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NATIONAL URANIUM RESOURCE EVALUATION PROGRAM

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

Uranium Resource Evaluation Project

May 31, 1980

OPERATED BY
UNION CARBIDE CORPORATION
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DEPARTMENT OF ENERGY

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NATIONAL URANIUM RESOURCE EVALUATION PROGRAM

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ABSTRACT

Results of a reconnaissance geochemical survey of the Corpus Christi Quadrangle, Texas are reported. Field and laboratory data are presented for 119 groundwater samples and 57 stream sediment samples. Also included is a brief discussion on the geology and hydrology of the quadrangle.

Groundwater data indicate that uranium concentrations above the 85th percentile occur primarily in a trend in western Nueces County. With one exception, waters in the trend are produced from the Evangeline aquifer and have high values for selenium and strontium. Owing to urbanization, low topographic relief, and the presence of Recent-to-Pleistocene surface material, stream sediment data were found to be less than optimum for the determination of the potential for uranium mineralization, and variation in uranium concentrations between units may simply reflect lithologic differences.

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HYDROGEOCHEMICAL AND STREAM SEDIMENT
RECONNAISSANCE BASIC DATA FOR
CORPUS CHRISTI 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 are the results of the work done by UCC-ND in the Corpus Christi NTMS Quadrangle, Texas.

Figure 1

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

GEOLOGY

LOCATION AND GEOLOGIC SETTING

The Corpus Christi Quadrangle covers approximately 8,000 km² (3,100 mi²) between lat. 27° and 28° N. and long. 96°45'00" and 98° W. The survey area is outlined on the generalized geologic map of Texas (Figure 2) and includes all or parts of Aransas, Brooks, Jim Wells, Kenedy, Kleberg, Nueces, and San Patricio 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.

The survey area is located in the West Texas Gulf Coastal Plain and consists primarily of grass-covered prairies in the north and windblown sand cover in the south. The topography is generally flat, and the land surface slopes to the east and southeast. The altitude ranges from sea level to approximately 200 ft in the extreme northwestern corner of the quadrangle. Low-gradient streams and canals provide drainage for much of the area.

Coastward dipping Quaternary formations are the oldest geologic units that crop out in the survey area. These formations consist primarily of clay, silt, sand, and gravel. Youngest deposits in the survey area are: (1) fill and spoil deposits, which are the result of dredging along the Intracoastal Waterway; and (2) barrier island deposits, which form Padre Island.

LITHOLOGY AND ENVIRONMENTS OF DEPOSITION

The stratigraphic units considered significant for interpretation of the results obtained from the reconnaissance geochemical sampling are, from oldest to youngest: (1) Fleming Formation; (2) Goliad Formation; (3) Lissie Formation; (4) Beaumont Formation; and (5) alluvium, windblown, and barrier island deposits. The formations dip to the south and southeast at an angle greater than the slope of the land surface (Shafer, 1968), and consequently, thicken gulfward.

The Fleming Formation (Miocene), present in the subsurface of the quadrangle, consists primarily of clay with lesser amounts of sand and silt (Plummer, 1932). In the survey area, the Fleming Formation is differentiated from the underlying Oakville Formation by the presence of thicker clay beds and thinner sand beds relative to the lithologies in the Oakville Formation. The Fleming Formation represents fluvial deposits during relatively drier climatic conditions than were present during deposition of the Oakville Formation (Eargle, et al, 1975). Beneath Padre Island, the Fleming Formation reaches a thickness of 685 m (2,250 ft).

The Goliad Formation is present only in the subsurface. During the Pliocene, sediments composing the Goliad Formation were transported by

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Figure 2

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

STRATIGRAPHIC COLUMN FOR THE CORPUS CHRISTI QUADRANGLE

ERA	SYSTEM	SERIES	GEOLOGIC SURFACE CODE	GEOLOGIC MEMBER	PRODUCING HORIZON CODE	AQUIFER NAME	MAXIMUM THICKNESS METERS FEET				
CENOZOIC	QUATERNARY	RECENT	QD	ALLUVIUM AND BARRIER ISLAND DEPOSITS	QD	SHALLOW, DISCONTINUOUS AQUIFERS					
			QWBD	DEWEYVILLE FORMATION (MAY BE LATE PLEISTOCENE)	AQCH	CHICOT AQUIFER	300	1,000			
		WINDBLOWN DEPOSITS									
		PLEISTOCENE	QPB	BEAUMONT FORMATION					ACEV	EVANGELINE AQUIFER	770
	QPLI		L SSIE FORMATION								
	TERTIARY	PLIOCENE	TPG	GOLIAD FORMATION	ACEV	EVANGELINE AQUIFER	770	2,500			
MIOCENE		TMF	UPPER FLEMING FORMATION								

SOURCE:

1. BAKER, E. T., "STRATIGRAPHIC AND HYDROLOGIC FRAMEWORK OF PART OF THE COASTAL PLAIN OF TEXAS," U.S. GEOLOGICAL SURVEY OPEN FILE REPORT 77-712 (MARCH 1978).
2. BARNES, V. E., "GEOLOGIC ATLAS OF TEXAS CORPUS CHRISTI SHEET" (1975).

LEGEND FOR FIGURE 3

streams that originated in West Texas, New Mexico, and possibly the Rocky Mountains (Eargle, et al, 1975). The unit consists of calcareous sand interbedded with calcareous clay and gravel. Beneath Padre Island, the Goliad Formation reaches a thickness of 370 m (1,100 ft) (Baker, 1978).

The units composing the Lissie Formation (Pleistocene) which unconformably overlies the Goliad Formation are fluvial deposits representing meanderbelt, levee, crevasse splay, floodplain, and distributary facies (Barnes, 1975). The sequence found in the Lissie Formation is similar to that being formed by the Brazos River (Achalabhuti, 1976). The Lissie Formation is composed of sand, silt, and clay, with minor amounts of gravel and iron-manganese hydrous oxides (Barnes, 1975). The Lissie Formation reaches a thickness of 180 m (600 ft) in Nueces County (Shafer, 1968); it crops out in the northwestern corner of the quadrangle.

The Beaumont Formation unconformably overlies the Lissie Formation and consists mostly of clay interbedded with sand, silt, and gravel. Stream channel, point bar, levee, backswamp, marsh, mud flat, and lagoonal facies are represented in the formation (Barnes, 1975). The Beaumont Formation attains a thickness of 150 m (500 ft) in Nueces County (Shafer, 1968); it crops out in the northern half of the quadrangle.

Windblown deposits, including sand dunes and sand and silt sheets, form the surface material in the southern half of the quadrangle. Northern Kenedy County and western Kleberg County are covered with migrating sand and silt sheets. Dune complexes are generally oriented with the longitudinal axis perpendicular to the coastline.

Because of its limited areal extent, the Deweyville Formation was combined with alluvial and barrier island deposits on the generalized geologic map of the Corpus Christi Quadrangle.

Recent deposits occur along the Nueces River basin and on Padre Island. In the Nueces River basin, alluvium forms point bar, levee, and stream channel deposits. Padre Island is a typical barrier island sequence.

STRUCTURE

Geologic structure of the survey area is relatively simple. The units form a monocline that dips gently toward the coast. No evidence of faulting is exposed on the surface. However, growth faults and diapirs caused by salt domes are common in the subsurface.

HYDROLOGY

The Evangeline aquifer is the oldest aquifer sampled in the survey area. Upper sections of the Fleming and Goliad Formations comprise this aquifer. The contact between the Goliad Formation and the Upper Fleming

Formation is difficult to determine in the subsurface, and they are hydrologically connected. Therefore, this part of the stratigraphic sequence is an intraformational aquifer. Thickness of the Evangeline aquifer, beneath Padre Island, is 770 m (2,500 ft) (Baker, 1978). Abundant amounts of fresh to slightly saline water are produced from this aquifer.

The Chicot aquifer includes the Lissie and Beaumont Formations. The Lissie and Beaumont Formations are indistinguishable in the subsurface. Baker (1978) has differentiated the Goliad Formation from the Lissie and Beaumont Formations; hence, the Chicot aquifer from the Evangeline aquifer. He made this differentiation on the basis of a higher clay content in the Lissie and Beaumont Formations, and the decrease in amount and quality of water in the Chicot aquifer. The thickness of the Chicot aquifer is approximately 300 m (1,000 ft) (Baker, 1978).

URANIUM OCCURRENCES

At the present time, no uranium is being mined in the study area, but there has been extensive exploration in counties to the north, northwest, and west of the study area. The presumed host units for uranium in the West Texas Coastal Plain are the Whitsett, Catahoula, and Oakville Formations (Eargle, et al, 1975). In the study area, these formations are present only in the subsurface, and no groundwaters were collected from these formations. West of the study area in Duval County, one deposit in the Goliad Formation is being mined above the Palangana salt dome (Eargle, et al, 1975).

SAMPLE COLLECTION

CHRONOLOGY OF THE SURVEY

Reconnaissance sampling in the Corpus Christi Quadrangle began in October 1979 and was completed in November 1979. All field sampling was performed by UCC-ND personnel. Laboratory analysis, as well as compilation and verification of all field and laboratory data, continued throughout the sampling period. The final field and laboratory data base used to prepare the statistical and areal distribution of uranium and uranium-related variables for this report was completed in March 1980.

FIELD PROCEDURES

A total of 119 groundwater and 57 stream sediment samples were collected within the boundaries of the Corpus Christi Quadrangle. No samples were collected in the southern one-third of the quadrangle because it was not possible to obtain the required permission. Plates 1 and 4 are overlays at a scale of 1:250,000 showing sample locations for groundwater and stream sediments, respectively. Drainage basins are drawn in on Plate 4

to indicate the area represented by the stream sediment samples. Producing horizon codes for groundwater samples were determined by using Figure 4 which shows the approximate depth to the base of the Chicot aquifer. Detailed information regarding techniques of sample collection, recording of site data, field equipment, and recording field measurements may be found in the following reports: "Hydrogeochemical and Stream Sediment Procedures of the Uranium Resource Evaluation Project" (Arendt, et al, December 1979); "Procedures Manual for Groundwater Reconnaissance Sampling" (Uranium Resource Evaluation Project, March 1978); "Procedures Manual for Stream Sediment Reconnaissance Sampling" (Uranium Resource Evaluation Project, May 1978). Field observations were recorded on the field forms 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 chlorination, water-softening, or filtering devices were not sampled if the sample 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, and 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 indicated on the field form. Any wells thought to be contaminated were noted as such on the field form. Wherever possible, sediment samples were collected upstream from road crossings. Visible signs of contamination or the presence of cultivated areas upstream from the sample site were noted on the field form.

The principal crops grown in the survey area are cotton and grain sorghum. Most fertilizers are nitrates and phosphates and are applied from mid-November to mid-January. Large-scale ranching is prevalent in the southern third of the quadrangle.

Oil, gas, and petrochemical production are major industries in the Corpus Christi Quadrangle. Groundwater contamination may occur from the movement of brines through improperly cased oil and gas wells, oil test wells that are not properly sealed or cased, and the infiltration of oil field brines from surface disposal pits (Shafer and Baker, 1973; Shafer, 1968).

CHEMICAL ANALYSIS

All samples collected in the survey area were returned to the URE Project laboratory in Oak Ridge, Tennessee for preparation and analysis. The elements determined and the analytical techniques used along with the appropriate detection limits are given in Table 1. These detection limits are considered the best average during normal operation; however, some variables have values reported below these limits. 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.

Figure 4

DEPTH TO THE BASE OF THE CHICOT AQUIFER
IN THE CORPUS CHRISTI QUADRANGLE

Table 1

DETECTION LIMITS OF VARIABLES DETERMINED IN WATER AND SEDIMENT SAMPLES

Variable	Method	Detection Limit	
		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
Hf	Plasma Source Emission Spectrometry	15	--
K	Plasma Source Emission Spectrometry	0.05(a)	0.1(b)
La	Plasma Source Emission Spectrometry	2	--
Li	Plasma Source Emission Spectrometry	1	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.

Part of the sediment sample was dissolved in 10 ml of 1:1 nitric-hydrofluoric acid. The analytical procedures which were used have been described by Cagle (1977) and Arendt, et al (December 1979). All observed data for 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 analyzed along with normal samples to ensure the validity of the reported results. A measurements control program provides information concerning precision and reliability of these measurements. Control samples of 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 2. 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 (038101, 038120, 038191, 038229) and three stream sediment samples (038061, 038127, and 038166) 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 200 individual analyses that were compared, the only results which were considered to be in error in the original analysis and thus require corrections were multielement values for Sediment Samples 038061, 038127, and 038166. This low error rate for the unusual samples indicates a high level of reliability for the laboratory measurements.

GEOCHEMICAL RESULTS

A statistical summary of all geochemical variables determined and the correlation matrix of selected variables for groundwater and stream

Table 2

SUMMARY OF MEASUREMENTS CONTROL RESULTS OBTAINED WITH SAMPLES FROM THE CORPLS CHRISTI QUADRANGLE

Measurements Control Results for Water									Measurements Control Results for Stream Sediment										
Batch L-4					Batch H-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 (ppm)	Standard Deviation (ppm)	Coefficient of Variation	No. of Samples	Mean (ppm)	Standard Deviation (ppm)	Coefficient of Variation
U	MS(a)	1	0.52	0.0	0.0	8	9.92	0.436	0.05	U	FL	52	4.15	0.400	0.10	30	9.93	0.871	0.09
U	FL(b)	29	0.68	0.234	0.15	25	10.30	0.632	0.06	U	NT(e)	61	4.86	0.135	0.03	40	10.26	0.276	0.03
As	AA(c)	33	3.5	0.72	0.20	41	0.7	0.29	0.42	As	AA	38	3.6	0.53	0.15	24	9.8	0.98	0.10
Se	AA	37	1.2	0.17	0.14	41	0.8	0.31	0.38	Se	AA	40	0.4	0.24	0.53	27	0.8	0.28	0.36
Al	PS(d)	30	96.0	17.6	0.18	30	350.0	21.4	0.06	Al	PS	53	31,900.0	2,450.0	0.08	32	55,800.0	4,470.0	0.08
B	PS	28	1,584.0	71.2	0.04	32	71.0	4.0	0.05	B	PS	57	12.0	6.1	0.48	32	49.0	9.7	0.20
Ba	PS	28	139.0	5.2	0.04	32	32.0	1.4	0.04	Ba	PS	50	416.0	16.1	0.04	35	381.0	20.3	0.05
Ca	PS	30	10,200.0	540.0	0.05	30	98,500.0	4,300.0	0.04	Be	PS	56	1.0	2.3	1.54	35	2.0	0.6	0.27
Co	PS	31	20.0	2.7	0.13	30	95.0	4.6	0.05	Ca	PS	57	2,700.0	440.0	0.16	36	3,500.0	470.0	0.13
Cr	PS	26	95.0	5.0	0.05	34	19.0	3.6	0.19	Ce	PS	49	62.86	10.815	0.17	32	83.19	22.161	0.27
Cu	PS	30	64.0	13.6	0.21	33	208.0	20.3	0.10	Co	PS	55	13.0	2.3	0.17	34	22.0	4.1	0.18
Fe	PS	31	86.0	21.7	0.25	30	984.0	49.5	0.05	Cr	PS	53	27.0	1.7	0.06	34	60.0	4.3	0.07
K	PS	30	1,910.0	328.0	0.17	34	20,100.0	2,363.0	0.12	Cu	PS	53	21.0	2.7	0.13	33	45.0	2.9	0.06
Li	PS	31	17.0	2.1	0.12	33	102.0	8.5	0.08	Fe	PS	53	17,700.0	1,150.0	0.06	32	33,600.0	1,580.0	0.05
Mg	PS	28	9,300.0	390.0	0.04	30	72,400.0	3,160.0	0.04	K	PS	53	9,800.0	810.0	0.08	30	19,400.0	1,580.0	0.08
Mn	PS	31	20.0	7	0.04	30	103.0	4.8	0.05	Li	PS	55	22.0	1.5	0.07	34	34.0	3.4	0.10
Mo	PS	28	34.0	7.2	0.21	33	6.0	5.7	0.90	Mg	PS	53	2,100.0	130.0	0.06	34	5,300.0	330.0	0.06
Na	PS	30	1,600.0	220.0	0.14	33	44,800.0	3,780.0	0.08	Mn	PS	53	1,898.0	112.4	0.06	32	761.0	38.4	0.05
Ni	PS	28	192.0	6.8	0.03	32	38.0	4.6	0.12	Mo	PS	56	2.0	1.2	0.47	34	27.0	2.4	0.09
P	PS	31	109.0	21.2	0.19	34	4,790.0	404.2	0.08	Na	PS	55	1,500.0	130.0	0.08	34	2,100.0	200.0	0.10
Sc	PS	28	62.0	3.8	0.06	31	11.0	0.7	0.06	Nb	PS	57	12.0	3.8	0.31	35	10.0	5.3	0.50
Si	PS	26	920.0	80.0	0.09	34	7,960.0	912.0	0.11	Ni	PS	57	18.0	2.4	0.13	34	56.0	3.3	0.06
Sr	PS	30	54.43	3.702	0.07	30	5,155.77	170.646	0.03	P	PS	53	1,808.0	251.0	0.14	32	808.0	88.3	0.11
Ti	PS	28	113.0	7.0	0.06	32	40.0	2.2	0.05	Sc	PS	55	5.0	0.6	0.10	32	11.0	0.7	0.06
V	PS	26	10.0	3.0	0.27	30	41.0	5.0	0.12	Sr	PS	51	54.39	2.995	0.05	35	79.94	5.693	0.07
Y	PS	31	9.0	1.1	0.12	32	47.0	2.0	0.04	Th	PS	57	7.0	4.3	0.60	36	8.0	2.6	0.32
Zn	PS	28	498.0	30.4	0.06	28	48.0	22.3	0.46	Ti	PS	53	3,197.0	281.1	0.09	36	2,955.0	267.7	0.09
										V	PS	53	52.0	4.5	0.09	30	157.0	10.7	0.07
										Y	PS	55	19.0	1.5	0.08	34	28.0	1.4	0.05
										Zn	PS	51	88.0	7.5	0.09	32	100.0	6.2	0.06
										Zr	PS	51	131.0	8.9	0.07	32	112.0	5.9	0.05

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

sediment samples collected in the Corpus Christi Quadrangle are presented in Appendixes A and B, respectively. Symbol plots, log frequency, lognormal probability, percentile plots, and tabular data listings for selected variables are also included. All field and laboratory data for groundwater and stream sediment samples may be found on microfiche in Appendix C. Details of all sampling, analytical, and statistical procedures are discussed in Report K/UR-100 (Arendt, et al, December 1979).

For discussion purposes, the 15th and 85th percentile concentrations are contoured on the symbol plots for all elements in Appendixes A and B, to indicate areas of low and high concentrations. This represents values of approximately one standard deviation below and above the mean for a normally distributed population. For more careful evaluation of the data presented, concentration levels considered to be anomalous should be determined separately for each geologic unit within the quadrangle.

GEOCHEMICAL DISTRIBUTIONS IN GROUNDWATER

The sample site locations for groundwater samples collected in the Corpus Christi Quadrangle are shown on Plate 1 at the 1:250,000 scale. Symbol plots for uranium and specific conductance are presented at this 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 the samples were collected is presented in Figure 5. The distribution of samples by producing horizon is listed in Table 3.

Observed data for the variables uranium, specific conductance, 1,000-uranium/specific conductance, boron, chloride, lithium, sodium, selenium, strontium, pH, and sulfate are listed in Table A-3. The figures in Appendix A present log frequency, lognormal probability, percentile, and symbol plots for these variables.

Uranium

The percentile plot (Figure A-1a) indicates the waters produced from the Evangeline aquifer have a higher background range for uranium than groundwater produced from the Chicot aquifer. The symbol plot for uranium (Plate 2 and Figure A-1b) indicates most groundwaters with uranium concentrations greater than the 85th percentile (20.00 ppb) occur in a trend in the western part of Nueces County. One well near the periphery and the two northernmost wells in the trend have been determined to produce from the Chicot aquifer. The remaining 12 wells in the trend have been determined to produce from the Evangeline aquifer.

Figure 5

PRODUCING HORIZON MAP FOR GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Table 3
DISTRIBUTION OF SAMPLES BY GEOLOGIC UNIT FROM THE CORPUS CHRISTI QUADRANGLE

<u>Geologic Member</u>	<u>Geologic Map Code</u>	<u>No. of Groundwater Samples</u>	<u>No. of Sediment Samples</u>
Alluvium Barrier Island Deposits Deweyville Formation	QD	2	1
Windblown Deposits	QWBD	0	5
Chicot Aquifer	AQCH	42	0
Beaumont Formation	QPB	0	39
Lissie Formation	QPLI	0	1
Evangeline Aquifer	AQEV	<u>75</u>	<u>0</u>
Total		119	46

Most groundwater samples collected in San Patricio and Aransas Counties have uranium concentrations less than 0.45 ppb (15th percentile). These waters are produced from the Chicot aquifer. Samples collected around Baffin Bay also have uranium values less than 0.45 ppb and are produced from the Evangeline aquifer.

The correlation matrix (Table A-2) indicates significant positive correlations with coefficients for both Pearson and Spearman correlations greater than 0.35 between uranium and selenium.

Specific Conductance

Figure A-2b indicates that most groundwater samples having specific conductance values greater than 4,638 $\mu\text{mhos/cm}$ (85th percentile) occur in a northwest-southeast trend southwest of Corpus Christi Bay. Samples with specific conductance values less than 1,949 $\mu\text{mhos/cm}$ (15th percentile) generally occur in the southern and extreme northeastern sections of the quadrangle. The percentile plot (Figure A-2a) indicates the waters produced from the Chicot aquifer have higher background values than from the Evangeline aquifer.

The trend of high specific conductance values, located southwest of Corpus Christi Bay, is composed of six wells producing from the Chicot aquifer and five wells producing from the Evangeline aquifer. Groundwaters with low specific conductance values (northeastern and southern sections of the quadrangle) are produced from the Chicot aquifer and the Evangeline aquifer, respectively.

The correlation matrix (Table A-2) indicates significant positive correlations with coefficients for both Pearson and Spearman correlations greater than 0.35 between specific conductance and boron, chloride, lithium, molybdenum, sodium, and sulfate, and a negative correlation between specific conductance and silicon.

Related Variables

In addition to uranium and specific conductance, variables considered useful for interpretation of the data include 1,000-uranium/specific conductance, boron, chloride, lithium, sodium, selenium, strontium, pH, and sulfate. Symbol plots, log frequency, lognormal probability, and percentile plots for these variables are presented in Appendix A.

The area that appears to have the greatest potential for uranium mineralization is the western section of Nueces County. Comparison of the 1,000-uranium/specific conductance symbol plot (Figure A-3b) to the uranium symbol plot (Figure A-1b) indicates a slight difference in the samples considered to have high uranium concentrations. The two northernmost samples shown in the trend on the uranium symbol plot and

determined to produce from the Chicot aquifer, do not have values greater than the 85th percentile on the 1,000-uranium/specific conductance symbol plot. The normalized uranium trend is composed of eight samples, seven of which produce from the Evangeline aquifer and one which produces from the Chicot aquifer. Most of the groundwaters in the trend are basic and have high selenium and strontium values. Selenium and strontium are the only variables listed in Table A-3 that show an association to the trend of high uranium values.

Groundwaters collected from the area southwest of Corpus Christi Bay and to the northeast of the area of anomalous uranium concentrations have high values for specific conductance, boron, chloride, lithium, sodium, and sulfate. The concentrations of these variables may indicate mixing of brines or brackish water with the water in the Chicot aquifer.

Summary of Groundwater Data

The area that appears most promising for potential uranium mineralization is represented by a trend of high 1,000-uranium/specific conductance values in the western part of Nueces County. The groundwaters in this trend are produced from the Evangeline aquifer, except for one sample taken from the Chicot aquifer. High selenium and strontium values are associated with the samples in the trend. An area of saline water is located to the southwest of Corpus Christi Bay and may be associated with improper brine disposal or an influx of brackish water into the Chicot aquifer.

GEOCHEMICAL DISTRIBUTIONS IN STREAM SEDIMENTS

Sample site locations for stream sediments collected in the Corpus Christi Quadrangle are shown on Plate 4. The symbol plot for the hot-acid-soluble uranium as determined by fluorometric analysis (U-FL) and thorium is presented on Plates 5 and 6, and in Figures B-1b and B-4b, respectively. The stream sediment data subset used to generate Tables B-1 and B-2 and the figures in Appendix B included all stream sediment samples collected from basins that average 25 km² (10 mi²). Samples collected from basins larger than 50 km² (Phase G) were not included. The distribution of the stream sediment samples collected from the major stratigraphic units is shown in Table 3. Data for all stream sediment samples collected in the Corpus Christi 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), uranium as determined by neutron activation (U-NT), U-FL/U-NT, thorium, arsenic, chromium, lithium, sodium, nickel, strontium, and zirconium are listed in Table B-3. The figures in Appendix B represent log frequency, log-normal probability, percentile, and symbol plots for these variables.

Uranium

Uranium in stream sediment samples is analyzed in two ways to obtain both U-FL and U-NT. The symbol plot for U-FL (Figure B-1b and Plate 5) indicate that there are six samples that have concentrations above 1.93 ppm (85th percentile). Four of these sediment samples are derived from basins draining the Beaumont Formation and the remaining two sediment samples are derived from basins draining windblown and alluvial deposits. The percentile plot (Figure B-1a) indicates the background range for U-FL is evenly distributed throughout all samples collected. Sediment samples with U-FL values less than 0.92 ppm (15th percentile) are located in the northwestern section of the quadrangle.

The symbol plot for U-NT (Figure B-2b) indicates that concentrations above 2.62 ppm (85th percentile) occur in seven stream sediment samples, five of which are derived from basins draining the Beaumont Formation, one sample which represents windblown deposits, and one sample from alluvial deposits. The percentile plot (Figure B-2a) indicates the samples derived from alluvial and windblown deposits have a higher background range than the samples derived from the Beaumont and Lissie Formations.

The correlation matrix (Table B-2) indicates significant positive correlations with coefficients for both Pearson and Spearman correlations of greater than 0.30 between U-FL and U-NT, calcium, lithium, sodium, strontium, titanium, vanadium, and zirconium. The matrix also indicates a correlation with a coefficient greater than 0.30, between U-NT and U-FL, calcium, strontium, titanium, vanadium, and zirconium.

The symbol plot for U-FL/U-NT (Figure B-3b) indicates that samples having a U-FL/U-NT value greater than 0.88 (85th percentile) occur in the central part of the sampled area, and are derived from the Beaumont Formation. Samples collected in the northern part of the quadrangle have U-FL/U-NT values less than 0.52 (15th percentile). This trend of low values can be traced northward into the Beeville Quadrangle (Uranium Resource Evaluation Project, October 1979) and the sediments appear to be derived from the Beaumont and Lissie Formations.

Thorium

The symbol plot for thorium (Figure B-4b and Plate 6) indicates that most thorium concentrations above 8 ppm (85th percentile) are present as scattered occurrences in sediments derived from the Beaumont Formation. Sediments with concentrations less than 3 ppm (15th percentile) also appear to occur in scattered locations throughout the quadrangle. The percentile plot (Figure B-4a) indicates that the sediments derived from the Beaumont and Lissie Formations have a distinctly higher background range than those collected from the alluvial and windblown deposits.

The correlation matrix (Table B-2) indicates significant positive correlations, with coefficients for both Pearson and Spearman correlations of greater than 0.30 between thorium and cerium, nickel, and yttrium.

Related Variables

Because of the low sample density caused by low relief, poor and artificial (man-made) drainage, farming and ranching activities, oil and natural gas fields, industrial development, and the high probability of contamination, the stream sediment data obtained from the Corpus Christi Quadrangle is apparently inconclusive in determining areas of potential uranium mineralization.

In addition to the low sampling density and probable contamination, other factors considered to complicate the geochemistry, and thus the identification of the area of greatest uranium mineralization potential, are the speculative sources for the origin of the Beaumont Formation and the windblown deposits.

The symbol plots for all variables listed in Table B-3 show clusters of samples having concentrations greater than the 85th percentile that are spatially similar to those samples that have U-FL and U-NT values above the 85th percentile. However, the values for the 85th percentile for U-FL and U-NT, 1.93 and 2.62 ppm, respectively, are very low. Therefore, the area is not considered to be favorable for the occurrence of uranium mineralization.

Summary of Stream Sediment Data

Because of the low sample density and the presence on the surface of Recent-to-Pleistocene strata which have multiple sources, the stream sediment data are considered to be inconclusive for identifying potential areas of uranium mineralization. However, the samples that show U-FL and U-NT values above the 85th percentile are derived from basins draining the Beaumont Formation. This occurrence may be related to the mineralogy of the unit; the Beaumont Formation is predominantly clay while the other surface unit - the windblown deposits - are predominantly sand and silt. Uranium and other elements may be adsorbed onto clay particles and therefore clay-rich units may show enrichment when compared with sandy units.

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APPENDIX A
GROUNDWATER

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APPENDIX A

GROUNDWATER

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Table A-1

STATISTICAL SUMMARY FOR GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

NO. SAMPLES ANALYZED											COEFFICIENT		LN TRANSFORMATION			
		BELOW								OF				ROBUST		
MEASURABLE DETECTION		DETECTION	MINIMUM	MAXIMUM	MEAN	MEDIAN	MODE	STANDARD	DEVIATION	VARIATION	MEAN	S. D.	MEAN	S. D.		
ELEMENT	VALUES	LIMIT	VALUE	VALUE												
U	113	6	<0.20	<0.20	92.38	10.09	4.30	0.46	12.956	1.284	1.40	1.54	1.27	1.59		
SP	119			942	17190	3353	2844	2255	1971.2	0.6	8.00	0.47	8.00	0.46		
U/SP	119			0.03	34.86	3.77	1.58	0.20	5.511	1.463	0.12	1.84	0.15	1.83		
U/B	119			0.04	54.67	6.17	2.14	0.30	9.532	1.544	0.55	1.91	0.58	1.90		
U/SN	119			0.16	10168.00	146.12	32.81	2.67	930.081	6.365	3.07	1.86	3.11	1.78		
AG	42	77	<2	<2	17	5	<2	<2	3.8	0.6	1.58	0.63				
AL	57	62	<10	<10	84	18	<10	<10	12.8	0.7	2.81	0.43				
AS	104	15	<0.5	<0.5	37.8	6.4	3.9	<0.5	5.77	0.90	1.49	0.90	1.28	1.23		
B	119			104	10089	2657	1819	1011	2140.9	0.8	7.57	0.85	7.61	0.87		
BA	118	1	<2	<2	1676	70	13	11	221.2	3.1	2.93	1.26	2.82	1.41		
BE	3	116	<1	<1	1	1	<1	<1	0.0	0.0	0.0	0.0				
CA	119			2.5	281.3	33.6	21.1	16.6	36.95	1.10	3.14	0.84	3.13	0.85		
CO	48	71	<2	<2	9	3	<2	<2	1.8	0.5	1.24	0.45				
CR	15	104	<4	<4	15	7	<4	<4	3.7	0.5	1.94	0.46				
CU	38	81	<2	<2	15	4	<2	<2	3.9	0.9	1.26	0.67				
FE	88	31	<10	<10	481	23	13	15	51.9	2.2	2.82	0.55	2.58	0.53		
K	119			1.2	28.8	5.6	5.2	2.4	3.75	0.67	1.54	0.63	1.53	0.59		
LI	119			11	240	83	75	60	38.3	0.5	4.31	0.51	4.34	0.53		
MG	119			1.0	104.6	13.1	8.0	6.0	15.30	1.17	2.14	0.93	2.13	0.92		
MN	101	18	<2	<2	485	20	5	<2	55.3	2.7	2.08	1.17	1.64	1.54		
MO	102	17	<4	<4	152	29	19	<4	25.6	0.9	3.08	0.78	2.87	1.07		
NA	119			101.2	891.2	349.0	309.5	285.2	137.98	0.40	5.78	0.41	5.79	0.47		
NI	35	84	<4	<4	15	7	<4	<4	3.2	0.4	1.90	0.40				
P	2	117	<40	<40	1435	737	<40	<40	986.4	1.3	5.48	2.53				
SC	45	74	<1	<1	4	1	<1	<1	0.6	0.6	0.08	0.30				
SE	112	7	<0.2	<0.2	5.5	0.7	0.4	0.5	0.79	1.21	-0.72	0.67	-0.84	0.71		
SI	119			0.8	29.8	8.6	7.7	7.7	4.05	0.47	2.07	0.41	2.07	0.38		
SR	119			280	6555	1750	1598	765	1107.9	0.6	7.26	0.68	7.28	0.75		
TI	49	70	<2	<2	16	5	<2	<2	3.1	0.6	1.49	0.59				
V	52	67	<4	<4	29	11	<4	<4	7.0	0.6	2.27	0.60				
Y	38	81	<1	<1	1	1	<1	<1	0.0	0.0	0.0	0.0				
ZN	116	3	<4	<4	1793	67	26	22	181.6	2.7	3.48	0.98	3.38	1.12		
ZR	41	78	<2	<2	8	3	<2	<2	1.6	0.5	1.14	0.43				
T-AK	119			144	400	267	261	226	52.1	0.2	5.57	0.20	5.57	0.20		
M-AK	119			122	400	264	260	270	52.7	0.2	5.56	0.20	5.56	0.21		
P-AK	119			0	92	5	0	0	11.2	2.0						
CL	119			79	2000	530	376	222	409.4	0.8	6.01	0.73	6.01	0.74		
NA/C	119			0.22	3.58	0.93	0.71	0.82	0.616	0.661	-0.23	0.55	-0.25	0.56		
PH	119			4.4	9.2	7.7	7.8	8.0	0.71	0.09						
SO4	116	3	<5	<5	1840	250	175	215	283.2	1.1	5.16	0.85	5.11	1.05		

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NOTE: Refer to Table 1, Page 22 and Table C-1, Page C-4 for concentration units and symbol definitions.

Table A-2

CORRELATION MATRIX FOR GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

CORRELATION MATRIX FOR GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE									
L-U	1.00 (113)								
L-U		L-SE							
L-SE	0.39*** (106)	1.00 (112)							
			L-AS						
L-AS	-0.21** (99)	-0.09 (98)	1.00 (104)						
				L-SR					
L-SR	0.22** (113)	0.38*** (112)	-0.43*** (104)	1.00 (119)					
					L-SP				
L-SP	-0.28*** (113)	0.08 (112)	0.03 (104)	0.43*** (119)	1.00 (119)				
						L-CL			
L-CL	-0.26*** (113)	0.03 (112)	0.08 (104)	0.32*** (119)	0.83*** (119)	1.00 (119)			
							L-LI		
L-LI	-0.09 (113)	0.09 (112)	-0.07 (104)	0.51*** (119)	0.82*** (119)	0.66*** (119)	1.00 (119)		
								L-NA	
L-NA	-0.11 (113)	0.06 (112)	-0.04 (104)	0.44*** (119)	0.85*** (119)	0.67*** (119)	0.92*** (119)	1.00 (119)	
									L-B
L-B	-0.14 (113)	0.07 (112)	0.07 (104)	0.27*** (119)	0.81*** (119)	0.66*** (119)	0.87*** (119)	0.88*** (119)	1.00 (119)
L-MO	-0.09 (98)	-0.02 (96)	0.03 (94)	-0.02 (102)	0.47*** (102)	0.42*** (102)	0.43*** (102)	0.56*** (102)	0.63*** (102)
L-SDA	0.01 (111)	0.19* (109)	-0.16 (101)	0.34*** (116)	0.45*** (116)	0.41*** (116)	0.48*** (116)	0.54*** (116)	0.55*** (116)
L-BA	-0.32*** (112)	-0.32*** (111)	0.07 (103)	-0.27*** (118)	-0.11 (118)	0.00 (118)	-0.22** (118)	-0.21** (118)	-0.25*** (118)
LTAK	-0.12** (113)	-0.13 (112)	0.02 (104)	-0.21** (119)	-0.09 (119)	-0.01 (119)	-0.12 (119)	-0.14 (119)	-0.08 (119)
L-CA	-0.16* (113)	0.01 (112)	-0.01 (104)	0.33*** (119)	0.04 (119)	0.13 (119)	-0.18** (119)	-0.24*** (119)	-0.32*** (119)
L-MG	-0.11 (113)	0.08 (112)	-0.00 (104)	0.45*** (119)	0.19** (119)	0.29*** (119)	0.01 (119)	-0.05 (119)	-0.14 (119)
L-K	0.21** (113)	0.15 (112)	-0.28*** (104)	0.48*** (119)	-0.31*** (119)	-0.22** (119)	-0.31*** (119)	-0.38*** (119)	-0.56*** (119)
L=ZN	0.02 (110)	0.01 (109)	-0.19* (102)	0.21** (116)	-0.09 (116)	-0.11 (116)	-0.10 (116)	-0.16* (116)	-0.19** (116)
L-SI	0.01 (113)	-0.10 (112)	0.27*** (104)	-0.18* (119)	-0.40*** (119)	-0.30*** (119)	-0.42*** (119)	-0.50*** (119)	-0.46*** (119)
PH	0.04 (113)	0.06 (112)	-0.13 (104)	-0.04 (119)	0.14 (119)	0.10 (119)	0.21** (119)	0.24*** (119)	0.33*** (119)

- 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-MD									
1.00									
(102)									
LSO4									
0.59***									
0.60***	1.00								
(102)	(116)								
L-BA									
-0.47***	-0.49***								
-0.50***	-0.59***	1.00							
(101)	(115)	(118)							
LTAK									
-0.19*	-0.47***	0.35***							
-0.23**	-0.54***	0.36***	1.00						
(102)	(116)	(118)	(119)						
L-CA									
-0.39***	-0.21**	0.29***	0.14						
-0.38***	-0.26***	0.32***	0.16*	1.00					
(102)	(116)	(118)	(119)	(119)					
L-MG									
-0.31***	-0.16*	0.20**	0.24***	0.89***					
-0.33***	-0.25***	0.24**	0.27***	0.91***	1.00				
(102)	(116)	(118)	(119)	(119)	(119)				
L-K									
-0.50***	-0.21**	0.05	0.05	0.67***	0.70***				
-0.50***	-0.34***	0.28***	0.09	0.63***	0.65***	1.00			
(102)	(116)	(118)	(119)	(119)	(119)	(119)			
L-ZN									
-0.24**	-0.21**	0.12	0.14	0.46***	0.39***	0.37***			
-0.25**	-0.23**	0.28***	0.16*	0.45***	0.39***	0.44***	1.00		
(100)	(113)	(115)	(116)	(116)	(116)	(116)	(116)		
L-SI									
-0.46***	-0.47***	0.27***	0.45***	0.48***	0.28***	0.31***	0.27***		
-0.39***	-0.50***	0.40***	0.37***	0.46***	0.29***	0.34***	0.19**	1.00	
(102)	(116)	(118)	(119)	(119)	(119)	(119)	(116)	(119)	
PH									
0.18*	0.24***	-0.16*	-0.22**	-0.48***	-0.40***	-0.37***	-0.24***	-0.47***	
0.19*	0.28***	-0.29***	-0.29***	-0.54***	-0.46***	-0.39***	-0.26***	-0.51***	1.00
(102)	(116)	(118)	(119)	(119)	(119)	(119)	(116)	(119)	(119)

Figure A-1a

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

Figure A-1b

GEOCHEMICAL DISTRIBUTION OF URANIUM (PPB)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-2a

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

Figure A-2b

GEOCHEMICAL DISTRIBUTION OF SPECIFIC CONDUCTANCE (μMHOS/CM)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-3a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR $1,000 \cdot \text{URANIUM/SPECIFIC CONDUCTANCE}$ IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-3b

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

Figure A-4a

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

Figure A-4b

GEOCHEMICAL DISTRIBUTION OF BORON (PPB)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-5a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR CHLORIDE (PPM)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-5b

GEOCHEMICAL DISTRIBUTION OF CHLORIDE (PPM)
 IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-6a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR LITHIUM (PPB)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-6b

GEOCHEMICAL DISTRIBUTION OF LITHIUM (PPB)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-7a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SODIUM (PPM)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-7b

GEOCHEMICAL DISTRIBUTION OF SODIUM (PPM)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-8a

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

Figure A-8b

GEOCHEMICAL DISTRIBUTION OF SELENIUM (PPB)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-9a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR STRONTIUM (PPB)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-9b

GEOCHEMICAL DISTRIBUTION OF STRONTIUM (PPB)
 IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-10a

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

Figure A-10b

GEOCHEMICAL DISTRIBUTION OF pH
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Figure A-11a

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

Figure A-11b

GEOCHEMICAL DISTRIBUTION OF SULFATE (PPM)
IN GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

Table A-3

PARTIAL DATA LISTING FOR GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

CORPUS CHRISTI QUADRANGLE - GROUNDWATER																	
OR SAMPLE	D. O. E.	SAMPLE	NUMBER	U	SP	U/SP	B	CL	LI	NA	SE	SR	PH	SO4			
NUMBER	ST	LAT	LONG	L	TY	REP	(PPB)	UMHOS/CM	(PPB)	(PPM)	(PPB)	(PPB)		(PPM)			
38002	48-27.649	-	97.585	-3-03-			1.1	3500	0.32	5900	320	100	460.	0.6	1700	8.0	260
38008	48-27.589	-	97.454	-3-03-			1.7	4900	0.34	6100	330	110	570.	0.5	2100	7.9	370
38009	48-27.586	-	97.534	-3-03-			2.3	3200	0.72	4600	190	71	410.	0.6	570	8.2	160
38010	48-27.593	-	97.593	-3-03-			1.3	2900	0.45	3200	170	75	400.	0.5	1200	8.2	160
38012	48-27.679	-	97.667	-3-03-			2.4	2700	0.91	2500	140	78	390.	0.4	890	8.2	120
38013	48-27.689	-	97.618	-3-03-			1.1	3100	0.37	4000	170	92	420.	0.3	910	8.3	170
38015	48-27.504	-	97.878	-3-03-			10.	1900	5.5	1000	230	57	270.	0.3	1800	7.6	130
38040	48-27.974	-	97.096	-3-03-			25.	1000	25.	470	150	20	130.	0.4	310	7.7	<5
38041	48-27.920	-	97.139	-3-03-			0.38	990	0.38	130	110	11	110.	0.3	280	7.4	<5
38043	48-27.964	-	97.245	-3-03-			0.29	6900	0.04	8000	1500	120	710.	0.3	1300	7.7	1800
38044	48-27.913	-	97.187	-3-03-			3.7	1500	2.4	620	260	30	180.	0.3	560	7.4	61
38045	48-27.965	-	97.143	-3-03-			<0.20	940	0.11	150	130	12	100.	0.2	350	7.3	<5
38047	48-27.932	-	97.213	-3-03-			4.6	3400	1.4	7600	1800	160	890.	0.4	4800	7.2	1400
38050	48-27.873	-	97.194	-3-03-			0.48	2300	0.21	290	390	34	170.	0.3	1000	7.4	64
38051	48-27.827	-	97.064	-3-03-			0.56	1600	0.34	290	200	11	130.	0.5	530	6.9	83
38052	48-27.827	-	97.222	-3-03-			<0.20	2500	0.04	190	490	33	230.	0.3	700	7.0	12
38056	48-27.984	-	97.398	-3-03-			<0.20	3300	0.03	2800	640	100	420.	0.2	350	7.9	93
38057	48-27.986	-	97.357	-3-03-			0.42	4200	0.10	3800	940	120	460.	0.2	330	9.2	90
38062	48-27.985	-	97.322	-3-03-			0.84	5100	0.17	5700	1300	110	520.	0.2	750	7.7	16
38063	48-27.968	-	97.445	-3-03-			0.61	4300	0.14	5400	920	120	450.	0.2	730	7.8	93
38064	48-27.323	-	97.792	-3-03-			44.	1900	23.	920	230	67	240.	1.0	2200	7.2	150
38065	48-27.288	-	97.663	-3-03-			0.39	3200	0.12	1200	390	78	310.	0.3	1200	7.9	800
38066	48-27.282	-	97.731	-3-03-			0.30	2400	0.13	1100	330	82	310.	<0.2	1700	7.7	190
38067	48-27.343	-	97.745	-3-03-			11.	2100	5.4	1000	270	67	260.	0.5	2200	7.7	180
38070	48-27.365	-	97.706	-3-03-			0.32	2200	0.15	1200	310	74	290.	0.2	2000	7.7	160
38071	48-27.407	-	97.744	-3-03-			4.7	2200	2.1	990	310	60	250.	5.4	1700	8.0	210
38072	48-27.696	-	97.938	-3-03-			4.7	2500	1.9	1700	390	69	300.	0.4	770	7.8	150
38088	48-27.827	-	97.723	-3-03-			2.8	4300	0.64	2500	800	130	450.	0.4	1800	7.1	300
38089	48-27.874	-	97.724	-3-03-			3.9	4100	0.95	2900	720	120	420.	<0.2	2200	7.1	350
38091	48-27.872	-	97.661	-3-03-			1.8	7400	0.25	6900	1500	200	630.	<0.2	1800	7.3	650
38092	48-27.767	-	97.717	-3-03-			3.4	5000	0.69	4700	750	140	510.	0.4	1300	7.6	670
38093	48-27.768	-	97.671	-3-03-			18.	5900	3.1	3100	1300	130	520.	0.8	4400	7.1	250
38094	48-27.787	-	97.623	-3-03-			0.21	6900	0.03	5700	1400	190	610.	<0.2	2600	8.1	630
38097	48-27.929	-	97.608	-3-03-			2.8	2300	1.2	450	140	28	110.	0.3	770	7.6	65
38098	48-27.966	-	97.711	-3-03-			2.0	1800	1.1	1400	260	49	220.	0.2	290	7.7	36
38099	48-27.964	-	97.669	-3-03-			6.2	1700	3.8	1200	220	54	170.	0.7	800	7.4	68
38100	48-27.970	-	97.561	-3-03-			0.49	6100	0.08	2800	1400	150	430.	0.5	3500	7.0	220
38101	48-27.974	-	97.506	-3-03-			0.31	8900	0.04	8200	2000	240	630.	0.3	3000	7.9	14
38103	48-27.963	-	97.615	-3-03-			0.21	4400	0.05	4400	920	140	430.	0.4	1100	8.1	120
38104	48-27.924	-	97.700	-3-03-			5.8	1900	3.3	1400	250	54	210.	0.3	390	7.8	47
38105	48-27.753	-	97.603	-3-03-			0.59	4500	0.13	9100	740	130	460.	0.4	750	7.8	360
38106	48-27.898	-	97.731	-3-03-			7.6	3900	2.0	3300	650	160	420.	0.3	1000	8.1	290
38107	48-27.925	-	97.501	-3-03-			2.5	1200	2.1	430	210	25	100.	0.3	750	8.1	70
38108	48-27.802	-	97.696	-3-03-			8.3	4700	1.8	3300	740	110	450.	0.4	2700	7.3	540
38109	48-27.914	-	97.576	-3-03-			1.8	3200	0.57	1800	610	58	290.	0.4	620	7.1	32
38110	48-27.710	-	97.824	-3-03-			28.	5300	5.2	3500	1100	110	460.	0.5	6600	7.8	300
38111	48-27.748	-	97.817	-3-03-			11.	4100	2.8	3000	720	100	400.	0.6	2200	8.1	180
38112	48-27.739	-	97.759	-3-03-			35.	3700	9.4	2700	640	96	400.	0.7	2200	8.1	190
38114	48-27.629	-	97.770	-3-03-			41.	2600	16.	1900	350	74	290.	0.9	2100	8.6	250
38115	48-27.620	-	97.863	-3-03-			13.	2800	4.7	1800	430	68	290.	3.4	2500	8.1	200
38117	48-27.657	-	97.914	-3-03-			11.	3800	3.0	2200	700	91	360.	1.2	4700	7.8	210
38118	48-27.730	-	97.905	-3-03-			26.	3700	6.9	2300	690	75	360.	0.4	2100	8.0	180
38120	48-27.708	-	97.780	-3-03-			92.	2600	35.	1900	340	72	280.	1.2	2200	8.2	220
38121	48-27.672	-	97.852	-3-03-			17.	4200	4.0	3300	730	120	400.	1.2	3200	8.2	180
38123	48-27.729	-	97.980	-3-03-			18.	3100	6.0	2200	480	73	300.	1.5	2000	7.9	180

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

CORPUS CHRISTI QUADRANGLE - GROUNDWATER														
OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPB)	SP UMHOS/CM	U/SP	B (PPB)	CL (PPM)	LI (PPB)	NA (PPM)	SE (PPB)	SR (PPB)	PH	SO4 (PPM)
38124	48-27.662	- 97.797	-3-03-	39.	2500	16.	1800	610	67	270.	1.5	2400	8.3	200
38125	48-27.621	- 97.810	-3-03-	31.	2300	13.	1700	290	66	270.	0.9	2000	8.4	220
38126	48-27.542	- 97.854	-3-03-	12.	2100	5.6	1300	270	51	220.	0.3	2100	8.0	140
38130	48-27.588	- 97.762	-3-03-	28.	2300	12.	1500	300	60	250.	1.2	1400	8.3	180
38131	48-27.577	- 97.811	-3-03-	12.	2200	9.3	1400	300	56	250.	0.9	2500	8.2	180
38133	48-27.499	- 97.825	-3-03-	12.	2100	5.6	1300	210	59	230.	0.3	2600	8.0	270
38134	48-27.930	- 97.658	-3-03-	0.74	2000	0.38	1500	230	57	200.	0.3	570	7.4	220
38136	48-27.885	- 97.664	-3-03-	0.82	6200	0.13	3800	1100	98	480.	0.6	1500	7.5	200
38137	48-27.207	- 97.786	-3-03-	18.	1300	14.	820	79	60	210.	0.3	2200	7.8	73
38139	48-27.340	- 97.695	-3-03-	<0.20	1900	0.05	1100	170	78	290.	0.2	1900	8.0	120
38148	48-27.814	- 97.775	-3-03-	12.	4600	2.7	2700	350	120	500.	1.1	3400	6.2	160
38151	48-27.931	- 97.778	-3-03-	16.	1400	12.	840	99	41	150.	0.6	970	6.9	53
38153	48-27.982	- 97.778	-3-03-	3.8	2900	1.3	1200	210	67	340.	0.4	1100	5.7	66
38155	48-27.993	- 97.838	-3-03-	15.	2800	5.3	1300	160	83	280.	0.6	2200	4.4	53
38159	48-27.766	- 97.814	-3-03-	24.	2800	8.6	2100	160	78	400.	0.9	1600	8.6	87
38162	48-27.818	- 97.865	-3-03-	25.	4600	5.4	3300	380	120	510.	0.9	3600	8.8	150
38163	48-27.774	- 97.892	-3-03-	27.	3000	9.1	1900	180	100	390.	0.6	2000	8.4	87
38164	48-27.855	- 97.791	-3-03-	23.	3700	6.2	2600	280	90	430.	0.7	2100	8.2	140
38165	48-27.688	- 97.501	-3-03-	1.1	4400	0.25	6900	570	110	400.	0.5	1000	8.6	330
38167	48-27.712	- 97.554	-3-03-	0.41	9100	0.05	10000	1400	190	650.	0.3	3100	8.8	810
38169	48-27.652	- 97.545	-3-03-	0.74	3600	0.21	5100	620	76	380.	0.5	1100	8.0	330
38170	48-27.688	- 97.561	-3-03-	14.	4400	3.3	7100	790	120	520.	0.4	1100	8.8	560
38171	48-27.740	- 97.646	-3-03-	5.4	3900	1.4	5800	740	100	390.	0.4	630	8.4	360
38172	48-27.966	- 97.867	-3-03-	0.78	4900	0.16	1200	1300	98	280.	0.4	4800	6.8	140
38175	48-27.878	- 97.875	-3-03-	1.8	2100	0.88	2700	340	52	240.	0.5	730	7.7	120
38176	48-27.880	- 97.828	-3-03-	0.66	2900	0.23	2400	500	61	310.	0.4	1600	7.6	220
38177	48-27.780	- 97.983	-3-03-	0.69	3400	0.20	1800	690	82	340.	0.5	2100	8.5	170
38179	48-27.841	- 97.950	-3-03-	0.29	3400	0.09	1800	610	82	320.	0.3	2500	8.0	220
38180	48-27.838	- 97.975	-3-03-	0.93	2800	0.34	1700	430	63	290.	0.6	1600	7.5	190
38181	48-27.880	- 97.984	-3-03-	<0.20	2600	0.04	2000	360	60	260.	0.3	1200	8.0	80
38183	48-27.783	- 97.951	-3-03-	4.0	5000	0.79	2800	1200	98	410.	1.1	3900	8.0	320
38185	48-27.929	- 97.982	-3-03-	1.4	3300	0.42	1400	480	62	230.	0.5	950	7.0	75
38186	48-27.968	- 97.928	-3-03-	1.7	3400	0.50	1800	550	57	250.	0.4	1500	6.7	110
38187	48-27.975	- 97.975	-3-03-	<0.20	3400	0.03	1500	600	61	250.	0.4	1400	7.2	81
38188	48-27.927	- 97.935	-3-03-	0.72	2700	0.27	1300	390	52	220.	0.4	940	7.2	90
38189	48-27.911	- 97.894	-3-03-	0.45	2400	0.19	1700	320	54	210.	0.4	860	7.4	100
38190	48-27.782	- 97.763	-3-03-	2.4	5600	0.42	2700	1100	99	440.	0.9	4300	8.0	360
38191	48-27.662	- 97.452	-3-03-	0.82	17000	0.05	9500	1700	160	720.	0.3	2900	8.1	1800
38192	48-27.296	- 97.808	-3-03-	0.61	2000	0.30	950	230	53	210.	0.8	1600	6.5	170
38193	48-27.298	- 97.773	-3-03-	20.	2100	9.6	1100	220	77	310.	0.2	1300	7.6	160
38194	48-27.343	- 97.827	-3-03-	33.	2000	17.	930	210	60	260.	0.2	1900	7.7	110
38196	48-27.351	- 97.776	-3-03-	4.8	1900	2.5	990	230	67	290.	0.2	1600	8.5	95
38198	48-27.401	- 97.822	-3-03-	10.	2000	4.9	890	200	61	280.	<0.2	2600	7.9	200
38199	48-27.398	- 97.777	-3-03-	16.	2200	7.5	920	230	64	300.	0.2	2300	7.1	200
38202	48-27.459	- 97.823	-3-03-	12.	2000	5.7	1100	220	66	290.	1.3	2000	7.6	130
38203	48-27.469	- 97.782	-3-03-	17.	2400	7.2	1500	230	85	330.	2.0	2500	8.0	210
38204	48-27.448	- 97.865	-3-03-	9.4	1900	5.0	1000	180	61	270.	<0.2	2400	7.8	130
38205	48-27.389	- 97.880	-3-03-	6.5	2300	2.8	970	240	62	290.	0.8	2700	7.0	130
38207	48-27.450	- 97.908	-3-03-	8.1	1800	4.5	1000	180	56	250.	0.2	1600	7.5	110
38208	48-27.493	- 97.887	-3-03-	7.3	2200	3.3	1100	260	63	290.	<0.2	2700	7.5	130
38220	48-27.688	- 97.714	-3-03-	14.	3100	4.6	2500	520	67	340.	0.5	1500	6.0	290
38222	48-27.747	- 97.749	-3-03-	14.	4100	3.3	2700	760	85	380.	5.5	2100	8.0	330
38223	48-27.743	- 97.700	-3-03-	16.	2400	6.7	3100	740	94	400.	0.5	1800	7.8	470
38224	48-27.727	- 97.669	-3-03-	17.	3800	4.4	3900	680	82	370.	0.4	530	8.4	330
38227	48-27.639	- 97.718	-3-03-	23.	2600	8.6	2100	440	73	300.	0.4	550	8.6	280

Table A-3, Continued

PARTIAL DATA LISTING FOR GROUNDWATER OF THE CORPUS CHRISTI QUADRANGLE

CORPUS CHRISTI QUADRANGLE - GROUNDWATER													
OR SAMPLE	D. O. E.	SAMPLE	NUMBER	U	SP	U/SP	B	CL	LI	NA	SE	SR	PH
NUMBER	ST	LAT	LONG	L TY REP	(PPB)	UMHDS/CM	(PPB)	(PPM)	(PPB)	(PPM)	(PPB)	(PPB)	(PPM)
38228	48-27.633	-	97.666	-3-03-	15.	2400	6.4	1700	410	58	270.	0.4	370
38229	48-27.641	-	97.635	-3-03-	20.	3100	6.4	4000	500	70	350.	2.1	920
38230	48-27.563	-	97.745	-3-03-	23.	2300	10.	1300	330	56	250.	0.5	820
38231	48-27.599	-	97.726	-3-03-	7.5	2400	3.1	1600	350	82	360.	0.3	760
38233	48-27.575	-	97.706	-3-03-	2.1	2700	0.77	1700	420	100	410.	0.9	1700
38234	48-27.585	-	97.663	-3-03-	1.3	2500	0.50	1800	100	79	360.	0.5	860
38235	48-27.610	-	97.632	-3-03-	1.6	2900	0.56	2900	140	86	430.	0.4	1100
38236	48-27.572	-	97.502	-3-03-	6.6	3500	1.8	4200	670	87	510.	0.2	1400
38238	48-27.615	-	97.502	-3-03-	9.7	4300	2.0	7300	860	120	620.	0.3	2200

APPENDIX B
STREAM SEDIMENT

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APPENDIX B

STREAM SEDIMENT

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Table B-1

STATISTICAL SUMMARY FOR STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

NO. SAMPLES ANALYZED		BELOW										COEFFICIENT		LN TRANSFORMATION			
MEASURABLE		DETECTION	DETECTION	MINIMUM	MAXIMUM	MEAN	MEDIAN	MODE	STANDARD	OF	MEAN	S. D.	ROBUST				
ELEMENT	VALUES	LIMIT	LIMIT	VALUE	VALUE				DEVIATION	VARIATION			MEAN	S. D.			
U-FL	45			0.50	3.39	1.44	1.38	1.48	0.532	0.370	0.30	0.37	0.30	0.39			
U-NT	46			0.80	3.80	1.99	1.80	1.60	0.624	0.314	0.64	0.31	0.65	0.31			
TH	42	3	<2	<2	13	5	4	5	2.7	0.5	1.51	0.52	1.46	0.62			
U/TU	45			0.29	1.27	0.73	0.72	0.85	0.184	0.251	-0.34	0.27	-0.33	0.25			
TH/U	45			0.53	6.88	2.60	2.31	1.53	1.593	0.612	0.76	0.66	0.77	0.74			
AG	1	44	<2	<2	2	2	<2	<2	0.0	0.0	0.69	0.0					
AL	45			0.75	5.28	2.92	2.89	2.82	0.942	0.322	1.01	0.38	1.04	0.37			
AS	44	1	<0.1	<0.1	14.2	3.1	2.5	2.4	2.33	0.75	0.92	0.70	0.91	0.72			
B	39	6	<10	<10	237	29	16	15	37.1	1.3	3.08	0.65	2.85	0.70			
BA	45			244	2439	436	345	312	348.7	0.8	5.95	0.43	5.90	0.40			
BE	43	2	<1	<1	6	1	<1	<1	1.1	0.9	0.10	0.39					
CA	45			0.10	5.23	1.35	0.97	0.56	1.152	0.830	-0.01	0.87	0.01	0.89			
CE	45			11	54	33	33	40	9.4	0.3	3.45	0.33	3.47	0.37			
CO	23	22	<4	<4	7	4	<4	<4	1.1	0.2	1.53	0.21					
CR	45			5	32	17	16	12	5.3	0.3	2.79	0.34	2.80	0.34			
CU	45			2	15	7	7	10	2.7	0.4	1.94	0.43	1.97	0.42			
FE	45			0.21	2.37	1.21	1.19	1.31	0.445	0.367	0.11	0.45	0.14	0.47			
K	45			0.38	1.21	0.77	0.74	0.68	0.180	0.235	-0.29	0.24	-0.29	0.24			
LI	45			6	33	15	15	14	5.6	0.4	2.71	0.35	2.72	0.36			
MG	44	1	<0.05	<0.05	1.05	0.43	0.37	0.37	0.206	0.476	-0.96	0.52	-0.96	0.63			
MN	45			82	748	268	239	251	139.4	0.5	5.49	0.44	5.48	0.43			
MO	0	45	<4	<4	<4	<4	<4	<4									
NA	45			0.20	2.77	0.52	0.36	0.37	0.462	0.885	-0.87	0.59	-0.91	0.65			
NB	39	6	<4	<4	19	6	6	6	3.1	0.5	1.86	0.34	1.74	0.52			
NI	45			2	16	6	7	7	3.0	0.4	1.85	0.45	1.86	0.47			
P	45			50	562	203	189	289	91.6	0.4	5.22	0.46	5.23	0.40			
SC	44	1	<1	<1	6	3	3	2	1.2	0.4	1.10	0.42	1.12	0.36			
SE	36	9	<0.1	<0.1	1.8	0.4	0.3	0.3	0.29	0.64	-0.93	0.45	-1.12	0.57			
SR	45			37	722	118	86	61	110.7	0.9	4.55	0.60	4.52	0.61			
TI	45			341	7005	2021	1836	1774	937.9	0.5	7.53	0.42	7.55	0.36			
V	45			8	67	32	32	35	11.2	0.3	3.41	0.40	3.43	0.39			
Y	45			3	15	10	10	11	2.8	0.3	2.26	0.33	2.28	0.33			
ZN	45			9	119	38	33	45	21.3	0.6	3.52	0.49	3.52	0.50			
ZR	45			14	85	55	57	61	14.5	0.3	3.98	0.34	4.01	0.36			

B-7

NOTE: Refer to Table 1, Page 22 and Table C-1, Page C-4 for concentration units and symbol definitions.

Table B-2

CORRELATION MATRIX FOR STREAM SEDIMENT
OF THE LAKEVIEW DETAILED GEOCHEMICAL SURVEY, OREGON

[illegible]

- 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-AS

1.00
(44)

L-CA

0.70***
0.65***
(44)

1.00
(45)

L-TM

0.20
0.18
(41)

0.24
0.22
(42)

1.00
(42)

L-NI

0.72***
0.67***
(44)

0.57***
0.52***
(45)

0.40***
0.42***
(42)

1.00
(45)

L-ZN

0.70***
0.55***
(44)

0.52***
0.40***
(45)

0.35**
0.35**
(42)

0.89***
0.89***
(45)

1.00
(45)

L-LI

0.80***
0.71***
(44)

0.69***
0.66***
(45)

0.32**
0.33**
(42)

0.89***
0.86***
(45)

0.88***
0.84***
(45)

1.00
(45)

L-AL

0.74***
0.64***
(44)

0.59***
0.51***
(45)

0.36**
0.41***
(42)

0.92***
0.92***
(45)

0.90***
0.91***
(45)

0.53***
0.53***
(45)

1.00
(45)

L-CU

0.61***
0.51***
(44)

0.43***
0.31**
(45)

0.32**
0.39**
(42)

0.88***
0.83***
(45)

0.86***
0.92***
(45)

0.80***
0.74***
(45)

0.91***
0.85***
(45)

1.00
(45)

L-MG

0.59***
0.56***
(43)

0.58***
0.61***
(44)

0.16
0.16
(42)

0.80***
0.75***
(44)

0.75***
0.71***
(44)

0.87***
0.84***
(44)

0.82***
0.78***
(44)

0.73***
0.59***
(44)

1.00
(44)

L-K

0.42***
0.27*
(44)

0.42***
0.36**
(45)

0.28*
0.30*
(42)

0.74***
0.66***
(45)

0.73***
0.71***
(45)

0.71***
0.64***
(45)

0.76***
0.71***
(45)

0.79***
0.73***
(45)

0.65***
0.61***
(44)

1.00
(45)

L-P

0.48***
0.28*
(44)

0.50***
0.41***
(45)

0.34***
0.34**
(42)

0.74***
0.64***
(45)

0.79***
0.79***
(45)

0.75***
0.67***
(45)

0.80***
0.76***
(45)

0.78***
0.71***
(45)

0.57***
0.53***
(44)

0.77***
0.69***
(45)

1.00
(45)

L-MN

0.35**
0.31**
(44)

0.42***
0.37**
(45)

0.24
0.25
(42)

0.56***
0.61***
(45)

0.55***
0.59***
(45)

0.53***
0.51***
(45)

0.50***
0.57***
(45)

0.45***
0.50***
(45)

0.60***
0.65***
(44)

0.48***
0.56***
(45)

0.45***
0.49***
(45)

1.00
(45)

Figure B-1a

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

Figure B-1b

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

Figure B-2a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR URANIUM BY NEUTRON ACTIVATION
IN STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

Figure B-2b

GEOCHEMICAL DISTRIBUTION OF URANIUM BY NEUTRON ACTIVATION
IN STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

Figure B-3a

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

Figure B-3b

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

Figure B-4a

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

Figure B-4b

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

Figure B-5a

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

Figure B-5b.

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

Figure B-6a

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

Figure B-6b

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

Figure B-7a

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

Figure B-7b

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

Figure B-8a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR SODIUM (%)
IN STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

Figure B-8b

GEOCHEMICAL DISTRIBUTION OF SODIUM (%)
IN STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

Figure B-9a

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

Figure B-9b

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

Figure B-10a

PROBABILITY, FREQUENCY, AND PERCENTILE PLOTS FOR STRONTIUM (PPM)
IN STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

Figure B-11a

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

Figure B-11b

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

Table B-3

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

OR SAMPLE NUMBER	D. O. E. ST LAT	SAMPLE LONG	NUMBER L TY REP	U (PPM)	U-NT (PPM)	U/TU	TH (PPM)	AS (PPM)	CR (PPM)	LI (PPM)	NA (%)	NI (PPM)	SR (PPM)	ZR (PPM)
38000	48-27.722	- 97.458	-3-12-	1.1	1.7	0.65	5	3.2	13	11	0.42	6	120	43
38001	48-27.709	- 97.437	-3-15-	1.7	2.3	0.75	<2	8.1	17	18	0.39	8	130	51
38003	48-27.593	- 97.610	-3-12-	1.3	1.8	0.73	28	6.5	38	26	1.1	13	990	63
38004	48-27.616	- 97.664	-3-12-	0.94	1.9	0.49	8	3.2	14	12	0.50	7	130	47
38005	48-27.599	- 97.664	-3-12-	2.0	2.3	0.87	9	5.0	27	21	0.79	13	160	78
38006	48-27.592	- 97.664	-3-12-	2.3	2.8	0.84	2	4.2	21	19	0.51	8	110	66
38011	48-27.669	- 97.696	-3-15-	1.3	1.3	0.98	2	4.4	14	14	0.36	6	88	43
38014	48-27.764	- 97.529	-3-15-	1.7	3.6	0.48	4	4.1	14	15	1.7	7	250	73
38042	48-27.929	- 97.187	-3-12-	1.5	2.0	0.73	5	1.5	17	14	0.34	6	68	53
38048	48-27.940	- 97.209	-3-15-	1.1	1.5	0.71	2	2.4	16	15	0.25	7	60	53
38049	48-27.964	- 97.208	-3-12-	1.5	2.3	0.65	3	2.5	14	14	0.29	4	59	58
38053	48-27.986	- 97.266	-3-12-	1.5	2.2	0.67	5	2.8	16	15	0.48	5	93	54
38054	48-27.986	- 97.294	-3-12-	2.0	2.6	0.76	4	2.5	13	13	0.53	4	100	57
38055	48-27.997	- 97.325	-3-12-	1.8	2.4	0.735	2	2.2	17	17	0.37	5	120	65
38058	48-27.941	- 97.482	-3-15-	1.6	1.9	0.85	<2	4.7	24	24	0.21	9	62	71
38059	48-27.998	- 97.437	-3-12-	1.5	1.8	0.84	8	<0.1	19	16	0.29	7	72	55
38060	48-27.897	- 97.477	-3-15-	1.1	1.6	0.68	6	3.6	13	13	0.37	5	67	42
38061	48-27.891	- 97.453	-3-15-	1.1	2.8	0.39	2	3.7	14	11	0.31	4	150	73
38068	48-27.332	- 97.719	-3-12-	0.76	0.98	0.84	3	1.9	10	10	1.0	5	93	25
38090	48-27.897	- 97.731	-3-15-	1.3	1.9	0.66	9	1.5	13	13	0.54	5	85	51
38095	48-27.785	- 97.592	-3-15-	1.3	2.1	0.61	13	2.5	17	16	0.33	7	84	57
38096	48-27.930	- 97.604	-3-15-	0.77	1.6	0.48	7	2.5	15	14	0.36	7	64	51
38102	48-27.900	- 97.513	-3-15-	1.9	2.3	0.84	6	4.1	17	20	0.53	9	130	55
38113	48-27.740	- 97.764	-3-15-	2.3	2.4	0.95	3	1.5	18	16	0.70	6	92	78
38116	48-27.611	- 97.667	-3-15-	1.4	1.6	0.91	4	3.0	20	15	0.33	9	85	61
38119	48-27.729	- 97.905	-3-15-	1.4	1.8	0.78	6	4.0	31	22	0.25	15	91	78
38127	48-27.551	- 97.841	-3-15-	1.6	2.0	0.79	2	2.5	260	14	0.51	83	250	74
38128	48-27.566	- 97.795	-3-12-	1.4	1.5	0.93	6	3.3	21	18	0.87	10	150	62
38129	48-27.565	- 97.789	-3-15-	1.5	2.2	0.68	4	3.6	18	17	0.40	7	87	60
38132	48-27.535	- 97.878	-3-15-	2.2	2.1	1.0	3	2.2	17	19	1.0	6	170	55
38135	48-27.932	- 97.662	-3-15-	1.9	3.8	0.51	6	1.5	15	7	0.42	2	60	72
38138	48-27.742	- 97.932	-3-15-	0.73	1.4	0.52	5	0.6	13	9	0.26	5	45	40
38140	48-27.272	- 97.803	-3-12-	0.86	1.6	0.54	6	0.5	11	11	1.1	5	210	32
38149	48-27.910	- 97.795	-3-12-	2.2	2.9	0.77	8	2.6	17	18	0.71	7	290	57
38150	48-27.908	- 97.792	-3-15-	1.1	1.8	0.63	5	2.7	19	19	0.55	8	120	56
38152	48-27.938	- 97.776	-3-12-	1.4	2.2	0.65	9	2.1	17	17	0.74	6	160	61
38154	48-27.955	- 97.839	-3-15-	1.6	2.0	0.80	6	1.7	13	11	0.31	6	57	52
38156	48-27.990	- 97.839	-3-15-	0.50	1.7	0.29	<2	0.2	5	6	0.20	2	37	14
38157	48-27.934	- 97.875	-3-15-	1.7	1.7	0.98	3	1.6	19	14	0.21	7	44	62
38158	48-27.811	- 97.784	-3-15-	1.0	0.80	1.3	3	2.5	9	9	0.29	3	58	26
38160	48-27.797	- 97.869	-3-12-	1.3	1.6	0.78	2	1.9	16	12	0.23	7	56	55
38166	48-27.709	- 97.502	-3-15-	3.4	3.1	1.1	5	5.3	23	21	0.81	10	160	85
38168	48-27.716	- 97.526	-3-15-		1.8									
38173	48-27.894	- 97.879	-3-12-	1.3	1.6	0.84	4	2.2	20	15	0.20	7	60	61
38178	48-27.835	- 97.951	-3-12-	0.70	1.2	0.58	2	2.0	11	11	0.25	4	47	41
38182	48-27.874	- 97.946	-3-15-	0.97	1.5	0.65	<2	1.2	14	13	0.26	5	54	54
38184	48-27.925	- 97.957	-3-12-	0.75	1.6	0.47	11	2.8	20	14	0.21	9	47	60
38195	48-27.357	- 97.760	-3-15-	2.4	3.0	0.80	5	1.7	15	19	1.4	6	300	51
38197	48-27.398	- 97.811	-3-12-	1.5	2.0	0.74	3	1.0	8	11	0.95	3	190	27
38200	48-27.422	- 97.796	-3-15-	1.6	2.1	0.74	6	2.0	22	18	0.39	8	110	64
38201	48-27.447	- 97.769	-3-12-	0.82	2.3	0.36	6	1.0	14	8	0.41	<2	84	56
38206	48-27.469	- 97.868	-3-12-	1.4	2.0	0.68	3	1.0	13	12	0.51	5	180	39
38221	48-27.687	- 97.712	-3-15-	1.8	1.8	0.99	5	7.7	24	31	2.8	12	720	62
38225	48-27.697	- 97.660	-3-15-	1.2	1.8	0.67	4	6.8	24	26	0.30	11	110	67
38226	48-27.696	- 97.658	-3-15-	1.1	1.7	0.66	10	5.6	26	25	0.29	13	94	68

Table B-3, Continued

PARTIAL DATA LISTING FOR STREAM SEDIMENT OF THE CORPUS CHRISTI QUADRANGLE

DR	SAMPLE	D.	O.	E.	SAMPLE	NUMBER		J	U-NT	W/TU	TH	AS	CR	LI	NA	NI	SR	ZR
NUMBER	ST	LAT		LONG	L	TY	REP	(PPM)	(PPM)		(PPM)	(PPM)	(PPM)	(PPM)	(%)	(PPM)	(PPM)	(PPM)
38232	48-27.561	-	97.727	-3-15-				1.1	1.7	0.64	10	14.	32	33	0.31	16	160	77
33237	48-27.560	-	97.543	-3-15-				1.2	1.7	0.71	4	2.0	21	18	0.41	8	77	60

APPENDIX C
MICROFICHE OF FIELD AND LABORATORY DATA

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APPENDIX C

MICROFICHE OF FIELD AND LABORATORY DATA

LIST OF TABLES

<u>No.</u>	<u>Title</u>	<u>Page</u>
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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	U-NT/U-FL	U/U, TUU
Phosphorus	P	U-FL/U-NT	U/TU
Lead	PB	TH/U-NT	TH/U
Platinum	PT	1,000·U/SP	U/SP
Scandium	SC	1,000·U/B	U/B
Silicon	SI	1,000·U/SO	U/SO, USO
Strontium	SR		

(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

1	Card Number
---	-------------

GENERAL SITE DATA

Attach Identical Sample Number Here									
2	3	4	5	6	7	8	9	10	11

8	9	10	11
---	---	----	----

Site Number

12	13	14	15	16	17
----	----	----	----	----	----

Map Code

Sample Type

18		
M	Stream Sediment	
H	Lake Sediment	
S	Stream Water	
W	Well Water	
P	Spring Water	
L	Lake Water	
A	Bog Water	
B	Plant	
F	Soil (Use Remarks)	
G	Rock	
Q	Other	

19	
----	--

Replicate Letter (A-Z)

Hour	Day	Month	Year
20	21	22	23
24	25	26	27

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

Collector's Initials

21	
----	--

Phase (P, 1, 2, or G)

32	Field Sheet Status
Q	Original
C	Correction
V	Voiding

33	Control Sample
A	Sediment, High U
B	Sediment, Low U
C	Water, High U
D	Water, Low U
Q	Other

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

Air Temperature (°C)

Latitude			Longitude		
Deg.	Min.	Sec.	Deg.	Min.	Sec.
38	39	40	41	42	43
44	45	46	47	48	49
50					

51	52	53	54
----	----	----	----

Surface Geologic Unit Code

Type of Vegetation

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

Density of Vegetation

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

Local Relief

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

Weather

59		59	
C	Calm	C	Clear
P	Lt Wind	L	Pt Cldy
V	Windy	W	Overcast
R	V. Windy	V	Rainy
S	Gale	G	Snowy

Classes of Contaminants

60	
N	None
M	Mining
A	Agriculture
F	Oil Field
I	Industry
S	Sewage
P	Power Plant
U	Urban
Q	Other

(Use Remarks)

Average Stream Velocity (in/sec)

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

N = No Visible Movement
P = Stagnant Pool

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

Water Width (m)

67	68	69
----	----	----

Average Depth (m)

Water Level

70		70	
D	Dry	N	Normal
P	Pools	H	High
L	Low	F	Flood

Dominant Bed Material

71	
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
----	----	----	----	----

V V Lt L Light M Medium D Dark CL Clear WH White YL Yellow QR Orange

PK Pink RD Red GN Green BU Blue BN Brown GY Gray BK Black QT Other

77	Odor of Sampled Material
N	None
S	H ₂ S
Q	Other

78	Results Request
R	(Use Remarks)

1	Card Number
---	-------------

PLANT SAMPLE

18	19
----	----

Number of Plants Sampled
(Number of grabs for moss)

20	21	22
----	----	----

Trunk Diameter (m)
(1 m above ground)

23	24	25
----	----	----

Plant Height (m)
(Average of Plants Sampled)

Name of Tree, Deciduous

26		26	
R	Alto Verde	U	Locust
A	Ash	P	Maple
B	Beech	M	Mesquite
I	Birch	K	Oak, Other
D	Box Elder	V	Olive
F	Cherry	Y	Poplar
N	Cottonwood	S	Sycamore
E	Elm	T	Salt Cedar
H	Hackberry	G	Walnut
C	Hickory	X	Willow
W	Hulsauts	Q	Other
L	Live Oak		

Name of Tree, Conifer

27		27	
A	N. Wh. Cedar	L	Larch
C	Cedar, Other	P	Pine
F	Fir	S	Spruce
H	Hemlock	Q	Other
J	Juniper		

Name of Bush

28		28	
A	Alder	W	Witch Hazel
B	Blueberry	Y	Yew
P	Pussy Willow	Q	Other

Name of Moss

29	
P	Peat
S	Sphagnum (live)
Q	Other

Algae

30	
G	Blue-Green
B	Brown
Q	Other

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
Q

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

Filtrated 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 O₂ (ppm)

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

Temperature (°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

80
3

Card Number

WELL WATER

Type of Well

81
D
P
G
U
Q

Drilled

Drive Point

Dug

Unknown

Other

Power Classification

82
A
E
G
W
H
Q

Artesian Flow

Electric

Gasoline

Wind

Hand

Other

Casing

83
N
S
G
P
U
Q

None (Below Water Table)

Steel

Galvanized

Plastic

Unknown

Other

Pipe Composition

84
F
Z
C
P
U
Q

Steel

Galvanized

Copper

Plastic

Unknown

Other

Sample Location

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

Meters from Well Head

H = Holding Tank (Use Remarks)

Where Sample Taken With Respect To Pressure Tank

88
B
A
N
F

Before

After

No Pressure Tank

From Pressure Tank (Use Remarks)

Use of Well

89
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

90
C
F
I
H

Constant (hourly)

Frequent (daily)

Infrequent (weekly)

Rare (no recent use)

Depth to top of Producing Horizon

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

(Meters)

Confidence of Producing Depth

95
H
R
S

High

Probable

Possible

Source of Producing Depth Information

96
P
W
U
G
Q

Publication

Owner

User

Geologic Inference

Other

Total Well Depth

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

(Meters)

Confidence of Total Depth

101
H
R
S

High

Probable

Possible

Source of Total Depth Information

102
P
W
U
G
Q

Publications

Owner

User

Geologic Inference

Other

LAKE WATER

Type of Lake

103
N
M

Natural

Manmade

Lake Area

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

(sq km)

MICROFICHE OF FIELD AND LABORATORY DATA

CONTENTS

<u>Laboratory Data</u>	<u>Page</u>
Well Water (W)	1- 9
Stream Sediment (M)	10-15
 <u>Field Data</u>	
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CORPUS CHRISTI
BASIC DATA

05/28/80

PAGE 1

DIVISION OF TECHNICAL INFORMATION
OAK RIDGE NATIONAL LABORATORY

LEGEND
○ WELL WATER

PLATE 1
CORPUS CHRISTI QUADRANGLE
GROUNDWATER SAMPLE
LOCATION MAP

SCALE 1: 250000
119 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
+	0.0	≤ X < 0.20
×	0.20	≤ X < 0.30
◦	0.30	≤ X < 0.50
○	0.50	≤ X < 0.75
◯	0.75	≤ X < 2.50
⊙	2.50	≤ X < 7.25
⊗	7.25	≤ X < 12.75
⊕	12.75	≤ X < 18.25
⊖	18.25	≤ X < 25.50
⦿	25.50	≤ X < 31.25
●	31.25	≤ X < 40.50
■	40.50	≤ X < 63.75
★	X ≥ 63.75	

PLATE 2
 CORPUS CHRISTI QUADRANGLE
 SYMBOL PLOT
 GROUNDWATER
 URANIUM (PPB)
 SCALE 1: 250000
 119 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
+	$0 \leq X <$	950
x	$950 \leq X <$	1000
.	$1000 \leq X <$	1400
.	$1400 \leq X <$	1800
o	$1800 \leq X <$	1950
o	$1950 \leq X <$	2250
o	$2250 \leq X <$	2600
o	$2600 \leq X <$	3150
o	$3150 \leq X \leq$	3800
o	$3800 \leq X <$	4550
o	$4550 \leq X <$	5150
o	$5150 \leq X <$	6200
●	$6200 \leq X <$	8300
■	$8300 \leq X <$	12350
★	$X \geq$	12350

PLATE 3
CORPUS CHRISTI QUADRANGLE
SYMBOL PLOT
GROUNDWATER
SPECIFIC CONDUCTANCE (UMHOS/CM)
SCALE 1: 250000
119 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
x	$0.50 \leq X <$	0.70
.	$0.70 \leq X <$	0.75
o	$0.75 \leq X <$	1.00
o	$1.00 \leq X <$	1.10
o	$1.10 \leq X <$	1.30
o	$1.30 \leq X <$	1.50
o	$1.50 \leq X <$	1.60
o	$1.60 \leq X <$	1.90
o	$1.90 \leq X <$	2.00
o	$2.00 \leq X <$	2.30
o	$2.30 \leq X <$	2.50
■	$2.50 \leq X <$	3.15
★	$X \geq$	3.15

PLATE 5
 CORPUS CHRISTI QUADRANGLE
 SYMBOL PLOT
 STREAM SEDIMENT
 URANIUM, FLUOROMETRIC (PPM)
 SCALE 1: 250000
 56 SAMPLES PLOTTED

SYMBOL RANGES FOR PLOTTED VARIABLE (X)		
+	$0 \leq X < 2$	2
x	$2 \leq X < 3$	3
○	$3 \leq X < 4$	4
⊙	$4 \leq X < 5$	5
⊙	$5 \leq X < 6$	6
⊙	$6 \leq X < 8$	8
⊙	$8 \leq X < 9$	9
●	$9 \leq X < 10$	10
●	$10 \leq X < 11$	11
■	$11 \leq X < 13$	13
★	$X \geq 13$	13

PLATE 6
 CORPUS CHRISTI QUADRANGLE
 SYMBOL PLOT
 STREAM SEDIMENT
 THORIUM (PPM)
 SCALE 1: 250000
 56 SAMPLES PLOTTED

STRATIGRAPHIC COLUMN FOR SURFACE GEOLOGY FOR THE CORPUS CHRISTI QUADRANGLE

ERA	SYSTEM	SERIES	GEOLOGIC SURFACE CODE	GEOLOGIC MEMBER	MAXIMUM THICKNESS	
CENOZOIC	QUATERNARY	RECENT	QWB	WINDBLOWN DEPOSITS		
			QD	ALLUVIUM		
		RECENT OR LATE PLEISTOCENE	QPB	BARRIER ISLAND DEPOSITS	150	500
		PLEISTOCENE	QPL	DEWEYVILLE FORMATION		
				BEAUMONT FORMATION	180	600
				LISSIE FORMATION		

SOURCE:
1. BARNES, V. E., "GEOLOGIC ATLAS OF TEXAS, CORPUS CHRISTI SHEET" (1975)

LEGEND
COUNTY LINE ———
GEOLOGIC CONTACT ———

PLATE 7
GENERALIZED GEOLOGIC MAP
CORPUS CHRISTI QUADRANGLE,
TEXAS