GJBX-2

'80

K/UR-130

ORGDP

OAK
RIDGE
GASEOUS
DIFFUSION
PLANT

UNION
CARBIDE

NATIONAL URANIUM RESOURCE EVALUATION PROGRAM

HYDROGEOCHEMICAL AND STREAM SEDIMENT
RECONNAISSANCE BASIC DATA FOR
BEEVILLE NTMS QUADRANGLE, TEXAS

Uranium Resource Evaluation Project

MASTER

October 31, 1979

OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Reference to a company or product name does not imply approval or recommendation of the product by Union Carbide Corporation or the U. S. Department of Energy to the exclusion of others that may meet specifications.

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use or the results of such use of any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

The data will be available on magnetic tape filed with GJOIS Project, UCC-ND Computer Applications Dept., 4500 North Building, Oak Ridge National Laboratory, P. O. Box X, Oak Ridge, Tennessee 37830.

Date of Issue: October 31, 1979

Report Number: K/UR-130

Subject Category: UC-51, Nuclear Raw Materials

NATIONAL URANIUM RESOURCE EVALUATION PROGRAM

**HYDROGEOCHEMICAL AND STREAM SEDIMENT
RECONNAISSANCE BASIC DATA FOR
BEEVILLE NTMS QUADRANGLE, TEXAS**

Uranium Resource Evaluation Project

DISCLAIMER

This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Union Carbide Corporation, Nuclear Division
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee

Prepared for the U. S. Department of Energy
Assistant Secretary for Resource Applications
Grand Junction Office, Colorado
under U. S. Government Contract W-7405 eng 26

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Uranium Resource Evaluation Project
J. W. Arendt, Project Manager
T. R. Butz, Assistant Project Manager

Geology and Geochemistry
T. R. Butz, Project Geologist/Geochemist
S. C. Minkin and P. M. Pritz, Field Geology Program
T. R. Putney, Field Geology Supervisor

Analytical Chemistry, Reconnaissance Geochemistry, and Report Preparation
J. D. Joyner, Data Management and Information Processing
R. N. Helgerson, Reconnaissance Geochemical Reporting
J. Switek, Coordinating Geologist

Uranium Resource Evaluation Project
Oak Ridge Gaseous Diffusion Plant
P. O. Box P, Mail Stop 246
Oak Ridge, Tennessee 37830
Telephone: (615) 574-8882
FTS 624-8882

CONTENTS

	<u>Page</u>
ABSTRACT.	9
INTRODUCTION.	11
GEOLOGY	13
Location and Geologic Setting	13
Lithology and Environments of Deposition.	13
Structure	19
Hydrology	20
Uranium Occurrences	20
SAMPLE COLLECTION	21
Chronology of the Survey.	21
Field Procedures.	22
Contamination	22
CHEMICAL ANALYSIS	23
QUALITY CONTROL	23
Measurements Control.	23
Principal Component Error Analysis.	23
GEOCHEMICAL RESULTS	27
Geochemical Distributions in Groundwater.	27
Uranium	27
Specific Conductance.	30
Related Variables	30
Summary of Groundwater Data	31
Geochemical Distributions in Stream Sediments	31
Uranium	32
Thorium	33
Related Variables	33
Summary of Stream Sediment Data	34
ACKNOWLEDGMENTS	35
BIBLIOGRAPHY.	37
APPENDIX A. GROUNDWATER.	A-1
APPENDIX B. STREAM SEDIMENT.	B-1
APPENDIX C. MICROFICHE OF FIELD AND LABORATORY DATA.	C-1

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

LIST OF TABLES

<u>No.</u>	<u>Title</u>	<u>Page</u>
1	Detection Limits of Variables Determined in Water and Sediment Samples	24
2	Detection Limits of Variables Determined in Water Samples in Western Half of Beeville Quadrangle .	25
3	Summary of Measurements Control Results Obtained With Samples From Eastern Half of Beeville Quadrangle	26
4	Distribution of Samples by Geologic Unit From the Beeville Quadrangle.	29

LIST OF FIGURES

<u>No.</u>	<u>Title</u>	<u>Page</u>
1	Index Map Showing the ORGDP Area of Responsibility for the HSSR Survey, the Beeville Quadrangle, and Quadrangles for Which Basic Data Reports Have Been Open Filed	12
2	Generalized Geologic Map of Texas	15
3	Generalized Geologic Map of the Beeville Quadrangle	17
4	Producing Horizon Map for Groundwater of the Beeville Quadrangle.	28

LIST OF PLATES
(In Back Pocket)

<u>No.</u>	<u>Title</u>
1	Beeville Quadrangle, Groundwater Sample Location Map
2	Beeville Quadrangle, Symbol Plot, Groundwater, Uranium
3	Beeville Quadrangle, Symbol Plot, Groundwater, Specific Conductance
4	Beeville Quadrangle, Stream Sediment Sample Location and Drainage Basin Map
5	Beeville Quadrangle, Symbol Plot, Stream Sediment, Uranium Fluorometric
6	Beeville Quadrangle, Symbol Plot, Stream Sediment, Thorium
7	Generalized Geologic Map, Beeville Quadrangle, Texas

ABSTRACT

Results of a reconnaissance geochemical survey of the Beeville Quadrangle, Texas are reported. Field and laboratory data are presented for 373 groundwater and 364 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed.

The groundwater data indicate that the northwestern corner of the quadrangle is the most favorable for potential uranium mineralization. Favorability is indicated by high uranium concentrations; high arsenic, molybdenum, and vanadium concentrations; and proximity and similar geologic setting to the mines of the Karnes County mining district. Other areas that appear favorable are an area in Bee and Refugio Counties and the northeastern part of the quadrangle. Both areas have water chemistry similar to the Karnes County area, but the northeastern area does-not have high concentrations of pathfinder elements.

The stream sediment data indicate that the northeastern corner of the quadrangle is the most favorable for potential mineralization, but agricultural practices and mineralogy of the outcropping Beaumont Formation may indicate a false anomaly. The northwestern corner of the quadrangle is considered favorable because of its proximity to the known uranium deposits, but the data do not seem to support this.

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

HYDROGEOCHEMICAL AND STREAM SEDIMENT
RECONNAISSANCE BASIC DATA FOR
BEEVILLE NTMS QUADRANGLE, TEXAS

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 (see Figure 1). 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. Described herein is a portion of the work done by UCC-ND in the Beeville NTMS Quadrangle, Texas.

Figure 1

INDEX MAP SHOWING THE ORGDP AREA OF RESPONSIBILITY
FOR THE HSSR SURVEY, THE BEEVILLE QUADRANGLE
AND QUADRANGLES FOR WHICH BASIC DATA REPORTS
HAVE BEEN OPEN FILED

GEOLOGY

LOCATION AND GEOLOGIC SETTING

The Beeville Quadrangle covers approximately 21,707 km² (8,382 mi²) between lat. 28° and 29° N. and long. 96° and 98° W. The survey area, outlined on the generalized geologic map of Texas shown in Figure 2, includes all, or parts, of Aransas, Bee, Calhoun, DeWitt, Goliad, Jackson, Jim Wells, Karnes, Live Oak, Matagorda, Refugio, San Patricio, Victoria, and Wharton Counties. A generalized geologic map, along with a stratigraphic column listing the geologic codes used in this report, is presented in Figure 3 and Plate 7.

Physiographically, the Beeville Quadrangle is in the Coastal Dark Prairie Province (Renfro, et al, 1973) and consists primarily of grass-covered, rolling plains grading into wave-cut cliffs, marshes, and beaches along the coast. Tertiary formations of calcareous clays and sandstones crop out in the north and west; these are overlain by Quaternary deposits to the south and east. All formations crop out in bands parallel to the coast and dip toward the Gulf of Mexico. The youngest natural deposits are recent alluvium and offshore barrier bars. There are also extensive fill and spoil deposits derived from the dredging of the Intracoastal Waterway along the coast inside of the barrier islands (Barnes, 1975).

LITHOLOGY AND ENVIRONMENT OF DEPOSITION

The Tertiary section of the Beeville Quadrangle includes the Jackson Group, Catahoula Formation, the undifferentiated Fleming and Oakville Formations, and the Goliad Formation. All of these formations thicken considerably to the southeast or south in the subsurface.

The Jackson Group of Eocene age represents a prograding delta system. The sequence grades upward from marine muds to fluvial deposits. The oldest outcropping unit is the delta-plain facies of the Manning Formation (Fisher, et al, 1970; Barnes, 1975) which is directly overlain by fluvial sediments of the Whitsett Formation. The Jackson Group crops out only in the extreme northwestern corner of the quadrangle where it is about 270 m (900 ft) thick (Anders, 1960). The group occurs at about 720 m (2,400 ft) below land surface at the Karnes-Goliad County line.

The uppermost unit of the Jackson Group is the Frio Clay. The Frio consists primarily of bentonitic and calcareous clay and silt about 60 m (200 ft) thick in Karnes County. The unit does not crop out in the study area, being completely overlapped by the overlying Catahoula Formation (Anders, 1960). The relationship between the Jackson, Frio, and Catahoula is not always consistent in the subsurface (Baker, 1977).

The Oligocene Catahoula Formation unconformably overlies the Jackson Group. The Catahoula was deposited on the subsiding margin of the Gulf

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

Figure 2

GENERALIZED GEOLOGIC MAP OF TEXAS
(AFTER KING, ET AL, 1974)

STRATIGRAPHIC COLUMN FOR THE BEEVILLE QUADRANGLE

ERA	SYSTEM	SERIES	GEOLOGIC SURFACE CODE	GEOLOGIC MEMBER	PRODUCING HORIZON CODE	AQUIFER NAME	MAXIMUM AQUIFER THICKNESS	
							FEET	METERS
CENOZOIC	QUATERNARY	RECENT	QAL	ALLUVIUM	QAL	SHALLOW, DISCONTINUOUS AQUIFERS		
		RECENT OR LATE PLEISTOCENE	QD	FLUVIAL TERRACE DEPOSITS AND BEWEYVILLE FORMATION				
		PLEISTOCENE	QPB	BEAUMONT FORMATION	AQCH	CHICOT AQUIFER	1250	382
			QPLI	BISSIE FORMATION, UNDIVIDED				
	TERTIARY		QPW	WILLIS FORMATION				
		PLIOCENE	TPG	COLIAD FORMATION	AQEV	EVANGELINE AQUIFER	2550	780
		MIOCENE	TMF	UPPER FLEMING	AQBK	BURKEVILLE CONFINING SYSTEM	2125	650
				FLEMING FORMATION				
				LOWER FLEMING	AQJS	JASPER AQUIFER	775	290
			TOC	CATAHOULA FORMATION	TOC	CATAHOULA CONFINING SYSTEM	2975	728
		OLIGOCENE OR EOCENE	TEJ	JACKSON GROUP	TEJ	JACKSON GROUP	1550	474

SOURCE OF GEOLOGY:

1. BAKER, E. T.; STRATIGRAPHIC AND HYDROGEOLOGIC FRAMEWORK OF PART OF THE COASTAL PLAIN OF TEXAS; U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 77-712 (1977).
2. BARNES, V. E.; GEOLOGIC ATLAS OF TEXAS, BEEVILLE-SAY CITY SHEET (1975).

LEGEND FOR FIGURES 3 AND 4

Figure 3

GENERALIZED GEOLOGIC MAP OF THE BEEVILLE QUADRANGLE

Coast sedimentary basin and in the survey area is considered part of the Gueydan-Fluvial System by Galloway (1977). The system is a complex series of fluvial deltaic deposits making generalizations over large areas difficult. The Catahoula is distinguished from overlying and underlying formations by its high content of volcanic ash (Galloway, 1977). The thickness of the unit ranges from 60 m (200 ft) to 300 m (1,000 ft) at the outcrop. The base of the Catahoula dips at 26 m/km (120 ft/mi), whereas the upper surface dips at 19 m/km (85 ft/mi) (Anders, 1960).

The Oakville Sandstone, Fleming Formation (Lagarto Clay in Texas Board of Water Engineers publications for this area), and the Goliad sand represent continuing fluvial-deltaic deposition at the shelf edge from Miocene through Pliocene time. Contacts between the three units are generally hard to define in the subsurface, and sometimes at the surface, due to their lithologic similarity.

The Oakville Sandstone and Fleming Formation crop out in the northwestern quarter of the quadrangle. Maximum thickness of the Oakville is about 285 m (950 ft) in DeWitt County (Follett and Gabrysch, 1965). The base of the Oakville dips at 19 m/km (85 ft/mi) whereas dip of the upper surface has been determined at 4 to 8 m/km (20 to 40 ft/mi) (Anders, 1960). The Oakville consists of mainly sands and sandstones with variable amounts of clays, gravels, ash, and marl. The Fleming Formation (Lagarto Clay) consists of clay and variable amounts of sand and gravel that, in places, grades into the underlying Oakville. The Fleming attains a thickness of 360 m (1,200 ft) in Goliad County (Dale, et al, 1957). At the surface in Karnes County, the Fleming is differentiated from the underlying Oakville by the characteristic reddish-brown soil formed on the Fleming (Anders, 1960).

The Goliad Sand is usually distinguished from the underlying Fleming in outcrop by the presence of pink clay and substantial amounts of caliche (Follett and Gabrysch, 1965). In the subsurface, the boundary between the two is hard to distinguish. The Goliad has a maximum thickness of 180 m (600 ft) in Refugio County where it occurs at a depth of more than 180 m (600 ft). The unit consists mainly of sand and sandstone with some clay and gravel (Mason, 1963).

The Quaternary section of the Gulf Coastal Plain is represented by the Willis Formation, Upper and Lower Lissie Formation, Beaumont Formation and Holocene alluvial, and barrier island deposits. These units were deposited during high sea level periods of the interglacial periods (Bernard and Leblanc, 1965).

The Willis Formation unconformably overlies the Pliocene Goliad Formation and is composed of gravel, sand, silt, and clay. The Willis is of fluvial origin, and contains iron oxide concretions. Some beds are completely cemented with iron oxides (Barnes, 1975).

The Lissie Formation lies unconformably on the Willis Formation, or on the Goliad Formation west of the Guadalupe River, where the Willis is not present. Sediments of the Lissie Formation are fluvial deposits that represent meanderbelt, levee, crevasse splay, distributary channels, and floodplain facies (Barnes, 1975). Upper and lower units of the Lissie are termed the Montgomery and Bentley Formations and are essentially indistinguishable in the study area (Barnes, 1975). The Lissie Formation consists of thick sequences of sand and gravels interbedded with silt and clay. The gravels consist primarily of chert pebbles with minor amounts of silicified wood and igneous rock. Some calcium carbonate concretions are present in the formation and iron oxide and iron-manganese nodules are common in the weathered zone (Barnes, 1975).

The Beaumont Formation unconformably overlies the Lissie Formation and consists of poorly bedded clay with sand and silt interbeds. The Beaumont was deposited on a lower alluvial delta plain similar to those of the Colorado and Brazos Rivers (Achalabhuti, 1976). These deposits grade down dip into marine deltaic sheet sands and strike-oriented sand ridges which are comparable to modern strand plain deposits.

Following deposition of the Beaumont Formation, the final Pleistocene glacial episode caused a drop in sea level of approximately 122 m (400 ft). This caused incision of underlying sediments by the ancestral Lavaca-Navidad and Guadalupe-San Antonio Rivers, forming deep valleys in the exposed Continental Shelf (McGowan, et al, 1976). At the end of the final glacial episode, rising sea level caused the gradual filling of the valleys with estuarine and marine sediments and the eventual formation of San Antonio, Lavaca, and smaller bays. Sand was transported by long shore transport from the Colorado-Brazos delta forming Matagorda and St. Joseph Islands (McGowan et al, 1976).

At the present time, Holocene alluvial systems continue filling the estuaries with sediment and prograding deltas. These systems have deposited sand, silt, clay, and gravel in point bar, natural levee, stream channel, back swamp, and mud flat environments as they cross the coastal plain (Barnes, 1975).

STRUCTURE

Geologic units in the study area crop out parallel to the gulf coast and become progressively younger towards the Gulf of Mexico. The Quaternary units dip at a very low angle—0.42 m/km (2 to 10 ft/mi) (Bernard and Leblanc, 1965). The units are encountered at progressively greater depths and thicken in a gulfward direction (Baker, 1965).

Numerous surface lineations occur within the study area and throughout the Texas coastal zone (McGowan, et al, 1976). These lineations may be passive structural features, representing either surface extensions of Tertiary faults or joint patterns (Kreitler, 1976). Subsidence caused by groundwater withdrawal or oil and gas production may cause activation of faults along formerly passive lineations (Kreitler, 1976).

For example, subsidence has occurred in Jackson County due to pumping large quantities of water from the local aquifers (Baker, 1965) and oil production has apparently caused subsidence in the Lolita area of Jackson County (McGowan, et al, 1976). Growth faults and faults resulting from salt tectonism are common in the Tertiary section of the Gulf Coast basin (Kreitler, 1976).

HYDROLOGY

Members of the Jackson Group provide groundwater as far south as Karnes City. The waters are fresh to slightly saline where the aquifers are within 300 m (1,000 ft) of the surface. Only small to moderate amounts of water are available from the Jackson (Anders, 1960).

Wesselman (1967) subdivided the formations above the Frio Clay in the Gulf Coast region into four hydrologic units based on differences in lithology, well water levels, and permeabilities in the individual units. These units are called the Jasper Aquifer, Burkeville Confining System, Evangeline Aquifer, and Chicot Aquifer (see legend for Figures 3 and 4).

The Jasper Aquifer generally includes the Miocene Oakville Formation, parts of the Lower Fleming Formation and, in places, the top of the Catahoula Formation. The average thickness of fresh to slightly saline water-bearing sands in the Jasper is from 183 to 305 m (600 to 1,000 ft) (Baker, 1978).

Above the Jasper Aquifer is the Burkeville Confining System which because of its large proportion of silt and clay is relatively impermeable compared to aquifers above and below it. The Burkeville is generally contained in the Fleming Formation, but transgresses the Oakville-Fleming contact in many places (Baker, 1978). Typically, the Burkeville is from 91 to 152 m (300 to 500 ft) (Baker, 1978).

The Evangeline Aquifer overlies the Burkeville Confining System and consists of the Goliad Formation and sandy sections of the Upper Fleming Formation. The thickness of the unit ranges from 122 to 305 m (400 to 1,000 ft) at outcrop to approximately 610 m (2,000 ft) near the coast (Baker, 1977).

The Chicot Aquifer is comprised of the Willis, Lissie, and Beaumont Formations of Pleistocene age. In the subsurface, the Chicot has been differentiated from the Evangeline by the presence of a higher sand-clay ratio in the Chicot, a prominent clay layer in some places, and differences in hydraulic conductivity or water levels in other areas (Baker, 1977). The maximum thickness of fresh water-bearing sands in the Chicot is 120 m (400 ft) (Wesselman, 1967).

URANIUM OCCURRENCES

Uranium is presently being mined in western Karnes and northeastern Live Oak Counties to the west of the study area. In the Karnes County deposits, oxidized shallow and unoxidized deep ore deposits are found in beach sandstones of the Whitsett Formation of the Jackson Group and in the Catahoula Formations (Eargle, et al, 1975). In Live Oak County, uranium ore occurs in channel sands in the basal part of the Oakville Sandstone (Eargle, et al, 1975). Solution mining of a deposit in the Goliad Sandstone occurs in Duval County to the southwest of the Beeville Quadrangle (Larson, 1978). The uranium in all these deposits is considered to have been derived from the tuffaceous sediments of the Catahoula Formation.

No uranium is being mined in the study area, but the presence of formations that are productive nearby and suitable host rocks indicate that there is potential for mineralization. There has been extensive uranium exploration in the western part of the quadrangle near the Karnes and Live Oak Districts.

SAMPLE COLLECTION

CHRONOLOGY OF THE SURVEY

Sampling in the western half of the Beeville Quadrangle began in January 1976 and was one of the first areas sampled on a reconnaissance basis by UCC-ND. Both Phase II and Phase I sampling was done. Phase II sampling involved collecting targets at a density of one water sample and one sediment sample per 25 km² (~10 mi²) whereas Phase I samples were taken at a density of one sample per 250 km² (~100 mi²). The aim of this sampling procedure was to determine whether the wide-spaced sample could be used to delineate favorable areas which would then be sampled more intensively at Phase II spacing. This strategy was later abandoned, and all subsequent reconnaissance sampling was done on Phase II spacing with the addition of Phase G stream sediments added to fill gaps in coverage caused by the presence of large streams, rivers, and lakes and by land access problems. Sampling of the western half of Beeville was completed in November 1976. Results of the survey of the western Beeville and Crystal City Quadrangles were open filed in February 1977 (Uranium Resource Evaluation Project, 1977).

Sampling in the eastern half of the Beeville Quadrangle began in October 1978 and was completed in December 1978. Laboratory analyses, as well as compilation and verification of all field and laboratory data, were completed in September 1979. The final field and laboratory data base used to illustrate the statistical and areal distribution of uranium and uranium-related parameters for this report was completed in September 1979.

FIELD PROCEDURES

Stream sediment and well water sampling was done by the UCC-ND staff. A total of 373 groundwater and 364 stream sediment samples were collected within the boundaries of the Beeville Quadrangle. Spring and well water samples are reported together as groundwater. Plates 1 and 4 are overlays at a scale of 1:250,000 showing sample locations for groundwater sites and stream sediment sites, respectively. Drainage basins are drawn on Plate 4 to indicate the area represented by the stream sediment samples.

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 of the Uranium Resource Evaluation Project" (Arendt, et al, In Press), "Procedures Manual for Groundwater Reconnaissance Sampling" (Uranium Resource Evaluation Project, March 1978), 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 C.

CONTAMINATION

Precautions were taken to avoid the possibility of collecting contaminated samples. Wells which were affected by any chlorination, water-softening, or filtering devices were not sampled if the water could not be taken before the water passed through such devices. Any well that had not been pumped recently was allowed to run long enough to flush the system. The fact that it had no recent use was noted on the field form. Since the possibility for contamination is high in dug wells, these are noted on the field form. Any wells that the samplers felt were possibly contaminated were checked as such on the field forms. Sediment samples were collected upstream from road crossings wherever possible. Visible signs of contamination, the presence of cultivated areas, or oil fields upstream from a sample site were noted on the field form.

The principal crops in the area are rice, flax, cotton, corn, and vegetables. Ranching is also a major activity in the quadrangle. In the vicinity of rice fields in the eastern part of the quadrangle, natural stream drainage has been rechanneled and diverted to farm irrigation canals. From July to September, a phosphate-nitrogen-potash fertilizer mixture is added directly to irrigation water in the rice paddies. The potential for phosphate fertilizer contamination in sediment samples taken from rice field irrigation canals is high.

Extensive oil and gas production occurs throughout the study area. Improperly cased production and exploration wells may allow contamination of fresh water aquifers with highly mineralized oil field waters. Improperly constructed oil field brine disposal pits may also allow seepage of brines into aquifers.

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 Tables 1 and 2. These detection limits are considered the best average during normal operation; however, some variables have values reported below these limits. All water samples were received in 250-ml polyethylene bottles and were filtered through 0.45- μ m cellulose acetate paper. Stream sediment 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 (In Press). All observed data from all samples are included in the microfiche in Appendix C.

QUALITY CONTROL

MEASUREMENTS CONTROL

The procedures used to analyze URE Project reconnaissance samples require that calibration standards, check samples, and blanks be run 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 two water batches and two 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 3. Results of uranium analysis of water and sediment control samples obtained from the Ames Laboratory as part of the Multilaboratory Analytical Quality Control for the HSSR Program are reported by D'Silva, et al (1979).

PRINCIPAL COMPONENT ERROR ANALYSIS

A principal component analysis of data from well water and 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 were listed first. Additional unusual 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 unusual samples identified by this procedure were reviewed. Four well water samples (023109, 023172, 023306, 023502) and four stream sediment samples (023516, 023293, 023387, 000577) which appeared to be the most unusual were submitted for reanalysis. The original results were compared to the results from reanalysis. Of the more than 250 individual analyses that were compared, the only result which was considered to be in error in the original analysis and thus

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	8
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
K	Plasma Source Emission Spectrometry	0.05(a)	0.1(b)
Li	Plasma Source Emission Spectrometry	1	4
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
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

DETECTION LIMITS OF VARIABLES DETERMINED IN WATER SAMPLES
IN WESTERN HALF OF BEEVILLE QUADRANGLE

Method	Element	Water, ppb(a)
Fluorometric	U	0.2
Mass Spectrometry	U	0.02
Neutron Activation	U	-
Atomic Absorption	As	0.5
Atomic Absorption	Se	0.2
Turbidimetry	SO ₄	30(b)
Conductivity	Conductivity	1(c)
Emission Spectroscopy	Ag	4
Emission Spectroscopy	Al	40
Emission Spectroscopy	Au	4
Emission Spectroscopy	B	4
Emission Spectroscopy	Ba	4
Emission Spectroscopy	Co	8
Emission Spectroscopy	Cr	4
Emission Spectroscopy	Cu	16
Emission Spectroscopy	Fe	40
Emission Spectroscopy	Li	-
Emission Spectroscopy	Mg	-
Emission Spectroscopy	Mn	4
Emission Spectroscopy	Mo	4
Emission Spectroscopy	Nb	4
Emission Spectroscopy	Ni	16
Emission Spectroscopy	P	400
Emission Spectroscopy	Pb	4
Emission Spectroscopy	Pt	-
Emission Spectroscopy	Sc	4
Emission Spectroscopy	Th	16
Emission Spectroscopy	Ti	24
Emission Spectroscopy	V	4
Emission Spectroscopy	Y	-
Emission Spectroscopy	Zn	240
Emission Spectroscopy	Zr	8

(a) Lower limits are higher for samples with high total dissolved solids (conductivity <5,000 μ mhos).

(b) Sulfate in water reported in ppm.

(c) Conductivity in water reported in μ mho/cm.

Table 3

SUMMARY OF THE MEASUREMENTS CONTROL RESULTS OBTAINED WITH SAMPLES FROM EASTERN HALF OF BEEVILLE QUADRANGLE

Measurements Control Results for Water										Measurements Control Results for Stream Sediments									
Batch L-4					Batch L-4					Batch R-3					Batch S-2				
Element	Method	No. of Samples	Mean (ppb)	Standard Deviation (ppb)	Coefficient of Variation	No. of Samples	Mean (ppb)	Standard Deviation (ppb)	Coefficient of Variation	Element	Method	No. of Samples	Mean (ppb)	Standard Deviation (ppb)	Coefficient of Variation	No. of Samples	Mean (ppb)	Standard Deviation (ppb)	Coefficient of Variation
U	MS(a)	1	0.52	0.0	0.0	8	9.92	0.496	0.05	U	FL	38	4.06	0.542	0.13	18	9.70	0.628	0.06
U	FL(b)	21	0.72	0.221	0.31	22	10.24	0.679	0.07	U	NT(e)	34	4.81	0.148	0.03	23	10.11	0.233	0.02
As	AA(c)	23	3.3	0.68	0.21	33	0.7	0.32	0.46	As	AA	26	3.6	0.44	0.12	15	10.1	0.51	0.05
Se	AA	27	1.2	0.19	0.15	33	0.8	0.28	0.35	Se	AA	27	0.5	0.24	0.50	20	0.8	0.26	0.32
Al	PS(d)	25	96.0	17.8	0.18	25	351.0	19.9	0.06	Al	PS	29	3.11	0.162	0.05	17	5.29	0.195	0.04
B	PS	22	1,580.0	76.7	0.05	23	72.0	2.8	0.04	B	PS	35	11.0	4.0	0.34	17	42.0	5.5	0.13
Ba	PS	22	138.0	5.2	0.04	27	32.0	1.4	0.04	Ba	PS	29	415.0	14.4	0.03	19	380.0	18.3	0.05
Ca	PS	24	10.1	0.48	0.05	25	99.1	4.13	0.04	Be	PS	35	1.0	1.4	0.79	20	2.0	0.8	0.34
Co	PS	25	20.0	2.3	0.11	25	96.0	4.3	0.04	Ca	PS	33	0.25	0.041	0.16	20	0.32	0.042	0.13
Cr	PS	20	95.0	6.6	0.07	29	19.0	3.9	0.20	Ce	PS	25	58.96	11.724	0.20	21	91.62	42.324	0.46
Cu	PS	24	66.0	16.9	0.25	28	207.0	19.4	0.09	Co	PS	33	14.0	1.5	0.10	17	25.0	1.3	0.05
Fe	PS	25	81.0	21.4	0.26	25	984.0	50.6	0.05	Cr	PS	33	26.0	1.8	0.07	15	58.0	3.7	0.06
K	PS	25	1.86	0.411	0.22	29	20.21	2.557	0.13	Cu	PS	33	22.0	3.8	0.17	15	47.0	2.4	0.05
Li	PS	25	17.0	2.3	0.13	28	102.0	8.9	0.09	Fe	PS	29	1.75	0.117	0.07	15	3.27	0.145	0.04
Mg	PS	22	9.2	0.41	0.04	25	72.9	3.16	0.04	K	PS	31	0.99	0.070	0.07	17	2.01	0.120	0.06
Mn	PS	25	20.0	1.7	0.08	25	103.0	4.4	0.04	Li	PS	33	22.0	1.4	0.06	17	33.0	3.3	0.10
Mo	PS	22	36.0	6.8	0.19	29	6.0	6.0	0.95	Mg	PS	33	0.20	0.019	0.09	19	0.53	0.036	0.07
Na	PS	24	1.6	0.23	0.15	28	45.1	4.01	0.09	Mn	PS	29	1,885.0	124.3	0.07	15	764.0	39.5	0.05
Ni	PS	22	192.0	8.7	0.05	27	39.0	3.7	0.09	Mo	PS	35	2.0	1.2	0.46	15	27.0	2.6	0.10
P	PS	22	116.0	15.0	0.13	27	4,853.0	363.8	0.07	Na	PS	33	0.15	0.012	0.08	19	0.21	0.021	0.10
Sc	PS	22	62.0	3.9	0.06	26	12.0	0.7	0.06	Nb	PS	33	13.0	2.2	0.17	20	14.0	2.9	0.21
Si	PS	20	0.90	0.069	0.08	29	7.93	0.974	0.12	Ni	PS	33	17.0	2.2	0.12	15	54.0	2.4	0.04
Sr	PS	25	53.40	4.500	0.08	25	5,157.60	158.964	0.03	P	PS	31	1,651.0	156.6	0.09	15	730.0	36.6	0.05
Ti	PS	22	112.0	6.0	0.05	27	40.0	1.8	0.04	Sc	PS	33	5.0	0.5	0.09	21	10.0	2.4	0.22
V	PS	20	10.0	3.1	0.29	25	41.0	5.3	0.13	Sr	PS	29	54.07	1.361	0.03	19	80.63	4.810	0.06
Y	PS	25	9.0	1.1	0.11	27	47.0	2.1	0.04	Th	PS	35	5.0	4.6	0.80	21	7.0	2.1	0.26
Zn	PS	22	500.0	26.4	0.05	23	48.0	23.3	0.48	Ti	PS	31	3,208.0	244.2	0.08	21	2,897.0	267.0	0.09
										V	PS	31	52.0	4.4	0.09	15	151.0	13.7	0.09
										Y	PS	33	19.0	1.7	0.09	17	27.0	1.2	0.04
										Zn	PS	31	87.0	8.5	0.10	15	97.0	5.4	0.06
										Zr	PS	29	130.0	7.7	0.06	17	113.0	7.2	0.06

- (a) Mass spectrometry.
 (b) Fluorometric analyses.
 (c) Atomic absorption.
 (d) Plasma source emission spectroscopy.
 (e) Neutron activation delayed neutron count.

require correction was the uranium value for Groundwater Sample 023306. This low error rate for the unusual samples indicates a high level of reliability for the laboratory measurements.

GEOCHEMICAL RESULTS

GEOCHEMICAL DISTRIBUTIONS IN GROUNDWATER

The sample site locations for groundwater samples collected in the Beeville Quadrangle are shown on Plate 1 at the 1:250,000 scale. Symbol plots for uranium and specific conductance are presented at this same scale on Plates 2 and 3 and at the 1:1,000,000 scale in Figures A-1b and A-2b, respectively. A map of the major producing horizons sampled and the samples noted as having hydrogen sulfide odor at the time of sampling is presented in Figure 4. The number of groundwater samples collected from each of the major producing units is presented in Table 4. The groundwater data subset used to generate all tables and figures in Appendix A include all 373 groundwater samples collected in the Beeville Quadrangle, including Phase 1 and Phase 2 samples.

Observed data for the variables uranium, specific conductance, arsenic, boron, manganese, molybdenum, pH, selenium, sulfate, total alkalinity, and vanadium are listed in Table A-3. The figures in Appendix A present log frequency, lognormal probability, percentile, and areal symbol plots for these variables plus 1,000 uranium/specific conductance.

Uranium

The percentile plot (Figure A-1a) indicates that waters produced from the Jasper Aquifer, Catahoula Formation, and Jackson Group have background ranges (25th to 85th percentile) that are relatively high compared to the regional range for all samples. The median value of 13.7 ppb for waters from the Jackson Group and Catahoula Formation is higher than the 85th percentile value (8.0 ppb) for all samples. The areal distribution plot (Figure A-1b) indicates three areas that produce groundwaters with high uranium concentrations. The most promising area seems to be in Karnes County near the uranium district. These waters are produced from the Catahoula Formation and the Jasper Aquifer.

The second major area of anomalous groundwaters occurs in Bee and Refugio Counties. This area consists of only six widely spaced wells, five of which produce from the Chicot Aquifer and one from the Evangeline Aquifer. The third area is in the northeastern part of the quadrangle in Matagorda and Jackson Counties where 12 wells producing from the Chicot Aquifer show high uranium values.

Groundwaters with uranium concentrations less than 0.2 ppb (15th percentile) appear to occur primarily in the eastern half of the quadrangle. The waters are produced from the Chicot Aquifer. The percentile plot indicates the waters produced from the Chicot and Quaternary deposits to have the lowest uranium background ranges of all the aquifers.

Figure 4
PRODUCING HORIZON MAP FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

Table 4
DISTRIBUTION OF SAMPLES BY GEOLOGIC UNIT FROM THE BEEVILLE QUADRANGLE

<u>Geologic Unit</u>	<u>Geologic Unit Code</u>	<u>No. of Groundwater Samples</u>	<u>No. of Sediment Samples</u>
Fluviatile Sediments (Alluvium)	QAL	2	-
Barrier Island Deposits (Alluvium - Various Deposits)	QD	-	7
Chicot Aquifer	AQCH	261	-
Beaumont Formation	QPB	-	190
Lissie Formation	QPLI	-	49
Willis Formation	QPW	-	3
Evangeline Aquifer	AQEV	56	-
Goliad Formation	TPG	-	56
Burkeville Confining System	AQBK	20	-
Fleming Formation	TMF	-	51
Jasper Aquifer	AQJS	19	-
Catahoula Formation	TOC	12	7
Jackson Group	TEJ	<u>3</u>	<u>1</u>
Total		373	364

The correlation matrix (Table A-3) indicates significant positive correlations with coefficients greater than 0.20 for both Pearson and Spearman correlations between uranium and calcium, magnesium, and sulfate and a negative correlation between uranium and barium.

Specific Conductance

The percentile plot (Figure A-2a) indicates that waters produced from the Jackson Group and Catahoula Formation have the highest background range for specific conductance. Waters from the Burkeville Confining System and Evangeline Aquifer have the lowest backgrounds. The areal distribution plot indicates that most groundwaters with specific conductances greater than 3,300 $\mu\text{mhos/cm}$ (85th percentile) occur in the vicinity of Matagorda and San Antonio Bays and are produced from the Chicot Aquifer. Another group of well waters with high specific conductance values occurs in the northwestern corner of the quadrangle. These wells produce from the Jackson Group, Catahoula Formation, and Jasper Aquifer. Most waters with specific conductances less than 890 $\mu\text{mhos/cm}$ (15th percentile) appear to come from the Evangeline Aquifer in the northwestern quarter of the quadrangle. The correlation matrix (Table A-3) indicates a significant positive correlation with coefficients of greater than 0.20 for both Pearson and Spearman correlations between specific conductance and boron, calcium, chloride, potassium, lithium, magnesium, sodium, strontium, and sulfate.

Related Variables

Groundwaters in the study area with high uranium contents also tend to have high 1,000 uranium/specific conductance (U/SP) indicating that anomalous uranium values are not attributable only to brines. In the region between Matagorda and San Antonio Bay, where the waters have high specific conductance, U/SP is generally low.

The northwestern corner of the quadrangle must be considered to have the highest potential for uranium mineralization because of its proximity to the Karnes County mines. The aquifers are the Jackson Group and Catahoula Formation both of which contain tuffaceous beds. The tuffs are considered to be the source for the uranium in the Karnes County district. The groundwaters from this area tend to have moderate to high total alkalinities and slightly alkaline pHs and tend to contain high arsenic, boron, sometimes manganese, molybdenum, sulfate, and vanadium. The presence of high arsenic, molybdenum, and vanadium contents also seems to enhance the favorability of the area. The waters generally contain low selenium concentrations.

The groundwaters in Bee and Refugio Counties that have high uranium values also tend to have high U/SP. These waters have neutral to slightly alkaline pHs and moderate to high alkalinities. Arsenic, boron, molybdenum, sulfate, and vanadium values are moderate to high in these waters. The town of Refugio and surrounding communities are in

the middle of this area and there is extensive oil field activity. Barnes (1975) indicates graben structures in southeastern Bee County that may be similar to structures in the Karnes County District believed to have provided pathways for the mineralizing solutions.

The groundwaters with high uranium in the northeastern corner of the quadrangle tend to have high U/SP, neutral to slightly alkaline pHs, and high to moderate total alkalinities. These waters contain moderate to high selenium contents and low to moderate boron and sulfate contents. There does not seem to be any notable concentrations of the pathfinders, arsenic, molybdenum, and vanadium. Oil field activity is extensive in this area and there is a possibility of contamination of the waters by oil field fluids. Oil field fluids may act as reductant for uranium in certain situations.

Summary of Groundwater Data

The groundwater data indicate that the northwestern part of the quadrangle is favorable for potential uranium mineralization. This is primarily due to the nearness to the Karnes County mining district. Geology and pathfinder element data also show this area to be favorable.

Two other favorable areas occur in Bee and Refugio Counties and in the northeastern corner of the quadrangle. In both these areas, water chemistry is similar to that in Karnes County, but pathfinder elements arsenic, molybdenum, and vanadium are not present in anomalous concentrations.

GEOCHEMICAL DISTRIBUTIONS IN STREAM SEDIMENTS

The sample site locations for stream sediments collected in the Beeville Quadrangle are shown on Plate 4 at the 1:250,000 scale. The symbol plot for the hot-acid-soluble uranium as determined by fluorometric analysis (U-FL) and thorium is presented at this scale in Plates 5 and 6, respectively, and at the 1:1,000,000 scale in Figures B-1b and B-4b, respectively. The stream sediment data subset used to generate all tables and figures in Appendix B include all 364 stream sediment samples collected from basins in the Beeville Quadrangle, including Phase 1, Phase 2, and Phase G samples. Because of overlap in the Phase 1 and Phase 2 sampling programs, some duplicate samples were taken. Thus, Samples 001906, 004184, 001939, 002091, 004173, 004162, and 001932 are replicates of Samples 000547, 000437, 000491, 000461, 023145, 023248, and 000432, respectively. The numbers of stream sediment samples collected from each of the major stratigraphic units of the survey area are presented in Table 4. Results from all stream sediment samples collected from the Beeville Quadrangle are included in Table B-3 and in the microfiche in Appendix C. Observed data for the variables hot-acid-soluble uranium (U-FL), total uranium as determined by neutron activation (U-NT), thorium, aluminum, cerium, chromium, iron, manganese, phosphorus, yttrium, and zirconium are listed in Table B-3. The figures in Appendix B represent log frequency, lognormal probability, percentile, and areal

symbol plots for these same variables, plus U-FL/U-NT, arsenic, cobalt, copper, lithium, molybdenum, nickel, selenium, and vanadium.

Uranium

The uranium areal distribution and percentile plots (Figures B-1b and B-1a, respectively) indicate that sediments derived from the Beaumont Formation are relatively high in soluble uranium. The percentile plot indicates that Beaumont Formation sediments have a background range that is distinctly higher than the range for all the samples. The background range for the Catahoula Formation is the highest for all geological units, excluding the Beaumont Formation. The Goliad Formation and Quaternary deposits have the lowest background ranges.

The areal distribution plot (Figure B-1b) indicates that most sediments with uranium concentrations greater than 2.10 ppm (85th percentile) occur in the eastern half of the quadrangle where the Beaumont Formation crops out.

The percentile plot for U-NT (Figure B-2a) indicates that the Catahoula and Beaumont Formations and the Quaternary deposits have the highest background ranges, whereas the Goliad Formation has the lowest range. The areal distribution map (Figure B-2b) indicates that most U-NT concentrations above 2.90 ppm (85th percentile) occur in sediments from the eastern half of the quadrangle, primarily where the Beaumont Formation crops out. There are some anomalous U-NT values in sediments from the Goliad, Willis, and Lissie Formations in Victoria County.

The correlation matrix (Table B-3) indicates significant positive correlation coefficients of ≥ 0.35 for both Pearson and Spearman correlations between U-FL and U-NT, aluminum, cerium, cobalt, chromium, iron, lithium, niobium, nickel, titanium, and vanadium, and also positive correlation coefficients of ≥ 0.35 between U-NT and U-FL, aluminum, cerium, cobalt, chromium, iron, lithium, niobium, nickel, titanium, and vanadium.

The areal distribution plot for U-FL/U-NT (Figure B-12b) is similar to the corresponding U-FL plot. Sediments with U-FL/U-NT greater than 0.80 (85th percentile) occur primarily in the eastern half of the quadrangle. The occurrence of high uranium values in Beaumont Formation sediments may be related to the mineralogy of the unit. The Beaumont is primarily a clay-shale unit, whereas the other formations tend to have sand, silt, and gravel. This is supported by the correlation of both U-FL and U-NT with aluminum. Barnes (1975) relates that the Beaumont Formation contains massive beds of caliche, iron oxide concretions, and iron-manganese oxides at the surface. All three types of deposits can be host for uranium. It must also be noted that most drainage in this area is channeled to provide irrigation for rice fields and to drain swampy areas. There is a strong possibility for agricultural contamination in this area. Also, there is heavy oil field activity in the eastern half

of the Beeville Quadrangle. U-FL and U-NT values less than 0.70 and 1.64 ppm, respectively, occur primarily in sediments derived from the Goliad and Lissie Formations.

Thorium

The areal distribution plot for thorium (Figure B-3b) indicates that sediments with thorium contents greater than 8 ppm (85th percentile) occur scattered throughout the Beeville Quadrangle. The northeastern corner of the quadrangle appears to contain more of these sediments than any other area. The sediments in the northeast are derived from the Beaumont Formation. The percentile plot (Figure B-3a) indicates that thorium is rather evenly distributed throughout the geologic section. There are no strong anomalies indicated. Sediments with thorium concentrations less than 3 ppm (15th percentile) appear to be mainly derived from the Goliad, Lissie, and Beaumont Formations. The correlation matrix indicates a significant positive correlation with coefficients of greater than 0.35 for both Pearson and Spearman correlations between thorium and U-NT, aluminum, cerium, chromium, iron, lithium, niobium, nickel, titanium, vanadium, zinc, and zirconium.

Related Variables

The data indicate that the northeastern corner of the quadrangle is the most favorable for potential uranium mineralization. The sediments contain high U-FL, U-NT, U-FL/U-NT, thorium, aluminum, cerium, cobalt, chromium, copper, iron, lithium, manganese, nickel, vanadium, yttrium, and zirconium.

The favorability is suspect due to the extensive development of rice farming in this area. Natural drainage is diverted to irrigation ditches and nitrogen-phosphate fertilizer is added directly to the water. Spalding and Sackett (1972) reported a relationship between anomalous uranium concentrations in streams with phosphate fertilizer use. There are some high phosphorous values in the northeast but not as much as might be expected. However, Spalding and Sackett (1972) point out that phosphate is specifically used up by plants and little would be available to the sediments. Also, the Beaumont Formation, which crops out in this area, contains a high clay content and high concentrations of iron-manganese oxyhydroxides. Both clays and iron-manganese oxyhydroxides would tend to concentrate uranium through adsorption and would also concentrate thorium, rare earths, and metals. The association of U-FL, U-NT, and thorium with aluminum supports the occurrence of uranium with the clays.

The northwestern corner of the quadrangle must be considered to be favorable because of the proximity to the known mining district. There are several high U-NT values and high arsenic, copper, molybdenum, and phosphorous values but U-FL and selenium values are low. The similarity of the geologic setting to that of the uranium producing area also indicates the area might be favorable.

Summary of Stream Sediment Data

The stream sediment data appear to indicate that the northeastern corner of the quadrangle is the most favorable for potential uranium mineralization. However, the presence of extensive rice farming, the use of phosphate fertilizer, and the mineralogy of the Beaumont Formation in this area make this data suspect. The northwestern corner of the quadrangle must be considered favorable because of the proximity to producing uranium mines and the presence of high arsenic and molybdenum values, but the U-FL data do not indicate a high degree of favorability.

ACKNOWLEDGMENTS

The URE Project personnel gratefully acknowledges the help of E. T. Baker, U. S. Geological Survey - Water Resources Division in interpreting the hydrology of the Texas Gulf Coast.

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

BIBLIOGRAPHY

1. Achalabhuti, C., *Pleistocene Depositional Systems of Central Texas Coastal Zone*, University of Texas, Austin, PhD. Dissertation (1976).
2. Anders, R. B., *Groundwater Geology of Karnes County, Texas*, Texas Board of Water Engineers, Austin, Bulletin No. 6007 (1960).
3. Arendt, J. W., Butz, T. R., Cagle, G. W., Kane, V. E., and Nichols, C. E., *Hydrogeochemical and Stream Sediment Reconnaissance Procedures of the Uranium Resource Evaluation Project*, Union Carbide Corporation, Oak Ridge, Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/UR-100 (In Press).
4. Baker, E. T., Jr., *Groundwater Resources of Jackson County, Texas*, Texas Water Development Board, Report No. 1 (1965).
5. Baker, E. T., Jr., *Stratigraphic and Hydrogeologic Framework of Part of the Coastal Plain of Texas*, United States Department of the Interior, United States Geological Survey, Open-File Report 77-712 (1978).
6. Barnes, V. E., *Geologic Atlas of Texas, Beeville-Bay City Sheet*, University of Texas, Austin, Bureau of Economic Geology (1975).
7. Bernard, H. A. and Leblanc, R. J., "Resumé of the Quaternary Geology of the Northwestern Gulf of Mexico Province," *The Quaternary of the United States*, Princeton University Press, pp 137-185 (1965).
8. Cagle, G. W., "The Oak Ridge Analytical Program," *Symposium on Hydrogeochemical and Stream Sediment Reconnaissance for Uranium in the United States, March 16 and 17, 1977*, pp 133-156, United States Energy Research and Development Administration, Grand Junction, Colorado, GJBX-77(77) (October 1977).
9. Dale, O. C., Moulder, E. A., and Arnow, T., *Groundwater Resources of Goliad County, Texas*, Texas Board of Water Engineers, Austin, Bulletin No. 5711 (1957).
10. D'Silva, A. P., Haas, W. J., and Floyd, M. A., *Multilaboratory Analytical Quality Control Program for the Hydrogeochemical and Stream Sediment Reconnaissance*, Ames Laboratory, Iowa State University, Ames, Iowa, IS-4624 (January 1979) (Available from National Technical Information Service, U. S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161).
11. Eargle, D. H., Dickinson, K. A., and Davis, B. O., "South Texas Uranium Deposits," *AAPG Bulletin*, 59, pp 766-779 (1975).

12. Fisher, W. L., Proctor, C. V., Jr., Galloway, W. E., and Nagle, J. S., "Depositional Systems in the Jackson Group of Texas--Their Relationship to Oil, Gas, and Uranium," *Gulf Coast Association of Geological Societies, Trans., Vol. 20*, University of Texas, Austin, Texas Bureau of Economic Geology, Geologic Circular 70-74 (1970).
13. Follett, C. R. and Gabrysch, R. K., *Groundwater Resources of Dewitt County, Texas*, Texas Water Commission, Austin, Bulletin No. 6518 (1965).
14. Galloway, W. E., *Catahoula Formation of the Texas Coastal Plain: Depositional Systems, Composition, Structural Development, Groundwater Flow History, and Uranium Distribution*, University of Texas, Austin, Texas Bureau of Economic Geology, Report of Investigations, No. 87 (1977).
15. Kane, V. E., Bear, T., and Begovich, C. L., *Principal Components Testing for Outliers*, Union Carbide Corporation, Nuclear Division, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/UR-7 (July 1977). United States Department of Energy, Grand Junction, Colorado [GJBX-71(77)].
16. King, P. B., Beikman, H. M., and Edmonston, G. J., *Geologic Map of the United States*, U.S. Geological Survey (1974).
17. Kreitler, C. W., *Lineations and Faults in the Texas Coastal Zone*, University of Texas, Austin, Bureau of Economic Geology, Report of Investigations, No. 85, (1976).
18. Larson, W. C., *Uranium in Situ Leach Mining in the United States*, United States Department of the Interior, Bureau of Mines, Information Circular No. 8777 (1978).
19. Mason, C. C., *Groundwater Resources of Refugio County, Texas*, Texas Water Commission, Bulletin No. 6312 (1963).
20. McGowen, J. H., Proctor, C. V., Jr., Brown, L. F., Jr., Evans, T. H., Fisher, W. L., and Groate, C. G., *Environmental Geologic Atlas of the Texas Coastal Zone - Port Lavaca Area*, University of Texas, Austin, Bureau of Economic Geology, (1976).
21. Renfro, H. B., Feray, D. E., and King, P. B., *Geological Highway Map of Texas*, American Association of Petroleum Geologists, Geological Highway Map Series, Map No. 7 (1973).
22. Spalding, R. F. and Sackett, W. M.; "Uranium in Runoff From the Gulf of Mexico Distributive Province: Anomalous Concentration"; *Science*, 175, pp 629-631 (1972).

23. Uranium Resource Evaluation Project, *Uranium Geochemical Survey in the Crystal City and Beeville Quadrangles, Texas*, Union Carbide Corporation, Nuclear Division, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/UR-5 (February, 1977). United States Department of Energy, Grand Junction, Colorado [GJBX-19(77)].
24. Uranium Resource Evaluation Project, *Procedures Manual for Groundwater Reconnaissance Sampling*, Union Carbide Corporation, Nuclear Division, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/UR-12 (March 1978). United States Department of Energy, Grand Junction, Colorado [GJBX-62(78)].
25. Uranium Resource Evaluation Project, *Procedures Manual for Stream Sediment Reconnaissance Sampling*, Union Carbide Corporation, Nuclear Division, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/UR-13, (May 1978). United States Department of Energy, Grand Junction, Colorado [GJBX-84(78)].
26. Wesselman, J. B., *Groundwater Resources of Jasper and Newton Counties, Texas*, Texas Water Development Board, Report No. 59, (1967).

APPENDIX A
GROUNDWATER

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

APPENDIX A

GROUNDWATER

LIST OF TABLES

<u>No.</u>	<u>Title</u>	<u>Page</u>
A-1	Statistical Summary for Groundwater of the Beeville Quadrangle	A-7
A-2	Correlation Matrix for Groundwater of the Beeville Quadrangle	A-8
A-3	Partial Data Listing for Groundwater of the Beeville Quadrangle	A-34

LIST OF FIGURES

<u>No.</u>	<u>Title</u>	<u>Page</u>
A-1a	Probability, Frequency, and Percentile Plots for Uranium (ppb) in Groundwater of the Beeville Quadrangle	A-10
A-1b	Geochemical Distribution of Uranium (ppb) in Groundwater of the Beeville Quadrangle . . .	A-11
A-2a	Probability, Frequency, and Percentile Plots for Specific Conductance ($\mu\text{mhos/cm}$) in Groundwater of the Beeville Quadrangle . . .	A-12
A-2b	Geochemical Distribution of Specific Conductance ($\mu\text{mhos/cm}$) in Groundwater of the Beeville Quadrangle	A-13
A-3a	Probability, Frequency, and Percentile Plots for 1,000-Uranium/Specific Conductance in Groundwater of the Beeville Quadrangle . . .	A-14
A-3b	Geochemical Distribution of 1,000-Uranium/ Specific Conductance in Groundwater of the Beeville Quadrangle	A-15

LIST OF FIGURES, Continued

<u>No.</u>	<u>Title</u>	<u>Page</u>
A-4a	Probability, Frequency, and Percentile Plots for Arsenic (ppb) in Groundwater of the Beeville Quadrangle	A-16
A-4b	Geochemical Distribution of Arsenic (ppb) in Groundwater of the Beeville Quadrangle . . .	A-17
A-5a	Probability, Frequency, and Percentile Plots for Boron (ppb) in Groundwater of the Beeville Quadrangle	A-18
A-5b	Geochemical Distribution of Boron (ppb) in Groundwater of the Beeville Quadrangle . . .	A-19
A-6a	Probability, Frequency, and Percentile Plots for Manganese (ppb) in Groundwater of the Beeville Quadrangle	A-20
A-6b	Geochemical Distribution of Manganese (ppb) in Groundwater of the Beeville Quadrangle . . .	A-21
A-7a	Probability, Frequency, and Percentile Plots for Molybdenum (ppb) in Groundwater of the Beeville Quadrangle	A-22
A-7b	Geochemical Distribution of Molybdenum (ppb) in Groundwater of the Beeville Quadrangle . . .	A-23
A-8a	Probability, Frequency, and Percentile Plots for Selenium (ppb) in Groundwater of the Beeville Quadrangle	A-24
A-8b	Geochemical Distribution of Selenium (ppb) in Groundwater of the Beeville Quadrangle . . .	A-25
A-9a	Probability, Frequency, and Percentile Plots for Vanadium (ppb) in Groundwater of the Beeville Quadrangle	A-26
A-9b	Geochemical Distribution of Vanadium (ppb) in Groundwater of the Beeville Quadrangle . . .	A-27
A-10a	Probability, Frequency, and Percentile Plots for Total Alkalinity (ppm) in Groundwater of the Beeville Quadrangle	A-28
A-10b	Geochemical Distribution of Total Alkalinity (ppm) in Groundwater of the Beeville Quadrangle	A-29

LIST OF FIGURES, Continued

<u>No.</u>	<u>Title</u>	<u>Page</u>
A-11a	Probability, Frequency, and Percentile Plots for pH in Groundwater of the Beeville Quadrangle	A-30
A-11b	Geochemical Distribution of pH in Groundwater of the Beeville Quadrangle . . .	A-31
A-12a	Probability, Frequency, and Percentile Plots for Sulfate (ppm) in Groundwater of the Beeville Quadrangle	A-32
A-12b	Geochemical Distribution of Sulfate (ppm) in Groundwater of the Beeville Quadrangle . . .	A-33

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

Table A-1
STATISTICAL SUMMARY FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

NO. SAMPLES ANALYZED										COEFFICIENT		LN TRANSFORMATION			
BELOW										OF		ROBUST			
MEASURABLE	DETECTION	DETECTION	MINIMUM	MAXIMUM					STANDARD						
ELEMENT	VALUES	LIMIT	LIMIT	VALUE	VALUE	MEAN	MEDIAN	MODE	DEVIATION	VARIATION	MEAN	S. D.	MEAN	S. D.	
U	265	108	<0.20	0.03	51.75	5.69	1.67	0.16	7.256	1.275	1.05	1.28	0.26	2.05	
SP	373			164	*****	2412	1522	1212	6106.8	2.5	7.42	0.67	7.39	0.61	
U/SP	373			0.00	48.84	2.60	1.15	0.11	4.341	1.668	-0.45	2.03	-0.42	1.80	
J/B	370			0.00	429.25	13.99	3.51	0.36	37.907	2.709	0.73	2.34	0.79	2.32	
U/SQ	373			0.02	3878.00	145.49	46.64	10.73	331.859	2.281	3.70	1.78	3.76	1.74	
AG	3	81	<4	<4	27	14	<4	<4	11.5	0.8	2.40	0.85			
AL	139	231	<40	<40	7500	193	<40	<40	645.3	3.3	4.65	0.80			
AS	271	102	<0.5	<0.5	322.0	6.1	1.3	<0.5	21.08	3.43	0.95	1.13	0.24	1.57	
B	370			14	50000	1356	500	174	3547.2	2.6	6.24	1.32	6.21	1.36	
BA	228	142	<4	<4	3000	244	10	4	414.7	1.7	4.42	1.66	2.57	2.72	
BE	71			6	65	32	35	34	11.4	0.3	3.41	0.42	3.44	0.34	
CU	16	354	<8	<8	102	37	<8	<8	28.3	0.8	3.35	0.76			
CR	69	301	<4	<4	200	25	<4	<4	43.0	1.7	2.51	1.05			
CU	62	308	<16	<16	996	73	<16	<16	132.0	1.8	3.82	0.82			
FE	147	223	<40	<40	6666	219	<40	<40	569.2	2.6	4.80	0.90			
MN	200	170	<4	<4	4000	61	<4	<4	307.9	5.0	2.88	1.19			
MO	137	233	<4	<4	500	28	<4	<4	60.1	2.1	2.62	1.03			
NI	56	314	<16	<16	20000	1107	<16	<16	2992.3	2.7	5.39	1.74			
P	5	365	<400	<400	2500	1533	<400	<400	892.9	0.6	7.15	0.73			
SC	0	370	<4	<4	<4	<4	<4	<4							
SE	319	54	<0.2	<0.2	5.3	0.5	0.4	0.5	0.41	0.85	-0.86	0.43	-0.99	0.48	
TI	14	356	<24	<24	1000	141	<24	<24	259.4	1.8	4.23	1.03			
V	134	236	<4	<4	500	42	<4	<4	60.0	1.4	3.09	1.14			
Y	37			0	13	0	0	0	2.2	5.1					
ZN	23	347	<240	<240	4999	868	<240	<240	991.4	1.1	6.46	0.70			
ZR	2	368	<8	<8	13	11	<8	<8	2.4	0.2	2.45	0.20			
T-AK	373			122	672	335	332	347	71.3	0.2	5.79	0.22	5.80	0.21	
M-AK	373			128	672	335	330	328	71.0	0.2	5.79	0.22	5.80	0.21	
D-AK	373			0	104	1	0	0	7.6	5.6					
CL	240	1	<10	<10	4650	334	183	49	480.2	1.4	5.29	0.97	5.26	0.96	
PH	372			4.5	10.9	7.3	7.2	7.0	0.65	0.09					
SO4	339	33	<5	<5	1580	70	<30	<30	155.3	2.2	3.50	1.12			
		1	<30												

NOTE: Refer to Table 1, Page 24; Table 3, Page 26; and Table C-1, Page 4 for concentration units and symbol definitions.

Table A-2

CORRELATION MATRIX FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE							
L-U							
L-U	1.00 (265)						
L-SO4							
	0.40***						
L-SO4	0.44*** (252)	1.00 (339)					
L-BA							
	-0.21***	-0.26***					
L-BA	-0.22*** (263)	-0.24*** (335)	1.00 (369)				
L-SE							
	0.08	0.07	-0.01				
L-SE	0.12* (222)	0.04 (290)	-0.02 (317)	1.00 (319)			
L-TAK							
	0.20***	0.11**	-0.19***	0.14**			
L-TAK	0.14** (265)	0.07 (339)	-0.21*** (369)	0.12** (319)	1.00 (373)		
L-CA							
	0.25***	0.32***	0.06	0.03	-0.09		
L-CA	0.23*** (142)	0.30*** (208)	0.09 (241)	0.10 (228)	-0.11 (241)	1.00 (241)	
L-MG							
	0.30***	0.37***	-0.01	0.01	0.01	0.87***	
L-MG	0.30*** (142)	0.39*** (208)	-0.01 (241)	0.03 (228)	0.09 (241)	0.75*** (241)	1.00 (241)
PH							
	-0.01	0.01	-0.07	-0.01	-0.06	-0.45***	-0.30***
PH	-0.01 (264)	-0.11** (338)	-0.08 (368)	-0.04 (318)	0.02 (372)	-0.54*** (241)	-0.36*** (241)
L-AS							
	0.14**	0.28***	0.07	-0.01	-0.13**	-0.20**	-0.23***
L-AS	0.13* (219)	0.29*** (248)	0.04 (267)	-0.06 (222)	-0.18*** (271)	-0.25*** (153)	-0.27*** (153)
L-LI							
	-0.00	0.46***	0.04	0.16**	0.12*	0.37***	0.53***
L-LI	0.11 (142)	0.40*** (208)	0.08 (241)	0.16** (228)	0.19*** (241)	0.35*** (241)	0.61*** (241)
L-SR							
	0.03	0.33***	0.31***	0.11*	-0.16**	0.67***	0.73***
L-SR	0.08 (142)	0.35*** (208)	0.29*** (241)	0.09 (228)	-0.05 (241)	0.62*** (241)	0.70*** (241)
L-SP							
	0.11*	0.33***	-0.13**	0.07	0.08	0.32***	0.46***
L-SP	0.20*** (265)	0.30*** (339)	-0.09* (359)	0.07 (319)	0.18*** (373)	0.30*** (241)	0.46*** (241)
L-CL							
	-0.06	0.44***	0.08	0.03	0.01	0.34***	0.48***
L-CL	-0.04 (141)	0.41*** (208)	0.08 (239)	0.01 (228)	0.15** (240)	0.32*** (239)	0.49*** (239)
L-K							
	-0.23***	0.40***	-0.16**	0.04	-0.08	0.40***	0.45***
L-K	-0.17** (141)	0.34*** (207)	-0.12* (240)	0.03 (227)	0.02 (240)	0.40*** (240)	0.43*** (240)
L-3							
	0.17***	0.53***	0.06	0.02	0.08	-0.09	0.07
L-3	0.21*** (265)	0.48*** (339)	0.06 (369)	-0.02 (319)	0.09* (373)	-0.22*** (241)	-0.00 (241)
L-NA							
	-0.12	0.36***	-0.10	0.02	0.15**	0.13**	0.30***
L-NA	-0.12 (142)	0.37*** (208)	-0.08 (241)	0.00 (228)	0.25*** (241)	-0.09 (241)	0.18*** (241)

NOTE: (1) Pearson correlation/Spearman correlation/(sample size). If either element has a concentration below the laboratory detection limits, it is omitted from the pairwise computations.

(2) Significance levels: *-10%, **-5%, ***-1%.

PH								
1.00 (372)								
L-AS								
0.22*** 0.17*** 1.00 (270) (271)								
		L-LI						
-0.04	-0.21**							
-0.10	-0.20**	1.00						
(241)	(153)	(241)						
L-SR								
-0.20***	-0.19**	0.74***						
-0.29***	-0.21***	0.77***	1.00					
(241)	(153)	(241)	(241)					
L-SP								
0.06	-0.02	0.71***	0.61***					
0.07	-0.01	0.72***	0.58***	1.00				
(372)	(271)	(241)	(241)	(373)				
L-CL								
0.01	0.03	0.70***	0.66***	0.90***				
-0.02	0.04	0.69***	0.61***	0.93***	1.00			
(240)	(152)	(239)	(239)	(240)	(240)			
L-K								
-0.06	-0.10	0.50***	0.45***	0.55***	0.54***			
-0.07	-0.09	0.53***	0.47***	0.56***	0.53***	1.00		
(240)	(152)	(240)	(240)	(240)	(238)	(240)		
L-B								
0.27***	0.39***	0.56***	0.34***	0.49***	0.67***	0.47***		
0.24***	0.39***	0.53***	0.27***	0.52***	0.68***	0.43***	1.00	
(372)	(271)	(241)	(241)	(373)	(240)	(240)	(373)	
L-NA								
0.18***	0.13	0.59***	0.42***	0.72***	0.67***	0.41***	0.83***	
0.25***	0.17**	0.63***	0.36***	0.84***	0.82***	0.41***	0.87***	1.00
(241)	(153)	(241)	(241)	(241)	(239)	(240)	(241)	(241)

Figure A-1a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR URANIUM (PPB)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-1b

GEOCHEMICAL DISTRIBUTION OF URANIUM (PPB) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-2a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SPECIFIC CONDUCTANCE (μ MHOS/CM)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-2b

GEOCHEMICAL DISTRIBUTION OF SPECIFIC CONDUCTANCE (μ MHOS/CM) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-3a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR 1,000*URANIUM/SPECIFIC CONDUCTANCE
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

A-15

Figure A-3b

GEOCHEMICAL DISTRIBUTION OF 1,000-URANIUM/SPECIFIC CONDUCTANCE IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-4a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR ARSENIC (PPB)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-4b

GEOCHEMICAL DISTRIBUTION OF ARSENIC (PPB) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-5a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR BORON (PPB)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-5b

GEOCHEMICAL DISTRIBUTION OF BORON (PPB) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-6a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR MANGANESE (PPB)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

A-21

Figure A-6b

GEOCHEMICAL DISTRIBUTION OF MANGANESE (PPB) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-7a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR MOLYBDENUM (PPB)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-8a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SELENIUM (PPB)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-8b

GEOCHEMICAL DISTRIBUTION OF SELENIUM (PPB) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-9a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR VANADIUM (PPB)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

A-27

Figure A-9b

GEOCHEMICAL DISTRIBUTION OF VANADIUM (PPB) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-10a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR TOTAL ALKALINITY (PPM)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

A-29

Figure A-10b

GEOCHEMICAL DISTRIBUTION OF TOTAL ALKALINITY (PPM) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-11a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR pH
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

A-31

Figure A-11b
GEOCHEMICAL DISTRIBUTION OF pH IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-12a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SULFATE (PPM)
IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Figure A-12b

GEOCHEMICAL DISTRIBUTION OF SULFATE (PPM) IN GROUNDWATER OF THE BEEVILLE QUADRANGLE

Table A-3

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE - GROUNDWATER												SECTION 1 OF 1		
OR SAMPLE	D. O. E.	SAMPLE	NUMBER	U	SP	AS	B	MN	MO	PH	SE	SO4	T-AK	V
NUMBER	ST	LAT	LONG	L TY REP	(PPB)	UMHOS/CM	(PPB)	(PPB)	(PPB)	(PPB)	(PPB)	(PPM)	(PPM)	(PPB)
304	48-28.800	- 97.922	-3-03-	32.	3700	3.8	3500	<4	10	7.4	<0.2	550	260	20
306	48-28.822	- 97.938	-3-03-	25.	6800	94.	13000	<4	50	8.8	1.1	930	670	33
310	48-28.814	- 97.910	-3-03-	14.	2200	36.	1000	<4	5	7.2	0.7	40	270	20
311	48-28.855	- 97.939	-3-03-	13.	2300	9.7	1500	10	10	7.0	<0.2	140	260	100
317	48-28.943	- 97.972	-3-03-	32.	1400	8.0	2600	13	66	7.5	<0.2	130	300	40
319	48-28.805	- 97.886	-3-03-	2.8	1000	9.6	500	<4	<4	7.1	<0.2	35	230	20
322	48-28.857	- 97.822	-3-03-	1.6	560	10.	120	<4	<4	6.6	<0.2	35	300	24
325	48-28.644	- 97.754	-3-03-	1.4	800	2.1	1300	<4	5	6.6	<0.2	110	450	<4
327	48-28.765	- 97.786	-3-03-	4.6	1100	5.0	500	5	<4	7.5	<0.2	60	300	40
336	48-28.761	- 97.637	-3-03-	1.8	1200	4.7	660	<4	<4	6.9	<0.2	40	270	66
345	48-28.816	- 97.815	-3-03-	8.0	2200	16.	1200	<4	13	6.8	<0.2	85	240	66
349	48-28.919	- 97.632	-3-03-	1.7	720	4.3	250	5	5	6.8	<0.2	35	360	20
360	48-28.973	- 97.776	-3-03-	11.	1100	8.4	430	<4	4	7.3	<0.2	110	430	10
367	48-28.934	- 97.811	-3-03-	18.	1800	18.	480	4	4	7.2	<0.2	220	270	17
371	48-28.747	- 97.788	-3-03-	3.6	980	2.0	150	10	<4	6.9	<0.2	70	320	5
377	48-28.663	- 97.819	-3-03-	5.4	4800	3.6	2000	<4	<4	7.0	<0.2	130	340	20
381	48-28.664	- 97.992	-3-03-	2.4	520	2.2	64	<4	<4	7.0	<0.2	40	250	10
385	48-28.666	- 97.982	-3-03-	10.	560	<0.5	320	<4	4	7.1	0.2	45	270	<4
390	48-28.683	- 97.835	-3-03-	8.1	2100	2.0	1700	<4	17	6.8	<0.2	130	250	100
402	48-28.466	- 97.861	-3-03-	2.5	520	8.0	530	5	<4	6.8	0.2	35	320	53
405	48-28.486	- 97.987	-3-03-	3.7	1300	3.0	750	20	<4	6.8	0.6	75	270	50
408	48-28.453	- 97.979	-3-03-	4.8	2100	4.0	1300	<4	<4	7.0	0.2	95	210	80
411	48-28.389	- 97.933	-3-03-	4.2	1500	2.0	630	30	10	6.9	0.3	40	230	30
412	48-28.663	- 97.592	-3-03-	6.8	1400	3.6	1000	<4	<4	6.7	<0.2	35	310	100
417	48-28.367	- 97.827	-3-03-	5.1	900	6.0	750	<4	<4	7.2	0.3	35	330	100
422	48-28.245	- 97.769	-3-03-	6.3	3200	5.0	2100	<4	<4	6.6	0.2	200	270	66
428	48-28.445	- 97.729	-3-03-	4.3	1200	4.4	400	25	<4	6.9	0.3	36	300	20
440	48-28.300	- 97.582	-3-03-	5.7	1700	19.	420	<4	<4	7.4	0.5	90	320	80
441	48-28.322	- 97.609	-3-03-	3.8	1200	26.	500	<4	<4	7.0	0.4	33	380	100
446	48-28.497	- 97.408	-3-03-	3.8	1900	7.6	400	10	<4	7.0	0.5	84	350	30
453	48-28.324	- 97.998	-3-03-	7.5	3.00	5.0	2000	<4	<4	6.8	0.6	84	230	20
457	48-28.240	- 97.981	-3-03-	14.	1500	2.9	680	14	10	7.3	0.6	96	290	<4
458	48-28.091	- 97.947	-3-03-	6.1	1800	19.	1500	<4	7	6.9	0.3	72	330	99
464	48-28.044	- 97.944	-3-03-	7.0	2900	5.6	2000	<4	10	7.0	0.3	57	280	50
467	48-28.029	- 97.868	-3-03-	3.9	820	10.	530	<4	<4	7.0	0.8	30	330	40
477	48-28.021	- 97.621	-3-03-	0.41	1200	7.5	480	<4	<4	7.1	0.5	42	330	<4
481	48-28.046	- 97.552	-3-03-	<0.20	1100	<0.5	480	<4	<4	7.0	0.3	69	390	<4
483	48-28.052	- 97.547	-3-03-	1.7	880	14.	580	26	7	7.7	0.7	36	380	<4
490	48-28.192	- 97.617	-3-03-	7.1	2700	19.	1000	<4	<4	6.4	0.3	84	250	100
496	48-28.696	- 97.858	-3-03-	2.1	900	6.0	400	<4	<4	6.9	0.3	35	350	53
497	48-28.041	- 97.410	-3-03-	0.08	1500	<0.5	200	<4	<4	7.7	0.3	<30	360	<4
500	48-28.002	- 97.320	-3-03-	0.70	3100	<0.5	13000	<4	<4	7.8	1.1	30	390	17
501	48-28.039	- 97.289	-3-03-	<0.20	3300	<0.5	4000	<4	<4	7.3	0.3	72	330	<4
510	48-28.567	- 97.545	-3-03-	12.	1200	0.7	1300	<4	<4	6.9	0.4	45	300	10
514	48-28.703	- 97.651	-3-03-	2.0	600	3.2	630	<4	<4	6.9	0.5	24	330	75
519	48-28.769	- 97.640	-3-03-	2.2	1300	1.9	400	<4	<4	7.2	<0.2	30	270	40
522	48-28.818	- 97.503	-3-03-	1.6	3300	6.3	320	5	<4	6.9	0.5	30	300	80
529	48-28.715	- 97.433	-3-03-	3.4	1200	8.6	400	<4	<4	6.8	0.5	45	420	40
533	48-28.848	- 97.454	-3-03-	0.06	960	3.9	3000	20	100	7.8	0.3	55	370	<4
542	48-28.778	- 97.338	-3-03-	1.3	500	7.0	330	<4	26	7.0	0.3	35	330	26
543	48-28.840	- 97.312	-3-03-	1.9	690	4.4	500	<4	<4	7.3	0.3	35	300	10
546	48-28.847	- 97.347	-3-03-	4.1	700	0.9	150	<4	<4	7.0	0.5	40	360	<4
555	48-28.978	- 97.422	-3-03-	1.6	470	2.3	260	<4	7	7.0	0.5	35	300	20
560	48-28.700	- 97.567	-3-03-	2.0	1300	0.5	630	<4	5	6.8	0.3	40	250	10
564	48-28.734	- 97.364	-3-03-	1.2	1000	2.5	300	30	5	6.9	0.3	35	370	20

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE - GROUNDWATER														SECTION 1 OF 1		
OR SAMPLE NUMBER	ST	D. O. E. LAT	SAMPLE LONG	NUMBER L TY REP	U (PPB)	SP UMHUS/CM	AS (PPB)	B (PPB)	MN (PPB)	MO (PPB)	PH	SE (PPB)	SQ4 (PPM)	T-AK (PPM)	V (PPB)	
567	48-28.769	-	97.219	-3-03-	2.3	1700	6.3	120	8	<4	7.0	0.3	160	370	16	
568	48-28.548	-	97.348	-3-03-	2.8	900	15.	200	<4	<4	7.3	0.3	50	310	20	
574	48-28.178	-	97.296	-3-03-	0.07	1800	5.6	10000	<4	<4	8.0	0.4	30	400	<4	
587	48-28.739	-	97.219	-3-03-	8.0	880	0.7	400	15	10	6.7	0.8	35	330	10	
588	48-28.649	-	97.212	-3-03-	6.5	2200	2.5	1200	<4	7	7.1	0.7	170	290	26	
1100	48-28.823	-	97.206	-3-03-	1.5	1200	8.5	160	24	<4	6.7	<0.2	40	360	8	
1104	48-28.845	-	97.168	-3-03-	1.4	730	3.3	500	<4	<4	6.8	<0.2	30	300	10	
1107	48-28.781	-	97.069	-3-03-	0.72	560	7.6	150	<4	<4	6.8	0.8	30	280	10	
1108	48-28.749	-	97.114	-3-03-	0.11	630	320.	300	10	<4	6.9	0.4	25	340	<4	
1114	48-28.700	-	97.050	-3-03-	2.3	1100	4.7	200	5	<4	7.0	0.2	35	290	10	
1117	48-28.749	-	97.065	-3-03-	3.0	1500	1.3	240	4	<4	6.9	<0.2	35	280	8	
1120	48-28.592	-	97.065	-3-03-	5.6	1200	1.0	660	<4	<4	6.9	<0.2	60	390	7	
1124	48-28.931	-	97.060	-3-03-	0.34	480	3.0	68	<4	<4	6.8	<0.2	30	240	7	
1127	48-28.938	-	97.110	-3-03-	0.84	650	3.9	130	<4	<4	7.0	<0.2	30	300	10	
1131	48-28.969	-	97.197	-3-03-	1.2	520	0.5	160	<4	<4	6.9	0.6	25	280	4	
1135	48-28.968	-	97.233	-3-03-	0.44	740	0.9	370	<4	<4	7.6	0.3	30	360	12	
1138	48-28.836	-	97.075	-3-03-	0.90	880	2.2	150	<4	<4	7.0	0.6	35	320	10	
1139	48-28.870	-	97.105	-3-03-	1.1	860	2.1	200	7	<4	7.0	0.6	25	370	7	
1142	48-28.898	-	97.129	-3-03-	1.0	1400	0.7	200	<4	<4	6.9	0.2	30	320	7	
1144	48-28.914	-	97.156	-3-03-	0.57	650	1.9	130	<4	<4	7.0	0.4	25	320	10	
1147	48-28.951	-	97.301	-3-03-	2.4	800	1.7	350	<4	<4	7.0	0.7	30	310	10	
1153	48-28.970	-	97.594	-3-03-	6.5	1200	<0.5	1000	<4	<4	6.9	0.4	35	250	<4	
1156	48-28.999	-	97.700	-3-03-	2.4	1400	0.6	1000	<4	<4	7.0	0.6	35	340	<4	
1161	48-28.914	-	97.641	-3-03-	2.6	48000	2.1	14	14	7	6.9	0.6	25	260	10	
1168	48-28.863	-	97.543	-3-03-	6.4	1400	0.6	400	5	5	7.0	0.3	45	340	10	
1169	48-28.874	-	97.527	-3-03-	2.0	1400	2.8	160	4	<4	6.8	0.6	45	300	16	
1329	48-29.000	-	97.952	-3-03-	0.03	6000	0.9	5800	740	12	7.3	<0.2	1500	340	<4	
1877	48-28.817	-	97.937	-3-03-	26.	3300	13.	2000	20	26	6.9	0.3	150	350	13	
1883	48-28.760	-	97.731	-3-03-	2.8	1200	7.5	400	<4	<4	7.0	0.2	35	340	26	
1886	48-28.757	-	97.567	-3-03-	1.8	860	8.6	1300	<4	<4	6.9	<0.2	15	350	40	
1889	48-28.762	-	97.478	-3-03-	1.5	1500	6.7	800	<4	<4	6.8	<0.2	25	370	60	
1892	48-28.450	-	97.410	-3-03-	8.6	1300	5.9	400	5	<4	7.7	0.4	45	330	20	
1895	48-28.762	-	97.305	-3-03-	1.6	2000	3.4	740	<4	<4	6.7	<0.2	15	310	50	
1899	48-28.975	-	97.627	-3-03-	7.7	870	<0.5	670	<4	6	6.9	0.3	40	320	13	
1902	48-28.942	-	97.307	-3-03-	5.6	620	1.1	300	<4	<4	6.9	0.6	45	290	10	
1903	48-28.859	-	97.438	-3-03-	9.6	450	2.9	2000	<4	<4	6.6	<0.2	160	380	200	
1911	48-28.924	-	97.096	-3-03-	3.8	590	2.0	150	<4	5	6.7	0.4	40	290	5	
1912	48-28.815	-	97.217	-3-03-	1.7	810	0.7	330	<4	6	6.8	0.3	40	350	6	
1913	48-28.685	-	97.765	-3-03-	10.	1400	<0.5	2500	<4	<4	7.0	0.2	45	280	17	
1915	48-28.546	-	97.615	-3-03-	3.3	550	1.8	750	5	<4	6.9	0.4	35	390	20	
1916	48-28.657	-	97.582	-3-03-	5.3	1300	<0.5	670	6	6	7.5	0.5	200	220	6	
1917	48-28.866	-	97.702	-3-03-	4.2	1000	<0.5	530	<4	6	7.2	0.5	45	350	13	
1918	48-28.953	-	97.824	-3-03-	5.3	960	9.9	1000	5	<4	6.9	0.3	50	460	20	
1919	48-28.697	-	97.919	-3-03-	2.9	1100	9.2	1300	6	6	7.1	0.3	200	290	130	
1920	48-28.566	-	97.818	-3-03-	<0.20	1600	<0.5	2500	<4	<4	7.2	0.2	180	330	<4	
1921	48-28.550	-	97.903	-3-03-	5.3	950	2.8	1300	<4	6	7.1	0.4	50	450	67	
1922	48-28.409	-	97.769	-3-03-	4.1	600	6.8	1800	<4	10	7.1	<0.2	40	280	150	
1930	48-28.329	-	97.858	-3-03-	1.8	960	4.5	670	<4	<4	6.7	<0.2	50	290	27	
2023	48-28.170	-	97.297	-3-03-	<0.20	1800	<0.5	8300	<4	<4	7.8	<0.2	150	310	<4	
2024	48-28.374	-	97.435	-3-03-	11.	1600	4.7	2500	<4	20	7.7	<0.2	150	360	100	
2025	48-28.414	-	97.157	-3-03-	12.	1400	5.9	2000	<4	20	7.5	0.9	150	350	60	
2026	48-28.371	-	97.304	-3-03-	21.	3300	4.1	2900	<4	17	7.6	<0.2	230	420	67	
2027	48-28.210	-	97.359	-3-03-	22.	2900	6.0	3000	<4	20	7.0	<0.2	200	350	60	
2031	48-28.052	-	97.621	-3-03-	6.6	2300	4.4	2500	<4	25	7.0	<0.2	130	240	75	
2034	48-28.485	-	97.600	-3-03-	2.8	1200	5.7	1000	10	<4	7.0	<0.2	150	370	75	

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE - GROUNDWATER													SECTION 1 OF 1		
OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPB)	SP UMHOS/CM	AS (PPB)	B (PPB)	MN (PPB)	MO (PPB)	PH	SE (PPB)	SO4 (PPM)	T-AK (PPM)	V (PPB)	
2035	48-28.172	- 97.570	-3-03-	27.	2200	9.1	2000	<4	40	7.0	0.3	200	510	150	
2036	48-28.171	- 97.756	-3-03-	5.8	2200	6.3	4400	<4	<4	7.0	0.3	150	280	100	
2037	48-28.051	- 97.761	-3-03-	<0.20	1200	<0.5	1300	<4	<4	7.4	0.3	150	290	<4	
2038	48-28.043	- 97.366	-3-03-	<0.20	2600	<0.5	17000	130	<4	8.0	<0.2	250	450	<4	
4180	48-28.350	- 97.585	-3-03-	6.4	1700	51.	5000	<4	<4	7.1	0.3	25	290	500	
4189	48-28.136	- 96.989	-3-03-	0.61	570	12.	600	<4	<4	8.1	<0.2	5	190	<4	
6804	48-28.924	- 97.848	-3-03-	16.	4500	14.	13000	<4	50	7.4	<0.2	180	310	200	
6805	48-28.969	- 97.827	-3-03-	30.	1700	15.	400	75	10	7.9	0.4	120	300	<4	
6806	48-28.920	- 97.901	-3-03-	10.	2300	31.	5000	<4	33	8.0	0.4	60	260	170	
6808	48-28.957	- 97.909	-3-03-	<0.20	2000	21.	4200	100	17	8.6	0.4	40	270	<4	
6810	48-28.996	- 97.961	-3-03-	<0.20	8300	1.7	30000	500	<4	8.3	<0.2	1600	330	<4	
6811	48-28.716	- 97.922	-3-03-	<0.20	110000	0.9	50000	4000	100	6.5	<0.2	640	280	<4	
6813	48-28.774	- 97.992	-3-03-	52.	2800	30.	10000	25	13	7.2	1.0	510	550	75	
6814	48-28.812	- 97.984	-3-03-	15.	2100	16.	3800	190	50	8.0	0.4	80	360	50	
6815	48-28.838	- 97.993	-3-03-	16.	2200	34.	5000	190	25	7.8	0.5	110	350	190	
6817	48-28.900	- 97.991	-3-03-	16.	3600	11.	3100	75	13	8.9	0.3	140	230	25	
6819	48-28.989	- 97.922	-3-03-	38.	1700	23.	4400	100	200	11.	0.7	410	240	<4	
6842	48-28.372	- 97.948	-3-03-	2.1	2000	0.7	2000	400	10	7.0	0.5	90	250	<4	
6852	48-28.653	- 97.987	-3-03-	0.74	1000	2.8	530	27	400	7.8	0.5	76	240	<4	
6853	48-28.674	- 97.927	-3-03-	1.4	1300	8.2	4200	17	17	7.8	0.6	33	280	170	
6854	48-28.709	- 97.933	-3-03-	2.3	990	20.	670	6	<4	7.8	0.7	26	240	100	
6857	48-28.595	- 97.932	-3-03-	4.5	2700	0.5	3300	<4	<4	8.1	0.2	140	300	130	
23101	48-28.707	- 96.825	-3-03-	11.	2100	0.6	630	<2	<4	6.7	0.2	46	400	<4	
23104	48-28.720	- 96.766	-3-03-	1.3	2200	0.7	300	5	<4	7.0	0.3	27	340	<4	
23106	48-28.985	- 96.792	-3-03-	0.25	850	0.7	83	<2	<4	6.8	0.5	16	280	<4	
23107	48-28.950	- 96.770	-3-03-	<0.20	980	0.5	99	64	5	7.0	0.3	28	290	<4	
23108	48-28.933	- 96.833	-3-03-	1.0	670	2.1	100	<2	<4	7.2	0.2	5	260	8	
23109	48-28.990	- 96.911	-3-03-	13.	1700	4.8	120	2	<4	7.2	0.5	47	330	24	
23110	48-28.959	- 96.888	-3-03-	11.	1800	1.3	110	2	<4	7.1	1.2	26	290	<4	
23111	48-28.936	- 96.944	-3-03-	<0.20	980	1.1	88	22	<4	7.6	<0.2	45	320	<4	
23112	48-28.978	- 96.939	-3-03-	<0.20	2200	<0.5	130	<2	<4	7.2	0.2	11	380	<4	
23113	48-28.908	- 96.820	-3-03-	2.4	890	1.5	120	<2	<4	6.9	0.3	8	310	<4	
23114	48-28.898	- 96.784	-3-03-	<0.20	1000	<0.5	520	5	<4	7.6	<0.2	45	300	<4	
23116	48-28.897	- 96.782	-3-03-	5.3	1100	2.7	130	2	<4	7.1	0.2	16	330	<4	
23117	48-28.854	- 96.769	-3-03-	<0.20	1500	0.8	300	110	<4	7.4	0.2	45	320	<4	
23118	48-28.860	- 96.816	-3-03-	<0.20	930	<0.5	130	24	<4	7.1	<0.2	19	350	<4	
23122	48-28.805	- 96.814	-3-03-	<0.20	1700	<0.5	280	29	<4	7.1	0.5	45	320	<4	
23124	48-28.803	- 96.775	-3-03-	<0.20	1900	<0.5	360	140	<4	7.1	0.7	30	390	<4	
23127	48-28.807	- 96.869	-3-03-	2.4	1000	1.7	120	<2	<4	7.2	0.4	10	330	6	
23128	48-28.762	- 96.872	-3-03-	5.5	2300	2.2	530	2	<4	7.1	0.5	81	390	<4	
23129	48-28.758	- 96.819	-3-03-	6.5	2300	2.3	550	2	<4	7.2	0.6	38	430	8	
23130	48-28.767	- 96.781	-3-03-	<0.20	1600	1.4	570	5	<4	8.0	0.5	45	360	<4	
23131	48-28.844	- 96.882	-3-03-	0.46	1100	<0.5	220	<2	<4	7.0	0.5	25	340	<4	
23135	48-28.810	- 96.780	-3-03-	30.	3700	3.0	1300	<2	<4	7.0	0.5	160	410	6	
23137	48-28.751	- 96.922	-3-03-	2.5	3100	1.3	460	2	<4	6.8	0.3	93	330	5	
23138	48-28.971	- 96.849	-3-03-	3.7	1600	1.2	170	<2	5	6.8	0.4	35	430	<4	
23144	48-28.895	- 96.883	-3-03-	<0.20	760	<0.5	120	3	<4	7.1	0.4	13	310	<4	
23147	48-28.901	- 96.995	-3-03-	10.	1100	3.7	180	2	<4	7.1	0.4	14	350	5	
23148	48-28.862	- 96.995	-3-03-	<0.20	950	1.2	110	24	<4	7.1	0.5	24	340	<4	
23150	48-28.896	- 96.940	-3-03-	3.5	800	3.0	120	<2	<4	7.3	0.3	9	320	8	
23153	48-28.805	- 96.919	-3-03-	2.6	3000	1.1	160	2	<4	6.6	0.4	190	370	<4	
23154	48-28.764	- 96.986	-3-03-	2.8	2300	0.9	350	<2	<4	6.8	1.0	50	310	<4	
23155	48-28.991	- 96.963	-3-03-	0.20	1100	<0.5	81	6	6	7.3	0.4	17	280	<4	
23156	48-28.988	- 96.885	-3-03-	<0.20	1800	6.9	100	13	6	7.0	0.4	64	320	<4	
23157	48-28.822	- 96.975	-3-03-	0.20	860	1.2	440	<2	4	7.0	0.4	6	320	<4	

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE - GROUNDWATER														
OR SAMPLE	D. O. E.	SAMPLE	NUMBER	U	SP	AS	B	MN	MO	PH	SE	SECTION	I OF	I
NUMBER	ST	LAT	LONG	L TY REP	(PPB)	UMHOS/CM	(PPB)	(PPB)	(PPB)	(PPB)	(PPB)	(PPM)	T-AK	V
23158	48-28.840	-	96.918	-3-03-	0.22	830	0.5	140	2	<4	7.5	0.4	<5	320
23160	48-28.936	-	96.391	-3-03-	1.4	1400	0.6	140	9	4	6.9	0.4	49	350
23161	48-28.991	-	96.390	-3-03-	11.	1300	0.6	190	<2	<4	7.0	0.4	17	380
23164	48-28.992	-	96.351	-3-03-	5.7	870	0.8	88	<2	<4	7.0	0.3	6	460
23165	48-28.952	-	96.345	-3-03-	7.0	2400	1.3	140	2	8	7.1	0.4	67	360
23172	48-28.891	-	96.283	-3-03-	39.	2600	<0.5	340	6	<4	7.1	0.9	70	540
23173	48-28.844	-	96.288	-3-03-	2.1	700	1.3	6	92	<4	7.3	0.4	11	270
23174	48-28.862	-	96.345	-3-03-	15.	1300	<0.5	220	4	<4	7.1	0.4	47	360
23177	48-28.914	-	96.333	-3-03-	8.0	3200	0.8	150	24	<4	6.8	0.6	74	380
23189	48-28.938	-	96.021	-3-03-	3.2	1500	0.5	120	<2	<4	7.0	<0.2	<5	350
23191	48-28.909	-	96.194	-3-03-	4.4	1400	0.7	110	<2	<4	5.7	0.4	<5	330
23192	48-28.897	-	96.142	-3-03-	0.31	1100	1.3	120	<2	6	7.0	0.2	7	260
23193	48-28.960	-	96.065	-3-03-	0.44	880	1.9	110	18	<4	7.7	<0.2	5	220
23194	48-28.982	-	96.015	-3-03-	<0.20	1000	1.4	130	34	6	7.8	0.2	9	250
23195	48-28.900	-	96.047	-3-03-	<0.20	950	7.0	160	21	<4	8.0	<0.2	<5	260
23197	48-28.935	-	96.187	-3-03-	4.6	1400	0.8	120	3	4	6.6	0.7	<5	450
23198	48-28.945	-	96.143	-3-03-	2.9	2600	<0.5	240	17	<4	6.8	0.3	110	500
23199	48-28.928	-	96.098	-3-03-	2.7	710	<0.5	98	<2	<4	7.2	0.3	16	320
23201	48-28.994	-	96.138	-3-03-	0.28	2100	<0.5	160	75	<4	7.0	0.8	36	440
23202	48-28.996	-	96.193	-3-03-	<0.20	1500	0.9	110	<2	<4	7.1	0.5	19	400
23206	48-28.903	-	96.235	-3-03-	<0.20	1700	2.3	100	100	6	7.5	0.3	14	240
23207	48-28.718	-	96.496	-3-03-	<0.20	1900	<0.5	990	5	7	8.2	0.4	<5	330
23208	48-28.643	-	96.444	-3-03-	<0.20	1100	<0.5	490	<2	10	8.4	0.4	10	320
23210	48-28.808	-	96.095	-3-03-	4.3	1300	<0.5	190	7	<4	7.6	0.3	42	350
23214	48-28.984	-	96.226	-3-03-	17.	3000	<0.5	140	2	<4	6.5	0.2	57	420
23215	48-29.000	-	96.087	-3-03-	3.8	1900	<0.5	110	2	<4	7.5	0.3	13	250
23249	48-28.393	-	96.868	-3-03-	0.23	3500	<0.5	520	84	<4	7.8	0.3	12	120
23250	48-28.436	-	96.871	-3-03-	0.46	3900	1.3	660	230	<4	6.9	0.4	100	270
23251	48-28.291	-	96.810	-3-03-	0.44	1200	4.1	280	220	<4	7.3	0.4	5	190
23252	48-28.250	-	96.787	-3-03-	<0.20	3000	<0.5	1000	20	<4	7.5	0.5	170	460
23253	48-28.276	-	96.881	-3-03-	2.0	4200	0.8	1700	<2	27	8.1	0.4	150	380
23254	48-28.209	-	96.912	-3-03-	1.4	3300	0.9	1100	61	<4	7.8	0.5	100	380
23255	48-28.718	-	96.880	-3-03-	6.3	3100	1.9	660	<2	<4	6.4	0.4	54	370
23256	48-28.657	-	96.773	-3-03-	17.	2600	1.4	610	<2	<4	6.8	0.5	100	400
23258	48-28.653	-	96.830	-3-03-	3.7	1600	2.1	280	<2	<4	6.3	0.5	15	400
23259	48-28.662	-	96.887	-3-03-	5.5	2200	0.5	670	7	<4	6.7	0.5	37	350
23260	48-28.666	-	96.958	-3-03-	2.4	2100	0.5	500	<2	<4	6.5	0.6	12	400
23261	48-28.675	-	96.957	-3-03-	0.30	1700	0.9	590	4	4	7.7	0.4	6	320
23262	48-28.630	-	96.923	-3-03-	5.5	2400	0.8	430	3	<4	6.9	0.3	60	350
23263	48-28.722	-	96.932	-3-03-	2.7	2600	1.0	460	<2	<4	6.8	0.3	80	330
23264	48-28.527	-	96.775	-3-03-	<0.20	2500	<0.5	480	40	4	5.1	0.3	120	380
23266	48-28.545	-	96.808	-3-03-	1.6	3000	<0.5	450	50	<4	5.1	0.4	5	260
23267	48-28.572	-	96.765	-3-03-	2.5	2400	0.8	210	<2	<4	4.5	0.4	7	350
23268	48-28.562	-	96.808	-3-03-	3.6	1700	<0.5	280	<2	<4	4.5	0.6	20	360
23273	48-28.553	-	96.943	-3-03-	0.25	2000	3.4	860	<2	6	7.3	5.3	13	340
23274	48-28.577	-	96.981	-3-03-	3.0	2300	3.2	210	2	<4	6.5	4.7	57	260
23275	48-28.609	-	96.985	-3-03-	3.9	2000	0.5	240	<2	<4	6.5	0.5	60	320
23276	48-28.517	-	96.967	-3-03-	<0.20	2100	<0.5	920	<2	<4	7.6	0.4	9	270
23277	48-28.730	-	96.971	-3-03-	0.94	1500	<0.5	130	16	<4	6.1	0.4	20	320
23278	48-28.676	-	96.917	-3-03-	8.6	2600	<0.5	590	15	4	6.3	0.4	76	320
23286	48-28.635	-	96.742	-3-03-	0.22	1800	<0.5	470	<2	<4	5.1	0.3	6	360
23287	48-28.653	-	96.718	-3-03-	0.30	1600	<0.5	410	33	<4	5.5	0.5	<5	380
23292	48-28.614	-	96.713	-3-03-	0.45	1800	4.3	450	63	6	7.2	0.3	<5	350
23296	48-28.566	-	96.719	-3-03-	4.1	1200	0.7	140	<2	<4	7.1	0.4	<5	330
23300	48-28.586	-	96.662	-3-03-	0.34	4300	<0.5	560	310	<4	7.4	0.4	7	230

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE - GROUNDWATER												SECTION 1 OF 1					
OR SAMPLE	D. O. E.	SAMPLE	NUMBER	U	SP	AS	B	MN	MO	PH	SE	SO4	T-AK	V			
NUMBER	ST	LAT	LONG	L	TY	REP	(PPB)	UMHOS/CM	(PPB)	(PPB)	(PPB)	(PPM)	(PPM)	(PPB)			
23301	48-28.611	-	96.659	-3-03-			0.47	3500	<0.5	560	120	<4	6.7	0.4	6	270	<4
23302	48-28.674	-	96.677	-3-03-			<0.20	1900	7.2	760	95	8	7.2	0.4	7	380	<4
23304	48-28.674	-	96.641	-3-03-			<0.20	4100	3.5	700	220	6	7.0	0.3	7	250	<4
23306	48-28.705	-	96.676	-3-03-			<0.20	1800	38.	880	8	<4	7.7	0.4	<5	370	<4
23307	48-28.693	-	96.714	-3-03-			11.	2000	1.2	440	5	<4	7.2	0.4	35	340	6
23309	48-28.511	-	96.488	-3-03-			<0.20	5700	0.6	1800	2	10	6.9	0.5	11	420	<4
23310	48-28.582	-	96.571	-3-03-			0.28	4500	<0.5	1600	97	23	7.3	0.3	10	480	<4
23312	48-28.564	-	96.634	-3-03-			<0.20	3000	0.6	680	45	<4	8.3	0.4	19	370	<4
23314	48-28.660	-	96.561	-3-03-			0.32	3800	2.0	300	<4	4	7.2	0.6	5	330	<4
23315	48-28.725	-	96.444	-3-03-			<0.20	1400	<0.5	400	<2	<4	7.8	0.5	23	300	<4
23316	48-28.705	-	96.540	-3-03-			0.55	3300	<0.5	590	7	<4	7.2	0.4	82	360	<4
23320	48-28.635	-	96.875	-3-03-			<0.20	3800	4.2	830	47	<4	7.2	0.5	10	220	<4
23321	48-28.530	-	96.718	-3-03-			0.76	3600	1.1	490	160	<4	6.3	0.5	21	270	<4
23325	48-28.528	-	96.676	-3-03-			3.2	1700	1.8	140	<2	<4	6.7	0.6	36	330	5
23328	48-28.764	-	96.539	-3-03-			<0.20	1700	<0.5	400	20	6	7.1	0.5	50	330	<4
23331	48-28.747	-	96.686	-3-03-			<0.20	1700	<0.5	2400	16	17	7.6	0.4	5	350	<4
23332	48-28.754	-	96.717	-3-03-			<0.20	1700	<0.5	1000	<2	10	8.0	0.6	10	350	<4
23333	48-28.807	-	96.671	-3-03-			<0.20	1900	2.3	650	<2	6	6.4	0.6	8	300	<4
23335	48-28.849	-	96.612	-3-03-			<0.20	3600	<0.5	1200	<2	<4	6.9	0.9	45	300	<4
23338	48-28.952	-	96.617	-3-03-			<0.20	1400	<0.5	260	33	<4	6.3	0.7	<5	320	<4
23342	48-28.990	-	96.663	-3-03-			2.2	1200	0.9	100	30	4	6.7	0.3	10	350	<4
23343	48-28.952	-	96.721	-3-03-			0.39	1600	<0.5	130	30	<4	6.7	0.4	23	360	<4
23348	48-28.907	-	96.724	-3-03-			<0.20	1600	<0.5	150	<2	<4	7.7	0.5	12	290	<4
23349	48-28.899	-	96.662	-3-23-			<0.20	1500	3.3	580	<2	<4	7.8	0.4	<5	330	<4
23350	48-29.000	-	96.712	-3-03-			<0.20	1500	<0.5	140	<2	<4	7.2	0.5	12	310	<4
23354	48-28.886	-	96.557	-3-03-			18.	1400	1.8	270	3	4	7.1	1.0	31	460	<4
23356	48-28.943	-	96.646	-3-03-			<0.20	1300	<0.5	250	<2	8	6.6	0.5	<5	370	<4
23360	48-28.984	-	96.559	-3-03-			11.	2300	0.5	130	5	7	6.1	0.6	100	400	5
23361	48-28.992	-	96.613	-3-03-			2.8	1100	1.7	79	<2	4	6.4	0.5	7	250	8
23362	48-28.953	-	96.549	-3-03-			3.4	1900	0.9	160	2	6	6.8	0.4	64	380	4
23363	48-28.844	-	96.502	-3-03-			1.5	1700	1.3	240	140	7	7.1	0.5	44	430	<4
23365	48-28.849	-	96.561	-3-03-			1.7	1200	<0.5	230	<2	<4	7.1	0.8	29	400	4
23367	48-28.810	-	96.553	-3-03-			1.9	1300	0.5	260	19	6	7.2	0.5	14	380	<4
23370	48-28.953	-	96.518	-3-03-			8.4	1300	2.0	160	2	4	5.6	0.6	14	370	4
23371	48-28.986	-	96.509	-3-03-			11.	1400	1.7	130	<2	7	7.5	0.6	17	350	7
23372	48-28.899	-	96.615	-3-03-			<0.20	1800	2.9	360	11	<4	7.3	0.4	<5	320	4
23374	48-28.858	-	96.672	-3-03-			3.1	2000	<0.5	390	<2	<4	7.3	0.6	14	340	<4
23375	48-28.849	-	96.714	-3-03-			<0.20	1500	<0.5	390	10	<4	7.3	0.5	<5	330	<4
23376	48-28.804	-	96.720	-3-03-			<0.20	1800	4.0	700	<2	<4	8.0	1.1	26	320	<4
23377	48-28.808	-	96.616	-3-03-			<0.20	3300	<0.5	1300	<2	<4	8.2	0.3	130	310	<4
23378	48-28.714	-	96.548	-3-03-			<0.20	4400	0.6	1800	11	7	5.9	0.4	150	360	<4
23379	48-28.536	-	96.619	-3-03-			<0.20	6800	<0.5	750	120	5	6.7	0.3	28	270	<4
23380	48-28.597	-	96.736	-3-03-			<0.20	2200	3.8	400	100	<4	6.0	0.5	<5	340	<4
23381	48-28.688	-	96.504	-3-03-			4.1	1500	0.5	240	8	<4	6.7	0.5	11	380	<4
23382	48-28.741	-	96.527	-3-03-			7.6	4800	<0.5	940	160	<4	6.7	0.6	11	330	<4
23383	48-28.739	-	96.505	-3-03-			<0.20	1800	<0.5	770	22	12	7.8	0.4	10	320	<4
23384	48-28.807	-	96.513	-3-03-			3.4	1300	0.5	160	<2	<4	6.9	0.4	<5	350	<4
23385	48-28.768	-	96.661	-3-03-			<0.20	1900	3.9	770	47	6	7.7	0.5	66	320	<4
23392	48-28.717	-	96.062	-3-03-			2.8	4100	<0.5	900	2	4	6.7	0.4	13	400	<4
23393	48-28.734	-	96.080	-3-03-			0.51	1300	2.5	290	14	11	7.4	0.3	6	350	<4
23394	48-28.714	-	96.143	-3-03-			<0.20	1500	<0.5	210	18	<4	7.6	0.5	<5	340	6
23397	48-28.668	-	96.136	-3-03-			<0.20	1200	<0.5	200	18	<4	7.7	0.4	7	340	<4
23398	48-28.888	-	96.514	-3-03-			3.6	1300	4.5	140	<2	8	6.1	0.4	<5	390	7
23400	48-28.656	-	96.196	-3-03-			<0.20	1300	<0.5	370	<2	8	6.7	0.4	10	450	<4
23401	48-28.591	-	96.189	-3-03-			<0.20	2100	<0.5	380	<2	6	7.3	0.4	10	470	<4

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE - GROUNDWATER														SECTION 1 OF 1		
OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPB)	SP UMHOS/CM	AS (PPB)	B (PPB)	MN (PPB)	MO (PPB)	PH	SE (PPB)	SO4 (PPM)	T-AK (PPM)	V (PPB)		
23402	48-28.641	- 96.209	-3-03-	<0.20	1700	<0.5	240	3	<4	7.8	0.4	10	130	<4		
23403	48-28.156	- 96.979	-3-03-	2.4	5300	2.7	1500	110	12	7.3	0.5	180	490	<4		
23404	48-28.325	- 96.792	-3-03-	0.34	2800	9.1	1000	<2	8	7.7	0.5	160	390	<4		
23405	48-28.169	- 96.909	-3-03-	<0.20	1100	0.5	160	3	<4	7.7	0.4	30	220	<4		
23406	48-28.386	- 96.837	-3-03-	1.8	1700	4.2	830	<2	6	7.9	0.5	76	340	<4		
23409	48-28.324	- 96.883	-3-03-	5.1	2300	1.6	1100	33	15	8.0	0.3	100	360	4		
23410	48-28.284	- 96.929	-3-03-	12.	3800	0.8	1800	28	37	7.5	0.4	150	460	<4		
23411	48-28.254	- 96.975	-3-03-	0.96	3400	1.7	2100	8	56	7.9	0.7	130	470	<4		
23413	48-28.398	- 96.907	-3-03-	10.	1700	0.9	600	32	<4	7.5	0.5	39	270	<4		
23415	48-28.475	- 96.914	-3-03-	8.0	160	2.0	270	2	<4	7.3	0.6	21	340	<4		
23417	48-28.484	- 96.970	-3-03-	3.4	960	2.5	260	4	<4	7.1	0.5	11	380	6		
23418	48-28.478	- 96.868	-3-03-	<0.20	2100	2.3	1500	<2	<4	8.1	0.6	<5	320	<4		
23419	48-28.444	- 96.792	-3-03-	0.40	12000	<0.5	1800	6	6	8.6	<0.2	12	130	<4		
23420	48-28.436	- 96.820	-3-03-	1.3	5100	2.0	1500	29	9	7.8	0.4	12	200	<4		
23421	48-28.466	- 96.773	-3-03-	<0.20	3900	<0.5	500	210	12	7.3	0.3	28	250	<4		
23422	48-28.335	- 96.900	-3-03-	6.1	1900	2.7	950	29	15	8.0	0.5	71	400	<4		
23426	48-28.433	- 96.722	-3-03-	0.69	3400	2.4	610	91	<4	7.5	0.4	34	360	<4		
23427	48-28.479	- 96.720	-3-03-	<0.20	3800	<0.5	580	64	<4	7.4	0.5	76	290	<4		
23431	48-28.489	- 96.661	-3-03-	0.45	5500	<0.5	650	330	<4	7.5	0.3	17	250	<4		
23434	48-28.388	- 96.706	-3-03-	<0.20	2600	<0.5	610	42	<4	7.6	0.3	26	370	<4		
23435	48-28.388	- 96.666	-3-03-	7.8	1700	9.9	590	3	4	7.5	0.4	39	330	<4		
23436	48-28.341	- 96.673	-3-03-	<0.20	2900	<0.5	750	<2	<4	8.1	0.3	14	430	<4		
23437	48-28.357	- 96.692	-3-03-	<0.20	450	19.	150	20	<4	8.0	0.3	7	150	<4		
23439	48-28.352	- 96.624	-3-03-	<0.20	3300	<0.5	900	<2	5	7.9	0.5	16	510	<4		
23441	48-28.383	- 96.607	-3-03-	3.0	2500	<0.5	920	<2	18	9.1	0.4	40	450	<4		
23442	48-28.425	- 96.668	-3-03-	0.98	2500	14.	610	<2	8	7.8	0.5	57	360	<4		
23445	48-28.438	- 96.638	-3-03-	<0.20	3700	1.9	610	18	<4	7.6	0.3	43	430	<4		
23448	48-28.425	- 96.547	-3-03-	<0.20	2000	3.8	210	<2	<4	7.5	0.2	19	190	<4		
23449	48-28.427	- 96.447	-3-03-	<0.20	3900	<0.5	1300	<2	8	8.0	0.5	11	530	<4		
23450	48-28.447	- 96.404	-3-03-	<0.20	3700	<0.5	1000	<2	16	7.8	0.5	25	460	<4		
23453	48-28.987	- 96.462	-3-03-	8.0	1100	0.7	130	25	<4	7.3	0.6	8	340	6		
23455	48-28.986	- 96.470	-3-03-	4.2	2600	0.5	130	6	<4	7.1	0.3	13	300	<4		
23456	48-28.942	- 96.453	-3-03-	11.	840	1.4	95	7	<4	7.7	0.6	7	310	<4		
23458	48-28.898	- 96.454	-3-03-	3.9	1300	1.9	130	2	5	7.0	0.2	15	340	8		
23462	48-28.861	- 96.454	-3-03-	11.	1200	0.8	170	<2	<4	7.0	0.5	12	340	<4		
23464	48-28.808	- 96.340	-3-03-	13.	1500	0.6	290	87	4	7.3	0.7	30	450	<4		
23467	48-28.816	- 96.284	-3-03-	2.0	950	<0.5	95	2	<4	7.3	0.4	10	340	<4		
23469	48-28.904	- 96.393	-3-03-	3.5	1500	0.7	140	6	<4	7.3	0.4	10	360	<4		
23471	48-28.941	- 96.300	-3-03-	12.	1200	0.6	130	<2	<4	7.3	0.7	10	440	5		
23472	48-28.997	- 96.311	-3-03-	4.5	930	1.0	70	<2	<4	7.4	0.3	<5	330	<4		
23474	48-28.754	- 96.298	-3-03-	0.30	820	1.3	150	35	<4	8.2	0.6	10	290	<4		
23475	48-28.414	- 96.624	-3-03-	0.96	600	1.9	350	<2	6	8.1	0.4	<5	170	<4		
23476	48-28.751	- 96.454	-3-03-	<0.20	1000	<0.5	320	<2	<4	8.2	0.4	10	280	<4		
23477	48-28.752	- 96.393	-3-03-	2.7	1200	0.7	130	2	<4	8.0	0.5	10	340	<4		
23484	48-28.666	- 96.452	-3-03-	<0.20	2100	0.5	1200	<2	<4	8.1	0.5	5	410	<4		
23485	48-28.666	- 96.409	-3-03-	<0.20	850	1.0	220	<2	<4	7.9	0.4	13	300	<4		
23486	48-28.713	- 96.409	-3-03-	<0.20	910	<0.5	510	12	<4	8.2	0.3	10	360	<4		
23488	48-28.719	- 96.347	-3-03-	<0.20	730	2.0	120	51	7	7.8	0.5	13	280	<4		
23489	48-28.718	- 96.299	-3-03-	<0.20	790	0.7	150	16	<4	8.0	0.3	13	300	<4		
23490	48-28.636	- 96.353	-3-03-	<0.20	970	<0.5	170	<2	6	7.8	0.2	11	280	<4		
23491	48-28.642	- 96.323	-3-03-	0.34	1200	2.6	450	<2	<4	8.2	0.3	11	390	<4		
23492	48-28.688	- 96.274	-3-03-	<0.20	2000	<0.5	430	78	<4	7.8	0.3	13	390	<4		
23493	48-28.653	- 96.358	-3-03-	<0.20	930	1.2	380	<2	6	8.2	0.3	10	390	<4		
23494	48-28.610	- 96.417	-3-03-	<0.20	1400	<0.5	700	<2	10	8.2	0.2	5	390	<4		
23495	48-28.602	- 96.427	-3-03-	<0.20	1900	<0.5	930	<2	6	8.2	0.4	7	430	<4		

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE - GROUNDWATER													SECTION 1 OF 1		
OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPB)	SP UMHOS/CM	AS (PPB)	B (PPB)	MA (PPB)	MO (PPB)	PH	SE (PPB)	SO4 (PPM)	T-AK (PPM)	V (PPB)	
23496	48-28.581	- 96.480	-3-03-	<0.20	3900	1.8	1100	3	5	8.2	<0.2	12	380	<4	
23500	48-28.334	- 96.810	-3-03-	4.5	3400	2.0	1200	25	13	7.3	0.3	230	420	<4	
23501	48-28.319	- 96.821	-3-03-	0.42	3200	0.7	990	48	8	7.6	0.3	100	460	<4	
23502	48-28.332	- 96.824	-3-03-	0.39	12000	<0.5	6000	15	200	8.5	0.3	76	190	<4	
23504	48-28.815	- 96.415	-3-03-	0.33	940	1.1	120	87	<4	7.2	<0.2	12	290	<4	
23505	48-28.777	- 96.407	-3-03-	0.38	750	4.2	170	12	<4	8.1	0.8	10	270	<4	
23506	48-28.770	- 96.328	-3-03-	5.6	1400	0.7	67	8	<4	7.3	0.5	83	340	<4	
23507	48-28.763	- 96.118	-3-03-	<0.20	1500	<0.5	790	<2	33	7.9	0.3	<5	500	<4	
23510	48-28.848	- 96.138	-3-03-	19.	1100	<0.5	220	3	6	7.5	0.3	5	440	<4	
23512	48-28.863	- 96.379	-3-03-	<0.20	840	2.2	120	100	4	7.5	0.2	8	250	<4	
23514	48-28.840	- 96.063	-3-03-	<0.20	1200	6.7	200	54	<4	7.3	0.2	<5	290	<4	
23515	48-28.864	- 96.022	-3-03-	<0.20	820	4.3	170	24	10	8.0	0.2	9	270	<4	
23517	48-28.888	- 96.111	-3-03-	0.20	1100	2.0	190	<2	<4	7.9	0.3	<5	300	<4	
23518	48-28.960	- 96.217	-3-03-	<0.20	1200	0.6	110	3	<4	7.3	0.2	10	360	7	
23519	48-28.781	- 96.094	-3-03-	0.97	1100	8.9	440	3	20	7.8	<0.2	13	390	<4	
23521	48-28.662	- 96.487	-3-03-	<0.20	2100	<0.5	1200	<2	11	8.1	0.3	17	400	<4	
23522	48-28.632	- 96.492	-3-03-	<0.20	2000	<0.5	820	<2	7	8.2	0.5	34	380	<4	
23547	48-28.434	- 96.477	-3-03-	<0.20	4200	3.2	240	3	<4	7.3	0.5	39	270	<4	
23548	48-28.467	- 96.439	-3-03-	<0.20	4700	4.0	1500	<2	17	8.0	0.4	11	480	<4	
23549	48-28.479	- 96.489	-3-03-	<0.20	5000	5.5	2400	<2	8	7.7	0.2	14	440	<4	
23550	48-28.461	- 96.546	-3-03-	9.8	3800	<0.5	830	<2	7	7.9	0.4	48	440	<4	
23551	48-28.645	- 96.140	-3-03-	<0.20	1300	<0.5	230	<2	<4	7.7	0.9	16	350	<4	
23552	48-28.627	- 96.138	-3-03-	<0.20	1300	<0.5	280	19	<4	7.5	0.3	<5	400	<4	
23553	48-28.720	- 96.171	-3-03-	<0.20	1200	<0.5	160	35	5	7.7	0.2	8	300	<4	
23554	48-28.713	- 96.240	-3-03-	<0.20	1300	2.5	320	<2	21	7.8	<0.2	12	370	<4	
23555	48-28.923	- 96.576	-3-03-	<0.20	1800	1.1	230	9	<4	6.3	<0.2	<5	310	<4	
23559	48-28.989	- 96.750	-3-03-	4.5	1200	1.4	97	98	<4	6.0	1.0	25	300	<4	
23560	48-28.851	- 96.246	-3-03-	<0.20	1000	1.8	110	20	<4	6.5	0.6	12	300	<4	
23561	48-28.845	- 96.190	-3-03-	<0.20	1300	2.4	120	8	7	6.7	0.6	9	290	<4	
23562	48-28.812	- 96.192	-3-03-	<0.20	1200	1.8	130	51	<4	7.1	0.4	5	310	<4	
23563	48-28.752	- 96.231	-3-03-	3.7	3300	<0.5	160	3	<4	6.8	0.5	100	440	<4	
23564	48-28.805	- 96.250	-3-03-	3.3	1800	<0.5	120	21	<4	7.0	0.7	10	320	<4	
23566	48-28.762	- 96.194	-3-03-	<0.20	1200	<0.5	200	34	7	8.9	0.5	7	360	<4	
23567	48-28.805	- 96.151	-3-03-	<0.20	1200	1.5	190	35	9	8.4	0.5	8	310	<4	
23570	48-28.651	- 96.727	-3-03-	27.	5000	<0.5	1100	5	<4	7.8	0.6	160	430	<4	
23571	48-28.663	- 96.724	-3-03-	<0.20	1800	5.0	600	44	4	8.7	0.6	<5	400	<4	
23572	48-28.549	- 96.536	-3-03-	<0.20	3400	0.5	1300	2	11	7.8	0.7	8	460	<4	
23573	48-28.505	- 96.616	-3-03-	9.7	15000	<0.5	1500	440	<4	7.8	0.5	500	200	<4	
23574	48-28.481	- 96.574	-3-03-	<0.20	5900	<0.5	980	78	10	8.0	0.6	1100	360	<4	
23575	48-28.917	- 96.525	-3-03-	0.59	1100	0.8	570	190	<4	6.9	0.4	7	300	<4	
23576	48-28.928	- 96.257	-3-03-	4.5	1300	0.7	110	3	4	7.8	0.6	8	460	7	
23577	48-28.835	- 96.379	-3-03-	7.6	1400	0.7	260	4	<4	8.1	1.5	14	340	<4	
23580	48-28.983	- 96.268	-3-03-	5.3	1600	<0.5	88	2	<4	6.5	0.6	6	440	<4	

APPENDIX B
STREAM SEDIMENT

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

APPENDIX B

STREAM SEDIMENT

LIST OF TABLES

<u>No.</u>	<u>Title</u>	<u>Page</u>
B-1	Statistical Summary for Stream Sediment of the Beeville Quadrangle	B-7
B-2	Correlation Matrix for Stream Sediment of the Beeville Quadrangle	B-8
B-3	Partial Data Listing for Stream Sediment of the Beeville Quadrangle	B-48

LIST OF FIGURES

<u>No.</u>	<u>Title</u>	<u>Page</u>
B-1a	Probability, Frequency, and Percentile Plots for Soluble Uranium (ppm) in Stream Sediment of the Beeville Quadrangle	B-10
B-1b	Geochemical Distribution of Soluble Uranium (ppm) in Stream Sediment of the Beeville Quadrangle	B-11
B-2a	Probability, Frequency, and Percentile Plots for Uranium by Neutron Activation (ppm) in Stream Sediment of the Beeville Quadrangle	B-12
B-2b	Geochemical Distribution of Uranium by Neutron Activation (ppm) in Stream Sediment of the Beeville Quadrangle	B-13
B-3a	Probability, Frequency, and Percentile Plots for Uranium Fluorometric/Uranium Neutron Activation in Stream Sediment of the Beeville Quadrangle	B-14
B-3b	Geochemical Distribution of Uranium Fluoro- metric/Uranium Neutron Activation in Stream Sediment of the Beeville Quadrangle	B-15

LIST OF FIGURES, Continued

<u>No.</u>	<u>Title</u>	<u>Page</u>
B-4a	Probability, Frequency, and Percentile Plots for Thorium (ppm) in Stream Sediment of the Beeville Quadrangle	B-16
B-4b	Geochemical Distribution of Thorium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-17
B-5a	Probability, Frequency, and Percentile Plots for Aluminum (%) in Stream Sediment of the Beeville Quadrangle	B-18
B-5b	Geochemical Distribution of Aluminum (%) in Stream Sediment of the Beeville Quadrangle .	B-19
B-6a	Probability, Frequency, and Percentile Plots for Arsenic (ppm) in Stream Sediment of the Beeville Quadrangle	B-20
B-6b	Geochemical Distribution of Arsenic (ppm) in Stream Sediment of the Beeville Quadrangle .	B-21
B-7a	Probability, Frequency, and Percentile Plots for Cerium (ppm) in Stream Sediment of the Beeville Quadrangle	B-22
B-7b	Geochemical Distribution of Cerium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-23
B-8a	Probability, Frequency, and Percentile Plots for Cobalt (ppm) in Stream Sediment of the Beeville Quadrangle	B-24
B-8b	Geochemical Distribution of Cobalt (ppm) in Stream Sediment of the Beeville Quadrangle .	B-25
B-9a	Probability, Frequency, and Percentile Plots for Chromium (ppm) in Stream Sediment of the Beeville Quadrangle	B-26
B-9b	Geochemical Distribution of Chromium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-27
B-10a	Probability, Frequency, and Percentile Plots for Copper (ppm) in Stream Sediment of the Beeville Quadrangle	B-28

LIST OF FIGURES, Continued

<u>No.</u>	<u>Title</u>	<u>Page</u>
B-10b	Geochemical Distribution of Copper (ppm) in Stream Sediment of the Beeville Quadrangle .	B-29
B-11a	Probability, Frequency, and Percentile Plots for Iron (%) in Stream Sediment of the Beeville Quadrangle	B-30
B-11b	Geochemical Distribution of Iron (%) in Stream Sediment of the Beeville Quadrangle .	B-31
B-12a	Probability, Frequency, and Percentile Plots for Lithium (ppm) in Stream Sediment of the Beeville Quadrangle	B-32
B-12b	Geochemical Distribution of Lithium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-33
B-13a	Probability, Frequency, and Percentile Plots for Manganese (ppm) in Stream Sediment of the Beeville Quadrangle	B-34
B-13b	Geochemical Distribution of Manganese (ppm) in Stream Sediment of the Beeville Quadrangle .	B-35
B-14a	Probability, Frequency, and Percentile Plots for Nickel (ppm) in Stream Sediment of the Beeville Quadrangle	B-36
B-14b	Geochemical Distribution of Nickel (ppm) in Stream Sediment of the Beeville Quadrangle .	B-37
B-15a	Probability, Frequency, and Percentile Plots for Phosphorus (ppm) in Stream Sediment of the Beeville Quadrangle	B-38
B-15b	Geochemical Distribution of Phosphorus (ppm) in Stream Sediment of the Beeville Quadrangle .	B-39
B-16a	Probability, Frequency, and Percentile Plots for Selenium (ppm) in Stream Sediment of the Beeville Quadrangle	B-40
B-16b	Geochemical Distribution of Selenium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-41

LIST OF FIGURES, Continued

<u>No.</u>	<u>Title</u>	<u>Page</u>
B-17a	Probability, Frequency, and Percentile Plots for Vanadium (ppm) in Stream Sediment of the Beeville Quadrangle	B-42
B-17b	Geochemical Distribution of Vanadium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-43
B-18a	Probability, Frequency, and Percentile Plots for Yttrium (ppm) in Stream Sediment of the Beeville Quadrangle	B-44
B-18b	Geochemical Distribution of Yttrium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-45
B-19a	Probability, Frequency, and Percentile Plots for Zirconium (ppm) in Stream Sediment of the Beeville Quadrangle	B-46
B-19b	Geochemical Distribution of Zirconium (ppm) in Stream Sediment of the Beeville Quadrangle .	B-47

Table B-1

STATISTICAL SUMMARY FOR STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

NO. SAMPLES ANALYZED		BELOW		MINIMUM VALUE	MAXIMUM VALUE	MEAN	MEDIAN	MODE	COEFFICIENT OF		LN TRANSFORMATION*			
MEASURABLE ELEMENT	DETECTION VALUES	DETECTION LIMIT	DETECTION LIMIT						STANDARD DEVIATION	VARIATION	MEAN	S. D.	MEAN	S. D.
U-FL	364			0.32	6.72	1.39	1.22	0.86	0.757	0.543	0.20	0.52	0.20	0.52
U-VT	346			0.82	8.00	2.28	2.10	2.02	0.891	0.390	0.77	0.33	0.76	0.36
TH	340	16	<2	<2	12	5	5	5	2.3	0.4	1.65	0.44	1.65	0.44
U/TU	346			0.17	1.35	0.60	0.58	0.58	0.218	0.362	-0.57	0.38	-0.56	0.40
TH/U	340			0.29	7.38	2.49	2.40	2.48	1.162	0.466	0.79	0.52	0.82	0.51
AG	0	356	<2	<2	<2	<2	<2	<2						
AL	356			0.37	5.50	2.30	2.25	2.04	0.888	0.387	0.75	0.43	0.77	0.44
AS	364			0.3	16.2	3.0	2.6	1.8	1.93	0.64	0.94	0.58	0.94	0.56
B	74	282	<10	<10	39	14	<10	<10	5.8	0.4	2.62	0.32		
BA	356			107	11896	416	313	247	668.2	1.6	5.83	0.50	5.80	0.46
BE	274	82	<1	<1	2	1	<1	<1	0.3	0.3	0.09	0.23		
CA	356			0.06	18.48	2.22	1.34	0.31	2.563	1.153	0.18	1.19	0.20	1.17
CE	356			13	380	55	47	39	35.9	0.6	3.88	0.48	3.87	0.48
CO	324	32	<4	<4	62	8	7	6	6.8	0.8	2.01	0.49	1.89	0.61
CR	356			6	102	19	18	14	8.9	0.5	2.88	0.40	2.88	0.39
CU	356			4	256	13	11	11	15.3	1.1	2.46	0.44	2.44	0.42
FE	356			0.22	4.83	1.24	1.15	1.30	0.578	0.467	0.11	0.45	0.12	0.45
K	356			0.09	1.41	0.59	0.57	0.64	0.227	0.382	-0.60	0.43	-0.58	0.44
LI	356			4	28	11	11	9	4.9	0.4	2.40	0.40	2.41	0.44
MG	353	3	<0.05	<0.05	1.16	0.33	0.29	0.22	0.179	0.547	-1.27	0.56	-1.27	0.58
MN	356			52	3514	429	278	258	473.6	1.1	5.73	0.74	5.71	0.78
MO	89	267	<4	<4	11	5	<4	<4	1.7	0.3	1.64	0.28		
NA	350	6	<0.05	<0.05	1.55	0.18	0.16	0.17	0.122	0.681	-1.86	0.50	-1.88	0.54
NB	353	3	<4	<4	34	12	12	10	4.1	0.3	2.45	0.33	2.45	0.34
NI	354	2	<2	<2	56	9	8	7	5.7	0.6	2.11	0.51	2.10	0.51
P	356			27	772	159	139	125	91.4	0.6	4.93	0.54	4.94	0.55
SC	356			1	9	3	3	3	1.6	0.5	1.14	0.47	1.16	0.48
SE	299	65	<0.1	<0.1	5.0	0.5	0.3	0.3	0.38	0.78	-0.89	0.58	-1.10	0.77
SR	356			15	362	70	59	50	40.7	0.6	4.12	0.50	4.11	0.48
TI	356			683	6263	1912	1861	1949	585.1	0.3	7.52	0.28	7.52	0.26
V	356			5	123	30	28	21	14.6	0.5	3.32	0.43	3.32	0.41
Y	356			3	28	10	10	11	3.9	0.4	2.28	0.37	2.29	0.37
ZN	356			7	783	34	28	24	49.9	1.5	3.34	0.51	3.33	0.46
ZR	356			18	100	54	54	54	14.6	0.3	3.96	0.29	3.97	0.29

NOTE: Refer to Table 1, Page 24; Table 3, Page 26; and Table C-1, Page C-4 for concentration units and symbol definitions.

Table B-2

CORRELATION MATRIX FOR STREAM SEDIMENT
OF THE BEEVILLE QUADRANGLE

L-U																
L-U	1.00 (364)															
LUNT	0.67000 (346)	LUNT	1.00 (346)													
L-TI	0.44000 (356)	0.74000 (340)	L-TI	1.00 (356)												
L-NB	0.42000 (353)	0.55000 (337)	0.73000 (353)	L-NB	1.00 (353)											
L-ZR	0.66000 (356)	0.65000 (340)	0.72000 (356)	0.65000 (353)	L-ZR	1.00 (356)										
L-TM	0.27000 (340)	0.35000 (324)	0.47000 (340)	0.59000 (340)	0.50000 (340)	L-TM	1.00 (340)									
L-SE	0.08 (299)	0.10 (283)	0.02 (294)	0.06 (292)	-0.01 (294)	0.03 (284)	L-SE	1.00 (299)								
L-AL	0.45000 (356)	0.36000 (340)	0.45000 (356)	0.52000 (353)	0.81000 (356)	0.39000 (340)	L-AL	-0.05 (294)	1.00 (356)							
L-LI	0.57000 (356)	0.47000 (340)	0.45000 (356)	0.50000 (353)	0.81000 (356)	0.37000 (340)	L-LI	0.02 (294)	0.92000 (356)	1.00 (356)						
L-CR	0.53000 (356)	0.47000 (340)	0.55000 (356)	0.60000 (353)	0.79000 (356)	0.48000 (340)	L-CR	0.03 (294)	0.83000 (356)	0.86000 (356)	1.00 (356)					
L-NI	0.48000 (354)	0.36000 (339)	0.47000 (354)	0.51000 (351)	0.68000 (354)	0.39000 (338)	L-NI	-0.04 (294)	0.82000 (354)	0.82000 (354)	0.84000 (354)	1.00 (354)				
L-ZN	0.29000 (356)	0.27000 (340)	0.43000 (356)	0.50000 (353)	0.64000 (356)	0.38000 (340)	L-ZN	-0.00 (294)	0.78000 (356)	0.74000 (356)	0.78000 (356)	0.72000 (354)	1.00 (356)			
L-FE	0.54000 (356)	0.52000 (340)	0.64000 (356)	0.64000 (353)	0.84000 (356)	0.46000 (340)	L-FE	0.02 (294)	0.90000 (356)	0.89000 (356)	0.89000 (356)	0.85000 (354)	0.78000 (356)	0.68000 (356)		
L-V	0.45000 (356)	0.52000 (340)	0.59000 (356)	0.62000 (357)	0.71000 (360)	0.43000 (340)	L-V	0.05 (294)	0.75000 (356)	0.81000 (356)	0.81000 (356)	0.76000 (354)	0.68000 (356)	0.58000 (356)		
L-MG	0.27000 (353)	0.24000 (338)	0.36000 (353)	0.52000 (351)	0.57000 (353)	0.33000 (338)	L-MG	-0.02 (292)	0.84000 (353)	0.80000 (353)	0.71000 (353)	0.73000 (352)	0.74000 (353)	0.61000 (353)		
L-P	0.25000 (356)	0.25000 (340)	0.31000 (356)	0.43000 (353)	0.52000 (356)	0.31000 (340)	L-P	-0.01 (294)	0.71000 (356)	0.67000 (356)	0.65000 (356)	0.66000 (354)	0.71000 (356)	0.58000 (356)		
L-U	0.14000 (356)	0.12000 (340)	0.20000 (356)	0.24000 (353)	0.42000 (356)	0.18000 (340)	L-U	-0.02 (294)	0.58000 (356)	0.55000 (356)	0.54000 (356)	0.53000 (354)	0.58000 (356)	0.47000 (356)		
L-CE	0.54000 (356)	0.55000 (340)	0.60000 (356)	0.61000 (353)	0.64000 (356)	0.51000 (340)	L-CE	0.04 (294)	0.57000 (356)	0.61000 (356)	0.65000 (356)	0.68000 (354)	0.52000 (356)	0.49000 (356)		
L-CO	0.51000 (324)	0.44000 (308)	0.44000 (324)	0.47000 (323)	0.59000 (324)	0.33000 (316)	L-CO	0.07 (273)	0.62000 (324)	0.70000 (324)	0.72000 (324)	0.76000 (322)	0.57000 (324)	0.49000 (324)		
L-MN	0.36000 (356)	0.36000 (340)	0.35000 (356)	0.40000 (353)	0.40000 (356)	0.17000 (340)	L-MN	0.08 (294)	0.45000 (356)	0.52000 (356)	0.51000 (356)	0.57000 (354)	0.45000 (356)	0.39000 (356)		
L-AS	0.14000 (364)	0.24000 (346)	0.33000 (356)	0.36000 (353)	0.25000 (356)	0.14000 (340)	L-AS	-0.06 (299)	0.42000 (356)	0.41000 (356)	0.42000 (356)	0.47000 (354)	0.42000 (356)	0.44000 (356)		
L-CA	-0.03 (356)	0.08 (340)	0.14000 (356)	0.31000 (353)	0.04 (356)	0.09 (340)	L-CA	-0.03 (294)	0.29000 (356)	0.29000 (356)	0.26000 (356)	0.35000 (354)	0.35000 (356)	0.34000 (356)		
L-SR	0.25000 (356)	0.25000 (340)	0.23000 (356)	0.42000 (353)	0.33000 (356)	0.22000 (340)	L-SR	0.03 (294)	0.52000 (356)	0.52000 (356)	0.41000 (356)	0.47000 (354)	0.49000 (356)	0.48000 (356)		
-BA	0.100 (356)	0.15000 (340)	0.13000 (356)	0.31000 (353)	0.15000 (356)	0.11000 (340)	-BA	0.02 (294)	0.29000 (356)	0.26000 (356)	0.25000 (356)	0.34000 (354)	0.27000 (356)	0.33000 (356)		
L-K	-0.01 (356)	0.01 (340)	0.10000 (356)	0.21000 (353)	0.35000 (356)	0.17000 (340)	L-K	-0.1300 (294)	0.61000 (356)	0.46000 (356)	0.34000 (356)	0.45000 (354)	0.46000 (356)	0.48000 (356)		
L-NA	0.02 (350)	0.05 (334)	-0.04 (350)	0.05 (347)	0.09 (350)	-0.03 (335)	L-NA	-0.01 (289)	0.34000 (350)	0.28000 (350)	0.07 (350)	0.13000 (349)	0.13000 (350)	0.19000 (350)		

NOTE: (1) Pearson correlation/Spearman correlation/(sample size). If either element has a concentration below the laboratory detection limits, it is omitted from the pairwise computations.

(2) Significance levels: *-10%, **-5%, ***-1%.

L-E												
1.00 (356)												
L-V												
0.91000 (356)	1.00 (356)											
L-MG												
0.81000 (353)	0.77000 (353)	1.00 (353)										
L-P												
0.70000 (356)	0.60000 (356)	0.72000 (353)	1.00 (356)									
L-LU												
0.54000 (356)	0.51000 (356)	0.50000 (353)	0.54000 (356)	1.00 (356)								
L-CE												
0.75000 (356)	0.77000 (356)	0.54000 (353)	0.48000 (356)	0.31000 (356)	1.00 (356)							
L-CO												
0.82000 (324)	0.80000 (324)	0.59000 (323)	0.47000 (324)	0.38000 (324)	0.06000 (324)	1.00 (324)						
L-MN												
0.65000 (356)	0.72000 (356)	0.57000 (353)	0.48000 (356)	0.35000 (356)	0.74000 (356)	0.79000 (324)	1.00 (356)					
L-AS												
0.58000 (356)	0.68000 (356)	0.60000 (353)	0.44000 (356)	0.36000 (356)	0.56000 (356)	0.71000 (324)	1.00 (356)					
L-CA												
0.38000 (356)	0.46000 (356)	0.62000 (353)	0.54000 (356)	0.28000 (356)	0.34000 (356)	0.28000 (324)	0.53000 (356)	1.00 (356)				
L-SR												
0.52000 (356)	0.52000 (356)	0.72000 (353)	0.65000 (356)	0.35000 (356)	0.42000 (356)	0.36000 (324)	0.50000 (356)	0.53000 (356)	1.00 (356)			
L-BA												
0.36000 (356)	0.44000 (356)	0.50000 (353)	0.38000 (356)	0.28000 (356)	0.42000 (356)	0.35000 (324)	0.51000 (356)	0.53000 (356)	0.59000 (366)	0.63000 (356)	1.00 (356)	
L-K												
0.42000 (356)	0.31000 (356)	0.59000 (353)	0.57000 (356)	0.37000 (356)	0.19000 (356)	0.1400 (324)	0.1300 (356)	0.23000 (356)	0.36000 (356)	0.55000 (356)	0.39000 (356)	1.00 (356)
L-NA												
0.1200 (350)	0.100 (350)	0.34000 (347)	0.34000 (350)	0.20000 (350)	-0.100 (350)	-0.07 (350)	0.01 (350)	0.100 (350)	0.24000 (350)	0.56000 (350)	0.29000 (350)	0.72000 (350)

Figure B-1a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SOLUBLE URANIUM (PPM)
 IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-1b

GEOCHEMICAL DISTRIBUTION OF SOLUBLE URANIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-2a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR URANIUM
BY NEUTRON ACTIVATION (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

B-13

Figure B-2b

GEOCHEMICAL DISTRIBUTION OF URANIUM BY NEUTRON ACTIVATION (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-3a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR URANIUM FLUOROMETRIC/
URANIUM NEUTRON ACTIVATION IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-3b

GEOCHEMICAL DISTRIBUTION OF URANIUM FLUOROMETRIC/URANIUM NEUTRON ACTIVATION
 IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-4a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR THORIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-4b

GEOCHEMICAL DISTRIBUTION OF THORIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-5a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR ALUMINUM (%)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-5b

GEOCHEMICAL DISTRIBUTION OF ALUMINUM (%) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-6a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR ARSENIC (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-6b

GEOCHEMICAL DISTRIBUTION OF ARSENIC (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-7a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR CERIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

B-23

Figure B-7b

GEOCHEMICAL DISTRIBUTION OF CERIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-8a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR COBALT (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-8b

GEOCHEMICAL DISTRIBUTION OF COBALT (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-9a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR CHROMIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-9b

GEOCHEMICAL DISTRIBUTION OF CHROMIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-10a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR COPPER (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

B-29

Figure B-10b

GEOCHEMICAL DISTRIBUTION OF COPPER (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-11a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR IRON (%)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-11b

GEOCHEMICAL DISTRIBUTION OF IRON (%) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-12a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR LITHIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

B-33

Figure B-12b

GEOCHEMICAL DISTRIBUTION OF LITHIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-13a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR MANGANESE (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

B-35

Figure B-13b

GEOCHEMICAL DISTRIBUTION OF MANGANESE (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-14a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR NICKEL (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

B-37

Figure B-14b

GEOCHEMICAL DISTRIBUTION OF NICKEL (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-15a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR PHOSPHORUS (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

B-39

Figure B-15b

GEOCHEMICAL DISTRIBUTION OF PHOSPHORUS (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-16a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SELENIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-16b

GEOCHEMICAL DISTRIBUTION OF SELENIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-17a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR VANADIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-17b

GEOCHEMICAL DISTRIBUTION OF VANADIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-18a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR YTTRIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-18b

GEOCHEMICAL DISTRIBUTION OF YTTRIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-19a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR ZIRCONIUM (PPM)
IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Figure B-19b

GEOCHEMICAL DISTRIBUTION OF ZIRCONIUM (PPM) IN STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

Table B-3

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE SEDIMENT															
JR SAMPLE	D. O. E.	SAMPLE	NUMBER		U	U-NI	TH	AL	CE	CR	FE	MN	P	Y	ZR
NUMBER	ST	LAT	LONG	L TY REP	(PPM)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(PPM)	(PPM)
301	48-28.815	-	97.871	-3-15-	0.56	2.0	4	1.8	31	12	0.74	170	110	7	40
305	48-28.800	-	97.920	-3-15-	1.0	2.1	10	3.3	62	21	1.6	350	240	12	67
308	48-28.820	-	97.937	-3-12-	0.88	2.1	7	3.1	53	17	1.3	420	180	11	63
309	48-28.838	-	97.924	-3-15-	0.96	2.1	5	3.0	44	13	1.1	250	140	11	59
312	48-28.854	-	97.945	-3-15-	1.3	2.6	5	3.2	49	14	1.3	320	140	12	69
313	48-28.929	-	97.934	-3-12-	1.5	3.0	5	3.5	56	17	1.4	370	180	13	69
315	48-28.937	-	97.969	-3-15-	1.8	2.5	10	3.3	63	19	1.4	330	290	14	67
318	48-28.801	-	97.882	-3-15-	0.65	1.8	4	1.9	41	15	0.93	300	180	8	48
320	48-28.941	-	97.906	-3-15-	1.6	2.4	5	2.9	47	22	1.2	280	380	11	50
324	48-28.850	-	97.825	-3-12-	0.71	2.3	6	2.3	47	18	1.1	260	250	9	53
326	48-28.767	-	97.786	-3-15-	0.87	1.7	9	2.7	51	21	1.5	340	290	11	45
328	48-28.776	-	97.774	-3-15-	0.80	2.0	2	2.8	39	19	1.3	280	200	9	48
332	48-28.771	-	97.713	-3-12-	0.44	1.6	4	2.0	35	13	0.83	130	130	7	40
335	48-28.761	-	97.642	-3-12-	0.52	1.8	3	1.9	32	14	0.79	150	150	8	38
338	48-28.767	-	97.662	-3-12-	0.68	2.3	3	1.7	40	12	1.0	570	220	8	40
342	48-28.842	-	97.708	-3-12-	1.3	2.1	10	2.1	54	20	1.3	380	200	9	43
344	48-28.817	-	97.820	-3-12-	0.68	2.0	5	1.8	41	15	1.1	280	170	8	43
347	48-28.820	-	97.845	-3-12-	0.52	1.9	4	1.4	33	12	0.88	190	190	7	46
348	48-28.920	-	97.634	-3-15-	0.76	1.3	7	2.3	46	31	1.1	220	140	9	45
352	48-28.917	-	97.642	-3-12-	0.52	1.8	7	2.1	39	15	0.95	240	120	8	44
354	48-28.912	-	97.739	-3-12-	0.68	2.4	7	1.8	47	16	1.3	370	230	9	48
355	48-28.976	-	97.737	-3-15-	0.68	2.0	6	2.1	47	18	1.4	380	400	9	50
357	48-28.957	-	97.776	-3-15-	0.89	2.1	5	2.1	52	16	1.2	340	240	11	44
359	48-28.973	-	97.776	-3-15-	0.91	2.1	6	2.8	49	17	1.3	280	190	11	59
361	48-28.930	-	97.832	-3-15-	0.60	2.0	6	2.6	53	18	1.3	290	180	10	51
363	48-28.898	-	97.788	-3-15-	0.92	2.9	10	4.2	73	33	2.6	670	630	16	69
365	48-28.936	-	97.815	-3-15-	1.1	2.4	7	2.7	55	18	1.2	210	280	11	56
368	48-28.973	-	97.868	-3-15-	1.0	1.9	8	3.0	59	15	1.1	260	260	12	60
370	48-28.748	-	97.790	-3-15-	1.1	1.8	10	3.5	64	25	1.6	290	280	12	61
372	48-28.705	-	97.754	-3-15-	0.69	1.5	10	2.5	55	18	1.2	240	130	9	51
374	48-28.644	-	97.754	-3-15-	0.76	1.7	5	2.7	49	20	1.3	220	190	11	55
376	48-28.663	-	97.819	-3-15-	0.99	1.9	3	2.6	39	17	1.3	300	150	10	52
378	48-28.634	-	97.859	-3-15-	1.1	2.0	5	3.3	55	23	1.7	350	250	13	56
382	48-28.664	-	97.996	-3-15-	1.2	2.6	4	2.8	43	15	1.4	310	180	11	65
383	48-28.669	-	97.994	-3-15-	1.0	2.4	9	3.0	57	18	1.5	400	190	11	65
386	48-28.710	-	97.899	-3-15-	0.96	2.0	4	2.6	40	17	1.3	340	180	10	56
388	48-28.683	-	97.835	-3-15-	0.78	1.6	5	2.3	39	16	1.1	280	120	9	45
391	48-28.594	-	97.895	-3-15-	0.56	1.1	3	1.8	32	11	0.77	160	110	6	36
393	48-28.548	-	97.908	-3-15-	0.59	1.4	4	2.4	38	14	0.97	270	200	8	48
395	48-28.544	-	97.910	-3-15-	0.88	1.2									
397	48-28.524	-	97.890	-3-15-	0.87	1.7	9	3.3	56	21	1.5	260	290	13	62
399	48-28.464	-	97.854	-3-15-	0.73	1.6	7	2.8	48	20	1.2	270	240	11	56
403	48-28.475	-	97.992	-3-15-	0.72	1.7	3	3.0	38	20	1.3	330	370	11	54
406	48-28.437	-	97.977	-3-15-	0.50	2.0	2	1.8	21	12	0.82	180	130	6	37
409	48-28.377	-	97.943	-3-15-	0.96	1.8	8	3.4	53	24	1.5	310	340	13	64
414	48-28.341	-	97.870	-3-15-	0.73	1.3	6	2.4	37	18	1.1	280	290	9	48
415	48-28.347	-	97.838	-3-15-	0.49	1.5	3	1.9	24	13	0.79	150	42	7	45
418	48-28.287	-	97.804	-3-15-	0.48	1.4	2	1.7	25	14	0.78	210	85	7	38
420	48-28.250	-	97.759	-3-15-	0.53	1.4	5	1.7	32	15	0.76	190	120	8	43
423	48-28.336	-	97.737	-3-15-	0.51	1.4	2	1.5	26	13	0.71	170	120	8	39
426	48-28.427	-	97.703	-3-12-	0.80	1.8	7	2.3	43	20	1.1	230	130	11	50
429	48-28.444	-	97.731	-3-15-	0.48	1.2	6	1.8	28	14	0.75	180	130	7	40
430	48-28.522	-	97.734	-3-15-	0.56	1.5	4	2.7	35	20	1.1	220	170	9	49
432	48-28.519	-	97.784	-3-15-	0.52	1.5	5	2.1	34	14	0.74	170	120	7	35
434	48-28.470	-	97.584	-3-12-	0.49	1.4	2	1.3	22	11	0.64	300	71	6	31

Table B-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE SEDIMENT													U	U-NT	TH	AL	CE	CR	FE	MN	P	Y	ZR
OR SAMPLE	D. O. E.	SAMPLE	NUMBER	NUMBER	ST	LAT	LONG	L	TY	REP			(PPM)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(PPM)	(PPM)
437	48-28.301	-	97.587	-3-15-									0.32	1.9	<2	0.57	13	7	0.40	110	27	4	21
439	48-28.300	-	97.586	-3-15-									0.32	1.1	<2	1.0	16	9	0.48	89	37	5	24
442	48-28.386	-	97.518	-3-12-									0.48	1.7	2	1.6	26	13	0.71	120	76	7	39
444	48-28.461	-	97.415	-3-12-									1.1	2.1	3	2.4	47	22	1.3	1900	170	13	51
447	48-28.546	-	97.412	-3-12-									0.64	1.6	3	0.98	34	11	0.56	400	47	7	28
449	48-28.566	-	97.543	-3-12-									0.88	2.0	3	2.2	38	19	1.1	310	160	11	52
451	48-28.535	-	97.583	-3-12-									1.3	2.5	4	0.95	29	9	0.50	550	85	7	28
454	48-28.319	-	97.995	-3-15-									0.54	1.7	5	2.1	30	14	0.81	200	200	7	41
455	48-28.238	-	97.975	-3-12-									0.79	1.7	7	2.6	37	17	1.0	210	290	9	49
460	48-28.090	-	97.946	-3-15-									0.45	2.6	9	1.3	35	14	1.0	230	67	6	41
461	48-28.024	-	97.940	-3-15-									0.71	1.5	4	2.4	42	20	1.3	240	170	11	50
463	48-28.043	-	97.943	-3-15-									0.74	1.4	7	2.1	35	20	1.0	220	190	10	43
465	48-28.033	-	97.863	-3-12-									1.0	1.8	2	1.6	25	10	0.68	360	110	6	33
468	48-28.164	-	97.719	-3-15-									0.43	1.3	4	1.3	27	12	0.59	160	230	7	32
470	48-28.134	-	97.792	-3-15-									1.1	1.7	6	1.8	39	16	0.88	250	120	10	50
472	48-28.128	-	97.849	-3-12-									0.68	1.6	2	2.1	20	13	0.86	260	130	7	43
475	48-28.022	-	97.618	-3-15-									0.69	1.4	2	1.6	29	13	0.75	190	76	7	45
478	48-28.045	-	97.554	-3-15-									0.75	1.5	4	1.9	35	16	0.85	230	150	10	50
482	48-28.049	-	97.547	-3-15-									0.43	1.2	4	0.91	26	10	0.43	230	45	5	26
484	48-28.002	-	97.477	-3-12-									0.99	2.0	4	1.9	36	15	0.91	260	82	9	44
488	48-28.187	-	97.618	-3-15-									1.9	4.0	3	1.4	100	15	0.88	680	110	11	39
491	48-28.176	-	97.556	-3-15-									1.2	2.0	6	2.5	50	21	1.3	290	150	13	53
494	48-28.697	-	97.856	-3-15-									0.87	2.7	5	1.9	35	14	1.0	230	140	8	56
502	48-28.040	-	97.286	-3-12-									1.6	2.6	3	2.9	39	20	1.5	860	130	10	57
504	48-28.212	-	97.357	-3-12-									0.69	1.7	<2	2.0	28	14	0.89	140	110	9	49
506	48-28.546	-	97.630	-3-12-									0.99	1.9	3	2.0	37	15	1.0	350	130	9	47
508	48-28.565	-	97.544	-3-12-									0.48	1.7	3	1.2	27	10	0.58	260	88	7	38
512	48-28.663	-	97.592	-3-12-									0.91	1.9	7	3.9	52	30	2.1	250	240	11	67
515	48-28.711	-	97.648	-3-12-									1.1	2.1	5	3.3	44	23	1.5	350	280	11	55
517	48-28.757	-	97.634	-3-12-									1.0	1.9	11	3.2	57	24	1.6	280	260	14	54
520	48-28.768	-	97.647	-3-12-									0.83	2.1	3	2.3	36	19	1.2	410	190	10	45
523	48-28.816	-	97.508	-3-12-									0.91	1.5	3	2.3	57	20	1.3	2000	320	14	50
530	48-28.713	-	97.432	-3-15-									1.1	1.8	3	2.3	48	16	1.2	660	140	12	52
531	48-28.744	-	97.456	-3-15-									0.95	1.7	2	2.2	34	14	1.0	370	120	11	46
534	48-28.848	-	97.452	-3-12-									1.1	1.9	7	1.8	53	18	1.0	1300	160	12	45
537	48-28.762	-	97.344	-3-15-									0.48	0.82	<2	0.85	44	9	0.46	430	53	6	25
539	48-28.775	-	97.341	-3-12-									0.58	2.7									
544	48-28.839	-	97.310	-3-12-									0.61		2	0.66	98	8	0.54	960	51	11	35
547	48-28.848	-	97.342	-3-12-									1.1	1.9	4	0.79	36	7	0.55	1300	110	9	25
549	48-28.902	-	97.408	-3-12-									1.3	4.0	6	2.2	49	19	1.5	1300	190	11	54
551	48-28.969	-	97.458	-3-12-									1.1	1.9	8	3.6	55	27	2.1	700	100	11	67
553	48-28.979	-	97.421	-3-12-									1.2	2.2	2	1.9	32	14	1.1	790	120	8	43
556	48-28.657	-	97.447	-3-12-									1.4	2.6	7	3.1	56	27	1.8	440	530	14	61
558	48-28.674	-	97.539	-3-12-									0.96	1.7	4	2.3	48	19	1.3	950	240	10	44
561	48-28.697	-	97.347	-3-15-									1.1	2.2	5	1.9	34	15	0.94	320	160	10	53
565	48-28.768	-	97.220	-3-12-									0.70	3.2	6	0.81	130	12	0.74	530	73	11	34
570	48-28.541	-	97.346	-3-12-									0.43	1.4	8	1.2	43	13	0.63	120	52	6	35
572	48-28.372	-	97.335	-3-12-									0.70	1.6	4	1.6	44	15	0.90	200	97	8	41
575	48-28.178	-	97.298	-3-12-									0.56	1.3	4	1.3	34	13	0.62	200	94	7	37
577	48-28.139	-	97.195	-3-12-									1.3	2.1	6	2.6	39	19	1.3	350	190	9	54
579	48-28.257	-	97.315	-3-15-									0.65	1.7	5	2.0	38	16	1.0	290	170	9	52
581	48-28.302	-	97.135	-3-15-									0.84	1.9	4	2.6	51	21	1.3	230	180	12	67
583	48-28.713	-	97.252	-3-12-									1.4	6.5	7	0.79	49	14	0.77	200	60	8	51
585	48-28.741	-	97.218	-3-12-									0.48										
590	48-28.646	-	97.210	-3-15-									0.84	2.4	7	2.6	52	21	1.4	360	110	10	56

Table B-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE SEDIMENT														
OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	U-NT (PPM)	TH (PPM)	AL (%)	CE (PPM)	CR (PPM)	FE (%)	MN (PPM)	P (PPM)	Y (PPM)	ZR (PPM)
592	48-28.386	- 97.137	-3-15-	0.71	1.8	7	2.0	42	18	1.0	190	110	10	53
594	48-28.402	- 97.104	-3-12-	0.92	1.8	8	2.6	54	22	1.3	350	79	10	56
596	48-28.319	- 97.003	-3-12-	1.1	2.4	5	2.3	52	18	1.1	150	130	11	66
598	48-28.318	- 97.007	-3-12-	0.56	2.1	9	2.9	56	23	1.4	180	130	12	64
1101	48-28.823	- 97.204	-3-15-	0.79		3	0.70	40	8	0.48	170	33	5	24
1102	48-28.837	- 97.186	-3-15-	0.80	2.0	5	1.6	83	17	1.1	560	70	10	40
1105	48-28.782	- 97.072	-3-12-	0.88		6	0.58	78	11	0.58	210	45	6	31
1109	48-28.750	- 97.110	-3-12-	1.1	5.0	6	0.37	39	15	0.68	400	39	7	51
1112	48-28.692	- 97.048	-3-12-	1.0	2.2	6	1.7	40	14	0.81	270	75	7	48
1115	48-28.734	- 97.065	-3-12-	0.96	1.8	7	2.1	51	18	1.0	190	190	11	54
1118	48-28.592	- 97.061	-3-15-	0.88	1.9	8	2.4	59	19	1.2	230	120	12	64
1121	48-28.916	- 97.072	-3-12-	1.9	3.0	4	2.7	70	23	1.6	830	150	12	69
1125	48-28.927	- 97.103	-3-12-	0.79	2.0	4	1.7	32	17	1.0	180	130	9	48
1129	48-29.000	- 97.055	-3-12-	0.70	2.4	6	2.4	52	22	1.4	890	110	12	60
1133	48-28.971	- 97.220	-3-15-	0.58	1.3	6	1.5	89	13	1.0	1400	140	12	35
1136	48-28.835	- 97.077	-3-12-	1.1	1.2	9	1.4	180	16	1.1	1100	160	18	34
1141	48-28.871	- 97.107	-3-12-	0.83	1.8	5	2.0	63	21	1.2	380	370	15	47
1143	48-28.897	- 97.132	-3-15-	0.74	2.0	9	2.5	65	22	1.5	300	270	12	54
1145	48-28.906	- 97.160	-3-12-	0.39										
1149	48-28.953	- 97.301	-3-12-	0.98	2.0	5	3.2	61	23	1.7	330	81	12	75
1151	48-28.926	- 97.405	-3-12-	0.62	1.7	2	1.3	30	11	0.99	650	77	7	38
1154	48-28.966	- 97.595	-3-12-	0.92	2.0	5	1.8	45	15	1.2	250	210	8	43
1157	48-28.995	- 97.711	-3-15-	0.90	1.8	5	2.9	46	21	1.5	340	290	12	60
1159	48-28.996	- 97.711	-3-15-	0.92	2.1	10	2.9	65	24	1.7	350	270	13	65
1162	48-28.914	- 97.642	-3-12-	0.91	1.8	5	2.0	33	14	0.94	270	160	7	39
1164	48-28.938	- 97.533	-3-15-	1.1	1.9	6	3.0	50	26	1.4	330	200	10	54
1166	48-28.861	- 97.543	-3-12-	1.2	1.6	5	2.9	51	23	1.6	460	250	12	48
1170	48-28.872	- 97.524	-3-15-	0.68	1.6	4	1.5	45	13	0.86	620	74	8	38
1326	48-28.991	- 97.927	-3-15-	1.7	3.7	6	3.4	53	8	0.77	200	89	11	51
1441	48-28.999	- 97.140	-3-12-	0.87	3.1	4	1.9	53	17	1.3	710	72	9	43
1879	48-28.836	- 97.774	-3-12-	1.3	2.4	8	2.1	45	18	1.3	320	430	10	54
1882	48-28.774	- 97.708	-3-12-	1.1	1.9	6	2.9	51	21	1.4	390	240	10	51
1885	48-28.715	- 97.533	-3-12-	1.0	2.0	4	2.7	52	22	1.4	540	260	12	55
1888	48-28.700	- 97.390	-3-12-	0.72	2.6	3	1.3	33	11	0.68	230	93	7	40
1891	48-28.427	- 97.403	-3-12-	1.2		4	0.85	120	9	0.59	950	190	17	27
1894	48-28.714	- 97.234	-3-12-	1.8		7	0.81	130	14	1.2	470	150	14	59
1898	48-28.930	- 97.449	-3-12-	1.0	2.4	8	1.9	69	16	1.2	400	180	11	58
1901	48-28.947	- 97.451	-3-12-	1.6	2.9	6	1.7	45	13	0.94	170	270	10	56
1906	48-28.849	- 97.343	-3-15-	0.91	2.6	4	1.5	39	13	0.85	250	110	8	48
1908	48-28.883	- 97.239	-3-15-	1.4	2.4	5	3.3	66	24	1.9	1000	240	14	66
1909	48-28.897	- 97.144	-3-12-	1.3	2.4	5	3.2	86	27	1.9	940	230	17	69
1924	48-28.683	- 97.616	-3-12-	0.87	1.4	7	2.0	44	14	0.91	200	180	9	40
1926	48-28.526	- 97.605	-3-15-	0.74	1.3	2	1.3	26	10	0.60	180	94	6	31
1929	48-28.522	- 97.513	-3-12-	1.4	2.5	<2	1.1	23	9	0.59	140	89	6	37
1932	48-28.517	- 97.783	-3-15-	1.0	1.8	3	2.4	41	16	1.1	200	180	9	46
1935	48-28.566	- 97.808	-3-12-	1.2	2.1	4	3.4	52	33	1.7	420	310	13	61
1937	48-28.160	- 97.593	-3-15-	1.0	1.4	5	1.4	37	14	0.77	220	89	8	35
1939	48-28.176	- 97.557	-3-12-	0.95	1.6	<2	1.0	16	8	0.47	130	100	5	30
1941	48-28.276	- 97.692	-3-15-	0.88	1.3									
1943	48-28.556	- 97.816	-3-12-	1.0	1.9	4	3.0	47	23	1.5	330	220	12	57
1946	48-28.370	- 97.423	-3-15-	0.62	0.93	<2	1.0	14	10	0.44	99	82	5	25
1948	48-28.380	- 97.683	-3-15-	0.57	1.2	<2	0.81	19	23	0.41	78	190	4	21
2016	48-28.332	- 97.245	-3-12-	0.96	1.7	6	1.8	40	16	0.85	260	140	8	46
2018	48-28.412	- 97.166	-3-15-	1.3	2.2	7	2.3	55	24	1.2	180	100	11	69
2020	48-28.215	- 97.307	-3-12-	1.3	1.9	7	2.0	46	17	1.0	310	130	10	50

Table B-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE SEDIMENT					U	U-NT	TH	AL	CE	CR	FE	MN	P	V	ZR
OR SAMPLE	D. O. E.	SAMPLE	NUMBER		(PPM)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(PPM)	(PPM)
NUMBER	ST	LAT	LONG	L TY REP											
2022	48-28.203	-	97.295	-3-12-	2.4	3.0	8	3.7	69	30	2.0	540	29C	16	76
2030	48-28.048	-	97.533	-3-12-	1.2	3.4	7	1.3	48	11	0.61	110	75	8	56
2033	48-28.044	-	97.788	-3-15-	1.1	1.8	5	2.0	39	15	1.0	280	150	9	44
2081	48-28.298	-	97.972	-3-15-	0.81	2.5	6	1.5	38	12	0.81	170	11C	7	39
2086	48-28.122	-	97.962	-3-12-	0.79	1.9	5	2.1	38	14	1.0	230	140	9	48
2088	48-28.156	-	97.981	-3-15-	0.76	1.1	5	1.7	25	9	0.66	130	120	6	32
2091	48-28.023	-	97.942	-3-15-	0.72	1.2	7	1.5	36	12	0.66	140	85	7	35
4162	48-28.326	-	96.935	-3-12-	1.3	6.4	10	1.5	65	15	0.87	210	120	9	69
4164	48-28.290	-	96.983	-3-12-	0.87	2.5	6	1.5	44	13	0.65	110	11C	7	46
4166	48-28.583	-	97.045	-3-12-	1.1	2.1	6	2.8	58	24	1.5	370	180	10	54
4168	48-28.763	-	97.044	-3-12-	0.53	1.3	3	1.1	29	11	0.57	190	54	5	27
4170	48-28.868	-	97.024	-3-12-	1.1	4.0	9	1.3	57	14	0.88	190	12C	9	71
4173	48-28.906	-	96.876	-3-15-	1.7	3.3	5	2.4	69	23	1.4	150	130	15	63
4175	48-28.845	-	96.710	-3-12-	0.88	1.4	6	1.2	33	13	0.68	160	8C	6	35
4177	48-28.945	-	96.177	-3-12-	1.9	2.3	8	2.9	58	100	1.7	340	230	13	67
4182	48-28.305	-	97.598	-3-12-	0.53	1.2	<2	0.62	14	6	0.30	89	50	4	18
4185	48-28.034	-	97.451	-3-12-	1.3	1.8	5	2.5	46	20	1.4	350	13C	9	53
4187	48-28.013	-	97.289	-3-12-	0.85	1.3	3	1.6	32	11	0.80	260	170	7	34
4200	48-28.304	-	97.113	-3-12-	0.81	1.9	11	4.1	77	28	1.8	390	19C	17	100
4202	48-28.752	-	97.183	-3-12-	0.97	1.6	5	1.9	160	18	1.2	3300	11C	17	47
6400	48-28.999	-	96.403	-3-12-	1.2	2.0									
7411	48-28.818	-	97.707	-3-12-B	0.84	3.3									
7422	48-28.039	-	97.407	-3-12-B	1.2	2.2									
10627	48-28.970	-	97.158	-3-12-	0.73	1.1	<2	1.1	29	10	0.71	280	95	6	25
23100	48-28.723	-	96.867	-3-15-	1.5	2.0	5	2.9	45	22	1.4	180	16C	12	64
23102	48-28.713	-	96.806	-3-12-	1.4	2.0	5	2.0	58	17	1.1	400	86	9	58
23103	48-28.708	-	96.765	-3-12-	1.4	2.1	<2	1.8	32	15	0.72	270	17C	7	45
23105	48-28.669	-	96.765	-3-15-	1.9	2.6	3	2.8	49	20	1.3	160	160	12	70
23119	48-28.914	-	96.774	-3-12-	1.3	2.2	2	1.1	23	10	0.55	130	52	5	34
23120	48-28.855	-	96.766	-3-12-	1.5	3.8	5	1.1	39	10	0.70	160	81	8	46
23121	48-28.857	-	96.827	-3-12-	1.8	2.6	4	1.5	45	15	0.92	250	72	7	51
23123	48-28.819	-	96.773	-3-12-	2.9	3.4	<2	2.3	88	18	1.3	320	120	12	63
23125	48-28.861	-	96.873	-3-12-	1.6	2.5	3	1.1	22	14	0.76	65	5C	4	44
23126	48-28.814	-	96.864	-3-12-	1.3	2.7	5	1.4	36	17	0.80	120	91	7	54
23132	48-28.756	-	96.835	-3-12-	1.5	2.6	11	2.8	73	24	1.5	320	140	13	66
23133	48-28.758	-	96.828	-3-12-	2.3	2.4	7	2.8	65	24	1.5	410	150	12	55
23134	48-28.756	-	96.799	-3-12-	2.1	2.0	3	2.3	42	17	1.0	160	93	9	57
23136	48-28.762	-	96.908	-3-	1.4	2.6	4	2.9	120	22	1.7	790	21C	13	61
23139	48-28.956	-	96.811	-3-12-	1.0	2.2	8	1.6	43	17	0.87	160	110	8	52
23141	48-28.951	-	96.768	-3-12-	1.3	2.6	3	2.0	45	16	0.99	260	89	10	56
23142	48-28.989	-	96.883	-3-12-	1.8	2.2	5	0.95	23	13	0.56	83	82	5	41
23143	48-28.944	-	96.931	-3-12-	1.4	2.3	5	1.3	30	15	0.77	290	73	6	44
23145	48-28.906	-	96.876	-3-12-	2.4	4.3	10	1.2	63	13	0.90	250	81	9	49
23146	48-28.961	-	96.990	-3-12-	2.0		6	1.6	63	17	1.0	810	110	10	44
23149	48-28.860	-	96.992	-3-12-	1.8	2.1	8	2.3	66	19	1.2	210	69	10	54
23151	48-28.822	-	96.953	-3-12-	1.2	2.2	6	2.0	43	18	0.99	150	100	9	59
23152	48-28.796	-	96.935	-3-12-	1.9	2.9	6	1.9	50	16	0.95	210	120	9	58
23159	48-28.946	-	96.411	-3-12-	3.4	4.2	5	3.5	66	29	1.8	690	19C	16	75
23162	48-28.993	-	96.412	-3-12-	2.0	3.0	7	2.9	78	24	1.6	480	17C	13	65
23163	48-28.980	-	96.328	-3-12-	2.3	3.7	8	3.4	75	28	1.7	360	170	15	77
23166	48-28.954	-	96.353	-3-12-	2.9	3.8	2	3.4	140	26	2.0	2200	170	19	78
23167	48-28.945	-	96.896	-3-12-	1.8	2.3	4	2.2	36	20	1.3	150	140	9	66
23168	48-28.930	-	96.947	-3-12-	2.0	2.7	6	1.2	35	15	0.84	190	44	6	44
23169	48-28.998	-	96.280	-3-12-	2.8	2.6	5	2.1	63	17	1.1	530	13C	11	69
23170	48-28.920	-	96.276	-3-12-	2.9	3.1	8	2.5	160	22	2.0	920	190	20	64

Table B-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE SEDIMENT														
OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	U-NT (PPM)	TH (PPM)	AL (%)	CE (PPM)	CR (PPM)	FE (%)	MN (PPM)	P (PPM)	Y (PPM)	ZR (PPM)
23171	48-28.940	- 96.303	-3-12-	1.8	2.1	6	2.3	52	17	1.4	310	160	11	54
23175	48-28.908	- 96.299	-3-12-	2.2	2.7	5	2.2	58	18	1.1	370	140	12	60
23176	48-28.908	- 96.328	-3-12-	1.8	2.3	5	2.1	41	16	1.1	140	85	8	63
23178	48-28.938	- 96.241	-3-12-	1.6	2.6	7	2.6	13	22	1.3	88	75	7	60
23179	48-28.973	- 96.192	-3- -	1.9	2.6	7	2.3	46	20	1.1	200	110	10	62
23180	48-28.986	- 96.240	-3-12-	1.8	2.1	2	1.7	25	13	0.66	94	100	6	50
23181	48-28.921	- 96.195	-3-12-	2.4	3.5	6	3.5	84	36	2.4	970	310	14	66
23182	48-28.912	- 96.170	-3-12-	2.3		8	4.3	260	45	4.8	3100	510	26	73
23183	48-28.897	- 96.140	-3-12-	1.7	2.6	4	2.4	51	22	1.4	670	180	10	59
23185	48-28.948	- 96.132	-3-12-	2.2	3.1	8	3.0	62	29	1.6	330	260	12	65
23186	48-28.983	- 96.086	-3-12-	3.0	2.5	6	2.8	45	23	1.3	170	110	11	70
23187	48-28.937	- 96.087	-3-12-	2.0	2.3	6	2.4	56	20	1.1	320	110	10	66
23188	48-28.938	- 96.020	-3-12-	2.2	2.1	7	2.9	60	24	1.5	260	140	11	70
23190	48-28.893	- 96.087	-3-12-	2.4	3.3	5	4.0	100	36	2.5	1600	770	16	72
23196	48-28.902	- 96.066	-3-12-	1.9	3.3	9	2.9	68	26	1.5	650	210	14	80
23200	48-28.983	- 96.125	-3-12-	1.9	2.4	2	2.4	45	19	1.3	630	96	5	63
23203	48-28.950	- 96.209	-3-15-	1.5	1.9	3	1.8	29	14	0.77	100	92	6	46
23204	48-28.878	- 96.159	-3-12-	1.6	2.5	7	2.6	75	22	1.6	960	180	12	62
23205	48-28.905	- 96.241	-3-12-	1.2	2.0	5	1.4	34	12	0.59	190	82	6	51
23209	48-28.796	- 96.117	-3-12-	2.1	2.9	6	2.8	70	29	1.8	1600	290	15	75
23211	48-28.810	- 96.094	-3-12-	1.3	2.2	6	1.5	40	15	0.84	180	120	8	62
23212	48-28.746	- 96.100	-3-15-	1.0	1.6	5	1.3	38	12	0.78	200	93	7	52
23213	48-28.849	- 96.073	-3-12-	1.7	2.2	3	1.9	38	16	1.1	170	130	8	60
23216	48-28.667	- 96.183	-3-12-	1.9	2.8	11	3.9	78	34	2.3	570	310	15	76
23247	48-28.322	- 96.930	-3-15-	1.6		8	3.9	67	29	2.1	220	210	15	77
23248	48-28.325	- 96.936	-3-12-	1.9	2.8	6	2.0	48	16	1.2	290	100	9	57
23257	48-28.664	- 96.822	-3-15-	1.7	2.2	6	2.7	62	21	1.5	410	120	12	64
23269	48-28.565	- 96.777	-3-15-	2.0	2.7	8	3.3	66	25	1.8	230	160	14	72
23270	48-28.542	- 96.957	-3-15-	2.2		8	4.5	79	31	2.5	520	320	18	73
23271	48-28.540	- 96.937	-3-15-	1.7	2.1	5	2.3	39	16	1.1	180	150	9	49
23272	48-28.548	- 96.957	-3-15-	2.2	2.0	2	2.3	41	16	1.1	250	150	9	51
23279	48-28.718	- 96.910	-3-15-	1.7	2.0	8	3.3	53	25	1.9	200	100	14	72
23280	48-28.722	- 96.950	-3-15-	1.0	1.9	8	2.5	53	20	1.4	230	140	12	61
23281	48-28.660	- 96.920	-3-15-	2.1	2.9	6	1.9	46	16	0.97	150	83	10	73
23282	48-28.672	- 96.873	-3-12-	2.6	2.4	4	3.8	110	29	2.4	1200	200	20	76
23283	48-28.566	- 96.804	-3-12-	1.3	2.3	6	1.6	46	13	0.84	140	58	8	59
23284	48-28.532	- 96.768	-3-15-	0.90	1.7	3	0.88	30	8	0.31	52	30	4	30
23285	48-28.634	- 96.878	-3-12-	1.3	2.5	5	1.8	46	13	0.97	140	220	9	55
23288	48-28.725	- 96.769	-3-12-	1.9	2.3	3	1.6	32	12	0.78	120	79	7	44
23289	48-28.749	- 96.739	-3-12-	2.8	2.5	8	2.4	89	20	1.3	910	140	15	62
23290	48-28.622	- 96.758	-3-12-	2.2		4	4.5	380	35	3.1	3200	160	28	82
23291	48-28.609	- 96.784	-3-12-	2.4	2.2	7	2.4	92	20	1.3	470	160	14	63
23293	48-28.614	- 96.714	-3-12-	1.5	2.8	7	2.1	65	42	1.3	410	120	10	58
23294	48-28.584	- 96.710	-3-12-	1.9	3.5	11	2.0	74	15	0.99	260	120	11	63
23295	48-28.582	- 96.713	-3-12-	2.1	2.8	7	3.0	83	23	1.7	570	120	12	61
23297	48-28.604	- 96.657	-3-12-	1.8	2.1	5	1.7	39	18	0.82	250	63	8	53
23298	48-28.630	- 96.634	-3-12-	2.1	2.4	3	2.4	69	23	1.4	310	270	10	53
23303	48-28.672	- 96.674	-3-15-	1.5	2.5	8	3.3	110	26	2.3	730	170	17	73
23305	48-28.664	- 96.649	-3-12-	1.9	2.5	8	3.1	74	24	2.0	280	150	14	71
23308	48-28.685	- 96.730	-3-12-	2.3	3.5	10	4.1	130	31	2.8	1500	210	21	86
23311	48-28.532	- 96.571	-3-15-	1.0	1.2	3	0.83	21	6	0.32	150	50	4	33
23313	48-28.501	- 96.643	-3-12-	1.1	2.0	5	1.8	41	12	0.92	660	140	9	50
23317	48-28.808	- 96.542	-3-12-	3.0	3.6	11	3.4	86	30	2.2	530	220	15	71
23318	48-28.806	- 96.533	-3-15-	1.7	1.5	4	1.4	28	12	0.71	91	43	6	46
23319	48-28.801	- 96.723	-3-15-	1.4	2.0	7	2.0	89	17	1.4	640	100	10	49

Table B-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE SEDIMENT												U	U-NT	TH	AL	CE	CR	FE	MN	F	Y	ZR
DR	SAMPLE	D. O. E.	SAMPLE	NUMBER																		
NUMBER	ST	LAT	LONG	L	TY	REP						(PPM)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(PPM)	(PPM)
23323	48-28.539	-	96.716	-3-12-								2.4	2.7	6	2.5	47	30	1.3	320	180	10	54
23324	48-28.525	-	96.677	-3-12-								0.74	2.0	6	1.7	38	20	0.74	110	120	6	45
23326	48-28.528	-	96.609	-3-12-								2.0	8.0	6	2.3	60	27	1.1	510	160	11	59
23327	48-28.733	-	96.527	-3-12-								1.2	1.8	2	2.1	43	22	1.0	480	320	9	45
23329	48-28.765	-	96.538	-3-12-								1.6	2.4	6	3.3	79	37	1.8	590	210	14	73
23330	48-28.724	-	96.682	-3-12-								1.4	1.5	3	1.3	30	14	0.56	120	66	6	35
23334	48-28.816	-	96.668	-3-12-								2.3	4.0	5	4.9	180	53	3.1	2000	300	21	79
23336	48-28.844	-	96.624	-3-15-								1.5	2.4	7	3.2	63	34	1.6	240	190	14	70
23337	48-28.848	-	96.662	-3-15-								1.9	4.4	8	4.4	77	42	2.3	580	270	18	82
23339	48-28.959	-	96.623	-3-12-								1.9	2.0	5	1.8	39	15	1.0	280	67	8	53
23340	48-28.966	-	96.626	-3-12-								1.1	1.6	2	1.0	26	11	0.60	110	220	5	33
23341	48-28.990	-	96.665	-3-15-								0.84	2.1	7	2.5	55	21	1.5	490	110	11	68
23344	48-28.960	-	96.728	-3-15-								2.1	4.5	8	3.5	84	26	1.8	610	320	19	81
23345	48-28.993	-	96.720	-3-12-								2.2	2.8	11	3.6	190	29	2.2	1200	240	24	78
23346	48-28.918	-	96.741	-3-12-								1.9	2.3	7	2.3	51	19	1.3	220	75	10	56
23347	48-28.910	-	96.737	-3-12-								1.5	1.6	<2	1.5	27	11	0.85	210	62	7	36
23351	48-28.950	-	96.516	-3-12-								2.1	2.4	2	3.3	56	26	1.9	530	190	12	62
23352	48-28.926	-	96.518	-3-12-								2.1	2.4	7	3.0	54	27	1.8	250	150	11	64
23353	48-28.892	-	96.539	-3-12-								1.6	1.9	3	1.8	32	19	0.81	250	130	7	52
23355	48-28.955	-	96.537	-3-12-								1.7	1.9	2	2.3	44	22	1.2	300	130	11	64
23357	48-28.935	-	96.631	-3-12-								1.5	1.8	<2	2.2	34	22	1.1	200	54	8	55
23358	48-28.899	-	96.605	-3-12-								1.0	1.5	5	1.1	34	10	0.53	140	77	6	35
23359	48-28.989	-	96.563	-3-12-								1.5	2.3	6	2.8	60	21	1.5	360	180	13	69
23364	48-28.816	-	96.633	-3-12-								1.9	2.1	4	2.5	71	21	1.6	500	150	13	64
23366	48-28.849	-	96.565	-3-15-								0.90	1.6	2	1.5	33	11	0.73	180	100	7	42
23369	48-28.844	-	96.506	-3-12-								1.7	2.1	7	2.4	50	19	1.3	200	85	11	68
23373	48-28.936	-	96.562	-3-15-								2.7	4.0	7	3.6	130	27	2.2	1800	170	18	79
23387	48-28.740	-	96.243	-3-12-								3.7	3.2	7	3.3	270	28	2.9	3500	270	21	68
23388	48-28.709	-	96.138	-3-12-								2.0	2.6	9	3.8	79	33	2.2	520	310	15	76
23389	48-28.700	-	96.114	-3-12-								1.6	2.0	2	1.6	26	13	0.69	90	84	6	53
23390	48-28.692	-	96.122	-3-12-								2.2	2.2	3	2.3	48	20	1.3	790	170	11	67
23391	48-28.703	-	96.091	-3-12-								1.8	2.4	7	2.0	61	18	1.1	850	120	11	68
23395	48-28.688	-	96.081	-3-12-								1.3	2.1	5	2.6	49	22	1.4	250	220	10	62
23396	48-28.676	-	96.133	-3-12-								1.3	2.3	4	3.3	64	27	1.8	360	210	13	72
23399	48-28.801	-	96.657	-3-12-								1.5	2.0	5	2.9	77	22	1.6	490	140	13	59
23407	48-28.364	-	96.860	-3-15-								1.8	1.8	7	2.3	48	18	1.3	280	180	10	53
23408	48-28.365	-	96.883	-3-12-								2.4		8	4.6	63	52	2.7	410	220	16	78
23412	48-28.384	-	96.912	-3-12-								1.6		5	3.9	70	29	2.3	340	150	15	68
23414	48-28.449	-	96.876	-3-12-								0.77	1.9	6	1.9	45	14	0.96	230	210	8	47
23423	48-28.301	-	96.866	-3-12-								3.5		12	5.5	85	41	3.3	470	260	19	100
23424	48-28.422	-	96.882	-3-12-								1.4	2.0	5	2.3	46	16	1.1	150	110	9	49
23425	48-28.464	-	96.929	-3-12-								1.1	2.0	3	2.1	32	14	1.1	120	95	8	49
23428	48-28.469	-	96.709	-3-12-								1.7	2.6	9	2.8	79	32	1.6	570	420	12	58
23429	48-28.447	-	96.740	-3-15-								2.1	2.8	8	3.2	67	32	1.9	330	210	13	68
23430	48-28.478	-	96.671	-3-12-								1.4	1.9	<2	1.9	38	14	0.90	270	120	8	43
23432	48-28.424	-	96.714	-3-12-								2.5	2.5	4	3.0	57	23	1.8	370	200	11	64
23438	48-28.373	-	96.655	-3-12-								1.8	1.7	7	1.6	45	14	0.68	270	95	7	45
23440	48-28.378	-	96.621	-3-12-								1.5	1.1	3	0.95	18	12	0.44	150	82	4	35
23443	48-28.439	-	96.635	-3-15-								1.3	1.7	8	1.6	42	14	0.72	120	110	7	50
23444	48-28.447	-	96.643	-3-15-								0.67	1.0	<2	0.88	15	6	0.22	52	41	3	22
23446	48-28.431	-	96.689	-3-12-								0.63	1.1	3	1.4	25	9	0.53	87	67	4	29
23447	48-28.473	-	96.624	-3-12-								1.0	2.3	5	1.7	41	14	0.76	270	120	7	39
23451	48-28.967	-	96.476	-3-12-								1.4	1.8	8	3.3	120	28	2.2	1500	150	17	76
23452	48-28.970	-	96.453	-3-12-								2.6	3.3	7	2.9	65	25	1.6	500	130	14	69
23454	48-28.987	-	96.466	-3-12-								2.9	2.5	4	2.1	42	17	0.98	200	120	10	61

Table B-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE BEEVILLE QUADRANGLE

BEEVILLE QUADRANGLE SEDIMENT																	
OR SAMPLE	D. O. E.	SAMPLE	NUMBER	U	U-NT	TH	AL	CE	CR	FE	MN	F	Y	ZR			
NUMBER	ST	LAT	LONG	L	TY	REP	(PPM)	(PPM)	(PPM)	(X)	(PPM)	(PPM)	(PPM)	(PPM)			
23457	48-28.943	-	96.480	-3-15-			2.6		10	4.5	120	39	2.7	1300	240	21	87
23459	48-28.907	-	96.424	-3-12-			1.5	2.6	9	2.8	60	30	1.3	200	130	13	67
23460	48-28.907	-	96.466	-3-12-			1.6	1.9	8	1.8	49	20	0.83	190	76	8	56
23461	48-28.844	-	96.483	-3-12-			2.1	2.9	4	3.9	64	45	2.3	550	300	15	70
23463	48-28.842	-	96.338	-3-12-			1.8	2.3	8	2.8	57	31	1.4	240	100	11	70
23465	48-28.787	-	96.357	-3-12-			6.7	5.8	7	2.7	110	28	1.8	1000	210	14	65
23466	48-28.755	-	96.307	-3-15-			2.8	3.6	7	3.9	100	41	2.3	1100	190	19	82
23468	48-28.840	-	96.289	-3-12-			3.8	3.6	6	2.4	55	21	1.4	300	150	11	59
23470	48-28.920	-	96.382	-3-12-			2.7	6.6	7	3.7	61	29	1.9	220	210	15	83
23473	48-28.863	-	96.299	-3-12-			1.2	2.2	5	1.6	35	12	0.69	220	94	8	55
23478	48-28.725	-	96.362	-3-12-			3.3	4.0	9	4.2	210	37	3.1	2400	240	22	84
23479	48-28.707	-	96.365	-3-12-			1.6	3.2	10	2.9	66	26	1.6	220	170	15	79
23480	48-28.661	-	96.353	-3-12-			1.1	2.3	6	2.1	40	14	0.83	120	95	5	55
23481	48-28.740	-	96.301	-3-12-			1.4	2.0	4	1.7	36	15	0.89	170	90	8	48
23482	48-28.744	-	96.285	-3-12-			2.2	1.8	6	2.6	51	23	1.4	250	130	11	59
23483	48-28.674	-	96.458	-3-12-			1.3	1.7	6	1.3	39	12	0.56	210	77	6	50
23497	48-28.803	-	96.210	-3-12-			1.5	1.8	5	1.1	30	9	0.38	64	58	4	39
23498	48-28.811	-	96.197	-3-12-			4.2	3.9	4	2.4	61	19	1.3	370	120	12	66
23499	48-28.772	-	96.234	-3-12-			2.1	2.1	2	1.6	35	12	0.89	370	92	7	50
23503	48-28.882	-	96.364	-3-12-			1.7	2.7	9	1.2	52	11	0.62	200	84	7	62
23509	48-28.769	-	96.125	-3-12-			2.8	4.0	9	3.9	96	35	2.6	1300	260	16	69
23511	48-28.752	-	96.429	-3-12-			2.0	2.2	3	1.8	34	15	0.83	150	99	9	60
23513	48-28.866	-	96.124	-3-12-			4.3	4.4	10	3.7	72	33	2.1	290	300	16	84
23516	48-28.889	-	96.113	-3-12-			3.2	4.1	12	4.4	98	40	2.7	1300	250	21	89
23520	48-28.810	-	96.065	-3-12-			2.7	3.2	7	3.1	71	28	1.9	560	120	15	83
23524	48-28.731	-	96.483	-3-12-			2.3	2.3	5	2.1	47	17	1.1	270	160	11	55
23556	48-28.913	-	96.589	-3-15-			2.2	3.3	9	3.0	78	24	1.7	340	120	15	75
23557	48-28.900	-	96.687	-3-15-			1.4		6	2.6	51	18	1.4	950	160	13	66
23558	48-28.865	-	96.694	-3-12-			1.5		9	4.0	82	33	2.2	330	360	21	79
23565	48-28.803	-	96.244	-3-15-			1.3	2.2	4	2.0	42	16	1.1	160	170	10	57
23568	48-28.867	-	96.210	-3-12-			1.9	2.7	5	2.7	50	22	1.4	1100	380	11	55
23578	48-28.888	-	96.485	-3-12-			1.1	2.9	2	1.3	20	9	0.54	67	41	5	46
23579	48-28.973	-	96.412	-3-15-			2.0	2.5	7	2.7	47	21	1.4	130	240	11	66
23581	48-28.862	-	96.464	-3-12-			1.6	2.0	7	2.4	52	19	1.3	160	110	9	57

APPENDIX C
MICROFICHE OF FIELD AND LABORATORY DATA

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

APPENDIX C

MICROFICHE OF FIELD AND LABORATORY DATA

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
Microfiche		C-7

Table C-1

COMPUTER CODE LIST OF GEOCHEMICAL VARIABLES

Variable(a)	Code	Variable(a)	Code
Uranium Measured by Fluorometry(b)	U-FL	Thorium	TH
Uranium Measured by Mass Spectrometry(b)	U-MS	Titanium	TI
Uranium Measured by Neutron Activation	U-NT	Vanadium	V
Arsenic	AS	Yttrium	Y
Selenium	SE	Zinc	ZN
Silver	AG	Zirconium	ZR
Aluminum	AL	Sulfate (ppm)	SO, SO ₄
Boron	B	Chloride (ppm)	CL
Barium	BA	Conductivity from Lab (μmhos/cm)	CT-L
Beryllium	BE	Conductivity from Field (μmhos/cm)	CT-F
Calcium	CA	Dissolved Oxygen (ppm)	DO
Cerium	CE	Temperature (°C)	TP, TEMP
Cobalt	CO	pH	PH
Chromium	CR	pH Measured by Lo Ion Paper	PH-P
Copper	CU	Total Alkalinity (ppm)	T-AK
Iron	FE	M Alkalinity (ppm)	T-AK
Potassium	K	P Alkalinity (ppm)	P-AK, LIP
Lithium	LI	Carbonate (ppm)	CB
Magnesium	MG	$CB = \begin{cases} 0 & \text{if pH} \leq 8.3 \\ \frac{3.42 \times M-AK}{5.61 + 10^{(11-pH)}} & \text{if pH} > 8.3 \end{cases}$	
Manganese	MN		
Molybdenum	MO	Bicarbonate (ppm)	BC
Sodium	NA	$BC = \begin{cases} \frac{2.62 \times M-AK}{4.3 + 10^{(7-pH)}} & \text{if pH} \leq 8.3 \\ 0.61 \times M-AK - CB & \text{if pH} > 8.3 \end{cases}$	
Niobium	NB		
Nickel	NI		
Phosphorus	P	U-NT/U-FL	U/U, TUU
Lead	PB	U-FL/U-NT	U/TU
Platinum	PT	TH/U-NT	TH/U
Scandium	SC	1,000·U/SP	U/SP
Silicon	SI	1,000·U/B	U/B
Strontium	SR	1,000·U/SO	U/SO, USO

(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

GENERAL SITE DATA

1

Card Number

Attach Identical
Sample Number Here

1 2 3 4 5 6 7 8 9 10 11

Site Number

12 13 14 15 16 17

Map Code

18

Sample Type

M
H
S
W
P
L
A
B
F
G
Q

Stream Sediment
Lake Sediment
Stream Water
Well Water
Spring Water
Lake Water
Bog Water
Plant
Soil
Rock
Other

(Use Remarks)
↓

19

Replicate Letter (A-Z)

20 21 22 23 24 25 26 27

Collector's Initials

28 29 30

Phase (P, 1, 2, or G)

31

Field Sheet Status

O
C
V

Original
Correction
Voiding

32

Control Sample

A
B
C
D
Q

Sediment, High U
Sediment, Low U
Water, High U
Water, Low U
Other

34 35 36 37

Air Temperature (°C)

38 39 40 41 42 43 44 45 46 47 48 49 50

Location

51 52 53 54

Surface Geologic Unit Code

Type of Vegetation

55

(Within 1 Km Upstream)
C Conifer
& Conifer & Deciduous
D Deciduous
B Brush
G Grass
M Moss
L Lichen
Q Other

56

Density of Vegetation
(Within 1 Km Upstream)
B Barren
S Sparse
M Moderate
D Dense
V Very Dense

57

Local Relief
(Within 1 Km Upstream)
F Flat (<2m)
L Low (2-15m)
G Gentle (15-60m)
M Moderate (60-300m)
H High (>300m)
Q Other

58

Weather
C Calm
P Lt Wind
V Windy
R V. Windy
S Gale

59

Clear
P Clody
W Overcast
V Rainy
G Snowy

60

Classes of Contaminants
N None
M Mining
A Agriculture
F Oil Field
I Industry
S Sewage
P Power Plant
U Urban
Q Other

61 62 63

Average Stream Velocity (m/sec)
N = No Visible Movement
P = Stagnant Pool

64 65 66

Water Width (m)

67 68 69

Average Depth (m)

70

Water Level
D Dry Pools
L Low

71

Dominant Bed Material
B Boulder
C Cobble
P Pebble
S Sand
T Silt
Y Clay
N None (Use Remarks)

Sample Color (Except Plants)

72 73 74 75 76

Adj. Noun
V V Lt
L Light
M Medium
D Dark
CL Clear
WH White
YL Yellow
OR Orange

77

Odor of Sampled Material
N None
S H₂S
Q Other

78

Results Request
(Use Remarks)

79

Card Number

PLANT SAMPLE

18 19</

Table C-2, Continued

OAK RIDGE GEOCHEMICAL SAMPLING FORM
SHOWING FIELD DATA RECORDED ON MICROFICHE

STREAM OR LAKE SEDIMENT

Sample Condition

31
D
W

Dry
wet

Sample Treatment

32
N
S
O

None
Sieved
Other

33	34
----	----

Number of Grains

35	36
----	----

% Organic Material (Field Estimate)

GENERAL WATER SAMPLES

Water Sample Treatment

37
N
F
C
A
Q

None
Filtered Only
Acidified Only
Acidified and Filtered
Other

Depth of Visibility (m)

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

C = Clear

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

Conductivity
($\mu\text{mhos/cm}$)

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

Dissolved O_2 (ppm)

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

Temperature ($^{\circ}\text{C}$)

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

pH

55
P

pH by Le-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
Q

Clear
Murky
Algal
Other

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

Discharge (liters/min)

REMARKS (Card 4)

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

Identification of Producing Horizon
(Geologic Unit Code)

Confidence of Producing Horizon Identification

78
H
R
S

High Degree
Probable
Possible

Source of Producing Horizon Identification

79
P
W
U
G
Q

Publication
Owner
User
Geologic Inference
Other

1
3

Card Number

WELL WATER

Type of Well

16
D
P
G
U
Q

Drilled
Drive Point
Dug
Unknown
Other

Power Classification

17
A
E
G
W
H
Q

Artesian Flow
Electric
Gasoline
Wind
Hand
Other

Casing

18
N
S
G
P
U
Q

None (Below Water Table)
Steel
Galvanized
Plastic
Unknown
Other

Pipe Composition

19
F
Z
C
P
U
Q

Steel
Galvanized
Copper
Plastic
Unknown
Other

Sample Location

22	23	24
----	----	----

Meters from Well Head
H = Holding Tank (Use Remarks)Where Sample Taken
With Respect To Pressure Tank

25
B
A
N
F

Before
After
No Pressure Tank
From Pressure Tank (Use Remarks)

Use of Well

26
M
H
S
I
A
X
Y
Z
N
Q

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

Frequency of Pumping

27
C
F
I
R

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

Depth to top of Producing Horizon

28	29	30	31
----	----	----	----

(Meters)

Confidence of Producing Depth

32
H
R
S

High
Probable
Possible

Source of Producing Depth Information

33
P
W
U
G
Q

Publication
Owner
User
Geologic Inference
Other

Total Well Depth

34	35	36	37
----	----	----	----

(Meters)

Confidence of Total Depth

38
H
R
S

High
Probable
Possible

Source of Total Depth Information

39
P
W
U
G
Q

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

Type of Lake

40
N
M

Natural
Manmade

Lake Area

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

(sq km)

MICROFICHE OF FIELD AND LABORATORY DATA

CONTENTS

<u>Laboratory Data</u>	<u>Page</u>
Well Water (W)	
Stream Sediment (M)	

<u>Field Data</u>
Page 1
Page 2
Page 3

BEEVILLE QUAD
BASIC DATA

11/09/79

PAGE 1

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
+	$0.0 \leq X <$	0.20
x	$0.20 \leq X <$	0.46
○	$0.46 \leq X <$	2.31
⊙	$2.31 \leq X <$	3.90
⊗	$3.90 \leq X <$	7.11
●	$7.11 \leq X <$	10.88
●	$10.88 \leq X <$	14.91
●	$14.91 \leq X <$	27.78
■	$27.78 \leq X <$	37.98
★	$X \geq$	37.98

PLATE 2
BEEVILLE QUADRANGLE
SYMBOL PLOT
GROUNDWATER
URANIUM (PPB)

SCALE 1: 250000
373 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
.	$0 \leq X <$	360
x	$360 \leq X <$	520
.	$520 \leq X <$	689
.	$689 \leq X <$	800
o	$800 \leq X <$	934
o	$934 \leq X <$	1180
o	$1180 \leq X <$	1400
o	$1400 \leq X <$	1800
o	$1800 \leq X <$	2270
o	$2270 \leq X <$	3300
o	$3300 \leq X <$	3885
●	$3885 \leq X <$	4800
●	$4800 \leq X <$	7130
■	$7130 \leq X <$	25750
★	$X \geq$	25750

PLATE 3
 BEEVILLE QUADRANGLE
 SYMBOL PLOT
 GROUNDWATER
 SPECIFIC CONDUCTANCE (UMHOS/CM)
 SCALE 1: 25000
 373 SAMPLES PLOTTED

LEGEND
□ STREAM SEDIMENT

PLATE 4
STREAM SEDIMENT SAMPLE
LOCATION AND DRAINAGE
BASIN MAP

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
×	$0.25 \leq X <$	0.40
.	$0.40 \leq X <$	0.55
.	$0.55 \leq X <$	0.70
o	$0.70 \leq X <$	0.85
o	$0.85 \leq X <$	1.00
o	$1.00 \leq X <$	1.15
o	$1.15 \leq X <$	1.30
o	$1.30 \leq X <$	1.50
o	$1.50 \leq X <$	1.80
o	$1.80 \leq X <$	2.10
o	$2.10 \leq X <$	2.50
●	$2.50 \leq X <$	3.20
■	$3.20 \leq X <$	4.00
★	$X \geq$	4.00

PLATE 5
BEEVILLE QUADRANGLE
SYMBOL PLOT - STREAM
SEDIMENT
URANIUM FLUOROMETRIC (ppm)

SCALE 1: 250000
364 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
x	1 ≤ X <	2
○	2 ≤ X <	3
○	3 ≤ X <	4
○	4 ≤ X <	5
○	5 ≤ X <	6
○	6 ≤ X <	7
○	7 ≤ X <	8
●	8 ≤ X <	9
●	9 ≤ X <	10
■	10 ≤ X <	11
★	X ≥	11

PLATE 6
 BEEVILLE QUADRANGLE
 SYMBOL PLOT - STREAM
 SEDIMENT
 THORIUM (PPM)
 SCALE 1: 250000
 356 SAMPLES PLOTTED