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Los Alamos

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BATCH SORPTION RESULTS FOR AMERICIUM, NEPTUNIUM, PLUTONIUM, TECHNETIUM, AND URANIUM TRANSPORT THROUGH THE BANDELIER TUFF, LOS ALAMOS, NEW MEXICO

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ABSTRACT

Quantifying the migration of radionuclides through the Bandelier Tuff is essential in conducting a performance assessment for Material Disposal Area-G, Technical Area-54, Los Alamos National Laboratory. The sorption of radionuclides on Bandelier Tuff is controlled by (1) the surface area and mineralogy of the tuff and (2) by the water chemistry of the solution in contact with the tuff. The dominant adsorbents within the Bandelier Tuff are inferred to include glass, hematite, smectite, amorphous $Fe(OH)_3$, kaolinite, and possibly calcite. Water Canyon Gallery (WCG) groundwater, discharging from the Bandelier Tuff, was used in the batch sorption experiments. This groundwater is relatively oxidizing and is characterized by a calcium-sodium-bicarbonate ionic composition with a TDS content less than 130 mg/L. The distribution coefficients for radionuclides measured on the Bandelier Tuff, at a pH value of 7.3, decrease in the following order: Am(III) >> Pu(V) > U(VI) >> Np(V) > Tc(VII). The distribution coefficients for Tc(VII) are all negative and therefore, they are assumed to be zero. Vadose-zone pore water was extracted from the Bandelier Tuff using an Unsaturated/Saturated Flow Apparatus. The pore water is characterized by a sodium-carbonate-bicarbonate solution with a TDS content of greater than 1300 mg/L. The pH values of the pore-water samples range from 9.2 to 9.8 and the solutions are oversaturated with respect to calcite. The distribution coefficients for radionuclides measured on the tuff samples using the synthetic pore water, at a pH value of 9.8, decrease in the following order: Am(III) >> Pu(V) > U(VI) > Np(V) >Tc(VII). The distribution coefficients for Am(III) and Np(V) using synthetic pore water are higher than the distribution coefficients for these two radionuclides using WCG groundwater. Based on MINTEQA2 simulations, the dominant aqueous complexes of Am(III) and Np(V) are predicted to include $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$, respectively. The synthetic pore water is predicted to be undersaturated with respect to $Am(OH)_3(s)$, $Am(OH)_3(am)$, $AmOHCO_3$, $NpO_2OH(am)$, $NpO_2OH(aged)$, $NaNpO_3 \cdot 3.5H_2O$, and $NaNpCO_3$. Enhanced sorption of Am(III) and Np(V) carbonato complexes on calcite is possible through surface exchange with carbonate and bicarbonate functional groups present on the calcite surface.

Introduction

Quantifying the migration of radionuclides through the Bandelier Tuff is essential in conducting a performance assessment (PA) of material disposal area (MDA)-G, technical area (TA)-54, Los Alamos National Laboratory. Adsorbates or radionuclides of interest at MDA-G include americium (Am), neptunium (Np), plutonium (Pu), technetium (Tc), and uranium (U). Neptunium, Tc, and U form soluble anionic species under oxidizing and near neutral pH conditions (Brookins, 1988; Brookins, 1984). These three elements are characterized by limited adsorption onto mineral surfaces in volcanic tuff (Triay et al., 1996; Thomas, 1987). The high solubilities of Np, Tc, and U make these three radionuclides a top priority in the transport investigations conducted as part of the PA for MDA-G.

The purpose of this report is to provide the results of batch-sorption experiments of Am, Np, Pu, Tc, and U performed on the Bandelier Tuff. Results obtained from these experiments are required for solute-transport calculations as part of the PA for MDA-G. These sorption data serve as input to the mass-heat transfer model FEHM (Finite Element Heat and Mass Transfer) (Zyvoloski et al., 1988).

The objectives of this investigation are:

1. identify the minerals and solid phases (silica glass, silicates, hematite, amorphous $Fe(OH)_3$) within the Bandelier Tuff;

2. characterize groundwater and pore-water chemistry most important to the sorption behavior of Am, Np, Pu, Tc, and U on Bandelier Tuff;

3. perform batch-sorption experiments with Bandelier Tuff (Tshirege Member) samples; and

4. determine statistical parameters of the distribution coefficients (K_d) for Am, Np, Pu, Tc, and U used in performance assessment calculations for MDA-G.

A detailed discussion on water-rock processes relevant to MDA-G is presented by Krier et al. (1995). Geochemical parameters, such as pH, Eh, solution composition, mineral solubility, and presence of competing and complexing ligands, have the greatest impact on the sorption behavior of the contaminants of concern found in the pits at MDA-G. The release of contaminants from the pits in MDA-G will be controlled by hydraulic flux, pore-water chemistry, mineral (radionuclide) solubility, and sorption behavior of the Bandelier Tuff and other underlying geological strata.

EXPERIMENTAL PROCEDURES

Groundwater

Groundwater from the Water Canyon Gallery (WCG), flowing from uppermost unit 4 in the Tshirege Member of the Bandelier Tuff, was used for the batch-sorption experiments. This solution is considered to be representative of groundwater flowing through the Bandelier Tuff. The most recent WCG groundwater sample was collected on February 1, 1996 via a pumping-distribution system at TA-16. Approximately 55 gallons of WCG groundwater were collected at the distribution system. Water Canyon Gallery groundwater was collected following procedures detailed in LANL-CP-CST-DP-99, R0 WCG-1. The measured pH and Eh of the WCG groundwater collected at the distribution point were 7.34 and +181 mV, respectively. The pH of the WCG groundwater is controlled by dissolved CO_2 gas under open conditions with the atmosphere. Analytical techniques for analyzing the groundwater include inductively coupled plasma emission spectroscopy (ICPES) (major cations and metals), ion chromatography (IC) (anions), carbonate alkalinity titration (CAT), cold vapor atomic absorption spectroscopy (CVAA) (mercury), and electrothermo vapor atomic absorption spectroscopy (ETVAA) (arsenic and selenium). Groundwater samples were analyzed at the EES-1 Laboratory, LANL and at the Department of Earth and Planetary Sciences, University of New Mexico using EPA-SW846 or equivalent methods. Results of chemical analyses of the WCG groundwater are provided in Appendix A.

The WCG groundwater collected in February, 1996 was filtered through 0.05-*um* filter prior to the chemical analyses and batch-sorption experiments. Prior to chemical analyses, the WCG groundwater samples collected by LANL staff were filtered through a 0.45 *um* membrane in the field. Filtration of the WCG groundwater removes any potential colloids that may bias experimental results. Groundwater analytical data from Yucca Mountain indicate that filtration does not cause changes in solute chemistry, which potentially may influence speciation of the adsorbates (radionuclides) (Triay et al., 1996).

Bandelier Tuff Samples and Mineralogy

The Bandelier Tuff samples used for batch-sorption experiments were obtained from the core hole 1107 drilled at TA-54, MDA-G, Los Alamos National Laboratory. Core samples were taken from split spoon, hollow-stem augers. Core samples selected for sorption experiments were collected from the Tshirege Member of the Bandelier Tuff from the following seven depth intervals (below ground surface, bgs): 10.8-12.0 ft; 65.0-66.0 ft, 74.0-75.0 ft, 79.1-79.7 ft, 79.9-80.0 ft, 91.0-91.5 ft, and 108.0-109.5 ft. The core sample collected from the

depth interval 10.8-12.0 ft is from the devitrified (crystal rich) unit 2. The core samples collected from 65.0 ft through 80.0 ft are from unit 1vu (vitric alteration, undifferentiated). The core samples collected from 91.0 ft through 91.5 ft are from unit 1vc (vitric alteration, collonnade, slightly welded). The core sample collected from 108.0 ft to 109.5 ft is from unit 1g (glass-rich). Geological characterization of the Bandelier Tuff at TA-54 is described in detail by Krier et al. (1995).

The mineralogy of the Bandelier Tuff was determined by x-ray diffraction (XRD) analysis and surface area of the tuff was determined by BET (Brunauer, Emmett, and Teller) analysis. The dry, partially disaggregated Bandelier Tuff samples were passed through a 500 *um* sieve prior to XRD and BET analyses. Crushing of the samples was performed prior to batch-sorption experiments. Details of the crushing and sieving procedures for the samples are given in LANL-CST-DP-63, R4, *Yucca Mountain Project Detailed Procedures*, Los Alamos National Laboratory. Data collected from the Yucca Mountain Project (YMP) indicate that crushing and sieving the tuff samples do not cause significant differences in the mineralogy of the tuff that may influence the sorptive capacity of the samples (Triay et al., 1996). Based on these results, the sorptive capacity of the Bandelier Tuff samples should not be biased by crushing and sieving.

Americium, Neptunium, Plutonium, Technetium, and Uranium Solutions

Acid stock solutions (4 N HNO_3) containing $^{241}Am(III)$, $^{243}Am(III)$, $^{237}Np(V)$, $^{239}Pu(V)$, $^{95m}Tc(VII)$, and $^{233}U(VI)$ were used in the batch-sorption experiments. The solutions were prepared by taking an aliquot of the well-characterized radionuclides and diluting them in the WCG groundwater or synthetic pore water. Radionuclide concentrations in the stock solutions used for the batch-sorption experiments are provided in Table 1. Nitsche et al. (1993) reported the solubility and speciation of Am, Np, and Pu in Yucca Mountain groundwater (well J-13) at room temperature at pH values 7 and 8.5. Based on these solubility measurements and similarities between the chemical compositions of WCG and J-13 groundwaters, the measured solubilities reported by Nitsche et al. (1993) were used to determine maximum concentrations of $^{241}Am(III)$, $^{243}Am(III)$, $^{237}Np(V)$, and $^{239}Pu(V)$ added to WCG groundwater and synthetic pore water (Table 2). The high solubility of Tc(VII) is estimated from geochemical data (Eh-pH diagrams) presented by Brookins (1988). Grenthe et al. (1992) present chemical thermodynamic data of U and based on their solubility data, U probably occurs as U(VI) in both WCG groundwater and pore water extracted from the Bandelier Tuff. The mineral schoepite ($UO_2(OH)_2 \cdot H_2O$) is considered to be the most important U(VI) solid controlling the distribution of U(VI) carbonato and hydroxo species, based on XRD analysis of oxidized U metal found at firing sites within the Laboratory.

Table 1. Procedures for Sorption Experiments

Procedure	Reference*
Batch sorption (under atmospheric conditions)	LANL-CST-DP-86
Batch sorption (within the controlled atmosphere of a glove box)	LANL-CST-DP-100
pH measurement	LANL-CST-DP-35
Eh measurement	LANL-CST-DP-102
Liquid scintillation counting	LANL-CST-DP-79

*Yucca Mountain Project Detailed Procedures, Los Alamos National Laboratory.

Table 1. Procedures for Sorption Experiments

Procedure	Reference*
Batch sorption (under atmospheric conditions)	LANL-CST-DP-86
Batch sorption (within the controlled atmosphere of a glove box)	LANL-CST-DP-100
pH measurement	LANL-CST-DP-35
Eh measurement	LANL-CST-DP-102
Liquid scintillation counting	LANL-CST-DP-79
Gamma scintillation counting	LANL-CST-NDK-95

*Yucca Mountain Project Detailed Procedures, Los Alamos National Laboratory.

Table 2. Summary of Results for Solubility Experiments on Americium, Neptunium, Plutonium, Technetium, and Uranium in Yucca Mountain Groundwater (Well J-13) at pH 7 and Water Canyon Gallery Groundwater, Los Alamos, NM at pH 7.3 and 25^{0}C.

Radionuclide	Solubility (M)*	Initial Concentration (M)**
Am(III)	1.2×10^{-9}	3.2×10^{-9}
Np(V)	1.3×10^{-4}	4.3×10^{-5}
Pu(V)	2.3×10^{-7}	3.0×10^{-7}
Tc(VII)***	very large	$> 10^{-3}$
U(VI)	3.6×10^{-6}	3.6×10^{-6}

*From Nitsche et al., 1993. **Measured in Water Canyon Gallery groundwater prior to sorption experiments. The solid phases $AmOHCO_3$ and $NaNpO_2(CO_3) \cdot 2H_2O$ were identified by XRD analysis. For plutonium, amorphous material with some crystallinity containing carbonate and Pu(IV) polymer was suggested by Nitsche et al. (1993). $UO_2(OH)_2$ is predicted to control U(VI) solubility (Grenthe et al., 1992). ***Rard (1983) reports a solubility for $NaTcO_4$ of $10^{-1.52}$ molar.

Batch Sorption Procedure

Batch-sorption experiments consisting of three different sets were conducted as part of the PA for MDA-G. Data set 1 provides distribution coefficients for radionuclides using WCG groundwater (Appendix B) to model transport under saturated-flow conditions beneath the disposal pits at MDA-G using the computer program FEHM. Data set 2 provides distribution coefficients for radionuclides (Appendix B, 10.8-12.0 ft sample depth interval) to model transport under (un)saturated-flow conditions within the disposal pits at MDA-G. Chemical analyses of pore water extracted from the Bandelier Tuff, using an Unsaturated/Saturated Flow Apparatus (UFA) (Conca and Wright, 1995) are tabulated in Appendix C. The pore water chemistry provides the basis for the composition of the synthetic pore water, which is included as part of data set 3. Data set 3 provides distribution coefficients for radionuclides (Appendix D) to model transport under unsaturated-flow conditions beneath the disposal pits at MDA-G.

Results of the batch-sorption experiments, using WCG groundwater and synthetic pore water, are provided in Appendices B and D, respectively. All batch-sorption experiments were performed at room temperature, following the procedure detailed in Triay et al. (1996). The sorption procedure initially consisted of pretreating the Bandelier Tuff samples with WCG groundwater or synthetic pore water for approximately twelve days. The sorbent : solution ratio was 1 g of Bandelier Tuff to 20 mL of WCG groundwater or synthetic pore water. After twelve days, the pretreated Bandelier Tuff samples were then separated from the WCG groundwater or synthetic pore water by centrifugation and then equilibrated with 20 mL of ^{241}Am(III), ^{243}Am(III), ^{237}Np(V), ^{239}Pu(V), ^{95m}Tc(VII), and ^{233}U(VI) in separate solutions. After a sorption period of three weeks, the solid phase(s) was separated from each solution by centrifugation.

The amount of radionuclide in solution initially and after sorption was determined with scintillation counters (Packard tri-carb 2200-TR/AB for ^{233}U, ^{241}Am, and ^{243}Am; Packard tri-carb 2500-TR/AB for ^{239}Pu; Packard tri-carb 2550-TR/AB for ^{237}Np) and a gamma counter (Cobra-Canberra) for ^{95m}Tc. The amount of radionuclide sorbed on the solid phase(s) was determined by the difference. The liquid scintillation counting technique used can discriminate alpha activity from beta activity and consequently, no interferences from ^{233}Pa (the daughter of ^{237}Np) are expected. Because the efficiency of the liquid scintillation counters is approximately 100% for the radionuclides, excluding ^{95m}Tc, the counts per minute (cpm) provided in Appendices B and D are approximately equivalent to disintegrations per minute (dpm). The efficiency of the gamma scintillation counter for ^{95m}Tc (self calibrating) is approximately 70%. Containers without Bandelier Tuff (control tubes) were used to monitor

radionuclide precipitation and sorption onto container walls during the sorption experiment. The difference in the concentrations of $^{241,\ 243}Am(III)$, $^{237}Np(V)$, $^{239}Pu(V)$, $^{95m}Tc(VII)$, and $^{233}U(VI)$ in the initial solutions and in the control tubes varied from 40% to 44%, -2% to 0.1%, 4% to 6%, -2% to 0.4%, 4% to 5%, respectively. The large concentration differences for $^{241}Am(III)$ and $^{243}Am(III)$ are due to the high sorption capacity of radionuclide on the control tubes.

The batch-sorption distribution coefficient, K_d, was calculated using

$$K_d = \frac{\text{moles of radionuclide per g of solid phase}}{\text{moles of radionuclide per mL of solution,}} \qquad (1)$$

and thus has units of mL/g.

Batch-sorption experiments were performed both under atmospheric conditions (synthetic Bandelier Tuff pore water, pH = 9.8) and inside glove boxes with a CO_2 gas overpressure (0.4% CO_2) to control the pH of the WCG groundwater. The initial pH values of the WCG groundwater, with the radionuclide solutions added, inside the glove boxes ranged from 7.08 to 7.55 (the CO_2 gas overpressure was adjusted to maintain pH values between 7.2 and 7.3). References describing the details of the experimental setup and analytical techniques used in the batch-sorption experiments are provided in Table 1.

Determination of very small or very large distribution coefficients result in large uncertainties in the calculated distribution coefficients (Triay et al., 1996). When little sorption occurs, calculations can yield negative K_d values; the error results from subtracting two large numbers (the initial radionuclide concentration in solution and the radionuclide concentration after sorption) to obtain a small number (the amount of radionuclide associated with the solid phase(s)). Therefore, small K_d values (in the range of ± 1) are not significant. When a great deal of sorption occurs, calculations can yield large uncertainties associated with measuring the small amount of radioactivity left in solution after sorption. Because sorption distribution coefficients for Np and Tc tend to be very small, most K_d values are only reported to two significant figures.

RESULTS AND DISCUSSION

Hydrochemistry and Geochemical Modeling of the Water Canyon Gallery Groundwater

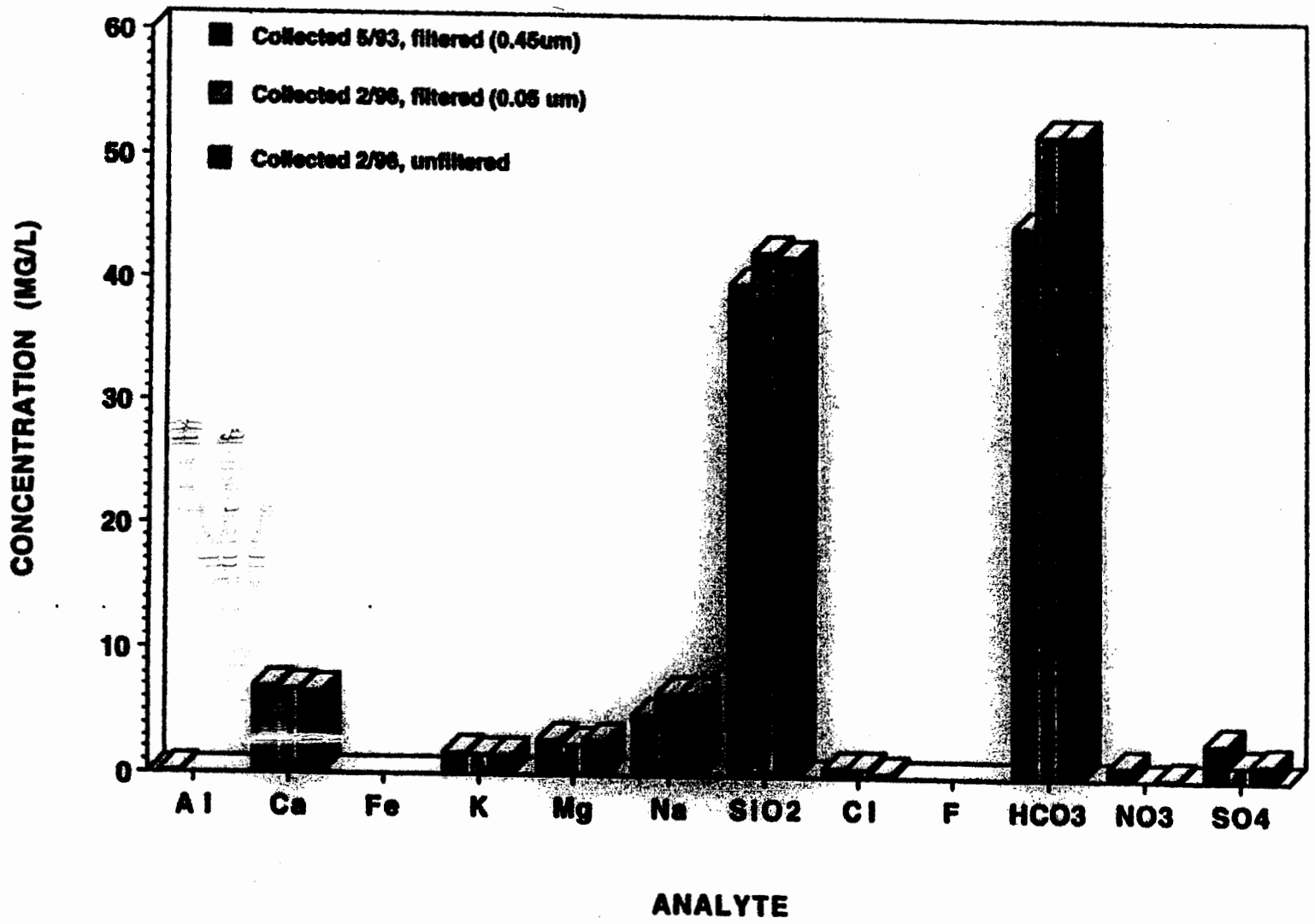
The chemistry of WCG groundwater is shown in Figure 1 and all water chemistry data are presented in Appendix A. The most recent WCG sample was collected in February 1996. The WCG groundwater is a calcium-sodium-bicarbonate solution with magnesium, potassium, sulfate, and chloride present as the other major ions (Blake et al., 1995). The composition of this groundwater shows little variation in solutes over time, excluding bicarbonate (Figure 1). Dissolved silicic acid ($Si(OH)_4^0$) is the most abundant neutral species occurring in this groundwater, which is derived from the dissolution of soluble SiO_2 glass present in the Bandelier Tuff. The ionic strength of the WCG groundwater (February 1996 sample) is 0.0011 molal. The charge balance (sum of cations - sum of anions/sum of cations + sum of anions) calculated for this groundwater analysis is +2.39%, verifying accurate analytical results for this sample.

The WCG groundwater is considered to be relatively oxidizing, based on both near-surface, fracture flow conditions within the Bandelier Tuff and the lack of chemical reductants present in groundwater (for example H_2S aq) (Blake et al., 1995) and in the Bandelier Tuff (solid organic matter) (Longmire et al., 1995). In addition, ferric iron is the dominant form of this redox-sensitive element occurring in different minerals and solid phases including amorphous $Fe(OH)_3$, Fe_2O_3, and Fe_3O_4 (Broxton et al., 1995). The measured Eh value (+181 mV) further suggests that the WCG groundwater is relatively oxidizing. The batch-sorption experiments were performed under oxidizing conditions, based on the observed hydrochemical characteristics of the WCG groundwater and the mineralogy of the Bandelier Tuff.

Calculations of solute speciation, PCO_2, and solid phase saturation indices were made using the computer code MINTEQA2 (Allison et al., 1991), with single ion activity coefficients calculated using the Davies equation. MINTEQA2 quantifies possible rock-water and water-atmosphere reactions, however, modeling results should be interpreted with caution and are limited by the scope of our understanding of hydrologic flow conditions (saturated and unsaturated), possible reaction mechanisms, and kinetic constraints in a disequilibrium-dominated system.

Mineral saturation index (SI) and speciation calculations were performed, using the analytical results from the February 1996 WCG sample, with the computer code, MINTEQA2 (Allison et al., 1991). The WCG groundwater is predicted to be slightly oversaturated with respect to cristobalite (SI = +0.631). The solution is

WATER CANYON GALLERY GROUNDWATER.



predicted to be in equilibrium (SI = 0.000 ± 0.500) with silica glass (SI = 0.025) and silica precipitate (SI = -0.302), which is consistent with results of mineralogical characterization studies of the Bandelier Tuff (Broxton et al., 1995). The solution is predicted to be undersaturated with respect to calcite (SI value for calcite = -1.674). This is consistent with the observation that only trace amounts of calcite typically occur in the matrix of unaltered Bandelier Tuff, excluding fracture fill material containing calcite and other soil constituents. In addition, calcite does not occur within non-contaminated alluvial aquifers consisting of Bandelier Tuff (for example upper Los Alamos Canyon), because native alluvial groundwater is undersaturated with respect to this mineral.

The oxidation states of Am, Np, Pu, Tc, and U in WCG groundwater and synthetic pore water are assumed to be III, V, V, VII, and VI, respectively, based on the following spectrophotometric and geochemical data. Americium(III) is the stable oxidation state of this actinide in Yucca Mountain groundwater (well J-13) (Nitsche et al., 1993). This is based on extractions with 0.5 M TTA at pH 0 and coprecipitation of Am(III) with LaF_3. The J-13 groundwater is a sodium and bicarbonate-rich solution similar to the ionic composition of WCG groundwater. Americium (III) is therefore, predicted to be the dominant oxidation state of this actinide in WCG groundwater and synthetic pore water. Results of absorption spectrophotometry studies conducted by Nitsche et al. (1993) suggest that Np is stable as Np(V) oxo and carbonato complexes in J-13 groundwater at a pH value of 7.0. The solution redox chemistry of Pu is very involved because several oxidation states (III, IV, V, and VI) can occur in aqueous solution. Nitsche et al. (1993) showed that at pH values of 7.0 and 8.5, Pu(V) is the dominant oxidation state of this actinide in J-13 groundwater. Nitsche et al. (1993) developed an indirect method to determine the oxidation states of Pu based on solvent extractions and coprecipitation. Technetium(VII) is stable as TcO_4^- at pH values ranging from 5 to 10 under oxidizing conditions (Brookins, 1988). Uranium (VI) is assumed to be the stable oxidation state of this element, based on relatively oxidizing conditions characteristic of both the WCG groundwater and pore water extracted from the Bandelier Tuff.

The chemistry of groundwater samples collected from well J-13 (summarized in Thomas, 1987) is similar to the WCG groundwater. There are some important differences, however, in temperature and major-ion chemistry that may influence adsorption processes in comparing the two groundwater chemistries to each other. The temperature of the J-13 groundwater (31.0°C) is higher than the temperature of the WCG groundwater (11.3°C). The dominant cations and anions in both groundwaters are sodium, calcium, and bicarbonate. The higher bicarbonate concentration in the J-13 groundwater probably influences the limited extent of adsorption of uranyl (U(VI)) species onto the Yucca Mountain tuffs. Subsequently, K_d values for uranium determined by Triay et al. (1994)

under oxidizing conditions are less than 2 mL/g. The total dissolved solids (TDS) content of the J-13 groundwater is higher than the TDS content of the WCG groundwater by approximately a factor of 1.7. The J-13 groundwater may have a longer residence time within the tuff(s) relative to the WCG groundwater, which may account for the higher TDS content. The pH values for the WCG and J-13 groundwaters are 7.3 and 6.9, respectively.

The speciated form(s) of the radionuclides of interest influence the extent of sorption that takes place with the adsorbent, in this case the Bandelier Tuff. Speciation versus pH diagrams for Am(III), Np(V), Pu(V), and U(VI) in WCG groundwater, using analytical results obtained from the February 1996 sample, were calculated using the computer program MINTEQA2. These diagrams are shown in Figures 2, 3, 4, and 5. Sources of thermochemical data used in the speciation calculations for the actinide elements include: Am (Kerrisk and Silva, 1986), Np (Lemire, 1984), Pu (Lemire and Tremaine, 1980), and U (Grenthe et al., 1992). At a pH value of 7.3, dissolved Am, Np, Pu, and U are predicted to be stable mainly as $AmCO_3^+$, NpO_2^+, PuO_2^+, and $UO_2(CO_3)_2^{2-}$, respectively (Figures 2, 3, 4, and 5). Technetium(VII) is stable as TcO_4^-, comprising 100% distribution of this element over pH values 6 to 10 (not shown as a figure). Depending on the pH_{pzc} for the different adsorbents present in the Bandelier Tuff, cationic solutes (radionuclides) tend to sorb to a greater amount than do anionic solutes under near-neutral pH conditions. Net-negative surface charge dominates above the pH_{pzc} for the different adsorbents, enhancing cation adsorption. Potential adsorbents in the tuff include glass, smectite, kaolinite, hematite, amorphous $Fe(OH)_3$, and possibly calcite.

Mineralogy and Surface Area of the Bandelier Tuff

The two major rock types of the Bandelier Tuff used in the batch-sorption experiments included vitric (glass) and devitrified (crystal rich) samples. Figure 6 summarizes the mineralogy of the Bandelier Tuff samples representative of the two rock types. The vitric Bandelier Tuff samples (unit 1g) are dominated by silica glass with varying amounts of alkali feldspar, quartz, and cristobalite. The devitrified Bandelier Tuff samples (units 1vu, 1vc, and 2) are characterized by alkali feldspar, quartz, tridymite, cristobalite with minor amounts of hematite and scapolite. Alkali feldspar is the dominant mineral present in the samples followed by quartz.

Figure 7 shows results of BET surface area measurements for the Bandelier Tuff samples. The surface area of the samples range from 1.294 m^2/g (sample depth interval 108.0-109.5 ft bgs) to 2.888 m^2/g (sample depth interval 10.8-12.0 ft bgs)(Figure 7). A correlation between surface area and mineralogy in the

FIGURE 2. RESULTS OF SPECIATION CALCULATIONS FOR WATER CANYON GALLERY WATER USING MINTEQA2, LOS ALAMOS, NEW MEXICO. LOG Am(III) = -8.62 M AND LOG CO3-2 = -3.07 M AT 25C.

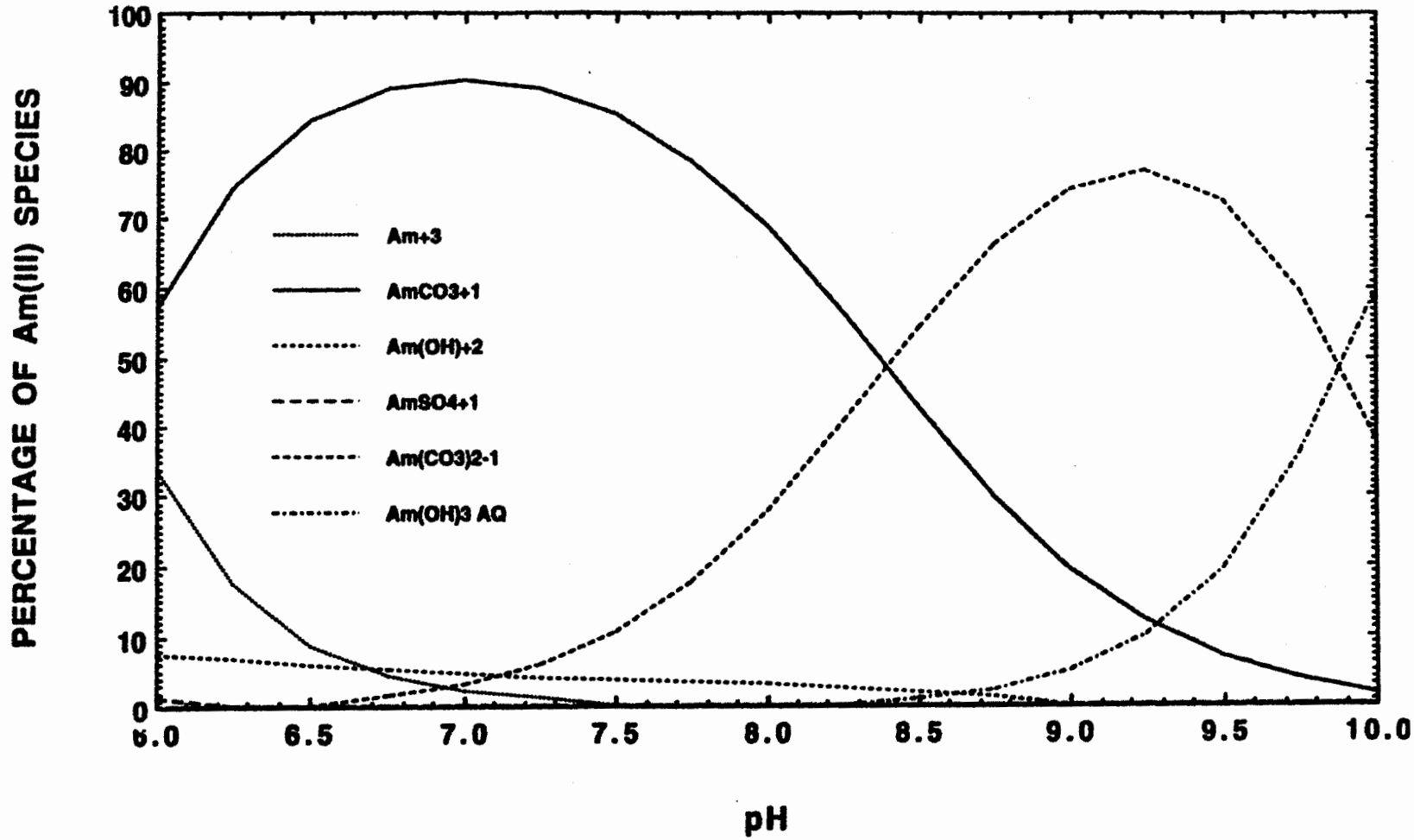


FIGURE 3. RESULTS OF SPECIATION CALCULATIONS FOR WATER CANYON GALLERY WATER USING MINTEQA2, LOS ALAMOS, NEW MEXICO. LOG Np(V) = -4.39 M AND LOG CO3-2 = -3.07 M AT 25C.

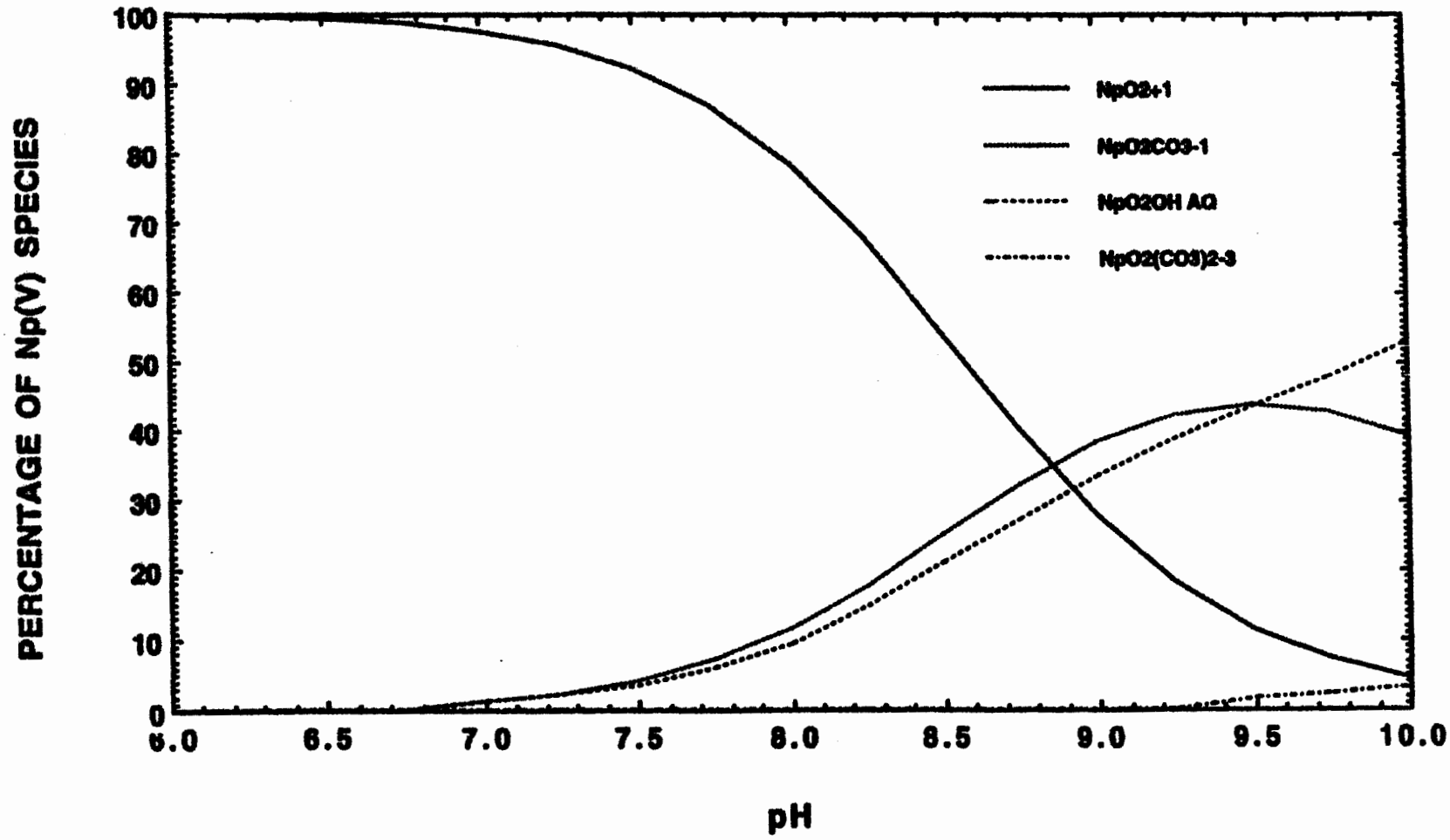


FIGURE 4. RESULTS OF SPECIATION CALCULATIONS FOR WATER CANYON GALLERY WATER USING MINTEQA2, LOS ALAMOS, NEW MEXICO. LOG Pu(V) = -6.54 M AND LOG CO3-2 = -3.07 M AT 25C.

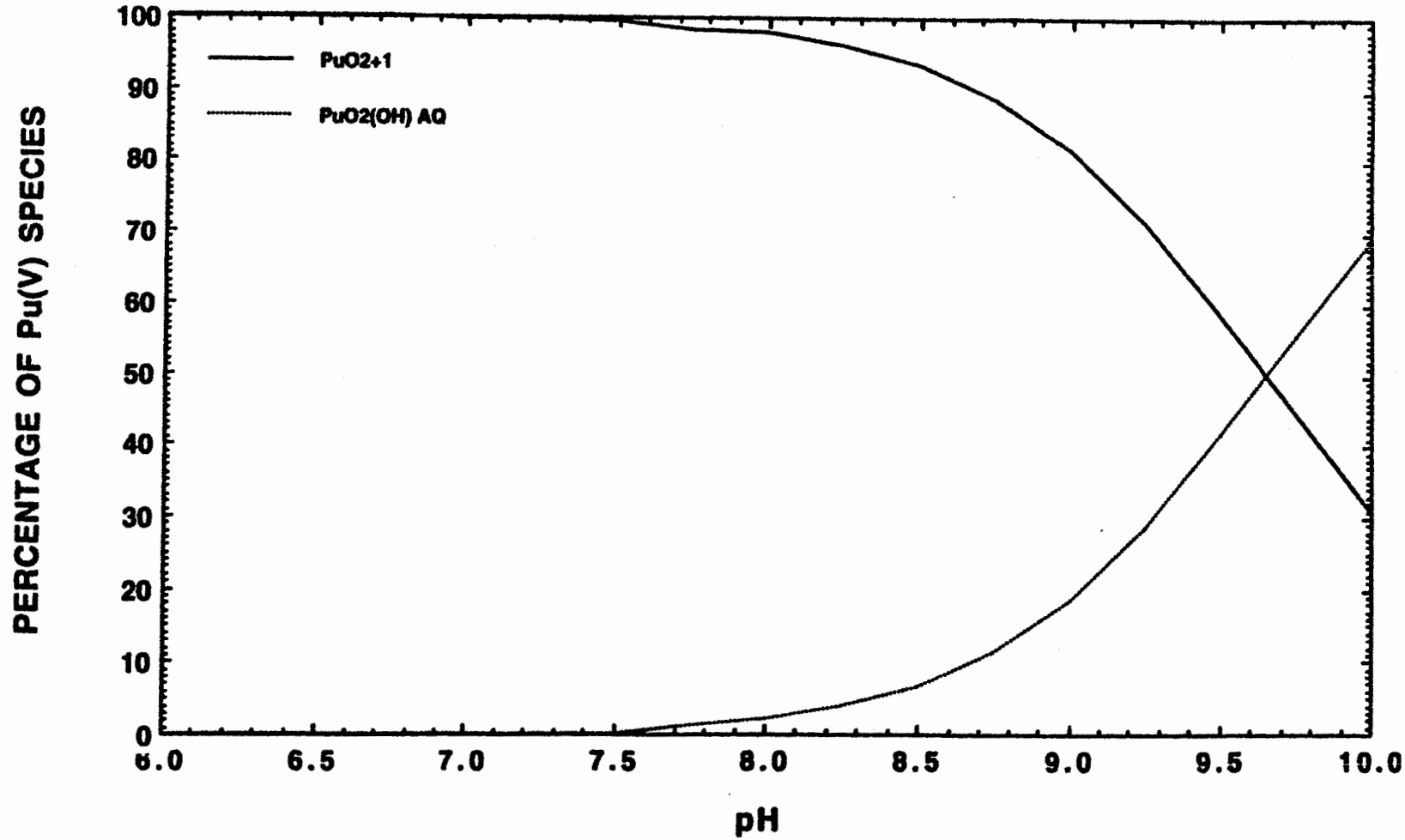


FIGURE 5. RESULTS OF SPECIATION CALCULATIONS FOR WATER CANYON GALLERY WATER USING MINTEQA2, LOS ALAMOS, NEW MEXICO. LOG U(VI) = -5.44 M AND LOG CO3-2 = -3.07 M AT 25C.

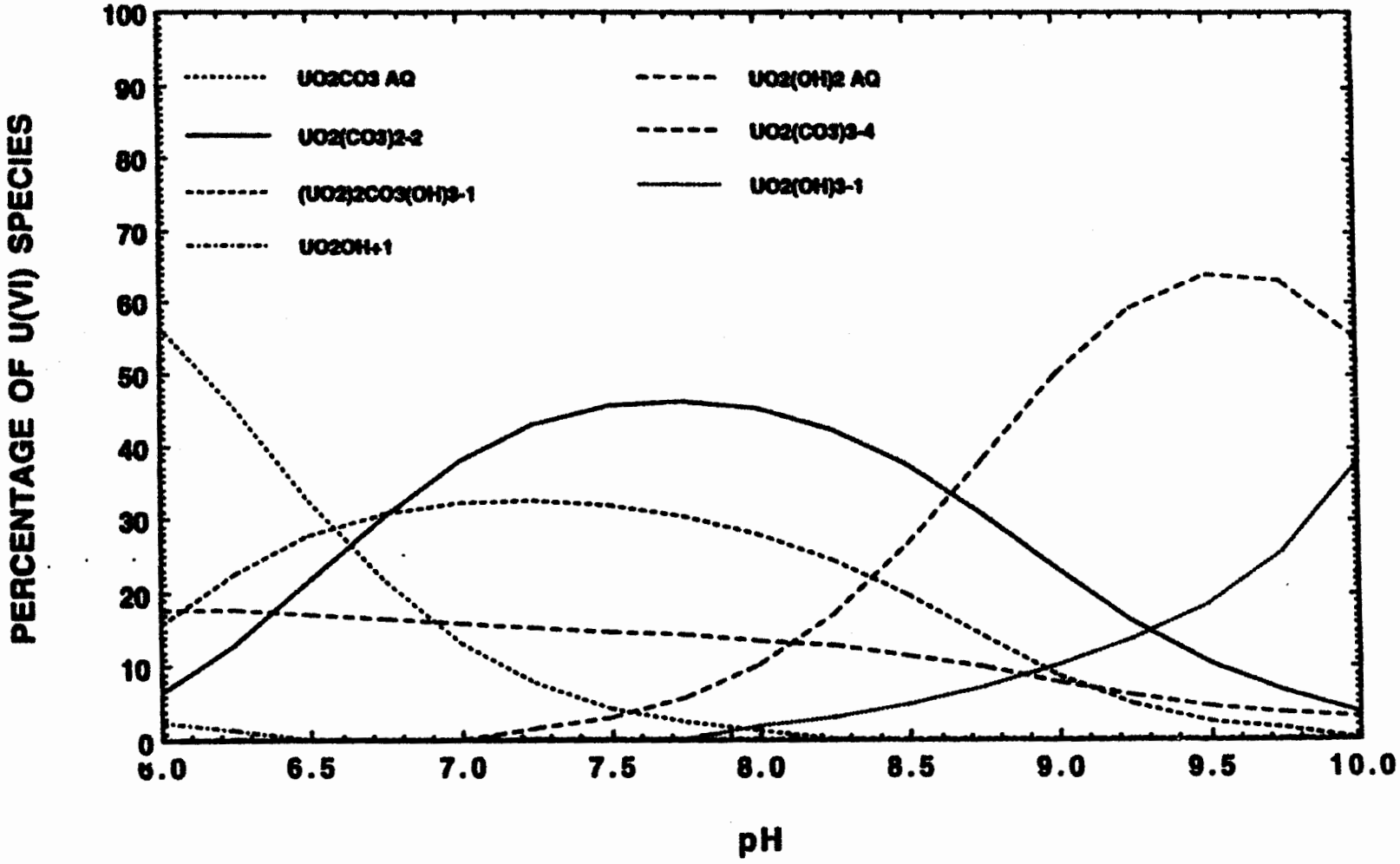


FIGURE 6. MINERALOGY OF CORE HOLE 1107, TA-54, LOS ALAMOS NATIONAL LABORATORY, NEW MEXICO.

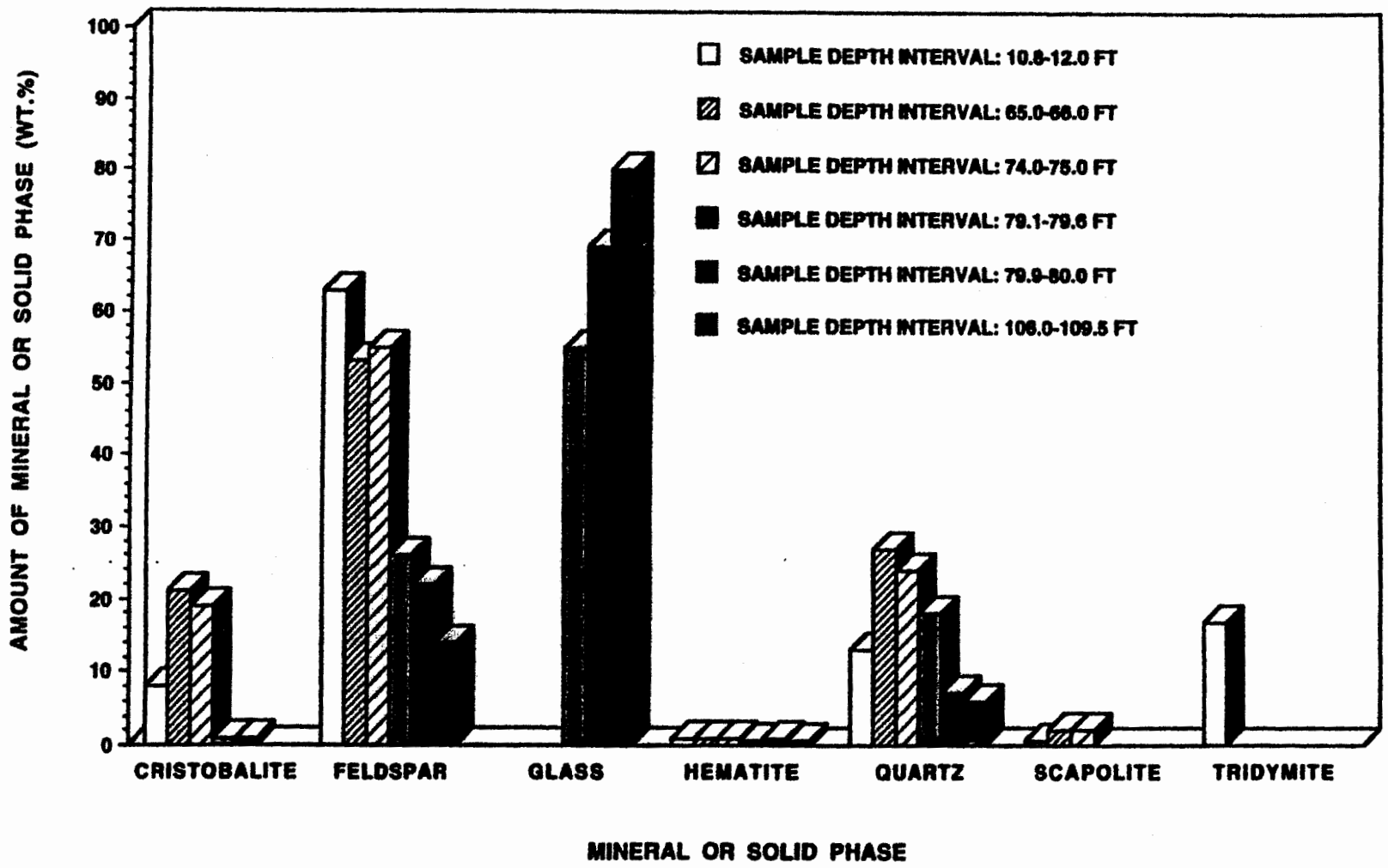
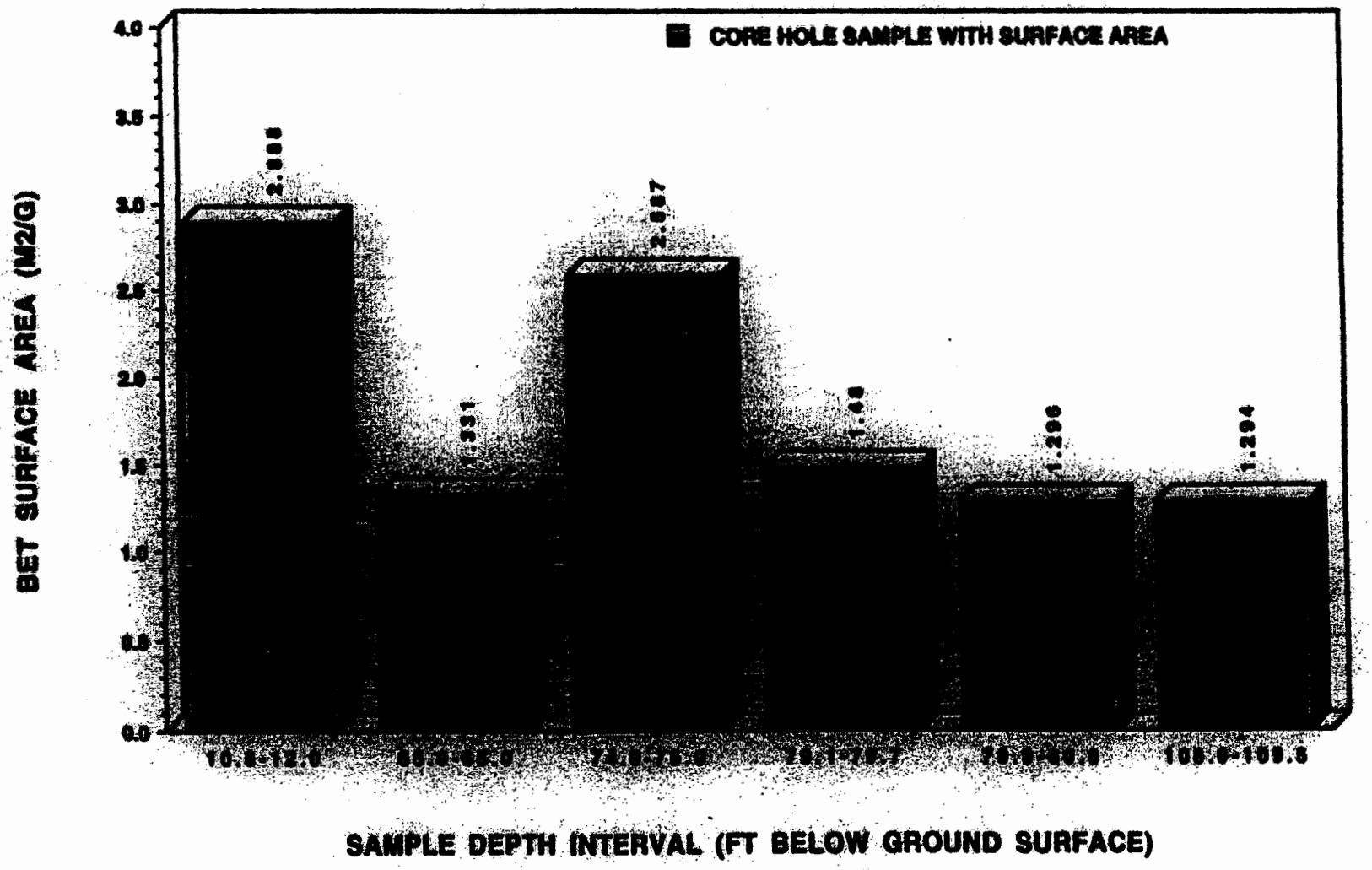


FIGURE 7. SURFACE AREA OF BANDELIER TUFF IN CORE HOLE 1107, MDA-G, TA-54, LOS ALAMOS NATIONAL LABORATORY, NEW MEXICO.



Bandelier Tuff is not possible with existing characterization data. Overall, the bulk surface area of the Bandelier Tuff is small (< 3 m^2/g) relative to specific surface areas of sorptive minerals or solid phases such as amorphous $Fe(OH)_3$ ($600m^2/g$)(Dzombak and Morel, 1990). Sorption of the radionuclides is in part controlled by the distribution of trace amounts of the highly sorptive phases (smectite, kaolinite, calcite, hematite, $Fe(OH)_3$) disseminated in the Bandelier Tuff. Increasing glass content of unit 1g does not contribute to increasing bulk surface area of the tuff (Figures 6 and 7).

Major and Minor Oxide Chemistry of the Bandelier Tuff

Major and minor oxide chemistry of the Bandelier Tuff (core hole 1107) is provided in Figure 8. The Bandelier Tuff is enriched in SiO_2, with values ranging from 72.00 to 74.89 weight percent (wt.%). The dominant silica phases present in the tuff include quartz, glass, cristobalite, and tridymite. The next most abundant oxide, Al_2O_3 ranges in concentration from 12.27 to 13.04 wt.%. Aluminum is a major structural constituent of alkali feldspars, smectite, kaolinite and amorphous $Al(OH)_3$ (Broxton et al., 1995). Concentration ranges of Fe_2O_3 and FeO in the tuff samples are 1.01 to 1.73 wt.% and 0.045 to 1.46 wt.%, respectively (Figures 8 and 9). The iron oxides Fe_2O_3 and FeO are representative of minor amounts of hematite (Fe_2O_3) and magnetite (Fe_3O_4). Hematite, however, is more abundant than magnetite in the Bandelier Tuff (Broxton et al., 1995). Magnetite increases in abundance below a depth of 79 ft bgs (increase in FeO concentration) in core hole 1107, which corresponds to the interface of lower unit 1g and upper unit 1v (Figure 9). Hematite is the dominant iron-rich phase within units 1v and 2 (Broxton et al., 1995). Abundances of CaO are generally less than 0.40 wt.% over most of the depth intervals sampled in core hole 1107 (Figure 9). Concentrations of CaO, however, increase to 2.48 wt.% in the depth interval 10.8-12.0 ft bgs within unit 2 of the Bandelier Tuff. This depth interval is also characterized by increasing concentrations of $H_2O(+)$ and CO_2, which suggest that calcite may be present in trace amounts (Figure 9). Broxton et al. (1995) report the occurrence of calcite in unit 2 within core samples drilled at TA-21, 1.5 miles northwest of TA-54. Calcite has a high sorptive capacity of Np (Triay et al., 1996) and other actinides.

Batch Sorption Experiments

The sorption of $^{243}Am(III)$, $^{237}Np(V)$, $^{239}Pu(V)$, $^{95m}Tc(VII)$, and $^{233}U(VI)$ on Bandelier Tuff samples was investigated and results of batch experiments (data set 1) are summarized in Table 3. All sorption data (data set 1) are tabulated in Appendix B. The distribution coefficients for the radionuclides (data set 1) are used to model transport under saturated-flow conditions beneath the disposal

FIGURE 8. OXIDE CHEMISTRY OF CORE HOLE 1107, MDA-G, TA-54, LOS ALAMOS NATIONAL LABORATORY, NEW MEXICO.

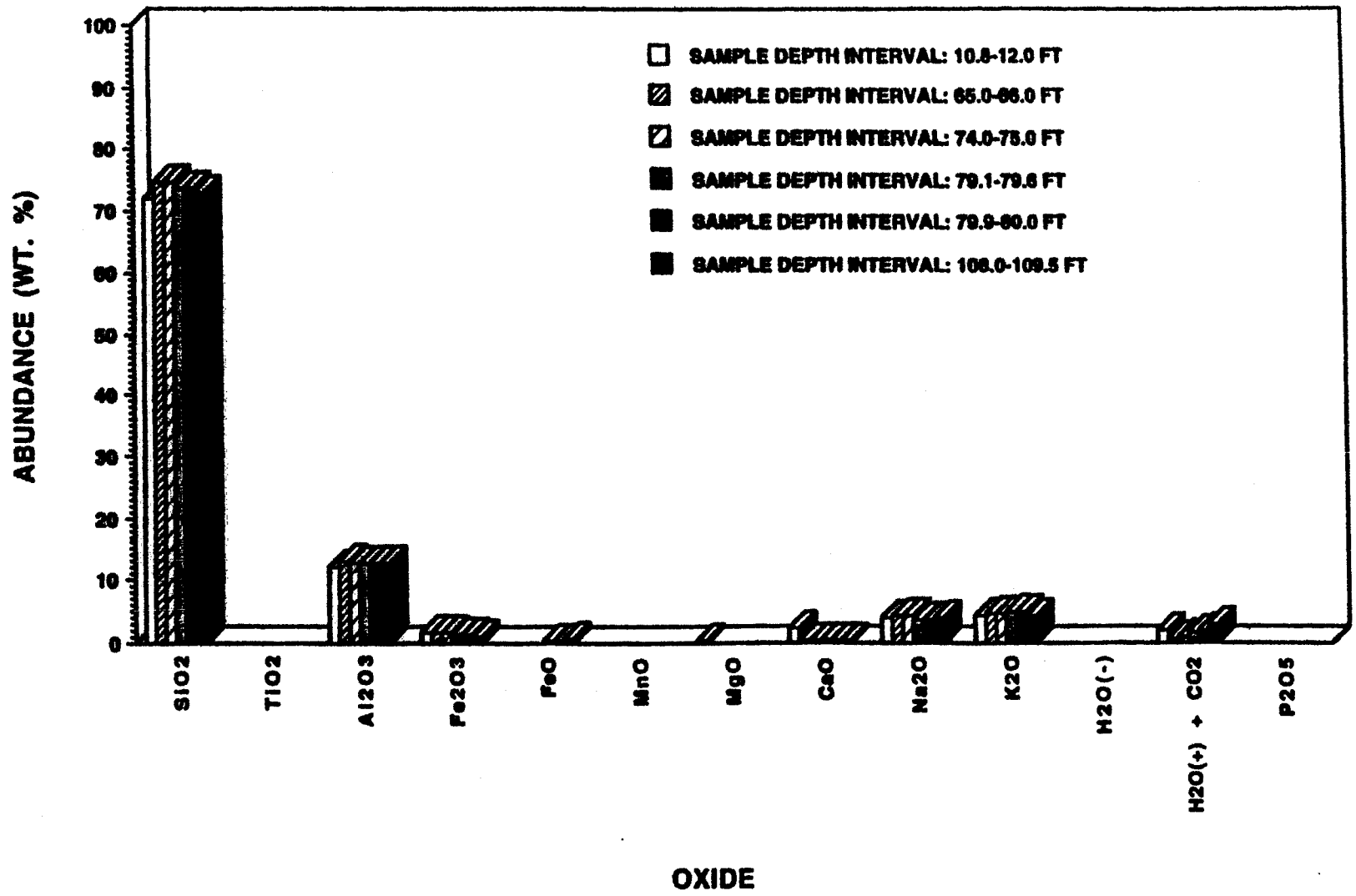


FIGURE 9. OXIDE CHEMISTRY OF CORE HOLE 1107, MDA-G, TA-54, LOS ALAMOS NATIONAL LABORATORY, NEW MEXICO.

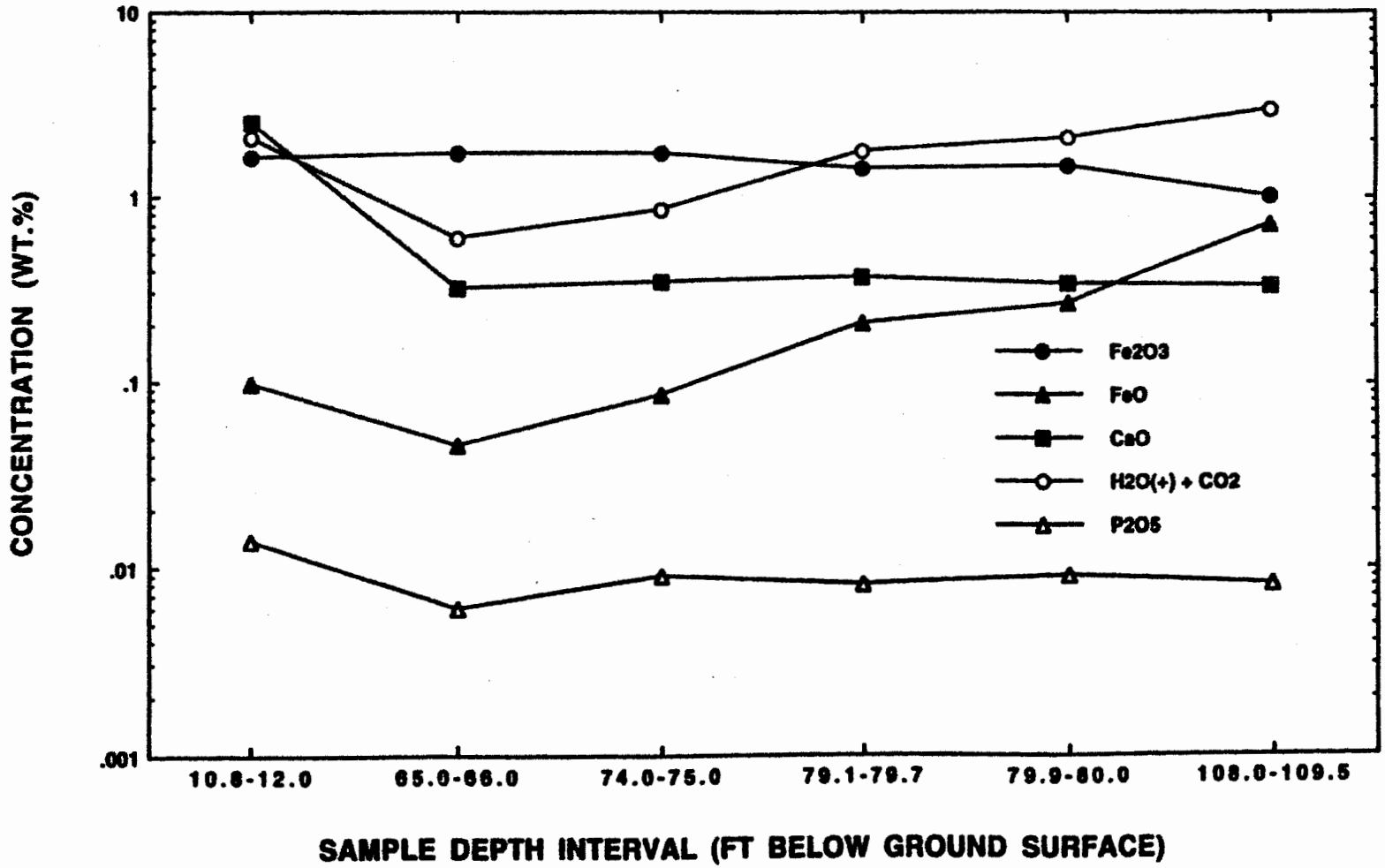


Table 3. Summary of Statistical Parameters for Distribution Coefficients (K_d) (mL/g) for the Bandelier Tuff (Core Hole 1107) using Water Canyon Gallery Groundwater (Data Set 1), Material Disposal Area G, Technical Area 54, Los Alamos National Laboratory, Los Alamos, New Mexico.

Statistic	Am-243	Np-237	Pu-239	U-233
Mean	144	0.253	20.41	5.14
Median	141	0.151	13.95	4.85
Stand. Dev.	13	0.239	18.78	2.98
Skewness	0.30	1.57	2.60	0.10
Minimum	122	0.082	7.64	1.33
Maximum	164	0.525	74.60	9.19
Sample No.	12	3	12	12

The pH of Water Canyon Gallery groundwater after sorption = 7.3 at 25 C. Sample depth intervals are 65.0-66.0 ft, 74.0-75.0 ft, 79.1-79.7 ft, 79.9-80.0 ft, 91.0-91.5 ft, and 108.5-109.0 ft BGS. Two rock samples from each depth interval were used in the sorption experiments. For ^{237}Np, nine sorption experiments yielded negative K_d values because of the low distribution coefficients for this radionuclide.

pits at MDA-G. Sample depth intervals listed in Table 3 include 65.0-66.0 ft, 74.0-75.0 ft, 79.1-79.7 ft, 79.9-80.0 ft, 91.0-91.5 ft, and 108.0-109.5 ft. The distribution coefficients measured on the Bandelier Tuff samples decrease in the following order: Am(III) >> Pu(V) > U(VI) >> Np(V) > Tc(VII). The distribution coefficients for Tc(VII) are all negative (Appendix B) and therefore, they are assumed to be zero. The distribution coefficients for the other radionuclides do not exhibit normal statistical distributions. This is based on differences between the mean and median values and a positive skewness characteristic of a right-sided distribution tail (Table 3). The average distribution coefficients (two sorption experiments per sample interval) for the different radionuclides, excluding Tc, are shown in Figure 10.

The distribution coefficients (data set 2) for the different radionuclides, using the Bandelier Tuff sample collected from the depth interval 10.8 to 12.0 ft bgs, are used to model transport under unsaturated-flow conditions within the disposal pits at MDA-G. The Bandelier Tuff, within the depth interval of 10.8-12.0 ft bgs, is used as pit fill material at MDA-G. Average distribution coefficients (two sorption experiments per sample) for Am(III), Np(V), Pu(V), and U(VI) measured on the tuff sample are 2050 mL/g, 7.5 mL/g, 711 mL/g, and 2.61 mL/g, respectively. The ranges in distribution coefficients for Am(III), Np(V), Pu(V), and U(VI) are 1550 to 2550 mL/g, 7.01 to 7.98 mL/g, 649 to 772 mL/g, and 1.43 to 3.78 mL/g, respectively (Figure 11). The distribution coefficients for Tc(VII) were negative and therefore, are assumed to be zero.

The distribution coefficients for Am(III), Np(V), and Pu(V), within sample depth interval 10.8-12.0 ft bgs, are larger than the distribution coefficients for these radionuclides at greater depths. This increase in the sorptive capacity of the Bandelier Tuff for Am(III), Np(V), and Pu(V) could be due to the presence of calcite, based on increasing concentrations of CaO and CO_2. This potential sorptive phase, however, was not quantified by XRD analysis. Distribution coefficients for U(VI), however, are smaller at this shallow depth interval relative to deeper sample intervals. Uranium is predicted to be stable as $UO_2(CO_3)_2^{2-}$ and this complex desorbs from ferric oxyhydroxide in equilibrium with solutions having a total carbonate concentration greater than 10^{-2} M (Hsi and Langmuir, 1985) at pH values greater than 6.

Figure 12 shows depth versus the distribution coefficients for ^{243}Am, ^{239}Pu, and ^{233}U and the BET surface area for the Bandelier Tuff (core hole 1107). The BET surface-area data correlate with the distribution coefficients for ^{243}Am and ^{239}Pu. The correlation, however, is not so obvious between ^{233}U and the BET surface area. Surface areas larger than 2 m^2/g may represent disseminated amorphous $Fe(OH)_3$, hematite, smectite, kaolinite, and calcite. Positive

FIGURE 10. AVERAGE DISTRIBUTION COEFFICIENT DATA FOR THE BANDELIER TUFF, TA-54, LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO.

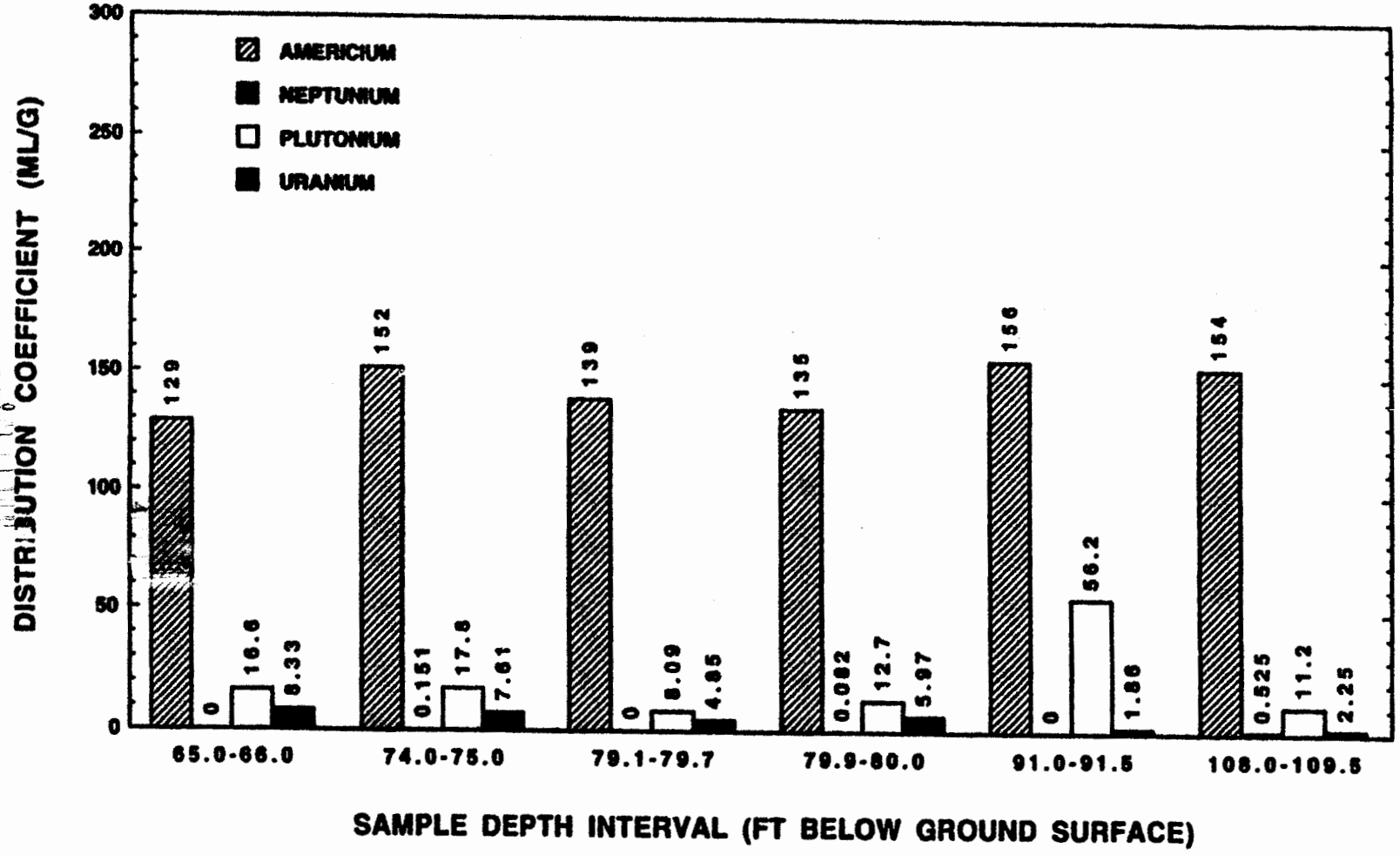


FIGURE 11. AVERAGE DISTRIBUTION COEFFICIENT DATA FOR THE BANDELIER TUFF, TA-54, LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO.

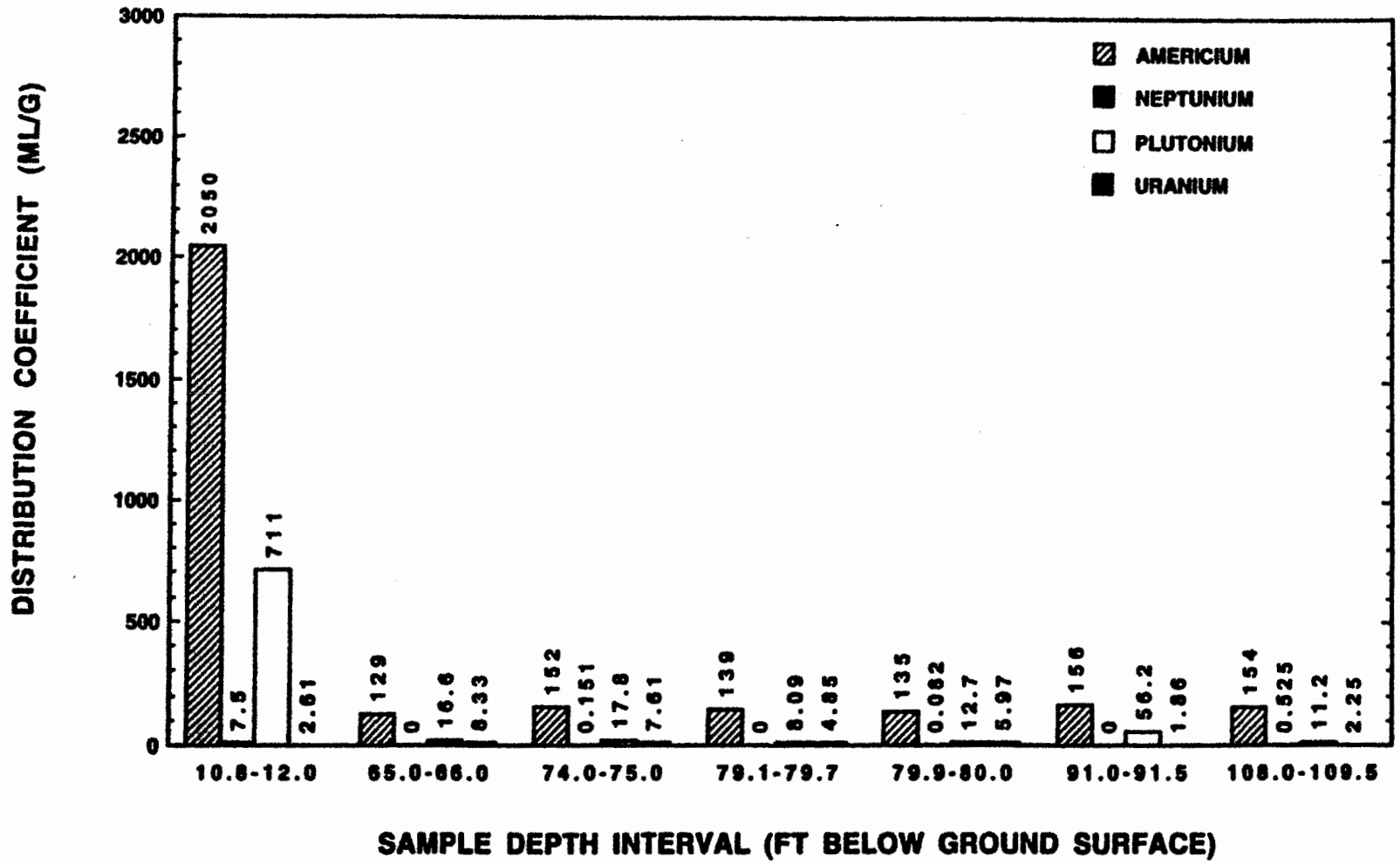
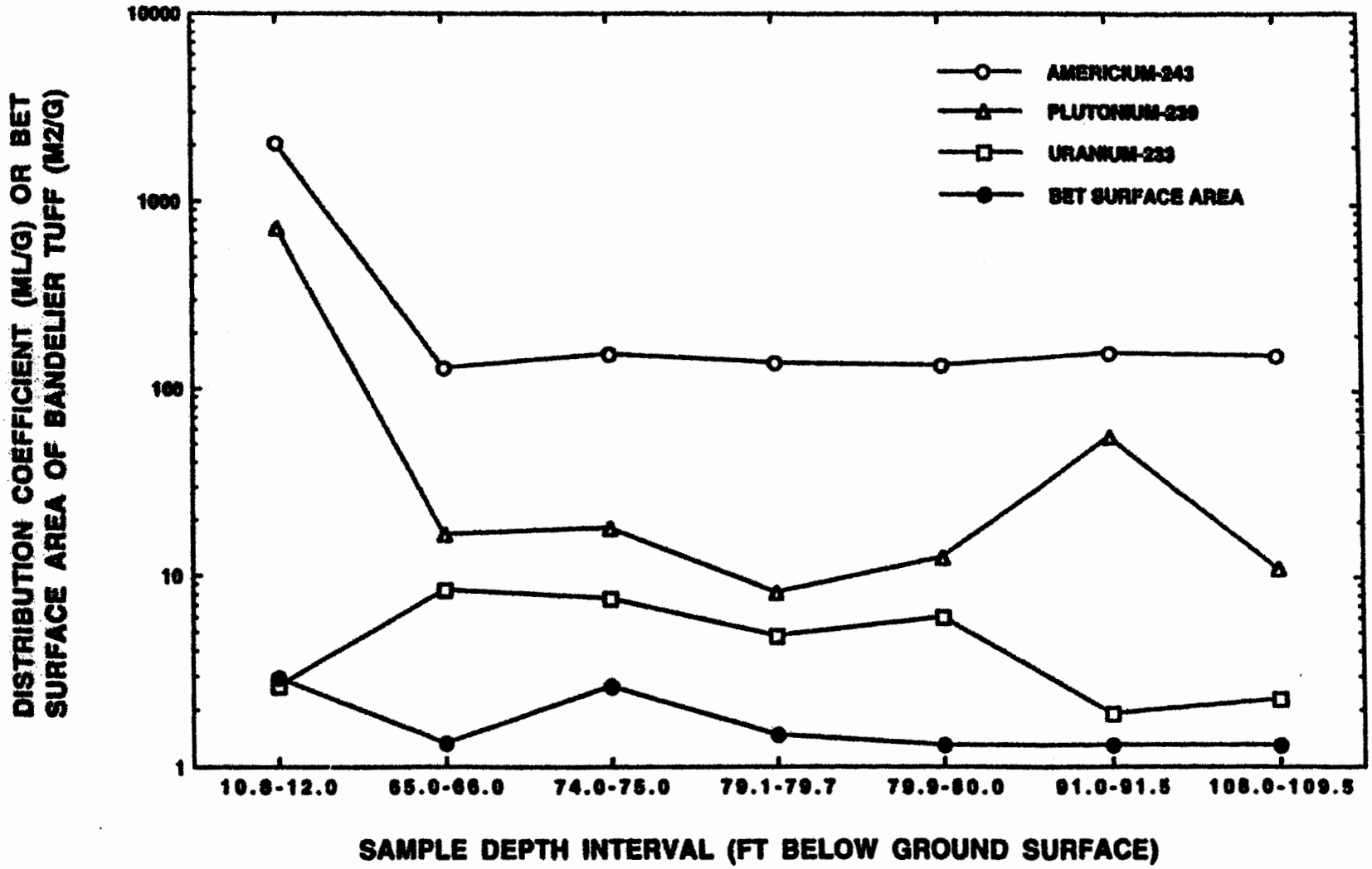


FIGURE 1. AVERAGE DISTRIBUTION COEFFICIENTS AND SURFACE AREA OF THE BANDELIER TUFF (CORE HOLE 1107), MDA-G, TA-54, LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO.



identification of these phases by XRD analysis, excluding hematite, has not been established in core hole 1107.

Figure 13 shows depth versus distribution coefficients for ^{243}Am, ^{239}Pu, and ^{233}U and oxide contents of the Bandelier Tuff (core hole 1107). Variation in abundances of FeO, CaO, and $H_2O(+) + CO_2$ generally correlate with the distribution coefficients for ^{243}Am and ^{239}Pu. This correlation, however, is reversed between the ^{233}U distribution coefficient and $H_2O(+) + CO_2$ content, which is consistent with experimental observations made by other researchers in that carbonate complexing of dissolved U decreases the distribution coefficient for this element (Triay et al., 1994; Hsi and Langmuir, 1985). The complex, $UO_2(CO_3)^{2-}$ is predicted to dominant between pH values 6.7 and 8.7 in WCG groundwater at an U(VI) concentration of $10^{-5.44}$ M (Figure 5).

Pore Water Chemistry of the Bandelier Tuff

Pore water was extracted from three core samples from core hole 1107 using an Unsaturated/Saturated Flow Apparatus (UFA) (Conca and Wright, 1995). This pore water is residual water trapped within pore spaces of the Bandelier Tuff within the vadose zone. The UFA is a new method, based on centrifugation, to obtain direct measurements of transport parameters for porous media and different fluids (Conca and Wright, 1995). The volumetric moisture content of the poorly indurated samples was less than 8%. Two more pore water samples were extracted from core holes 1121 (at 35 ft bgs) and1123 (at 59 ft bgs). The unconsolidated core samples were rotated at 10,000 rpm at a centrifugal force of 11,692 g for several days. The volume of pore water extracted from the core samples ranged from 1.5 to 6.0 mL. The solutions were diluted with ultrapure, double deionized water under controlled atmosphere conditions (argon gas) in glove boxes. The pH of each solution was then measured. The diluted samples were then analyzed from major cations and anions and trace elements. All pore-water chemistry data are provided in Appendix C.

Variation in pore-water chemistry of three core samples (1107) versus depth are shown in Figures 14 and 15. Overall, the pore water extracted from the Bandelier Tuff is characterized by a sodium-carbonate-bicarbonate solution. The pH of the pore-water samples ranges from 9.2 to 9.8, which is much more alkaline than the WCG groundwater (pH = 7.3). Accordingly, carbonate and bicarbonate concentrations are much higher in the pore waters relative to WCG groundwater. These two solutes increase in concentration with depth (Figure 14). Chloride and sulfate concentrations are also much higher in the pore-water samples relative to WCG groundwater and both of these solutes vary with depth in core hole 1107. Anion concentrations in the pore water generally decrease in the following order: chloride = bicarbonate > sulfate > carbonate >

FIGURE 13. AVERAGE DISTRIBUTION COEFFICIENTS AND OXIDE CONTRATIONS IN BANDELIER TUFF (CORE HOLE 1107), TA-54, LOS ALAMOS, NEW MEXICO.

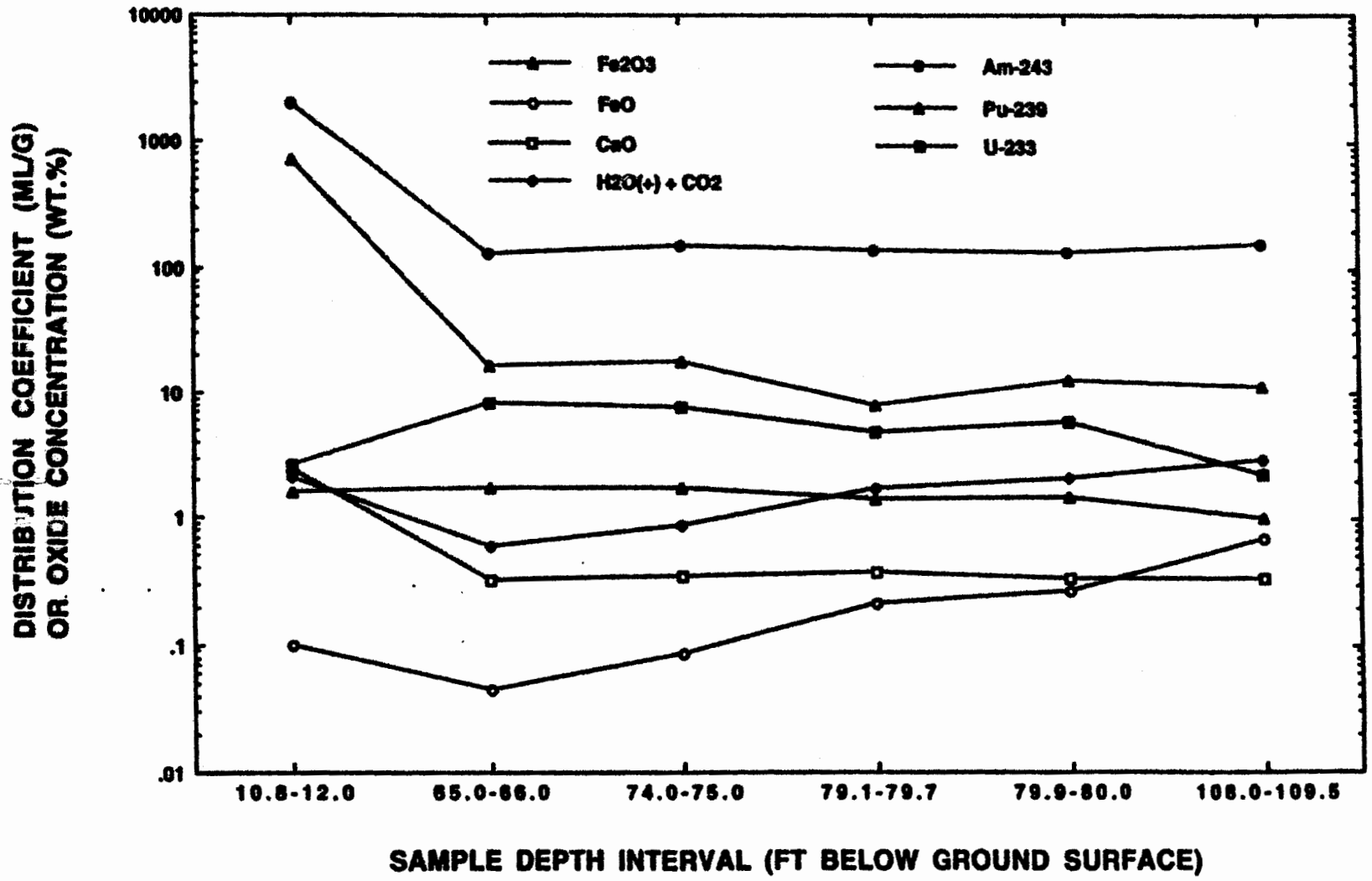


FIGURE 14. SOLUTE AND pH DISTRIBUTIONS WITHIN PORE WATER EXTRACTED FROM BANDELIER TUFF AT TA-54 (CORE HOLE 1107).

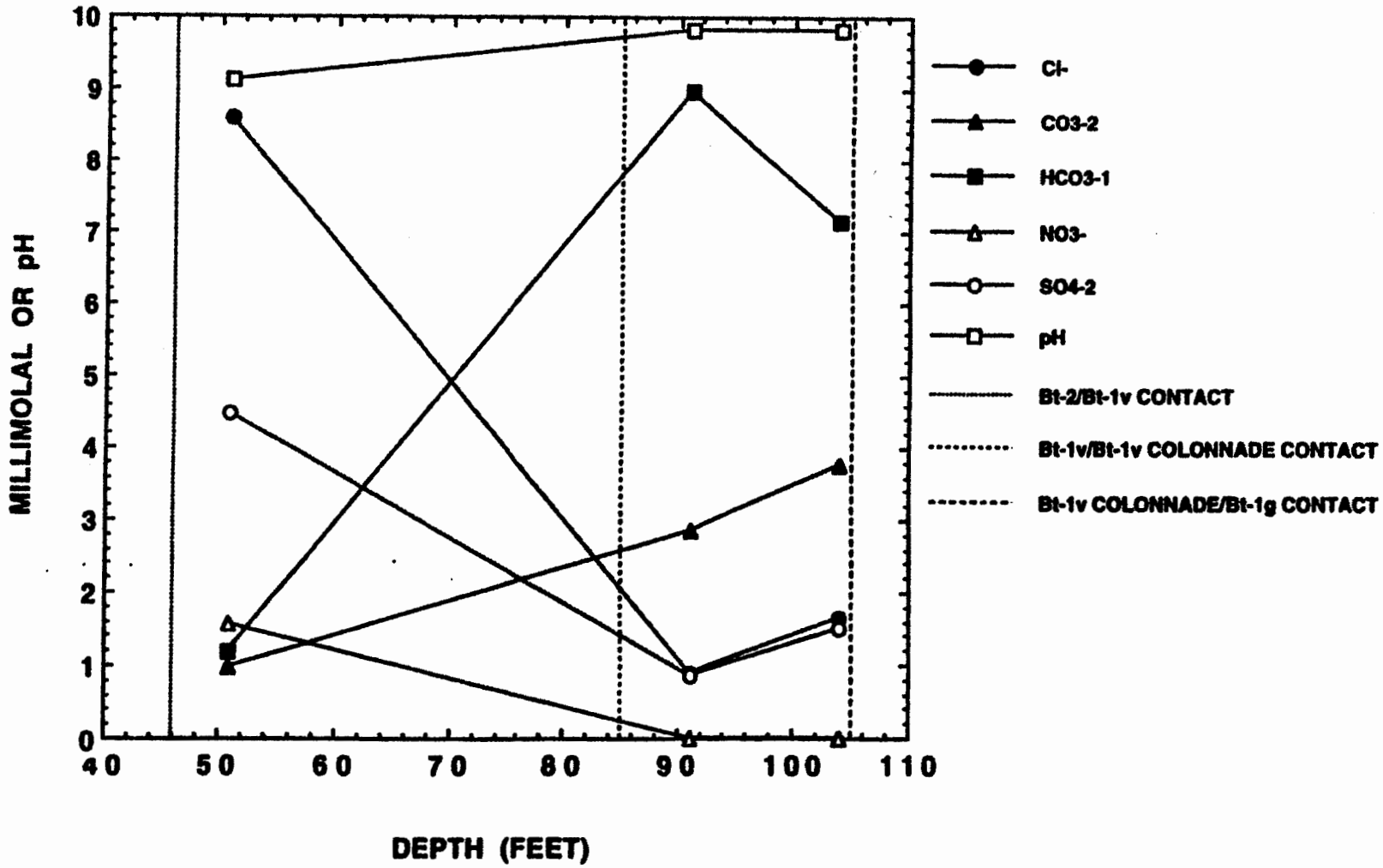
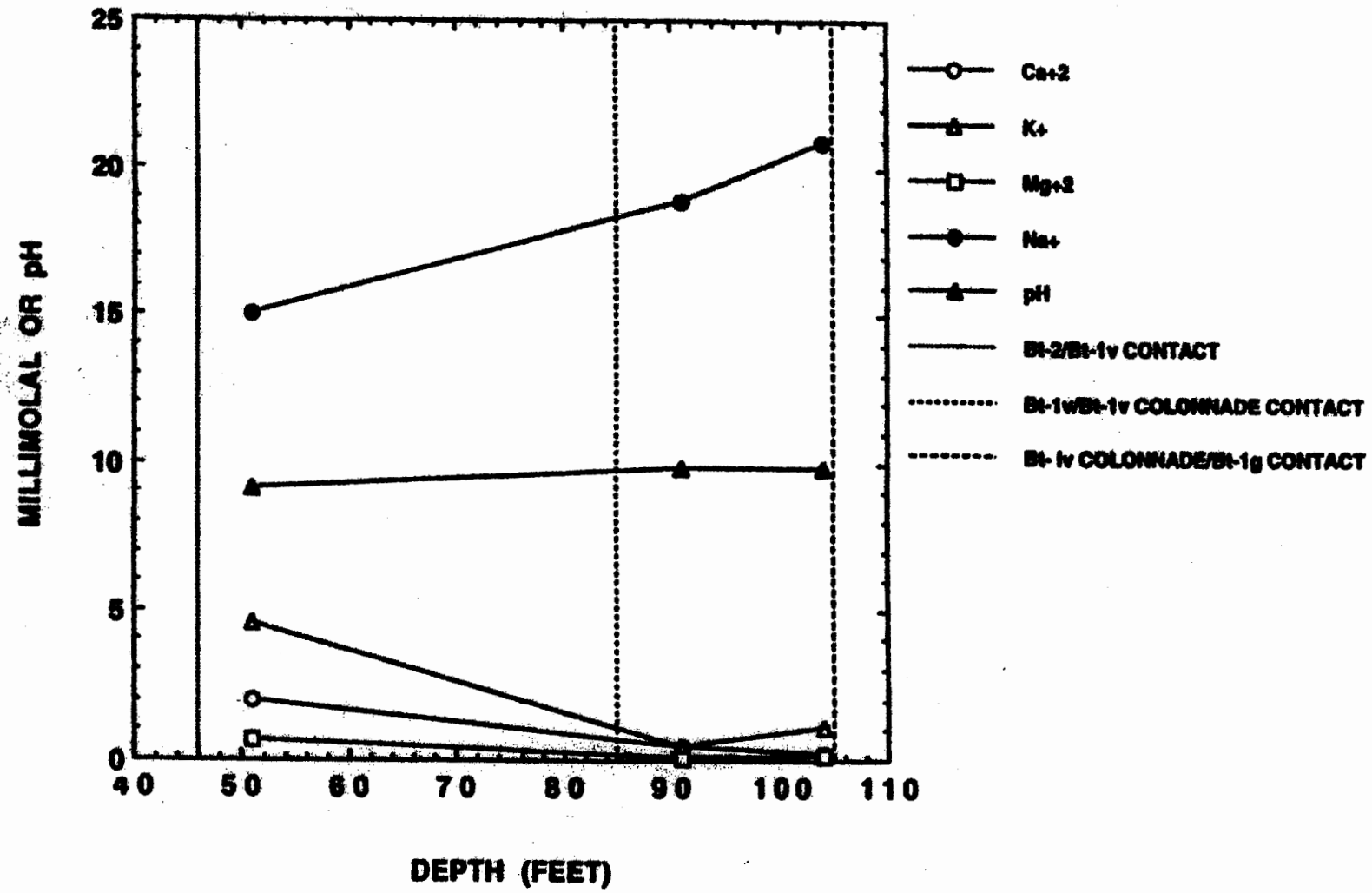


FIGURE 15. SOLUTE AND pH DISTRIBUTIONS WITHIN PORE WATER EXTRACTED FROM BANDELIER TUFF AT TA-54 (CORE HOLE 1107).



nitrate. Sodium is the most abundant cation in the pore-water samples and concentrations of this cation increase with depth. Concentrations of calcium, magnesium, and potassium are much lower than sodium and they decrease in concentration with depth (Figure 15). Cation concentrations in the pore water generally decrease in the following order: sodium >> potassium > calcium > magnesium.

Mineral-saturation index calculations were performed using the computer code, MINTEQA2 (Allison et al., 1991) on pore water extracted from core hole 1107 at 91 ft depth. The pH of this pore-water sample is 9.8 and the total carbonate (HCO_3^- plus CO_3^{2-}) is 718 ppm ($10^{-1.93}$ M as CO_3^{2-}). The extracted pore water is predicted to be oversaturated with respect to the mineral calcite (SI value for calcite = +1.718). Calcite was not observed by XRD analysis, however, this mineral could occur as surface coatings present at concentrations less than 1 wt.%.

The pore-water chemistry of core hole 1107 suggests that evaporation is an important process for concentrating dissolved species within the vadose zone of the Bandelier Tuff. Stable isotope and chloride leaching data collected at TA-54 (Newman, 1996) also suggest evaporation is an important process that occurs within the mesa. Vaniman and Chipera (1995) report the occurrence of evaporite minerals such as gypsum ($CaSO_4 \cdot 2H_2O$) and halite (NaCl) within fractures at TA-69. The chemical evolution of the pore water is also controlled by the low hydraulic flux, which allows for long residence times (mass of solute/flux of solute) of solutes within the Bandelier Tuff. Under ambient moisture conditions in the Bandelier Tuff, precipitation of sorptive phases, such as calcite and amorphous $Fe(OH)_3$ with high surface areas, is enhanced. These phases have been observed in fracture fill material across the Laboratory (Davenport, 1993; Longmire et al., 1995). Iron, in the forms of amorphous $Fe(OH)_3$ and hematite, and aluminum, concentrated within smectite, kaolinite, and possibly amorphous $Al(OH)_3$, are also elevated within the fracture fill material relative to the Bandelier Tuff at TA-46 (Longmire et al., 1995). Longmire et al. (1995) showed that naturally occurring trace elements (As, Be, Mn, and U) are concentrated within fracture fill material at TA-46, which is consistent with adsorption or possibly coprecipitation being an effective process for removing trace metals from solution.

Batch Sorption Experiments Using Synthetic Bandelier Tuff Pore Water

A synthetic pore water, based on the general composition of the pore water extracted from the Bandelier Tuff using the UFA, was prepared for the batch-

sorption experiments to quantify the mobility of selected radionuclides within the vadose zone. The synthetic solution consisted of a mixture of equal volumes of $10^{-1.26}$ M Na_2CO_3 and $10^{-1.23}$ M $NaHCO_3$ at 25°C. The total carbonate in the synthetic pore-water solution ($10^{-0.94}$ M) is greater than that measured in the extracted pore water ($10^{-1.93}$ M) to achieve a pH value of 9.8. pH is considered to be the master variable controlling sorption of radionuclides on Bandelier Tuff under vadose zone conditions. This variable, in addition to total carbonate, controls the speciation of the adsorbate and the solubility of the solid phase(s) containing the radionuclide of interest. The synthetic solution had an initial pH value of 10.3, which is slightly higher than the pH values (9.2-9.9) measured in the extracted solutions. At the conclusion of the batch-sorption experiments, the pH decreased to 9.8. The experiments were conducted under atmospheric conditions, with sealed sorption vessels, to maintain the alkaline pH conditions characteristic of the pore water within vadose zone.

Results of $^{241}Am(III)$, $^{237}Np(V)$, $^{239}Pu(V)$, $^{95m}Tc(VII)$, and $^{233}U(VI)$ sorption experiments, using the synthetic pore water, are summarized in Table 4. All sorption data are tabulated in Appendix D. Samples collected from depth intervals 10.8-12.0 ft, 65.0-66.0 ft, 74.0-75.0 ft, 79.1-79.7 ft, 79.9-80.0 ft, 91.0-91.5 ft, and 108.0-19.5 ft were used in the sorption experiments. The distribution coefficients measured on the tuff samples with the synthetic pore water decrease in the following order: Am(III) >> Pu(V) > U(VI) > Np(V). The distribution coefficients for Tc are all negative (Appendix D) and therefore, they are assumed to be zero. The distribution coefficients do not exhibit normal statistical distributions based on differences between the mean and median values. In addition, a positive skewness is characteristic of the right-sided distribution tails for $^{241}Am(III)$ and $^{239}Pu(V)$, whereas and a negative skewness is characteristic of the left-sided distribution tails for $^{237}Np(V)$ and $^{233}U(V)$ (Table 4). The average distribution coefficients (two sorption experiments per sample interval) for the different radionuclides, excluding $^{95m}Tc(VII)$, are shown in Figure 16. The distribution coefficients for $^{241}Am(III)$ and $^{239}Np(V)$ using synthetic pore water are larger than the distribution coefficients for these two radionuclides using WCG groundwater (Tables 3 and 4).

Results of speciation calculations for the synthetic pore-water solution, at a pH value equal to 9.8 using MINTEQA2, are shown in Figures 17 and 18. Based on the model simulations, the dominant aqueous complexes of $^{241}Am(III)$ and $^{237}Np(V)$ are predicted to include $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$, respectively. The dominant dissolved complexes of $^{239}Pu(V)$ and $^{233}U(VI)$ are predicted to include PuO_2OH^0 and $UO_2(CO_3)_3^{4-}$, respectively. The complex PuO_2^{1+}, however, is present at 49%. The synthetic pore-water solution is predicted to be undersaturated with respect to $Am(OH)_3(s)$, $Am(OH)_3(am)$, $AmOHCO_3$,

Table 4. Summary of Statistical Parameters for Distribution Coefficients (K_d) (mL/g) for the Bandelier Tuff (Core Hole 1107) Using Synthetic Pore Water Solution (Data Set 3), Material Disposal Area G, Technical Area 54, Los Alamos National Laboratory, Los Alamos, New Mexico.

Statistic	Am-241	Np-237	Pu-239	U-233
Mean	7611	1.88	8.06	2.44
Median	2359	2.25	4.13	2.43
Stand. Dev.	9754	1.15	7.89	0.66
Skewness	1.03	-0.41	0.66	-0.14
Minimum	198	0.17	1.23	1.38
Maximum	27300	3.07	19.40	3.44
Sample No.	12	12	12	12

Sample depth intervals are 10.8-12.0 ft, 65.0-66.0 ft, 74.0-75.0 ft, 79.1-79.7 ft, 79.9-80.0 ft, 91.0-91.5 ft, and 108.5-109.0 ft BGS. Two rock samples from each depth interval were used in the sorption experiments. pH = 9.8 using synthetic Bandelier Tuff pore water based on unsaturated flow apparatus (UFA) extractions.

FIGURE 16. AVERAGE DISTRIBUTION COEFFICIENT DATA FOR BANDELIER TUFF (SYNTHETIC PORE WATER, pH = 9.8), TA-54, LOS ALAMOS NATIONAL LABORATORY, NEW MEXICO.

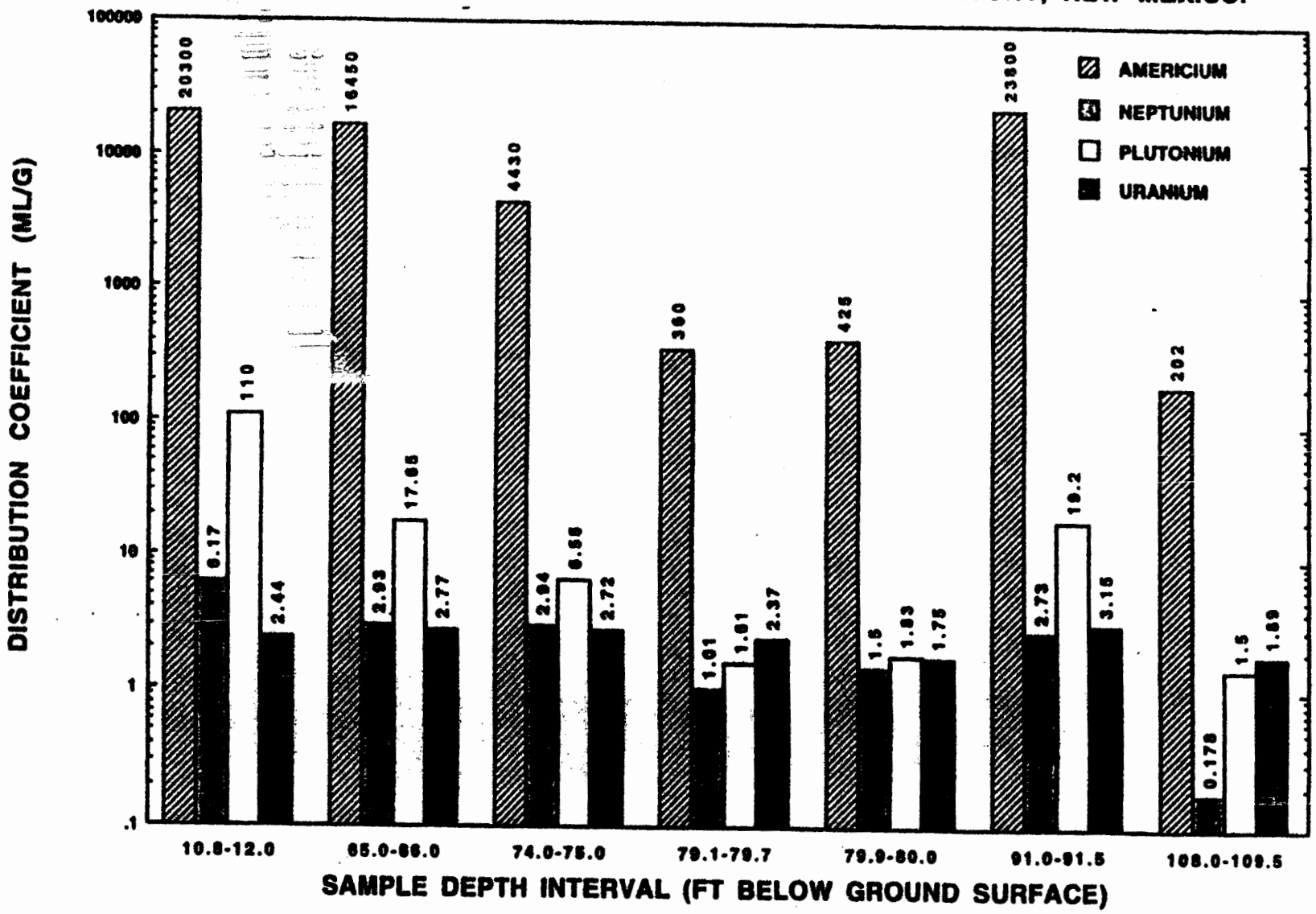


FIGURE 17. RESULTS OF SPECIATION CALCULATIONS USING MINTEQA2 FOR SYNTHETIC BANDELIER TUFF PORE WATER AT 25 C (LOG CO3-2 = -0.94 M, LOG Am(III) = -8.50 M, AND LOG Np(V) = -4.37 M).

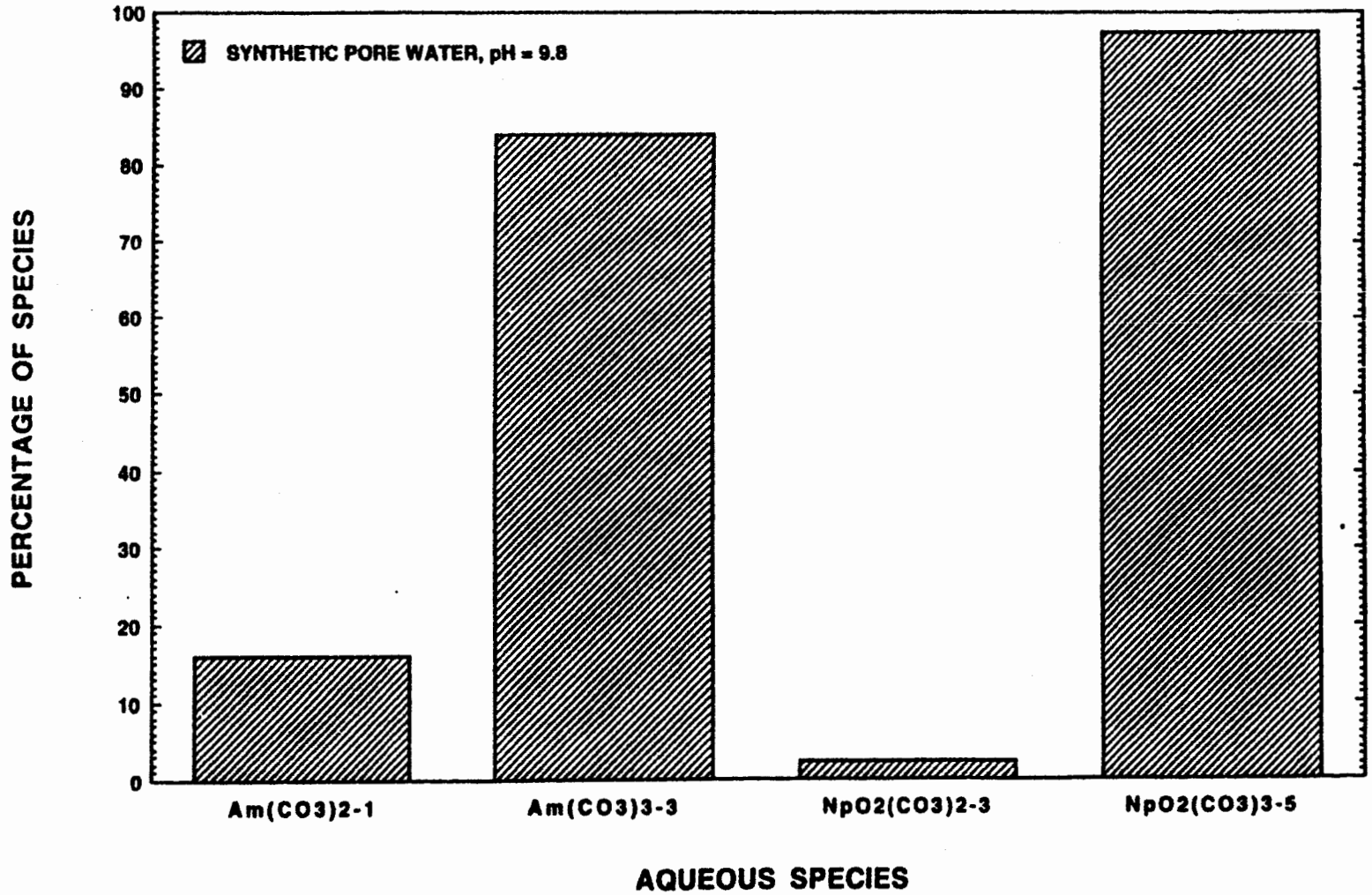
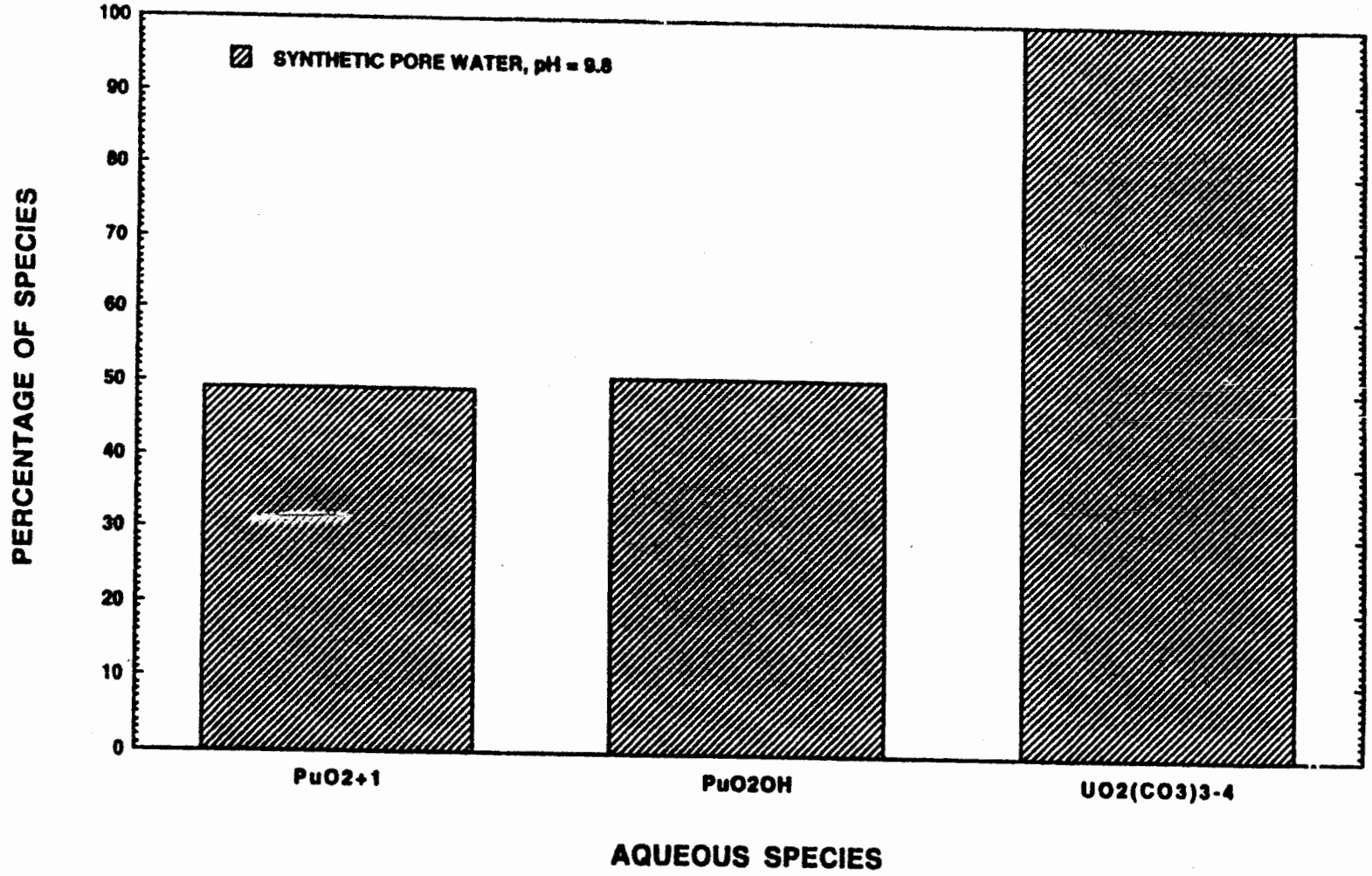


FIGURE 18. RESULTS OF SPECIATION CALCULATIONS USING MINTEQA2 FOR SYNTHETIC BANDELIER TUFF PORE WATER AT 25 C (LOG CO3-2 = -0.94 M, LOG Pu(V) = -6.53 M, AND LOG U(VI) = -5.45 M).



$NpO_2OH(am)$, $NpO_2OH(aged)$, $NaNpO_3 \cdot 3.5H_2O$, $NaNpCO_3$, $PuO_2OH(am)$, and $UO_2(OH)_2$ (Figures 19 and 20). Precipitation of these phases from the carbonate-rich solution is not likely from a thermochemical basis because of the strong complexing of Am(III), Np(V), and U(VI) with carbonate ligands.

Precipitation of calcite during the batch-sorption experiments using the synthetic pore water solution is possible. This solution containing $10^{-0.94}$ M total carbonate is predicted to be slightly oversaturated with respect to calcite (SI for calcite = +0.641), at Ca^{2+} concentrations equal to $10^{-4.60}$ M (1 ppm). Calcite has a strong affinity for sorbing Np(V) based on results of batch-sorption experiments conducted by Triay et al. (1996). Calcite, with a pH_{pzc} of 9.0 (saturated $CaCO_3$ solution with Log_{10} Ca = -4.4 M and Log_{10} PCO_2 = -3.5 atm) (Zachara et al., 1993), is characterized by a net-neutral surface charge at pH 9.0. As a comparison to the value provided by Zachara et al. (1993), Parks (1967) reports a pH_{zpc} value of 9.5 for calcite. Based on a net positive surface charge, calcite adsorbs anions at pH values below 9 or 9.5 and this phase can be an important adsorbent for anions in natural systems under near neutral to alkaline pH conditions. Conversely, the sorption of cationic metals on calcite is maximal above the pH_{pzc} for calcite (Zachara et al., 1993). At a pH value of 9.8, characteristic of pore water within the Bandelier Tuff, however, calcite contains a majority of negatively-charged surface sites consisting of O^{2-} (from dissociated surface H_2O), CO_3, and HCO_3. The positive charged surface sites on calcite consist of Ca and other substituted divalent metal cations.

Under the high alkalinity conditions (Log_{10} total CO_3^{2-} = -0.94 M) of the batch-sorption experiments, carbonate ligands attached to dissolved Am ($Am(CO_3)_3^{3-}$) and Np ($NpO_2(CO_3)_3^{5-}$) complexes may replace the CO_3 and HCO_3 surface sites on calcite through surface (ligand) exchange reactions. Sorption of Am(III) and Np(V) complexes directly onto calcite (as inner sphere complexes) at a pH value 9.8 under high carbonate conditions is possible based on geometries of the actinide(IV) and actinide(VI) carbonate species presented by Clark et al., (1994). The formation of bidentate surface complexes consisting of Am(III) and Np(V) carbonate adsorbates is consistent with the higher distribution coefficients measured for these two actinides using the synthetic pore water. The geometric configurations of the adsorbed $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$ complexes and their orientation on the adsorbing calcite surface have not been investigated as part of this study. An estimation based on the crystal radii of Am(III) and Np(V) carbonato ions, however, suggests that adsorbed $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$ complexes have cross sectional diameters larger than the cross sectional area of individual surface functional groups found on calcite consisting of CO_3 and HCO_3. It therefore seems likely that each adsorbed $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$ complex has exchanged more than one of its CO_3^{2-} ligands with

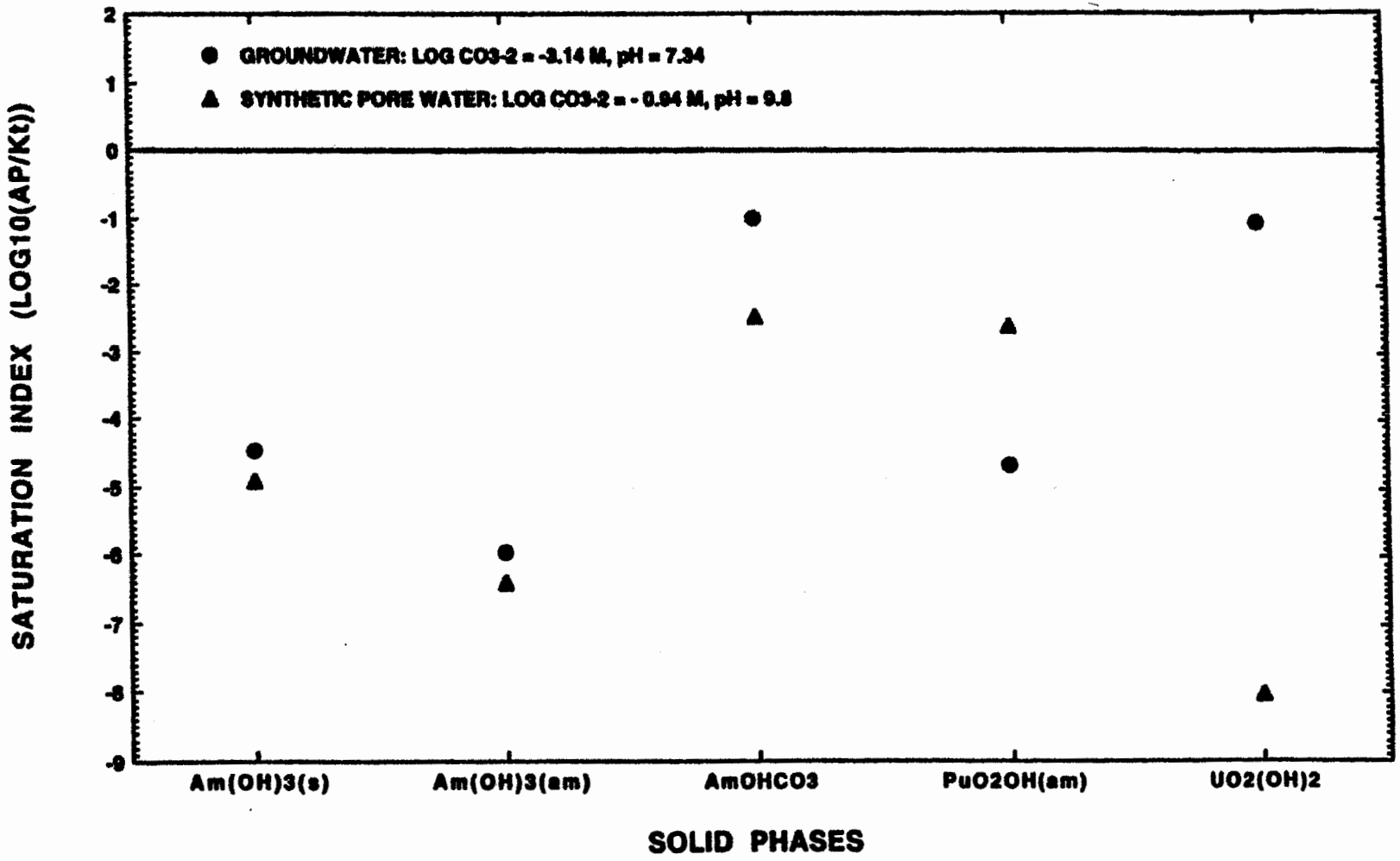
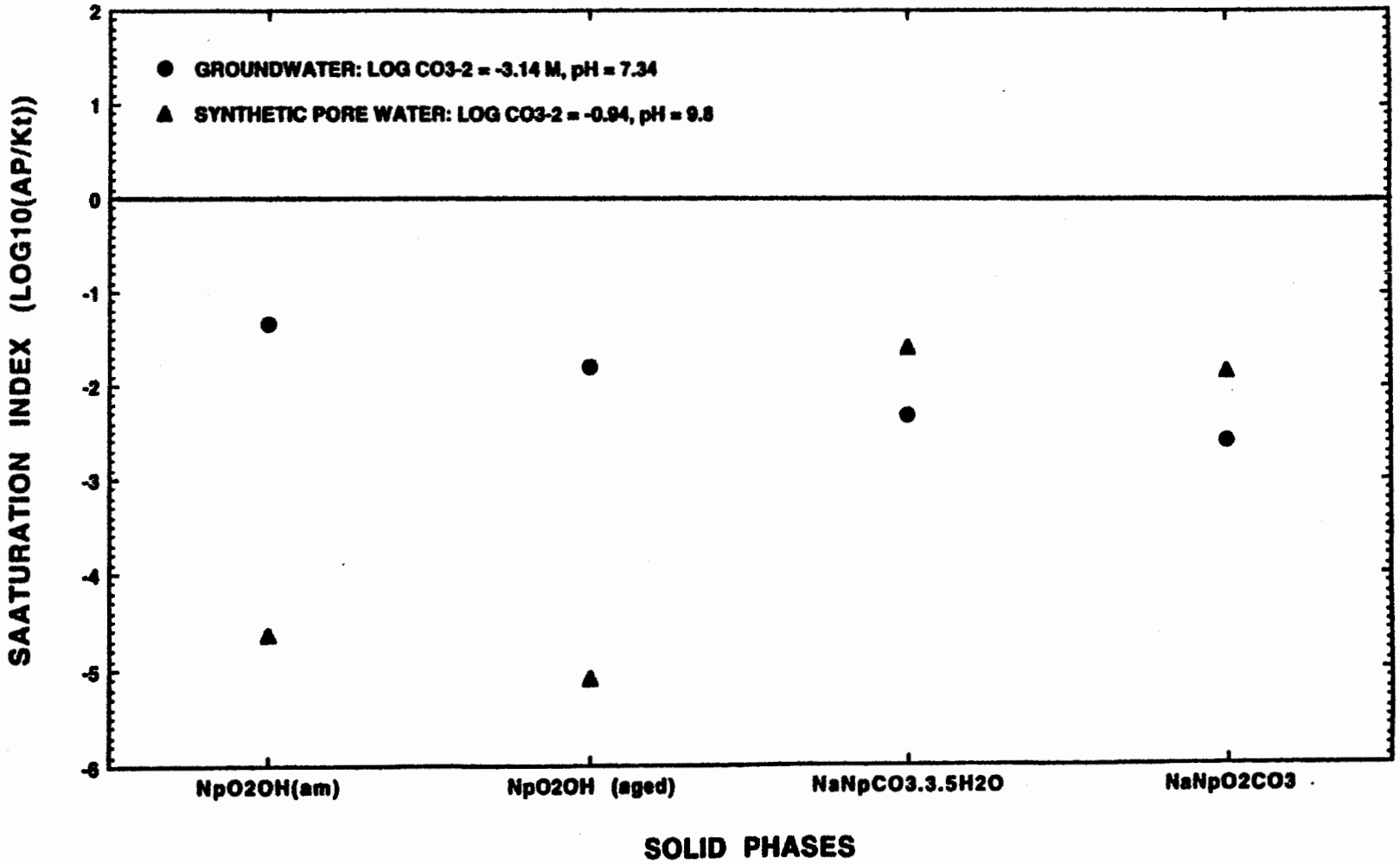

GROUNDWATER: LOG CO3-2 = -3.14 M, pH = 7.34
SYNTHETIC PORE WATER: LOG CO3-2 = - 0.94 M, pH = 9.8
SATURATION INDEX (LOG10(AP/Kt))
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
Am(OH)3(s)
Am(OH)3(am)
AmOHCO3
PuO2OH(am)
UO2(OH)2
SOLID PHASES

FIGURE 20. RESULTS OF SATURATION INDEX CALCULATIONS USING MINTEQA2 FOR WATER CANYON GALLERY GROUNDWATER AND SYNTHETIC POREWATER, TA-54, LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO.



the surface functional groups. This supports the hypothesis that ligand exchange forms a bidentate surface complex, based on the geometry (hexagonal bipyramidal coordination geometry about the central actinide atom) of the basic structural unit of $AnO_2(CO_3)_3^{4-}$ reported by Clark et al. (1994). A tridentate complex is less likely than a bidentate complex because of the geometry of the three CO_3 ligands in $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$ complexes.

Based on carbon-13 nuclear magnetic resonance studies of carbonate exchange on plutonyl(VI) carbonate complexes conducted by Clark et al. (1994) and sorption modeling simulations for calcite presented by Zachara et al. (1993), ligand exchange of carbonato complexes of Am(III) and Np(V) with CO_3 surface sites (X'), forming a bidentate surface complex, are shown by the following reactions:

$$2X'\text{-}CO_3 + Am(CO_3)_3^{3-} = [2X'\text{-}(CO_3)_2AmCO_3]^{+} + 2CO_3^{2-} \qquad (2)$$

and

$$2X'\text{-}CO_3 + NpO_2(CO_3)_3^{5-} = [2X'\text{-}(CO_3)_2NpO_2CO_3]^{-} + 2CO_3^{2-}. \qquad (3)$$

X' represents the anion-specific surface sites for CO_3. These two reactions assume that $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$ are dominant complexes sorbing on the calcite surface.

Based on arguments made by Zachara et al. (1993) for other anionic complexes (SeO_3^{2-}) undergoing surface exchange reactions with calcite, the half reactions for the anionic complexes of Am(III) and Np(V) may require at least two different surface species (CO_3 and HCO_3) to successfully describe the batch-sorption data. Bicarbonate is considered as a surface-reactive species and competitor with $NpO_2(CO_3)_3^{5-}$ and $Am(CO_3)_3^{3-}$ because it is predicted to be the dominant non-complexed carbonate species (42.7%) present in the synthetic pore-water solution at a pH value of 9.8.

The distribution coefficients for $^{239}Pu(V)$ and $^{233}U(VI)$ using synthetic pore water, however, are smaller than the distribution coefficients for these two radionuclides using WCG groundwater (Tables 3 and 4). The decrease in sorption capacity of the Bandelier Tuff for Pu and U is most likely related to the speciation of these two actinides. The species PuO_2OH^0 may not undergo significant adsorption due to the lack of charge. In addition, ligand exchange is not effective for sorbing the complexes PuO_2OH^0 and PuO_2^{1+} on calcite. In the case of U(VI), the intrinsic surface exchange constants for $UO_2(CO_3)_3^{4-}$ with

CO_3 surface sites must be smaller than those for $Am(CO_3)_3^{3-}$ and $NpO_2(CO_3)_3^{5-}$.

SUMMARY

Batch-sorption experiments were conducted to quantify the sorption capacity of the Bandelier Tuff (units 1g, 1v, and 2) for Am(III), Np(V), Pu(V), Tc(VII), and U(VI). The experiments were conducted using either WCG groundwater at a pH value of 7.3 or a synthetic pore-water solution at a pH value of 9.8. The WCG groundwater is characterized by a calcium-sodium-bicarbonate composition with a TDS content less than 130 mg/L. The synthetic pore water, representing pore water extracted from the Bandelier Tuff, is characterized by a sodium-bicarbonate-carbonate solution with a TDS content greater than 1300 mg/L.

At a pH value of 7.3 characteristic of WCG groundwater, the dominant aqueous complexes of Am(III), Np(V), Pu(V), Tc(VII), and U(VI) are predicted to occur as $AmCO_3^-$, NpO_2^+, PuO_2^+, TcO_4^-, and $UO_2(CO_3)_2^{2-}$, respectively. The WCG groundwater is predicted to be undersaturated with respect to calcite, $AmOHCO_3$, $Am(OH)_3$(am), $Am(OH)_3$(s), $NpO_2(OH)$(am), $NaNpCO_3 \cdot 3.5H_2O$, NpO_2OH(am), NpO_2OH(aged), $NaNpO_2CO_3$, PuO_2OH(am), and $UO_2(OH)_2$.

Based on model simulations using MINTEQA2, the dominant dissolved complexes of Am(III), Np(V), Pu(V), Tc(VII), and U(VI) in the synthetic pore water, at a pH value of 9.8 with a total carbonate concentration of $10^{-0.94}$ M, include $Am(CO_3)_3^{3-}$, $NpO_2(CO_3)_3^{5-}$, $PuO_2(OH)^0$, TcO_4^-, and $UO_2(CO_3)_3^{4-}$, respectively. The synthetic pore water is predicted to be undersaturated with respect to $AmOHCO_3$, $Am(OH)_3$(am), $Am(OH)_3$(s), $NpO_2(OH)$(am), $NaNpCO_3 \cdot 3.5H_2O$, NpO_2OH(am), NpO_2OH(aged), $NaNpO_2CO_3$, PuO_2OH(am), and $UO_2(OH)_2$. The synthetic pore water is predicted to be slightly oversaturated with respect to calcite.

Under the experimental conditions representing both transport under saturated (WCG groundwater) and unsaturated flow (synthetic pore water) conditions, the sorption capacity of the Bandelier Tuff for the radionuclides of interest decreases in the following order: Am(III) >> Pu(V) > U(VI) > Np(V) > Tc(VII). The distribution coefficients for Tc(VII) are assumed to be zero in all of the batch sorption experiments. The distribution coefficients for Am(III) and Np(V) using synthetic pore water are greater than those measured for these two actinides using WCG groundwater. It is postulated that calcite precipitated from the carbonate-rich synthetic pore water, which enhanced the sorptive capacity of the Bandelier Tuff for Am(III) and Np(V).

RECOMMENDATIONS FOR FURTHER RESEARCH

More studies should be conducted to characterize both the pore water chemistry of the Bandelier Tuff and sorption processes occurring in the vadose zone at MDA-G, TA-54. Transport under unsaturated flow conditions dominates beneath the disposal pits at MDA-G. The increased sorption of Am(III) and Np(V) on the Bandelier Tuff, at a pH value of 9.8 using synthetic pore water, with a total carbonate concentration of $10^{-0.94}$ M, has not been fully evaluated. Calcite is an important adsorbent for Np(V) carbonato species. Calcite is known to occur within the Bandelier Tuff where evaporation of matrix pore water and fracture fill solutions have occurred. Distribution coefficients for Am(III), Np(V), Pu(V), and U(VI) have not been determined using both glass-rich (unit 1g) samples of the Bandelier Tuff and buried soils potentially present beneath the disposal pits. More detailed mineralogical studies will be useful in identifying the adsorbents that are important in radionuclide transport at MDA-G. These investigations will be useful in quantifying the transport of mobile species including Np(V), under oxidizing and unsaturated flow conditions, for the performance assessment conducted at MDA-G.

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APPENDIX A

CHEMICAL ANALYSES OF WATER CANYON GALLERY GROUNDWATER

Summary of Chemical Analysis of Groundwater Samples, Water Canyon Gallery, Los Alamos, New Mexico.

	08/18/92*	05/20/93*	04/04/96**	04/04/96** (not filtered)
	15.3	11.3	25	25
	<0.10	0.20	<0.1	<0.1
	<0.05	<0.01	NA	NA
	<0.05	<0.05	NA	NA
	7.20	6.94	6.8	6.5
	0.64	0.69	0.66	0.42
	0.003	<0.002	NA	NA
	0.05	0.06	0.04	0.05
	<0.01	0.05	<0.1	<0.1
	52.8	44.6	52.0	52.0
	1.72	1.79	1.5	1.6
	3.05	2.79	2.5	2.8
	<0.01	<0.01	<0.01	<0.01
	6.30	4.90	6.60	6.60
	<0.05	<0.02	NA	NA
	0.48	0.98	0.05	0.18
	7.4	7.6	7.40	7.60
	43.7	39.8	42.4	42.0
	1.05	2.85	1.18	1.33
	0.07	0.07	NA	NA
	0.02	0.05	NA	NA
	117	106	114	NA

water analyzed at Los Alamos National Laboratory, EES-1. Dale Counce analyst.
lwater analyzed at University of New Mexico, Dept of Earth and Planetary Sciences.
ler analyst.
lyses are in mg/L, except where noted.
is Not Analyzed.
rd units.
total dissolved solids.

APPENDIX B

RADIONUCLIDE BATCH SORPTION EXPERIMENTAL DATA AND RESULTS USING WATER CANYON GALLERY GROUNDWATER

	A	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1	Sample Identification	Mass after Sorption and Decantation, g	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK)	Kd (ml/g) of Original Tracer Solution Based on Standards
2	WC.ST.100-2001.GB	24.95	N/A	N/A	6.52	12.73	26.77	6.21	56.20	9.05	2.97E+02
3	WC.ST.100-2002.GB	24.96		N/A	6.57	12.59	26.62	6.01	60.95	10.14	2.65E+02
4	WC.ST.00-2003.GB	25.25	N/A	N/A	6.53	12.46	26.50	5.93	64.45	10.87	2.38E+02
5	WC.ST.00-2004.GB	24.74		N/A	6.52	12.47	26.52	5.95	61.00	10.25	2.59E+02
6	WC.ST.75-2005.GB	25.22	N/A	N/A	6.52	12.52	26.57	6.00	54.15	9.03	2.96E+02
7	WC.ST.75-2006.GB	25.19		N/A	6.52	12.48	26.53	5.96	60.55	10.16	2.58E+02
8	WC.ST.75-2007.GB	25.15	N/A	N/A	6.5	12.47	26.51	5.97	60.10	10.07	2.64E+02
9	WC.ST.75-2008.GB	25.31		N/A	6.49	12.44	26.48	5.95	58.70	9.87	2.54E+02
10	WC.ST.50-2009.GB	25.59	N/A	N/A	6.51	12.39	26.43	5.88	66.95	11.39	2.26E+02
11	WC.ST.50-2010.GB	25.06		N/A	6.56	12.57	26.61	6.01	62.50	10.40	2.50E+02
12	WC.ST.12-2011.GB	25.21	N/A	N/A	6.5	12.49	26.52	5.99	3.90	0.65	4.42E+03
13	WC.ST.12-2012.GB	25.21		N/A	6.51	12.47	26.50	5.96	6.25	1.05	2.70E+03
14	WC.ST.01-2001.GB	25.00		N/A	6.52	12.52	26.55	6.00	52.35	8.73	3.00E+02
15	WC.ST.01-2002.GB	24.95		N/A	6.49	12.48	26.51	6.00	58.65	9.78	2.70E+02
16	Am.SOR.ST.WCG 5/21/96_CTR 1		N/A	N/A	6.51	12.45	26.50	5.94	503.05	84.69	N/A
17	Am.SOR.ST.WCG 5/21/96_CTR 2			N/A	6.49	12.43	26.46	5.94	483.95	81.47	N/A
18	Am.SOR.ST.WCG 5/21/96_STD 1				6.46	12.46	26.50	6.00	848.75	141.46	N/A
19	Am.SOR.ST.WCG 5/21/96_STD 2				6.48	12.43	26.49	5.96	867.50	146.80	N/A
20	[illegible]										
21	WC.ST.100-2013.GB	25.29	N/A	N/A	6.46	12.14	26.19	5.68	76011.60	13382.32	4.32E-01
22	WC.ST.100-2014.GB	25.12		N/A	6.49	12.53	26.51	6.04	83174.10	13770.55	-1.74E-01
23	WC.ST.00-2015.GB	25.23	N/A	N/A	6.55	12.48	26.51	5.93	80611.60	13593.96	-9.17E-03
24	WC.ST.00-2016.GB	25.24		N/A	6.47	12.44	26.49	5.97	82236.60	13774.97	-4.02E-01
25	WC.ST.75-2017.GB	25.38	N/A	N/A	6.57	12.45	26.48	5.88	79999.10	13435.22	6.12E-02
26	WC.ST.75-2018.GB	25.55		N/A	6.51	12.54	26.58	6.03	83457.40	13840.36	-7.40E-01
27	WC.ST.75-2019.GB	25.25	N/A	N/A	6.56	12.24	26.27	5.68	76336.60	13439.54	-1.11E+00
28	WC.ST.75-2020.GB	25.01		N/A	6.48	12.40	26.43	5.92	80349.10	13572.48	-1.18E+00
29	WC.ST.50-2021.GB	25.39	N/A	N/A	6.56	12.47	26.50	5.91	80486.60	13619.71	-1.18E+00
30	WC.ST.50-2022.GB	24.97		N/A	6.51	12.43	26.46	5.92	81999.10	13851.20	-1.46E+00
31	WC.ST.12-2023.GB	24.75	N/A	N/A	6.56	12.51	26.54	5.95	58789.10	9880.52	6.88E+00

1	A Sample Identification	AF Mass after Sorption and Decantation, g	AG pH of Tracer Solution after Sorption	AH Eh of Tracer Solution after Sorption	AI Mass of Counting Vial, g	AJ Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	AK Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	AL Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	AM Total CPM in Counted Tracer Solution after Sorption	AN CPM/g in Counted Tracer Solution after Sorption (Col.AL/Col.AK)	AO Kd (ml/g) of Original Tracer Solution Based on Standards
32	WC.BT.12-2024.GB	24.93		N/A	6.48	12.44	26.47	5.96	56999.10	9563.61	7.85E+00
33	WC.BT.01-2063.GB	25.04		N/A	6.52	12.54	26.57	6.02	82294.90	13670.25	-1.30E+00
34	WC.BT.01-2064.GB	24.90		N/A	6.47	12.43	26.46	5.96	81711.50	13710.00	-1.29E+00
35	Np.SOR.BT.WCG 5/21/96_CTR 3		N/A	N/A	6.50	12.44	26.47	5.94	85565.80	14406.02	N/A
36	Np.SOR.BT.WCG 5/21/96_CTR 4			N/A	6.51	12.51	26.54	6.00	85915.80	14319.30	N/A
37	Np.SOR.BT.WCG 5/21/96_STD 3				6.48	12.53	26.59	6.05	85632.40	14154.12	N/A
38	Np.SOR.BT.WCG 5/21/96_STD 4				6.51	12.48	26.54	5.97	86249.10	14447.09	N/A
39	[illegible]										
40	WC.BT.100-2025.GB	25.08	N/A	N/A	6.47	12.44	26.47	5.97	30769.90	5154.09	1.38E+01
41	WC.BT.100-2026.GB	24.97		N/A	6.52	12.49	26.53	5.97	32206.40	5394.71	1.24E+01
42	WC.BT.00-2027.GB	25.60	N/A	N/A	6.56	12.47	26.52	5.91	29633.70	5014.18	1.49E+01
43	WC.BT.00-2028.GB	25.55		N/A	6.52	12.36	26.40	5.84	29393.00	5033.05	1.44E+01
44	WC.BT.75-2029.GB	25.16	N/A	N/A	6.56	12.54	26.59	5.98	26472.30	4426.81	1.91E+01
45	WC.BT.75-2030.GB	25.13		N/A	6.51	12.54	26.56	6.03	25695.60	4261.29	2.10E+01
46	WC.BT.79-2031.GB	25.57	N/A	N/A	6.5	12.51	26.55	6.01	34152.30	5682.58	9.38E+00
47	WC.BT.79-2032.GB	25.73		N/A	6.52	12.47	26.49	5.95	32727.30	5500.39	1.03E+01
48	WC.BT.00-2033.GB	25.52	N/A	N/A	6.48	12.44	26.46	5.96	25918.90	4348.81	1.71E+01
49	WC.BT.00-2034.GB	25.23		N/A	6.49	11.97	26.01	5.48	23149.20	4224.31	2.04E+01
50	WC.BT.12-2035.GB	24.72	N/A	N/A	6.48	12.48	26.52	6.00	1272.78	212.13	8.18E+02
51	WC.BT.12-2036.GB	25.03		N/A	6.5	12.50	26.54	6.00	1530.05	255.01	6.88E+02
52	WC.BT.0-2065.GB	25.41		N/A	6.5	12.00	26.03	5.50	15566.60	2830.29	4.12E+01
53	WC.BT.01-2066.GB	24.85		N/A	6.53	12.04	26.07	5.51	9712.91	1762.78	8.02E+01
54	Pu.SOR.BT.WCG 5/21/96_CTR 5		N/A	N/A	6.47	12.00	26.05	5.53	47257.80	8545.71	N/A
55	Pu.SOR.BT.WCG 5/21/96_CTR 6			N/A	6.49	12.00	26.04	5.51	46796.70	8493.05	N/A
56	Pu.SOR.BT.WCG 5/21/96_STD 5				6.47	12.46	26.52	5.99	53572.30	8943.62	N/A
57	Pu.SOR.BT.WCG 5/21/96_STD 6				6.52	12.52	26.57	6.00	54492.30	9082.05	N/A
58	[illegible]										
59	WC.BT.100-2037.GB	25.30	N/A	N/A	6.47	12.45	26.28	5.98	76963.80	12870.20	3.83E+00
60	WC.BT.100-2038.GB	25.24		N/A	6.52	12.49	26.54	5.97	77426.30	12969.23	3.69E+00
61	WC.BT.00-2039.GB	24.83	N/A	N/A	6.56	12.55	26.60	5.99	60797.90	10149.90	1.07E+01

	A	B	C	D	E	F	G	H	I	J
	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity, CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved	Tube + Cap Mass, g
62	WC.ST.[illegible]-2040.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	79.8'-80.0' Fe rich	< 500	Dry	N/A	23.08
63	WC.ST.[illegible]-2041.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	74.0'-75.0'	< 500	Dry	N/A	22.93
64	WC.ST.[illegible]-2042.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	74.0'-75.0'	< 500	Dry	N/A	23.04
65	WC.ST.[illegible].GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	79.1'-79.7'	< 500	Dry	N/A	23.06
66	WC.ST.79-2044.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	79.1'-79.7'	< 500	Dry	N/A	23.01
67	[illegible].GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	65.0'-66.0'	< 500	Dry	N/A	22.74
68	WC.ST.50-2046.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	65.0'-66.0'	< 500	Dry	N/A	23.15
69	WC.ST.12-2047.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	10.8'-12.0'	< 500	Dry	N/A	23.09
70	WC.ST.12-2048.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	10.8'-12.0'	< 500	Dry	N/A	23.19
71	[illegible].ST.91-2067.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	91'0	< 500	Dry	N/A	22.75
72	WC.ST.91-[illegible]	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	91'0	< 500	Dry	N/A	22.82
73	U.9OR.ST.WCG 8/21/96_CTR 7	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	N/A	N/A	N/A	N/A	23.14
74	U.9OR.ST.WCG 8/21/96_CTR 8	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	16200 of U 233	N/A	N/A	N/A	N/A	22.76
75	[illegible] 8/21/96_STD 7									
76	U.9OR.ST.WCG 8/21/96_STD 8									
77	[illegible]									
78	WC.ST.100-2069.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	109.0'-109.5'	< 500	Dry	N/A	22.85
79	WC.ST.100-2060.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	109.0'-109.5'	< 500	Dry	N/A	23.16
80	WC.ST.80-2061.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	79.8'-80.0' Fe rich	< 500	Dry	N/A	22.99
81	WC.ST.80-2062.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	79.8'-80.0' Fe rich	< 500	Dry	N/A	22.99
82	WC.ST.75-2063.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	74.0'-75.0'	< 500	Dry	N/A	22.70
83	WC.ST.75-2064.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	74.0'-75.0'	< 500	Dry	N/A	22.69
84	WC.ST.79-2065.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	79.1'-79.7'	< 500	Dry	N/A	22.92
85	WC.ST.79-2066.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	79.1'-79.7'	< 500	Dry	N/A	22.79
86	WC.ST.50-2067.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	65.0'-66.0'	< 500	Dry	N/A	23.04
87	WC.ST.50-2068.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	65.0'-66.0'	< 500	Dry	N/A	22.85
88	WC.ST.12-2069.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	10.8'-12.0'	< 500	Dry	N/A	23.00
89	WC.ST.12-2070.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	10.8'-12.0'	< 500	Dry	N/A	22.87
90	WC.ST.91-2069.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	91'0	< 500	Dry	N/A	22.85
91	WC.ST.91-2070.GB	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	91'0	< 500	Dry	N/A	22.76

	A	B	C	D	E	F	G	H	I	J
1	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity, CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved	Tube + Cap Mass, g
92	Tc.SOR.BT.WCG 5/21/96_CTR 9	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	N/A	N/A	N/A	N/A	23.09
93	Tc.SOR.BT.WCG 5/21/96_CTR 10	3 weeks	Bandelier. Sorp.WCG	0.4% CO_2	34000 of Tc 95	N/A	N/A	N/A	N/A	22.95
94	Tc.SOR.BT.WCG 5/21/96_STD 9									
95	Tc.SOR.BT.WCG 5/21/96_STD 10									
96										
97										
98										
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	A	B	C	D	E	F	G	H	I	J
1	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity, CPM/g	Description of Solid (Sandoller Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved	Tube + Cap Mass, g
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	A	B	C	D	E	F	G	H	I	J
	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity, CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved	Tube + Cap Mass, g
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175										
176										
177										

	A	K	L	M	N	O	P	Q	R	S	T
1	Sample Identification	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g	% Evaporation during Pretreatment ((Col.N-Col.S) /Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g
2	WC.ST.100-2001.GB	24.05	0.99	43.91	19.86	150.6140	162.539	11.9250	43.89	0.07	25.12
3	WC.ST.100-2002.GB	24.19	0.99	43.92	19.73	150.6140	162.539	11.9250	43.89	0.07	25.22
4	WC.ST.00-2003.GB	23.75	1.01	43.50	19.75	150.6140	162.539	11.9250	43.49	0.02	24.97
5	WC.ST.00-2004.GB	23.65	1.00	42.90	19.25	150.6140	162.539	11.9250	42.55	0.58	24.62
6	WC.ST.75-2005.GB	23.99	1.00	43.79	19.80	150.6140	162.539	11.9250	43.77	0.05	25.26
7	WC.ST.75-2006.GB	23.94	1.01	43.73	19.79	150.6140	162.539	11.9250	43.70	0.07	25.23
8	WC.ST.75-2007.GB	22.81	0.99	43.56	20.75	150.6140	162.539	11.9250	43.53	0.07	25.11
9	WC.ST.75-2008.GB	22.83	1.00	43.56	20.73	150.6140	162.539	11.9250	43.53	0.07	25.15
10	WC.ST.00-2009.GB	23.31	1.01	44.09	20.78	150.6140	162.539	11.9250	44.05	0.10	25.57
11	WC.ST.00-2010.GB	22.82	1.01	43.60	20.78	150.6140	162.539	11.9250	43.57	0.07	24.99
12	WC.ST.12-2011.GB	23.38	0.99	44.12	20.74	150.6140	162.539	11.9250	44.03	0.20	25.13
13	WC.ST.12-2012.GB	23.15	1.00	43.78	20.63	150.6140	162.539	11.9250	43.77	0.02	24.95
14	WC.ST.01-2001.GB	22.68	1.01	43.37	20.68	150.6140	162.539	11.9250	43.35	0.05	24.85
15	WC.ST.01-2002.GB	22.65	1.00	43.30	20.65	150.6140	162.539	11.9250	43.28	0.05	24.86
16	Am.SOR.ST.WCG 5/21/96_CTR 1										
17	Am.SOR.ST.WCG 5/21/96_CTR 2										
18	Am.SOR.ST.WCG 5/21/96_STD 1										
19	Am.SOR.ST.WCG 5/21/96_STD 2										
20	[illegible]										
21	WC.ST.100-2013.GB	24.17	0.99	43.54	19.37	150.6140	162.539	11.9250	43.50	0.09	25.18
22	WC.ST.100-2014.GB	23.99	0.99	43.89	19.90	150.6140	162.539	11.9250	43.88	0.02	25.00
23	WC.ST.00-2015.GB	23.90	1.00	43.90	20.00	150.6140	162.539	11.9250	43.87	0.07	25.02
24	WC.ST.00-2016.GB	23.96	0.99	43.96	20.00	150.6140	162.539	11.9250	43.93	0.07	25.18
25	WC.ST.75-2017.GB	23.97	1.01	43.94	19.97	150.6140	162.539	11.9250	43.92	0.05	25.25
26	WC.ST.75-2018.GB	24.10	1.01	44.05	19.95	150.6140	162.539	11.9250	44.04	0.02	25.56
27	WC.ST.75-2019.GB	22.87	1.01	43.82	20.95	150.6140	162.539	11.9250	43.81	0.02	25.33
28	WC.ST.75-2020.GB	22.67	0.99	43.60	20.93	150.6140	162.539	11.9250	43.58	0.05	24.96
29	WC.ST.00-2021.GB	23.04	1.01	44.07	21.03	150.6140	162.539	11.9250	44.06	0.02	25.30
30	WC.ST.00-2022.GB	22.64	1.01	43.59	20.95	150.6140	162.539	11.9250	43.57	0.05	24.92
31	WC.ST.12-2023.GB	22.84	1.01	43.77	20.93	150.6140	162.539	11.9250	43.75	0.05	24.85

	A	K	L	M	N	O	P	Q	R	S	T
1	Sample Identification	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g	% Evaporation during Pretreatment ((Col.N-Col.S) /Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g
32	WC.BT.12-2024.GB	23.01	0.99	43.98	20.97	150.6140	162.539	11.9250	43.96	0.05	25.02
33	WC.BT.91-2063.GB	22.87	1.00	43.82	20.95	150.6140	162.539	11.9250	43.81	0.02	25.15
34	WC.BT.91-2064.GB	22.69	1.00	43.66	20.97	150.6140	162.539	11.9250	43.64	0.05	24.91
35	Np.SOR.BT.WCG 5/21/96_CTR 3										
36	Np.SOR.BT.WCG 5/21/96_CTR 4										
37	Np.SOR.BT.WCG 5/21/96_STD 3										
38	Np.SOR.BT.WCG 5/21/96_STD 4										
39	[illegible]										
40	WC.BT.100-2025.GB	23.85	1.01	43.78	19.93	150.6140	162.539	11.9250	43.76	0.05	24.99
41	WC.BT.100-2026.GB	23.87	1.01	43.81	19.94	150.6140	162.539	11.9250	43.80	0.02	24.88
42	WC.BT.86-2027.GB	24.14	0.99	44.09	19.95	150.6140	162.539	11.9250	44.09	0.00	25.38
43	WC.BT.86-2028.GB	24.18	1.00	44.11	19.93	150.6140	162.539	11.9250	44.10	0.02	25.62
44	WC.BT.75-2029.GB	23.83	1.01	43.74	19.91	150.6140	162.539	11.9250	43.72	0.05	25.18
45	WC.BT.75-2030.GB	23.86	1.00	43.76	19.90	150.6140	162.539	11.9250	43.74	0.05	25.26
46	WC.BT.75-2031.GB	23.15	0.99	44.04	20.89	150.6140	162.539	11.9250	44.03	0.02	25.58
47	WC.BT.75-2032.GB	23.18	1.01	44.11	20.93	150.6140	162.539	11.9250	44.08	0.07	25.51
48	WC.BT.66-2033.GB	23.15	1.00	44.05	20.90	150.6140	162.539	11.9250	44.03	0.05	26.26
49	WC.BT.66-2034.GB	23.00	1.00	43.88	20.88	150.6140	162.539	11.9250	43.87	0.02	25.16
50	WC.BT.12-2035.GB	22.88	1.00	43.66	20.78	150.6140	162.539	11.9250	43.60	0.14	24.83
51	WC.BT.12-2036.GB	23.04	0.99	43.91	20.87	150.6140	162.539	11.9250	43.90	0.02	24.97
52	WC.BT.0-2065.GB	23.19	1.00	44.03	20.84	150.6140	162.539	11.9250	44.02	0.02	25.54
53	WC.BT.91-2066.GB	22.62	0.99	43.42	20.80	150.6140	162.539	11.9250	43.41	0.02	24.82
54	[illegible] 5										
55	Pu.SOR.BT.WCG 5/21/96_CTR 6										
56	Pu.SOR.BT.WCG 5/21/96_STD 5										
57	Pu.SOR.BT.WCG 5/21/96_STD 6										
58	[illegible]										
59	WC.BT.100-2037.GB	23.09	1.00	43.87	20.78	150.6140	162.539	11.9250	43.87	0.00	25.15
60	WC.BT.100-2038.GB	23.00	0.99	43.80	20.80	150.6140	162.539	11.9250	43.79	0.02	26.06
61	WC.BT.86-2039.GB	22.68	0.99	43.45	20.77	150.6140	162.539	11.9250	43.43	0.05	24.84

1	A Sample Identification	K Tube + Cap + Mineral Mass, g	L Mineral Mass, g (Col. K-Col. J)	M Tube + Cap + Mineral + Water Mass, g	N Water Mass, g (Col. M-Col. K)	O Julian Date Pretreatment Started '96	P Julian Date Pretreatment Ended '96	Q Period of Pretreatment, Days	R Tube + Cap + Mineral + Water after Pretreatment Mass, g	S % Evaporation during Pretreatment ((Col.N-Col.S)/Col.N*100)	T Tube + Cap + Mineral + Water after Decantation Mass, g
62	WC.ST.56-2040.GB	23.00	1.01	43.69	20.61	150.6140	162.539	11.9250	43.67	0.05	25.26
63	WC.ST.70-2041.GB	22.93	1.00	43.58	20.65	150.6140	162.539	11.9250	43.57	0.02	25.18
64	WC.ST.70-2042.GB	23.04	1.01	43.56	20.51	150.6140	162.539	11.9250	43.52	0.07	25.36
65	WC.ST.70-2043.GB	23.05	1.00	43.58	20.53	150.6140	162.539	11.9250	43.57	0.02	25.33
66	WC.ST.70-2044.GB	22.91	0.99	43.86	20.86	150.6140	162.539	11.9250	43.85	0.02	25.31
67	WC.ST.56-2045.GB	22.74	1.01	43.51	20.77	150.6140	162.539	11.9250	43.50	0.02	24.94
68	WC.ST.56-2046.GB	23.16	1.00	43.91	20.75	150.6140	162.539	11.9250	43.88	0.07	25.28
69	WC.ST.12-2047.GB	23.00	1.00	43.91	20.82	150.6140	162.539	11.9250	43.90	0.05	24.94
70	WC.ST.10-2048.GB	23.10	1.01	44.00	20.81	150.6140	162.539	11.9250	43.98	0.05	25.00
71	[illegible]	22.75	1.00	43.49	20.74	150.6140	162.539	11.9250	43.47	0.05	24.91
72	WC.ST.91-2049.GB	22.82	0.99	43.54	20.72	150.6140	162.539	11.9250	43.52	0.05	25.00
73	U.SOR.ST.WCG 8/21/96_CTR 7										
74	U.SOR.ST.WCG 8/21/96_CTR 8										
75	U.SOR.ST.WCG 8/21/96_STD 7										
76	U.SOR.ST.WCG 8/21/96_STD 8										
77	[illegible]										
78	[illegible]	22.85	0.99	43.90	150.00	150.6140	162.539	11.9250	43.88	0.05	25.17
79	[illegible]	23.16	1.00	43.86	20.70	150.6140	162.539	11.9250	43.85	0.02	25.21
80	[illegible]	22.99	1.01	43.77	20.78	150.6140	162.539	11.9250	43.77	0.00	25.15
81	[illegible]	22.99	1.00	43.63	20.64	150.6140	162.539	11.9250	43.63	0.00	25.23
82	WC.ST.70-2053.GB	22.70	1.00	43.46	20.76	150.6140	162.539	11.9250	43.46	0.02	24.91
83	WC.ST.70-2054.GB	22.69	1.01	43.35	20.66	150.6140	162.539	11.9250	43.33	0.05	24.96
84	WC.ST.70-2055.GB	22.92	1.01	43.58	20.66	150.6140	162.539	11.9250	43.57	0.02	25.07
85	WC.ST.70-2056.GB	22.79	1.00	43.27	20.48	150.6140	162.539	11.9250	43.26	0.02	25.04
86	WC.ST.56-2057.GB	23.04	1.01	43.48	20.44	150.6140	162.539	11.9250	43.46	0.05	25.25
87	WC.ST.56-2058.GB	22.86	0.99	43.42	20.57	150.6140	162.539	11.9250	43.40	0.05	25.03
88	WC.ST.12-2059.GB	23.00	0.99	43.55	20.55	150.6140	162.539	11.9250	43.54	0.02	24.77
89	WC.ST.12-2060.GB	22.87	0.99	43.89	21.02	150.6140	162.539	11.9250	43.83	0.14	24.74
90	WC.ST.91-2069.GB	22.85	0.99	43.82	20.97	150.6140	162.539	11.9250	43.82	0.00	25.00
91	WC.ST.91-2070.GB	22.76	0.99	43.73	20.97	150.6140	162.539	11.9250	43.73	0.00	24.84

	A	K	L	M	N	O	P	Q	R	S	T
1	Sample Identification	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g	% Evaporation during Pretreatment ((Col.N-Col.S) /Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g
92	Tc.SOR.BT.WCG 5/21/96_CTR 9										
93	Tc.SOR.BT.WCG 5/21/96_CTR 10										
94	Tc.SOR.BT.WCG 5/21/96_STD 9										
95	Tc.SOR.BT.WCG 5/21/96_STD 10										
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	A	K	L	M	N	O	P	Q	R	S	T
1	Sample Identification	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g	% Evaporation during Pretreatment ((Col.N-Col.S) /Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g
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	A	K	L	M	N	O	P	Q	R	S	T
	Sample Identification	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g	% Evaporation during Pretreatment ((Col.N-Col.S) /Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g
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179											
177											

	A	U	V	W	X	Y	Z	AA	AB	AC	AD
1	Sample Identification	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.Y-Col.AC)/Col.Y*100)
2	WC.ST.[illegible]	7.46	N/A	163.5204	44.94	19.82	163.6504	184.6079	20.9575	44.78	0.36
3	WC.ST.100-2002.GB	N/A	N/A	163.5204	45.24	20.02	163.6504	184.6079	20.9575	45.18	0.13
4	WC.ST.00-2003.GB	7.25	N/A	163.5204	44.76	19.81	163.6504	184.6079	20.9575	44.73	0.11
5	WC.ST.00-2004.GB	N/A	N/A	163.5204	44.78	19.96	163.6504	184.6079	20.9575	44.70	0.18
6	WC.ST.75-2005.GB	7.29	N/A	163.5204	45.19	19.93	163.6504	184.6079	20.9575	45.13	0.13
7	WC.ST.75-2006.GB	N/A	N/A	163.5204	45.19	19.96	163.6504	184.6079	20.9575	45.16	0.09
8	WC.ST.75-2007.GB	7.28	N/A	163.5204	45.01	19.90	163.6504	184.6079	20.9575	44.92	0.20
9	WC.ST.75-2008.GB	N/A	N/A	163.5204	44.07	19.92	163.6504	184.6079	20.9575	44.01	0.14
10	WC.ST.00-2009.GB	7.27	N/A	163.5204	45.45	19.88	163.6504	184.6079	20.9575	45.37	0.18
11	WC.ST.00-2010.GB	N/A	N/A	163.5204	44.83	19.84	163.6504	184.6079	20.9575	44.75	0.16
12	WC.ST.12-2011.GB	7.28	N/A	163.5204	45.06	19.93	163.6504	184.6079	20.9575	44.99	0.16
13	WC.ST.12-2012.GB	N/A	N/A	163.5204	44.82	19.87	163.6504	184.6079	20.9575	44.77	0.11
14	WC.ST.51-2001.GB	7.38	N/A	163.5204	44.59	19.74	163.6504	184.6079	20.9575	44.53	0.13
15	WC.ST.51-2002.GB	N/A	N/A	163.5204	44.72	19.86	163.6504	184.6079	20.9575	44.65	0.15
16	Am.SOR.ST.WCG 5/21/96_CTR 1			163.5204	43.03	19.90	163.6504	184.6079	20.9575	42.99	0.09
17	Am.SOR.ST.WCG 5/21/96_CTR 2			163.5204	42.99	19.87	163.6504	184.6079	20.9575	42.96	0.07
18	Am.SOR.ST.WCG 5/21/96_STD 1										
19	Am.SOR.ST.WCG 5/21/96_STD 2										
20	[illegible]										
21	WC.ST.100-[illegible]	7.36	N/A	163.5204	45.26	20.08	163.6504	184.6079	20.9575	45.20	0.13
22	WC.ST.100-2014.GB	N/A	N/A	163.5204	44.94	19.94	163.6504	184.6079	20.9575	44.87	0.18
23	WC.ST.00-2015.GB	7.34	N/A	163.5204	45.04	20.02	163.6504	184.6079	20.9575	44.97	0.18
24	WC.ST.00-2016.GB	N/A	N/A	163.5204	45.18	19.98	163.6504	184.6079	20.9575	45.10	0.13
25	WC.ST.75-2017.GB	7.32	N/A	163.5204	45.15	19.90	163.6504	184.6079	20.9575	45.09	0.13
26	WC.ST.75-2018.GB	N/A	N/A	163.5204	45.48	19.92	163.6504	184.6079	20.9575	45.43	0.11
27	WC.ST.75-2019.GB	7.33	N/A	163.5204	45.21	19.88	163.6504	184.6079	20.9575	45.14	0.15
28	WC.ST.75-2020.GB	N/A	N/A	163.5204	44.50	19.54	163.6504	184.6079	20.9575	44.43	0.16
29	WC.ST.00-2021.GB	7.32	N/A	163.5204	45.18	19.88	163.6504	184.6079	20.9575	45.11	0.15
30	WC.ST.00-2022.GB	N/A	N/A	163.5204	44.84	20.02	163.6504	184.6079	20.9575	44.78	0.13
31	WC.ST.12-2023.GB	7.39	N/A	163.5204	44.73	19.88	163.6504	184.6079	20.9575	44.66	0.18

	A	U	V	W	X	Y	Z	AA	AB	AC	AD
1	Sample Identification	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.Y-Col.AD) /Col.Y*100)
32	WC.BT.12-2024.GB	N/A	N/A	163.5204	44.63	19.61	163.6504	184.6079	20.9575	44.56	0.16
33	WC.BT.91-2063.GB	7.40	N/A	163.5204	45.03	19.68	163.6504	184.6079	20.9575	44.97	0.13
34	WC.BT.91-2064.GB	N/A	N/A	163.5204	44.70	19.79	163.6504	184.6079	20.9575	44.62	0.18
35	Np.SOR.BT.WCG 5/21/96_CTR 3			163.5204	42.71	19.90	163.6504	184.6079	20.9575	42.69	0.05
36	Np.SOR.BT.WCG 5/21/96_CTR 4			163.5204	42.79	19.84	163.6504	184.6079	20.9575	42.76	0.07
37	Np.SOR.BT.WCG 5/21/96_STD 3										
38	Np.SOR.BT.WCG 5/21/96_STD 4										
39	[illegible]										
40	WC.BT.100-2025.GB	7.66	N/A	163.5204	45.04	20.05	163.6504	184.6079	20.9575	44.96	0.18
41	WC.BT.100-2026.GB	N/A	N/A	163.5204	44.92	20.04	163.6504	184.6079	20.9575	44.87	0.11
42	WC.BT.66-2027.GB	7.37	N/A	163.5204	45.30	19.94	163.6504	184.6079	20.9575	45.22	0.18
43	WC.BT.66-2028.GB	N/A	N/A	163.5204	45.53	19.91	163.6504	184.6079	20.9575	45.45	0.18
44	WC.BT.75-2029.GB	7.36	N/A	163.5204	45.06	19.90	163.6504	184.6079	20.9575	45.01	0.11
45	WC.BT.75-2030.GB	N/A	N/A	163.5204	45.25	19.99	163.6504	184.6079	20.9575	45.11	0.31
46	WC.BT.75-2031.GB	7.34	N/A	163.5204	45.40	19.84	163.6504	184.6079	20.9575	45.33	0.15
47	WC.BT.75-2032.GB	N/A	N/A	163.5204	45.35	19.84	163.6504	184.6079	20.9575	45.28	0.15
48	WC.BT.66-2033.GB	7.31	N/A	163.5204	45.05	19.79	163.6504	184.6079	20.9575	44.96	0.20
49	WC.BT.66-2034.GB	N/A	N/A	163.5204	44.97	19.81	163.6504	184.6079	20.9575	44.90	0.16
50	WC.BT.12-2035.GB	7.56	N/A	163.5204	44.60	19.77	163.6504	184.6079	20.9575	44.54	0.13
51	WC.BT.12-2036.GB	N/A	N/A	163.5204	44.86	19.89	163.6504	184.6079	20.9575	44.80	0.13
52	WC.BT.0-2066.GB	7.37	N/A	163.5204	45.45	19.91	163.6504	184.6079	20.9575	45.39	0.13
53	WC.BT.91-2066.GB	N/A	N/A	163.5204	44.65	19.83	163.6504	184.6079	20.9575	44.58	0.16
54	Pu.SOR.BT.WCG 5/21/96_CTR 5			163.5204	42.75	19.80	163.6504	184.6079	20.9575	42.73	0.05
55	Pu.SOR.BT.WCG 5/21/96_CTR 6			163.5204	42.53	19.78	163.6504	184.6079	20.9575	42.51	0.05
56	Pu.SOR.BT.WCG 5/21/96_STD 5										
57	Pu.SOR.BT.WCG 5/21/96_STD 6										
58	[illegible]										
59	WC.BT.100-2037.GB	7.36	N/A	163.5204	45.18	20.03	163.6504	184.6079	20.9575	45.11	0.15
60	WC.BT.100-2038.GB	N/A	N/A	163.5204	45.12	20.06	163.6504	184.6079	20.9575	45.04	0.18
61	WC.BT.66-2039.GB	7.37	N/A	163.5204	44.82	19.98	163.6504	184.6079	20.9575	44.74	0.18

1	A Sample Identification	U pH of Water after Pretreatment	V Eh of Water after Pretreatment, mV	W Julian Date Tracer Solution was Added, '96	X Mass after Tracer Solution was Added, g	Y Mass of Tracer Solution Added, g	Z Julian Date Sorption Started '96	AA Julian Date Sorption Ended '96	AB Period of Sorption, Days	AC Mass after Sorption Ended, g	AD % Evaporation during Sorption (#Col.Y-CoLAD) /Col.Y*100)
62	WC.ST.60-2040.GB	N/A	N/A	163.5204	45.14	19.86	163.6504	184.6079	20.9575	45.07	0.16
63	WC.ST.70-2041.GB	7.34	N/A	163.5204	45.10	19.92	163.6504	184.6079	20.9575	45.02	0.19
64	WC.ST.70-2042.GB	N/A	N/A	163.5204	45.27	19.89	163.6504	184.6079	20.9575	45.21	0.13
65	[illegible].70-2043.GB	7.33	N/A	163.5204	45.30	19.97	163.6504	184.6079	20.9575	45.25	0.11
66	WC.ST.70-2044.GB	N/A	N/A	163.5204	45.25	19.94	163.6504	184.6079	20.9575	45.19	0.13
67	WC.ST.60-2045.GB	7.33	N/A	163.5204	44.85	19.81	163.6504	184.6079	20.9575	44.59	0.13
68	WC.ST.60-2046.GB	N/A	N/A	163.5204	44.55	19.27	163.6504	184.6079	20.9575	44.46	0.20
69	WC.ST.12-2047.GB	7.59	N/A	163.5204	44.74	19.80	163.6504	184.6079	20.9575	44.67	0.16
70	WC.ST.12-2048.GB	N/A	N/A	163.5204	44.67	19.58	163.6504	184.6079	20.9575	44.57	0.22
71	WC.ST.01-2067.GB	7.41	N/A	163.5204	44.78	19.87	163.6504	184.6079	20.9575	44.71	0.16
72	WC.ST.01-2068.GB	N/A	N/A	163.5204	45.05	19.97	163.6504	184.6079	20.9575	44.98	0.16
73	U.SOR.ST.WCG 9/21/96_CTR 7			163.5204	42.99	19.86	163.6504	184.6079	20.9575	42.97	0.05
74	U.SOR.ST.WCG 9/21/96_CTR 8			163.5204	42.69	20.43	163.6504	184.6079	20.9575	42.67	0.05
75	U.SOR.ST.WCG 9/21/96_STD 7										
76	U.SOR.ST.WCG 9/21/96_STD 8										
77	[illegible]										
78	WC.ST.100-2049.GB	7.37	N/A	163.5204	45.21	20.04	163.6504	184.6079	20.9575	44.89	0.71
79	WC.ST.100-2050.GB	N/A	N/A	163.5204	45.16	19.95	163.6504	184.6079	20.9575	45.10	0.13
80	WC.ST.60-2051.GB	7.35	N/A	163.5204	45.15	20.00	163.6504	184.6079	20.9575	45.09	0.13
81	WC.ST.60-2052.GB	N/A	N/A	163.5204	45.22	19.99	163.6504	184.6079	20.9575	45.17	0.11
82	WC.ST.70-2053.GB	7.34	N/A	163.5204	44.88	19.97	163.6504	184.6079	20.9575	44.78	0.22
83	WC.ST.70-2054.GB	N/A	N/A	163.5204	44.91	19.98	163.6504	184.6079	20.9575	44.85	0.13
84	WC.ST.70-2055.GB	7.31	N/A	163.5204	44.98	19.91	163.6504	184.6079	20.9575	44.92	0.13
85	WC.ST.70-2056.GB	N/A	N/A	163.5204	44.88	19.84	163.6504	184.6079	20.9575	44.82	0.13
86	WC.ST.60-2057.GB	7.29	N/A	163.5204	45.19	19.94	163.6504	184.6079	20.9575	45.13	0.13
87	WC.ST.60-2058.GB	N/A	N/A	163.5204	44.89	19.86	163.6504	184.6079	20.9575	44.81	0.18
88	WC.ST.12-2059.GB	7.57	N/A	163.5204	44.72	19.95	163.6504	184.6079	20.9575	44.66	0.13
89	WC.ST.12-2060.GB	N/A	N/A	163.5204	44.65	19.91	163.6504	184.6079	20.9575	44.57	0.18
90	WC.ST.01-2069.GB	7.32	N/A	163.5204	44.85	19.85	163.6504	184.6079	20.9575	44.79	0.13
91	WC.ST.01-2070.GB	N/A	N/A	163.5204	44.57	19.73	163.6504	184.6079	20.9575	44.50	0.16

	A	U	V	W	X	Y	Z	AA	AB	AC	AD
1	Sample Identification	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.Y-Col.AD) /Col.Y*100)
92	Tc.SOR.BT.WCG 5/21/96_CTR 9			163.5204	42.87	19.78	163.6504	184.6079	20.9575	42.85	0.05
93	Tc.SOR.BT.WCG 5/21/96_CTR 10			163.5204	42.73	19.78	163.6504	184.6079	20.9575	42.71	0.05
94	Tc.SOR.BT.WCG 5/21/96_STD 9										
95	Tc.SOR.BT.WCG 5/21/96_STD 10										
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	A	U	V	W	X	Y	Z	AA	AB	AC	AD
	Sample Identification	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.Y-Col.AC) /Col.Y*100)
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	A	U	V	W	X	Y	Z	AA	AB	AC	AD
1	Sample Identification	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.Y-Col.AD) /Col.Y*100)
175											
176											
177											

1	A Sample Identification	AE pH of tracer solution after sorption (pH'ed in glove box)	AF Mass after Sorption and Decantation, g	AG pH of Tracer Solution after Sorption	AH Eh of Tracer Solution after Sorption	AI Mass of Counting Vial, g	AJ Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	AK Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	AL Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	AM Total CPM in Counted Tracer Solution after Sorption	AN CPM/g in Counted Tracer Solution after Sorption (Col.AL/Col.AK)
2	WC.ST.100-2001.GB	7.16	24.95	N/A	N/A	6.52	12.73	26.77	6.21	56.20	9.05
3	WC.ST.100-2002.GB		24.98		N/A	6.57	12.58	26.62	6.01	60.95	10.14
4	WC.ST.00-2003.GB	7.16	25.25	N/A	N/A	6.53	12.46	26.50	5.93	64.45	10.87
5	WC.ST.00-2004.GB		24.74		N/A	6.52	12.47	26.52	5.95	61.00	10.25
6	WC.ST.75-2005.GB	7.13	25.22	N/A	N/A	6.52	12.52	26.57	6.00	54.15	9.03
7	WC.ST.75-2006.GB		25.19		N/A	6.52	12.48	26.53	5.96	60.55	10.16
8	WC.ST.70-2007.GB	7.15	25.15	N/A	N/A	6.5	12.47	26.51	5.97	60.10	10.07
9	WC.ST.70-2008.GB		25.31		N/A	6.49	12.44	26.48	5.95	58.70	9.87
10	WC.ST.00-2009.GB	7.22	25.59	N/A	N/A	6.51	12.39	26.43	5.88	66.95	11.39
11	WC.ST.00-2010.GB		25.05		N/A	6.56	12.57	26.61	6.01	62.50	10.40
12	WC.ST.12-2011.GB	7.14	25.21	N/A	N/A	6.5	12.49	26.52	5.99	3.90	0.65
13	WC.ST.12-2012.GB		25.21		N/A	6.51	12.47	26.50	5.98	6.25	1.05
14	WC.ST.01-2001.GB	7.16	25.00		N/A	6.52	12.52	26.55	6.00	52.35	8.73
15	WC.ST.01-2002.GB		24.85		N/A	6.48	12.48	26.51	6.00	58.65	9.78
16	Am.SOR.ST.WCG 5/21/99_CTR 1	7.13		N/A	N/A	6.51	12.45	26.50	5.94	503.05	84.69
17	Am.SOR.ST.WCG 5/21/99_CTR 2				N/A	6.49	12.43	26.46	5.94	483.95	81.47
18	Am.SOR.ST.WCG 5/21/99_STD 1					6.46	12.46	26.50	6.00	848.75	141.46
19	Am.SOR.ST.WCG 5/21/99_STD 2					6.48	12.43	26.49	5.96	867.50	145.80
20											
21	WC.ST.100-2013.GB	7.12	25.28	N/A	N/A	6.46	12.14	26.18	5.68	76011.60	13382.32
22	WC.ST.100-2014.GB		25.12		N/A	6.49	12.53	26.51	6.04	83174.10	13770.55
23	WC.ST.00-2015.GB	7.11	25.23	N/A	N/A	6.55	12.48	26.51	5.93	80611.60	13593.86
24	WC.ST.00-2016.GB		25.24		N/A	6.47	12.44	26.48	5.97	82236.60	13774.97
25	WC.ST.75-2017.GB	7.08	25.36	N/A	N/A	6.57	12.45	26.48	5.88	78999.10	13435.22
26	WC.ST.75-2018.GB		25.55		N/A	6.51	12.54	26.58	6.03	83457.40	13840.36
27	WC.ST.70-2019.GB	7.18	25.25	N/A	N/A	6.56	12.24	26.27	5.68	76336.60	13439.54
28	WC.ST.70-2020.GB		25.01		N/A	6.48	12.40	26.43	5.92	80349.10	13572.48
29	WC.ST.00-2021.GB	7.23	25.39	N/A	N/A	6.56	12.47	26.50	5.91	80486.60	13618.71
30	WC.ST.00-2022.GB		24.97		N/A	6.51	12.43	26.46	5.92	81999.10	13851.20
31	WC.ST.12-2023.GB	7.40	24.75	N/A	N/A	6.56	12.51	26.54	5.95	58789.10	9880.52

	A	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
1	Sample Identification	pH of tracer solution after sorption (pH'ed in glove box)	Mass after Sorption and Decantation, g	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK)
32	WC.ST.12-2024.GB		24.93		N/A	6.48	12.44	26.47	5.96	56999.10	9563.61
33	WC.ST.01-2063.GB	7.30	25.04		N/A	6.52	12.54	26.57	6.02	82294.90	13670.25
34	WC.ST.01-2064.GB		24.90		N/A	6.47	12.43	26.46	5.96	81711.60	13710.00
35	Np.SOR.ST.WCG 5/21/96_CTR 3	7.14		N/A	N/A	6.50	12.44	26.47	5.94	85585.80	14405.02
36	Np.SOR.ST.WCG 5/21/96_CTR 4				N/A	6.51	12.51	26.54	6.00	85915.80	14319.30
37	Np.SOR.ST.WCG 5/21/96_STD 3					6.48	12.53	26.59	6.05	85632.40	14154.12
38	Np.SOR.ST.WCG 5/21/96_STD 4					6.51	12.48	26.54	5.97	86249.10	14447.09
39											
40	WC.ST.100-2025.GB	7.12	25.08	N/A	N/A	6.47	12.44	26.47	5.97	30769.90	5154.09
41	WC.ST.100-2026.GB		24.97		N/A	6.52	12.49	26.53	5.97	32208.40	5394.71
42	WC.ST.00-2027.GB	7.14	25.60	N/A	N/A	6.56	12.47	26.52	5.91	29633.70	5014.16
43	WC.ST.00-2028.GB		25.55		N/A	6.52	12.36	26.40	5.84	29393.00	5033.05
44	WC.ST.75-2029.GB	7.21	25.16	N/A	N/A	6.56	12.54	26.59	5.98	26472.30	4426.81
45	WC.ST.75-2030.GB		25.13		N/A	6.51	12.54	26.55	6.03	25695.60	4261.29
46	WC.ST.75-2031.GB	7.23	25.57	N/A	N/A	6.5	12.61	26.55	6.01	34152.30	5682.58
47	WC.ST.75-2032.GB		25.73		N/A	6.52	12.47	26.49	5.95	32727.30	5500.39
48	WC.ST.00-2033.GB	7.27	25.52	N/A	N/A	6.48	12.44	26.46	5.96	25918.90	4348.81
49	WC.ST.00-2034.GB		25.23		N/A	6.49	11.97	26.01	5.48	23149.20	4224.31
50	WC.ST.12-2035.GB	7.53	24.72	N/A	N/A	6.48	12.48	26.52	6.00	1272.78	212.13
51	WC.ST.12-2036.GB		25.03		N/A	6.5	12.50	26.54	6.00	1530.05	255.01
52	WC.ST.0-2068.GB	7.15	25.41		N/A	6.5	12.00	26.03	5.50	16566.60	2830.29
53	WC.ST.01-2066.GB		24.85		N/A	6.53	12.04	26.07	5.51	9712.91	1762.78
54	Pu.SOR.ST.WCG 5/21/96_CTR 5	7.28		N/A	N/A	6.47	12.00	26.05	5.53	47257.80	8545.71
55	Pu.SOR.ST.WCG 5/21/96_CTR 6				N/A	6.49	12.00	26.04	5.51	46796.70	8493.05
56	Pu.SOR.ST.WCG 5/21/96_STD 5					6.47	12.46	26.52	5.99	53572.30	8943.62
57	Pu.SOR.ST.WCG 5/21/96_STD 6					6.52	12.52	26.57	6.00	54492.30	9082.05
58											
59	WC.ST.100-2037.GB	7.13	25.30	N/A	N/A	6.47	12.45	26.28	5.98	76963.80	12870.20
60	WC.ST.100-2038.GB		25.24		N/A	6.52	12.49	26.54	5.97	77426.30	12969.23
61	WC.ST.00-2039.GB	7.21	24.83	N/A	N/A	6.56	12.55	26.60	5.99	60797.90	10149.90

1	A	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
	Sample Identification	pH of tracer solution after sorption (pH'ed in glove box)	Mass after Sorption and Decantation, g	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK)
62	WC.ST.[illegible]-2040.GB		25.27		N/A	6.56	12.56	26.61	6.00	76126.30	12687.72
63	WC.ST.75-2041.GB	7.10	25.21	N/A	N/A	6.55	12.54	26.59	5.99	64179.20	10714.39
64	WC.ST.75-2042.GB		25.33		N/A	6.52	12.53	26.56	6.01	62616.70	10452.03
65	WC.ST.75-2043.GB	7.07	25.41	N/A	N/A	6.52	12.47	26.50	5.95	66400.00	11159.66
66	WC.ST.75-2044.GB		25.36		N/A	6.49	12.48	26.52	5.99	73550.00	12279.60
67	WC.ST.[illegible]-2045.GB	7.19	25.10	N/A	N/A	6.52	12.46	26.50	5.94	60637.60	10208.35
68	WC.ST.[illegible]-2046.GB		25.63		N/A	6.53	12.52	26.55	5.99	62610.10	10452.44
69	WC.ST.13-2047.GB	7.55	25.07	N/A	N/A	6.53	12.53	26.56	6.00	74161.40	12360.23
70	WC.ST.12-2048.GB		25.08	N/A	N/A	6.56	12.55	26.59	5.99	81337.50	13578.88
71	WC.ST.01-2067.GB	7.10	25.09	N/A	N/A	6.51	12.49	26.53	5.98	80775.00	13507.53
72	WC.ST.01-2068.GB		24.88		N/A	6.51	12.50	26.54	5.99	77175.00	12883.97
73	U.SOR.ST.WCG 5/21/06_CTR 7	7.08		N/A	N/A	6.54	12.50	26.54	5.96	94670.90	15894.38
74	U.SOR.ST.WCG 5/21/06_CTR 8				N/A	6.50	12.48	26.52	5.98	94337.50	15775.50
75	U.SOR.ST.WCG 5/21/06_STD 7					6.50	12.47	26.50	5.97	100088.00	16765.16
76	U.SOR.ST.WCG 5/21/06_STD 8					6.61	12.62	26.65	6.01	98867.50	16453.83
77											
78	WC.ST.100-2049.GB	7.16	25.27	N/A	N/A	3.24	3.97	N/A	0.73	11770.00	16123.29
79	WC.ST.100-2050.GB		25.21		N/A	3.22	4.21	N/A	0.99	15966.00	16016.16
80	WC.ST.00-2051.GB	7.16	25.27	N/A	N/A	3.22	4.24	N/A	1.02	16267.00	15948.04
81	WC.ST.00-2052.GB		26.10		N/A	3.26	4.27	N/A	1.01	15962.00	15704.95
82	WC.ST.75-2053.GB	7.11	25.02	N/A	N/A	3.23	4.24	N/A	1.01	16037.00	15878.22
83	WC.ST.75-2054.GB		25.09		N/A	3.26	4.26	N/A	1.00	15926.00	15926.00
84	WC.ST.75-2055.GB	7.33	25.41	N/A	N/A	3.25	4.25	N/A	1.00	15962.00	15962.00
85	WC.ST.75-2056.GB		25.54		N/A	3.24	4.23	N/A	0.99	15675.00	15833.33
86	WC.ST.00-2057.GB	7.08	25.47	N/A	N/A	3.25	4.25	N/A	1.00	15905.00	15905.00
87	WC.ST.00-2058.GB		25.12		N/A	3.24	4.26	N/A	1.02	16260.00	15980.78
88	WC.ST.12-2059.GB	7.09	24.99	N/A	N/A	3.22	4.23	N/A	1.01	16400.00	16237.62
89	WC.ST.12-2060.GB		24.75		N/A	3.22	4.23	N/A	1.01	16368.00	16203.96
90	WC.ST.01-2069.GB	7.12	25.16		N/A	3.25	4.24	N/A	0.99	15861.00	16021.21
91	WC.ST.01-2070.GB		25.13		N/A	3.23	4.24	N/A	1.01	15953.00	15795.05

1	A Sample Identification	AE pH of tracer solution after sorption (pH'ed in glove box)	AF Mass after Sorption and Decantation, g	AG pH of Tracer Solution after Sorption	AH Eh of Tracer Solution after Sorption	AI Mass of Counting Vial, g	AJ Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	AK Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	AL Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	AM Total CPM in Counted Tracer Solution after Sorption	AN CPM/g in Counted Tracer Solution after Sorption (Col.AL/Col.AK)
92	Tc.SOR.BT.WCG 5/21/96_CTR 9	7.15		N/A	N/A	3.28	4.30	N/A	1.02	17052.00	16717.65
93	Tc.SOR.BT.WCG 5/21/96_CTR 10				N/A	3.24	4.25	N/A	1.01	17008.00	16839.60
94	Tc.SOR.BT.WCG 5/21/96_STD 9					3.22	4.19	N/A	0.97	16275.00	16779.35
95	Tc.SOR.BT.WCG 5/21/96_STD 10					3.23	4.22	N/A	0.99	16337.00	16502.02
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1	A Sample Identification	AE pH of tracer solution after sorption (pH'ed in glove box)	AF Mass after Sorption and Decantation, g	AG pH of Tracer Solution after Sorption	AH Eh of Tracer Solution after Sorption	AI Mass of Counting Vial, g	AJ Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	AK Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	AL Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	AM Total CPM in Counted Tracer Solution after Sorption	AN CPM/g in Counted Tracer Solution after Sorption (Col.AL/Col.AK)
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	A	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
1	Sample Identification	pH of tracer solution after sorption (pH'ed in glove box)	Mass after Sorption and Decantation, g	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption + Scintillation Cocktail, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK)
175											
176											
177											

	A	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	Sample Identification	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	pH of Tracer Solutions Equilibrated in Glove Box	Binder where Raw Experimental Data are Located	Optical Disk where Reduced Data are Located	Subdirectory
2	WC.ST.100-2001.GB	2.97E+02	1.63E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
3	WC.ST.100-2002.GB	2.65E+02	1.44E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
4	WC.ST.50-2003.GB	2.36E+02	1.29E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
5	WC.ST.50-2004.GB	2.59E+02	1.41E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
6	WC.ST.75-2005.GB	2.99E+02	1.62E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
7	WC.ST.75-2006.GB	2.59E+02	1.41E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
8	WC.ST.75-2007.GB	2.84E+02	1.40E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
9	WC.ST.75-2008.GB	2.54E+02	1.38E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
10	WC.ST.50-2009.GB	2.26E+02	1.22E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
11	WC.ST.50-2010.GB	2.50E+02	1.35E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
12	WC.ST.12-2011.GB	4.42E+03	2.56E+03	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
13	WC.ST.12-2012.GB	2.70E+03	1.55E+03	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
14	WC.ST.91-2001.GB	3.00E+02	1.64E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
15	WC.ST.91-2002.GB	2.70E+02	1.47E+02	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
16	Am.SOR.ST.WCG 5/21/96_CTR 1	N/A	N/A	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
17	Am.SOR.ST.WCG 5/21/96_CTR 2	N/A	N/A	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
18	Am.SOR.ST.WCG 5/21/96_STD 1	N/A	N/A	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
19	Am.SOR.ST.WCG 5/21/96_STD 2	N/A	N/A	WCG-1F.1	Ultima Gold AB	Am.SOR.ST.WCG 5/21/96	7.35			
20	[illegible]									
21	WC.ST.100-2013.GB	4.32E-01	5.25E-01	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
22	WC.ST.100-2014.GB	-1.74E-01	-8.42E-02	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
23	WC.ST.50-2015.GB	-9.17E-03	8.15E-02	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
24	WC.ST.50-2016.GB	-4.02E-01	-3.11E-01	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
25	WC.ST.75-2017.GB	6.12E-02	1.51E-01	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
26	WC.ST.75-2018.GB	-7.40E-01	-6.52E-01	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
27	WC.ST.75-2019.GB	-1.11E+00	-1.02E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
28	WC.ST.75-2020.GB	-1.19E+00	-1.09E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
29	WC.ST.50-2021.GB	-1.16E+00	-1.08E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
30	WC.ST.50-2022.GB	-1.46E+00	-1.37E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			
31	WC.ST.12-2023.GB	8.86E+00	7.01E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.ST.WCG 5/21/96	7.32			

	A	AO	AP	AQ	AR	AS	AT	AU	AV	AW
	Sample Identification	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	pH of Tracer Solutions Equilibrated in Glove Box	Binder where Raw Experimental Data are Located	Optical Disk where Reduced Data are Located	Subdirectory
32	WC.BT.12-2024.GB	7.85E+00	7.98E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.BT.WCG 5/21/96	7.32			
33	WC.BT.01-2063.GB	-1.30E+00	-1.21E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.BT.WCG 5/21/96	7.32			
34	WC.BT.01-2064.GB	-1.29E+00	-1.20E+00	WCG-1F.1	Ultima Gold AB	Np.SOR.BT.WCG 5/21/96	7.32			
35	Np.SOR.BT.WCG 5/21/96_CTR 3	N/A	N/A	WCG-1F.1	Ultima Gold AB	Np.SOR.BT.WCG 5/21/96	7.32			
36	Np.SOR.BT.WCG 5/21/96_CTR 4	N/A	N/A	WCG-1F.1	Ultima Gold AB	Np.SOR.BT.WCG 5/21/96	7.32			
37	Np.SOR.BT.WCG 5/21/96_STD 3	N/A	N/A	WCG-1F.1	Ultima Gold AB	Np.SOR.BT.WCG 5/21/96	7.32			
38	Np.SOR.BT.WCG 5/21/96_STD 4	N/A	N/A	WCG-1F.1	Ultima Gold AB	Np.SOR.BT.WCG 5/21/96	7.32			
39	[illegible]									
40	WC.BT.100-2025.GB	1.38E+01	1.19E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
41	WC.BT.100-2026.GB	1.24E+01	1.05E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
42	WC.BT.00-2027.GB	1.49E+01	1.29E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
43	WC.BT.00-2028.GB	1.44E+01	1.24E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
44	WC.BT.75-2029.GB	1.91E+01	1.69E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
45	WC.BT.75-2030.GB	2.10E+01	1.87E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
46	WC.BT.70-2031.GB	9.38E+00	7.64E+00	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
47	WC.BT.70-2032.GB	1.03E+01	8.54E+00	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
48	WC.BT.00-[illegible]	1.71E+01	1.50E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
49	WC.BT.00-2034.GB	2.04E+01	1.81E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
50	WC.BT.12-2035.GB	8.18E+02	7.72E+02	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
51	WC.BT.12-2036.GB	6.88E+02	6.49E+02	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
52	WC.BT.0-[illegible].GB	4.12E+01	3.77E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
53	WC.BT.01-2066.GB	8.02E+01	7.46E+01	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
54	Pu.SOR.BT.WCG 5/21/96_CTR 5	N/A	N/A	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
55	Pu.[illegible] 6	N/A	N/A	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
56	Pu.SOR.BT.WCG 5/21/96_STD 5	N/A	N/A	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
57	Pu.SOR.BT.WCG 5/21/96_STD 6	N/A	N/A	WCG-1F.1	Ultima Gold AB	Pu.SOR.BT.WCG 5/21/96	7.27			
58	[illegible]									
59	WC.BT.100-2037.GB	3.83E+00	2.62E+00	WCG-1F.1	Ultima Gold AB	U.SOR.BT.WCG 6/6/96	7.20			
60	WC.BT.100-2038.GB	3.69E+00	2.47E+00	WCG-1F.1	Ultima Gold AB	U.SOR.BT.WCG 6/6/96	7.20			
61	WC.BT.00-2039.GB	1.07E+01	9.19E+00	WCG-1F.1	Ultima Gold AB	U.SOR.BT.WCG 6/6/96	7.20			

	A	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	Sample Identification	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	pH of Tracer Solutions Equilibrated in Glove Box	Binder where Raw Experimental Data are Located	Optional Disk where Reduced Data are Located	Subdirectory
62	[illegible]	3.97E+00	2.76E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
63	WC.ST.75-0041.GB	8.79E+00	7.34E+00	WCG-1F.1	[illegible] Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
64	WC.ST.75-0042.GB	8.34E+00	7.08E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
65	WC.ST.75-0043.GB	7.92E+00	6.13E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
66	WC.ST.75-0044.GB	4.84E+00	3.56E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
67	WC.ST.50-0045.GB	1.03E+01	8.78E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
68	[illegible]	9.31E+00	7.87E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
69	WC.ST.13-0047.GB	5.03E+00	3.78E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
70	WC.ST.13-0048.GB	2.54E+00	1.43E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
71	WC.ST.91-0067.GB	2.47E+00	1.33E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
72	WC.ST.91-0068.GB	3.62E+00	2.40E+00	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
73	U.SOR.ST.WCG 5/21/96_CTR 7	N/A	N/A	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
74	U.SOR.ST.WCG 5/21/96_CTR 8	N/A	N/A	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
75	U.SOR.ST.WCG 5/21/96_STD 7	N/A	N/A	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
76	U.SOR.ST.WCG 5/21/96_STD 8	N/A	N/A	WCG-1F.1	Ultima Gold AB	U.SOR.ST.WCG 6/6/96	7.20			
77	[illegible]									
78	WC.ST.100-0040.GB	-1.37E+00	-1.20E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
79	WC.ST.100-0059.GB	-1.21E+00	-1.04E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
80	WC.ST.25-0054.GB	-1.22E+00	-1.05E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
81	WC.ST.50-0052.GB	-1.00E+00	-8.23E-01	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
82	WC.ST.75-0030.GB	-1.15E+00	-9.78E-01	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
83	WC.ST.75-0034.GB	-1.16E+00	-9.87E-01	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
84	WC.ST.75-2066.GB	-1.23E+00	-1.06E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
85	WC.ST.75-2056.GB	-1.18E+00	-1.01E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
86	WC.ST.50-2057.GB	-1.22E+00	-1.04E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
87	WC.ST.50-2058.GB	-1.27E+00	-1.09E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
88	WC.ST.13-2069.GB	-1.23E+00	-1.06E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
89	WC.ST.13-2060.GB	-1.27E+00	-1.09E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
90	WC.ST.91-2068.GB	-1.34E+00	-1.16E+00	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			
91	WC.ST.91-2079.GB	-9.64E-01	-7.89E-01	WCG-1F.1	Ultima Gold AB	Tc.SOR.ST.WCG 5/21/96	7.22			

	A	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	Sample Identification	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	pH of Tracer Solutions Equilibrated in Glove Box	Binder where Raw Experimental Data are Located	Optical Disk where Reduced Data are Located	Subdirectory
92	Tc.SOR.BT.WCG 5/21/96_CTR 9	N/A	N/A	WCG-1F.1	Ultima Gold AB	Tc.SOR.BT.WCG 5/21/96	7.22			
93	Tc.SOR.BT.WCG 5/21/96_CTR 10	N/A	N/A	WCG-1F.1	Ultima Gold AB	Tc.SOR.BT.WCG 5/21/96	7.22			
94	Tc.SOR.BT.WCG 5/21/96_STD 9	N/A	N/A	WCG-1F.1	Ultima Gold AB	Tc.SOR.BT.WCG 5/21/96	7.22			
95	Tc.SOR.BT.WCG 5/21/96_STD 10	N/A	N/A	WCG-1F.1	Ultima Gold AB	Tc.SOR.BT.WCG 5/21/96	7.22			
96	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]			
97	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]			
98	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]			
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	A	AD	AE	AQ	AR	AS	AT	AU	AV	AW
	Sample Identification	Kd (mlg) of Original Tracer Solution Based on Standards	Kd (mlg) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	pH of Tracer Solutions Equilibrated in Glove Box	Binder where Raw Experimental Data are Located	Optical Disk where Reduced Data are Located	Subdirectory
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	A	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	Sample Identification	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	pH of Tracer Solutions Equilibrated in Glove Box	Binder where Raw Experimental Data are Located	Optical Disk where Reduced Data are Located	Subdirectory
175										
176										
177										

	A	AX	AY	AZ	BA	BB
1	Sample Identification	File Name				
2	WC.ST.100-0001.GB					
3	WC.ST.100-0002.GB					
4	WC.ST.80-0003.GB					
5	WC.ST.80-0004.GB					
6	WC.ST.75-0005.GB					
7	WC.ST.75-0006.GB					
8	WC.ST.70-0007.GB					
9	WC.ST.70-0008.GB					
10	WC.ST.90-0009.GB					
11	WC.ST.90-0010.GB					
12	WC.ST.10-0011.GB					
13	WC.ST.10-0012.GB					
14	WC.ST.[illegible].GB					
15	WC.ST.[illegible].GB					
16	[illegible]_CTR 1					
17	Am.SOR.ST.WCG 5/21/96_CTR 2					
18	Am.SOR.ST.WCG 5/21/96_STD 1					
19	Am.SOR.ST.WCG 5/21/96_STD 2					
20	[illegible]					
21	[illegible]ST.100-0013.GB					
22	WC.ST.100-0014.GB					
23	WC.ST.[illegible].GB					
24	[illegible]					
25	WC.ST.75-0017.GB					
26	WC.ST.75-0018.GB					
27	WC.ST.75-0019.GB					
28	WC.ST.75-0020.GB					
29	WC.ST.90-0021.GB					
30	WC.ST.90-0022.GB					
31	WC.ST.12-0023.GB					

	A	AX	AY	AZ	BA	BB
1	Sample Identification	File Name				
32	WC.ST.12-2024.GB					
33	WC.ST.01-2063.GB					
34	WC.ST.01-2064.GB					
35	Np.SOR.ST.WCG 5/21/96_CTR 3					
36	Np.SOR.ST.WCG 5/21/96_CTR 4					
37	Np.SOR.[illegible] 5/21/96_STD 3					
38	Np.SOR.ST.WCG [illegible]/96_STD 4					
39	[illegible]					
40	WC.ST.100-2025.G[illegible]					
41	[illegible]					
42	WC.ST.50-2027.GB					
43	WC.ST.50-2028.GB					
44	WC.ST.75-2029.GB					
45	WC.ST.75-2030.GB					
46	WC.ST.75-2031.GB					
47	WC.ST.75-2032.GB					
48	WC.ST.50-2033.GB					
49	[illegible]					
50	WC.ST.12-2036.GB					
51	WC.ST.[illegible]					
52	WC.ST.0-2068.GB					
53	WC.ST.01-2069.GB					
54	Pu.SOR.ST.WCG 5/21/96_CTR 5					
55	Pu.SOR.ST.WCG 5/21/96_CTR 6					
56	Pu.SOR.ST.WCG 5/21/96_STD 5					
57	Pu.SOR.ST.WCG 5/21/96_STD 6					
58	[illegible]					
59	WC.ST.100-2037.GB					
60	WC.ST.100-2038.GB					
61	WC.ST.50-2039.GB					

#	Sample Identification	AX File Name	AY	AZ	BA	BB
68	WC.ST.70-0940.00					
69	WC.ST.70-0941.00					
70	WC.ST.70-0942.00					
71	[illegible]					
72	WC.ST.70-0944.00					
73	WC.ST.70-0945.00					
74	WC.ST.70-0946.00					
75	[illegible]					
76	WC.ST.70-0948.00					
77	WC.ST.70-0949.00					
78	WC.ST.70-0950.00					
79	[illegible]					
80	U.SOR.ST.WC8 [illegible]_CTR 7					
81	U.SOR.ST.WC8 [illegible]/8_CTR 8					
82	U.SOR.ST [illegible] 7					
83	U.SOR.ST.WC8 [illegible]_STB 8					
84	[illegible]					
85	WC.ST.100-0949.00					
86	WC.ST.100-0950.00					
87	WC.ST.70-0951.00					
88	WC.ST.70-0952.00					
89	WC.ST.70-0953.00					
90	WC.ST.70-0954.00					
91	WC.ST.70-0955.00					
92	WC.ST.70-0956.00					
93	WC.ST.70-0957.00					
94	WC.ST.70-0958.00					
95	WC.ST.70-0959.00					
96	WC.ST.70-0960.00					
97	WC.ST.70-0961.00					
98	WC.ST.70-0962.00					

	A	AX	AY	AZ	BA	BB
1	Sample Identification	File Name				
92	Te.SOR.ST.WCG 8/21/96_CTR 9					
93	Te.SOR.ST.WCG 8/21/96_CTR 10					
94	Te.SOR.ST.WCG 8/21/96_STD 9					
95	Te.SOR.ST.WCG 8/21/96_STD 10					
96	[redacted]					
97	[redacted]					
98	[redacted]					
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	A	AX	AY	AZ	BA	BB
	Sample Identification	File Name				
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APPENDIX C

CHEMICAL ANALYSES OF PORE WATER EXTRACTED FROM BANDELIER TUFF

Summary of Chemical Analysis of Pore Water Samples, Bandelier Tuff, Los Alamos, New Mexico.

Date Analysis[a]	03/96*	06/96*	06/96*	06/96*	06/96*
CH	1107	1107	1107	1121	1123
D (ft)	91.0	51.0	104.0	35.0	59.0
Al	NA	0.23	0.15	0.14	0.90
B	NA	7.53	3.24	1.90	0.70
Br	1.07	4.28	1.00	2.58	22.6
Ca	17.3	78.0	8.79	23.8	853
Cl	31.4	306	58.3	161	1430
CO_3	171	58.2	225	239	<3
F	46.0	20.0	41.6	43.9	4.29
Fe	NA	<0.03	<0.03	<0.07	<0.03
HCO_3	547	71.2	436	176	<3
K	16.3	179	42.8	16.7	58.5
Mg	1.63	16.1	3.09	4.05	63.8
Na	435	345	481	567	920
NO_3	0.47	96.7	0.50	109	28.9
pH[b]	9.81	9.11	9.82	10.01	9.08
OH	NA	NA	NA	NA	52.1
SiO_2	NA	96.9	88.4	195	86.7
SO_4	81.1	429	143	279	1951
TDS[c]	1348	1708	1533	1819	5473

* Groundwater analyzed at Los Alamos National Laboratory, EES-1. Dale Counce analyst.

a. All analyses are in mg/L, except where noted.

CH means Core Hole Number.

D means depth of sample where pore water is extracted from (in feet).

NA means Not Analyzed due to insufficient sample volume.

b. Standard units.

c. TDS is total dissolved solids.

APPENDIX D

RADIONUCLIDE BATCH SORPTION EXPERIMENTAL DATA AND RESULTS USING SYNTHETIC PORE WATER

	A	B
1	**AREA G SORPTION DATA INFORMATION SHEET**	
2	Experiment Number	Bandelier.Sorp.SYN.WCG#2
3	ID of Water Used in Experiment	SYNWCG.9/17/96
4	Notebook Reference	Area"G" Sorption Studies
5	Tracer Solution ID#	Am.SORP.SYNWCG.9/23/96 Np.SORP.SYN.WCG. 9/17/96 U.SORP.SYNWCG. 9/17/96 Tc.SORP.SYNWCG.9/23/96 Pu.SORP.SYNWCG 9/17/96
6	Notebook with Information on Tracer Solution	Area"G" Sorption Studies
7	YMP Balance ID# Used Before Addition of Tracer	OHAUS GT4100 817457
8	YMP Balance Calibration Due Date	2/5/97
9	YMP Balance ID# Used after Addition of Tracer	OHAUS GT4100 817457
10	YMP Balance Calibration Due Date	2/5/97
11	YMP Balance ID# Used in Glovebox	N/A
12	YMP Balance Calibration Due Date	N/A
13	For Glovebox, YMP Balance ID# Used to Weigh Scintillation Vials and Aliquots	N/A
14	YMP Balance Calibration Due Date	N/A
15	Mineral Code IDs	Bandelier Tuff: 108.0'-109.5', 79.9'-80.0', 79.1'-79.7', 74.0'-75.0', 65.0'-66.0', 10.8'-12.0', 91.0'
16	Sieving Information	Dry
17	Notebook Reference for Information on Solid Samples	Area"G" Sorption Studies
18	Type of Oak Ridge Container Used for Sorption Experiment	POLYCARBONATE
19	Detailed Procedure Used - Sorption	LANL-CST-DP-86
20	DP Revision Number	R1
21	**Glovebox Information**	
22	Glovebox Temperature Before Adding Equilibration Water to OR Tubes, °C	N/A
23	Glovebox Humidity Before Adding Equilibration Water to OR Tubes, %	N/A
24	Glovebox Pressure Before Adding Equilibration Water to OR Tubes, Torr	N/A
25	Glovebox CO2 Reading Before Adding Equilibration Water to OR Tubes, %	N/A
26	Arbitrary Glovebox Air Pressure Gauge Input Reading Before Adding Equilibration Water to OR Tubes	N/A
27	Arbitrary Glovebox CO2 Pressure Gauge Input Reading Before Adding Equilibration Water to OR Tubes	N/A
28	Detailed Procedure Used - Glovebox	N/A
29	DP Revision Number	N/A
30		
31	Glovebox Humidity Before Adding Tracer Solution to OR Tubes, %	N/A
32	Glovebox Pressure Before Adding Tracer Solution to OR Tubes, Torr	N/A
33	Arbitrary Glovebox Air Pressure Gauge Input Reading Before Adding Tracer Solution to OR Tubes	N/A
34	Arbitrary Glovebox CO2 Pressure Gauge Input Reading Before Adding Tracer Solution to OR Tubes	N/A
35		
36	Back-up Equilibration Water pH after Sorption	N/A
37	pH Meter Used, YMP ID#	N/A
38	pH Buffers Used/Manufacturer	N/A
39	pH Buffer 4, Lot #/Expiration Date	N/A
40	pH Buffer 7, Lot #/Expiration Date	N/A
41	Detailed Procedure Used	N/A
42	DP Revision Number	N/A
43	Glovebox Temperature after Sorption, °F	N/A
44	Glovebox Humidity after Sorption, %	N/A
45	Glovebox Pressure after Sorption, Torr	N/A
46	Glovebox CO2 Reading after Sorption, %	N/A
47	Arbitrary Glovebox Air Pressure Gauge Input Reading After Sorption	N/A
48	Arbitrary Glovebox CO2 Pressure Gauge Input Reading After Sorption	N/A
49		
50	Glove Box Identification Code	N/A

	A	B
51	Hygrometer Used in Glovebox	N/A
52	Controlled Atmosphere Pressure Gauge Used in Glovebox	N/A
53	CO2 and Air Input Pressure Gauges Used in Glovebox	N/A
54	Notebook Reference for CO2/Air Input Pressure Gauge Calibration	N/A
55	Volumetric Flow for Air Input, sccm	N/A
56	Volumetric Flow for CO2 Input, sccm	N/A
57	**pH Measurement**	
58	pH Meter Used, YMP ID#	645399
59	Detailed Procedure Used	LANL-CST-DP-35
60	DP Revision Number	R3
61	Tracer Solution pH Before Adding to OR Tubes	Tc=10.03; Np=10.03, U=10.03, Pu=10.03, Tc=10.04
62	Glovebox Temperature Before Adding Tracer Solution to OR Tubes, °C	N/A
63	Glovebox Humidity Before Adding Tracer Solution to OR Tubes, %	N/A
64	pH Buffer 4, Manufacturer/Lot #/Expiration Date	Fischer/962222-24/4-98
65	Reading for pH 4 Buffer (Prior to Making Measurements)	4.01
66	Reading for pH 4 Buffer (after Making Measurements)	4 07
67	pH Buffer 7, Manufacturer/Lot #/Expiration Date	Fischer/953693-24/6-97
68	Reading for pH 7 Buffer (Prior to Making Measurements)	6.99
69	Reading for pH 7 Buffer (after Making Measurements)	7.03
70	pH Buffer 10, Manufacturer/Lot #/Expiration Date	Fischer/953243-24/5-97
71	Reading for pH 10 Buffer (Prior to Making Measurements)	10
72	Reading for pH 10 Buffer (after Making Measurements)	9.98
73	**Eh Measurement**	
74	Detailed Procedure Used	N/A
75	YMP ID# of Eh Meter	N/A
76	Electrodes Used for Eh Measurement	N/A
77	Zobell Lot Number and Ideal Value	N/A
78	Zobell Solution Preparation Date	N/A
79	Eh of Zobell Solution (Prior to Making Measurements), mV	N/A
80	Eh of Zobell Solution (after making Measurements), mV	N/A
81	Temperature Range for Eh Measurements, °C	N/A
82	Eh of Water Used in the Experiment, mV	N/A
83	**Verification of Liquid Scintillation Counter**	
84	YMP Counter ID#	841221, 901133, 754745
85	ID# of Low Standard Counted	Am243-1/96 Mid; Nist 2/4/94 A Np; U233-1/96 mid, St-Pu-1
86	Expected CPM of Standard Counted	Am243-1/96 Mid=1462, Nist 2/4/94 A Np=233, U233-1/96 mid=1318, St-Pu-1=842
87	Total Activity (-Bkg)	Am243-1/96 Mid=1398; Nist 2/4/94 A Np=239; U233-1/96 mid=1220; St-Pu-1=770
88	ID# of High Standard Counted	Am-243-1/96 high, Nist 1/4/94 A; U233-1/96 High; St-Pu-2
89	Expected CPM of Standard Counted	Am-243-1/96 high=45060; Nist 1/4/94 A Np=1032; U233-1/96 High42585; St-Pu-2=3650
90	Total Activity (-Bkg)	Am-243-1/96 high=42063, Nist 1/4/94 A Np=1073; U233-1/96 High 42368; St-Pu-2=3600
91	Detailed Procedure Used	LANL-CST-DP-79
92	DP Revision Number	R2
93	Explanation of Sample Coding	WC refers to the type of water used; BT refers to Bandelier Tuff; the number after BT is the core depth; the last number is a unique number assigned to each sample; GB refers to the Glove Box; CTR refers to the controls, STD refers to the standards.
94	**Verification of Gamma Counter for Technetium 95m**	

I3

	A	B
95	YMP Counter ID#	Auto-Gamma 5000 Counter
96	Detailed Procedure Used	Gamma Counter Tc 95m Notebook Procedure
97	Notebook & Pages	LA-CST-NBK-95-015 E2-E21
98	Vendor Sample Analysis Information	
99	Vendor Analysis Notebook Reference	N/A
100	Acceptance Plan Notebook Reference	N/A
101	Location of Data	
102	Experimental Data (Notebook ID#)	Area G Sorption Studies
103	Experimental Data (Page(s) #)	Sorp. #2
104	Reduced Data (Optical disk #)	TWS-INC-05-95-05
105	Reduced Data (Subdirectory)	Area G Sorption
106	Reduced Data (File name)	Data Sheet SYN.WCG #2
107		
108	* Scales were overdue for calibration, LATA was notified.	

	A	B	C	D	E	F	G	H	I
1	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved
2	SYN.WCG.BT.109-3101	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	109.0'-109.5'	< 500	Dry	N/A
3	SYN.WCG.BT.109-3102	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	109.0'-109.5'	< 500	Dry	N/A
4	SYN.WCG.BT.79.9-3103	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	79.9'-80.0' Fe rich	< 500	Dry	N/A
5	SYN.[illegible]94	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	79.9'-80.0' Fe rich	< 500	Dry	N/A
6	SYN.WCG.BT.74-3106	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	74.0'-75.0'	< 500	Dry	N/A
7	SYN.WCG.BT.74-3106	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	74.0'-75.0'	< 500	Dry	N/A
8	[illegible]	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	79.1'-79.7'	< 500	Dry	N/A
9	SYN.WCG.BT.79.1-3108	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	79.1'-79.7'	< 500	Dry	N/A
10	SYN.WCG.BT.86-3109	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	86.0'-86.0'	< 500	Dry	N/A
11	SYN.WCG.BT.86-3110	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	86.0'-86.0'	< 500	Dry	N/A
12	SYN.WCG.BT.10-3111	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	10.8'-12.0'	< 500	Dry	N/A
13	[illegible]	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	10.8'-12.0'	< 500	Dry	N/A
14	SYN.WCG.BT.91-3113	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	91'0	< 500	Dry	N/A
15	SYN.WCG.BT.91-3114	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	91'0	< 500	Dry	N/A
16	Am.SOR.BT.SYN.WCG.S0096 CTR 3101	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	N/A	N/A	N/A	N/A
17	Am.SOR.BT.SYN.WCG.S0096 CTR 3102	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	4300	N/A	N/A	N/A	N/A
18	Am.SOR.BT.SYN.WCG.S0096 STD 11								
19	Am.SOR.BT.SYN.WCG.S0096 STD 12								

	A	J	K	L	M	N	O	P	Q	R
1	Sample Identification	Tube + Cap Mass, g	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g
2	STN.WCG.BT.[illegible]-S101	22.93	23.93	1.00	44.11	20.18	250.6146	267.5417	16.9271	44.03
3	STN.WCG.BT.[illegible]-S102	23.17	24.16	0.99	44.41	20.25	250.6146	267.5417	16.9271	44.20
4	STN.WCG.BT.[illegible]-S103	23.11	24.11	1.00	44.34	20.23	250.6146	267.5417	16.9271	44.25
5	STN.WCG.BT.[illegible]-S104	23.23	24.23	1.00	44.46	20.23	250.6146	267.5417	16.9271	44.35
6	STN.WCG.BT.[illegible]-S105	23.04	24.04	1.00	44.22	20.18	250.6146	267.5417	16.9271	44.13
7	STN.WCG.BT.[illegible]-S106	22.95	23.95	1.00	44.14	20.20	250.6146	267.5417	16.9271	44.09
8	STN.WCG.BT.[illegible]-S107	23.11	24.12	1.01	44.36	20.23	250.6146	267.5417	16.9271	44.26
9	STN.WCG.BT.[illegible]-S108	23.00	24.00	1.00	44.20	20.20	250.6146	267.5417	16.9271	44.19
10	STN.WCG.BT.[illegible]-S109	22.90	23.89	1.00	44.04	20.15	250.6146	267.5417	16.9271	43.93
11	STN.WCG.BT.[illegible]-S110	23.00	24.00	1.00	43.84	19.75	250.6146	267.5417	16.9271	43.74
12	STN.WCG.BT.[illegible]-S111	23.20	24.27	0.99	44.32	20.05	250.6146	267.5417	16.9271	44.21
[illegible]	[illegible]-S113	23.13	24.12	0.99	44.27	20.15	250.6146	267.5417	16.9271	44.17
14	STN.WCG.[illegible]-S115	22.91	23.92	1.01	44.00	20.16	250.6146	267.5417	16.9271	43.90
15	STN.WCG.[illegible]-S114	22.94	23.95	1.01	44.06	20.11	250.6146	267.5417	16.9271	43.96
16	[illegible] CTR S101	23.16								
17	[illegible] CTR S102	22.80								
18	[illegible].BT.STN.WCG.[illegible] STD 11									
19	[illegible].BT.STN.WCG.[illegible] STD 15									

	A	S	T	U	V	W	X	Y	Z	AA
1	Sample Identification	% Evaporation during Pretreatment ((Col.N-Col.S)/Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96
2	SYN.WCG.BT.100-3101	0.18	24.84	9.96	N/A	268.3431	44.96	20.12	268.3431	282.4167
3	SYN.WCG.BT.100-3102	0.47	24.91		N/A	268.3431	45.01	20.10	268.3431	282.4167
4	SYN.WCG.BT.79.0-3103	0.20	25.24	9.97	N/A	268.3431	45.34	20.10	268.3431	282.4167
5	SYN.WCG.BT.79.0-3104	0.25	25.30		N/A	268.3431	45.48	20.18	268.3431	282.4167
6	[illegible]	0.20	25.26	9.96	N/A	268.3431	45.46	20.20	268.3431	282.4167
7	SYN.WCG.BT.74-3106	0.18	25.04		N/A	268.3431	45.08	20.05	268.3431	282.4167
8	SYN.WCG.BT.79.1-3107	0.20	25.45	9.97	N/A	268.3431	45.64	20.19	268.3431	282.4167
9	SYN.WCG.BT.79.1-3108	0.23	25.22		N/A	268.3431	45.33	20.11	268.3431	282.4167
10	SYN.WCG.BT.66-3109	0.25	25.05	9.97	N/A	268.3431	45.17	20.12	268.3431	282.4167
11	SYN.WCG.BT.66-3110	0.23	25.30		N/A	268.3431	45.46	20.16	268.3431	282.4167
12	SYN.WCG.BT.10-3111	0.25	25.20	9.99	N/A	268.3431	45.30	20.10	268.3431	282.4167
13	SYN.WCG.BT.10-3112	0.23	24.97		N/A	268.3431	45.05	20.08	268.3431	282.4167
14	SYN.WCG.BT.91-3113	0.20	25.13	9.95	N/A	268.3431	45.23	20.10	268.3431	282.4167
15	[illegible]	0.25	25.05		N/A	268.3431	45.00	19.95	268.3431	282.4167
16	Am.SOR.BT.SYN.WCG.5/96/96 CTR 3101					268.3431	43.29	20.13	268.3431	282.4167
17	Am.SOR.BT.SYN.WCG.5/96/96 CTR 3106					268.3431	42.61	19.92	268.3431	282.4167
18	Am.SOR.BT.SYN.WCG.5/96/96 STD 11									
19	Am.SOR.BT.SYN.WCG.5/96/96 STD 12									

	A	AB	AC	AD	AE	AF	AG	AH	AI	AJ
	Sample Identification	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.X-Col.AB)/Col.X*100)	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption
3	STK.WCG.BT.[illegible]-0101	14.0736	44.84	0.27	0.79	N/A	0.17	7.20	1.03	391.35
5	STK.WCG.BT.[illegible]-0102	14.0736	44.76	0.36		N/A	0.21	7.24	1.03	410.00
7	STK.WCG.BT.[illegible]-0103	14.0736	45.19	0.33	0.8	N/A	0.17	8.23	2.06	421.10
9	STK.WCG.BT.[illegible]-0104	14.0736	45.28	0.26		N/A	0.19	7.22	1.03	190.84
11	STK.WCG.BT.[illegible]-0105	14.0736	45.30	0.22	0.79	N/A	0.2	7.22	1.02	20.55
13	STK.WCG.BT.[illegible]-0106	14.0736	44.98	0.24		N/A	0.21	7.23	1.02	19.06
15	STK.WCG.BT.[illegible]-0107	14.0736	45.46	0.53	0.79	N/A	0.19	7.21	1.03	242.95
17	STK.WCG.BT.[illegible]-0108	14.0736	45.22	0.24		N/A	0.17	7.20	1.03	222.15
19	STK.WCG.BT.[illegible]-0109	14.0736	45.08	0.33	0.79	N/A	0.2	7.22	1.02	4.95
21	STK.WCG.BT.[illegible]-0110	14.0736	45.37	0.20		N/A	0.19	7.22	1.03	3.85
12	STK.WCG.BT.[illegible]-0111	14.0736	45.19	0.24	0.81	N/A	0.19	7.19	1.01	4.50
14	STK.WCG.BT.[illegible]-0112	14.0736	44.94	0.24		N/A	0.23	7.26	1.03	4.00
16	STK.WCG.BT.[illegible]-0113	14.0736	45.06	0.36	0.79	N/A	0.2	7.20	1.00	4.20
18	STK.WCG.BT.[illegible]-0114	14.0736	44.79	0.47		N/A	0.21	7.21	1.00	3.10
16	[illegible]/STK.WCG.BT.[illegible] CTR 0101	14.0736	43.19	0.23	0.81	N/A	0.17	7.17	1.00	4305.05
17	[illegible]/STK.WCG.BT.[illegible] CTR 0102	14.0736	42.70	0.26		N/A	0.17	7.18	1.01	4331.00
18	[illegible]/STK.WCG.BT.[illegible] STD 11						0.05	7.02	0.97	4154.05
19	[illegible]/STK.WCG.BT.[illegible] STD 13						0.05	7.02	0.97	4154.05

	A	AK	AL	AM	AN	AO	AP	AQ
1	Sample Identification	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	Binder where Raw Experimental Data are Located
2	SYN.WCG.BT.100-3101	379.95	2.26E+02	2.06E+02	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
3	SYN.WCG.BT.100-3102	398.06	2.18E+02	1.98E+02	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
4	SYN.WCG.BT.70.0-3103	204.42	4.20E+02	4.00E+02	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
5	SYN.WCG.BT.70.0-3104	183.98	4.69E+02	4.49E+02	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
6	[illegible]	20.15	4.29E+03	4.27E+03	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
7	SYN.WCG.BT.74-3106	18.83	4.61E+03	4.59E+03	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
8	SYN.WCG.BT.70.1-3107	235.78	3.62E+02	3.42E+02	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
9	SYN.WCG.BT.70.1-3108	215.68	3.98E+02	3.78E+02	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
10	SYN.WCG.BT.05-3109	4.85	1.78E+04	1.77E+04	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
11	SYN.WCG.BT.05-3110	5.68	1.52E+04	1.52E+04	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
12	SYN.WCG.BT.10-3111	4.75	1.83E+04	1.83E+04	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
13	SYN.WCG.BT.10-3112	3.88	2.24E+04	2.23E+04	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
14	SYN.WCG.BT.91-3113	4.20	2.03E+04	2.03E+04	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
15	SYN.WCG.BT.91-3114	3.10	2.73E+04	2.73E+04	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
16	Am.SOR.BT.SYN.WCG.5/96/96 CTR 3104	4305.05	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
17	Am.SOR.BT.SYN.WCG.5/96/96 CTR 3105	4288.91	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
18	Am.SOR.BT.SYN.[illegible] STD 11	4282.53	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies
19	Am.SOR.BT.SYN.WCG.5/96/96 STD 12	4282.53	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Am.SOR.SYNWCG 9/23/96	Area G Sorption Studies

	A	AR	AS	AT
1	Sample Identification	Optical Disk where Reduced Data are Located	Subdirectory	File Name
2	SYN.WCG.BT.1[illegible]-5101	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
3	SYN.WCG.BT.1[illegible]-5102	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
4	SYN.WCG.BT.1[illegible]-5103	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
5	SYN.WCG.BT.1[illegible]-5104	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
6	SYN.WCG.BT.1[illegible]-5105	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
7	SYN.[illegible]	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
8	SYN.WCG.BT.1[illegible]-5107	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
9	SYN.WCG.BT.1[illegible]-5108	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
10	SYN.[illegible]	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
11	[illegible].BT.[illegible]-5110	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
12	SYN.WCG.BT.1[illegible]-5111	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
13	SYN.WCG.BT.1[illegible]-5112	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
14	SYN.WCG.BT.1[illegible]-5113	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
15	SYN.WCG.BT.1[illegible]-5114	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
16	Am.SOR.BT.SYN.WCG.[illegible] CTR 5104	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
17	Am.SOR.BT.SYN.WCG.[illegible] CTR 5105	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
18	Am.SOR.BT.SYN.WCG.[illegible] STB 11	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2
19	Am.SOR.BT.SYN.WCG.[illegible] STB 13	TW9-SIC-[illegible]	Area G Sediment	Syn.Fil Seep. #2

	A	B	C	D	E	F	G	H	I
1	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved
20	[redacted]								
21	SYN.[illegible]	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	108.0'-109.5'	< 500	Dry	N/A
22	SYN.WCG.BT.108-3116	2 weeks	[illegible].SYN.WCG#2	.03%CO2	16175 of Np 237	108.0'-109.5'	< 500	Dry	N/A
23	SYN.[illegible]CG.BT.79.9-3117	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	79.9'-80.0' Fe rich	< 500	Dry	N/A
24	SYN.[illegible]CG.BT.79.9-3118	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	79.9'-80.0' Fe rich	< 500	Dry	N/A
25	[illegible].WCG.BT.74-3119	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	74.0'-75.0'	< 500	Dry	N/A
26	SYN.[illegible]BT.74-3120	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175of Np 237	74.0'-75.0'	< 500	Dry	N/A
27	SYN.WCG.BT.79.1-3121	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175of Np 237	79.1'-79.7'	< 500	Dry	N/A
28	SYN.WCG.BT.79.1-3122	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	79.1'-79.7'	< 500	Dry	N/A
29	SYN.WCG.BT.66-3123	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	66.0'-66.0'	< 500	Dry	N/A
30	[illegible].WCG.[illegible].66-3124	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	66.0'-66.0'	< 500	Dry	N/A
31	SYN.WCG.B[illegible]	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175of Np 237	10.9'-12.0'	< 500	Dry	N/A
32	SYN.WCG.BT.10-3126	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	10.9'-12.0'	< 500	Dry	N/A
33	SYN.WCG.BT.91-3127	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	91'0	< 500	Dry	N/A
34	SYN.WCG.BT.91-3128	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	91'0	< 500	Dry	N/A
35	Np.SOR.BT.SYN.WCG.S6090 CTR 3115	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	N/A	N/A	N/A	N/A
36	Np.SOR.BT.SYN.WCG.S6090 CTR 3116	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	16175 of Np 237	N/A	N/A	N/A	N/A
37	Np.SOR.BT.SYN.WCG.S6090 STD 13								
38	Np.SOR.BT.SYN.WCG.S6090 STD 14								

	A	J	K	L	M	N	O	P	Q	R
1	Sample Identification	Tube + Cap Mass, g	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g
20										
21	STN.WCO.BT.100-S115	22.99	23.99	0.99	44.17	20.18	250.6146	267.5417	16.9271	44.09
22	STN.WCO.BT.100-S116	23.05	24.04	0.99	44.24	20.20	250.6146	267.5417	16.9271	44.13
23	STN.WCO.BT.70.9-S117	23.22	24.22	1.00	44.42	20.20	250.6146	267.5417	16.9271	44.32
24	STN.WCO.BT.70.9-S118	22.97	23.97	1.00	44.16	20.19	250.6146	267.5417	16.9271	44.06
25	STN.WCO.BT.74-S119	22.92	23.92	1.00	44.09	20.27	250.6146	267.5417	16.9271	44.09
26	STN.WCO.BT.74-S120	23.17	24.17	1.00	44.41	20.24	250.6146	267.5417	16.9271	44.32
27	STN.WCO.BT.70.1-S121	22.90	23.90	1.00	43.53	19.73	250.6146	267.5417	16.9271	43.43
28	STN.WCO.BT.70.1-S122	23.14	24.14	1.00	44.19	20.05	250.6146	267.5417	16.9271	44.10
29	STN.WCO.BT.66-S123	22.96	23.96	1.00	43.83	19.87	250.6146	267.5417	16.9271	43.74
30	STN.WCO.BT.66-S124	23.25	24.25	1.00	44.17	19.92	250.6146	267.5417	16.9271	44.08
31	STN.WCO.BT.16-S125	23.04	24.03	0.99	44.06	20.03	250.6146	267.5417	16.9271	43.97
32	STN.WCO.BT.16-S126	22.94	23.95	1.01	44.06	20.13	250.6146	267.5417	16.9271	43.99
33	STN.WCO.BT.61-S127	23.11	24.12	1.01	44.25	20.13	250.6146	267.5417	16.9271	44.16
34	STN.WCO.BT.61-S128	23.22	24.23	1.01	44.30	20.07	250.6146	267.5417	16.9271	44.18
35	Np.SOR.BT.STN.WCO.S0096 CTR S136	22.70								
36	Np.SOR.BT.STN.WCO.S0096 CTR S136	22.73								
37	Np.SOR.BT.STN.WCO.S0096 STD 12									
38	Np.SOR.BT.STN.WCO.S0096 STD 14									

	A	S	T	U	V	W	X	Y	Z	AA
1	Sample Identification	% Evaporation during Pretreatment ((Col.N-Col.S) /Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96
20										
21	SYN.WCG.BT.108-3115	0.18	25.25	9.96	N/A	268.3431	45.35	20.10	268.3431	282.4167
22	SYN.WCG.BT.108-3116	0.25	25.04		N/A	268.3431	45.11	20.07	268.3431	282.4167
23	SYN.WCG.BT.79.9-3117	0.23	25.50	9.96	N/A	268.3431	45.63	20.13	268.3431	282.4167
24	SYN.WCG.BT.79.9-3118	0.18	25.16		N/A	268.3431	45.31	20.15	268.3431	282.4167
25	SYN.WCG.BT.74-3119	0.20	25.13	9.97	N/A	268.3431	44.95	19.82	268.3431	282.4167
26	SYN.WCG.BT.74-3120	0.20	25.30		N/A	268.3431	45.42	20.12	268.3431	282.4167
27	SYN.WCG.BT.79.1-3121	0.23	25.24	9.97	N/A	268.3431	45.32	20.08	268.3431	282.4167
28	SYN.WCG.BT.79.1-3122	0.20	25.27		N/A	268.3431	45.39	20.12	268.3431	282.4167
29	SYN.WCG.BT.65-3123	0.21	25.87	9.96	N/A	268.3431	45.88	20.01	268.3431	282.4167
30	SYN.WCG.BT.65-3124	0.20	25.34		N/A	268.3431	45.27	19.93	268.3431	282.4167
31	SYN.WCG.BT.10-3125	0.20	25.98	9.98	N/A	268.3431	46.02	20.04	268.3431	282.4167
32	SYN.WCG.BT.10-3126	0.20	25.43		N/A	268.3431	45.47	20.04	268.3431	282.4167
33	SYN.WCG.BT.91-3127	0.20	25.88	9.97	N/A	268.3431	44.85	19.97	268.3431	282.4167
34	SYN.WCG.BT.91-3128	0.27	25.34		N/A	268.3431	45.40	20.06	268.3431	282.4167
35	Np.SOR.BT.SYN.WCG.5/30/96 CTR 3115					268.3431	42.81	20.02	268.3431	282.4167
36	Np.SOR.BT.SYN.WCG.5/30/96 CTR 3116	[illegible]				268.3431	42.70	19.97	268.3431	282.4167
37	Np.SOR.BT.SYN.WCG.5/30/96 STD 13									
38	Np.SOR.BT.SYN.WCG.5/30/96 STD 14									

	A	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	Sample Identification	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.X-Col.AB)/Col.X*100)	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption
20	[redacted]									
21	STK.WCO.ST.[illegible]	14.0736	45.13	0.49	9.8	N/A	6.17	7.19	1.01	10030.90
22	STK.WCO.ST.[illegible]	14.0736	44.83	0.62		N/A	6.2	7.21	1.01	16273.20
23	STK.[illegible]17	14.0736	45.44	0.42	9.8	N/A	6.19	7.19	1.01	15493.10
24	STK.WCO.ST.70.0-5110	14.0736	45.20	0.24		N/A	6.19	7.26	1.07	15599.90
25	STK.WCO.ST.74-5119	14.0736	44.84	0.24	9.70	N/A	6.19	7.19	1.00	13667.00
26	STK.WCO.ST.74-5120	14.0736	45.31	0.24		N/A	6.2	7.20	1.00	14643.90
27	STK.WCO.ST.[illegible]-5121	14.0736	45.06	0.53	9.8	N/A	6.2	7.21	1.01	15266.90
28	[illegible]-5125	14.0736	45.27	0.26		N/A	6.2	7.20	1.00	15370.00
29	STK.WCO.ST.[illegible]-5128	14.0736	45.73	0.33	9.8	N/A	6.19	7.20	1.01	13615.40
30	STK.WCO.ST.[illegible]-5130	14.0736	45.12	0.33		N/A	6.22	7.23	1.01	14214.90
31	STK.WCO.ST.[illegible]-5126	14.0736	45.91	0.24	9.8	N/A	6.2	7.21	1.01	12235.00
32	STK.WCO.ST.[illegible]-5136	14.0736	45.36	0.26		N/A	6.19	7.19	1.00	12154.00
33	STK.WCO.ST.[illegible]-5127	14.0736	44.74	0.25	9.79	N/A	6.19	7.19	1.00	13400.20
34	STK.WCO.ST.[illegible]-5130	14.0736	45.00	0.70		N/A	6.2	7.20	1.00	14524.70
35	[illegible] CTR 5116	14.0736	42.70	0.26	9.81	N/A	6.25	7.26	1.01	10070.20
36	[illegible] CTR 5116	14.0736	42.50	0.26		N/A	6.17	7.17	1.00	10000.00
37	[illegible] STD 13						6.57	7.58	1.01	16511.40
38	[illegible] STD 14						6.54	7.55	1.01	16290.30

	A	AK	AL	AM	AN	AO	AP	AQ
	Sample Identification	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	Binder where Raw Experimental Data are Located
21	SYN.WCG.BT.100-3118	15881.09	-6.04E-01	1.66E-01	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
22	SYN.[illegible]	16112.06	-5.68E-01	1.89E-01	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
23	SYN.WCG.BT.70.0-3117	15329.80	1.03E-01	8.94E-01	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
24	SYN.WCG.BT.70.0-3116	14541.40	1.27E+00	2.11E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
25	SYN.WCG.BT.74-3119	13987.00	2.02E+00	2.88E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
26	[illegible]	14043.30	2.13E+00	2.99E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
27	SYN.WCG.BT.70.1-3121	15104.26	3.68E-01	1.11E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
28	SYN.WCG.BT.70.1-3122	15379.60	1.14E-01	8.81E-01	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
29	SYN.WCG.BT.65-3123	13678.61	1.96E+00	2.87E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
30	SYN.WCG.BT.65-3124	14073.47	2.13E+00	2.98E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
31	SYN.WCG.BT.10-3125	12112.48	5.04E+00	6.04E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
32	SYN.WCG.BT.10-3126	12154.00	5.32E+00	6.30E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
33	SYN.WCG.BT.91-3127	13468.20	2.23E+00	3.07E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
34	SYN.WCG.BT.91-3128	14524.70	1.56E+00	2.38E+00	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
35	Np.SOR.BT.SYN.WCG.5/30/96 CTR 3115	16811.09	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
36	Np.SOR.BT.SYN.WCG.5/30/96 CTR 3116	16869.90	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
37	Np.SOR.BT.SYN.WCG.5/30/96 STD 13	16347.92	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies
38	Np.SOR.BT.SYN.WCG.5/30/96 STD 14	16129.01	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Np.SOR.SYNWCG 9/17/96	Area G Sorption Studies

	A	AR	AS	AT
1	Sample Identification	Optical Disk where Reduced Data are Located	Sub-directory	File Name
20	[redacted]			
21	SYN.WCG.ST.100-5115	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
22	SYN.WCG.ST.100-5116	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
23	SYN.WCG.ST.10.5-5117	TWS-INC-05-03-05	Area [redacted]	[redacted] Rt Sorp. #2
24	SYN.WCG.ST.10.5-5118	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
25	SYN.WCG.ST.14-5119	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
26	SYN.WCG.ST.14-5120	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
27	SYN.WCG.ST.10.1-5121	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
28	SYN.WCG.ST.10.1-5122	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
29	SYN.WCG.ST.05-5123	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
30	SYN.WCG.ST.05-5124	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
31	SYN.WCG.ST.10-5125	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
32	SYN.WCG.ST.10-5126	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
33	SYN.WCG.ST.01-5127	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
34	SYN.WCG.ST.01-5128	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
35	Kp.SOR.ST.SYN.WCG.[redacted] CTR 5115	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
36	Kp.SOR.ST.SYN.WCG.[redacted] CTR 5114	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
37	Kp.SOR.ST.SYN.WCG.[redacted] STD 13	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2
38	Kp.SOR.ST.SYN.WCG.[redacted] STD 14	TWS-INC-05-03-05	Area G Sorption	Syn.Rt Sorp. #2

	A	B	C	D	E	F	G	H	I
1	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (N Sieved)	Sieving Information	Type of Water Used I Wet Sieved
39									
40	SYN.WCG.BT.109-3129	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	109.0'-109.5'	< 500	Dry	N/A
41	SYN.WCG.BT.109-3130	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	109.0'-109.5'	< 500	Dry	N/A
42	SYN.WCG.BT.79.9-3131	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	79.9'-80.0' Fe rich	< 500	Dry	N/A
43	SYN.WCG.BT.79.9-3132	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	79.9'-80.0' Fe rich	< 500	Dry	N/A
44	SYN.WCG.BT.74-3133	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	74.0'-75.0'	< 500	Dry	N/A
45	[illegible]	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	74.0'-75.0'	< 500	Dry	N/A
46	SYN.WCG.BT.79.1-3135	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	79.1'-79.7'	< 500	Dry	N/A
47	SYN.WCG.BT.79.1-3136	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	79.1'-79.7'	< 500	Dry	N/A
48	SYN.WCG.BT.65-3137	2 [illegible]	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	65.0'-66.0'	< 500	Dry	N/A
49	SYN.WCG.BT.65-3138	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	65.0'-66.0'	< 500	Dry	N/A
50	SYN.WCG.BT.10-3139	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	10.0'-12.0'	< 500	Dry	N/A
51	SYN.WCG.BT.10-3140	2 weeks	[illegible].Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	10.0'-12.0'	< 500	Dry	N/A
52	SYN.WCG.BT.91-3141	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	91'0	< 500	Dry	N/A
53	SYN.WCG.BT.91-3142	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	91'0	< 500	Dry	N/A
54	Pu.SOR.BT.SYN.WCG.5/30/96 CTR 3129	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	N/A	N/A	N/A	N/A
55	Pu.SOR.BT.SYN.WCG.5/30/96 CTR 3130	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	9710 of Pu 239	N/A	N/A	N/A	N/A
56	Pu.SOR.BT.SYN.WCG.5/30/96 STD 15								
57	Pu.SOR.BT.SYN.WCG.5/30/96 STD 16								

	A	J	K	L	M	N	O	P	Q	R
1	Sample Identification	Tube + Cap Mass, g	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g
39										
40	SYN.WCG.BT.[illegible]-0128	23.29	24.29	1.00	44.41	20.12	250.6146	267.5417	16.9271	44.32
41	SYN.WCG.BT.[illegible]-0129	23.03	24.03	1.00	44.17	20.14	250.6146	267.5417	16.9271	44.06
[illegible]	[illegible]	23.24	24.24	1.00	44.19	19.95	250.6146	267.5417	16.9271	44.19
43	SYN.WCG.BT.70.0-0132	22.97	23.97	1.00	43.88	19.91	250.6146	267.5417	16.9271	43.71
44	SYN.WCG.BT.74-0133	23.12	24.12	1.00	44.12	20.00	250.6146	267.5417	16.9271	44.02
45	SYN.WCG.BT.74-0134	22.96	23.96	1.00	43.81	19.85	250.6146	267.5417	16.9271	43.71
46	SYN.WCG.BT.70.3-0135	23.14	24.14	1.00	44.13	19.99	250.6146	267.5417	16.9271	44.03
47	SYN.WCG.BT.70.3-0136	23.07	24.07	1.00	44.16	20.09	250.6146	267.5417	16.9271	44.07
48	SYN.WCG.BT.65-0137	23.16	24.16	1.00	44.16	20.00	250.6146	267.5417	16.9271	44.06
49	SYN.WCG.BT.65-0138	22.99	23.99	1.00	47.67	23.68	250.6146	267.5417	16.9271	47.46
50	SYN.WCG.BT.[illegible]-0139	23.12	24.11	0.99	44.23	20.12	250.6146	267.5417	16.9271	44.14
51	SYN.WCG.BT.30-0140	23.06	24.06	1.00	44.06	19.96	250.6146	267.5417	16.9271	43.96
52	SYN.WCG.BT.91-0141	22.97	23.98	1.01	43.73	19.75	250.6146	267.5417	16.9271	43.63
53	SYN.WCG.BT.91-0142	22.96	23.97	1.01	43.70	19.73	250.6146	267.5417	16.9271	43.40
54	Pu.SOR.BT.SYN.WCG.[illegible] CTR 0139	23.12								
55	Pu.SOR.BT.SYN.WCG.[illegible] CTR 0140	23.14								
56	Pu.SOR.BT.SYN.WCG.[illegible] STD 15									
57	Pu.SOR.BT.SYN.WCG.[illegible] STD 16									

	A	S	T	U	V	W	X	Y	Z	AA
1	Sample Identification	% Evaporation during Pretreatment ((Col.N-Col.S)/Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96
39										
40	SYN.WCG.BT.106-3129	0.20	25.89	10	N/A	268.3431	46.11	20.22	268.3431	282.4167
41	SYN.WCG.BT.106-3130	0.20	24.90	N/A	N/A	268.3431	45.06	20.16	268.3431	282.4167
42	SYN.WCG.BT.70.1-3131	0.20	25.77	9.96	N/A	268.3431	46.01	20.24	268.3431	282.4167
43	SYN.WCG.BT.70.1-3132	0.39	26.02	N/A	N/A	268.3431	46.14	20.12	268.3431	282.4167
44	[illegible].BT.74-3133	0.23	27.06	9.96	N/A	268.3431	47.18	20.12	268.3431	282.4167
45	SYN.WCG.BT.74-3134	0.23	26.26	N/A	N/A	268.3431	44.90	18.62	268.3431	282.4167
46	SYN.WCG.BT.70.1-3135	0.23	25.81	9.97	N/A	268.3431	42.91	17.10	268.3431	282.4167
47	SYN.WCG.BT.70.1-3136	0.20	26.44	N/A	N/A	268.3431	46.60	20.16	268.3431	282.4167
48	SYN.WCG.BT.66-3137	0.23	25.89	10.02	N/A	268.3431	46.09	20.20	268.3431	282.4167
49	[illegible]	0.23	26.34	N/A	N/A	268.3431	46.38	20.04	268.3431	282.4167
50	SYN.WCG.BT.10-3139	0.20	25.48	9.98	N/A	268.3431	45.55	20.07	268.3431	282.4167
51	SYN.WCG.BT.10-3140	0.23	25.94	N/A	N/A	268.3431	46.01	20.07	268.3431	282.4167
52	SYN.WCG.BT.91-3141	0.23	26.92	9.99	N/A	268.3431	45.80	18.88	268.3431	282.4167
53	SYN.WCG.BT.91-3142	0.48	26.13	N/A	N/A	268.3431	45.92	19.79	268.3431	282.4167
54	Pu.SOR.BT.SYN.WCG.5/96/96 CTR 3120					268.3431	43.15	20.03	268.3431	282.4167
55	Pu.SOR.BT.SYN.WCG.5/96/96 CTR 3130					268.3431	43.04	19.90	268.3431	282.4167
56	Pu.SOR.BT.SYN.WCG.5/96/96 STD 15									
57	Pu.SOR.BT.SYN.WCG.5/96/96 STD 16									

1	A	AB	AC	AD	AE	AF	AG	AH	AI	AJ
	Sample Identification	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.X-Col.AB)/Col.X*100)	pH of Tracer Solution after Sorption	EH of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption
39	[redacted]									
40	STN.WCG.ST.[illegible]-5139	14.0736	46.91	0.43	0.6	N/A	0.2	7.21	1.01	8703.86
41	[illegible].ST.[illegible]-5130	14.0736	44.06	0.56		N/A	0.19	7.22	1.03	8971.56
42	STN.WCG.ST.70.0-5131	14.0736	45.99	0.26	0.6	N/A	0.2	7.20	1.00	8381.10
43	STN.WCG.ST.70.9-5132	14.0736	46.99	0.33		N/A	0.19	7.22	1.03	8475.90
44	STN.WCG.ST.74-5133	14.0736	47.93	0.32	0.6	N/A	0.18	7.21	1.03	8887.65
45	STN.WCG.ST.14-5134	14.0736	44.76	0.31		N/A	0.18	7.19	1.01	8633.30
46	STN.WCG.ST.70.1-5135	14.0736	42.70	0.26	0.6	N/A	0.2	7.21	1.01	8266.05
47	STN.WCG.ST.70.1-5136	14.0736	46.47	0.28		N/A	0.17	7.19	1.02	8356.56
48	STN.WCG.ST.40-5137	14.0736	46.97	0.26	0.6	N/A	0.27	7.29	1.02	5136.50
49	STN.WCG.ST.40-5138	14.0736	46.20	0.26		N/A	0.17	7.19	1.02	4932.05
50	STN.WCG.ST.10-5139	14.0736	45.35	0.44	0.6	N/A	0.24	7.25	1.01	1496.30
51	STN.WCG.ST.10-5140	14.0736	45.86	0.33		N/A	0.18	7.17	0.99	1492.20
52	STN.WCG.ST.20-5141	14.0736	46.51	0.63	0.70	N/A	0.18	7.21	1.02	4961.50
53	STN.WCG.ST.20-5142	14.0736	46.74	0.39		N/A	0.17	7.15	0.98	4515.80
54	Pu.SOR.ST.STN.WCG.[illegible] CTR 5129	14.0736	43.05	0.23	0.61	N/A	0.18	7.19	1.01	9880.40
55	Pu.SOR.ST.STN.WCG.[illegible] CTR 5130	14.0736	42.95	0.21		N/A	0.18	7.19	1.01	9791.40
56	Pu.SOR.ST.STN.WCG.[illegible] STD 15						0.58	7.57	0.99	9580.20
57	Pu.SOR.ST.STN.WCG.[illegible] STD 16						0.59	7.56	0.97	9458.50

	A	AK	AL	AM	AN	AO	AP	AQ
1	Sample Identification	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	Binder where Raw Experimental Data are Located
39	[redacted]							
40	SYN.WCG.BT.100-3129	8617.62	1.17E+00	1.23E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
41	SYN.WCG.BT.100-3130	8710.63	1.71E+00	1.77E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
42	SYN.WCG.BT.70.9-3131	8381.10	1.81E+00	1.87E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
43	SYN.WCG.BT.70.9-3132	8228.64	1.73E+00	1.79E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
44	SYN.WCG.BT.74-3133	6687.04	6.31E+00	6.39E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
45	SYN.WCG.BT.74-3134	6567.62	6.64E+00	6.71E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
46	SYN.WCG.BT.79.1-3135	8204.90	1.59E+00	1.65E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
47	SYN.WCG.BT.79.1-3136	8194.66	1.50E+00	1.56E+00	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
48	SYN.WCG.BT.65-3137	5036.08	1.72E+01	1.73E+01	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
49	SYN.WCG.BT.65-3138	4835.34	1.79E+01	1.80E+01	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
50	SYN.WCG.BT.10-3139	1481.49	1.11E+02	1.12E+02	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
51	SYN.WCG.BT.10-3140	1507.27	1.08E+02	1.08E+02	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
52	SYN.WCG.BT.91-3141	4471.86	1.93E+01	1.94E+01	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area [illegible]
53	SYN.WCG.BT.91-3142	4703.75	1.89E+01	1.90E+01	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
54	Pu.SOR.BT.SYN.WCG.5/30/96 CTR 3130	9782.57	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
55	Pu.SOR.BT.SYN.WCG.5/30/96 CTR 3130	9694.46	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
56	Pu.SOR.BT.SYN.WCG.5/30/96 STD 15	9676.97	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies
57	Pu.SOR.BT.SYN.WCG.5/30/96 STD 16	9748.97	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	Pu.SOR.SYNWCG 9/17/96	Area G Sorption Studies

	A	AR	AS	AT
1	Sample Identification	Optical Disk where Reduced Data are Located	Subdirectory	File Name
39	[redacted]			
40	SYN.WCG [illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
[illegible]	[illegible] BT.[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
42	SYN.WCG.BT [illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
43	SYN.WCG.BT.70.0-[illegible]	[illegible]	Area G Soupion	Syn.Rt Soup. #2
44	SYN.WCG.BT.74-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
45	SYN.WCG.BT.74-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
46	SYN.WCG.BT.70.1-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
47	SYN.WCG.BT.70.1-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
48	SYN.WCG.BT.05-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
49	SYN.WCG.BT.05-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
50	SYN.WCG.BT.10-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
51	SYN.WCG.BT.10-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
52	SYN.WCG.BT.01-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
53	SYN.WCG.BT.01-[illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
54	Pu.SOR.BT.SYN.WCG.[illegible] CTR [illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
55	Pu.SOR.BT.SYN.WCG.[illegible] CTR [illegible]	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
56	Pu.SOR.BT.SYN.WCG.[illegible] STD 15	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2
57	Pu.SOR.BT.SYN.WCG.[illegible] STD 14	TWS-[illegible]	Area G Soupion	Syn.Rt Soup. #2

	A	B	C	D	E	F	G	H	I
1	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved
58									
59	SYN.WCG.BT.108-3143	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	108.0'-109.5'	< 500	Dry	N/A
60	SYN.WCG.BT.108-3144	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	108.0'-109.5'	< 500	Dry	N/A
61	SYN.WCG.BT.79.9-3145	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	79.9'-80.0' Fe rich	< 500	Dry	N/A
62	SYN.WCG.BT.79.9-3146	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	79.9'-80.0' Fe rich	< 500	Dry	N/A
63	SYN.WCG.BT.74-3147	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	74.0'-75.0'	< 500	Dry	N/A
64	SYN.WCG.BT.74-3148	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	74.0'-75.0'	< 500	Dry	N/A
65	SYN.WCG.BT.79.1-3149	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	79.1'-79.7'	< 500	Dry	N/A
66	SYN.WCG.BT.79.1-3150	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	79.1'-79.7'	< 500	Dry	N/A
67	SYN.WCG.BT.65-3151	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	65.0'-66.0'	< 500	Dry	N/A
68	SYN.WCG.BT.65-3152	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	65.0'-66.0'	< 500	Dry	N/A
69	SYN.WCG.BT.10-3153	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	10.0'-12.0'	< 500	Dry	N/A
70	SYN.WCG.BT.10-3154	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	10.0'-12.0'	< 500	Dry	N/A
71	SYN.WCG.BT.91-3155	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	91'0	< 500	Dry	N/A
72	SYN.WCG.BT.91-3156	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	91'0	< 500	Dry	N/A
73	U.SOR.BT.SYN.WCG.5/96/96 CTR 3143	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	N/A	N/A	N/A	N/A
74	U.SOR.BT.SYN.WCG.5/96/96 CTR 3144	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	49566 of U 233	N/A	N/A	N/A	N/A
75	U.SOR.BT.SYN.WCG.5/96/96 STD 17								
76	U.SOR.BT.SYN.WCG.5/96/96 STD 18								

	A	J	K	L	M	N	O	P	Q	R
1	Sample Identification	Tube + Cap Mass, g	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g
59	[redacted]									
60	[redacted]	23.21	24.21	1.00	43.88	19.67	250.6146	267.5417	16.9271	43.75
61	STYL.WCO.BT.100-0144	23.02	24.02	1.00	43.05	19.03	250.6146	267.5417	16.9271	43.83
62	STYL.WCO.BT.70.0-0145	23.14	24.15	1.01	43.97	19.82	250.6146	267.5417	16.9271	43.86
63	STYL.WCO.BT.70.0-0146	22.95	23.95	1.00	43.67	19.72	250.6146	267.5417	16.9271	43.57
64	STYL.WCO.BT.74-0147	23.06	24.06	1.00	43.77	19.71	250.6146	267.5417	16.9271	43.65
65	STYL.WCO.BT.74-0148	23.04	24.04	1.00	43.78	19.74	250.6146	267.5417	16.9271	43.68
66	STYL.WCO.BT.70.1-0149	22.95	23.95	1.00	43.79	19.84	250.6146	267.5417	16.9271	43.69
67	STYL.WCO.BT.70.1-0150	22.73	23.73	1.00	43.61	19.88	250.6146	267.5417	16.9271	43.62
68	STYL.WCO.BT.80-0151	22.90	23.90	1.00	43.26	19.26	250.6146	267.5417	16.9271	43.17
69	STYL.WCO.BT.80-0152	23.17	24.17	1.00	43.84	19.67	250.6146	267.5417	16.9271	43.41
70	STYL.WCO.BT.10-0153	22.93	23.93	1.00	43.36	19.42	250.6146	267.5417	16.9271	43.26
71	STYL.WCO.BT.10-0154	22.64	23.64	1.00	43.65	20.01	250.6146	267.5417	16.9271	43.65
72	STYL.WCO.BT.91-0155	22.61	23.61	1.00	43.33	19.72	250.6146	267.5417	16.9271	43.21
73	STYL.WCO.BT.91-0156	22.92	23.93	1.01	43.73	19.80	250.6146	267.5417	16.9271	43.64
74	U.SOR.BT.STYL.WCO.S0000 CTR 0143	23.05								
75	U.SOR.BT.STYL.WCO.S0000 CTR 0144	22.83								
76	U.SOR.BT.STYL.WCO.S0000 STD 17									
77	U.SOR.BT.STYL.WCO.S0000 STD 18									

	A	S	T	U	V	W	X	Y	Z	AA
1	Sample Identification	% Evaporation during Pretreatment ((Col N-Col.S) /Col.N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96
58										
59	SYN.WCG.BT.100-3143	0.30	25.88	9.99	N/A	268.3431	45.88	20.18	268.3431	282.4167
60	SYN.WCG.BT.100-3144	0.27	25.37		N/A	268.3431	45.50	20.13	268.3431	282.4167
61	SYN.WCG.BT.70.9-3145	0.25	26.92	9.99	N/A	268.3431	47.03	20.11	268.3431	282.4167
62	SYN.WCG.BT.70.9-3146	0.23	26.02		N/A	268.3431	46.15	20.13	268.3431	282.4167
63	SYN.WCG.BT.74-3147	0.27	25.81	9.99	N/A	268.3431	45.95	20.14	268.3431	282.4167
64	SYN.WCG.BT.74-3148	0.23	26.18		N/A	268.3431	46.29	20.11	268.3431	282.4167
65	SYN.WCG.BT.70.1-3149	0.23	26.52	9.97	N/A	268.3431	46.62	20.10	268.3431	282.4167
66	SYN.WCG.BT.70.1-3150	0.21	26.11		N/A	268.3431	45.92	19.81	268.3431	282.4167
67	SYN.WCG.BT.65-3151	0.18	25.79	9.98	N/A	268.3431	45.92	20.13	268.3431	282.4167
68	SYN.WCG.BT.65-3152	0.98	26.18		N/A	268.3431	46.23	20.07	268.3431	282.4167
69	SYN.WCG.BT.10-3153	0.21	25.55	9.98	N/A	268.3431	45.63	20.08	268.3431	282.4167
70	SYN.WCG.BT.10-3154	0.23	25.22		N/A	268.3431	45.15	19.93	268.3431	282.4167
71	SYN.WCG.BT.91-3155	0.26	26.11	9.97	N/A	268.3431	46.06	19.95	268.3431	282.4167
72	SYN.WCG.BT.91-3156	0.21	26.00		N/A	268.3431	45.91	19.91	268.3431	282.4167
73	U.SOR.BT.SYN.WCG.S/00/00 CTR 3143					268.3431	43.10	20.05	268.3431	282.4167
74	U.SOR.BT.SYN.WCG.S/00/00 CTR 3144					268.3431	42.78	19.95	268.3431	282.4167
75	U.SOR.BT.SYN.WCG.S/00/00 STD 17									
76	U.SOR.BT.SYN.WCG.S/00/00 STD 18									

	A	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	Sample Identification	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.X-Col.AB)/Col.X*100)	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption
58										
59	SYN.WCO.BT.100-S143	14.0736	45.60	1.70	9.8	N/A	6.2	7.23	1.03	44443.00
60	SYN.WCO.BT.100-S144	14.0736	45.36	0.31		N/A	6.20	7.19	0.99	43630.60
61	SYN.WCO.BT.70.5-S145	14.0736	46.00	0.26	9.8	N/A	6.18	7.21	1.03	41606.20
62	SYN.WCO.BT.70.5-S146	14.0736	46.01	0.30		N/A	6.17	7.18	1.01	42926.50
63	SYN.WCO.BT.74-S147	14.0736	45.90	0.33	9.79	N/A	6.21	7.22	1.01	40949.00
64	SYN.WCO.BT.74-S148	14.0736	46.16	0.20		N/A	6.22	7.23	1.01	41107.40
65	SYN.WCO.BT.70.1-S149	14.0736	46.40	0.26	9.8	N/A	6.19	7.21	1.02	41670.50
66	SYN.WCO.BT.70.1-S150	14.0736	46.00	0.26		N/A	6.21	7.21	1.00	39584.00
67	SYN.WCO.BT.65-S151	14.0736	45.90	0.26	9.8	N/A	6.19	7.22	1.03	41134.60
68	SYN.WCO.BT.65-S152	[illegible]	45.74	1.06		N/A	6.2	7.19	0.99	41455.00
69	SYN.WCO.BT.10-S153	14.0736	45.52	0.24	9.8	N/A	6.21	7.23	1.02	42026.50
70	SYN.WCO.BT.10-S154	14.0736	45.91	0.31		N/A	6.19	7.20	1.01	42443.10
71	SYN.WCO.BT.01-S155	14.0736	45.70	0.78	9.8	N/A	6.22	7.20	0.98	39013.40
72	SYN.WCO.BT.01-S156	14.0736	45.77	0.30		N/A	6.17	7.18	1.01	39477.70
73	U.BOR.BT.SYN.WCO.[illegible] CTR IN45	14.0736	42.99	0.26	9.81	N/A	6.20	7.19	0.98	49726.50
74	U.BOR.BT.SYN.WCO.[illegible] CTR IN44	14.0736	42.68	0.23		N/A	6.25	7.27	1.02	50234.80
75	U.BOR.BT.SYN.WCO.[illegible] STD 17						6.63	7.62	0.99	50046.50
76	U.BOR.BT.SYN.WCO.[illegible] STD 18						6.59	7.56	0.97	47093.10

	A	AK	AL	AM	AN	AO	AP	AQ
1	Sample Identification	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	Binder where Raw Experimental Data are Located
58	[redacted]							
59	SYN.WCG.BT.100-3143	43148.54	2.52E+00	2.39E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
60	SYN.WCG.BT.100-3144	44071.31	1.50E+00	1.38E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
61	SYN.WCG.BT.79.9-3145	40394.37	2.13E+00	1.99E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
62	SYN.WCG.BT.79.9-3146	42501.49	1.63E+00	1.50E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
63	SYN.WCG.BT.74-3147	40536.63	3.11E+00	2.97E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
64	SYN.WCG.BT.74-3148	40700.46	2.59E+00	2.46E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
65	SYN.WCG.BT.79.1-3149	40853.43	2.07E+00	1.93E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
66	SYN.WCG.BT.79.1-3150	39584.80	2.96E+00	2.82E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
67	SYN.WCG.BT.65-3151	39936.70	3.40E+00	3.26E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
68	SYN.WCG.BT.65-3152	41873.74	2.40E+00	2.27E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
69	SYN.WCG.BT.10-3153	41202.45	2.78E+00	2.65E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
70	SYN.WCG.BT.10-3154	42022.87	2.35E+00	2.22E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
71	SYN.WCG.BT.91-3155	39809.59	2.97E+00	2.84E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
72	SYN.W[illegible]	39088.83	3.60E+00	3.46E+00	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
73	U.SOR.BT.SYN.WCG.[illegible] CTR 3143	50226.79	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
74	U.SOR.BT.SYN.WCG.[illegible] CTR 3144	49249.00	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
75	U.SOR.BT.SYN.WCG.[illegible] STD 17	50552.02	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies
76	U.SOR.BT.SYN.WCG.[illegible] STD 18	49477.42	N/A	N/A	SYN.WCG 9/17/96	Ultima Gold AB	U.SOR.SYNWCG 9/17/96	Area G Sorption Studies

	A	AR	AS	AT
1	Sample Identification	Optical Disk where Reduced Data are Located	Subdirectory	File Name
58				
59	SYN.WCO.ST.100-9143	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
60	SYN.WCO.ST.100-9144	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
61	SYN.WCO.ST.70.5-9145	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
62	SYN.WCO.ST.70.5-9146	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
63	SYN.WCO.ST.74-9147	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
64	SYN.WCO.ST.74-9148	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
65	SYN.[illegible]	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
66	SYN.WCO.ST.70.1-9150	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
67	SYN.WCO.ST.50-9151	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
68	SYN.WCO.ST.50-9152	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
69	SYN.WCO.ST.10-9153	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
70	SYN.WCO.ST.10-9154	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
71	SYN.WCO.ST.51-9155	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
72	SYN.WCO.ST.51-9156	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
73	U.SOR.ST.SYN.WCO.5/00/00 CTR 9145	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
74	U.SOR.ST.SYN.WCO.5/00/00 CTR 9146	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
75	U.SOR.ST.SYN.WCO.5/00/00 STD 17	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2
76	U.SOR.ST.SYN.WCO.5/00/00 STD 18	TWS-INC-05-03-05	Area G Scepticn	Syn.Rt Scep. #2

	A	B	C	D	E	F	G	H	I
1	Sample Identification	Sorption Time	Experiment No.	Atmosphere	Desired Pu, Am, Np, U, Tc Tracer Solution Activity CPM/g	Description of Solid (Bandelier Tuff)	Particle Size, Micrometers (If Sieved)	Sieving Information	Type of Water Used If Wet Sieved
77									
78	SYN.WCG.BT.108-3157	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	108.0'-108.5'	< 500	Dry	N/A
79	SYN.WCG.BT.108-3158	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	108.0'-108.5'	< 500	Dry	N/A
80	SYN.WCG.BT.79.9-3159	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	79.9'-80.0' Fe rich	< 500	Dry	N/A
81	SYN.WCG.BT.79.9-3160	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	79.9'-80.0' Fe rich	< 500	Dry	N/A
82	SYN.WCG.BT.74-3161	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	74.0'-75.0'	< 500	Dry	N/A
83	SYN.WCG.BT.74-3162	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	74.0'-75.0'	< 500	Dry	N/A
84	SYN.WCG.BT.79.1-3163	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	79.1'-79.7'	< 500	Dry	N/A
85	SYN.WCG.BT.79.1-3164	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	79.1'-79.7'	< 500	Dry	N/A
86	SYN.WCG.BT.66-3165	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	66.0'-66.0'	< 500	Dry	N/A
87	SYN.WCG.BT.66-3166	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	66.0'-66.0'	< 500	Dry	N/A
88	SYN. WCG.BT.10-3167	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	10.9'-12.0'	< 500	Dry	N/A
89	SYN.WCG.BT.10-3168	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	10.9'-12.0'	< 500	Dry	N/A
90	SYN.WCG.BT.91-3169	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	91'0	< 500	Dry	N/A
91	SYN.WCG.BT.91-3170	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	91'0	< 500	Dry	N/A
92	Tc.SOR.BT.SYN.WCG.5/30/96 CTR 3157	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	N/A	N/A	N/A	N/A
93	Tc.SOR.BT.SYN.WCG.5/30/96 CTR 3158	2 weeks	Bandelier.Sorp.SYN.WCG#2	.03%CO2	34000 of Tc 95	N/A	N/A	N/A	N/A
94	Tc.SOR.BT.SYN.WCG.5/30/96 STD 10	Only 70 % Efficency on Scintillation Counter #103476 AUTO-GAMMA							
95	Tc.SOR.BT.SYN.WCG.5/30/96 STD 30	Only 70 % Efficency on Scintillation Counter #103476 AUTO-GAMMA							

	A	J	K	L	M	N	O	P	Q	R
1	Sample Identification	Tube + Cap Mass, g	Tube + Cap + Mineral Mass, g	Mineral Mass, g (Col. K-Col. J)	Tube + Cap + Mineral + Water Mass, g	Water Mass, g (Col. M-Col. K)	Julian Date Pretreatment Started '96	Julian Date Pretreatment Ended '96	Period of Pretreatment, Days	Tube + Cap + Mineral + Water after Pretreatment Mass, g
77										
78	SYN.WCO.ST.100-S157	23.12	24.12	1.00	43.09	19.77	250.6146	267.5417	16.9271	43.74
79	SYN.WCO.ST.100-S158	23.18	24.18	1.00	43.99	19.81	250.6146	267.5417	16.9271	43.68
80	SYN.WCO.ST.70.5-S159	22.97	23.97	1.00	43.69	19.72	250.6146	267.5417	16.9271	43.59
81	SYN.WCO.ST.70.5-S160	22.64	23.64	1.00	43.44	19.80	250.6146	267.5417	16.9271	43.31
82	SYN.WCO.ST.74-S161	22.90	23.90	1.00	42.12	18.22	250.6146	267.5417	16.9271	42.63
83	SYN.WCO.ST.74-S162	23.14	24.14	1.00	43.05	18.91	250.6146	267.5417	16.9271	43.56
84	SYN.WCO.ST.70.1-S163	22.05	23.05	1.00	42.26	19.21	250.6146	267.5417	16.9271	42.76
85	SYN.WCO.ST.70.1-S164	22.94	23.94	1.00	43.44	19.50	250.6146	267.5417	16.9271	43.36
86	SYN.WCO.ST.80-S165	22.89	23.89	1.00	43.46	19.57	250.6146	267.5417	16.9271	43.36
87	SYN.WCO.ST.80-S166	23.05	24.05	1.00	43.71	19.66	250.6146	267.5417	16.9271	43.62
88	SYN. WCO.ST.30-S167	22.87	23.86	0.99	43.38	19.53	250.6146	267.5417	16.9271	43.20
89	[illegible]	22.90	23.90	1.00	43.68	19.78	250.6146	267.5417	16.9271	43.66
90	SYN.WCO.ST.01-S169	23.14	24.14	1.00	43.82	19.68	250.6146	267.5417	16.9271	43.72
91	SYN.WCO.ST.01-S170	23.15	24.14	0.99	43.59	19.45	250.6146	267.5417	16.9271	43.60
92	T+.SOR.ST.SYN.WCO.S80/90 CTR S157	22.89								
93	T+.SOR.ST.SYN.WCO.S80/90 CTR S158	22.73								
94	T+.SOR.ST.SYN.WCO.S80/90 STD 10									
95	T+.SOR.ST.SYN.WCO.S80/90 STD 20									

	A	S	T	U	V	W	X	Y	Z	AA
	Sample Identification	% Evaporation during Pretreatment ((Col N-Col.S) /Col N*100)	Tube + Cap + Mineral + Water after Decantation Mass, g	pH of Water after Pretreatment	Eh of Water after Pretreatment, mV	Julian Date Tracer Solution was Added, '96	Mass after Tracer Solution was Added, g	Mass of Tracer Solution Added, g	Julian Date Sorption Started '96	Julian Date Sorption Ended '96
77	[redacted]									
78	SYN.W[illegible].BT.100-3157	0.34	25.87	9.98	N/A	268.3431	46.07	20.20	268.3431	282.4167
79	SYN.WCG.[illegible]-3158	0.70	25.89		N/A	268.3431	46.06	20.17	268.3431	282.4167
80	SYN.[illegible]CG.BT.79.0-3159	0.23		9.98	N/A	268.3431	45.96	45.96	268.3431	282.4167
81	SYN.WCG.BT.79.0-3160	0.30			N/A	268.3431	45.90	45.90	268.3431	282.4167
82	[illegible]CG.BT.[illegible]	0.21	25.00	9.96	N/A	268.3431	45.02	20.02	268.3431	282.4167
83	SYN.WCG.BT.74-3163	0.21	25.39		N/A	268.3431	45.50	20.11	268.3431	282.4167
84	SYN.WCG.BT.79.1-[illegible]	0.23	24.97	9.95	N/A	268.3431	45.07	20.10	268.3431	282.4167
85	SYN.WCG.BT.79.1-3164	0.21	25.03		N/A	268.3431	45.12	20.09	268.3431	282.4167
86	SYN.[illegible]	0.18	25.04	9.96	N/A	268.3431	45.22	20.18	268.3431	282.4167
87	SYN.WCG.BT.65-3166	0.21	25.17		N/A	268.3431	45.14	19.97	268.3431	282.4167
88	SYN.WCG.BT.10-3167	0.30	24.75	9.98	N/A	268.3431	44.80	20.05	268.3431	282.4167
89	SYN.WCG.BT.10-3168	0.18	24.72		N/A	268.3431	44.70	19.98	268.3431	282.4167
90	SYN.WCG.BT.91-3169	0.23	25.26	9.97	N/A	268.3431	45.15	19.89	268.3431	282.4167
91	SYN.WCG.BT.91-3170	0.21	25.21		N/A	268.3431	44.79	19.58	268.3431	282.4167
92	Te.90R.BT.SYN.WCG.[illegible] CTR 3157					268.3431	42.90	20.01	268.3431	282.4167
93	[illegible] CTR 3158					268.3431	42.60	19.87	268.3431	282.4167
94	Te.90R.BT.SYN.WCG.[illegible] STD 19									
95	Te.90R.BT.SYN.WCG.[illegible] STD 20									

	A	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	Sample Identification	Period of Sorption, Days	Mass after Sorption Ended, g	% Evaporation during Sorption ((Col.X-Col.AB) /Col.X*100)	pH of Tracer Solution after Sorption	Eh of Tracer Solution after Sorption	Mass of Counting Vial, g	Mass of Counting Vial + Aliquot of Tracer Solution after Sorption, g	Mass of Counted Tracer Solution after Sorption, g (Col.AI-Col.AH)	Total CPM in Counted Tracer Solution after Sorption
77	[redacted]									
78	STN.WCO.BT.100-S157	14.0736	45.49	1.26	9.82	N/A	2.66	3.67	1.01	26700.00
79	STN.WCO.BT.100-S158	14.0736	45.33	1.50		N/A	2.67	3.67	1.00	26952.00
80	STN.WCO.BT.70.5-S159	14.0736	45.82	0.36	9.81	N/A	2.66	3.66	1.00	25454.00
81	STN.WCO.BT.70.5-S160	14.0736	45.74	0.55		N/A	2.66	3.66	1.00	25721.00
82	STN.WCO.BT.74-S161	14.0736	44.91	0.24	9.8	N/A	2.66	3.67	1.01	27025.00
83	STN.WCO.BT.74-S162	14.0736	45.34	0.35		N/A	2.67	3.68	1.01	27037.00
84	STN.WCO.BT.70.1-S163	14.0736	44.97	0.22	9.81	N/A	2.7	3.70	1.00	26879.00
85	STN.WCO.BT.70.1-S164	14.0736	45.01	0.24		N/A	2.66	3.67	1.01	27160.00
86	STN.WCO.BT.68-S165	14.0736	44.96	0.53	9.81	N/A	2.65	3.65	1.00	27125.00
87	STN.WCO.BT.68-S166	14.0736	45.04	0.22		N/A	2.66	3.67	1.01	27255.00
88	STN. WCO.BT.10-S167	14.0736	44.69	0.25	9.81	N/A	2.7	3.70	1.00	27164.00
89	STN.WCO.BT.10-S168	14.0736	44.56	0.27		N/A	2.65	3.64	0.99	27249.00
90	STN.WCO.BT.91-S169	14.0736	45.04	0.24	9.81	N/A	2.65	3.65	1.00	26630.00
91	STN.WCO.BT.91-S170	14.0736	44.68	0.25		N/A	2.67	3.68	1.01	27000.00
92	Tc.SOR.BT.STN.WCO.S0099 CTR S167	14.0736	42.80	0.23	9.81	N/A	2.65	3.65	1.00	28165.00
93	Tc.SOR.BT.STN.WCO.S0099 CTR S168	14.0736	42.49	0.26		N/A	2.66	3.66	1.00	28100.00
94	Tc.SOR.BT.ST[illegible] STD 19						3.24	4.23	0.99	28265.00
95	Tc.SOR.BT.STN.WCO.S0094 STD 20						3.24	4.21	0.97	27254.00

	A	AK	AL	AM	AN	AO	AP	AQ
1	Sample Identification	CPM/g in Counted Tracer Solution after Sorption (Col.AL/ Col.AK	Kd (ml/g) of Original Tracer Solution Based on Standards	Kd (ml/g) of Original Tracer Solution Based on Controls	Water ID	Type of Scintillation Cocktail Used	ID of Tracer Solutions Used for Sorption Experiment	Binder where Raw Experimental Data are Located
77								
78	SYN.WCG.BT.100-3157	26524.75	2.00E-01	9.09E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
79	SYN.WCG.BT.100-3158	26952.00	4.65E-02	-6.06E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
80	SYN.WCG.BT.79.9-3159	25454.00	2.93E+01	2.90E+01	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
81	SYN.WCG.BT.79.9-3160	25721.00	2.84E+01	2.82E+01	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
82	SYN.WCG.BT.74-3161	26758.42	8.11E-02	-2.60E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
83	SYN.WCG.BT.74-3162	26769.31	7.77E-02	-2.99E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
84	SYN.WCG.BT.79.1-3163	26879.00	-1.40E-01	-2.47E-01	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
85	SYN.WCG.BT.79.1-3164	26900.00	8.33E-02	-2.37E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
86	SYN.WCG.BT.65-3165	27125.00	-1.82E-02	-1.25E-01	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
87	SYN.WCG.BT.65-3166	26985.15	-2.94E-02	-1.35E-01	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
88	SYN. WCG.BT.10-3167	27164.00	7.68E-02	-3.00E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
89	SYN.WCG.BT.10-3168	27524.24	-3.97E-02	-1.44E-01	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
90	SYN.WCG.BT.91-3169	26839.00	9.03E-02	-1.58E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
91	SYN.WCG.BT.91-3170	26821.78	1.38E-01	3.22E-02	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
92	Tc.SOR.BT.SYN.WCG.5/30/96 CTR 3157	28165.00	N/A	N/A	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
93	Tc.SOR.BT.SYN.WCG.5/30/96 CTR 3158	28196.00	N/A	N/A	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
94	Tc.SOR.BT.SYN.WCG.5/30/96 STD 10	28550.51	N/A	N/A	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies
95	Tc.SOR.BT.SYN.WCG.5/30/96 STD 30	28096.91	N/A	N/A	SYN.WCG 9/17/96	N/A	Tc.SOR.SYNWCG 9/18/96	Area G Sorption Studies

1	A Sample Identification	AR Optical Disk where Reduced Data are Located	AS Subdirectory	AT File Name
77				
78	SYN.WCG.ST.100-5157	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
79	SYN.WCG.ST.100-5158	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
80	SYN.WCG.ST.70.9-5159	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
81	SYN.WCG.ST.70.9-5160	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
82	SYN.WCG.ST.74-5161	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
83	SYN.WCG.ST.74-5162	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
84	SYN.WCG.ST.70.1-5163	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
85	SYN.WCG.ST.70.1-5164	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
86	SYN.WCG.ST.68-5165	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
87	SYN.WCG.ST.68-5166	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
88	SYN. WCG.ST.10-5167	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
89	SYN.WCG.ST.10-5168	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
90	SYN.WCG.ST.51-5169	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
91	SYN.WCG.ST.51-5170	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
92	Tc.SOR.ST.SYN.WCG.S6806 CTB 5157	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
93	Tc.SOR.ST.SYN.WCG.S6806 CTB 5158	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
94	Tc.SOR.ST.SYN.WCG.S6806 STD 19	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2
95	Tc.SOR.ST.SYN.WCG.S6806 STD 20	TWS-INC-05-03-05	Area G Scopion	Syn.Rt Scop. #2

Am-241

Mineral ID	kd based on stds	kd based on ctrls	molarity
108.0'-109.5'	2.26E+02	2.06E+02	2.34E-09
108.0'-109.5'	2.18E+02	1.98E+02	2.34E-09
79.9'-80.0' Fe rich	4.20E+02	4.00E+02	2.34E-09
79.9'-80.0' Fe rich	4.69E+02	4.49E+02	2.34E-09
74.0'-75.0'	4.29E+03	4.27E+03	2.34E-09
74.0'-75.0'	4.61E+03	4.59E+03	2.34E-09
79.1'-79.7'	3.62E+02	3.42E+02	2.34E-09
79.1'-79.7'	3.98E+02	3.78E+02	2.34E-09
65.0'-66.0'	1.78E+04	1.77E+04	2.34E-09
65.0'-66.0'	1.52E+04	1.52E+04	2.34E-09
10.8'-12.0'	1.83E+04	1.83E+04	2.34E-09
10.8'-12.0'	2.24E+04	2.23E+04	2.34E-09
91'0	2.03E+04	2.03E+04	2.34E-09
91'0	2.73E+04	2.73E+04	2.34E-09

Np-237

Mineral ID	kd based on stds	kd based on ctrls	molarity
108.0'-109.5'	-6.04E-01	1.66E-01	4.49E-05
108.0'-109.5'	-5.68E-01	1.89E-01	4.49E-05
79.9'-80.0' Fe rich	1.03E-01	8.94E-01	4.49E-05
79.9'-80.0' Fe rich	1.27E+00	2.11E+00	4.49E-05
74.0'-75.0'	2.02E+00	2.88E+00	4.49E-05
74.0'-75.0'	2.13E+00	2.99E+00	4.49E-05
79.1'-79.7'	3.08E-01	1.11E+00	4.49E-05
79.1'-79.7'	1.14E-01	9.01E-01	4.49E-05
65.0'-66.0'	1.98E+00	2.87E+00	4.49E-05
65.0'-66.0'	2.13E+00	2.98E+00	4.49E-05
10.8'-12.0'	5.04E+00	6.04E+00	4.49E-05
10.8'-12.0'	5.32E+00	6.30E+00	4.49E-05
91'0	2.23E+00	3.07E+00	4.49E-05
91'0	1.56E+00	2.38E+00	4.49E-05

Pu-239

Mineral ID	kd based on stds	kd based on ctrls	molarity
108.0'-109.5'	1.17E+00	1.23E+00	2.95E-07
108.0'-109.5'	1.71E+00	1.77E+00	2.95E-07

79.9'-80.0' Fe rich	1.81E+00	1.87E+00	2.95E-07
79.9'-80.0' Fe rich	1.73E+00	1.79E+00	2.95E-07
74.0'-75.0'	6.31E+00	6.39E+00	2.95E-07
74.0'-75.0'	6.64E+00	6.71E+00	2.95E-07
79.1'-79.7'	1.59E+00	1.65E+00	2.95E-07
79.1'-79.7'	1.50E+00	1.56E+00	2.95E-07
65.0'-66.0'	1.72E+01	1.73E+01	2.95E-07
65.0'-66.0'	1.79E+01	1.80E+01	2.95E-07
10.8'-12.0'	1.11E+02	1.12E+02	2.95E-07
10.8'-12.0'	1.08E+02	1.08E+02	2.95E-07
91'0	1.93E+01	1.94E+01	2.95E-07
91'0	1.89E+01	1.90E+01	2.95E-07

U-233

Mineral ID	kd based on stds	kd based on ctrls	molarity
108.0'-109.5'	2.52E+00	2.39E+00	9.70E-06
108.0'-109.5'	1.50E+00	1.38E+00	9.70E-06
79.9'-80.0' Fe rich	2.13E+00	1.99E+00	9.70E-06
79.9'-80.0' Fe rich	1.63E+00	1.50E+00	9.70E-06
74.0'-75.0'	3.11E+00	2.97E+00	9.70E-06
74.0'-75.0'	2.59E+00	2.46E+00	9.70E-06
79.1'-79.7'	2.07E+00	1.93E+00	9.70E-06
79.1'-79.7'	2.96E+00	2.82E+00	9.70E-06
65.0'-66.0'	3.40E+00	3.26E+00	9.70E-06
65.0'-66.0'	2.40E+00	2.27E+00	9.70E-06
10.8'-12.0'	2.78E+00	2.65E+00	9.70E-06
10.8'-12.0'	2.35E+00	2.22E+00	9.70E-06
91'0	2.97E+00	2.84E+00	9.70E-06
91'0	3.60E+00	3.46E+00	9.70E-06

Tc-95

Mineral ID	kd based on stds	kd based on ctrls	molarity
108.0'-109.5'	2.00E-01	9.09E-02	7.06E-12
108.0'-109.5'	4.65E-02	-6.06E-02	7.06E-12
79.9'-80.0' Fe rich	2.93E+01	2.90E+01	7.06E-12
79.9'-80.0' Fe rich	2.84E+01	2.82E+01	7.06E-12
74.0'-75.0'	8.11E-02	-2.60E-02	7.06E-12
74.0'-75.0'	7.77E-02	-2.99E-02	7.06E-12
79.1'-79.7'	-1.40E-01	-2.47E-01	7.06E-12

79.1'-79.7'	8.33E-02	-2.37E-02	7.06E-12
65.0'-66.0'	-1.82E-02	-1.25E-01	7.06E-12
65.0'-66.0'	-2.94E-02	-1.35E-01	7.06E-12
10.8'-12.0'	7.68E-02	-3.00E-02	7.06E-12
10.8'-12.0'	-3.97E-02	-1.44E-01	7.06E-12
91'0	9.03E-02	-1.58E-02	7.06E-12
91'0	1.38E-01	3.22E-02	7.06E-12