CHICOT EQUIVALENT AQUIFER SYSTEM SUMMARY

BASELINE MONITORING PROJECT, FY 2003

APPENDIX 12

OF THE

TRIENNIAL SUMMARY REPORT, 2003

FOR THE

ENVIRONMENTAL EVALUATION DIVISION

OF

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PARTIAL FUNDING PROVIDED THROUGH 106 CWA

CHICOT EQUIVALENT AQUIFER SYSTEM SUMMARY
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BACKGROUND

In order to better assess the water quality of a particular aquifer at a given point in time, an attempt was made during the project year to sample all Baseline Monitoring Project (Project or BMP) wells producing from a common aquifer in a narrow time frame. Also, to more conveniently and economically promulgate those data collected from a particular aquifer, a summary report on each aquifer sampled was prepared separately. Collectively, these aquifer summaries will make up part of the Project Triennial Summary Report.

Figure 12-1 shows the geographic locations of the Chicot Equivalent aquifer system and the associated Project wells, whereas Table 12-2 lists the wells in the aquifer along with their total depths and the use made of produced waters and date sampled.

From August of 2002 to February of 2003, twenty-six wells were sampled which produce from the Chicot Equivalent aquifer system. Ten of the wells are classified as industrial, eight are domestic, and five are public supply wells. Also, one well is classified as an irrigation well, one is a monitoring well, and one is classified as a power generation well. The wells are located in thirteen parishes, in southeast Louisiana.

Well data for registered water wells were obtained from the Louisiana Department of Transportation and Development's Water Well Registration Data file.

GEOLOGY

The Chicot Equivalent aquifer system is composed of the Pleistocene aged aquifers of the New Orleans area, the Baton Rouge area, and St. Tammany, Tangipahoa, and Washington Parishes. The aquifers are in Pleistocene aged alluvial and terrace deposits. The sedimentary sequences that make up the aquifer system are subdivided into several aquifer units separated by confining beds. Northward within southeast Louisiana, fewer units are recognized because some younger units pinch out updip and some clay layers present to the south disappear. Where clay layers are discontinuous or disappear, aquifer units coalesce. The aquifers are moderately well, to well sorted, and consist of fine sand near the top, grading to coarse sand and gravel in lower parts and are generally confined by silt and clay layers.

HYDROGEOLOGY

The deposits that constitute the individual aquifers are not readily differentiated at the surface and act as one hydraulic system that can be subdivided into several hydrologic zones in the subsurface. The Mississippi River Valley is entrenched into the Pleistocene strata in the western part of the system, resulting in water movement between the river, the shallow sands, and the Pleistocene aquifers. Recharge occurs primarily by the direct infiltration of rainfall in interstream, upland outcrop areas, by the movement of water between aquifers, and between the aquifers and the Mississippi River. The hydraulic conductivity varies between 10-200 feet/day.

The maximum depths of occurrence of freshwater in the Chicot Equivalent range from 350 feet above sea level, to 1,100 feet below sea level. The range of thickness of the fresh water interval in the Chicot Equivalent is 50 to 1,100 feet. The depths of the Chicot Equivalent wells that were monitored in conjunction with the BMP range from 88 to 807 feet.

INTERPRETATION OF DATA

FIELD, WATER QUALITY, AND NUTRIENTS PARAMETERS

Table 12-3 lists the field parameters that are checked and the water quality and nutrients parameters that are sampled for at each well. It also shows the field results and the water quality and nutrients analytical results for each well. Table 12-5 lists the minimum, maximum, and average results for the field data, water quality data, and nutrients data for the Chicot Equivalent aquifer system.

Federal Primary Drinking Water Standards

Under the Federal Safe Drinking Water Act, EPA has established maximum contaminant levels (MCLs) for pollutants that may pose a health risk in public drinking water. An MCL is the highest level of a contaminant that EPA allows in public drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. While not all wells sampled were public supply wells, this Office does use the MCLs as a benchmark for further evaluation.

A review of the analyses listed on Table 12-3 shows that no primary MCL was exceeded for field, water quality, or nutrients parameters.

Federal Secondary Drinking Water Standards

EPA has set secondary standards that are defined as non-enforceable taste, odor, or appearance guidelines.

Field and laboratory data contained in Table 12-3 show that the following secondary MCLs (SMCL)s were exceeded.

Chloride – SMCL = 250 ppm

AN-321 – 298 ppm
AN-500 – 263 ppm, duplicate – 264 ppm
AN-6297Z – 731 ppm
SC-179 – 319 ppm
SJB-173 – 337 ppm, duplicate – 336 ppm

Color – SMCL = 15 PCU

JF-28 – 140 PCU
OR-61 – 150 PCU, duplicate – 150 PCU
SC-179 – 50 PCU

pH – SMCL = 6.5 – 8.5 S.U.

AN-6297Z – 8.88 S.U.
EB-1231 – 6.47 S.U.
JF-28 – 8.53 S.U.
OR-61 – 8.59 S.U.
SH-77 – 5.72 S.U.
SH-5333Z – 6.45 S.U.
ST-5245Z – 5.91 S.U.
TA-520 – 5.13 S.U.
WA-5311Z – 5.80 S.U.

TDS – SMCL = 500 ppm

AN-296 – 566 ppm
AN-316 – 544 ppm
AN-321 – 652 ppm
AN-500 – 582 ppm, duplicate – 582 ppm
AN-6297Z – 1,288 ppm
JF-28 – 754 ppm
OR-61 – 562 ppm, duplicate – 560 ppm
SC-179 – 936 ppm
SJ-226 – 518 ppm
SJB-173 – 908 ppm, duplicate – 902 ppm

Comparison To Historical Data

Table 12-7 lists the current field, water quality, and nutrients data averages alongside those parameters' data averages for the two previous sampling rotations (three and six years prior). A comparison shows that the laboratory conductivity averages have fluctuated greatly, but that for the most part the averages have been consistent with only slight fluctuations.

INORGANIC PARAMETERS

Table 12-4 shows the inorganic (total metals) parameters that are sampled for and the analytical results for those parameters for each well. Table 12-6 lists the minimum, maximum, and average results for the inorganic data for the Chicot Equivalent aquifer system.

Federal Primary Drinking Water Standards

Arsenic was detected in project well SJ-226 at a concentration of 12.6 ppb, which is below arsenic's current MCL of 50 ppb, but over the future arsenic MCL of 10 ppb which will come into affect on January 23, 2006. This concentration is also consistent with previous arsenic results from the sampling of this well. In 1999 arsenic was detected at a concentration of 10.8 ppb and in 1997 it was detected at a concentration of 15.3 ppb. It is this office's opinion that the existence of arsenic in the well, which is an industrial well, has been established, and the well owner has been made aware of these concentrations.

Mercury was detected in the sample analyses of wells EB-1231, EF-5329Z, SJB-173, and ST-5245Z. For EB-1231 and SJB-173, mercury was detected in the duplicate samples only, not in the initial samples taken from these two wells. Therefore it is the opinion of this office that the mercury concentrations exhibited in these two wells' sample analyses are due to field/laboratory contamination, not contamination of the wells. However, the existence of mercury in wells EF-5329Z and ST-5245Z has been established. EF-5329Z, which is a domestic well, was sampled for the first time during this current round of sampling. Mercury was detected at a concentration of 0.07 ppb during the initial round of sampling and therefore the well was resampled. The results of the resample analyses revealed mercury concentrations of 0.08 ppb and 0.07 ppb, which are consistent with the initial sample. Mercury was also detected in the current round of sampling of ST-5245Z, which is also a domestic well, at 0.39 ppb and 0.27 ppb. These concentrations are consistent with previous mercury detections from this well. Mercury was detected in well ST-5245Z during a 1999 sampling event at a concentration of 0.43 ppb, so the well was resampled. Mercury was detected in the subsequent resample analyses twice at 0.20 ppb (the resample and its duplicate). It should be noted that the owners of all of the above mentioned wells have been notified about their well's respective situations. It should also be noted that all the mercury concentrations listed above are below mercury's MCL of 2 ppb.

A further review of the analyses listed on Table 12-4 shows that no primary MCL was exceeded for inorganic parameters.

Federal Secondary Drinking Water Standards

Laboratory data contained in Table 12-4 show that the following secondary SMCL was exceeded.

Iron – SMCL = 300 ppb

AN-296 – 703 ppb
EB-34 – 403 ppb
SJ-226 – 921 ppb
ST-5245Z – 9,705 ppb, duplicate – 9,160 ppb
AN-6297Z – 1,220 ppb
SH-77 – 769 ppb
SJB-173 – 569 ppb, duplicate – 586 ppb
ST-11516Z – 676 ppb

Comparison To Historical Data

Table 12-8 lists the current inorganic data averages alongside the inorganic data averages for the two previous sampling rotations (three and six years prior). A comparison shows that iron has steadily increased while the other averages have been consistent, with only slight fluctuations.

VOLATILE ORGANIC COMPOUNDS

Table 12-9 shows the volatile organic compound (VOC) parameters that are sampled for. Due to the large number of analytes in this category, a total list of the analytical results for each analyte is not provided, however any detection of a VOC would be discussed in this section.

1,2-Dichloroethane was detected in well EB-34, an industrial well, at a concentration of 29.1 ppb. The well was subsequently resampled and 1,2-dichloroethane was again detected, this time at concentrations of 29.6 ppb and 28.5 ppb. It is therefore this office's opinion that the existence of 1,2-dichloroethane in the well has been confirmed. The well owner was made aware of this situation and the Louisiana Department of Environmental Quality's Environmental Technology Division was notified. It should be noted that the concentrations mentioned above are all higher than 1,2-dichloroethane's MCL of 5.0 ppb that EPA has established under the Federal Safe Drinking Water Act.

Bromodichloromethane, bromoform, chloroform, chloromethane, and dibromochloromethane were detected during the current sampling of the Chicot Equivalent aquifer system. These are chlorination byproducts that have been detected intermittently during recent Baseline sampling in wells, field blanks, and laboratory blanks. Therefore it is the opinion of this office these current detections are due to field/laboratory contamination and are considered invalid.

Taking into account the invalid chlorination byproducts mentioned above, the 1,2-dichloroethane detection found in EB-34 was the only VOC that was detected during the FY 2003 sampling of the Chicot Equivalent aquifer system.

SEMIVOLATILE ORGANIC COMPOUNDS

Table 12-10 shows the semivolatile organic compound parameters that are sampled for. Due to the large number of analytes in this category, a total list of the analytical results for each analyte is not provided, however any detection of a semivolatile would be discussed in this section. Please note that two different laboratories were used to analyze the semivolatiles during the current sampling of the Chicot Equivalent aquifer system. Table 12-10 shows the analytes, along with their practicable quantitation limits (PQLs), that were analyzed by Pace Analytical. There are some slight differences between this list and the list of analytes and PQLs from the other laboratory that was used. Any further information on this can obtained directly from the BMP staff.

Laboratory data show that thirteen of the Chicot Equivalent wells that were sampled during FY 2003 exhibited values for bis(2-ethylhexyl)phthalate. Laboratory analyses from well samples, field blanks, and laboratory blanks have consistently exhibited phthalate concentrations in the last several rounds of sampling of the different aquifers that are monitored by the BMP. Therefore, it is the opinion of this office that the bis(2-ethylhexyl)phthalate concentrations exhibited in the FY 2003 Chicot Equivalent sample analyses are due to laboratory contamination, not contamination of the aquifer.

Taking into consideration the invalid phthalate concentrations, no semivolatile organic compounds were detected during the FY 2003 sampling of the Chicot Equivalent aquifer system.

PESTICIDES AND PCBS

Table 12-11 shows the pesticide and PCB parameters that are sampled for. Due to the large number of analytes in this category, a total list of the analytical results for each analyte is not provided, however any detection of a pesticide or PCB would be discussed in this section. Please note that two different laboratories were used to analyze the pesticide and PCB parameters during the current sampling of the Chicot Equivalent aquifer system. Table 12-11 shows the analytes, along with their PQLs, that were analyzed by Pace Analytical. There are some slight differences between this list and the list of analytes and PQLs from the other laboratory that was used. Any further information on this can obtained directly from the BMP staff.

No pesticide or PCB was detected during the 2003 sampling of the Chicot Equivalent aquifer system.

COMMON WATER CHARACTERISTICS

Table 12-1 below highlights some of the more common water characteristics that are considered when studying ground water quality. The minimum, maximum, and average values that were found during the current sampling of the Chicot Equivalent aquifer system for pH, TDS, hardness, chloride, iron, and nitrite-nitrate are listed in the table. Figures 12-2, 12-3, 12-4, and 12-5 respectively, represent the contoured data for pH, TDS, chloride, and iron. The data values that are contoured and reported in the contour maps are derived from the initial current sampling of each well with any duplicate samples or resamples averaged into them. The data average for hardness shows that the ground water produced from this aquifer is soft[1].

Table 12-1 Common Water Characteristics
Fiscal Year 2003

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
PH (SU)	5.13	8.88	7.16
TDS (ppm)	23.3	1,228.0	364.8
Hardness (ppm)	<10.0	187.0	46.2
Chloride (ppm)	2.9	731.0	120.2
Iron (ppb)	<10	9,705.00	380.01
Nitrite-Nitrate (ppm)	<0.05	1.50	0.14

[1] Classification based on hardness scale from: *Peavy, H.S. et al. Environmental Engineering, 1985.*

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the ground water produced from the Chicot Equivalent aquifer system is soft and that one primary MCL was exceeded. 1,2-Dichloroethane was detected in well EB-34, an industrial well, at a concentration of 29.1 ppb. The well was subsequently resampled and 1,2-dichloroethane was again detected, this time at concentrations of 29.6 ppb and 28.5 ppb. It is therefore this office's opinion that the existence of 1,2-dichloroethane in the well has been confirmed. The well owner was made aware of this situation and the Louisiana Department of Environmental Quality's Environmental Technology Division was notified. It should be noted that the concentrations mentioned above are all higher than 1,2-dichloroethane's MCL of 5.0 ppb that EPA has established under the Federal Safe Drinking Water Act. Also, arsenic was detected in project well SJ-226 at a concentration of 12.6 ppb, which is below arsenic's current MCL of 50 ppb, but over the future arsenic MCL of 10 ppb which will come into affect on January 23, 2006. This concentration is also consistent with previous arsenic results from the sampling of this well, therefore it is this office's opinion that the existence of arsenic in the well, which is an industrial well, has been established. Mercury was detected in the sample analyses of wells EF-5329Z and ST-5245Z. EF-5329Z, which is a domestic well, was sampled for the first time during this current round of sampling. Mercury was detected at a concentration of 0.07 ppb during the initial round of sampling and therefore the well was resampled. The results of the resample analyses revealed mercury concentrations of 0.08 ppb and 0.07 ppb, which are consistent with the initial sample. Mercury was also detected in the current round of sampling of ST-5245Z, which is also a domestic well, at 0.39 ppb and 0.27 ppb. These concentrations are consistent with previous mercury detections from this well. It should be noted that all the mercury concentrations listed above are below mercury's MCL of 2 ppb. It should also be noted that all the owners of all of the above mentioned wells have been notified about their well's respective situations. Furthermore, this aquifer is of fair quality when considering taste, odor, or appearance guidelines. Also, a comparison of present and historical BMP data averages shows that the laboratory conductivity averages have fluctuated greatly and iron has steadily increased, but that for the most part the averages have been consistent with only slight fluctuations.

It is recommended that the Project wells assigned to the Chicot Equivalent aquifer system be resampled as planned in approximately three years. In addition, several wells should be added to those currently in place to increase the well density for this aquifer.

Table 12-2 List of Project Wells Sampled

PROJECT NUMBER	PARISH	WELL NUMBER	DATE SAMPLED	OWNER	DEPTH (FEET)	WELL USE
199904	ASCENSION	AN-266	08/06/2002	CITY OF GONZALES	548	PUBLIC SUPPLY
199005	ASCENSION	AN-296	09/23/2002	UNIROYAL CHEMICAL CO.	300	INDUSTRIAL
199004	ASCENSION	AN-316	09/16/2002	BORDEN CHEMICAL AND PLASTICS	478	INDUSTRIAL
199008	ASCENSION	AN-321	09/16/2002	RUBICON, INC.	523	INDUSTRIAL
200209	ASCENSION	AN-338	09/16/2002	BASF CORP.	466	PUBLIC SUPPLY
199406	ASCENSION	AN-500	02/03/2003	UNIROYAL CHEMICAL CO.	480	INDUSTRIAL
199009	ASCENSION	AN-6297Z	09/17/2002	VULCAN CHEMICAL	294	MONITOR
200210	ASCENSION	AN-9183Z	09/23/2002	PRIVATE OWNER	630	DOMESTIC
199903	EAST BATON ROUGE	EB-1231	08/05/2002	GEORGIA PACIFIC CORP.	280	INDUSTRIAL
199002	EAST BATON ROUGE	EB-34	08/05/2002	EXXONMOBIL USA	453	INDUSTRIAL
198607	EAST BATON ROUGE	EB-991B	08/05/2002	BATON ROUGE WATER WORKS	565	PUBLIC SUPPLY
200301	EAST FELICIANA	EF-5329Z	02/19/2003	PRIVATE OWNER	97	DOMESTIC
199014	JEFFERSON	JF-28	10/15/2002	ENTERGY (NINE MILE POINT)	807	INDUSTRIAL
199317	LIVINGSTON	LI-5477Z	08/06/2002	PRIVATE OWNER	106	DOMESTIC
198504	LIVINGSTON	LI-85	08/06/2002	FRENCH SETTLEMENT WATER SYS	405	PUBLIC SUPPLY
199328	ORLEANS	OR-61	10/15/2002	ENTERGY (A.B. PATTERSON)	653	POWER GENERATION
199013	ST. CHARLES	SC-179	10/14/2002	UNION CARBIDE	460	INDUSTRIAL
200302	ST. HELENA	SH-5333Z	02/19/2003	PRIVATE OWNER	230	DOMESTIC
199624	ST. HELENA	SH-77	12/10/2002	TRANSCO	170	PUBLIC SUPPLY
199905	ST. JAMES	SJ-226	10/14/2002	KAISER ALUMINUM	248	INDUSTRIAL
200211	ST. JOHN THE BAPTIST	SJB-173	10/31/2002	E.I. DUPONT	425	INDUSTRIAL
200303	ST. TAMMANY	ST-11516Z	02/19/2003	PRIVATE OWNER	340	DOMESTIC
199318	ST. TAMMANY	ST-5245Z	12/09/2002	PRIVATE OWNER	90	DOMESTIC
198820	TANGIPAHOA	TA-520	12/10/2002	PRIVATE OWNER	135	IRRIGATION
199319	WASHINGTON	WA-5295Z	12/09/2002	PRIVATE OWNER	100	DOMESTIC
199320	WASHINGTON	WA-5311Z	12/09/2002	PRIVATE OWNER	90	DOMESTIC

Table 12-3 Summary of Water Quality Data

WELL NUMBER	COND. mmhos/cm	pH SU	SAL. ppt	TEMP. OC	ALK. ppm	Cl ppm	COLOR PCU	COND. umhos/cm	SO4 ppm	TDS ppm	TSS ppm	TURB. NTU	NH3 (as N) ppm	HARD. ppm	NITRITE-NITRATE (as N) ppm	TKN ppm	TOT. P ppm
	FIELD PARAMETERS				*WATER QUALITY PARAMETERS*								*NUTRIENTS*				
AN-266	0.297	7.7	0.14	24.28	143.0	12.30	<5.0	305.0	4.00	204.0	<4.0	<1.0	0.27	35.8	<0.05	0.40	0.22
AN-296	1.083	7.49	0.54	22.10	355.0	143.00	11.0	1021.0	<1.25	566.0	<4.0	1.8	2.61	115.0	<0.05	2.85	0.53
AN-316	1.025	6.8	0.51	24.21	152.0	235.00	<5.0	965.0	1.40	544.0	<4.0	<1.0	0.53	67.9	<0.05	0.53	0.17
AN-321	1.228	7.46	0.61	22.90	157.0	298.00	5.0	1148.0	1.30	652.0	<4.0	1.0	0.57	50.0	<0.05	0.60	0.28
AN-338	0.444	7.73	0.21	23.44	151.0	48.00	5.0	415.0	2.50	266.0	<4.0	1.4	0.74	36.2	<0.05	0.73	0.22
AN-338*	0.444	7.73	0.21	23.44	151.0	48.10	5.0	415.0	2.60	268.0	<4.0	1.2	0.73	35.7	<0.05	0.61	0.20
AN-500	1.158	6.67	0.57	25.53	173.0	263.00	7.0	1096.0	<1.25	582.0	<4.0	1.1	0.16	85.4	<0.05	0.17	0.34
AN-500*	1.158	6.67	0.57	25.53	172.0	264.00	7.0	1086.0	<1.30	582.0	<4.0	1.2	0.12	87.4	<0.05	0.21	0.32
AN-6297Z	2.592	8.88	1.34	24.95	132.0	731.00	10.0	2510.0	<1.25	1228.0	<4.0	8.1	2.13	67.7	<0.05	2.39	0.10
AN-9183Z	0.403	8.1	0.19	23.59	167.0	28.40	7.0	370.0	3.10	244.0	<4.0	<1.0	0.22	<10.0	<0.05	0.27	0.16
EB-1231	0.226	6.47	0.11	20.55	63.9	31.30	<5.0	219.0	3.90	145.0	<4.0	<1.0	<0.10	59.8	0.07	<0.10	0.06
EB-1231*	0.226	6.47	0.11	20.55	63.9	32.00	<5.0	219.0	3.80	149.0	<4.0	<1.0	<0.10	59.4	0.08	<0.10	0.06
EB-34	0.26	6.87	0.12	22.73	128.0	8.40	5.0	249.0	4.00	199.0	<4.0	<1.0	0.21	29.9	<0.05	0.22	0.12
EB-991B	0.25	6.57	0.12	22.63	127.0	3.60	<5.0	241.0	8.80	189.0	<4.0	<1.0	0.24	<10.0	<0.05	0.38	0.11
EF-5329Z	0.041	7.19	0.02	18.48	9.1	2.90	<5.0	37.4	1.90	36.7	<4.0	1.4	<0.10	10.4	<0.05	0.22	<0.05
JF-28	1.427	8.53	0.71	24.47	367.0	243.00	140.0	1427.0	<1.30	754.0	<4.0	<1.0	1.16	27.4	0.05	1.22	0.71
LI-5477Z	0.381	7.71	0.18	21.90	206.0	7.20	5.0	399.0	<1.30	228.0	<4.0	<1.0	0.40	49.9	0.05	0.47	0.20
LI-85	0.584	7.74	0.28	23.65	135.0	106.00	<5.0	609.0	3.30	342.0	<4.0	<1.0	0.34	53.5	<0.05	0.54	0.21
OR-61	0.975	8.59	0.48	24.21	400.0	87.40	150.0	977.0	<1.30	562.0	<4.0	<1.0	1.25	21.4	<0.05	1.41	0.58
OR-61*	0.975	8.59	0.48	24.21	398.0	87.40	150.0	975.0	<1.30	560.0	<4.0	1.3	1.26	21.2	<0.05	1.43	0.53

* Denotes duplicate sample.

Table 12-3 Summary of Water Quality Data (continued)

WELL NUMBER	COND. mmhos/cm	pH SU	SAL. ppt	TEMP. OC	ALK. ppm	Cl ppm	COLOR PCU	COND. umhos/cm	SO4 ppm	TDS ppm	TSS ppm	TURB. NTU	NH3 (as N) ppm	HARD. ppm	NITRITE-NITRATE (as N) ppm	TKN ppm	TOT. P ppm
	FIELD PARAMETERS				*WATER QUALITY PARAMETERS*								*NUTRIENTS*				
SC-179	1.789	7.75	0.91	22.46	451.0	319.00	50.0	1766.0	<1.30	936.0	<4.0	<1.0	2.48	72.2	<0.05	2.69	0.56
SH-5333Z	0.065	6.45	0.03	20.74	21.3	6.90	<5.0	65.0	<1.30	45.3	<4.0	1.2	<0.10	12.2	0.23	0.15	<0.05
SH-77	0.027	5.72	0.01	19.52	<2.0	3.40	5.0	55.1	<1.25	23.3	<4.0	2.7	<0.10	<10.0	0.25	0.12	0.06
SJ-226	1.027	7.25	0.51	20.06	208.0	187.00	6.0	1014.0	25.80	518.0	<4.0	2.6	1.40	187.0	<0.05	5.47	0.57
SJB-173	1.66	7.04	0.84	21.98	383.0	337.00	21.0	1655.0	<1.25	908.0	<4.0	1.1	1.54	167.0	<0.05	1.62	0.27
ST-11516Z	0.286	7.41	0.14	21.28	144.0	8.90	10.0	288.0	2.40	185.0	<4.0	2.9	0.21	18.5	<0.05	0.44	0.33
ST-5245Z	0.052	5.91	0.02	19.38	13.8	4.40	<5.0	47.9	<1.30	35.3	12.3	16.0	0.57	<10.0	0.22	0.90	0.07
ST-5245Z*	0.052	5.91	0.02	19.38	14.5	4.40	5.0	48.5	<1.30	33.3	12.7	19.0	0.66	<10.0	0.21	0.97	0.06
TA-520	0.035	5.13	0.01	19.24	<2.0	3.90	5.0	34.1	<1.25	24.0	<4.0	<1.0	<0.10	<10.0	1.50	0.16	0.09
WA-5295Z	0.039	7.14	0.02	18.54	9.3	3.10	<5.0	30.9	<1.30	40.7	<4.0	1.4	<0.10	<10.0	<0.05	0.24	0.06
WA-5311Z	0.028	5.8	0.01	15.48	<2.0	4.20	<5.0	27.5	<1.25	26.7	<4.0	1.3	<0.10	<10.0	0.73	0.16	0.06

* Denotes duplicate sample.

Table 12-4 Summary of Inorganic Data

WELL NUMBER	ANTIMONY PPB	ARSENIC PPB	BARIUM PPB	BERYLLIUM PPB	CADMIUM PPB	CHROMIUM PPB	COPPER PPB	IRON PPB	LEAD PPB	MERCURY PPB	NICKEL PPB	SELENIUM PPB	SILVER PPB	THALLIUM PPB	ZINC PPB
AN-266	<5.0	<5.0	108.0	<1.0	<1.0	<5.0	<5.0	155.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
AN-296	<5.0	<5.0	425.0	<1.0	<1.0	<5.0	48.1	703.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	267.0
AN-316	<5.0	<5.0	357.0	<1.0	<1.0	<5.0	<5.0	196.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
AN-321	<5.0	<5.0	251.0	<1.0	<1.0	<5.0	<5.0	167.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
AN-338	<5.0	<5.0	99.1	<1.0	<1.0	<5.0	<5.0	62.5	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
AN-338*	<5.0	<5.0	97.0	<1.0	<1.0	<5.0	<5.0	60.9	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
AN-500	<5.0	<5.0	326.0	<1.0	<1.0	<5.0	<5.0	272.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	497.0
AN-500*	<5.0	<5.0	320.0	<1.0	<1.0	<5.0	5.5	216.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	413.0
AN-6297Z	<5.0	<5.0	241.0	<1.0	<1.0	<5.0	<5.0	1,220.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
AN-9183Z	<5.0	<5.0	33.4	<1.0	<1.0	<5.0	<5.0	<20.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
EB-1231	<5.0	<5.0	127.0	<1.0	<1.0	<5.0	<5.0	22.1	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
EB-1231*	<5.0	<5.0	126.0	<1.0	<1.0	<5.0	<5.0	<20.0	<10.0	Invalid data	<5.0	<5.0	<1.0	<5.0	<10.0
EB-34	<5.0	<5.0	95.9	<1.0	<1.0	<5.0	6.8	403.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
EB-991B	<5.0	<5.0	28.3	<1.0	<1.0	<5.0	<5.0	88.6	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
EF-5329Z	<5.0	<5.0	17.9	<1.0	<1.0	<5.0	12.7	<20.0	<10.0	0.07	<5.0	<5.0	<1.0	<5.0	<10.0
EF-5329Z**	Not sampled.									0.08	Not sampled.				
EF-5329Z***										0.07					
JF-28	<5.0	<5.0	137.0	<1.0	<1.0	<5.0	<5.0	123.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
LI-5477Z	<5.0	<5.0	93.1	<1.0	<1.0	<5.0	<5.0	32.6	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
LI-85	<5.0	<5.0	197.0	<1.0	<1.0	<5.0	7.0	71.9	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
OR-61	<5.0	<5.0	83.3	<1.0	<1.0	<5.0	<5.0	102.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	10.5
OR-61*	<5.0	<5.0	82.8	<1.0	<1.0	<5.0	<5.0	102.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0

* Denotes duplicate sample.
** Denotes resample.
*** Denotes duplicate resample.

Table 12-4 Summary of Inorganic Data

WELL NUMBER	ANTIMONY PPB	ARSENIC PPB	BARIUM PPB	BERYLLIUM PPB	CADMIUM PPB	CHROMIUM PPB	COPPER PPB	IRON PPB	LEAD PPB	MERCURY PPB	NICKEL PPB	SELENIUM PPB	SILVER PPB	THALLIUM PPB	ZINC PPB
SC-179	<5.0	<5.0	93.6	<1.0	<1.0	<5.0	<5.0	283.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
SH-5333Z	<5.0	<5.0	67.8	<1.0	<1.0	<5.0	36.1	23.9	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
SH-77	<5.0	<5.0	14.9	<1.0	<1.0	<5.0	<5.0	769.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
SJ-226	<10.0	12.6	344.0	<1.0	<1.0	<5.0	<5.0	921.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
SJB-173	<5.0	<5.0	392.0	<1.0	<1.0	<5.0	<5.0	569.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	63.0
ST-11516Z	<5.0	<5.0	68.6	<1.0	<1.0	<5.0	6.8	676.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	41.3
ST-5245Z	<5.0	<5.0	73.4	<1.0	<1.0	<5.0	<5.0	9,705.0	<10.0	0.39	<5.0	<5.0	<1.0	<5.0	<10.0
ST-5245Z*	<5.0	<5.0	75.4	<1.0	<1.0	<5.0	<5.0	9,160.0	<10.0	0.27	<5.0	<5.0	<1.0	<5.0	<10.0
TA-520	<5.0	<5.0	33.9	<1.0	<1.0	<5.0	36.7	<20.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<1.0
WA-5295Z	<5.0	<5.0	66.9	<1.0	<1.0	<5.0	201.0	68.7	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
WA-5311Z	<5.0	<5.0	20.9	<1.0	<1.0	<5.0	<5.0	<20.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	12.1

* Denotes duplicate sample.
** Denotes resample.
*** Denotes duplicate resample.

Table 12-5 Water Quality Statistics

Fiscal Year 2003

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
PH (SU)	5.13	8.88	7.16
Temperature ^{O}C	15.48	25.53	21.86
Sp. Conductivity (mmhos/cm) (Field)	0.027	2.592	0.669
Salinity (ppt)	0.01	1.34	0.33
TSS (ppm)	<4	12.3	<4
TDS (ppm)	23.3	1,228.0	364.8
Alkalinity (ppm)	<2	451.0	157.7
Hardness (ppm)	<10.0	187.0	46.2
Turbidity (NTU)	<1	16.00	1.92
Sp. Conductivity (umhos/cm) (Lab)	27.5	2,510.0	652.8
Color (PCU)	<5	150.0	18.0
Chloride (ppm)	2.9	731.0	120.2
Sulfate (ppm)	<1.25	25.80	2.74
Nitrite-Nitrate, as N (ppm)	<0.05	1.50	0.14
Phosphorus (ppm)	<0.05	1.50	0.14
TKN (ppm)	<0.1	5.47	0.94
Ammonia (ppm)	<0.1	2.61	0.67

Table 12-6 Inorganic Statistics

Fiscal Year 2003

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (ppb)	<5	5.00	<5
Arsenic (ppb)	<5	12.60	<5
Barium (ppb)	14.90	425.00	146.00
Beryllium (ppb)	<1	<1	<1
Cadmium (ppb)	<1	<1	<1
Chromium (ppb)	<5	<5	<5
Copper (ppb)	<5	201.00	15.39
Iron (ppb)	<20	9,705.00	641.32
Lead (ppb)	<10	<10	<10
Mercury (ppb)	<0.05	0.39	<0.05
Nickel (ppb)	<5	<5	<5
Selenium (ppb)	<5	<5	<5
Silver (ppb)	<1	<1	<1
Thallium (ppb)	2.50	<5	<5
Zinc (ppb)	<10	497.00	37.94

Table 12-7 Three-year Water Quality Statistics

PARAMETER	FY 1997 AVERAGE	FY 2000 AVERAGE	FY 2003 AVERAGE
PH (SU)	7.09	7.23	7.16
Temperature ^{O}C	21.17	21.90	21.86
Sp. Conductivity (mmhos/cm) (Field)	0.618	0.692	0.669
Salinity (ppt)	0.32	0.30	0.33
TSS (ppm)	<4	<4	<4
TDS (ppm)	393.7	415.8	364.8
Alkalinity (ppm)	160.8	165.8	157.7
Hardness (ppm)	46.5	49.1	46.2
Turbidity (NTU)	<1	2.30	1.92
Sp. Conductivity (umhos/cm) (Lab)	623.9	711.6	652.8
Color (PCU)	18.0	21.8	18.0
Chloride (ppm)	108.6	125.3	120.2
Sulfate (ppm)	3.15	2.71	2.74
Nitrite-Nitrate, as N (ppm)	0.15	0.15	0.14
Phosphorus (ppm)	0.21	0.22	0.14
TKN (ppm)	0.89	0.73	0.94
Ammonia (ppm)	0.51	2.36	0.67

Table 12-8 Three-year Inorganic Statistics

PARAMETER	FY 1997 AVERAGE	FY 2000 AVERAGE	FY 2003 AVERAGE
Antimony (ppb)	5.30	<5	<5
Arsenic (ppb)	<5	<5	<5
Barium (ppb)	107.08	140.64	146.00
Beryllium (ppb)	<1	<1	<1
Cadmium (ppb)	<1	<1	<1
Chromium (ppb)	<5	<5	<5
Copper (ppb)	19.63	10.82	15.39
Iron (ppb)	230.02	370.89	641.32
Lead (ppb)	<10	<10	<10
Mercury (ppb)	<0.05	0.06	<0.05
Nickel (ppb)	<5	<5	<5
Selenium (ppb)	<5	<5	<5
Silver (ppb)	<1	<1	<1
Thallium (ppb)	<5	<5	<5
Zinc (ppb)	32.16	31.99	37.94

Table 12-9 List of VOC Analytical Parameters
BASELINE MONITORING PROJECT
VOLATILE ORGANICS BY EPA METHOD 624

COMPOUND	PQL (ppb)
CHLOROMETHANE	2
VINYL CHLORIDE	2
BROMOMETHANE	2
CHLOROETHANE	2
TRICHLOROFLUOROMETHANE	2
1,1-DICHLOROETHENE	2
METHYLENE CHLORIDE	2
TRANS-1,2-DICHLOROETHENE	2
METHYL-t-BUTYL ETHER	2
1,1-DICHLOROETHANE	2
CHLOROFORM	2
1,1,1-TRICHLOROETHANE	2
CARBON TETRACHLORIDE	2
BENZENE	2
1,2-DICHLOROETHANE	2
TRICHLOROETHENE	2
1,2-DICHLOROPROPANE	2
BROMODICHLOROMETHANE	2
CIS-1,3-DICHLOROPROPENE	2
TOLUENE	2
TRANS-1,3-DICHLOROPROPENE	2
1,1,2-TRICHLOROETHANE	2
TETRACHLOROETHENE	2
DIBROMOCHLOROMETHANE	2
CHLOROBENZENE	2
ETHYLBENZENE	2
P&M XYLENE	4
O-XYLENE	2
STYRENE	2
BROMOFORM	2
1,1,2,2-TETRACHLOROETHANE	2
1,3-DICHLOROBENZENE	2
1,4-DICHLOROBENZENE	2
1,2-DICHLOROBENZENE	2

PQL = Practical Quantitation Limit
ppb = parts per billion

Table 12-10 List of Semivolatile Analytical Parameters

BASELINE MONITORING PROJECT

SEMIVOLATILE ORGANICS BY EPA METHOD 8270

COMPOUND	PQL (ppb)
Acenaphthene	10
Acenaphthylene	10
Anthracene	10
Benzidine	30
Benzo(a)anthracene	10
Benzo(b)fluoranthene	10
Benzo(k)fluoranthene	10
Benzo(g,h,i)perylene	10
Benzo(a)Pyrene	10
4-Bromophenyl phenyl ether	10
Butylbenzylphthalate	10
Bis(2-chloroethoxy)methane	10
Bis(2-chloroethyl)ether	10
2,2-Oxybis(1-chloropropane)	10
4-Chloro-3-methylphenol (p-Chloro-m-cresol)	10
2-Chloronaphthalene	10
2-Chlorophenol (o-Chlorophenol)	10
4-Chlorophenyl phenyl ether	10
Chrysene	10
Dibenz(a,h)anthracene	10
Di-n-butylphthalate	10
1,2-Dichlorobenzene (o-Dichlorobenzene)	10
1,3-Dichlorobenzene (m-Dichlorobenzene)	10
1,4-Dichlorobenzene (p-Dichlorobenzene)	10
3,3’-Dichlorobenzidine	20
2,4-Dichlorophenol	10
Diethylphthalate	10
2,4-Dimethylphenol	10
Dimethylphthalate	10
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	25
2,4-Dinitrophenol	25
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
Di-n-octylphthalate	10
1,2-Diphenylhydrazine (as azobenzene)	10
Bis(2-ethylhexyl)phthalate	10
Fluoranthene	10
Fluorene	10
Hexachlorobenzene	10
Hexachlorobutadiene	10

Table 12-10 (Cont'd)
Semivolatile Parameters

COMPOUND	PQL (ppb)
Hexachlorocyclopentadiene	10
Hexachloroethane	10
Indeno(1,2,3-cd)pyrene	10
Isophorone	10
Naphthalene	20
Nitrobenzene	10
2-Nitrophenol (o-Nitrophenol)	10
4-Nitrophenol (p-Nitrophenol)	25
N-Nitrosodiphenylamine	10
N-Nitroso-di-n-propylamine	10
N-Nitrosodiphenylamine (Diphenylamine)	10
Pentachlorophenol	25
Phenathrene	10
Phenol	10
Pyrene	10
1,2,4-Trichlorobenzene	10
2,4,6-Trichlorophenol	10

Table 12-11 List of Pesticide and PCB Analytical Parameters

EPA METHOD 8080

COMPOUND	PQL (ppb)
Aldrin	0.0500
Alpha BHC	0.0500
Beta BHC	0.0500
Delta BHC	0.0500
Gamma BHC (Lindane)	0.0500
Chlordane (technical)	0.500
4,4'-DDD (p,p'-DDD)	0.100
4,4'-DDE (p,p'-DDE)	0.100
4,4'-DDT (p,p'-DDT)	0.100
Dieldrin	0.100
Endosulfan I (alpha-Endosulfan)	0.0500
Endosulfan II (beta-Endosulfan)	0.100
Endosulfan Sulfate	0.100
Endrin	0.100
Endrin Aldehyde	0.100
Heptachlor	0.0500
Heptachlor epoxide	0.0500
Toxaphene	5.00
Aroclor-1016	1.00
Aroclor-1221	1.00
Aroclor-1232	1.00
Aroclor-1242	1.00
Aroclor-1248	1.00
Aroclor-1254	1.00
Aroclor-1260	1.00

BASELINE MONITORING PROJECT WELLS OF THE CHICOT EQUIVALENT AQUIFER SYSTEM

Aquifer boundary digitized from Louisiana Hydrologic Map No. 2: Areal Extent of Freshwater in Major Aquifers of Louisiana, Smoot, 1986; USGS/LDOTD Report 86-4150.

Figure 12-1 Location Plat, Chicot Equivalent Aquifer System

CHICOT EQUIVALENT AQUIFER SYSTEM - pH (SU)

Baseline Monitoring Project, FY 2003

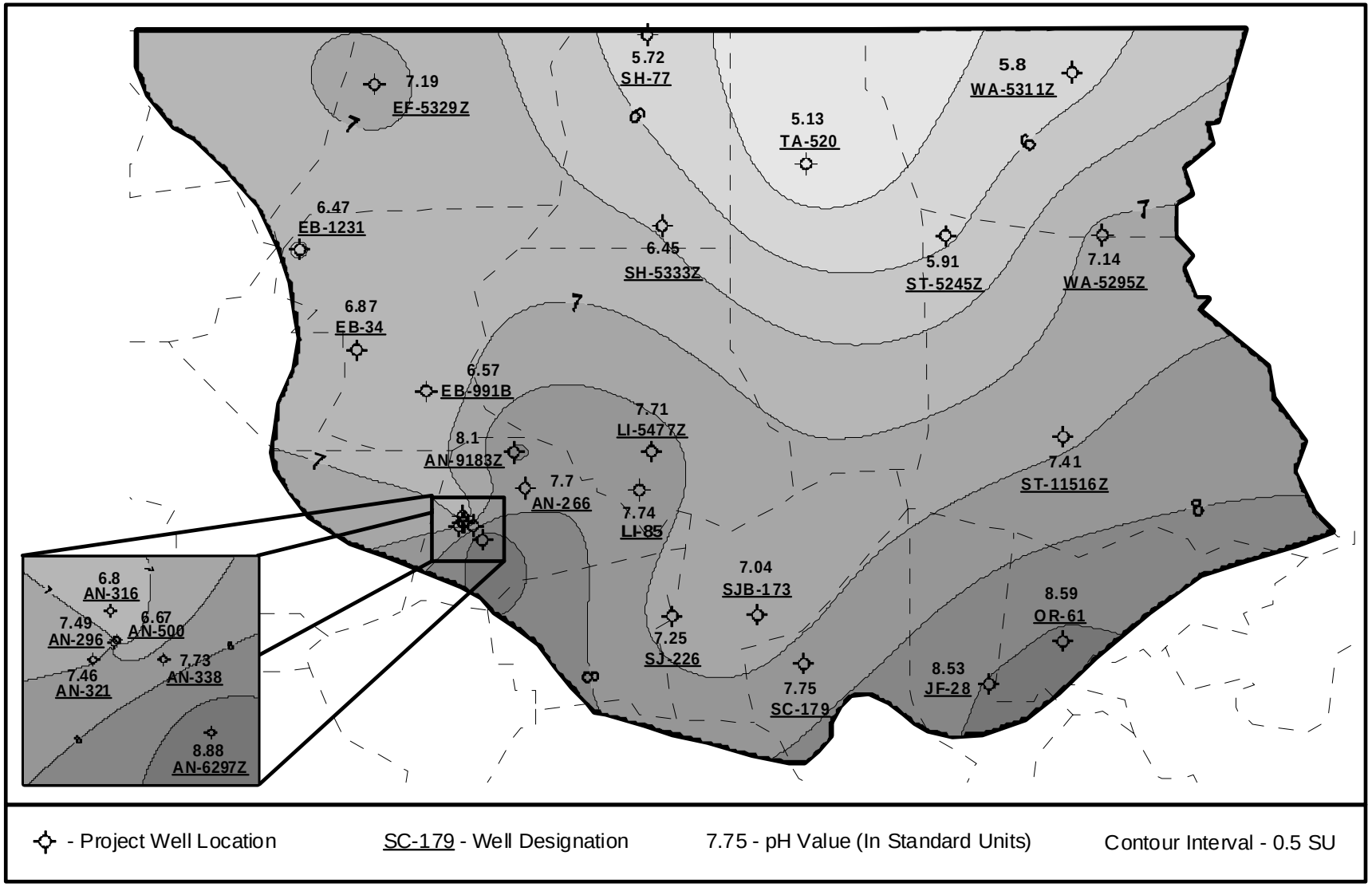

Figure 12-2 Map of pH Data

CHICOT EQUIVALENT AQUIFER SYSTEM - TDS (PPM)

Baseline Monitoring Project, FY 2003

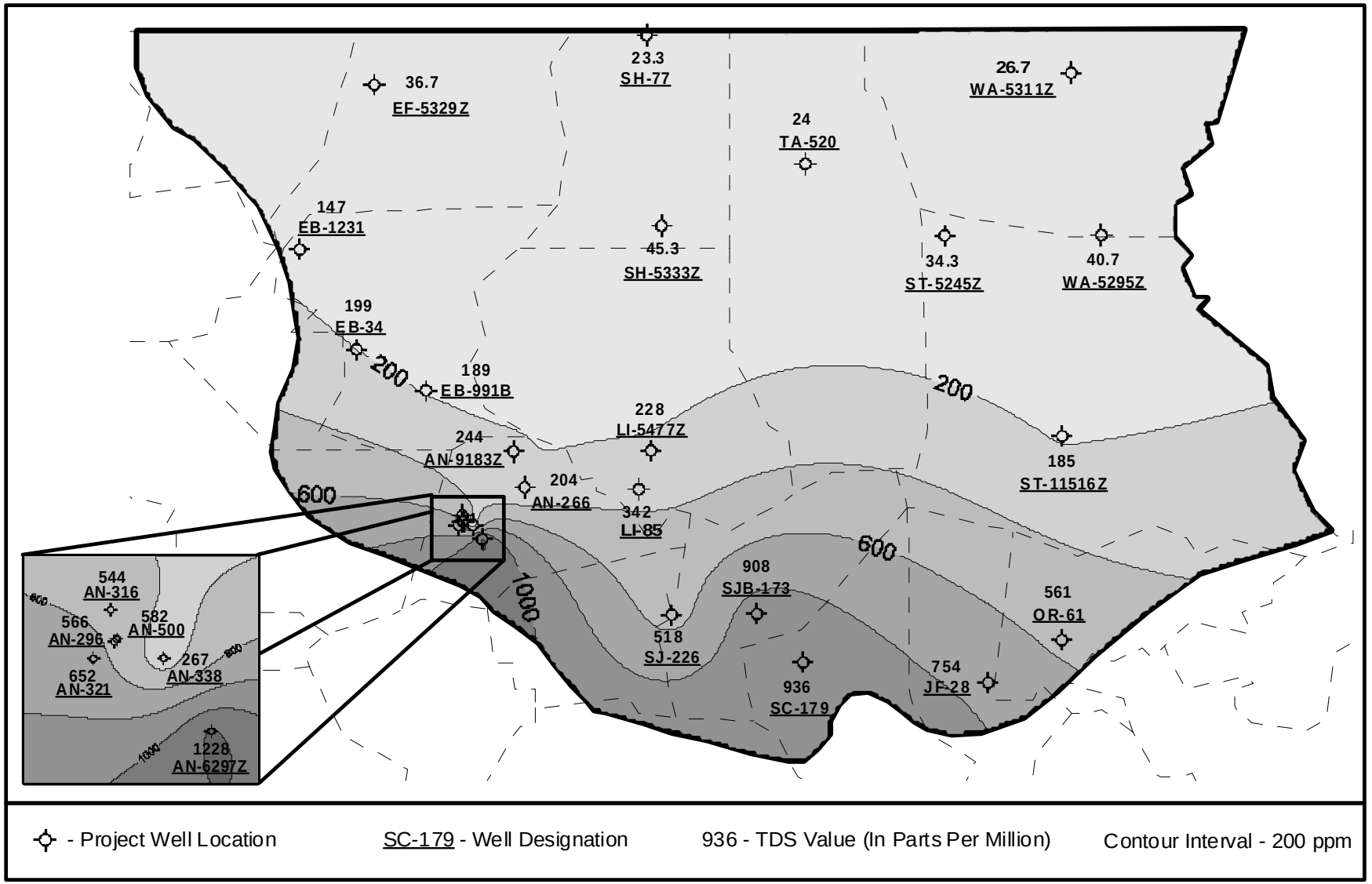

Figure 12-3 Map of TDS Data

CHICOT EQUIVALENT AQUIFER SYSTEM - Chloride (PPM)

Baseline Monitoring Project, FY 2003

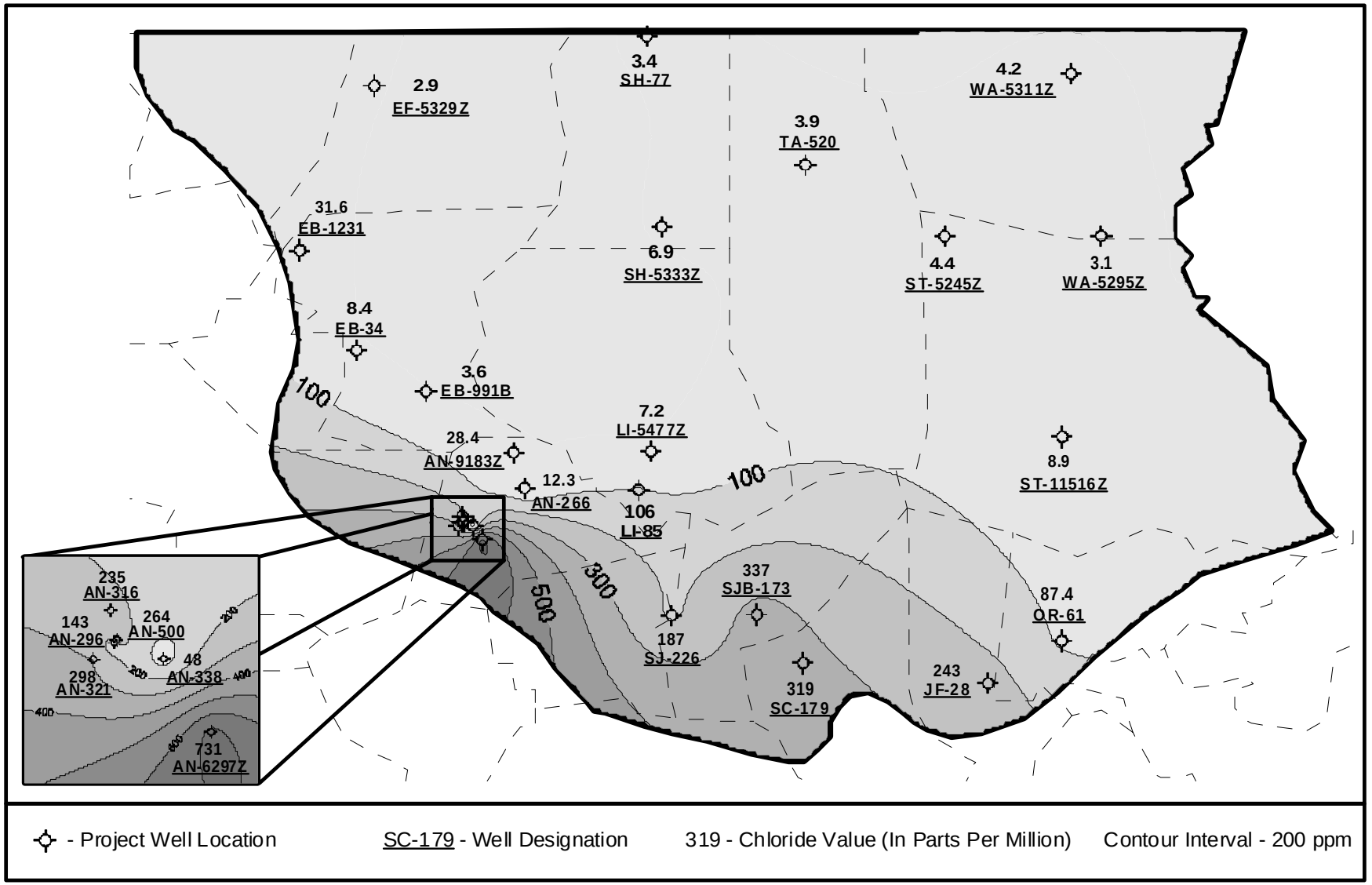

Figure 12-4 Map of Chloride Data

CHICOT EQUIVALENT AQUIFER SYSTEM - Iron (PPB)

Baseline Monitoring Project, FY 2003

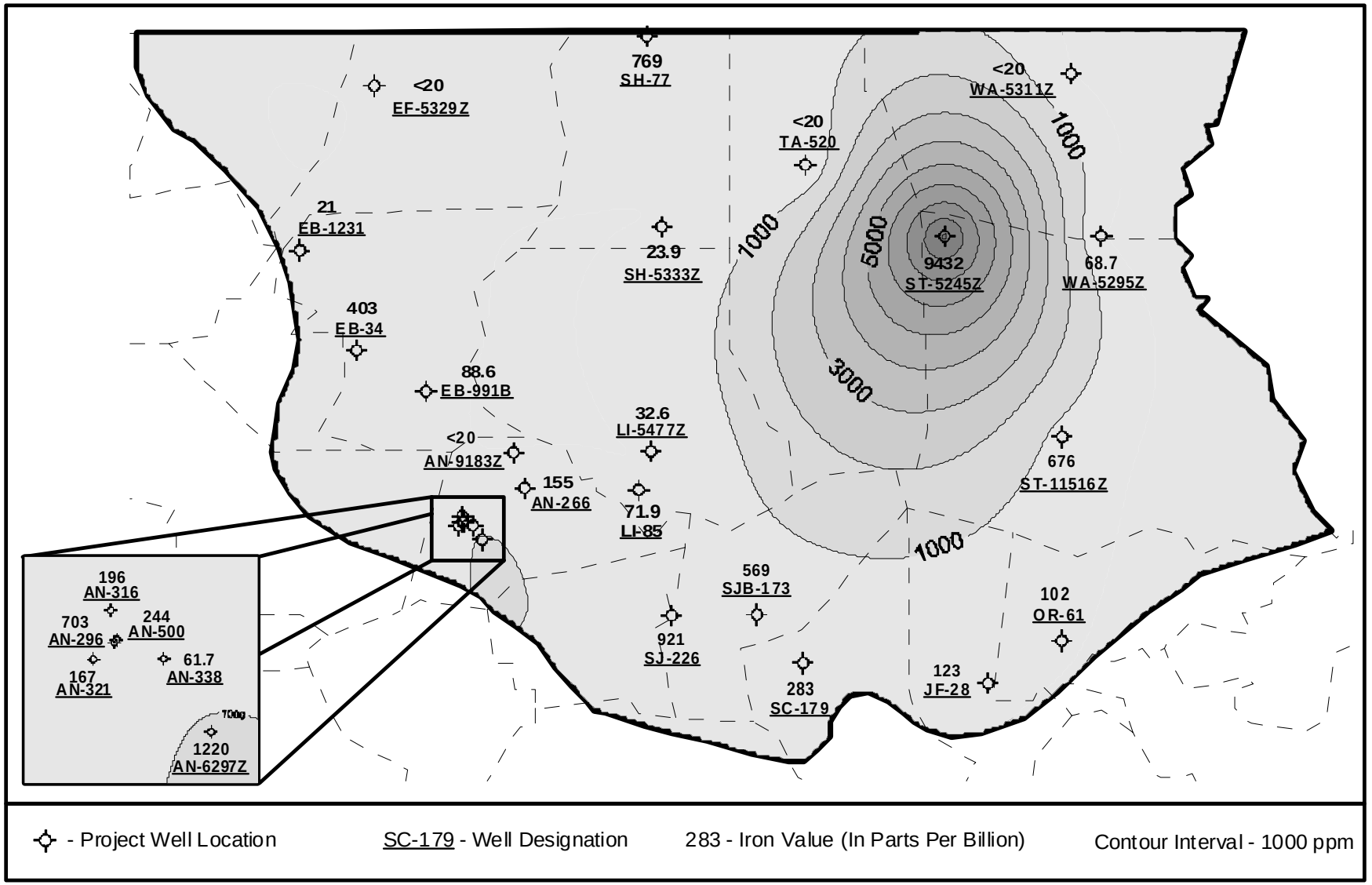

Figure 12-5 Map of Iron Data