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STREAM SEDIMENT
DETAILED GEOCHEMICAL SURVEY
FOR DATE CREEK BASIN, ARIZONA

MASTER

T. R. Butz, D. J. Tieman, J. G. Grimes, C. S. Bard,
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Uranium Resource Evaluation Project

June 30, 1980

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A computer readable magnetic tape containing measurement, analysis, and location data may be purchased from the GJOIS Project, UCC-ND Computer Applications Dept., 4500 North Building, Oak Ridge National Laboratory, P. O. Box X, Oak Ridge, Tennessee 37830.

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ABSTRACT

Results of the Date Creek Basin detailed geochemical survey are reported. Field and laboratory data are reported for 239 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed.

Based on stream sediment geochemical data, significant concentrations of uranium are restricted to the Anderson Mine area. The 84th percentile concentrations of U-FL, U-NT, and U-FL/U-NT combined with low thorium/U-NT values reflect increased mobility and enrichment of uranium in the carbonate host rocks of that area. Elements characteristically associated with the uranium mineralization include lithium and arsenic. No well defined diffusion halos suggesting outliers of similar uranium mineralization were observed from the stream sediment data in other areas of the Date Creek Basin.

Significant concentrations of U-FL or U-NT found outside the mine area are generally coincident with low U-FL/U-NT values and high concentrations of zirconium, titanium, and phosphorus. This suggests that the uranium is related to a resistate mineral assemblage derived from surrounding crystalline igneous and metamorphic rocks.

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STREAM SEDIMENT
DETAILED GEOCHEMICAL SURVEY
FOR DATE CREEK BASIN, ARIZONA

INTRODUCTION

The National Uranium Resource Evaluation (NURE) Program was established by the U.S. Atomic Energy Commission, now the U.S. Department of Energy (DOE), in the spring of 1973 to assess uranium resources and to identify favorable areas for detailed uranium exploration throughout the United States. The principal objectives of the NURE Program are: (1) to provide a comprehensive in-depth assessment of the nation's uranium resources for national energy planning, and (2) to identify areas favorable for uranium resources. A NURE Program report covering uranium resource assessment in 116 National Topographic Map Series (NTMS) 1° x 2° quadrangles, which contain 100% of the currently estimated uranium resources, is targeted for 1980. The complete resource assessment of the 272 highest-priority quadrangles is scheduled for completion in 1985, and the first comprehensive assessment report of the entire United States is scheduled for completion in 1988. This program, which is being administered by DOE, is expected to increase the activity of commercial exploration for uranium in the United States.

The NURE Program consists of five parts:

1. Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) Program,
2. Aerial Radiometric and Magnetic Survey,
3. Surface Geologic Investigations,
4. Drilling for Geologic Information, and
5. Geophysical Technology Development.

The objective of the HSSR Program is to provide information to be used in accomplishing the overall NURE Program objectives. This is accomplished by a reconnaissance of surface water, groundwater, stream sediment, and lake sediment. The survey is being conducted by three Government-owned laboratories. Union Carbide Corporation, Nuclear Division (UCC-ND), under contract with DOE, is conducting its survey in 154 NTMS 1° x 2° quadrangles which cover approximately 2,500,000 km² (1,000,000 mi²) of the Central United States. This area includes most of the states of Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Wisconsin, Michigan, Indiana, Illinois, and Iowa, as well as parts of Arkansas, Missouri, New Mexico, and Ohio.

As part of the HSSR Program, detailed geochemical surveys were initiated in the fall of 1978 to supply comprehensive detailed geochemical data from specific areas. These surveys are designed to characterize the hydrogeochemistry; stream sediment geochemistry; and/or radiometric patterns of known or potential uranium occurrences. The data can be used to interpret data from the 1° x 2° NTMS quadrangle basic data surveys.

Described herein are the results of the work done by UCC-ND in the Date Creek Basin, Arizona (see Figure 1).

LOCATION AND PHYSIOGRAPHY

The Date Creek Basin detailed geochemical survey area is located in the southwestern portion of the Prescott, Arizona NTMS 1° x 2° quadrangle, as outlined on the generalized geologic map of Arizona, shown in Figure 2. The area investigated covers an estimated 900 km² (350 mi²) and includes parts of Yavapai, Mohave, and Yuma Counties.

The Date Creek Basin lies in the Sonora and southernmost Mohave sections of the Basin and Range Province. In Arizona, this province is characterized by elongated north to northwest-trending mountain ranges separated by valleys containing fluvial and lacustrine deposits. The basin consists of relatively flat or locally rolling hills with higher relief found along major drainages and within a dissected plateau region in the northeastern portion of the area. The basin is encircled by mountain ranges (the Poachie Range to the north, the Black Mountains to the northeast, the Artillery Mountains to the northwest, the Buckskin-Rawhide Mountains to the west, and the Harcuvar Mountains to the south), all of which attain elevations less than 610 m (2,000 ft) above the valley floor.

CLIMATE

The Date Creek Basin has an arid, Sonora Desert-type climate. Average yearly precipitation is approximately 18 to 20 cm (7 to 8 in.) and occurs in two generally predictable seasons. Summer thundershowers occur from July through September while winter storms periodically move in from December through March. Snow may fall during the winter, but quickly melts except in the higher elevations. The hottest month is July, which has a mean maximum temperature of 41°C (105°F) and a mean minimum temperature of 23°C (73°F). Often, however, temperatures may exceed 46°C (115°F) during the late afternoon. January is the coolest month with mean maximum and minimum monthly temperatures of 17°C (62°F) and 1°C (34°F), respectively. The mean annual percentage of sunshine for the area is nearly 85% (National Oceanic and Atmospheric Administration, 1974).

RELATED STUDIES

Most studies of the Date Creek Basin have centered around investigations by federal agencies and private industry into the geology and reserves of the Anderson Mine (uranium) or the Artillery Mountain manganese district. Lasky and Webber (1944) completed studies of the Tertiary rocks of the Artillery Mountain manganese district which are time-equivalent to those in the Anderson Mine area. The first description of the geology of the Anderson Mine area was provided by Reyner, et al (1956) who also included projected uranium reserves for the deposit.

Figure 1

INDEX MAP SHOWING THE BOUNDARIES FOR THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure 2

GENERALIZED GEOLOGIC MAP OF ARIZONA WITH LOCATION
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA
(AFTER KING, ET AL, 1974)

Sherborne, et al (1979) utilized core data collected by the Minerals Exploration Company to present a more detailed interpretation of the stratigraphy, structure, depositional environments, geochemistry, and origin of the uranium mineralization at the Anderson Mine.

The Date Creek Basin has been previously investigated by the NURE Program. Lawrence Livermore Laboratory has released a basic data report (Clark, 1979) containing analyses for water and stream sediment samples collected in the Prescott NTMS Quadrangle. Analyses of a limited number of samples from the Date Creek Basin failed to identify the Anderson Mine or indicate the presence of anomalous concentrations of uranium. An orientation study of the Artillery Peak 15-Minute Quadrangle completed by Lawrence Livermore Laboratory supplied geochemical data and a brief interpretation of the manganese and uranium-bearing Tertiary rocks of this area (Puchlik, et al, 1979).

GEOLOGY

STRATIGRAPHY

Much of the Date Creek Basin is covered by Pliocene, Pleistocene, and Holocene alluvial sediments that conceal a diversified sequence of Tertiary volcanic and sedimentary rocks. No Paleozoic or Mesozoic rocks have been recognized within the basin, though scattered outcrops have been observed in the surrounding highlands. Exposure of the Tertiary rocks is limited to type-sections cropping out in the northeastern corner of the basin (Anderson Mine sequence), the northwestern corner of the basin (Artillery Peak sequence), and along the Santa Maria River. The Tertiary rocks display complex facies relationships rendering correlation of time-equivalent lithologies extremely difficult across the basin. The stratigraphy of the survey area presented in this section is based on the classification of the Anderson Mine sequence proposed by Sherborne, et al (1979). A brief description of the Artillery Peak sequence (Otton, 1977a; Lasky and Webber, 1944) is also included since western portions of the survey area may be genetically more related to them. A generalized geologic map, as well as a stratigraphic column, showing the various lithologic codes used in this survey is included in Figure 3 and Plate 4. The nomenclature used in the discussion is more detailed than is represented on the geologic map. Several units described by Sherborne, et al (1979) have been combined on this map and discrepancies in mapping between the Arizona Bureau of Mines and Sherborne also exist.

According to Sherborne, et al (1979), the Anderson Mine type-section is more than 1,100 m (3,600 ft) thick. Sherborne has divided this section into five informal stratigraphic units which overlie Precambrian basement rock: the basal Tertiary rocks, the Arrastra Volcanics, the Anderson Mine Formation, the Flat Top Formation, and a capping basalt-agglomerate unit.

STRATIGRAPHIC COLUMN

ERA	SYSTEM	GEOLOGIC CODE GROUPS	UNITS
CENOZOIC	QUATERNARY	QD	SAND, SILT AND GRAVEL
		QB	BASALT FLOWS, TUFF AND AGGLOMERATE
	QUATERNARY OR TERTIARY	QTS	SAND, SILT, GRAVEL AND CONGLOMERATE
		QTB	BASALT FLOWS, TUFF AND AGGLOMERATE
		QTL	LAKE DEPOSITS, INCLUDES SILTSTONE, SANDSTONE AND LIMESTONE
	TERTIARY	TR	RHYOLITE
		TS	SAND, GRAVEL AND CONGLOMERATE
		TA	ANDESITE FLOWS, DIKES, PLUGS, TUFF AND AGGLOMERATE
		TKS	SANDSTONE, SHALE, CONGLOMERATE AND SOME VOLCANIC ROCKS
		TLI	RHYOLITIC TO ANDESITIC DIKES AND PLUGS
CENOZOIC OR MESOZOIC		TLG	GRANITIC INTRUSIVE
MESOZOIC	CRETACEOUS	MSS	MESOZOIC SHALE, SANDSTONE, CONGLOMERATE AND LIMESTONE (UNDIVIDED)
		KA	ANDESITE
		KS	LIMESTONE CONGLOMERATE
		KI	RHYOLITIC TO ANDESITIC DIKES AND PLUGS
MESOZOIC OR PALEOZOIC		PMU	SHALE, QUARTZITE AND LIMESTONE
PALEOZOIC		PS	PALEOZOIC LIMESTONE, SHALE, SANDSTONE AND QUARTZITE (UNDIVIDED)
	CAMBRIAN	CDI	REDWALL AND MARTIN LIMESTONE
PRECAMBRIAN		PCGR	GRANITE
		PCSH	SCHIST
		PCGN	GRANITE GNEISS
		PCGS	GRANITE AND SCHIST UNDIFFERENTIATED

SOURCE OF GEOLOGY:

1. ARIZONA BUREAU OF MINES; GEOLOGIC MAP OF MOHAVE COUNTY, ARIZONA (1959).
2. ARIZONA BUREAU OF MINES; GEOLOGIC MAP OF YAVAPAI COUNTY, ARIZONA (1958).
3. ARIZONA BUREAU OF MINES; GEOLOGIC MAP OF YUMA COUNTY, ARIZONA (1960).

LEGEND FOR FIGURE 3

Figure 3

GENERALIZED GEOLOGIC MAP OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

The basal Tertiary sequence is well exposed in several downdropped fault blocks north of the Santa Maria River in the Poachie Range. It is composed of up to 110 m (360 ft) of reddish, arkosic sandstone and conglomerate overlain by rhyolitic ignimbrites, air fall tuffs, and water-reworked tuffs. These rocks unconformably overlie the Precambrian basement and have been correlated with the Eocene Lower Artillery Formation found in the northwestern portion of the basin.

Unconformably overlying the basal Tertiary sequence are the Arrastra volcanics (stratigraphically equivalent to TA in the stratigraphic column, Figure 3). However, northwest of the Anderson Mine, the basal sequence is missing, resulting in a Precambrian basement - Arrastra Volcanics contact. The Arrastra Volcanics section consists of a minimum of 457 m (1,500 ft) of basalt flows, vitrophyric augite and biotite andesite flows, andesitic fragmental tuff beds, and interlayered conglomeratic units. An erosional surface developed on the post-Arrastra Volcanics terrain during which time thick paleosoils and colluvial deposits (up to 20 m) were formed. These horizons have been preserved as reddish clays containing abundant volcanic fragments. The Arrastra Volcanics have been tentatively correlated with the Eocene-Oligocene (?) Upper Artillery Formation of the Artillery Peak type-section. The existence of two dacite plugs south of the Santa Maria River and the abundance of thick flows which grade into fluvially reworked tuffaceous units away from the plug vicinity suggests that the Arrastra Volcanics originated from a proximal source.

The Anderson Mine Formation (stratigraphically equivalent to QTL in the stratigraphic column, Figure 3) is composed of Early to Middle Miocene sediments which contain economic uranium mineralization. The lower member consists of up to 120 m (390 ft) of arkosic sedimentary rocks and locally derived volcanic sandstones and conglomerates. This member represents the distal portion of a subaerial fan conglomerate deposit which thickens to the south and west of the mine area. The upper member is a complex sequence, 80 to 140 m (260 to 460 ft) thick, that can be divided into the following four subunits: (1) a lower carbonaceous unit 20 m (66 ft) thick; (2) an intermediate clastic unit 12 m (39 ft) thick containing greenish-gray to tan, tuffaceous siltstone and sandstone with minor subarkosic sandstone and carbonaceous mudstone; (3) an upper carbonaceous unit 20 m (66 ft) thick; and (4) an upper tuff and limestone unit 80 m (262 ft) thick consisting of greenish-gray, tuffaceous mudstone, reworked vitric tuffs, yellowish to pinkish-gray marlstones, limestones, and minor carbonaceous beds. The limestone and marlstone beds in this subunit are often extensively replaced by chalcedony.

The two carbonaceous units, which are the major uranium-bearing host rocks in the Anderson Mine Formation, are tabular in shape and consist of a complex sequence of greenish-gray tuffaceous mudstones, interstratified with dark gray to black mudstones and siltstone, fossiliferous marlstones, tuffaceous siltstones, calcareous tuffs, and minor arkosic sandstones and lignites. Significant lateral and vertical lithological

variation exists within the carbonaceous units, and a particular lithology may be vertically repeated several times, giving the section a stacked appearance. The carbonaceous units laterally interfinger with limestone and marls to the south and east of the mine area and wedge out against Arrastra age paleohighs to the north.

The complex facies relationships illustrated by the Upper Anderson Mine Formation are indicative of lacustrine, paludal, and, more rarely, fluvial environments. These depositional environments were present in the vicinity of the Anderson Mine in a restricted downfaulted basin surrounded by Arrastra age highlands. Lateral and vertical facies patterns developed as sedimentation regimes migrated in response to the following: (1) variable clastic sediment influx, (2) climatic control of lake levels, (3) rate of basin subsidence, (4) sporadic occurrence of proximal and distal volcanic activity, and (5) erosion and subsequent burial of adjacent uplands.

The entire Anderson Mine Formation has undergone extensive diagenetic alteration in the form of silicification, calcification, zeolitization, and argillic alteration. All of these processes were contemporaneous, but initial stages of silicification and calcification probably preceded clay mineral and zeolite formation. Silicification is extremely widespread in the upper units of the Upper Anderson Mine Formation and has occurred in two stages. During the initial stage, considerable thicknesses of the upper limestone, marlstone, tuff, and carbonaceous beds were penetrated and replaced by silica-rich fluids. The later stage resulted in the infilling of voids and fractures with chalcedony. These mineralizing fluids appear to have been formed during the diagenetic devitrification of volcanic glass shards found abundantly in the tuffaceous lake sediments. Diagenetic calcification of the Anderson Mine Formation has resulted in localized cementation of arkosic sandstones and the replacement of feldspars (in the tuffs and tuffaceous, carbonaceous mudstones) and micrite (in the marlstones and limestones) with calcite. Argillic alteration of the tuffaceous sediments has formed light greenish-gray bentonitic clays such as smectite, illite, and more rarely, hectorite (lithium-bearing magnesium clay). Accompanying zeolitization of the sediments has also produced clinoptilite and possibly analcime (Sherborne, et al, 1979).

The Middle to Late Miocene Flat Top Formation (included in QTL) unconformably overlies the Anderson Mine Formation. It consists of an upward coarsening sequence of yellowish-brown arkosic siltstones, coarse sandstones, and conglomerate with interspersed layers of reworked tuffaceous siltstones. Up to 170 m (560 ft) of these sediments were deposited in an extensive paleochannel system which actively eroded away a significant portion of the underlying lacustrine section. The source of much of the coarser clastics was Precambrian crystalline basement rock with subordinate contributions from Tertiary volcanics.

A basalt, mud flow conglomerate, and conglomerate sequence of Late Miocene age (stratigraphically equivalent to QTB in the stratigraphic column, Figure 3) unconformably overlies the Flat Top Formation. Deposition of these volcanic and volcanoclastic materials was localized in channels which scoured into the Flat Top paleosurface. Intracanyon basalt flows and channel-reworked agglomeratic sandstones and conglomerates are common in the unit. In the northwestern corner of the basin, the Artillery Peak type-section (Otton, 1977a; Lasky and Webber, 1944) consists of the Artillery Formation (Eocene), an unnamed unit composed of interbedded tuff and sandstone (Lower Miocene), the Chapin Wash Formation (Middle to Late Miocene), and a capping basalt (Late Miocene). Lithologically, the Artillery Formation (apparently stratigraphically equivalent to the basal Tertiary rocks and the Arrastra Volcanics of the Anderson Mine type-section) is composed of, from oldest to youngest, arkose to arkosic conglomerate, fine-grained calcareous siltstone and sandstone, volcanic pebble conglomerate, limestone, meta-volcanic breccia, limestone, and basalt. The Chapin Wash Formation includes a basal unit of basalt and conglomerate locally intruded by andesitic bodies, massive megabreccias, and manganese conglomerates and sandstones. The various lithologies are separated by numerous unconformities and have been deposited in fluvial, alluvial fan, playa, and lacustrine environments created as a result of localized downfaulting.

STRUCTURE

The Tertiary rocks in the survey area have been subjected to three stages of deformation - an initial period of folding followed by two later episodes of Basin and Range faulting. Major folding accompanied by differential uplift occurred along a north-northwest trend before extrusion of the Arrastra Volcanics. In some areas, the basal Tertiary arkoses were tilted up to 35° to the south during this stage. Basin and Range faulting probably occurred intermittently throughout the Middle Tertiary, but intensified immediately before and subsequent to deposition of the Anderson Mine Formation. The majority of the resulting normal faults trend northwest (north 10 to 65° west) although east-west and northeast-trending faults have been observed in various areas of the basin. Displacement along the northwest-trending faults is to the southwest, south of the Santa Maria River and to the northeast, north of the river. Tilting and rotation of beds along fault zones have produced an average dip in the Anderson Mine Formation of 8° (ranging from 0 to 14°), but may be locally as much as 45° . Other deformational features such as second order faults, scissor faults, gravity gliding faults, shear and fracture zones, and small-scale normal faults are associated with the major fault zones (Sherborne, et al, 1979).

A large-scale deformational feature which passes through the southwestern corner of the Date Creek Basin is the northwest-trending "Aubrey" lineament. This poorly understood basement feature separates

normal northwest-trending mountain ranges north of the lineament from uncharacteristic northeast-trending ranges to the south. It also defines a boundary separating Precambrian basement rock to the north from Tertiary (?) metamorphic complexes to the south (Suneson and Lucchitta, 1979).

SURFACE DRAINAGE

Within the area sampled, there are three major drainage systems - the Santa Maria River, Date Creek, and Bullard Wash - all of which eventually drain into the Alamo Reservoir. The Santa Maria River flows east to west along the northern portion of the area sampled draining volcanic, sedimentary, and gneissic-granitic rocks. The headwater tributaries of Date Creek drain volcanic rocks in the northeastern and eastern portion of the area sampled. Eventually these tributaries coalesce southward into a major wash which trends southeast to northwest across the area sampled. Bullard Wash flows southeast to northwest in the southwest and south central portion of the area sampled and drains the Tertiary (?) metamorphics composing the Harcuvar and Buckskin Mountains to the south. The dominant grain size of the bed material in these streams is sand and pebbles.

Stream gradients in the basin are generally low, except in the plateau area surrounding the Anderson Mine. Here, in this dissected region, the smaller tributaries often exhibit moderate to high gradients. During most of the year, the streams are dry and flow only during extended winter rains or sporadic summer thunderstorms. At these times, sediment transport may be very rapid. Walcott, et al (1956) presented discharge data for the Santa Maria River spanning a 10-yr measuring period. During this time, the river had a momentary maximum discharge of 33,600 cfs, minimum discharge of 3 cfs, and a mean discharge of 28.9 cfs. Along the Santa Maria River, discharge of groundwater greatly exceeds surface flow for most of the year.

URANIUM OCCURRENCES

The Anderson Mine (lat. $34^{\circ}18'$ N. and long. $113^{\circ}16'$ W.), located in the northeastern portion of the Date Creek Basin, has been the most important producer of uranium in the basin area. Past production (between 1955 and 1959) has resulted in the extraction of approximately 33,230 lb of U_3O_8 and 10,055 lb of vanadium from ore averaging 0.15% U_3O_8 . Projected reserves probably exceed 3,000,000 lb U_3O_8 , based on utilization of ore ranging in grade from 0.03 to 0.10% U_3O_8 with an average grade of 0.07% U_3O_8 (Sherborne, et al, 1979).

The Anderson Mine is a stratiform-type deposit in which mineralized zones averaging 1 to 3 m (3 to 10 ft) thick are often stacked into composite thicknesses of 15 m (49 ft) or more. The deposit is bounded by dimensions of 1,000 m (3,300 ft) by 1,500 m (4,900 ft) and extends

downdip 1,000 m (3,300 ft) into the subsurface. Two types of ore occur at the Anderson Mine: (1) highly silicified, oxidized tuffaceous siltstone containing abundant organics; and (2) less silicified, carbonaceous siltstones and mudstones. Uranium mineralization in the oxidized zone consists of fine-grained carnotite deposited along fractures and bedding planes and uraniferous silica in the form of jasper or chalcedony. Much of the near-surface carnotite mineralization may be secondary. In the subsurface, the carbonaceous mudstone ore contains a urano-silica complex resembling coffenite. It is finely disseminated in the matrix or occurs as patches and veinlets closely associated with carbonaceous material (Otton, 1977b).

The combination of lacustrine and paludal environments affords the appropriate geochemical setting for concentration of uranium mineralization. Paludal sediments containing abundant organic debris such as leaves, twigs, roots, palm wood stumps, and grasslike plants were deposited in low-energy, marsh-type environments adjacent to the enclosing highlands. Transgression of the lacustrine environment into these areas preserved the organic-rich sediment beneath a veneer of uranium-bearing, tuffaceous lake sediments (originally containing an average 25 ppm uranium). During compaction, dewatering, and diagenetic alteration of the resulting thick sequence of interbedded paludal and lacustrine sediments, uranium and silica were leached from the tuffaceous sediments. Alkaline carbonate pore water is believed to be responsible for the mobilization and transportation of uranium. Precipitation and fixation of the uranium occurred when uranyl carbonate complexes encountered the reducing environment provided by diffusing H_2S in and surrounding the organic-rich carbonaceous zones (Sherborne, et al, 1979).

Occurrences similar to the Anderson Mine deposit exist in areas surrounding the Date Creek Basin. In the Artillery Peak area, limited production has been reported from the Candy Bar, Lucky Four, and Master-son Mines where uranium mineralization occurs in thin beds of carbonaceous, often silicified, mudstone, sandstone, and limestone within the Artillery Formation (Keith, 1970). Uraniferous lacustrine deposits are also known in the Ester Basin north of the Rawhide Mountains and the Lincoln Ranch Basin south of the Buckskin Mountains (Otton, 1977b).

Other types of uranium occurrences include uranium-bearing pegmatitic dikes and fault zones in Precambrian granite at the White Owl and Gray Boy claims (west of Black Mesa), radioactive schists and veins in Precambrian granite (State Mine and Fools Peak Area), and the Red Hills prospect north of the Rawhide Mountains. This occurrence consists of radioactive shear zones and associated tectonic and/or sedimentary breccias cemented by silica, carbonate, manganese oxides, and in some cases containing barite, fluorite, or copper mineralization (Puchlik, et al, 1979).

SAMPLE COLLECTION

CHRONOLOGY OF THE SURVEY

The Date Creek survey area was sampled by UCC-ND personnel in June and early July of 1979. Laboratory analyses, as well as compilation and verification of all field and laboratory data, were completed in October 1979. The final field and laboratory data base used to prepare the statistical and areal distribution of uranium and other related variables for this report was completed in November 1979.

FIELD PROCEDURES

A total of 239 stream sediment samples and 246 radiometric measurements was collected within the area sampled. Groundwater samples were not obtained due to the absence of wells and seasonal dry condition of most of the springs in the basin. Sample locations for stream sediment and radiometric sites are plotted on Plates 1 and 5, respectively. Drainage basins are drawn on Plate 1 to illustrate the surface area potentially contributing sediment to a given sample site, thus allowing more accurate determination of specific lithological input.

A BSGI Scintrex scintillometer was utilized to take a total gamma reading at each stream sediment site. The measurement was taken on that portion of the bed material represented in the sediment sample. The intended purpose of the radiometric sampling was to determine whether a scintillometer could be used to detect perceptible differences in uranium content in stream sediments. If successful, this approach would facilitate in-the-field evaluation and selection of detailed interbasin sampling sites. Several scintillometer readings were also taken on outcrops of the lacustrine sequence exposed in the vicinity of the Anderson Mine.

Detailed information regarding techniques in sample collection, recording site data, field equipment, and field measurements may be found in the following reports: "Hydrogeochemical and Stream Sediment Reconnaissance Procedures for the Uranium Resource Evaluation Project" (Arendt, et al, December 1979); and "Procedures Manual for Stream Sediment Reconnaissance Sampling" (Uranium Resource Evaluation Project, May 1978). Field observations were recorded on the field form shown in Table C-2 and are included in the microfiche in Appendix D.

CONTAMINATION

Contamination of the sediment was consciously avoided, but several possible contaminants exist. Streams were sampled upstream of road crossings whenever possible, although quite often roads crossed the upstream portion of the basin sampled. Several samples were collected in basins draining the Anderson Mine and other adjacent uranium prospects to obtain geochemical data representative of the ore-bearing

units. Possible contamination from mine tailings, road materials, or wind blown material was noted on the field form. Along Date Creek and Bullard Wash, the drainage consists of a network of interconnected washes. Therefore, the sediment collected from supposed discrete channels will be somewhat homogenized in a given area and reflect a composite source. Dark resistate minerals are abundant in the Date Creek sediments and are known to contain significant concentrations of various incorporated elements, including uranium. Thus, an effort was made to exclude accumulations of this sediment fraction from the sample to prevent the appearance of false anomalies.

CHEMICAL ANALYSIS

All samples collected in the field geology program were returned to the URE Project laboratory in Oak Ridge, Tennessee for preparation and analysis. The elements determined and the analytical techniques used along with the appropriate detection limits are given in Table 1. These detection limits are considered the best average during normal operation; however, some variables have values reported below these limits. Stream sediments samples were dried overnight at 85°C and sieved to collect the <150- μ m fraction. Part of the sediment sample was dissolved in 10 ml of 1:1 nitric-hydrofluoric acid. The analytical procedures which were used have been described by Cagle (1977) and Arendt, et al (December 1979). All observed data from all samples are included in the microfiche in Appendix D.

QUALITY CONTROL

MEASUREMENTS CONTROL

The procedures used to analyze URE Project samples require that calibration standards, check samples, and blanks be analyzed along with normal samples to ensure the validity of the reported results. A measurements control program provides information concerning precision and reliability of these measurements. Control samples of three sediment batches are submitted anonymously along with routine samples on a daily basis. A statistical summary of results reported on control samples, which were analyzed along with the samples included in this survey, is given in Table 2. Results of uranium analysis of sediment control samples obtained from the Ames Laboratory as part of the Multi-laboratory Analytical Quality Control for the HSSR Program are reported by D'Silva, et al (1980).

PRINCIPAL COMPONENT ERROR ANALYSIS

A principal component analysis of data from stream sediment samples was used to produce an ordered list of samples using the eigenvalue statistics as described by Kane, et al (1977), where the most extreme samples

Table 1

DETECTION LIMITS OF VARIABLES DETERMINED IN WATER AND SEDIMENT SAMPLES

Variable	Method	Detection Limits	
		Sediment (ppm)	Water (ppb)
U-FL	Fluorometry	0.25	0.2
U-MS	Mass Spectrometry-Isotope Dilution	--	0.02
U-NT	Neutron Activation-Delayed Neutron Count	0.02	--
As	Atomic Absorption	0.1	0.5
Se	Atomic Absorption	0.1	0.2
Ag	Plasma Source Emission Spectrometry	2	2
Al	Plasma Source Emission Spectrometry	0.05(a)	10
B	Plasma Source Emission Spectrometry	10	4
Ba	Plasma Source Emission Spectrometry	2	2
Be	Plasma Source Emission Spectrometry	1	1
Ca	Plasma Source Emission Spectrometry	0.05(a)	0.1(b)
Ce	Plasma Source Emission Spectrometry	10	30
Co	Plasma Source Emission Spectrometry	4	2
Cr	Plasma Source Emission Spectrometry	1	4
Cu	Plasma Source Emission Spectrometry	2	2
Fe	Plasma Source Emission Spectrometry	0.05(a)	10
Hf	Plasma Source Emission Spectrometry	15	--
K	Plasma Source Emission Spectrometry	0.05(a)	0.1(b)
La	Plasma Source Emission Spectrometry	2	--
Li	Plasma Source Emission Spectrometry	1	2
Mg	Plasma Source Emission Spectrometry	0.05(a)	0.1(b)
Mn	Plasma Source Emission Spectrometry	4	2
Mo	Plasma Source Emission Spectrometry	4	4
Na	Plasma Source Emission Spectrometry	0.05(a)	0.1(b)
Nb	Plasma Source Emission Spectrometry	4	--
Ni	Plasma Source Emission Spectrometry	2	4
P	Plasma Source Emission Spectrometry	5	40
Pb	Plasma Source Emission Spectrometry	10	--
Sc	Plasma Source Emission Spectrometry	1	1
Si	Plasma Source Emission Spectrometry	--	0.1(b)
Sr	Plasma Source Emission Spectrometry	1	2
Th	Plasma Source Emission Spectrometry	2	--
Ti	Plasma Source Emission Spectrometry	10	2
V	Plasma Source Emission Spectrometry	2	4
Y	Plasma Source Emission Spectrometry	1	1
Zn	Plasma Source Emission Spectrometry	2	4
Zr	Plasma Source Emission Spectrometry	2	2
SO ₄	Spectrophotometry	--	5(b)
Cl	Spectrophotometry	--	10(b)

(a) Detection limits expressed in percent.

(b) Detection limits expressed in ppm.

Table 2

SUMMARY OF MEASUREMENTS CONTROL RESULTS OBTAINED WITH STREAM SEDIMENT SAMPLES
FROM THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Element	Method	Batch Q-1				Batch R-3				Batch S-3			
		No. of Samples	Mean (ppm)	Standard Deviation (ppm)	Coefficient of Variation	No. of Samples	Mean (ppm)	Standard Deviation (ppm)	Coefficient of Variation	No. of Samples	Mean (ppm)	Standard Deviation (ppm)	Coefficient of Variation
U	FL(a)	40	0.79	0.268	0.34	37	4.76	0.469	0.11	38	20.52	2.674	0.09
U	NT(b)	39	0.67	0.160	0.24	50	4.91	0.102	0.02	35	26.25	0.797	0.03
AS	AA(c)	17	1.8	0.25	0.14	27	3.6	0.64	0.18	19	26.4	3.11	0.12
SE	AA	12	0.5	0.31	0.57	28	0.2	0.43	2.02	20	1.4	0.62	0.45
AL	PS(d)	36	9,700.0	490.0	0.05	39	34,100.0	2,730.0	0.00	30	48,700.0	3,400.0	0.07
B	PS	38	7.0	3.5	0.46	34	20.0	7.1	0.34	30	61.0	10.3	0.17
BA	PS	38	130.0	14.6	0.11	39	454.0	51.0	0.11	32	314.0	31.1	0.10
BE	PS	37	0.0	0.6	0.94	40	0.0	10.3	10.27	32	2.0	4.0	1.74
CA	PS	38	1,200.0	100.0	0.08	40	3,100.0	300.0	0.10	31	16,900.0	80.0	0.06
CE	PS	37	19.08	3.677	0.19	39	68.82	7.196	0.10	29	55.59	4.968	0.09
CO	PS	38	4.0	2.7	0.59	40	10.0	2.2	0.20	31	33.0	3.1	0.09
CR	PS	38	14.0	2.1	0.14	39	28.0	3.2	0.11	32	65.0	6.6	0.10
CU	PS	35	3.0	0.8	0.22	38	20.0	1.5	0.07	30	69.0	2.9	0.04
FE	PS	37	9,700.0	390.0	0.04	40	18,000.0	1,070.0	0.06	30	40,800.0	2,070.0	0.05
K	PS	37	1,900.0	190.0	0.10	38	9,900.0	930.0	0.09	31	17,200.0	2,000.0	0.12
LI	PS	37	9.0	0.8	0.08	39	23.0	1.8	0.08	32	35.0	3.6	0.10
MG	PS	38	1,100.0	50.0	0.05	39	2,200.0	110.0	0.05	32	5,600.0	260.0	0.05
MN	PS	37	317.0	9.9	0.03	40	1,909.0	87.8	0.05	30	404.0	15.9	0.04
MO	PS	1	0.0	0.0	0.0	40	2.0	0.9	0.41	29	43.0	3.7	0.08
NA	PS	1	0.0	0.0	0.0	40	1,600.0	190.0	0.13	31	1,600.0	220.0	0.14
NB	PS	37	2.0	0.7	0.32	41	8.0	4.3	0.49	33	2.0	1.6	0.58
NI	PS	37	6.0	1.0	0.16	41	20.0	3.1	0.15	30	108.0	6.3	0.06
P	PS	36	70.0	6.0	0.09	35	2,149.0	217.3	0.10	28	1,441.0	83.8	0.06
PB	PS	28	5.0	3.0	0.50	27	38.0	5.6	0.14	28	21.0	3.6	0.16
SC	PS	38	1.0	0.5	0.31	41	5.0	0.8	0.16	32	10.0	0.8	0.08
SR	PS	36	19.17	1.320	0.07	39	55.33	4.054	0.07	32	85.56	6.133	0.07
TH	PS	38	2.0	1.7	0.74	41	8.0	2.8	0.34	33	8.0	2.5	0.30
TI	PS	38	572.0	54.8	0.10	39	3,321.0	369.9	0.11	32	2,123.0	174.9	0.08
V	PS	35	20.0	0.9	0.04	38	55.0	4.4	0.08	30	166.0	6.7	0.04
Y	PS	37	4.0	0.3	0.08	39	20.0	1.7	0.08	30	33.0	1.6	0.05
ZN	PS	36	13.0	2.1	0.16	35	93.0	7.5	0.08	29	185.0	12.0	0.06
ZR	PS	38	30.0	2.9	0.10	38	136.0	10.9	0.08	31	83.0	6.0	0.07
HP	PS	27	2.11	1.577	0.75	27	3.83	2.685	0.70	28	1.95	1.455	0.75
LA	PS	28	20.89	3.023	0.14	27	78.00	15.056	0.19	28	90.61	4.787	0.05

(a) Fluorometric analysis.

(b) Neutron activation delayed neutron count.

(c) Atomic absorption.

(d) Plasma source emission spectroscopy.

were listed first. Additional samples were identified if single-element measurements were outside a three standard deviation confidence interval around the mean. The laboratory and field data from the samples identified by this procedure were reviewed. Four stream sediment samples (900264, 900315, 900419, and 900492) were submitted for reanalysis. The original results were compared to the results from reanalysis. Of the more than 60 individual analyses that were compared, the only results which were considered to be in error in the original analysis and thus require corrections were two soluble uranium values and multielement values for one sample. This low error rate indicates a high level of reliability for the laboratory measurements.

GEOCHEMICAL RESULTS

A statistical summary of all geochemical variables determined and the correlation matrix of selected variables of stream sediment samples represented in the Date Creek detailed geochemical survey are presented in Appendix A. Areal distribution maps; log frequency, log probability, and percentile plots; and tabular data listings for selected variables are also included. All field and laboratory data for stream sediment samples may be found on the microfiche in Appendix D. A generalized geologic map of the survey area is shown on Plate 4 and Figure 3. Details of all sampling, analytical, and statistical procedures are discussed by Arendt, et al (1979).

GEOCHEMICAL DISTRIBUTIONS IN STREAM SEDIMENTS

Sample site locations and the outline of drainage basins from which stream sediment samples were collected in the area sampled are shown on Plate 1. Symbol plots for hot-acid-soluble uranium, as determined by fluorometric analysis (U-FL), and for thorium, as determined by plasma source emission spectrometry, are presented on Plates 2 and 3, respectively.

Table 3 presents the number of stream sediment samples collected from each of the major geologic units sampled. Data for all samples are included on the microfiche in Appendix D.

Observed data for the variables soluble uranium (U-FL), total uranium determined by neutron activation (U-NT), (U-FL)/U-NT, thorium, thorium/U-NT, arsenic, lithium, manganese, phosphorus, titanium, and zirconium are listed in Table A-3. The figures in Appendix A present log frequency, lognormal probability, percentile, and areal distribution plots for these same variables.

Uranium

The areal distribution of U-FL (Plate 2 and Figure A-1b) and U-NT (Figure A-2b) in stream sediment shows that uranium concentrations above

Table 3

DISTRIBUTION OF SAMPLES BY GEOLOGIC UNIT
FROM THE DATE CREEK DETAILED GEOCHEMICAL SURVEY AREA, ARIZONA

<u>Surface Geologic Unit</u>	<u>Geologic Unit Code</u>	<u>No. of Sediment Samples</u>	<u>No. of Radiometric Samples</u>
Sand, Silt and Gravel	QD	16	16
Basalt, Tuff and Agglomerate	QB	2	2
Silt, Sand and Gravel	QTS	142	142
Basalt Flows, Tuff and Agglomerate	QTB	4	4
Flat Top Formation and Anderson Mine Formation	QTL	9	15
Sandstone, Shale and Conglomerate (may include Lower Anderson Mine Formation)	TKS	8	10
Arrastra Volcanics	TA	49	47
Dikes and Plugs	TLI	1	1
Granitic Gneiss	PCGN	8	9
Total		239	246

the 84th percentile (4.36 and 8.00 ppm, respectively) are found grouped in four general areas: (1) outlining the surface exposure of the lacustrine carbonates in the Anderson Mine area; (2) in recent alluvium in the southwestern portion of the area sampled; (3) in Precambrian granites north of the Anderson Mine paleobasin; and (4) in Tertiary sandstones, siltstones, conglomerates, and tuffs along the Santa Maria River in the northern portion of the area sampled. Scattered samples containing above background concentrations of both U-FL and U-NT are also found in alluvium covering other portions of the area sampled. The areal distribution plot of U-FL/U-NT (Figure A-3b) is used in determining the location and extent of those areas which have higher than normal amounts of uranium in sediment in a soluble form. Those U-FL/U-NT values greater than the 84th percentile (0.79) have more than 79% of the total uranium in a soluble form, and thus delineate, within the areas of greater than 84th percentile concentrations of U-FL and U-NT, those areas most favorable for an economic concentration of uranium.

In the Anderson Mine area bounded by lat. $34^{\circ}18'$ to $34^{\circ}19'$ N. and long. $113^{\circ}16'$ to $113^{\circ}19'$ W., six samples (900055, 900315, 900321, 900323, 900419, and 900427) contain U-FL and U-NT concentrations above the 84th percentile. The U-FL/U-NT value for four of the six samples is also above the 84th percentile and indicates that a high percentage of the uranium in this area is acid soluble. These samples represent drainage from mine tailings, roadbeds, or natural outcrops of the uranium-bearing tuffaceous mudstone units composing the Anderson Mine Formation. Much of the lacustrine units in the Anderson Mine area are covered by alluvial deposits. In these areas, sediment sampling did not delineate any potential outliers of uranium mineralization in addition to those previously explored.

Several groupings of samples with U-FL and U-NT concentrations above the 84th percentile are found in an area bounded by lat. $34^{\circ}11'$ to $34^{\circ}16'$ N. and long. $113^{\circ}23'$ to $113^{\circ}32'$ W. These samples were collected from recent alluvial deposits (QTS). Most of the samples with U-FL and U-NT concentrations above the 84th percentile have U-FL/U-NT values significantly below the 84th percentile. This would indicate that the majority of the uranium is contained in resistate minerals which are abundant in the sediment. In one grouping of samples near lat. $34^{\circ}13'$ N. and long. $113^{\circ}24'$ W., the uranium appears to be somewhat more mobile as indicated by U-FL/U-NT values above the 84th percentile. Some of the uranium may have been derived from a deteriorating tar and gravel road which is drained in this area.

Significant U-FL and U-NT concentrations (those above the 84th percentile) were observed north of the Anderson Mine. In this area, the major lithologic contributors to the stream sediment are Precambrian basement granites and gneisses. These lithologies naturally contain high concentrations of uranium and other related elements in comparison to most other lithologies (Turekian and Wedepohl, 1961). Thus, the high values observed are probably not related to any economic concentrations of uranium.

Another area of high U-FL and U-NT concentrations (above the 84th percentile) extends from lat. $34^{\circ}18'$ N. and long. $113^{\circ}30'$ W. east toward the Anderson Mine area approximately paralleling the Santa Maria River. These high concentrations are somewhat scattered across the trend of samples and for the most part have U-FL/U-NT values below the 84th percentile. This may indicate uranium in this area is contained in resistate minerals derived from Tertiary siltstones, sandstones, and conglomerates.

The correlation matrix (Table A-2) indicates a significant positive correlation between the natural logs of uranium and U-NT, uranium/U-NT, cerium, iron, lithium, manganese, phosphorus, thorium, titanium, vanadium, and zirconium. A significant negative correlation is indicated between the natural logs of U-FL and barium, strontium, sodium, and aluminum.

Thorium

Thorium concentrations above the 84th percentile (24 ppm) display a somewhat scattered distribution in the area sampled (Figure A-4b). Numerous significant groupings are located in the south to south central, western, northwestern, and northern portions of the basin.

Significant groupings of samples with thorium concentrations above 24 ppm occur in two areas. In these areas, bounded by lat. $34^{\circ}8'$ to $34^{\circ}14'$ N. and long. $113^{\circ}17.5'$ to $113^{\circ}26'$ W and lat. $34^{\circ}14'$ to $34^{\circ}19'$ N. and long. $113^{\circ}27'$ to $113^{\circ}32'$ W., thorium correlates with high concentrations of U-FL and U-NT and low U-FL/U-NT values. This suggests that the uranium in these areas may be immobile and paired with thorium in resistate minerals.

The high thorium concentrations found in the northern portion of the area sampled (centering about lat. $34^{\circ}20'$ N. and long. $113^{\circ}17'$ W.) are associated with high U-FL and U-NT values. This thorium may be attributed to the granitic rocks which crop out in that area.

In the Anderson Mine area, thorium concentrations are low (in some cases below the 16th percentile value of 7 ppm) and coincide with high U-FL and U-NT values. The low thorium/U-NT concentrations (Figure A-5b) within the Anderson Mine area [as compared to the normal thorium/U-NT value of 3 to 7 found in most rock types (Turekian and Wedepohl, 1961)] indicate that uranium has been brought into the area.

The correlation matrix (Table A-2) indicates a significant positive correlation between the natural logs of thorium and uranium, U-NT, cerium, thorium/U-NT, iron, manganese, phosphorus, titanium, vanadium, zinc, and zirconium. A significant negative correlation exists between the natural logs of thorium, copper, U-FL/U-NT, strontium, sodium, and aluminum.

Related Variables

The geochemical distribution of lithium, phosphorus, zirconium, titanium, manganese, and arsenic in sediment samples is investigated to determine their relationships to particular geochemical environments which might be related to uranium mineralization in the area sampled. Sherborne, et al (1979) reported that both molybdenum and vanadium are frequently associated with uranium in the Anderson Mine strata. However, significant concentrations of molybdenum or vanadium were detected in only two samples collected from the mine area. Above background concentrations of molybdenum, vanadium, and selenium are noticeably scattered throughout the basin and do not generally coincide with high uranium values.

High lithium concentrations (above 51 ppm) occur in the northern portion of the area sampled and coincide with basins draining volcanic (TA and QB), granitic (PCGN), and lacustrine (QTL) units (Figure A-7b). The largest grouping of high lithium values (including the maximum value of 273 ppm) center around the paleo-basin in which the Anderson Mine is located. This restricted occurrence implies that lithium is related to the volcanic sediments composing the Anderson Mine Formation. According to Sherborne, et al (1979), diagenetic alteration of the tuffaceous sediments, especially the mudstones, found at the Anderson Mine results in the formation of lithium-bearing clays such as hectorite. Therefore, high lithium concentrations in this area are indicative of a particular lithology which is stratigraphically associated with uranium mineralized zones.

The correlation matrix (Table A-2) suggests a significant positive correlation between phosphorus and uranium. Those samples containing phosphorus values above 1,018 ppm (above 84th percentile) were collected from basins apparently draining the Precambrian granitic and metamorphic rocks (PCGN). Phosphorus is a common constituent in apatite, zircon, and other accessory minerals found in acidic igneous and metamorphic rocks (Lrebau, 1967). The distribution of phosphorus (Figure A-9b) may then reflect the abundance in stream sediments of accessory mineral phases which can also contain uranium. Only two samples (neither of which contain above background concentrations of uranium) out of 18 collected in the Anderson Mine area display high concentrations of phosphorus. This implies that phosphorus and uranium are not related in the Anderson Mine type of mineralization.

Significant zirconium concentrations (above 84 ppm) are scattered throughout the area sampled. Three well defined, clustered areas exist - in the northwest, in the southeast, and in the northeastern portion of the area sampled (Figure A-11b). In the southeastern and northwestern groupings, several samples display significant U-NT (above 8.00 ppm) and zirconium (above 84 ppm) values, in addition to low U-FL/U-NT values. This implies that some of the uranium observed in these portions of the area sampled may be attributed to resistate minerals,

which include zircon. The source of the zirconium appears to be the Arrastra Volcanics in the eastern portion of the area sampled and the Tertiary clastic rocks in the northwest.

The presence of abundant resistate minerals in the sediment is further supported by the widespread occurrence of titanium (Figure A-10b) in the basin. A cluster of titanium concentrations above the 84th percentile (7,083 ppm) is evident in the northwestern portion of the area sampled. This grouping is generally coincident with high zirconium (above 84 ppm) as well as significant U-NT (above 8.0 ppm) and thorium (above 24 ppm) values. Therefore, occurrences of significant concentrations of uranium and thorium in this area can probably be related to the abundant resistate assemblage most likely derived from the Tertiary clastic units. In the Anderson Mine area, where U-FL, U-NT, and U-FL/U-NT values are high, both zirconium and titanium values are low. This indicates that, in this area, uranium is in a more soluble form and not related to resistates.

High manganese concentrations (>968 ppm) were observed in the northwestern portion of the area sampled (Figure A-8b) with a maximum value of 2,087 ppm. This distribution corresponds to the outcrop pattern of the Tertiary clastics. These units, particularly the Chapin Wash Formation, are the host lithology for sedimentary manganese deposits in the Artillery Mountain Manganese District. Manganese concentrations up to 2,300 ppm have been noted in the highly mineralized uranium zones at the Anderson Mine (Sherborne, et al, 1979). However, no direct relationship between uranium and manganese was indicated from analyses of sediment samples collected in the mine area which averaged only 528 ppm manganese.

Arsenic concentrations above 5.0 ppm (84th percentile value) cluster in the north-northwestern portion of the area sampled (Figure A-6b). These high values coincide with Tertiary clastics and Precambrian granites. However, significant arsenic was also observed in three out of six samples containing significant uranium from the Anderson Mine area. This implies that arsenic may be related to the uranium mineralization and is a potentially useful pathfinder element.

Summary of Stream Sediment Data

Based on stream sediment geochemical data, significant concentrations of uranium were restricted to the Anderson Mine area. The 84th percentile concentrations of U-FL, U-NT, and U-FL/U-NT combined with low thorium/U-NT values reflect increased mobility and enrichment of uranium in the carbonate host rocks of that area. It was suspected that potential outliers of similar uranium mineralization might exist beneath the alluvial cover in other parts of the area sampled. Possible upward diffusion of uranium or associated elements might delineate such extensions of the uraniferous strata in surface sediment. However, no well defined diffusion halos were observed. High concentrations of lithium

and arsenic were observed in stream sediment samples from the Anderson Mine area; whereas, expected significant vanadium and molybdenum concentrations were markedly absent.

Most of the uranium observed from samples collected within the area sampled can be attributed to resistate minerals. Significant concentrations of U-FL or U-NT are generally coincident with low U-FL/U-NT values. High concentrations of elements typically found in a resistate assemblage such as zirconium, titanium, and, less commonly, phosphorus are found in the sediment, further supporting this contention.

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APPENDIX A
STREAM SEDIMENT

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APPENDIX A

STREAM SEDIMENT

LIST OF TABLES

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Table A-1

STATISTICAL SUMMARY FOR STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

NBA SAMPLES ANALYZED BELOW														
ELEMENT	VALUES	MEASURABLE DETECTION		MINIMUM	MAXIMUM	MEAN	MEDIAN	MODE	STANDARD	COEFFICIENT	LN TRANSFORMATION			
		LIMIT	LIMIT								MEAN	S. D.	MEAN	S. D.
U-FL	239			1.00	82.05	3.59	2.84	2.82	5.431	1.513	1.09	0.49	1.06	0.49
U-NT	238			1.40	89.10	5.67	4.70	3.07	6.137	1.082	1.57	0.49	1.56	0.46
TH	238	1	<2	<2	133	16	12	7	15.3	0.9	2.54	0.63	2.51	0.64
U/TU	238			0.23	1.45	0.64	0.61	0.66	0.172	0.270	-0.48	0.26	-0.48	0.26
TH/U	238			0.10	13.22	3.02	2.65	1.59	1.757	0.582	0.96	0.57	0.98	0.50
AG	0	239	<2	<2	<2	<2	<2	<2						
AL	239			3.38	9.21	5.33	5.20	5.18	0.576	0.127	1.66	0.12	1.66	0.12
AS	238	1	<0.1	<0.1	19.8	3.7	3.1	2.2	2.51	0.71	1.12	0.60	1.11	0.67
B	6	233	<10	<10	17	14	<10	<10	2.3	0.2	2.65	0.17		
BA	239			357	2985	742	691	572	274.4	0.4	6.57	0.27	6.54	0.25
BE	232	7	<1	<1	8	2	2	<1	1.5	0.6	0.73	0.61	0.77	0.59
CA	239			0.99	9.03	2.91	2.75	2.95	1.081	0.371	1.01	0.35	1.01	0.37
CE	238			36	423	128	112	60	66.5	0.5	4.74	0.48	4.73	0.47
CO	239			9	49	19	18	17	6.0	0.3	2.92	0.29	2.91	0.31
CR	239			24	216	61	56	47	26.2	0.4	4.05	0.35	4.04	0.37
CU	239			8	59	22	22	21	6.7	0.3	3.08	0.29	3.08	0.27
FE	239			1.72	9.41	4.15	4.02	4.55	1.343	0.324	1.37	0.32	1.37	0.34
K	239			0.89	2.86	1.67	1.65	1.62	0.269	0.161	0.50	0.16	0.50	0.15
LI	239			8	273	34	26	26	29.4	0.8	3.35	0.58	3.32	0.62
MG	239			0.64	2.33	1.18	1.09	1.10	0.336	0.286	0.13	0.26	0.12	0.27
MN	239			366	2087	766	717	580	238.6	0.3	6.60	0.28	6.59	0.28
MO	33	206	<4	<4	9	5	<4	<4	1.5	0.3	1.62	0.26		
NA	239			0.88	2.58	1.41	1.37	1.42	0.304	0.215	0.32	0.20	0.32	0.21
NB	239			10	65	26	24	22	10.0	0.4	3.20	0.35	3.20	0.40
NI	239			10	76	20	18	16	7.9	0.4	2.96	0.30	2.94	0.30
P	239			355	2474	814	735	697	343.5	0.4	6.64	0.35	6.62	0.39
SC	239			5	25	11	11	9	3.1	0.3	2.38	0.26	2.37	0.28
SE	233	6	<0.1	<0.1	5.2	0.5	0.5	0.6	0.37	0.72	-0.79	0.45	-0.81	0.45
SR	239			196	1003	424	393	306	138.1	0.3	6.00	0.31	6.00	0.31
TI	239			2378	11471	5243	4928	4013	1728.4	0.3	8.51	0.32	8.51	0.29
V	239			43	283	99	92	85	36.4	0.4	4.54	0.34	4.54	0.33
Y	239			9	107	30	26	19	15.9	0.5	3.32	0.44	3.30	0.44
ZN	236	3	<2	<2	185	64	61	65	21.8	0.3	4.11	0.30	4.10	0.29
ZR	239			15	137	62	63	67	23.4	0.4	4.05	0.43	4.07	0.47

NOTE: Refer to Table 1, Page 25 and Table C-1, Page C-4 for concentration units and symbol definitions.

[illegible]

- NOTE: (1) Pearson correlation/Spearman correlation/(sample size).
If either element has a concentration below the laboratory detection limit, it is omitted from the pairwise computations.
- (2) Significance levels: *-10%, **-5%, ***-1%.

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Figure A-1a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SOLUBLE URANIUM (PPM)
IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-11

Figure A-1b

GEOCHEMICAL DISTRIBUTION OF URANIUM (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-2a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR URANIUM BY NEUTRON ACTIVATION IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-13

Figure A-2b

GEOCHEMICAL DISTRIBUTION OF URANIUM BY NEUTRON ACTIVATION
IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-3a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR URANIUM FLUOROMETRIC/
URANIUM NEUTRON ACTIVATION IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-15

Figure A-3b

GEOCHEMICAL DISTRIBUTION OF URANIUM FLUOROMETRIC/URANIUM NEUTRON ACTIVATION
IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GECHEMICAL SURVEY, ARIZONA

Figure A-4a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR THORIUM (PPM)
IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-17

Figure A-4b

GEOCHEMICAL DISTRIBUTION OF THORIUM (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-5a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR THORIUM/URANIUM NEUTRON ACTIVATION
IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-5b

GEOCHEMICAL DISTRIBUTION OF THORIUM/URANIUM NEUTRON ACTIVATION
IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-6a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR ARSENIC (PPM) IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-6b

GEOCHEMICAL DISTRIBUTION OF ARSENIC (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-7a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR LITHIUM (PPM) IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-23

Figure A-7b

GEOCHEMICAL DISTRIBUTION OF LITHIUM (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-8a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR MANGANESE (PPM) IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-25

Figure A-8b

GEOCHEMICAL DISTRIBUTION OF MANGANESE (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-9a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR PHOSPHORUS (PPM) IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-27

Figure A-9b

GEOCHEMICAL DISTRIBUTION OF PHOSPHORUS (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-10a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR TITANIUM (PPM) IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-29

Figure A-10b

GEOCHEMICAL DISTRIBUTION OF TITANIUM (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Figure A-11a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR ZIRCONIUM (PPM) IN STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

A-31

Figure A-11b

GEOCHEMICAL DISTRIBUTION OF ZIRCONIUM (PPM) IN STREAM SEDIMENT
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

Table A-3

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	L-NT (PPM)	U/TU	TH (PPM)	TH/U	AS (PPM)	LI (PPM)	MN (PPM)	P (PPM)	TI (PPM)	ZR (PPM)
900000	18-34.232	-113.184	-3-15-	1.85	3.00	0.62	7	2.33	2.9	30	810	437	4317	63
900002	18-34.216	-113.197	-3-15-	2.29	3.00	0.76	5	1.67	2.4	24	716	427	5131	61
900004	18-34.221	-113.207	-3-15-	2.63	5.00	0.53	5	1.00	2.7	23	723	457	4688	67
900006	18-34.232	-113.213	-3-15-	3.77	4.30	0.88	9	2.09	11.2	37	1010	987	6692	82
900008	18-34.231	-113.212	-3-15-	3.07	6.70	0.46	13	1.94	3.2	23	981	564	7734	83
900010	18-34.244	-113.216	-3-15-	1.62			6		2.9	27	1202	576	9828	77
900012	18-34.244	-113.216	-3-15-	1.74	3.00	0.58	7	2.33	3.5	30	669	567	4378	63
900014	18-34.236	-113.225	-3-15-	2.70	7.50	0.36	11	1.47	3.4	24	1025	589	7384	76
900016	18-34.237	-113.225	-3-15-	2.13	3.50	0.61	5	1.43	3.0	26	787	482	6062	69
900018	18-34.238	-113.237	-3-15-	2.33	2.70	0.86	<2	0.37	3.1	25	502	334	3403	44
900020	18-34.232	-113.234	-3-15-	2.82	4.70	0.60	17	3.62	3.0	23	632	679	3676	62
900023	18-34.233	-113.234	-3-15-	4.74	8.10	0.59	47	5.80	2.6	23	952	679	6663	83
900025	18-34.301	-113.224	-3-15-	2.27	2.90	0.78	14	4.83	2.4	23	582	426	3343	65
900027	18-34.304	-113.209	-3-15-	2.12	2.00	1.06	8	4.00	2.4	27	617	417	3401	81
900029	18-34.304	-113.209	-3-15-	2.44	4.00	0.61	6	1.50	2.9	86	803	721	4948	56
900031	18-34.296	-113.210	-3-15-	2.87	3.30	0.87	7	2.12	2.9	25	580	435	3574	60
900032	18-34.299	-113.209	-3-15-	2.13	3.00	0.71	14	4.67	2.2	23	561	443	3189	63
900033	18-34.286	-113.243	-3-15-	2.11	2.80	0.75	6	2.14	2.1	24	555	407	3210	62
900035	18-34.303	-113.260	-3-15-	1.40	2.70	0.52	7	2.59	2.2	23	548	355	3180	71
900037	18-34.303	-113.259	-3-15-	1.72	1.40	1.23	4	2.86	2.1	171	366	492	2521	48
900039	18-34.302	-113.248	-3-15-	2.11	2.40	0.88	7	2.92	2.5	57	713	615	3594	68
900041	18-34.301	-113.248	-3-15-	1.81	3.40	0.53	9	2.65	1.9	13	559	495	3809	44
900043	18-34.297	-113.241	-3-15-	1.97	2.00	0.98	8	4.00	1.9	36	647	500	3795	57
900045	18-34.269	-113.254	-3-15-	1.43	2.80	0.51	9	3.21	3.1	23	550	620	4254	74
900047	18-34.269	-113.256	-3-15-	1.70	3.20	0.53	5	1.56	2.5	23	612	412	4356	59
900049	18-34.213	-113.242	-3-15-	3.74	8.70	0.43	21	2.41	3.6	25	630	695	4199	68
900051	18-34.268	-113.243	-3-15-	1.72	2.50	0.69	9	3.60	2.5	26	518	424	3186	61
900053	18-34.267	-113.243	-3-15-	1.90	2.90	0.66	7	2.41	2.5	24	462	391	3099	57
900055	18-34.303	-113.275	-3-15-	7.48	8.00	0.93	6	0.75	3.6	103	536	545	3267	41
900057	18-34.227	-113.294	-3-15-	3.33	5.60	0.59	21	3.75	3.5	20	715	529	5417	53
900060	18-34.218	-113.298	-3-15-	3.88	10.20	0.38	16	1.57	3.3	24	724	794	5120	65
900062	18-34.211	-113.297	-3-15-	3.58	6.00	0.60	14	2.33	3.2	24	580	730	4216	62
900064	18-34.229	-113.298	-3-15-	2.42	4.60	0.53	9	1.96	3.3	21	623	508	4334	52
900066	18-34.213	-113.317	-3-15-	2.57	4.30	0.60	13	3.02	3.5	26	573	542	3876	49
900068	18-34.224	-113.316	-3-15-	2.30	4.30	0.53	10	2.33	4.0	23	575	609	4440	46
900070	18-34.261	-113.263	-3-15-	3.78	6.00	0.63	19	3.17	4.0	19	831	565	6209	81
900072	18-34.261	-113.264	-3-15-	3.72	6.60	0.56	23	3.48	3.8	20	1039	584	7820	95
900074	18-34.296	-113.301	-3-15-	2.66	4.00	0.66	7	1.75	3.3	24	570	653	4592	54
900076	18-34.296	-113.302	-3-15-	2.82	4.80	0.59	8	1.67	3.5	24	803	860	6164	72
900078	18-34.297	-113.301	-3-15-	3.14	4.50	0.70	4	0.89	3.6	33	610	549	4840	54
900080	18-34.297	-113.283	-3-15-	4.28	4.00	1.07	17	4.25	3.8	29	758	807	5743	72
900083	18-34.301	-113.348	-3-15-	2.98	4.70	0.63	15	3.19	5.1	29	763	929	5257	76
900085	18-34.291	-113.353	-3-15-	3.54	5.20	0.68	16	3.08	4.8	53	862	785	6569	78
900087	18-34.289	-113.346	-3-15-	3.71	5.10	0.73	13	2.55	5.0	27	1041	926	7818	74
900089	18-34.282	-113.337	-3-15-	3.66	5.20	0.70	11	2.12	4.2	26	940	801	7066	97
900091	18-34.284	-113.339	-3-15-	3.25	5.50	0.59	15	2.73	4.7	26	887	902	7075	82
900093	18-34.285	-113.337	-3-15-	2.65	4.10	0.65	16	3.90	4.9	32	934	782	7267	77
900095	18-34.283	-113.336	-3-15-	3.50	5.10	0.69	9	1.76	4.0	26	903	803	6985	81
900097	18-34.263	-113.531	-3-15-	3.36	7.30	0.46	12	1.64	10.0	36	1098	634	7788	76
900099	18-34.265	-113.524	-3-15-	5.45	8.60	0.63	12	1.40	10.1	25	1087	715	10205	90
900101	18-34.267	-113.524	-3-15-	3.40	7.30	0.47	24	3.29	19.8	31	1494	592	7940	81
900103	18-34.243	-113.524	-3-15-	2.25	5.40	0.42	11	2.04	3.2	22	936	1351	8004	40
900105	18-34.242	-113.524	-3-15-	6.42	6.60	0.97	34	5.15	2.6	21	760	1535	8698	43
900108	18-34.243	-113.556	-3-15-	2.58	3.60	0.72	9	2.50	3.7	27	658	615	5221	39
900110	18-34.242	-113.551	-3-15-	1.98	3.60	0.55	5	1.39	3.7	25	499	956	3834	22

Table A-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	U-NT (PPM)	U/TU	TH (PPM)	TH/U	AS (PPM)	LI (PPM)	MN (PPM)	P (PPM)	TI (PPM)	ZR (PPM)
900112	18-34.233	-113.537	-3-15-	2.72	5.20	0.52	12	2.31	3.0	22	765	983	5752	39
900114	18-34.319	-113.334	-3-15-	2.92	3.60	0.81	9	2.50	2.9	113	691	698	4079	74
900116	18-34.320	-113.340	-3-15-	7.23	11.00	0.66	20	1.82	5.5	57	937	1707	7170	49
900118	18-34.314	-113.337	-3-15-	2.66	3.00	0.89	9	3.00	10.7	137	1012	794	4963	91
900120	18-34.309	-113.348	-3-15-	3.37	4.30	0.78	9	2.09	8.7	77	1117	845	4806	90
900122	18-34.307	-113.344	-3-15-	3.13	4.00	0.78	10	2.50	7.4	52	820	896	5110	69
900124	18-34.283	-113.337	-3-15-	2.92	4.10	0.71	13	3.17	3.2	27	702	788	4731	68
900126	18-34.318	-113.419	-3-15-	2.82	4.50	0.63	11	2.44	9.5	51	1106	948	5430	83
900128	18-34.318	-113.420	-3-15-	3.27	5.70	0.57	13	2.28	10.0	49	1292	1678	6015	97
900132	18-34.320	-113.433	-3-15-	2.78	4.90	0.57	13	2.65	10.7	56	748	1017	3972	60
900134	18-34.310	-113.440	-3-15-	3.55	7.00	0.51	22	3.14	10.7	48	901	1427	5190	74
900136	18-34.305	-113.447	-3-15-	2.67	8.40	0.35	25	2.98	5.7	33	556	707	4045	38
900138	18-34.306	-113.456	-3-15-	4.26	7.60	0.57	42	5.53	5.8	31	771	781	6062	65
900140	18-34.308	-113.461	-3-15-	3.37	4.60	0.73	32	6.96	6.9	51	837	913	4916	67
900142	18-34.299	-113.460	-3-15-	1.48	3.00	0.49	8	2.67	3.4	41	861	589	4299	76
900144	18-34.192	-113.439	-3-15-	5.31	10.90	0.49	25	2.29	2.1	14	901	849	7075	56
900146	18-34.204	-113.417	-3-15-	10.46	7.20	1.45	15	2.08	2.1	20	809	659	5967	66
900148	18-34.202	-113.418	-2-15-	6.82	13.10	0.52	77	5.88	2.2	16	1189	737	9547	110
900150	18-34.192	-113.411	-3-15-	3.15	8.10	0.39	27	3.33	2.9	23	734	650	5282	60
900152	18-34.194	-113.405	-3-15-	4.20	4.90	0.88	25	5.10	2.4	17	844	640	6160	63
900154	18-34.299	-113.412	-3-15-	3.43	4.80	0.71	12	2.50	10.6	33	958	868	6649	66
900156	18-34.300	-113.404	-3-15-	5.21	6.40	0.81	13	2.03	11.1	45	930	1705	7363	57
900158	18-34.304	-113.392	-3-15-	4.88	10.20	0.48	24	2.35	8.1	23	954	1134	8316	74
900160	18-34.307	-113.383	-3-15-	4.79	8.50	0.56	14	1.65	7.7	42	868	2063	7520	68
900162	18-34.304	-113.369	-3-15-	2.96	3.70	0.80	5	1.35	4.9	71	836	787	5024	90
900164	18-34.304	-113.367	-3-15-	2.50	3.60	0.69	3	0.83	4.5	60	860	708	4654	89
900166	18-34.304	-113.419	-3-15-	3.11	4.70	0.66	12	2.55	13.6	47	824	857	5960	66
900168	18-34.304	-113.423	-3-15-	5.70	9.60	0.59	26	2.71	7.6	30	1286	1179	8434	137
900170	18-34.304	-113.427	-3-15-	2.50	3.90	0.64	6	1.54	8.6	56	830	1019	4577	93
900172	18-34.232	-113.498	-3-15-	2.58	5.00	0.60	16	3.20	3.7	23	583	823	4842	50
900174	18-34.224	-113.490	-3-15-	3.79	7.20	0.53	11	1.53	1.1	13	893	2474	8770	41
900176	18-34.224	-113.490	-3-15-	2.80	4.90	0.57	6	1.22	1.7	13	755	1523	6023	37
900178	18-34.211	-113.479	-3-15-	2.66	5.10	0.52	8	1.57	1.7	17	654	878	4606	43
900181	18-34.212	-113.478	-3-15-	2.78	5.30	0.52	11	2.08	1.4	16	679	893	4687	41
900183	18-34.217	-113.482	-3-15-	2.77	3.20	0.87	7	2.19	2.3	30	659	875	3995	35
900185	18-34.218	-113.480	-3-15-	1.88	3.30	0.57	7	2.12	12.7	20	548	673	3570	51
900187	18-34.213	-113.475	-3-15-	2.22	3.30	0.70	9	2.73	1.9	21	582	695	3621	50
900189	18-34.183	-113.448	-3-15-	2.51	5.30	0.47	3	0.57	3.2	24	654	526	3687	48
900191	18-34.178	-113.443	-3-15-	2.84	4.90	0.58	10	2.04	2.7	20	582	763	4554	42
900193	18-34.178	-113.441	-3-15-	3.01	8.20	0.37	11	1.34	1.9	14	776	1186	5902	48
900195	18-34.184	-113.444	-3-15-	2.51	5.90	0.43	14	2.37	1.4	16	683	1004	4864	54
900197	18-34.179	-113.441	-3-15-	3.26	5.10	0.64	12	2.35	1.4	14	688	1155	4853	36
900199	18-34.191	-113.439	-3-15-	4.55	15.00	0.30	11	0.73	1.7	12	941	952	6244	77
900202	18-34.194	-113.389	-3-15-	3.14	5.10	0.62	21	4.12	2.4	27	661	637	3922	78
900204	18-34.205	-113.391	-3-15-	7.66	11.80	0.67	18	1.53	2.7	23	912	999	6013	122
900206	18-34.217	-113.361	-3-15-	2.16	3.60	0.60	10	2.78	3.4	22	468	549	3299	65
900208	18-34.214	-113.397	-3-15-	5.03	5.70	0.88	8	1.40	3.5	44	638	748	4026	63
900210	18-34.222	-113.407	-3-15-	2.64	3.30	0.80	5	1.52	3.4	32	478	642	3464	55
900212	18-34.126	-113.381	-3-15-	1.40	2.70	0.52	6	2.22	1.2	13	459	447	2378	15
900214	18-34.123	-113.378	-3-15-	1.87	4.20	0.45	11	2.62	1.1	12	459	618	3141	17
900216	18-34.122	-113.379	-3-15-	1.63	2.90	0.56	15	5.17	1.3	10	584	616	3182	18
900218	18-34.156	-113.336	-3-15-	3.12	7.90	0.39	14	1.77	2.3	20	977	885	6742	91
900220	18-34.145	-113.301	-3-15-	1.72	3.50	0.49	4	1.14	2.0	13	452	456	3565	38
900222	18-34.147	-113.285	-3-15-	1.36	3.10	0.44	3	0.97	1.3	13	634	882	4153	21
900224	18-34.146	-113.260	-3-15-	1.96	8.60	0.23	18	2.09	1.4	10	564	449	5267	40

Table A-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	U-NT (PPM)	U/TU	TH (PPM)	TH/U	AS (PPM)	LI (PPM)	MN (PPM)	P (PPM)	TI (PPM)	ZR (PPM)
900226	18-34.160	-113.264	-3-15-	3.43	4.70	0.73	12	2.55	2.4	42	651	708	4241	67
900228	18-34.173	-113.261	-3-15-	3.17	4.20	0.75	17	4.05	2.9	26	697	777	4538	87
900230	18-34.194	-113.303	-3-15-	4.94	11.20	0.44	47	4.20	3.0	13	986	1094	7196	126
900232	18-34.192	-113.301	-3-15-	4.19	8.00	0.52	35	4.38	3.7	21	958	1067	7131	99
900234	18-34.186	-113.288	-3-15-	4.07	5.80	0.70	22	3.79	3.2	22	786	897	5749	80
900236	18-34.184	-113.286	-3-15-	3.76	5.90	0.64	24	4.07	3.3	24	855	886	5886	84
900238	18-34.188	-113.320	-3-15-	5.14	6.60	0.78	22	3.33	3.0	22	909	869	6045	86
900240	18-34.186	-113.334	-3-15-	4.43	9.10	0.49	25	2.75	2.7	22	1160	1186	8091	116
900242	18-34.194	-113.349	-3-15-	2.84	4.00	0.71	18	4.50	2.2	23	694	644	4647	75
900244	18-34.147	-113.380	-3-15-	3.10	7.80	0.40	53	6.79	1.5	10	790	1053	8143	40
900246	18-34.150	-113.376	-3-15-	2.20	3.90	0.56	20	5.13	1.7	15	688	468	5158	40
900250	18-34.287	-113.188	-3-15-	1.68	2.40	0.70	9	3.75	1.5	24	696	664	3663	98
900252	18-34.287	-113.188	-3-15-	1.40	2.40	0.58	8	3.33	1.7	27	923	760	5419	93
900254	18-34.284	-113.196	-3-15-	1.72	3.20	0.54	8	2.50	1.8	26	694	612	4234	86
900256	18-34.284	-113.195	-3-15-	1.53	1.90	0.81	9	4.74	1.5	29	742	719	4007	91
900258	18-34.282	-113.213	-3-15-	1.57	2.40	0.65	8	3.33	1.9	25	687	606	4216	78
900260	18-34.282	-113.212	-3-15-	1.85	4.00	0.46	14	3.50	2.1	21	771	567	5187	68
900262	18-34.275	-113.200	-3-15-	1.43	3.00	0.48	13	4.33	1.0	22	1042	905	6082	107
900264	18-34.270	-113.202	-3-15-	2.84	3.10	0.92	10	3.23	1.2	17	1055	743	7137	88
900266	18-34.264	-113.200	-3-15-	1.39	2.10	0.66	6	2.86	1.5	26	648	697	3811	85
900268	18-34.244	-113.271	-3-15-	2.00	3.10	0.65	14	4.52	2.6	21	615	633	3836	67
900270	18-34.245	-113.250	-3-15-	2.00	4.70	0.43	18	3.83	2.1	27	765	602	5684	66
900272	18-34.246	-113.250	-3-15-	2.50	4.60	0.54	13	2.83	2.3	19	725	528	4941	66
900274	18-34.246	-113.262	-3-15-	1.50	2.60	0.58	8	3.08	2.3	26	521	665	3556	67
900276	18-34.228	-113.272	-3-15-	5.23	9.20	0.58	14	1.52	3.1	19	783	813	6034	72
900278	18-34.231	-113.270	-3-15-	3.98	10.60	0.38	19	1.79	2.2	21	1091	923	7583	102
900280	18-34.226	-113.279	-3-15-	3.44	7.40	0.48	20	2.70	3.1	24	761	920	5313	82
900282	18-34.221	-113.273	-3-15-	3.63	5.80	0.63	10	1.72	2.4	24	597	869	4048	64
900284	18-34.215	-113.242	-3-15-	2.23	3.30	0.71	13	3.94	3.0	24	561	784	3257	61
900286	18-34.219	-113.241	-3-15-	2.07	5.10	0.41	10	1.96	2.6	26	524	716	3605	61
900288	18-34.256	-113.207	-3-15-	2.11	2.60	0.81	7	2.69	1.9	25	621	598	3736	80
900291	18-34.256	-113.206	-3-15-	2.05	3.50	0.59	8	2.29	1.5	24	602	569	4590	78
900293	18-34.222	-113.332	-3-15-	2.09	5.70	0.37	40	7.02	3.0	25	749	799	5148	73
900295	18-34.221	-113.329	-3-15-	3.00	5.90	0.51	20	3.39	3.5	25	789	775	5443	70
900297	18-34.214	-113.330	-3-15-	2.55	6.20	0.41	27	4.35	2.8	22	786	704	5090	63
900299	18-34.333	-113.277	-3-15-	7.85	11.90	0.66	59	4.96	3.9	64	1470	2094	7901	60
900301	18-34.335	-113.279	-3-15-	10.80	12.40	0.87	28	2.26	3.9	53	1122	2306	6852	52
900303	18-34.331	-113.286	-3-15-	7.58	9.70	0.78	24	2.47	4.9	43	1048	2057	7091	45
900305	18-34.326	-113.279	-3-15-	1.90	2.80	0.68	9	3.21	1.8	75	673	705	4220	75
900307	18-34.329	-113.276	-3-15-	4.29	10.00	0.44	29	2.90	2.8	43	1613	1611	9014	71
900309	18-34.322	-113.275	-3-15-	1.08	2.60	0.42	8	3.08	1.3	73	863	935	6145	79
900311	18-34.320	-113.270	-3-15-	2.13	3.10	0.69	8	2.58	2.0	33	728	663	4042	67
900313	18-34.322	-113.276	-3-15-	1.87	3.20	0.58	8	2.50	2.0	41	594	756	3705	59
900315	18-34.307	-113.268	-3-15-	18.83	25.40	0.74	6	0.24	3.2	273	457	562	2472	41
900317	18-34.321	-113.298	-3-15-	4.36	8.20	0.53	28	3.41	5.9	41	1168	2466	7738	47
900319	18-34.322	-113.294	-3-15-	1.43	2.40	0.60	8	3.33	3.1	93	705	903	5423	84
900321	18-34.314	-113.290	-3-15-	8.11	11.80	0.69	11	0.93	5.4	97	520	727	3490	53
900323	18-34.314	-113.291	-3-15-	8.68	8.90	0.98	13	1.46	4.2	35	600	621	4097	48
900326	18-34.287	-113.361	-3-15-	3.61	5.90	0.61	22	3.73	5.1	45	774	820	5349	50
900328	18-34.284	-113.359	-3-15-	2.50	3.30	0.88	11	3.33	3.6	29	520	603	3779	51
900330	18-34.284	-113.360	-3-15-	2.89	3.80	0.76	9	2.37	4.0	33	591	734	4163	49
900333	18-34.279	-113.361	-3-15-	3.07	6.10	0.50	26	4.26	4.6	27	869	941	6272	72
900335	18-34.279	-113.361	-3-15-	2.58	3.90	0.66	11	2.82	4.3	33	559	788	4032	46
900337	18-34.266	-113.402	-3-15-	2.82	3.80	0.74	7	1.84	3.6	32	479	606	3173	42
900339	18-34.277	-113.401	-3-15-	2.57	3.70	0.69	9	2.43	3.5	34	485	698	3410	43

Table A-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	U-NT (PPM)	U/TU	TH (PPM)	TH/U	AS (PPM)	LI (PPM)	MN (PPM)	P (PPM)	TI (PPM)	ZR (PPM)
900341	18-34.278	-113.396	-3-15-	3.00	5.20	0.58	8	1.54	3.6	3	642	792	5317	47
900343	18-34.286	-113.413	-3-15-	3.17	4.10	0.77	19	4.63	4.1	3	580	690	3803	42
900345	18-34.280	-113.433	-3-15-	3.25	5.30	0.61	13	2.45	4.2	31	616	662	5080	50
900347	18-34.216	-113.398	-3-15-	2.80	3.90	0.72	15	3.85	4.1	32	534	682	3761	52
900349	18-34.225	-113.413	-3-15-	2.11	3.10	0.68	9	2.90	3.8	35	402	533	2804	45
900351	18-34.229	-113.421	-3-15-	2.73	4.10	0.67	11	2.68	4.2	47	585	678	3231	46
900353	18-34.289	-113.377	-3-15-	3.58	5.10	0.70	18	3.53	4.0	30	734	803	5152	51
900355	18-34.291	-113.395	-3-15-	2.81	3.70	0.76	8	2.16	5.0	55	582	584	3362	38
900357	18-34.292	-113.407	-3-15-	2.50	3.00	0.83	7	2.33	3.8	36	432	597	2914	38
900359	18-34.294	-113.412	-3-15-	2.91	3.60	0.81	10	2.78	8.6	33	868	690	3509	44
900361	18-34.240	-113.423	-3-15-	2.29	3.60	0.64	13	3.61	<0.1	40	689	667	3149	48
900363	18-34.242	-113.423	-3-15-	2.85	3.50	0.81	11	3.14	4.5	44	561	576	2844	44
900365	18-34.242	-113.426	-3-15-	2.36	3.10	0.76	5	1.61	5.1	38	729	562	2592	40
900367	18-34.221	-113.466	-3-15-	7.34	18.50	0.40	64	3.46	3.1	15	1171	761	8235	106
900369	18-34.207	-113.463	-3-15-	2.73	5.50	0.50	9	1.64	2.1	13	718	839	5673	30
900371	18-34.208	-113.465	-3-15-	2.08	3.40	0.61	5	1.47	1.9	15	597	665	3677	25
900373	18-34.208	-113.467	-3-15-	2.22	3.20	0.69	7	2.19	1.9	15	619	780	4223	23
900375	18-34.180	-113.467	-3-15-	2.10	4.50	0.47	7	1.56	1.8	14	654	870	4824	27
900377	18-34.153	-113.372	-3-15-	2.32	5.40	0.43	12	2.22	1.8	14	772	1071	6345	29
900379	18-34.157	-113.363	-3-15-	1.85	3.40	0.54	14	4.12	2.2	21	660	977	4529	31
900381	18-34.153	-113.344	-3-15-	2.14	4.50	0.48	13	2.89	1.9	13	741	628	5230	24
900383	18-34.163	-113.348	-3-15-	4.78	7.90	0.61	12	1.52	1.9	22	664	636	4637	55
900385	18-34.172	-113.349	-3-15-	6.09	5.10	1.19	21	4.12	2.1	21	587	546	4065	50
900387	18-34.165	-113.382	-3-15-	2.56	6.20	0.48	11	1.77	2.0	15	665	913	5176	37
900389	18-34.162	-113.390	-3-15-	3.82	6.40	0.60	27	4.22	2.1	15	672	711	6650	50
900391	18-34.161	-113.392	-3-15-	3.45	5.40	0.64	30	5.56	2.2	17	671	594	6119	47
900393	18-34.157	-113.400	-3-15-	3.57	4.60	0.78	28	6.09	2.1	17	640	500	5087	46
900396	18-34.155	-113.403	-3-15-	3.37	5.00	0.67	25	5.00	2.1	17	688	516	6393	52
900398	18-34.148	-113.406	-3-15-	3.02	6.70	0.45	38	5.67	1.8	13	853	1072	7664	46
900400	18-34.144	-113.409	-3-15-	2.14	4.00	0.53	9	2.25	1.6	17	556	748	3845	32
900402	18-34.155	-113.414	-3-15-	2.51	4.40	0.57	13	2.95	1.9	19	527	705	3838	36
900404	18-34.150	-113.335	-3-15-	1.62	4.50	0.36	6	1.33	0.8	14	636	693	4450	29
900406	18-34.140	-113.326	-3-15-	2.14	4.40	0.49	9	2.05	1.2	12	518	788	3901	19
900412	18-34.306	-113.300	-3-15-	3.81	7.30	0.52	12	1.64	3.1	83	672	1038	4373	52
900414	18-34.306	-113.302	-3-15-	3.66	4.70	0.78	11	2.34	5.1	147	681	822	3961	67
900416	18-34.307	-113.304	-3-15-	1.58	1.90	0.83	8	4.21	3.7	69	1047	1076	5817	103
900419	18-34.311	-113.304	-3-15-	82.05	89.10	0.92	9	0.10	7.5	112	444	587	3452	63
900421	18-34.317	-113.296	-3-15-	4.27	5.00	0.85	13	2.60	3.4	87	800	1252	5498	73
900423	18-34.315	-113.298	-3-15-	2.75	3.10	0.89	11	3.55	3.3	133	1199	1048	6461	108
900425	18-34.301	-113.305	-3-15-	3.40	5.50	0.62	10	1.82	4.1	53	737	939	5056	69
900427	18-34.310	-113.304	-3-15-	9.96	9.20	1.08	11	1.20	4.9	126	610	728	3600	58
900429	18-34.316	-113.314	-3-15-	2.50	4.70	0.53	20	4.26	3.5	53	814	1023	5369	76
900431	18-34.324	-113.325	-3-15-	3.60	4.40	0.82	12	2.73	5.1	68	1038	797	6274	109
900433	18-34.324	-113.326	-3-15-	3.34	3.40	0.98	5	1.47	2.1	67	581	698	3580	70
900435	18-34.318	-113.324	-3-15-	3.25	6.70	0.50	15	2.24	3.8	29	1015	1129	7273	78
900437	18-34.315	-113.320	-3-15-	2.70	4.90	0.55	24	4.90	4.7	47	865	1057	6204	82
900439	18-34.149	-113.312	-3-15-	2.56	4.30	0.60	7	1.63	1.6	25	600	815	4040	55
900441	18-34.137	-113.315	-3-15-	2.99	6.50	0.46	12	1.85	1.2	12	477	1317	4572	25
900443	18-34.129	-113.316	-3-15-	2.31	4.10	0.56	7	1.71	1.1	14	432	1134	3607	22
900445	18-34.123	-113.320	-3-15-	3.08	6.30	0.49	9	1.43	1.2	12	526	1666	4610	22
900447	18-34.123	-113.319	-3-15-	2.11	5.10	0.41	8	1.57	1.1	13	485	1146	3975	21
900449	18-34.112	-113.349	-3-15-	2.08	3.00	0.69	9	3.00	1.1	12	597	871	3312	15
900451	18-34.112	-113.348	-3-15-	1.00	2.00	0.50	5	2.50	1.0	17	887	1719	5674	23
900453	18-34.113	-113.358	-3-15-	1.63	2.70	0.60	19	7.04	0.7	3	537	624	3536	16
900455	18-34.113	-113.358	-3-15-	1.93	2.90	0.67	16	5.52	1.6	15	586	518	3546	29

Table A-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	U-NT (PPM)	U/TU	TH (PPM)	TH/U	AS (PPM)	LI (PPM)	MN (PPM)	P (PPM)	TI (PPM)	ZR (PPM)
900457	18-34.122	-113.333	-3-15-	1.77	3.60	0.49	21	5.83	1.5	13	604	560	3943	25
900459	18-34.125	-113.330	-3-15-	1.21	2.20	0.55	7	3.18	0.4	11	551	428	2777	17
900461	18-34.147	-113.312	-3-15-	2.57	3.90	0.76	36	9.23	2.0	17	795	801	5693	52
900463	18-34.296	-113.432	-3-15-	3.49	4.10	0.85	17	4.15	5.8	53	951	952	7088	106
900465	18-34.295	-113.424	-3-15-	3.24	4.60	0.70	16	3.48	8.4	63	1225	865	6698	106
900467	18-34.299	-113.445	-3-15-	3.39	4.70	0.66	30	6.38	4.9	32	857	710	6278	83
900469	18-34.284	-113.434	-3-15-	2.48	2.90	0.86	10	3.45	5.2	27	864	782	6090	96
900471	18-34.283	-113.488	-3-15-	4.53	8.60	0.54	25	2.91	4.8	13	1334	779	11114	90
900473	18-34.267	-113.499	-3-15-	3.46	6.30	0.55	19	3.02	4.5	21	974	582	7780	69
900477	18-34.281	-113.466	-3-15-	3.72	6.60	0.56	14	2.12	4.9	24	862	719	7275	72
900479	18-34.280	-113.465	-3-15-	4.57	5.10	0.90	16	3.14	3.6	34	848	865	5425	80
900481	18-34.281	-113.473	-3-15-	3.38	3.40	0.91	11	3.24	4.0	29	677	629	4803	46
900483	18-34.291	-113.466	-3-15-	3.34	7.20	0.53	59	8.19	8.6	35	1085	843	8803	98
900485	18-34.293	-113.482	-3-15-	6.58	10.80	0.61	133	12.31	5.2	25	907	785	11471	117
900487	18-34.271	-113.507	-3-15-	2.30	4.00	0.70	14	3.50	8.4	33	2087	662	6556	84
900490	18-34.288	-113.510	-3-15-	4.74	5.40	0.88	60	11.11	10.6	51	1697	695	4850	81
900492	18-34.254	-113.525	-3-15-	4.51	9.00	0.51	119	13.22	2.7	14	1170	955	7105	50
900494	18-34.249	-113.524	-3-15-	2.38	3.70	0.64	16	4.32	2.3	13	761	822	5554	52
900496	18-34.243	-113.517	-3-15-	4.40	8.00	0.55	32	4.00	5.0	13	1029	1099	11318	63

APPENDIX B
RADIOMETRIC DATA

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Table B-1

PARTIAL DATA LISTING FOR RADIOMETRICS
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	TGAM (CPM)
900001	18-34.232	-113.184	-3-92-	7200
900003	18-34.216	-113.197	-3- -	7200
900005	18-34.221	-113.207	-3- -	7200
900007	18-34.232	-113.212	-3- -	8400
900009	18-34.231	-113.212	-3- -	8400
900011	18-34.242	-113.215	-3- -	7200
900013	18-34.244	-113.216	-3- -	6600
900015	18-34.236	-113.225	-3- -	7800
900017	18-34.237	-113.225	-3- -	7800
900019	18-34.238	-113.237	-3- -	7200
900022	18-34.232	-113.234	-3-12-	10200
900024	18-34.233	-113.234	-3- -	9000
900026	18-34.301	-113.224	-3- -	9000
900028	18-34.304	-113.209	-3- -	9000
900030	18-34.304	-113.210	-3- -	7800
900034	18-34.286	-113.243	-3- -	8400
900036	18-34.303	-113.260	-3-92-	22800
900038	18-34.303	-113.259	-3- -	26400
900040	18-34.302	-113.248	-3- -	2600
900042	18-34.301	-113.248	-3- -	9600
900044	18-34.297	-113.241	-3- -	9000
900046	18-34.269	-113.256	-3- -	9600
900048	18-34.269	-113.254	-3- -	9600
900050	18-34.213	-113.242	-3- -	14400
900052	18-34.268	-113.243	-3- -	9000
900054	18-34.267	-113.243	-3- -	9000
900056	18-34.303	-113.275	-3- -	10800
900059	18-34.227	-113.294	-3- -	10200
900061	18-34.218	-113.297	-3- -	19200
900063	18-34.211	-113.297	-3- -	18000
900065	18-34.229	-113.298	-3- -	10200
900067	18-34.213	-113.317	-3- -	9600
900069	18-34.224	-113.316	-3- -	9600
900071	18-34.261	-113.263	-3- -	8400
900073	18-34.261	-113.264	-3- -	8400
900075	18-34.296	-113.301	-3- -	7800
900077	18-34.296	-113.302	-3- -	7800
900079	18-34.297	-113.301	-3- -	7800
900081	18-34.297	-113.283	-3- -	8400
900082	18-34.301	-113.305	-3-92-	39600
900084	18-34.301	-113.348	-3- -	7200
900086	18-34.291	-113.353	-3- -	6600
900088	18-34.289	-113.346	-3- -	8400
900090	18-34.282	-113.337	-3- -	7800
900092	18-34.284	-113.339	-3- -	8400
900094	18-34.285	-113.337	-3- -	7800
900096	18-34.283	-113.336	-3- -	7800
900098	18-34.263	-113.531	-3-15-	7800
900100	18-34.266	-113.524	-3-15-	7800
900102	18-34.267	-113.523	-3-15-	8400
900104	18-34.243	-113.524	-3-15-	9600
900107	18-34.242	-113.524	-3- -	9000
900109	18-34.243	-113.556	-3- -	9600
900111	18-34.242	-113.551	-3-15-	8400
900113	18-34.233	-113.537	-3-15-	7200

Table B-1, Continued

PARTIAL DATA LISTING FOR RADIOMETRICS
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	TGAM (CPM)
900115	18-34.319	-113.334	-3- -	5400
900117	18-34.320	-113.340	-3- -	7200
900119	18-34.314	-113.337	-3- -	5100
900121	18-34.309	-113.348	-3- -	5400
900123	18-34.307	-113.344	-3- -	6600
900125	18-34.283	-113.337	-3-15-	7500
900127	18-34.318	-113.419	-3- -	6600
900129	18-34.318	-113.420	-3-15-	6600
900131	18-34.320	-113.434	-3- -	7800
900133	18-34.320	-113.433	-3- -	7800
900135	18-34.310	-113.440	-3- -	8400
900137	18-34.305	-113.447	-3- -	7200
900139	18-34.306	-113.456	-3- -	8400
900141	18-34.308	-113.461	-3- -	7800
900143	18-34.299	-113.460	-3- -	7200
900145	18-34.192	-113.439	-3- -	9000
900147	18-34.204	-113.417	-3- -	8400
900149	18-34.202	-113.418	-3- -	9000
900151	18-34.192	-113.411	-3- -	7800
900153	18-34.194	-113.405	-3- -	9600
900155	18-34.299	-113.412	-3-15-	8400
900157	18-34.300	-113.404	-3-15-	9600
900159	18-34.304	-113.392	-3-15-	9600
900161	18-34.307	-113.383	-3-15-	9000
900163	18-34.304	-113.369	-3-15-	6600
900165	18-34.304	-113.367	-3-15-	6600
900167	18-34.304	-113.419	-3-15-	9600
900169	18-34.304	-113.423	-3-15-	7200
900171	18-34.304	-113.427	-3-15-	8400
900173	18-34.232	-113.498	-3-15-	12000
900175	18-34.224	-113.490	-3-15-	9000
900177	18-34.224	-113.490	-3-15-	9600
900180	18-34.211	-113.479	-3-15-	8400
900182	18-34.212	-113.478	-3-15-	8400
900184	18-34.217	-113.482	-3-15-	8400
900186	18-34.218	-113.480	-3-15-	7800
900188	18-34.213	-113.475	-3-15-	9600
900190	18-34.183	-113.448	-3-15-	7200
900192	18-34.178	-113.443	-3-15-	6000
900194	18-34.178	-113.441	-3- -	6000
900196	18-34.184	-113.444	-3-15-	5000
900198	18-34.178	-113.440	-3- -	7200
900200	18-34.192	-113.440	-3- -	9000
900203	18-34.194	-113.389	-3- -	9600
900205	18-34.205	-113.391	-3- -	10800
900207	18-34.217	-113.361	-3-15-	7800
900209	18-34.214	-113.397	-3-15-	7200
900211	18-34.222	-113.407	-3-15-	7200
900213	18-34.126	-113.381	-3-15-	7800
900215	18-34.123	-113.378	-3-15-	9600
900217	18-34.122	-113.379	-3- -	7800
900219	18-34.156	-113.336	-3- -	10800
900221	18-34.145	-113.301	-3-15-	6000
900223	18-34.147	-113.285	-3-15-	6000
900225	18-34.146	-113.260	-3- -	8400

Table B-1, Continued

PARTIAL DATA LISTING FOR RADIOMETRICS
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	TGAM (CPM)
900227	18-34.160	-113.264	-3-15-	7800
900229	18-34.173	-113.261	-3-15-	8400
900231	18-34.194	-113.303	-3-15-	8400
900233	18-34.192	-113.301	-3-15-	9600
900235	18-34.186	-113.288	-3-15-	8400
900237	18-34.184	-113.286	-3-15-	8400
900239	18-34.188	-113.320	-3-15-	8400
900241	18-34.186	-113.334	-3-15-	18000
900243	18-34.194	-113.349	-3- -	12000
900245	18-34.147	-113.380	-3-15-	10200
900247	18-34.150	-113.376	-3-15-	7800
900251	18-34.287	-113.188	-3-92-	7200
900253	18-34.286	-113.187	-3-15-	6000
900255	18-34.284	-113.196	-3-92-	7800
900257	18-34.284	-113.195	-3-15-	6600
900259	18-34.282	-113.213	-3-15-	7200
900261	18-34.282	-113.212	-3-15-	6600
900263	18-34.275	-113.200	-3-15-	6000
900265	18-34.270	-113.202	-3-15-	6600
900267	18-34.264	-113.200	-3-15-	8400
900269	18-34.244	-113.271	-3-15-	6600
900271	18-34.245	-113.250	-3-15-	9800
900273	18-34.246	-113.250	-3-15-	9800
900275	18-34.246	-113.262	-3-15-	6600
900277	18-34.228	-113.272	-3- -	12000
900279	18-34.231	-113.270	-3-15-	7800
900281	18-34.226	-113.279	-3-15-	9000
900283	18-34.221	-113.273	-3-15-	19200
900285	18-34.215	-113.242	-3-15-	7800
900287	18-34.219	-113.241	-3-15-	9000
900290	18-34.255	-113.207	-3-15-	8400
900292	18-34.256	-113.206	-3-15-	8400
900294	18-34.222	-113.332	-3-15-	10200
900296	18-34.221	-113.329	-3-15-	10200
900298	18-34.214	-113.330	-3-15-	10200
900300	18-34.333	-113.277	-3-15-	10200
900302	18-34.335	-113.279	-3-15-	11400
900304	18-34.331	-113.286	-3-15-	10200
900306	18-34.326	-113.279	-3-15-	7800
900308	18-34.329	-113.276	-3-15-	10200
900310	18-34.322	-113.275	-3-15-	7800
900312	18-34.320	-113.270	-3-92-	7200
900314	18-34.322	-113.276	-3-15-	7200
900316	18-34.307	-113.268	-3-99-	66000
900318	18-34.321	-113.298	-3-15-	9000
900320	18-34.322	-113.293	-3-92-	9600
900322	18-34.314	-113.290	-3-15-	11400
900324	18-34.314	-113.291	-3-15-	8400
900325	18-34.309	-113.287	-3-92-	99999
900327	18-34.287	-113.361	-3-92-	10800
900329	18-34.284	-113.359	-3-15-	10800
900332	18-34.284	-113.360	-3-15-	9000
900334	18-34.279	-113.361	-3-15-	9600
900336	18-34.279	-113.361	-3-15-	9000
900338	18-34.266	-113.402	-3- -	8400

Table B-1, Continued

PARTIAL DATA LISTING FOR RADIOMETRICS
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. O. ST	E. LAT	SAMPLE LONG	NUMBER L TY REP	TGAM (CPM)
900340	18-34.277	-113.401	-3-	-	9000
900342	18-34.278	-113.396	-3-	-	9600
900344	18-34.286	-113.413	-3-92-	-	9000
900346	18-34.280	-113.433	-3-	-	8400
900348	18-34.216	-113.398	-3-	-	8400
900350	18-34.225	-113.413	-3-	-	8400
900352	18-34.229	-113.421	-3-	-	7800
900354	18-34.289	-113.378	-3-	-	8610
900356	18-34.291	-113.395	-3-	-	7800
900358	18-34.292	-113.407	-3-	-	9000
900360	18-34.294	-113.412	-3-	-	9000
900362	18-34.242	-113.423	-3-	-	7800
900364	18-34.241	-113.423	-3-	-	8400
900366	18-34.242	-113.426	-3-	-	8400
900368	18-34.221	-113.466	-3-	-	9000
900370	18-34.207	-113.463	-3-	-	8400
900372	18-34.208	-113.465	-3-	-	5600
900374	18-34.208	-113.467	-3-	-	6600
900376	18-34.180	-113.467	-3-	-	600
900378	18-34.153	-113.372	-3-	-	6000
900380	18-34.157	-113.363	-3-	-	6000
900382	18-34.153	-113.344	-3-15-	-	6000
900384	18-34.163	-113.348	-3-15-	-	11400
900386	18-34.172	-113.349	-3-15-	-	-
900388	18-34.165	-113.382	-3-15-	-	6600
900390	18-34.162	-113.390	-3-15-	-	6600
900392	18-34.161	-113.392	-3-15-	-	6600
900395	18-34.157	-113.400	-3-15-	-	6600
900397	18-34.155	-113.403	-3-15-	-	6000
900399	18-34.148	-113.406	-3-15-	-	6600
900401	18-34.144	-113.409	-3-15-	-	6000
900403	18-34.155	-113.414	-3-	-	6000
900405	18-34.150	-113.335	-3-	-	6000
900407	18-34.140	-113.326	-3-	-	6000
900408	18-34.303	-113.273	-3-92-	-	9600
900409	18-34.307	-113.270	-3-92-	-	42000
900410	18-34.307	-113.272	-3-	-	33600
900411	18-34.310	-113.276	-3-92-	-	99999
900413	18-34.306	-113.300	-3-	-	36000
900415	18-34.306	-113.302	-3-	-	6000
900417	18-34.307	-113.304	-3-	-	4600
900420	18-34.311	-113.304	-3-	-	6000
900422	18-34.317	-113.296	-3-	-	6600
900424	18-34.315	-113.298	-3-	-	6000
900426	18-34.301	-113.305	-3-	-	9000
900428	18-34.310	-113.304	-3-	-	6600
900430	18-34.316	-113.314	-3-	-	7200
900432	18-34.324	-113.325	-3-15-	-	5400
900434	18-34.324	-113.326	-3-	-	6600
900436	18-34.318	-113.324	-3-	-	7800
900438	18-34.315	-113.320	-3-	-	6600
900440	18-34.149	-113.312	-3-	-	8400
900442	18-34.137	-113.315	-3-	-	6600
900444	18-34.129	-113.316	-3-	-	6600
900446	18-34.123	-113.320	-3-	-	5400

Table B-1, Continued

PARTIAL DATA LISTING FOR RADIOMETRICS
OF THE DATE CREEK BASIN DETAILED GEOCHEMICAL SURVEY, ARIZONA

OR SAMPLE NUMBER	D. U. ST	E. SAMPLE LAT	NUMBER LONG	L TY REP	TGAM (CPM)
900448	18-34.123	-113.319	-3-	-	6000
900450	18-34.112	-113.349	-3-	-	6600
900452	18-34.112	-113.349	-3-	-	5400
900454	18-34.113	-113.359	-3-	-	7800
900456	18-34.113	-113.359	-3-	-	7800
900458	18-34.122	-113.333	-3-	-	7200
900460	18-34.125	-113.330	-3-	-	7200
900462	18-34.147	-113.312	-3-	-	7200
900464	18-34.296	-113.432	-3-	-	6600
900466	18-34.295	-113.424	-3-	-	7000
900468	18-34.299	-113.445	-3-	-	7200
900470	18-34.284	-113.433	-3-	-	6600
900472	18-34.283	-113.488	-3-	-	7200
900474	18-34.267	-113.499	-3-15-	-	8400
900475	18-34.269	-113.497	-3-15-	-	7800
900478	18-34.281	-113.466	-3-15-	-	9000
900480	18-34.280	-113.465	-3-15-	-	7800
900482	18-34.281	-113.473	-3-15-	-	8400
900484	18-34.291	-113.466	-3-15-	-	8400
900486	18-34.293	-113.482	-3-15-	-	9300
900488	18-34.272	-113.507	-3-15-	-	7800
900489	18-34.288	-113.508	-3-92-	-	27600
900491	18-34.288	-113.510	-3-15-	-	9600
900493	18-34.254	-113.525	-3-	-	7800
900495	18-34.249	-113.524	-3-15-	-	7200
900499	18-34.235	-113.565	-3-15-	-	9000

APPENDIX C

FIELD FORM AND COMPUTER CODE LIST

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APPENDIX C

FIELD FORM AND COMPUTER CODE LIST

LIST OF TABLES

<u>No.</u>	<u>Title</u>	<u>Page</u>
C-1	Computer Code List of Geochemical Variables	C-4
C-2	Oak Ridge Geochemical Sampling Form Showing Field Data Recorded on Microfiche	C-5

Table C-1

COMPUTER CODE LIST OF GEOCHEMICAL VARIABLES

Variable(a)	Code	Variable(a)	Code
Uranium Measured by Fluorometry(b)	U-FL	Yttrium	Y
Uranium Measured by Mass Spectrometry(b)	U-MS	Zinc	ZN
Uranium Measured by Neutron Activation	U-NT	Zirconium	ZR
Arsenic	AS	Sulfate (ppm)	SO, SO ₄
Selenium	SE	Chloride (ppm)	CL
Silver	AG	Fluoride (ppm)	F
Aluminum	AL	Specific Conductance (μmhos/cm)	SP
Boron	B	Dissolved Oxygen (ppm)	DO
Barium	BA	Temperature (°C)	TP, TEMP
Beryllium	BE	pH	PH
Calcium	CA	Total Alkalinity (ppm)	T-AK
Cerium	CE	P Alkalinity (ppm)	P-AK, LIP
Cobalt	CO	M Alkalinity (ppm)	M-AK
Chromium	CR	Carbonate (ppm)	CB
Copper	CU	$CB = \begin{cases} 0 & \text{if pH} \leq 8.3 \\ \frac{3.42 \times \text{M-Alkalinity}}{5.61 + 10(11-\text{pH})} & \text{if pH} > 8.3 \end{cases}$	
Iron	FE		
Hafnium	HF		
Mercury	HG	Bicarbonate (ppm)	BC
Potassium	K	$BC = \begin{cases} \frac{2.62 \times \text{M-Alkalinity}}{4.3 + 10(7-\text{pH})} & \text{if pH} \leq 8.3 \\ 0.61 \times \text{M-Alkalinity} - \text{CB} & \text{if pH} > 8.3 \end{cases}$	
Lanthanum	LA		
Lithium	LI	U-NT/U-FL	U/U, TU/U
Magnesium	MG	U-FL/U-NT	U/TU
Manganese	MN	TH/U-NT	TH/U
Molybdenum	MO	1,000-U/SP	U/SP
Sodium	NA	1,000-U/B	U/B
Niobium	NB	1,000-U/SO	U/SO, USO
Nickel	NI	Sodium/Chloride	NA/C
Phosphorus	P	Helium/Neon	H/N
Lead	PB	Total Alkalinity/Sulfate	A/SO
Platinum	PT	Total Gamma (cps)	TGAM
Radon	RN	Equivalent Uranium (ppm)	EII
Scandium	SC	Counts Per Minute Uranium (cpm)	CPU
Silicon	SI	Equivalent Potassium (%)	EK
Tin	SN	Counts Per Minute Potassium (cpm)	CPK
Strontium	SR	Equivalent Thorium (ppm)	ETH
Thorium	TH	Counts Per Minute Thorium (cpm)	CPTH
Titanium	TI	Total Counts (cpm)	TUT
Vanadium	V		

(a) If natural logarithm of variable is used, L or L- precedes the variable code.

(b) If method is not specified for waters, U-FL is used, except where value is below laboratory detection limit in which case U-MS is substituted if it is available.

Table C-2

OAK RIDGE GEOCHEMICAL SAMPLING FORM SHOWING FIELD DATA RECORDED ON MICROFICHE

OAK RIDGE GEOCHEMICAL SAMPLING FORM

<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">1</div> Card Number </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">1</div> Card Number </div>	
GENERAL SITE DATA			
Attach Identical Sample Number Here <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">2</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">3</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">4</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">5</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">6</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">7</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">8</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">9</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">10</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">11</div> </div> Site Number		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">12</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">13</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">14</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">15</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">16</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">17</div> </div> Map Code	
Sample Type			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">18</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">M</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">H</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">W</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">L</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">A</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">B</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">G</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> </div>		Stream Sediment Lake Sediment Stream Water Well Water Spring Water Lake Water Bog Water Plant Soil Rock Other	
		(Use Remarks)	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">19</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Replicate Letter (A-Z)</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">20</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">21</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">22</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">23</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">24</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">25</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">26</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">27</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">28</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">29</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">30</div> </div> Collector's Initials			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">31</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Phase (P, 1, 2, or G)</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">32</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Field Sheet Status</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Original</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Correction</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Voiding</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">33</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Control Sample</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Sediment, High U</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Sediment, Low U</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Water, High U</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Water, Low U</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">34</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">35</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">36</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">37</div> </div> Air Temperature (°C)			
Location			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">38</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">39</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">40</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">41</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">42</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">43</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">44</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">45</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">46</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">47</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">48</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">49</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">50</div> </div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">51</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">52</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">53</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">54</div> </div> Surface Geologic Unit Code			
Type of Vegetation			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">55</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">(Within 1 Km Upstream)</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">C</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Conifer</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">D</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Conifer & Deciduous</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">B</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Deciduous</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">G</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Brush</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">M</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Grass</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">L</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Moss</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Lichen</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">56</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">(Within 1 Km Upstream)</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">B</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Barren</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Sparse</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">M</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Moderate</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">D</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Dense</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">V</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Very Dense</div> </div>	
Density of Vegetation			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">57</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">(Within 1 Km Upstream)</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Flat</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">L</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Low</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">G</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Gentle</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">M</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Moderate</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">H</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">High</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">58</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">(Within 1 Km Upstream)</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">C</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Clear</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">L</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Lt Wind</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">W</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Windy</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">V</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">V. Windy</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Gale</div> </div>	
		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">59</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Clear</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Pt Cldy</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">O</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Overcast</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">R</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Rainy</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Snowy</div> </div>	
Local Relief			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">60</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">None</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">M</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Mining</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">A</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Agriculture</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Oil Field</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">I</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Industry</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Sewage</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Power Plant</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">U</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Urban</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">61</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">62</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">63</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">64</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">65</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">66</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">67</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">68</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">69</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">70</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Dry</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Pools</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">L</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Low</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">71</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Normal</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">H</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">High</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Flood</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">72</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Average Stream Velocity (m/sec)</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">N</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">No Visible Movement</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Stagnant Pool</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">73</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Water Width (m)</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">74</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Average Depth (m)</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">75</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Water Level</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">76</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Name of Tree, Deciduous</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">77</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Alto Verde</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">A</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Ash</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">B</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Beech</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">I</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Birch</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">D</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Box Elder</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Cherry</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">N</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Cottonwood</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">E</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Elm</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">H</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Hackberry</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">C</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Hickory</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">W</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Huisache</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">L</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Live Oak</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">78</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Locust</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Maple</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">M</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Mesquite</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">K</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Oak, Other</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">V</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Olive</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Y</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Poplar</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Sycamore</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">T</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Selt Cedar</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">G</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Walnut</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">X</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Willow</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">79</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Name of Tree, Conifer</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">80</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">N. Wh. Cedar</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">C</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Cedar, Other</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Fir</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">H</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Hemlock</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">J</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Juniper</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">81</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Larch</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Pine</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Spruce</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">82</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Name of Bush</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">83</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Alder</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">B</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Blueberry</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Pussy Willow</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">84</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Witch Hazel</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Y</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Yew</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">85</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Name of Moss</div> </div>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">86</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Peat</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Sphagnum (live)</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">87</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Algae</div> </div>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">88</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Blue-Green</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">B</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Brown</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">89</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Sample Color (Except Plants)</div> </div>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">90</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Ad</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">None</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">72</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">73</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">74</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">75</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">76</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">91</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Odor of Sampled Material</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">N</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">None</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">H₂S</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Q</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Other</div> </div>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">92</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Results Request</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">R</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">(Use Remarks)</div> </div>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">93</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Card Number</div> </div>	

Table C-2, Continued

OAK RIDGE GEOCHEMICAL SAMPLING FORM
SHOWING FIELD DATA RECORDED ON MICROFICHE

STREAM OR LAKE SEDIMENT

Sample Condition

31
D
W

Sample Treatment

32
N
S
O

33	34
----	----

Number of Grabs

35	36
----	----

% Organic Material (Field Estimate)

GENERAL WATER SAMPLES

Water Sample Treatment

37
N
F
C
A
G

Depth of Visibility (m)

38	39	40
----	----	----

C = Clear

41	42	43	44	45
----	----	----	----	----

Conductivity (microhm/cm)

46	47	48
----	----	----

Dissolved O₂ (ppm)

49	50	51
----	----	----

Temperature (°C)

52	53	54
----	----	----

pH

55
P

pH by Lo-Ion Paper

56	57	58	59
----	----	----	----

Total Alkalinity (ppm)

60	61	62	63
----	----	----	----

P Alkalinity (ppm)

64	65	66	67
----	----	----	----

M Alkalinity (ppm)

Appearance of Water

68
C
M
A
O

Clear
Murky
Algal
Other

69	70	71	72	73
----	----	----	----	----

Discharge (liters/min)

Identification of Producing Horizon
(Geologic Unit Code)

74	75	76	77
----	----	----	----

Confidence of Producing Horizon Identification

78
H
R
O

High Degree
Probable
Possible

Source of Producing Horizon Identification

79
P
W
U
G
O

Publication
Owner
User
Geologic Inference
Other

80
3

Card Number

WELL WATER

Type of Well

81
D
P
G
U
O

Drilled
Drive Point
Dug
Unknown
Other

Power Classification

82
A
E
G
W
H
O

Artesian Flow
Electric
Gasoline
Wind
Hand
Other

Casing

83
N
S
G
P
U
O

None (Below Water Table)
Steel
Galvanized
Plastic
Unknown
Other

Pipe Composition

84
F
Z
C
P
U
O

Steel
Galvanized
Copper
Plastic
Unknown
Other

Sample Location

85	86	87
----	----	----

Meters from Well Head
H = Holding Tank (Use Remarks)

Where Sample Taken

88
B
A
N
F

With Respect To Pressure Tank
Before
After
No Pressure Tank
From Pressure Tank (Use Remarks)

Use of Well

89
M
H
S
I
A
X
Y
Z
N
O

Municipal
Household
Stock
Irrigation
All of above
H and S
H and I
S and I
None
Other

Frequency of Pumping

90
C
F
I
R

Constant (hourly)
Frequent (daily)
Infrequent (weekly)
Rare (no recent use)

Depth to top of Producing Horizon

91	92	93	94
----	----	----	----

(Meters)

Confidence of Producing Depth

95
H
R
S

High
Probable
Possible

Source of Producing Depth Information

96
P
W
U
G
O

Publication
Owner
User
Geologic Inference
Other

Total Well Depth

97	98	99	100
----	----	----	-----

(Meters)

Confidence of Total Depth

101
H
R
S

High
Probable
Possible

Source of Total Depth Information

102
P
W
U
G
O

Publications
Owner
User
Geologic Inference
Other**LAKE WATER**

Type of Lake

103
N
M

Natural
Manmade

Lake Area

104	105	106	107
-----	-----	-----	-----

(sq km)

REMARKS (Card 4)

Table C-2, Continued

**OAK RIDGE GEOCHEMICAL SAMPLING FORM
SHOWING FIELD DATA RECORDED ON MICROFICHE**

**OAK RIDGE GEOCHEMICAL SAMPLING FORM
FIELD DATA SUPPLEMENT**

Attach Identical
Sample Number Here

1	2	3	4	5	6	7

Sequence Number

1

Procedure Number

8	9

Results for Procedure 31

16	17	18	19	20

Total Gamma - Scintillometer (counts/minute)

Results for Procedures 34-41

16	17	18	19	20

Variables and Procedures
are listed below

Results for Procedure 32 Gamma Spectrometer

16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55

TOTAL COUNTS (CPM)

e POTASSIUM (%)

POTASSIUM (CPM)

e URANIUM (ppm)

URANIUM (CPM)

e THORIUM (ppm)

THORIUM (CPM)

*Note To Sampler: Blocks 16-20 Not Used
Should Be Marked Out.*

DO NOT KEYPUNCH

Procedures 34-41

34 Uranium (ppb)
35 Fluoride (ppm)
36 Nitrate (ppm)
37 Sulphate (ppm)
38 Phosphate (ppm)
39 Ferrous Iron (ppm)
40 Total Iron (ppm)
41 Turbidity (% T)

Readings made in Counts per _____

VARIABLE	READING		BACKGROUND		RESULTS
	ACTUAL	CPM	ACTUAL	CPM	
TOTAL COUNTS					
POTASSIUM					
URANIUM					
THORIUM					

APPENDIX D

MICROFICHE OF FIELD AND LABORATORY DATA

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MICROFICHE OF FIELD AND LABORATORY DATA

CONTENTS

<u>Laboratory Data</u>	<u>Page</u>
Stream Sediment (M)	1-27
<u>Field Data</u>	
Page 1	1-124

DATE CREEK
BASIC DATA

07/11/80

PAGE 1

LEGEND
□ STREAM SEDIMENT

PLATE 1
DATE CREEK
DETAILED GEOCHEMICAL SURVEY
SAMPLE LOCATION AND DRAINAGE
BASIN MAP

SCALE 1: 125000
239 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
x	$0.25 \leq X <$	1.35
.	$1.35 \leq X <$	1.43
.	$1.43 \leq X <$	1.66
o	$1.66 \leq X <$	1.91
o	$1.91 \leq X <$	2.27
o	$2.27 \leq X <$	2.69
o	$2.69 \leq X <$	3.07
o	$3.07 \leq X <$	3.54
o	$3.54 \leq X <$	4.36
o	$4.36 \leq X <$	5.17
•	$5.17 \leq X <$	7.23
•	$7.23 \leq X <$	8.94
■	$8.94 \leq X <$	17.22
★	$X \geq$	17.22

PLATE 2
 DATE CREEK
 DETAILED GEOCHEMICAL SURVEY
 STREAM SEDIMENT
 URANIUM (PPM)

SCALE 1: 125000
 239 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
+	$0 \leq X <$	2
x	$2 \leq X <$	4
.	$4 \leq X <$	5
.	$5 \leq X <$	6
o	$6 \leq X <$	7
o	$7 \leq X <$	9
o	$9 \leq X <$	11
o	$11 \leq X <$	13
o	$13 \leq X <$	17
o	$17 \leq X <$	24
•	$24 \leq X <$	28
•	$28 \leq X <$	38
•	$38 \leq X <$	59
■	$59 \leq X <$	111
★	$X \geq$	111

PLATE 3
DETAILED GEOCHEMICAL SURVEY
STREAM SEDIMENT
THORIUM (PPM)
SCALE 1: 125000
239 SAMPLES PLOTTED

STRATIGRAPHIC COLUMN			
ERA	SYSTEM	GEOLOGIC CODE GROUPS	UNITS
CENOZOIC	QUATERNARY	QD	SAND, SILT AND GRAVEL
		QB	BASALT FLOWS, TUFF AND AGGLOMERATE
	QUATERNARY OR TERTIARY	QTS	SAND, SILT, GRAVEL AND CONGLOMERATE
		QTB	BASALT FLOWS, TUFF AND AGGLOMERATE
		QTL	LAKE DEPOSITS, INCLUDES SILTSTONE, SANDSTONE AND LIMESTONE
	TERTIARY	TR	RHYOLITE
		TS	SAND, GRAVEL AND CONGLOMERATE
		TA	ANDESITE FLOWS, DIKES, PLUGS, TUFF AND AGGLOMERATE
		TKS	SANDSTONE, SHALE, CONGLOMERATE AND SOME VOLCANIC ROCKS
		TLI	RHYOLITIC TO ANDESITIC DIKES AND PLUGS
CENOZOIC OR MESOZOIC		TLG	GRANITIC INTRUSIVE
MESOZOIC	CRETACEOUS	MSS	MESOZOIC SHALE, SANDSTONE, CONGLOMERATE AND LIMESTONE (UNDIVIDED)
		KA	ANDESITE
		KS	LIMESTONE CONGLOMERATE
		KI	RHYOLITIC TO ANDESITIC DIKES AND PLUGS
MESOZOIC OR PALEOZOIC		PMU	SHALE, QUARTZITE AND LIMESTONE
PALEOZOIC	CAMBRIAN	PS	PALEOZOIC LIMESTONE, SHALE, SANDSTONE AND QUARTZITE (UNDIVIDED)
		CDI	REDWALL AND MARTIN LIMESTONE
PRECAMBRIAN		PCGR	GRANITE
		PCSH	SCHIST
		PCGN	GRANITE GNEISS
		PCGS	GRANITE AND SCHIST UNDIFFERENTIATED

SOURCE OF GEOLOGY:
 1. ARIZONA BUREAU OF MINES; GEOLOGIC MAP OF MOHAVE COUNTY, ARIZONA (1959).
 2. ARIZONA BUREAU OF MINES; GEOLOGIC MAP OF YAVAPAI COUNTY, ARIZONA (1958).
 3. ARIZONA BUREAU OF MINES; GEOLOGIC MAP OF YUMA COUNTY, ARIZONA (1960).

PLATE 4
 GENERALIZED GEOLOGIC MAP
 OF THE DATE CREEK
 DETAILED GEOCHEMICAL SURVEY
 ARIZONA

LEGEND
+ SOIL, ROCK, AND OTHER
□ STREAM SEDIMENT

PLATE 5
DATE CREEK
DETAILED GEOCHEMICAL SURVEY
RADIOMETRIC SITE LOCATION

SCALE 1: 125000
246 SAMPLES PLOTTED