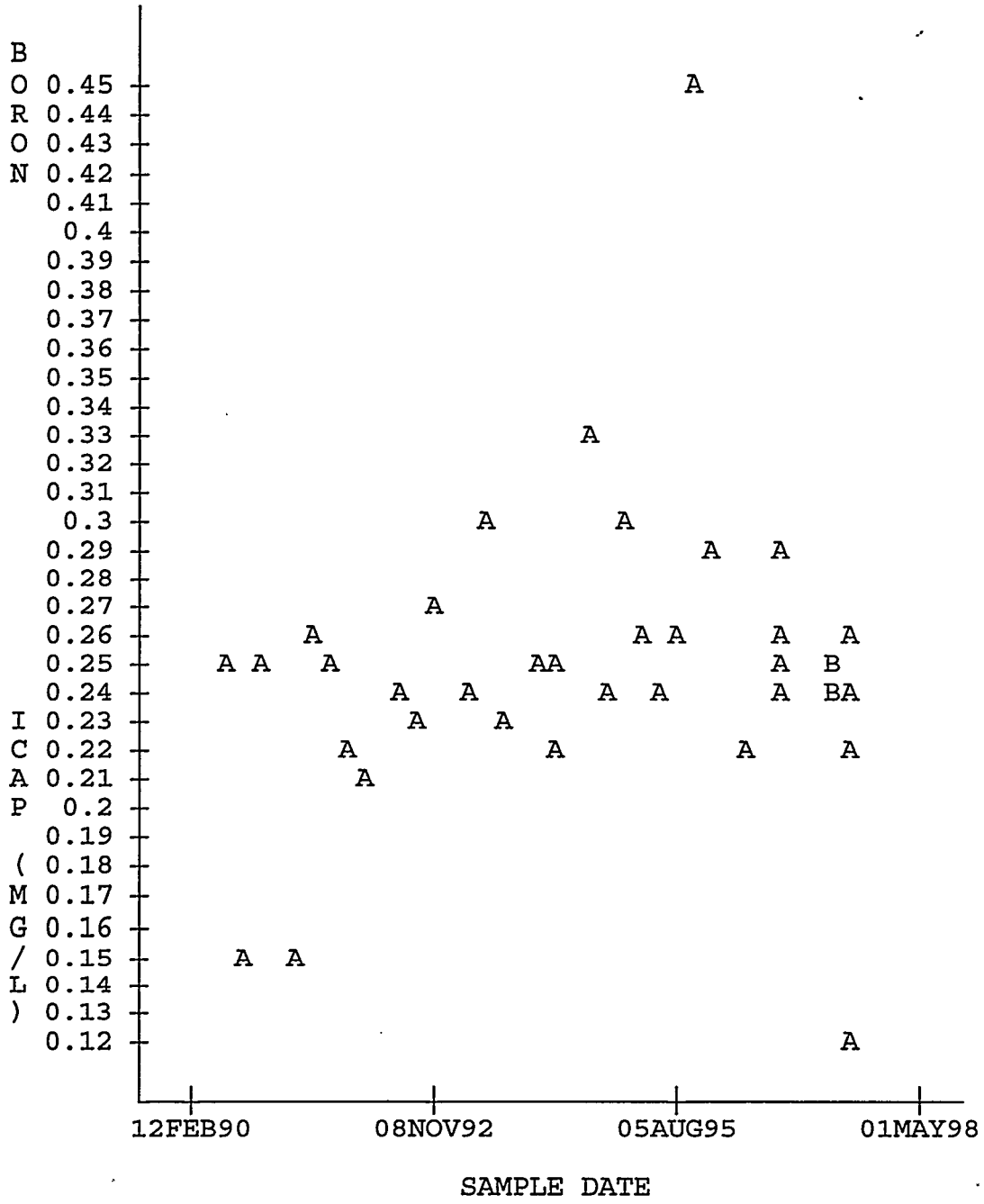
Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11120.0	13733.0	SAMPLE DATE	
M6	0.1200	0.4500	BORON	ICAP (MG/L)
M23	4.1000	9.4000	STRONTIUM	ICAP (MG/L)
GAA	-0.3500	28.0000	GROSS ALPHA	(PCI/L)
GBA	-3.2900	24.4400	GROSS BETA	(PCI/L)

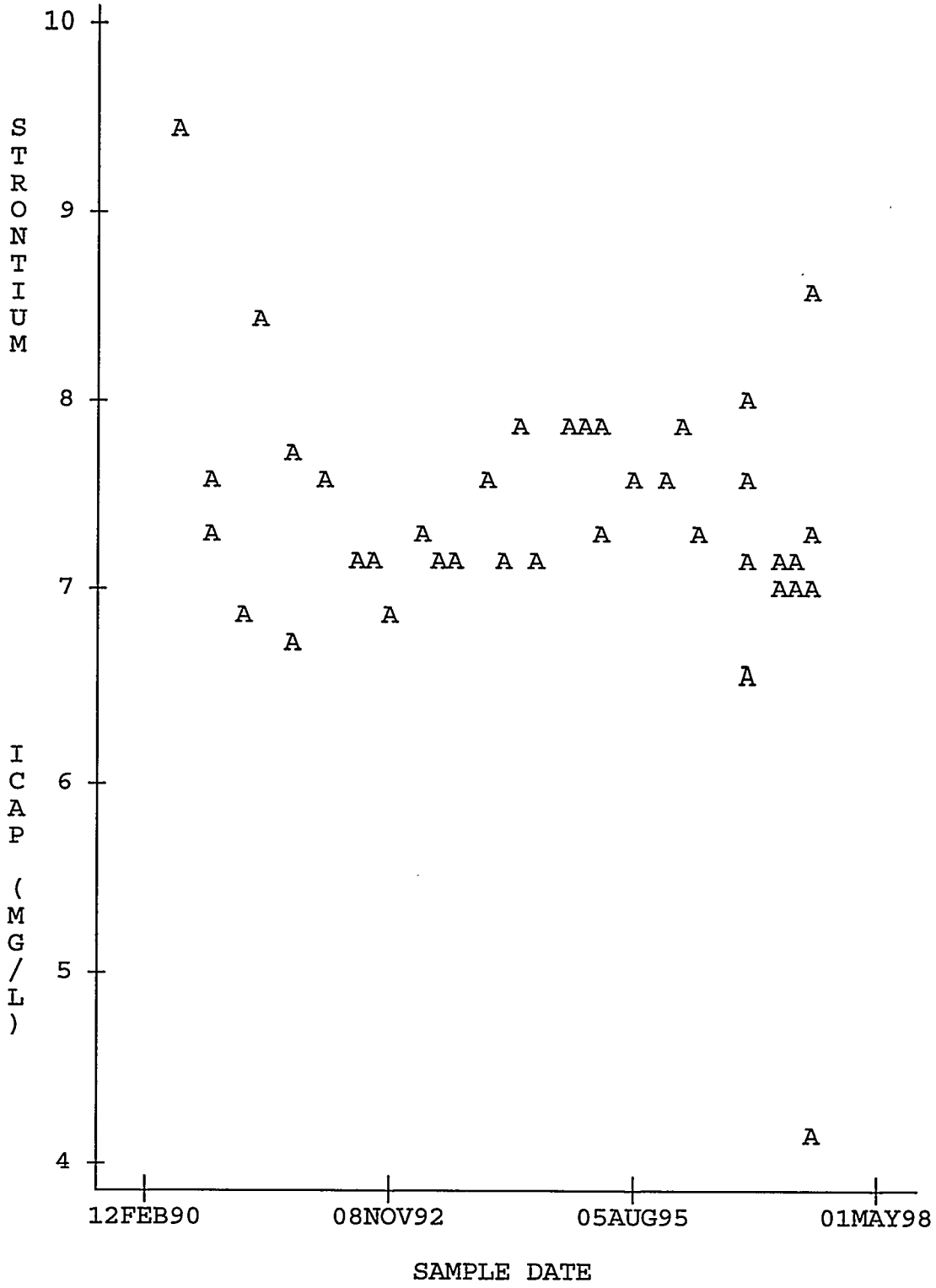
Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	M6	M23	GAA	GBA
SAMPLEDT	0.08518	-0.13610	0.00570	-0.22938
SAMPLE DATE	0.4686	0.2436	0.9629	0.0608
	38	38	33	33

---------- STATION NAME=GW-145 ----------



STATION NAME=GW-145



---------- STATION NAME=GW-231 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
4 'VAR' Variables: M6 M23 GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	37	12651	856.857352	12714
M6	37	0.024735	0.028756	0.016000
M23	37	0.036919	0.006189	0.037000
GAA	33	1.813048	6.688179	0.801000
GBA	33	0.211333	3.166634	0.697000

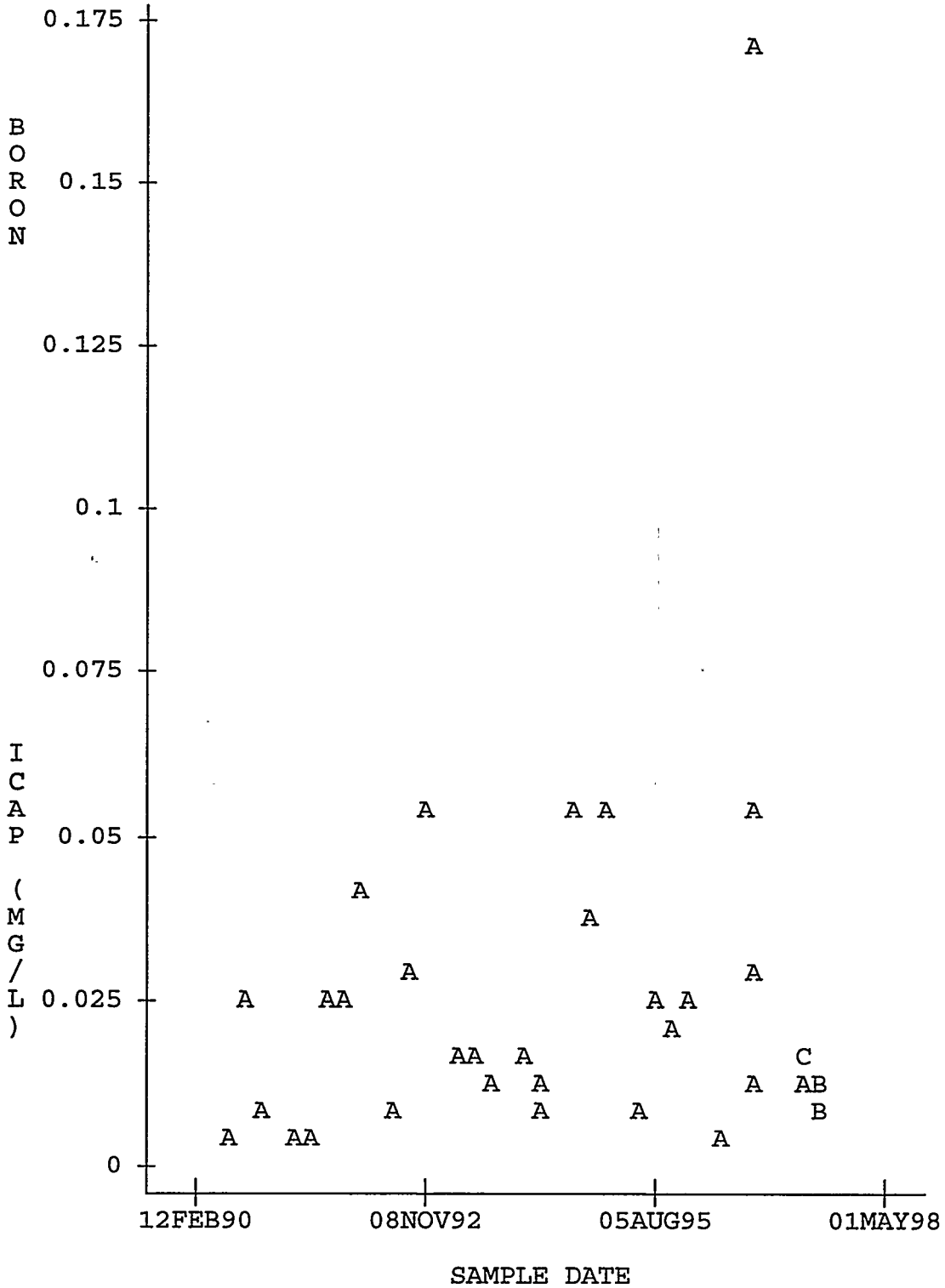
Simple Statistics

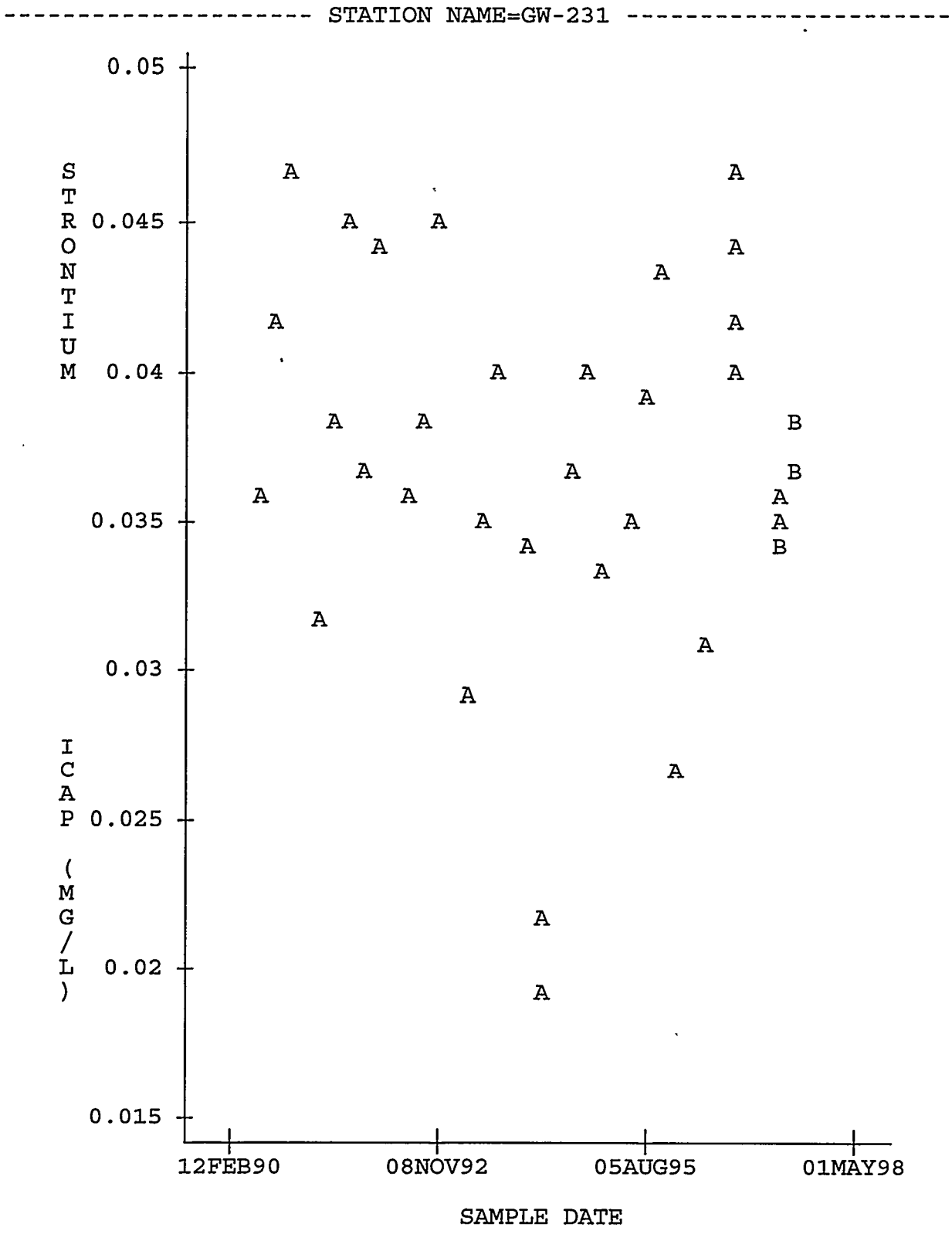
Variable	Minimum	Maximum	Label	
SAMPLEDT	11120.0	13733.0	SAMPLE DATE	
M6	0.00400	0.1700	BORON	ICAP (MG/L)
M23	0.0190	0.0470	STRONTIUM	ICAP (MG/L)
GAA	-2.3500	38.4000	GROSS ALPHA	(PCI/L)
GBA	-5.9800	5.2300	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	M6	M23	GAA	GBA
SAMPLEDT	0.02118	-0.06403	0.09470	-0.16667
SAMPLE DATE	0.8546	0.5819	0.4385	0.1727
	37	37	33	33

STATION NAME=GW-231




STATION NAME=GW-231
STRONTIUM ICAP (MG/L)
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
12FEB90
08NOV92
05AUG95
01MAY98
SAMPLE DATE

APPENDIX G.2

KERR HOLLOW QUARRY
Second 180-Day Reporting Period, CY 1997

LOCKHEED MARTIN ENERGY SYSTEMS, INC.

Post Office Box 2009
Oak Ridge, Tennessee 37831

February 18, 1998

Mr. Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
Fifth Floor, L&C Tower
401 Church Street
Nashville, Tennessee 37243-1535

Dear Mr. Tiesler:

Semiannual Post-Closure Statistical Determinations of Groundwater Quality Data from the Kerr Hollow Quarry (KHQ), Oak Ridge Y-12 Plant (TN3 89 009 0001), Second, 180-Day Reporting Period for Calendar Year (CY) 1997

Condition VI.F.1 of the Resource Conservation and Recovery Act post-closure permit for the KHQ (Permit TNHW-088) requires the permittee to determine, on a semiannual basis, whether there is a statistically significant increase over background values for specified parameters at the point of compliance. Sampling activities at the KHQ for the second, semiannual monitoring event of CY 1997 were completed on November 14, 1997. Analyses of target list constituents and a statistical evaluation of analytical results were performed in accordance with permit Conditions VI.D and VI.G. The permittee received verified data and statistical evaluation results for the second, semiannual sampling event from their data analysis subcontractor on February 3, 1998. The evaluations were completed in accordance with permit Conditions VI.F.3 and VI.G.5, which require that statistical analyses must be completed within 90 days after completion of semiannual sampling.

Condition VI.H.2.(a) of Permit TNHW-088 requires notification to the Tennessee Department of Environment and Conservation (TDEC) Commissioner within seven days if post-closure statistical evaluations indicate a release of contaminants to groundwater. Statistical evaluations did not indicate a release of contaminants to groundwater; therefore, a seven-day notification was not required. This report and the synopsis of statistical results contained in Enclosure 1 are provided for informational and recordkeeping purposes. Enclosure 2 contains the results of all analyses conducted during the second, semiannual CY 1997 sampling event at the KHQ.

Variance tests conducted for the second, semiannual sampling event of CY 1997 indicated that total uranium concentrations in all downgradient wells were statistically higher than those in upgradient well GW-231. However, there was no statistical difference in the total uranium concentrations among all downgradient wells and upgradient well GW-142. Because the variance test results showed that total uranium concentrations in downgradient wells were significantly higher than those in one of the upgradient wells, the data were compared with upper tolerance limits; and intrawell comparisons were performed. These comparisons indicated that none of the total uranium results exceeded background values or were significantly higher than historical measurements within each well. Quantitative trend analyses were also conducted for gross alpha and gross beta. None of the wells at the KHQ showed a statistically significant increase in either gross alpha or gross beta activities over time.

The TDEC approved Class 1, [1]1, and 2 modifications, Modification Numbers: 3 and 4 (C-74), to Permit Number TNHW-088 in a letter from C. Bullington (TDEC) to R. J. Spence (Department of Energy [DOE]), T. R. Butz (Lockheed Martin Energy Systems), and R. C. Sleeman (DOE), dated July 23, 1997. With respect to KHQ, these modifications included clarifications in the detection monitoring requirements, revisions to the statistical procedure for KHQ detection monitoring, updating technical field procedures, and the removal of boron and total strontium from the target compound list for KHQ. All of these modifications were implemented during the fourth quarter of CY 1997. In accordance with the updated Groundwater Sampling procedure SESD-TP-8204, Rev. 3, beginning in the fourth quarter of CY 1997, the low-flow minimal drawdown method was used to purge and sample all of the wells within the detection monitoring well network at the KHQ. Prior to this change, all wells within the Chestnut Ridge Hydrogeologic Regime were sampled using conventional purging methods (pumping or bailing) performed at flow rates higher than 300 milliliters per minute. Thus, comparison of data obtained using conventional purging and sampling methods with data obtained using only low-flow methods may not be appropriate in a karst aquifer.

I certify under penalty of law that this document and all attachments were prepared under my direction or 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.

If you have any questions, please contact S. B. Jones at (423) 574-7536 or Helen King at (423) 241-5257.

Very truly yours,

T. R. Butz
Y-12 Plant Manager

TRB:sbj

Enclosures: As Stated

February 18, 1998

cc/encs: W. P. Carlton
J. P. Donnelly, DOE-ORO
M. S. Ferre, DOE-ORO
P. J. Gross, DOE-ORO
C. S. Haase
G. S. Hartman, DOE-ORO
H. L. King
E. C. Leming, TDEC/DOE-O
C. T. Rightmire
L. O. Vaughan/S. B. Jones
File-EMEF-DMC-RC
GWPP-File-RC

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C. L. Stair/ J. E. Powell

SUMMARY OF POST-CLOSURE DETECTION MONITORING
AT THE KERR HOLLOW QUARRY (KHQ),
SECOND, 180-DAY REPORTING PERIOD OF CALENDAR YEAR (CY) 1997

1.0 Statistical Methods

Conditions VI.D and VI.F of post-closure Permit TNHW-088 require specific sample collection protocols and a statistical evaluation of semiannual post-closure detection monitoring data. The required target list compounds are cadmium, chromium, lead, mercury, nickel, total uranium, carbon tetrachloride, tetrachloroethene, chloroform, gross alpha, and gross beta. The statistical evaluation methods specified in Permit TNHW-088 are as follows:

1. Four replicate samples are collected at a suitable time interval to account for chemical variability in the groundwater system. Wells GW-143, GW-144, GW-145, and GW-231 were sampled over four consecutive days, whereas Well GW-142 was sampled over a five day period.

2. Statistical comparisons are performed for all target list compound concentrations (except gross alpha and gross beta) between each groundwater monitoring well at the point of compliance and the upgradient wells (Wells GW-142 and GW-231) using a variance test. Analysis of variance (ANOVA) is specified for parametric data distribution. Alternately, a nonparametric variance test may be employed for nonnormal data distribution.

3. If the variance test indicates that target list constituent concentrations are higher in downgradient wells as compared with the upgradient wells, then comparison of target compound concentrations at each groundwater monitoring well to historical background data (upper tolerance limits [UTLs]) and data within each well (intrawell comparisons) will be conducted to establish whether the variance also exceeds the normal range of concentrations over time. Practical quantitation limits (PQLs) are used where UTLs could not be calculated from the pool of historical data (1986 through 1994) due to a high proportion of nondetected results. For a water matrix, PQLs are set at ten times the instrument detection limit.

4. Gross alpha and gross beta measurements are statistical summary results with associated error; therefore, application of statistical calculations is not feasible. Accordingly, quantitative trending is used to evaluate these two target list parameters.

The two-part test is denoted in the post-closure permit to account for the considerable natural geochemical variability in the karst groundwater system that exists beneath the KHQ. Both parts of the test must show a statistical increase for the test to be considered valid. The variance test compares the mean value of each target list compound concentration (calculated from the four replicate samples) at each downgradient well with the mean result at the upgradient well; the test is limited to data from a single sampling event. Comparison of individual downgradient well results with the UTL (or PQL) determines if a constituent concentration is higher than expected based on historical variability upgradient of the site. The intrawell comparisons determine whether a particular result from a well is statistically greater than the range of historical concentrations observed within that particular well.

2.0 Results for the Second, 180-Day Reporting Period for CY 1997

A. Total Uranium

A high proportion of nondetected constituents resulted in nonparametric data distributions for all target list parameters. As a result, parametric ANOVA tests could not be conducted; rather, a nonparametric variance test (Kruskal-Wallis Test) was used. As shown in the summary table, the variance test indicated that statistical differences existed among the five facility monitoring wells for total uranium. In the case of total uranium concentrations, all downgradient wells and upgradient Well GW-142 were statistically higher than upgradient Well GW-231. However, total uranium levels in downgradient wells were statistically less than (Wells GW-143 and GW-144) or statistically equal to (Well GW-145) upgradient Well GW-142. Two of the downgradient wells were also statistically different from each other (Well GW-144 < Well GW-145). Because the variance test indicated that total uranium levels were statistically higher in the downgradient wells as compared with one of the upgradient wells, comparisons to UTLs and intrawell comparisons were performed for this parameter.

The total uranium UTL of 0.019 milligrams per liter (mg/L) was established in the post-closure permit application for the KHQ using available interim status historical data collected between 1986 and 1994 from the two upgradient wells (SAIC, Inc., 1995). As demonstrated in the summary table, total uranium results in any downgradient well did not exceed the UTL.

The intrawell comparisons (Wilcoxon Rank-Sum Test) showed that in downgradient Well GW-144, total uranium results for the second, semiannual CY 1997 sampling event were actually statistically lower than historical results. Accordingly, a release of total uranium was determined not to have occurred.

B. Trend Test

Quantitative trend analysis (Kendall-Tau B Test) was performed for gross alpha and gross beta using data collected during the period CY 1990 through the second semiannual reporting period of CY 1997. Results of the trending analyses indicated that no statistically significant increasing trend over this time period has been exhibited.

3.0 Assumptions for Statistical Evaluations

For the purposes of statistical evaluations, the following baseline assumptions were used.

A. Kruskal-Wallis Test.

1. As a conservative assumption for calculations, the detection limit was substituted for analytical measurements reported as less than the detection limit.

B. Wilcoxon Rank-Sum Test.

1. As a conservative assumption for calculations, the detection limit was substituted for analytical measurements reported as less than the detection limit.

2. The baseline period for the intrawell comparisons included interim status monitoring results collected during the period CY 1990 through CY 1995.

3. Measurements reported at multiple detection limits during the baseline period were converted to the highest detection limit in the ranking process.

4. Current measurements reported at detection limits higher than those in the baseline period were deleted from the ranking process.

C. Kendall-Tau B Test. The data set used to conduct trending analyses included all data collected since the first quarter of CY 1990.

KRUSKAL-WALLIS TEST RESULTS
(NONPARAMETRIC PROCEDURE USED INSTEAD OF 1-WAY ANOVA)
AND FOLLOW UP MULTIPLE COMPARISON TESTS,
IF INDICATED BY KRUSKAL WALLIS TEST RESULT

4 replicate measurements collected
at 2 upgradient and 3 downgradient wells during 4th Quarter 1997

COMPARISON OF DOWNGRADIENT WELLS TO UPGRADIENT WELL

MEASUREMENTS REPORTED AS <#, CONVERTED TO # FOR CALCULATIONS

SUMMARY OF KRUSKAL-WALLIS TEST RESULTS AND MULTIPLE COMPARISON TESTS
KERR HOLLOW QUARRY

PARAMETER	KRUSKAL-WALLIS TEST RESULT	MULTIPLE COMPARISON TEST RESULTS	
Cadmium (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Chromium (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Lead (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Mercury (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Nickel (mg/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Uranium (mg/L)	There are statistical differences in the location parameter across 5 monitoring wells	GW-231 GW-143 GW-144 GW-142 GW-145 ---------- ---------- ----------	Uranium results in all downgradient wells and in upgradient well GW-142 are statistically greater than those in upgradient well GW-231. GW-143 results are statistically less than those in GW-142 & GW-145. GW-144 results are statistically less than those in GW-145.
Carbon tetrachloride (ug/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Tetrachloroethene (ug/L)	There are no statistical differences in the location parameter across 5 monitoring wells		
Chloroform (ug/L)	There are no statistical differences in the location parameter across 5 monitoring wells		

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CADMIUM ICAP (MG/L)	RANK
1	GW-142	10NOV97	<0.003	3
		11NOV97	<0.003	6
		12NOV97	<0.003	11
		14NOV97	<0.003	20
2	GW-143	10NOV97	<0.003	2
		11NOV97	<0.003	9
		12NOV97	<0.003	14
		13NOV97	<0.003	18
3	GW-144	10NOV97	<0.003	4
		11NOV97	<0.003	7
		12NOV97	<0.003	12
		13NOV97	<0.003	16
4	GW-145	10NOV97	<0.003	5
		11NOV97	<0.003	8
		12NOV97	<0.003	13
		13NOV97	<0.003	17
5	GW-231	10NOV97	<0.003	1
		11NOV97	<0.003	10
		12NOV97	<0.003	15
		13NOV97	<0.003	19

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CADMIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-231	4	42.0	42.0	0.0	10.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 4 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CHROMIUM ICAP (MG/L)	RANK
1	GW-142	10NOV97	<0.01	3
		11NOV97	<0.01	6
		12NOV97	<0.01	11
		14NOV97	<0.01	20
2	GW-143	10NOV97	<0.01	2
		11NOV97	<0.01	9
		12NOV97	<0.01	14
		13NOV97	<0.01	18
3	GW-144	10NOV97	<0.01	4
		11NOV97	<0.01	7
		12NOV97	<0.01	12
		13NOV97	<0.01	16
4	GW-145	10NOV97	<0.01	5
		11NOV97	<0.01	8
		12NOV97	<0.01	13
		13NOV97	<0.01	17
5	GW-231	10NOV97	<0.01	1
		11NOV97	<0.01	10
		12NOV97	<0.01	15
		13NOV97	<0.01	19

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CHROMIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-231	4	42.0	42.0	0.0	10.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 4 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	LEAD PMS (MG/L)	RANK
1	GW-142	10NOV97	<0.0005	2
		11NOV97	<0.0005	3
		12NOV97	<0.0005	8
		14NOV97	<0.0005	16
2	GW-143	10NOV97	<0.0005	1
		11NOV97	<0.0005	6
		12NOV97	<0.0005	11
		13NOV97	<0.0005	15
3	GW-145	11NOV97	<0.0005	5
		12NOV97	<0.0005	10
		13NOV97	<0.0005	14
		10NOV97	0.0006	17
4	GW-144	11NOV97	<0.0005	4
		12NOV97	<0.0005	9
		13NOV97	<0.0005	13
		10NOV97	0.0016	19
5	GW-231	11NOV97	<0.0005	7
		12NOV97	<0.0005	12
		13NOV97	0.0006	18
		10NOV97	0.0089	20

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable LEAD
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	34.0000000	42.0	7.39274182	8.5000000
GW-143	4	34.0000000	42.0	7.39274182	8.5000000
GW-144	4	44.5000000	42.0	7.39274182	11.1250000
GW-145	4	43.0000000	42.0	7.39274182	10.7500000
GW-231	4	54.5000000	42.0	7.39274182	13.6250000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 4.2669 DF = 4 Prob > CHISQ = 0.3711

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	MERCURY CVAA (MG/L)	RANK
1	GW-142	10NOV97	<0.0002	3
		11NOV97	<0.0002	6
		12NOV97	<0.0002	11
		14NOV97	<0.0002	20
2	GW-143	10NOV97	<0.0002	2
		11NOV97	<0.0002	9
		12NOV97	<0.0002	14
		13NOV97	<0.0002	18
3	GW-144	10NOV97	<0.0002	4
		11NOV97	<0.0002	7
		12NOV97	<0.0002	12
		13NOV97	<0.0002	16
4	GW-145	10NOV97	<0.0002	5
		11NOV97	<0.0002	8
		12NOV97	<0.0002	13
		13NOV97	<0.0002	17
5	GW-231	10NOV97	<0.0002	1
		11NOV97	<0.0002	10
		12NOV97	<0.0002	15
		13NOV97	<0.0002	19

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable MERCURY
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-231	4	42.0	42.0	0.0	10.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 4 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	NICKEL ICAP (MG/L)	RANK
1	GW-142	10NOV97	<0.01	3
		11NOV97	<0.01	6
		12NOV97	<0.01	11
		14NOV97	<0.01	20
2	GW-143	10NOV97	<0.01	2
		11NOV97	<0.01	9
		12NOV97	<0.01	14
		13NOV97	<0.01	18
3	GW-144	10NOV97	<0.01	4
		11NOV97	<0.01	7
		12NOV97	<0.01	12
		13NOV97	<0.01	16
4	GW-145	10NOV97	<0.01	5
		11NOV97	<0.01	8
		12NOV97	<0.01	13
		13NOV97	<0.01	17
5	GW-231	10NOV97	<0.01	1
		11NOV97	<0.01	10
		12NOV97	<0.01	15
		13NOV97	<0.01	19

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable NICKEL
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-231	4	42.0	42.0	0.0	10.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 4 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	URANIUM PMS (MG/L)	RANK
1	GW-231	10NOV97	<0.0005	1
		11NOV97	<0.0005	2
		12NOV97	<0.0005	3
		13NOV97	<0.0005	4
2	GW-143	12NOV97	0.001	5
		13NOV97	0.001	6
		10NOV97	0.0012	7
		11NOV97	0.0013	8
3	GW-144	13NOV97	0.0016	9
		10NOV97	0.0017	10
		12NOV97	0.0017	11
		11NOV97	0.0018	12
4	GW-142	11NOV97	0.0055	13
		12NOV97	0.0058	14
		14NOV97	0.0059	15
		10NOV97	0.0065	16
5	GW-145	11NOV97	0.011	17
		10NOV97	0.012	18
		12NOV97	0.012	19
		13NOV97	0.012	20

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	58.0	42.0	10.5191555	14.5000000
GW-143	4	26.0	42.0	10.5191555	6.5000000
GW-144	4	42.0	42.0	10.5191555	10.5000000
GW-145	4	74.0	42.0	10.5191555	18.5000000
GW-231	4	10.0	42.0	10.5191555	2.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 18.508 DF = 4 Prob > CHISQ = 0.0010

Wells 231, 143, 144 and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	58.0	34.0	8.17312670	14.5000000
GW-143	4	26.0	34.0	8.17312670	6.5000000
GW-144	4	42.0	34.0	8.17312670	10.5000000
GW-231	4	10.0	34.0	8.17312670	2.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 14.371 DF = 3 Prob > CHISQ = 0.0024

Wells 143, 144, 142 and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	34.0	8.20975030	10.5000000
GW-143	4	10.0	34.0	8.20975030	2.5000000
GW-144	4	26.0	34.0	8.20975030	6.5000000
GW-145	4	58.0	34.0	8.20975030	14.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 14.243 DF = 3 Prob > CHISQ = 0.0026

Wells 231, 143, and 144

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	26.0	26.0	5.76299585	6.5000000
GW-144	4	42.0	26.0	5.76299585	10.5000000
GW-231	4	10.0	26.0	5.76299585	2.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 10.277 DF = 2 Prob > CHISQ = 0.0059

Wells 143, 144, and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	26.0	5.86721760	10.5000000
GW-143	4	10.0	26.0	5.86721760	2.5000000
GW-144	4	26.0	26.0	5.86721760	6.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 9.9155 DF = 2 Prob > CHISQ = 0.0070

Wells 144, 142, and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	26.0	26.0	5.83614651	6.5000000
GW-144	4	10.0	26.0	5.83614651	2.5000000
GW-145	4	42.0	26.0	5.83614651	10.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 10.021 DF = 2 Prob > CHISQ = 0.0067

Wells 231, and 143

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	26.0	18.0	3.22932987	6.50000000
GW-231	4	10.0	18.0	3.22932987	2.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 26.0000 Z = 2.32246 Prob > |Z| = 0.0202

T-Test Approx. Significance = 0.0532

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 6.1370 DF = 1 Prob > CHISQ = 0.0132

Wells 143, and 144

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-143	4	10.0	18.0	3.42261387	2.50000000
GW-144	4	26.0	18.0	3.42261387	6.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 10.0000 Z = -2.19131 Prob > |Z| = 0.0284

T-Test Approx. Significance = 0.0646

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 5.4634 DF = 1 Prob > CHISQ = 0.0194

Wells 144, and 142

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	26.0	18.0	3.44342023	6.50000000
GW-144	4	10.0	18.0	3.44342023	2.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 26.0000 Z = 2.17807 Prob > |Z| = 0.0294

T-Test Approx. Significance = 0.0658

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 5.3976 DF = 1 Prob > CHISQ = 0.0202

Wells 142, and 145

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	10.0	18.0	3.38061702	2.50000000
GW-145	4	26.0	18.0	3.38061702	6.50000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 10.0000 Z = -2.21853 Prob > |Z| = 0.0265

T-Test Approx. Significance = 0.0620

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 5.6000 DF = 1 Prob > CHISQ = 0.0180

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CARBON TETRACHLORIDE (UG/L)	QUALIFIER	RANK
1	GW-142	10NOV97	5U		3
		11NOV97	5U		6
		12NOV97	5U		11
		14NOV97	5U		20
2	GW-143	10NOV97	5U		2
		11NOV97	5U		9
		12NOV97	5U		14
		13NOV97	5U		18
3	GW-144	10NOV97	5U		4
		11NOV97	5U		7
		12NOV97	5U		12
		13NOV97	5U		16
4	GW-145	10NOV97	5U		5
		11NOV97	5U		8
		12NOV97	5U		13
		13NOV97	5U		17
5	GW-231	10NOV97	5U		1
		11NOV97	5U		10
		12NOV97	5U		15
		13NOV97	5U		19

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CARBON TETRACHLORIDE
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-231	4	42.0	42.0	0.0	10.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 4 Prob > CHISQ = 1.0000

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	TETRACHLOROETHENE (UG/L)	QUALIFIER	RANK
1	GW-144	10NOV97	5U		3
		11NOV97	5U		6
		12NOV97	5U		11
		13NOV97	5U		15
2	GW-145	10NOV97	5U		4
		11NOV97	5U		7
		12NOV97	5U		12
		13NOV97	5U		16
3	GW-231	10NOV97	5U		1
		11NOV97	5U		9
		12NOV97	5U		14
		13NOV97	5U		18
4	GW-142	10NOV97	5U		2
		11NOV97	5U		5
		12NOV97	5U		10
		14NOV97	1	BJ	19
5	GW-143	11NOV97	5U		8
		12NOV97	5U		13
		13NOV97	5U		17
		10NOV97	1	J	20

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable TETRACHLOROETHENE
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	48.0	42.0	5.50597761	12.0000000
GW-143	4	48.0	42.0	5.50597761	12.0000000
GW-144	4	38.0	42.0	5.50597761	9.5000000
GW-145	4	38.0	42.0	5.50597761	9.5000000
GW-231	4	38.0	42.0	5.50597761	9.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 3.1667 DF = 4 Prob > CHISQ = 0.5303

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	CHLOROFORM (UG/L)	QUALIFIER	RANK
1	GW-142	10NOV97	5U		3
		11NOV97	5U		6
		12NOV97	5U		11
		14NOV97	5U		20
2	GW-143	10NOV97	5U		2
		11NOV97	5U		9
		12NOV97	5U		14
		13NOV97	5U		18
3	GW-144	10NOV97	5U		4
		11NOV97	5U		7
		12NOV97	5U		12
		13NOV97	5U		16
4	GW-145	10NOV97	5U		5
		11NOV97	5U		8
		12NOV97	5U		13
		13NOV97	5U		17
5	GW-231	10NOV97	5U		1
		11NOV97	5U		10
		12NOV97	5U		15
		13NOV97	5U		19

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable CHLOROFORM
Classified by Variable WELLID

WELLID	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
GW-142	4	42.0	42.0	0.0	10.5000000
GW-143	4	42.0	42.0	0.0	10.5000000
GW-144	4	42.0	42.0	0.0	10.5000000
GW-145	4	42.0	42.0	0.0	10.5000000
GW-231	4	42.0	42.0	0.0	10.5000000

Average Scores Were Used for Ties

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0 DF = 4 Prob > CHISQ = 1.0000

COMPARISON TO UPPER TOLERANCE LIMITS

RANK OF MEAN RANK	STATION NAME	SAMPLE DATE	URANIUM PMS (MG/L)	EXCEEDS UTL (0.019 MG/L)	RANK
1	GW-231	10NOV97	<0.0005	No	1
		11NOV97	<0.0005	No	2
		12NOV97	<0.0005	No	3
		13NOV97	<0.0005	No	4
2	GW-143	12NOV97	0.001	No	5
		13NOV97	0.001	No	6
		10NOV97	0.0012	No	7
		11NOV97	0.0013	No	8
3	GW-144	13NOV97	0.0016	No	9
		10NOV97	0.0017	No	10
		12NOV97	0.0017	No	11
		11NOV97	0.0018	No	12
4	GW-142	11NOV97	0.0055	No	13
		12NOV97	0.0058	No	14
		14NOV97	0.0059	No	15
		10NOV97	0.0065	No	16
5	GW-145	11NOV97	0.011	No	17
		10NOV97	0.012	No	18
		12NOV97	0.012	No	19
		13NOV97	0.012	No	20

WILCOXON RANK-SUM TEST
(NONPARAMETRIC PROCEDURE USED INSTEAD OF T-TEST)

INTRAWELL COMPARISONS OF 4TH QUARTER 1997 WELL MEASUREMENTS TO HISTORIC MEASUREMENTS

MEASUREMENTS REPORTED AS <#
WERE CONVERTED TO # FOR CALCULATIONS

MEASUREMENTS REPORTED AT ELEVATED DETECTION LIMITS WERE DELETED

MEASUREMENTS FOR ANALYTES REPORTED
AT MULTIPLE DETECTION LIMITS
WERE CONVERTED TO THE HIGHER DETECTION LIMIT

SUMMARY OF WILCOXON RANK-SUM TEST RESULTS
KERR HOLLOW QUARRY BASIN

PARAMETER	WILCOXON RANK-SUM TEST RESULT	WELL	CONCLUSION
Uranium	There are statistical differences in the location parameter within wells.	**GW-144**	1997 Q4 < Historic

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-142	1997 Q4	11/11/97	0.0055
		11/12/97	0.0058
		11/14/97	0.0059
		11/10/97	0.0065
GW-142	Historic	10/22/94	.
		03/20/95	.
		06/11/90	<0.001
		02/20/92	<0.001
		09/17/90	0.001
		11/05/95	0.0018
		09/14/92	0.003
		07/21/94	0.003
		11/04/91	0.004
		05/28/92	0.004
		03/05/93	0.004
		11/30/92	0.005
		07/14/95	0.0095
		08/03/91	0.01
		04/12/94	0.01
		04/20/95	0.01
		01/10/95	0.011
		03/15/91	0.014
		11/26/90	0.016
		06/11/93	0.019
		12/15/93	0.019
		06/13/91	0.02
		02/16/94	0.024
		08/25/93	0.032
GW-143	1997 Q4	11/12/97	0.001
		11/13/97	0.001
		11/10/97	0.0012
		11/11/97	0.0013
GW-143	Historic	06/13/93	.
		10/24/94	.
		06/14/90	<0.001
		09/17/90	0.001
		11/27/90	0.001
		03/16/91	0.001
		06/16/91	0.001
		11/07/91	0.001
		02/21/92	0.001
		05/29/92	0.001

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-143	Historic	12/01/92	0.001
		04/18/94	0.001
		01/17/95	0.0012
		04/24/95	0.0012
		07/16/95	0.0017
		06/12/93	0.002
		12/15/93	0.002
		03/03/94	0.002
		07/24/94	0.002
		11/09/95	0.0022
		09/05/91	0.003
		03/06/93	0.003
		08/27/93	0.003
		09/28/92	0.006
GW-144	1997 Q4	11/13/97	0.0016
		11/10/97	0.0017
		11/12/97	0.0017
		11/11/97	0.0018
GW-144	Historic	10/25/94	.
		03/22/95	.
		07/16/95	<0.001
		06/13/90	0.001
		09/17/90	0.001
		11/27/90	0.001
		03/16/91	0.002
		03/10/94	0.002
		04/19/94	0.002
		07/26/94	0.002
		04/25/95	0.002
		11/14/95	0.0023
		01/18/95	0.0025
		06/12/93	0.003
		08/26/93	0.003
		06/15/91	0.004
		02/21/92	0.004
		05/29/92	0.004
		12/01/92	0.004
		03/06/93	0.004
		12/15/93	0.004
		11/06/91	0.005
		09/15/92	0.005
		09/05/91	0.007

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-145	1997 Q4	11/11/97	0.011
		11/10/97	0.012
		11/12/97	0.012
		11/13/97	0.012
GW-145	Historic	10/26/94	.
		03/24/95	.
		07/17/95	<0.001
		08/25/93	0.008
		07/26/94	0.01
		03/16/91	0.011
		09/04/91	0.011
		06/14/91	0.012
		06/12/93	0.012
		04/26/95	0.012
		11/15/95	0.012
		11/30/92	0.013
		12/14/93	0.013
		03/11/94	0.013
		01/18/95	0.013
		11/26/90	0.014
		05/29/92	0.014
		09/15/92	0.014
		03/06/93	0.014
		04/20/94	0.014
		06/12/90	0.015
		11/05/91	0.015
		10/08/90	0.016
		02/20/92	0.016
GW-231	1997 Q4	11/10/97	<0.001
		11/11/97	<0.001
		11/12/97	<0.001
		11/13/97	<0.001
GW-231	Historic	10/23/94	.
		06/12/90	<0.001
		10/08/90	<0.001
		11/26/90	<0.001
		03/14/91	<0.001
		07/19/91	<0.001
		09/04/91	<0.001
		11/05/91	<0.001
		02/21/92	<0.001
		05/28/92	<0.001

STATION NAME	PERIOD	SAMPLE DATE	URANIUM (MG/L)
GW-231	Historic	03/05/93	<0.001
		06/11/93	<0.001
		12/14/93	<0.001
		02/28/94	<0.001
		04/13/94	<0.001
		01/15/95	<0.001
		04/21/95	<0.001
		07/15/95	<0.001
		11/06/95	<0.001
		11/30/92	0.001
		08/24/93	0.001
		09/15/92	0.002
		07/23/94	0.002

---------- STATION NAME=GW-142 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable URANIUM
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	50.0	54.0	14.0375321	12.5000000
Historic	22	301.0	297.0	14.0375321	13.6818182

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 50.0000 Z = -.249332 Prob > |Z| = 0.8031

T-Test Approx. Significance = 0.8051

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.08120 DF = 1 Prob > CHISQ = 0.7757

---------- STATION NAME=GW-143 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	43.0	54.0	13.3199677	10.7500000
Historic	22	308.0	297.0	13.3199677	14.0000000

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 43.0000 Z = -.788290 Prob > |Z| = 0.4305

T-Test Approx. Significance = 0.4379

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.68199 DF = 1 Prob > CHISQ = 0.4089

---------- STATION NAME=GW-144 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	26.0	54.0	13.9067222	6.5000000
Historic	22	325.0	297.0	13.9067222	14.7727273

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 26.0000 Z = -1.97746 Prob > |Z| = 0.0480

T-Test Approx. Significance = 0.0591

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 4.0538 DF = 1 Prob > CHISQ = 0.0441

---------- STATION NAME=GW-145 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	35.0	54.0	13.8481879	8.7500000
Historic	22	316.0	297.0	13.8481879	14.3636364

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 35.0000 Z = -1.33591 Prob > |Z| = 0.1816

T-Test Approx. Significance = 0.1936

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 1.8824 DF = 1 Prob > CHISQ = 0.1701

---------- STATION NAME=GW-231 ----------

N P A R 1 W A Y P R O C E D U R E

Wilcoxon Scores (Rank Sums) for Variable U_
Classified by Variable PERIOD

PERIOD	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
1997 Q4	4	50.0	54.0	6.49923072	12.5000000
Historic	22	301.0	297.0	6.49923072	13.6818182

Average Scores Were Used for Ties

Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

S = 50.0000 Z = -.538525 Prob > |Z| = 0.5902

T-Test Approx. Significance = 0.5950

Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.37879 DF = 1 Prob > CHISQ = 0.5383

KENDALL TAU B STATISTIC
TEST FOR STATISTICALLY SIGNIFICANT POSITIVE RELATIONSHIP BETWEEN INDICATOR PARAMETER CONCENTRATIONS AND TIME

SUMMARY OF KENDALL TAU B TEST RESULTS
KERR HOLLOW QUARRY

PARAMETER	KENDALL TAU B TEST RESULT	
Gross alpha (pCi/L)	There is no statistically significant increase in gross alpha activity over time for any well.	
Gross beta (pCi/L)	There is no statistically significant increase in in gross beta activity over time for any well.	

4th Quarter 1997

---------- STATION NAME=GW-142 ----------

OBS	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
1	7.3	6.8
2	3.3	3.9
3	5.7	2.7
4	3.6	7.9

Historic Data

---------- STATION NAME=GW-142 ----------

OBS	SAMPLE DATE	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
1	11JUN90	3.07	8.960
2	17SEP90	4.23	20.880
3	26NOV90	12.49	17.790
4	15MAR91	9.64	12.520
5	13JUN91	15.82	10.310
6	03AUG91	5.30	10.700
7	04NOV91	3.58	5.250
8	20FEB92	15.10	38.800
9	28MAY92	4.07	7.560
10	14SEP92	10.20	4.930
11	30NOV92	3.06	9.850
12	05MAR93	3.53	9.710
13	11JUN93	7.73	7.320
14	25AUG93	15.00	13.100
15	15DEC93	11.90	11.700
16	16FEB94	14.70	-6.790
17	12APR94	3.29	4.590
18	21JUL94	1.53	7.000
19	22OCT94	2.03	4.720
20	10JAN95	6.08	5.350
21	20MAR95	.	.
22	20APR95	6.34	10.200
23	14JUL95	6.62	8.440
24	05NOV95	2.00	5.670
25	04JAN96	16.80	3.100
26	17APR96	2.68	2.080
27	21OCT96	3.31	-0.842
28	22OCT96	6.79	6.730
29	23OCT96	8.11	7.430
30	24OCT96	6.95	5.700
31	29APR97	15.00	11.000
32	29APR97	10.00	4.400
33	30APR97	15.00	10.000
34	01MAY97	11.00	8.700

4th Quarter 1997

---------- STATION NAME=GW-143 ----------

OBS	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
5	5.7	12
6	4.0	16
7	1.2	16
8	3.3	44

Historic Data

---------- STATION NAME=GW-143 ----------

OBS	SAMPLE DATE	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
35	14JUN90	1.780	20.49
36	17SEP90	3.790	5.71
37	27NOV90	5.890	19.17
38	16MAR91	4.260	18.49
39	16JUN91	4.980	18.55
40	05SEP91	3.360	20.13
41	07NOV91	3.890	14.30
42	21FEB92	0.552	14.00
43	29MAY92	5.120	21.00
44	28SEP92	11.100	17.50
45	01DEC92	0.873	13.50
46	06MAR93	6.170	20.50
47	12JUN93	4.650	18.70
48	13JUN93	.	.
49	27AUG93	3.730	8.86
50	15DEC93	4.440	16.70
51	03MAR94	1.400	19.40
52	18APR94	3.540	16.60
53	24JUL94	0.919	13.40
54	24OCT94	12.000	33.40
55	17JAN95	3.860	18.20
56	24APR95	4.390	15.70
57	16JUL95	3.170	13.70
58	09NOV95	2.690	14.20
59	21OCT96	1.440	16.90
60	22OCT96	4.830	18.00
61	23OCT96	6.160	14.90
62	24OCT96	3.780	12.50
63	28APR97	1.600	6.80
64	29APR97	0.700	7.30
65	30APR97	5.500	21.00
66	01MAY97	3.200	5.70

4th Quarter 1997

---------- STATION NAME=GW-144 ----------

OBS	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
9	2.9	1.4
10	4.2	-2.5
11	2.1	2.8
12	-0.3	1.7

Historic Data

---------- STATION NAME=GW-144 ----------

OBS	SAMPLE DATE	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
67	13JUN90	0.790	2.210
68	17SEP90	0.860	2.460
69	27NOV90	2.020	1.610
70	16MAR91	4.470	3.560
71	15JUN91	1.710	0.620
72	05SEP91	5.300	3.030
73	06NOV91	6.860	6.950
74	21FEB92	2.150	0.670
75	29MAY92	4.780	3.530
76	15SEP92	-4.290	6.550
77	01DEC92	1.980	7.030
78	06MAR93	4.820	5.280
79	12JUN93	2.070	5.270
80	26AUG93	0.823	-2.530
81	15DEC93	5.000	3.520
82	10MAR94	3.750	2.440
83	19APR94	2.600	2.970
84	26JUL94	1.540	2.110
85	25OCT94	8.430	7.490
86	18JAN95	3.230	5.450
87	22MAR95	.	.
88	25APR95	2.290	4.590
89	16JUL95	1.780	2.090
90	14NOV95	2.530	5.300
91	22JAN96	2.580	0.210
92	24APR96	1.400	-2.180
93	21OCT96	3.460	0.316
94	22OCT96	0.776	-2.390
95	23OCT96	1.270	1.070
96	24OCT96	1.800	2.200
97	28APR97	1.300	3.100
98	29APR97	1.400	-3.700
99	30APR97	1.500	1.000
100	01MAY97	1.400	2.800

4th Quarter 1997

---------- STATION NAME=GW-145 ----------

OBS	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
13	12.0	14
14	8.7	14
15	11.0	17
16	12.0	16

Historic Data

---------- STATION NAME=GW-145 ----------

OBS	SAMPLE DATE	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
101	12JUN90	9.49	24.440
102	08OCT90	-0.35	-3.290
103	26NOV90	12.56	19.740
104	16MAR91	14.09	21.720
105	14JUN91	12.81	17.380
106	04SEP91	10.16	23.120
107	05NOV91	14.30	17.800
108	20FEB92	10.80	15.300
109	29MAY92	9.09	19.100
110	15SEP92	28.00	-0.823
111	30NOV92	10.20	17.900
112	06MAR93	14.10	23.200
113	12JUN93	11.70	15.200
114	25AUG93	12.10	12.800
115	14DEC93	7.54	14.300
116	11MAR94	9.46	17.600
117	20APR94	11.70	14.300
118	26JUL94	10.10	15.500
119	26OCT94	15.50	23.500
120	18JAN95	14.10	16.700
121	24MAR95	.	.
122	26APR95	9.93	14.700
123	17JUL95	9.71	16.300
124	15NOV95	13.00	21.100
125	23JAN96	11.60	13.100
126	25APR96	6.27	10.500
127	21OCT96	12.80	18.900
128	22OCT96	13.30	11.100
129	23OCT96	11.10	9.380
130	24OCT96	10.00	21.700
131	28APR97	16.00	7.000
132	29APR97	16.00	11.000
133	30APR97	9.70	12.000
134	01MAY97	8.70	22.000

4th Quarter 1997

---------- STATION NAME=GW-231 ----------

OBS	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
17	1.5	4.30
18	1.0	-0.18
19	1.8	3.90
20	4.3	5.10

Historic Data

---------- STATION NAME=GW-231 ----------

OBS	SAMPLE DATE	GROSS ALPHA (PCI/L)	GROSS BETA (PCI/L)
135	12JUN90	1.8000	4.310
136	08OCT90	-2.3500	-4.620
137	26NOV90	0.9300	0.690
138	14MAR91	1.7000	2.130
139	19JUL91	1.8500	1.900
140	04SEP91	1.2400	3.540
141	05NOV91	-0.1540	-0.774
142	21FEB92	-0.1620	-0.835
143	28MAY92	-0.1750	1.430
144	15SEP92	0.0000	-4.100
145	30NOV92	-0.1610	2.940
146	05MAR93	0.2830	5.230
147	11JUN93	0.4460	-1.480
148	24AUG93	5.7400	-4.920
149	14DEC93	-0.8030	1.060
150	28FEB94	0.4860	5.180
151	13APR94	0.8010	-0.254
152	23JUL94	-0.9980	1.980
153	23OCT94	0.8120	2.290
154	15JAN95	1.1300	1.140
155	21APR95	1.0100	3.280
156	15JUL95	0.0761	0.230
157	06NOV95	0.8220	0.697
158	10JAN96	38.4000	-5.980
159	18APR96	1.1900	-1.550
160	21OCT96	0.8060	2.060
161	22OCT96	0.0315	-4.710
162	23OCT96	1.3100	-2.540
163	24OCT96	1.6100	4.750
164	28APR97	-0.1000	-2.300
165	29APR97	0.8000	0.100
166	30APR97	1.1000	1.400
167	01MAY97	0.3600	-5.300

---------- STATION NAME=GW-142 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
2 'VAR' Variables: GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	38	12664	863.226185	12753
GAA	37	7.644595	4.718476	6.620000
GBA	37	8.328595	7.033516	7.430000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11119.0	13832.0	SAMPLE DATE	
GAA	1.5300	16.8000	GROSS ALPHA	(PCI/L)
GBA	-6.7900	38.8000	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	GAA	GBA
SAMPLEDT	0.00904	-0.32607
SAMPLE DATE	0.9374	0.0045
	37	37

---------- STATION NAME=GW-143 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
2 'VAR' Variables: GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	36	12619	877.263814	12575
GAA	35	3.941829	2.510931	3.790000
GBA	35	16.665714	7.100810	16.600000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11122.0	13831.0	SAMPLE DATE	
GAA	0.5520	12.0000	GROSS ALPHA	(PCI/L)
GBA	5.7000	44.0000	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	GAA	GBA
SAMPLEDT	-0.08908	-0.19360
SAMPLE DATE	0.4516	0.1024
	35	35

---------- STATION NAME=GW-144 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
2 'VAR' Variables: GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	38	12667	862.019799	12759
GAA	37	2.467000	2.142570	2.070000
GBA	37	2.379081	2.791618	2.440000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11121.0	13831.0	SAMPLE DATE	
GAA	-4.2900	8.4300	GROSS ALPHA	(PCI/L)
GBA	-3.7000	7.4900	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	GAA	GBA
SAMPLEDT	-0.12792	-0.23291
SAMPLE DATE	0.2661	0.0426
	37	37

---------- STATION NAME=GW-145 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
2 'VAR' Variables: GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	38	12668	861.405782	12759
GAA	37	11.601622	4.075868	11.600000
GBA	37	15.547757	6.021427	16.000000

Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11120.0	13831.0	SAMPLE DATE	
GAA	-0.3500	28.0000	GROSS ALPHA	(PCI/L)
GBA	-3.2900	24.4400	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / Number of Observations

	GAA	GBA
SAMPLEDT	-0.02261	-0.21353
SAMPLE DATE	0.8444	0.0632
	37	37

---------- STATION NAME=GW-231 ----------

Correlation Analysis

1 'WITH' Variables: SAMPLEDT
2 'VAR' Variables: GAA GBA

Simple Statistics

Variable	N	Mean	Std Dev	Median
SAMPLEDT	37	12661	871.029538	12714
GAA	37	1.849476	6.320845	0.812000
GBA	37	0.543081	3.211030	1.060000

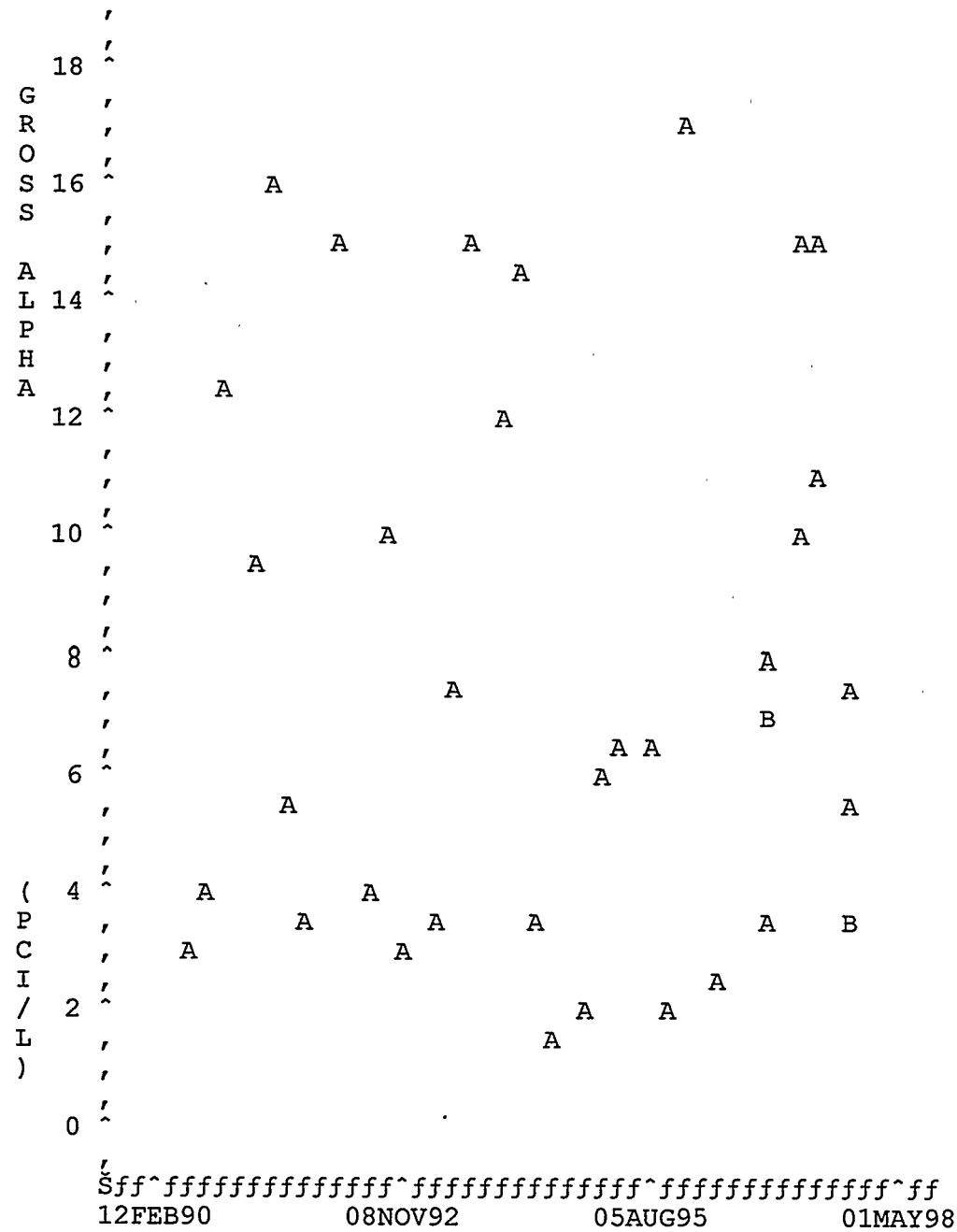
Simple Statistics

Variable	Minimum	Maximum	Label	
SAMPLEDT	11120.0	13831.0	SAMPLE DATE	
GAA	-2.3500	38.4000	GROSS ALPHA	(PCI/L)
GBA	-5.9800	5.2300	GROSS BETA	(PCI/L)

Kendall Tau b Correlation Coefficients
/ Prob > |R| under Ho: Rho=0 / N = 37

	GAA	GBA
SAMPLEDT	0.21021	-0.02102
SAMPLE DATE	0.0671	0.8547

---------- STATION NAME=GW-142 ----------



NOTE: 1 obs had missing values.

---------- STATION NAME=GW-142 ----------

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          12FEB90        08NOV92        05AUG95        01MAY98

                                SAMPLE DATE
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NOTE: 1 obs had missing values.

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-------------------- STATION NAME=GW-143 ---------------------

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        12FEB90        08NOV92        05AUG95        01MAY98

                          SAMPLE DATE
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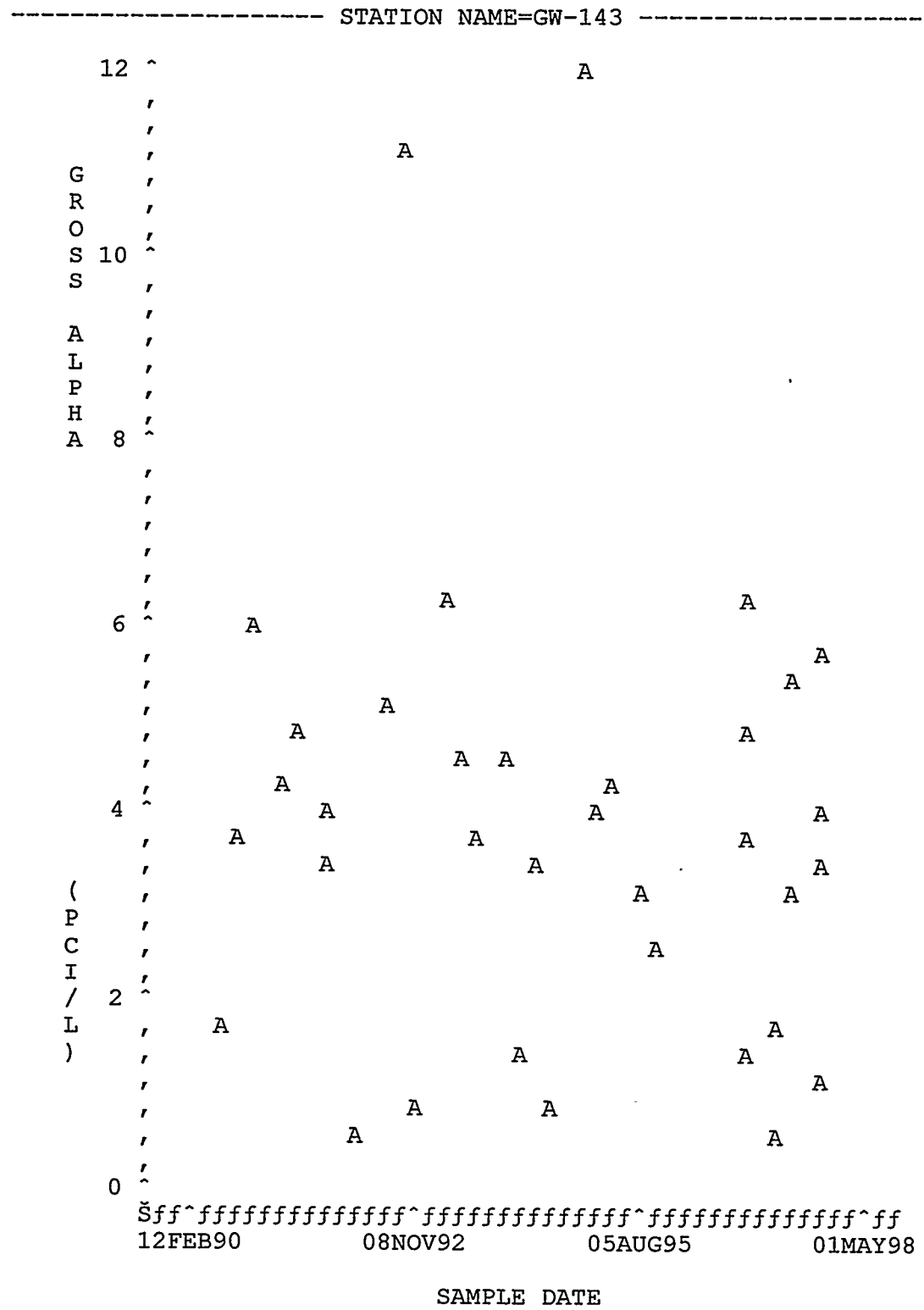

NOTE: 1 obs had missing values.

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--------------------- STATION NAME=GW-143 ----------------------

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      12FEB90        08NOV92        05AUG95        01MAY98

                          SAMPLE DATE
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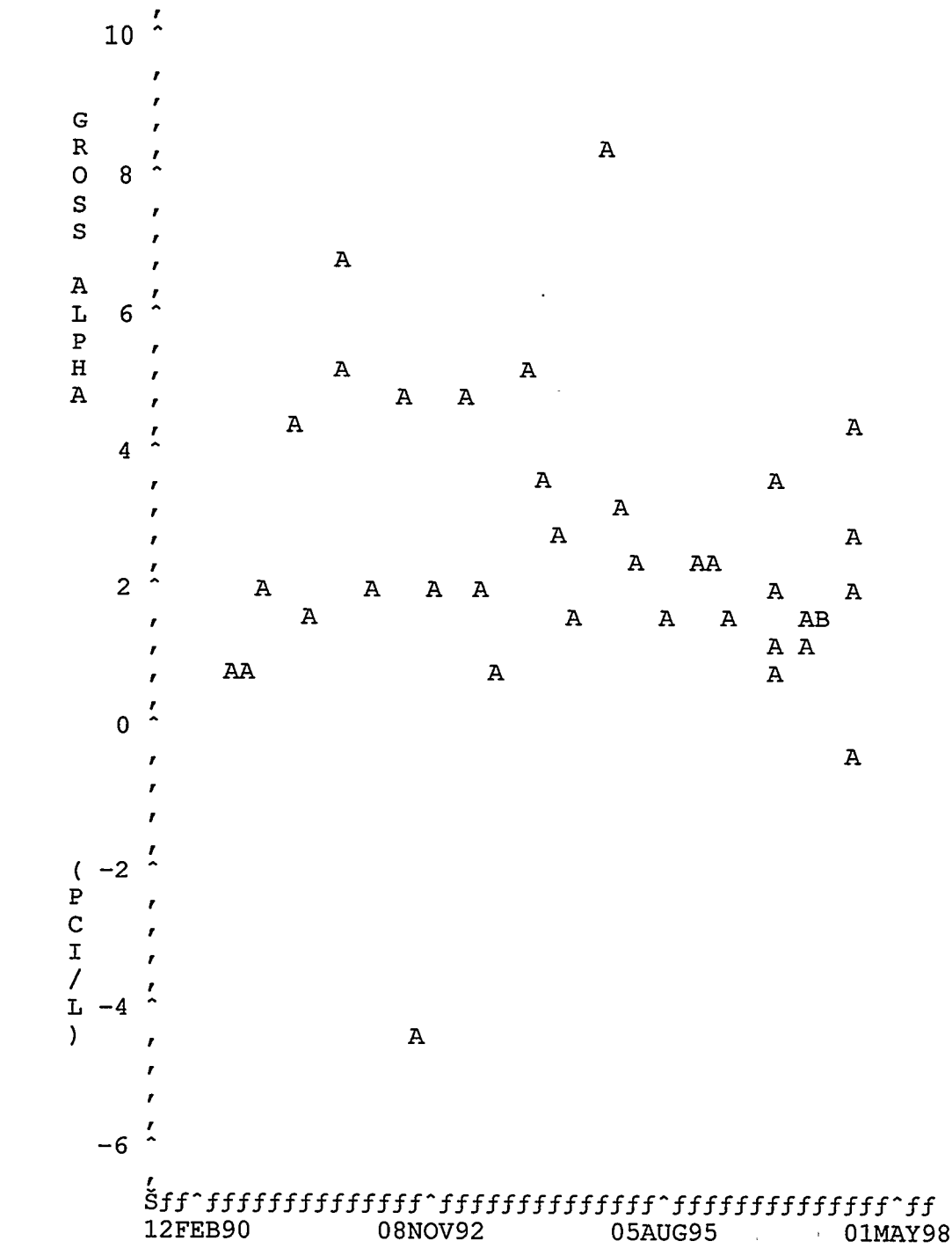
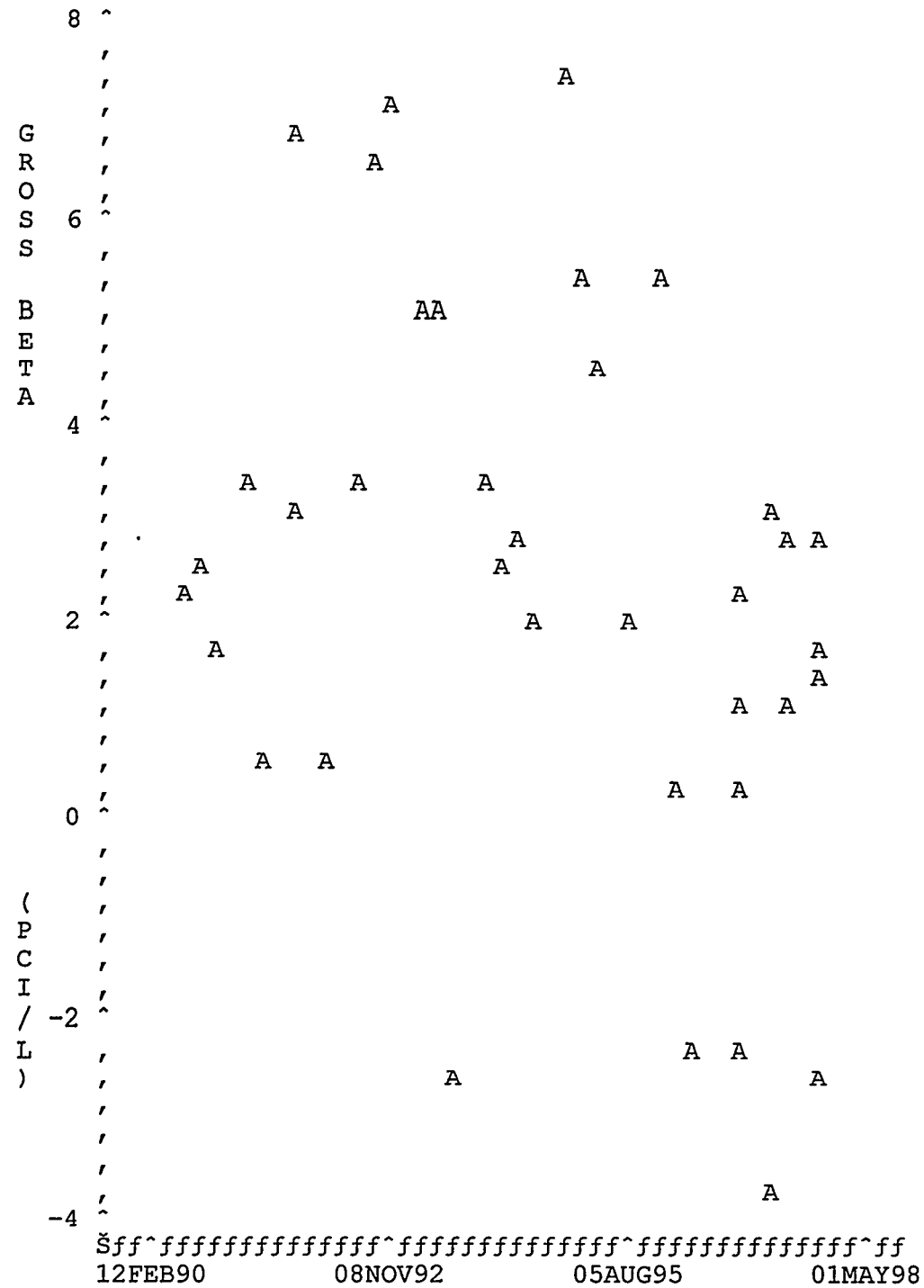
NOTE: 1 obs had missing values.

---------- STATION NAME=GW-144 ----------



NOTE: 1 obs had missing values.

---------- STATION NAME=GW-144 ----------



NOTE: 1 obs had missing values.

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      12FEB90        08NOV92        05AUG95        01MAY98

                          SAMPLE DATE
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NOTE: 1 obs had missing values.

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--------------------- STATION NAME=GW-145 ----------------------

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                              SAMPLE DATE
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NOTE: 1 obs had missing values.

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-------------------- STATION NAME=GW-231 ----------------------

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                         SAMPLE DATE
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-------------------- STATION NAME=GW-231 ----------------------

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       12FEB90        08NOV92        05AUG95        01MAY98

                          SAMPLE DATE
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