CHICOT AQUIFER SUMMARY

BASELINE MONITORING PROGRAM, FY 2005

APPENDIX 10

OF THE

TRIENNIAL SUMMARY REPORT

FOR THE

WATER QUALITY ASSESSMENT DIVISION

OF

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PARTIAL FUNDING PROVIDED THROUGH THE CWA

CHICOT AQUIFER 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 year to sample all Baseline Monitoring Program (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 Baseline Monitoring Program Triennial Summary Report.

Figure 10-1 shows the geographic locations of the Chicot aquifer and the associated wells, whereas Table 10-2 lists the wells in the aquifer along with their total depths and the use made of produced waters and date sampled.

In April and May of 2005, twenty-five wells were sampled which produce from the Chicot aquifer. Twelve of the wells are classified as public supply wells, four are industrial wells, four are classified as observation wells, three are domestic wells, one is classified as an irrigation well, and one is classified as a recovery well by the La. DOTD. The wells are located in fourteen parishes, mainly in southwest 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 aquifer system consists of fining upward sequences of gravels, sands, silts, and clays of the Pleistocene Prairie, intermediate, and high terrace deposits of southwestern Louisiana. The medium to coarse-grained sand and gravel aquifer units dip and thicken toward the Gulf, thin slightly toward the west into Texas, and thicken toward the east where it is overlain by alluvium of the Atchafalaya and Mississippi rivers. The aquifers are confined, have a finer texture, and are increasingly subdivided by silts and clays southward from the northern limit of the outcrop area in southern Vernon and Rapides parishes.

In the Lake Charles area, the Chicot is divided into the shallow alluvial sands, the "200-foot" sand, the "500-foot" sand, and the "700-foot" sand. East of Calcasieu parish the Chicot is divided into the "upper sand" (in hydraulic connection to the Atchafalaya sand, Abbeville sand, and "200-foot" sand) and the "lower sand" ("700-foot" sand). The "500-foot" sand is largely isolated except where it merges with the "700-foot" sand north of Calcasieu Parish. Fresh water in the Chicot and other southwestern Louisiana aquifers is separated from fresh water in southeast Louisiana by a saltwater ridge along the western edge of the Mississippi River valley. Salt water occurs within the Chicot along the coast and in isolated bodies north of the coast.

HYDROGEOLOGY

Recharge to the Chicot occurs primarily through the direct infiltration of rainfall in the interstream, upland outcrop-subcrop areas. Recharge also occurs by water movement from the Atchafalaya alluvium, downward infiltration through the clays south of the primary recharge outcrop area, upward movement from the underlying Evangeline aquifer, and inflow from the Vermilion and Calcasieu rivers. Water movement is generally toward the pumping centers at Lake Charles and Eunice. There is little movement of water from the west because of pumping in the Orange, Texas area. The hydraulic conductivity varies between 40-220 feet/day.

The maximum depths of occurrence of freshwater in the Chicot range from 100 feet above sea level, to 1,000 feet below sea level. The range of thickness of the fresh water interval in the Chicot is 50 to 1,050 feet. The depths of the Chicot wells that were monitored in conjunction with the BMP range from 66 to 697 feet.

INTERPRETATION OF DATA

FIELD, WATER QUALITY, AND NUTRIENTS PARAMETERS

Table 10-3 lists the field parameters that are checked and the water quality and nutrients parameters for which samples are collected at each well. It also shows the field results and the water quality and nutrients analytical results for each well. Table 10-5 lists the minimum, maximum, and average results for the field data, water quality data, and nutrients data for the Chicot aquifer.

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 10-3 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 10-3 show that the following secondary MCLs (SMCL)s were exceeded.

Color – SMCL = 15 PCU
CU-1366 – 24 PCU
JD-862 – 46 PCU
I-5050Z – 140 PCU
SL-392 – 25 PCU

pH – SMCL = 6.5 – 8.5 S.U.
BE-412 – 5.82 S.U.
V-535 – 5.88 S.U.
R-5428Z – 5.68 S.U.

Total Dissolved Solids (TDS) – SMCL = 500 ppm
CU-862 – 804 ppm
SMN-109 – 688
JD-862 – 530 ppm
VE-862 – 650 ppm

Comparison To Historical Data

Table 10-7 lists the current field, water quality, and nutrients data averages alongside those parameters' data averages for the three previous sampling rotations (three, six and nine years prior). For the most part the averages have remained consistent for the four regular sampling episodes over the past twelve years.

INORGANIC PARAMETERS

Table 10-4 shows the inorganic (total metals) parameters for which samples are collected and the analytical results for those parameters for each well. Table 10-6 lists the minimum, maximum, and average results for the inorganic data for the Chicot aquifer.

Federal Primary Drinking Water Standards

A review of the analyses listed on Table 10-4 shows that no primary MCL was exceeded for inorganic parameters.

Federal Secondary Drinking Water Standards

Laboratory data contained in Table 10-4 show that the following secondary SMCL was exceeded.

Iron – SMCL = 300 ppb

AC-539 – 1,609 ppb, duplicate – 1,630
BE-378 – 2,747 ppb
CU-1125 – 1,196 ppb
CU-1436 – 1,760 ppb, duplicate – 1,760 ppb
I-5050Z – 33,101 ppb
SL-392 – 12, 229 ppb
VE-650 – 5,061 ppb
VE-882 – 383 ppb
AC-6919Z – 13,964 ppb
CU-862 – 2,450 ppb
CU-1366 – 2,200 ppb
EV-673 – 1,027 ppb
JD-862 – 2,651 ppb
SMN-109 – 1,211 ppb
VE-862 – 1,022 ppb

Federal Lead Action Level

Under the Federal Safe Drinking Water Act, EPA has established a lead action level of 15 ppb for public drinking water. This action level is the highest level of lead that EPA allows in public drinking water. The action level ensures that drinking water does not pose either a short-term or long-term health risk due to lead contamination. While not all wells sampled were public supply wells, this Office does use the lead action level as a benchmark for further evaluation of lead results.

Laboratory data show that well AC-6919Z exceeded the Federal Action Level for lead with a reported concentration of 33 ppb. This privately owned irrigation has not exceeded the lead action level in the past, but close attention will be given to future analysis of this well. If a public supply well were to exceed the action level for lead, then some treatment technique would be required to reduce the amount of lead in the water supplied to the public.

Comparison To Historical Data

Table 10-8 lists the current inorganic data averages alongside the inorganic data averages for the three previous sampling rotations (three, six and nine years prior). A comparison shows that the barium, copper and iron averages have increased over the past twelve years. The zinc averages decreased between FY 1996 and FY 2002, but increased in 2005. All other averages were consistently below detection levels.

VOLATILE ORGANIC COMPOUNDS

Table 10-9 shows the volatile organic compound (VOC) parameters for which samples were collected and analyzed. 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.

There were no confirmed detections of a volatile organic compound for the FY 2005 sampling of the Chicot aquifer.

SEMIVOLATILE ORGANIC COMPOUNDS

Table 10-10 shows the semi-volatile organic compound parameters for which samples were collected and analyzed. 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 confirmed detection of a semi-volatile would be discussed in this section.

Preliminary laboratory data show that well CU-1125, a non-community public supply well, exceeded the MCL of 6 parts per billion (ppb) for bis(2-ethylhexyl)phthalate (BEHP), with a reported concentration of 16 ppb. BEHP is a common compound for which false positives are reported, and follow-up resamples taken from this well did not report a detection of BEHP in the resample nor its duplicate. These findings did not confirm the original BEHP results. Therefore, taking these items into consideration, it is the opinion of this Office that the original sample results were due to field or laboratory contamination, and are rejected.

Based on the previous information, there were no confirmed detections of semivolatile organic compounds for the FY 2005 sampling of the Chicot aquifer.

PESTICIDES AND PCBS

Table 10-11 shows the pesticide and PCB parameters for which samples were collected and analyzed. 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 confirmed detection of a pesticide or PCB would be discussed in this section.

There were no confirmed detections of a pesticide or PCB for the FY 2005 sampling of the Chicot aquifer.

COMMON WATER CHARACTERISTICS

Table 10-1 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 aquifer for pH, TDS, hardness, chloride, iron, and nitrite-nitrate are listed in the table. Figures 10-2, 10-3, 10-4, and 10-5 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 moderately hard[1].

Table 10-1 Common Water Characteristics
Fiscal Year 2005

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
PH (SU)	5.68	8.05	7.22
TDS (ppm)	20.7	934	321.5
Hardness (ppm)	5.0	408	133.2
Chloride (ppm)	2.6	377	59.7
Iron (ppb)	<20	33,101	3,073.6
Nitrite-Nitrate (ppm)	<0.05	<0.05	<0.05

[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 aquifer is moderately hard and that no primary MCL was exceeded. This aquifer is of fair quality when considering taste, odor, or appearance guidelines, due to the number of wells (15) that exceeded the secondary MCL for iron.

Lead was detected in two Chicot aquifer wells, AC-6919Z and V-535. It was detected in AC-6919Z, a privately owned irrigation well, at 33 ppb, which is above the lead action level of 15 ppb. A review of previous sampling results found that lead has been detected in this well intermittently, so close attention will be paid to the lead results from the next regularly scheduled sampling. The well owner has been notified of this. Lead was detected in well V-535 at 14.7 ppb, a concentration that is consistent with previous sampling results from 1996, 1999 and 2002 that showed lead levels of 11.3 ppb, 14.2 ppb and 14.7 ppb respectively. It is the opinion of this Office that the existence of lead in well V-535 has been established. However all of the lead concentrations found in V-535 were below the lead action level of 15 ppb. The owner of this well, which is a public supply well that serves a fire station, has been notified of these lead concentrations. The privately owned irrigation well AC-6919Z, was the only well that exceeded the lead action level of 15 ppb during the current round of sampling.

A comparison of present and historical BMP data averages of field and conventional parameters show that for the most part they have remained consistent over the past nine years. A comparison of inorganic parameters show that the barium, copper and iron averages have increased during this time period, while zinc averages decreased between FY 1996 and FY 2002, but increased in 2005. The average concentrations for all other inorganic parameters have remained below detection levels.

It is recommended that the wells assigned to monitor the Chicot aquifer 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 10-2 List of Wells Sampled

DOTD WELL NUMBER	PARISH	SAMPLE DATE	OWNER	DEPTH (In Feet)	WELL USE
AC-539	ACADIA	4/4/2005	CITY OF RAYNE	251	PUBLIC SUPPLY
AC-6919Z	ACADIA	4/4/2005	PRIVATE OWNER	UNKNOWN	IRRIGATION
AL-141	ALLEN	4/25/2005	TOWN OF OBERLIN	155	PUBLIC SUPPLY
BE-378	BEAUREGARD	4/26/2005	TRANSCONTINENTAL GAS PIPELINE	172	INDUSTRIAL
BE-412	BEAUREGARD	4/26/2005	BOISE CASCADE	202	INDUSTRIAL
BE-486	BEAUREGARD	4/25/2005	EAST BEAUREGARD HIGH SCHOOL	150	PUBLIC SUPPLY
BE-488	BEAUREGARD	4/26/2005	SINGER WATER DISTRICT	262	PUBLIC SUPPLY
CN-5589Z	CAMERON	5/10/2005	PRIVATE OWNER	140	DOMESTIC
CU-10192Z	CALCASIEU	5/9/2005	PPG	230	RECOVERY
CU-1125	CALCASIEU	5/9/2005	LDOTD	570	PUBLIC SUPPLY
CU-1366	CALCASIEU	5/10/2005	CITY OF LAKE CHARLES	685	PUBLIC SUPPLY
CU-1436	CALCASIEU	5/9/2005	PPG INDUSTRIES	530	INDUSTRIAL
CU-770	CALCASIEU	5/23/2005	USGS	490	OBSERVATION
CU-862	CALCASIEU	5/10/2005	CITGO PETROLEUM REFINING	560	INDUSTRIAL
EV-673	EVANGELINE	4/4/2005	CITY OF MAMOU	247	PUBLIC SUPPLY
I-5050Z	IBERIA	4/5/2005	PRIVATE OWNER	188	DOMESTIC
JD-862	JEFFERSON DAVIS	4/26/2005	CITY OF WELSH	697	PUBLIC SUPPLY
LF-572	LAFAYETTE	4/5/2005	CITY OF LAFAYETTE	570	PUBLIC SUPPLY
R-5428Z	RAPIDES	4/25/2005	PRIVATE OWNER	85	DOMESTIC
SL-392	ST LANDRY	5/23/2005	USGS	126	OBSERVATION
SMN-109	ST MARTIN	5/24/2005	USGS	375	OBSERVATION
V-535	VERNON	4/25/2005	MARLOW FIRE STATION	66	PUBLIC SUPPLY
VE-650	VERMILION	5/24/2005	USGS	205	OBSERVATION
VE-862	VERMILION	4/4/2005	TOWN OF GUEYDAN	249	PUBLIC SUPPLY
VE-882	VERMILION	4/5/2005	WATER PLANT	279	PUBLIC SUPPLY

Table 10-3 Summary of Water Quality Data

Well Name	pH SU	Sal. ppt	Sp. Cond. mmhos/cm	TDS g/L	Temp. Deg. C	Alk. ppm	NH3 ppm	Cl ppm	Color PCU	Hard. ppm	Nitrite-Nitrate (as N) ppm	TKN ppm	Tot. P ppm	Sp. Cond. umhos/cm	SO4 ppm	TDS ppm	TSS ppm	Turb. NTU
	LABORATORY DETECTION LIMITS →					2.0	0.1	1.3	5.0	5.0	0.05	0.1	0.05	10	1.3/1.25	4.0	4.0	1.0
	FIELD PARAMETERS					LABORATORY PARAMETERS												
AC-539	7.43	0.31	0.64	0.42	22.18	320	1.09	27.1	5	218	<0.05	1.33	0.2	645	<1.25	378	4.5	11
AC-539*	7.43	0.31	0.64	0.42	22.18	316	1.11	27.3	6	217	<0.05	1.36	0.21	639	<1.25	356	4	14
AC-6919Z	7.44	0.39	0.79	0.51	22.54	230	0.99	108	<5	408	<0.05	1.56	0.97	784	<1.25	460	42	40
AL-141	8.05	0.16	0.34	0.22	23.49	166	0.16	8.1	6	<5	<0.05	0.16	0.35	326	<1.3	221	<4	<1
AL-141*	8.05	0.16	0.34	0.22	23.49	166	0.15	8.1	6	<5	<0.05	0.15	0.36	327	<1.3	221	<4	1.1
BE-378	6.51	0.16	0.32	0.21	22.56	93	<0.1	37.7	7	59	<0.05	<0.1	0.44	316	5	211	<4	<1
BE-412	5.82	0.03	0.05	0.03	20.58	16.6	<0.1	5.3	<5	7.2	0.1	<0.1	<0.05	54.9	<1.3	61.3	<4	<1
BE-486	7.61	0.06	0.13	0.09	20.20	34.9	<0.1	18.6	<5	22.2	0.06	<0.1	<0.05	131	<1.3	119	<4	1.3
BE-488	6.08	0.03	0.07	0.04	21.28	27.6	<0.1	5.5	<5	11.6	0.07	<0.1	<0.05	70.9	<1.3	80	<4	<1
CN-5589Z	7.59	0.39	0.79	0.51	23.37	372	<0.1	56	<5	196	<0.05	0.88	0.15	819	<1.3	476	<4	1.1
CU-10192Z	7.90	0.19	0.4	0.26	23.48	203	0.26	16.1	<5	114	0.08	0.32	0.11	409	<1.3	242	<4	2.4
CU-1125	7.71	0.17	0.36	0.23	22.84	153	0.18	27.2	<5	62.4	<0.05	0.21	0.21	370	1.5	241	<4	4
CU-1366	7.26	0.33	0.68	0.44	24.27	149	0.17	132	24	114	<0.05	0.17	0.31	701	6.8	400	<4	6
CU-1436	7.31	0.29	0.59	0.38	24.25	156	0.18	95.6	8	134	<0.05	†0.3	0.27	594	2	342	<4	14
CU-1436*	7.31	0.29	0.59	0.38	24.25	156	0.17	95.1	8	127	<0.05	†0.18	0.28	595	2	342	<4	13
CU-770	8.02	0.17	0.34	0.22	22.75	141	<0.1	25.4	<5	98.8	<0.05	0.2	0.16	342	<1.3	200	<4	2.4
CU-770*	8.02	0.17	0.34	0.22	22.75	142	<0.1	25.1	<5	100	<0.05	0.22	0.17	341	<1.3	208	<4	2.3
CU-862	7.36	0.66	1.33	0.86	24.59	188	0.17	304	13	268	<0.05	†0.12	0.18	1367	<1.25	804	4.5	17
EV-673	7.34	0.35	0.72	0.47	21.47	280	0.15	63.2	<5	148	<0.05	0.32	0.25	713	<1.3	422	<4	7.9
I-5050Z	6.75	0.34	0.69	0.44	21.82	203	0.44	73.5	140	<5	<0.05	0.57	0.29	628	4.5	356	378	150
JD-862	6.97	0.48	0.98	0.63	24.40	128	0.23	201	46	170	<0.05	0.32	0.33	942	<1.3	512	<4	2.5
LF-572	7.41	0.19	0.39	0.25	20.60	195	0.13	5.6	<5	184	<0.05	0.14	0.17	380	5.7	243	<4	<1
R-5428Z	5.68	0.02	0.04	0.02	20.76	10.1	<0.1	3.9	<5	<5	0.09	<0.1	<0.05	38	<1.3	52.7	<4	<1
SL-392	6.85	0.19	0.39	0.25	21.92	167	<0.1	12.6	25	166	<0.05	0.18	0.18	359	8.9	232	24	110
SMN-109	7.29	0.60	1.21	0.78	21.87	475	0.67	128	11	324	<0.05	0.98	0.17	1194	<1.25	688	4.5	9.4
V-535	5.88	0.01	0.02	0.01	18.39	5.8	<0.1	2.6	<5	<5	0.09	<0.1	<0.05	24.2	<1.3	20.7	4	4.1
VE-650	7.31	0.25	0.51	0.33	22.88	265	0.65	9.5	23	268	<0.05	0.95	0.32	493	<1.25	292	11	45

Well Name	pH SU	Sal. ppt	Sp. Cond. mmhos/cm	TDS g/L	Temp. Deg. C	Alk. ppm	NH3 ppm	Cl ppm	Color PCU	Hard. ppm	Nitrite-Nitrate (as N) ppm	TKN ppm	Tot. P ppm	Sp. Cond. umhos/cm	SO4 ppm	TDS ppm	TSS ppm	Turb. NTU
	LABORATORY DETECTION LIMITS →					2.0	0.1	1.3	5.0	5.0	0.05	0.1	0.05	10	1.3/1.25	4.0	4.0	1.0
	FIELD PARAMETERS					LABORATORY PARAMETERS												
VE-862	7.57	0.59	1.18	0.76	22.38	393	1.83	147	<5	229	<0.05	2.18	0.22	1172	<1.25	650	<4	6.2
VE-882	7.42	0.42	0.85	0.55	21.53	367	<0.1	63.2	5	203	<0.05	0.62	0.13	862	8.4	492	4.5	1.1

* Denotes Duplicate Sample

† Laboratory Estimated Value

Table 10-4 Summary of Inorganic Data

WELL NAME	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
Laboratory Detection Limits	10	10	1	1	1	5	10	20	10	0.05	5	10/30	10	5/50	20
AC-539	<10	<10	617	<1	<1	<5	<10	1609	<10	<0.05	<5	<10	<10	<5	<20
AC-539*	<10	<10	624	<1	<1	<5	<10	1630	<10	<0.05	<5	<30	<10	<50	<20
AC-6919Z	<10	<10	774	<1	<1	7.2	412	13964	33	<0.05	10.4	<30	<10	<5	39.7
AL-141	<10	<10	12.9	<1	<1	<5	<10	80.4	<10	<0.05	<5	<10	<10	<5	<20
AL-141*	<10	<10	12.6	<1	<1	<5	<10	79	<10	<0.05	<5	<10	<10	<50	<20
BE-378	<10	<10	136	<1	<1	<5	<10	2747	<10	<0.05	<5	<10	<10	<50	<20
BE-412	<10	<10	114	<1	<1	<5	<10	<20	<10	<0.05	<5	<10	<10	<50	<20
BE-486	<10	<10	137	<1	<1	<5	<10	117	<10	<0.05	<5	<10	<10	<50	25.8
BE-488	<10	<10	79.7	<1	<1	<5	37.8	209	<10	<0.05	<5	<10	<10	<50	40.9
CN-5589Z	<10	<10	524	<1	<1	<5	<10	165	<10	<0.05	<5	<10	<10	<5	<20
CU-10192Z	<10	<10	275	<1	<1	<5	<10	151	<10	<0.05	<5	<10	<10	<5	153
CU-1125	<10	<10	223	<1	<1	<5	11.9	1960	<10	<0.05	<5	<10	<10	<5	332
CU-1366	<10	<10	398	<1	<1	<5	<10	2200	<10	<0.05	<5	<10	<10	<5	<20
CU-1436	<10	<10	314	<1	<1	<5	<10	1760	<10	<0.05	<5	<10	<10	<5	<20
CU-1436*	<10	<10	315	<1	<1	<5	<10	1760	<10	<0.05	<5	<10	<10	<5	<20
CU-770	<10	<10	242	<1	<1	<5	<10	239	<10	<0.05	<5	<10	<10	<5	416
CU-770*	<10	<10	248	<1	<1	<5	<10	323	<10	<0.05	<5	<10	<10	<50	412
CU-862	<10	<10	734	<1	<1	<5	<10	2450	<10	<0.05	<5	<10	<10	<5	<20
EV-673	<10	<10	333	<1	<1	<5	27.7	1544	<10	<0.05	<5	<30	<10	<50	<20
I-5050Z	<10	<10	329	<1	<1	8.4	29.1	33101	<10	<0.05	23.9	<30	<10	<50	9639
JD-862	<10	<10	856	<1	<1	<5	<10	2651	<10	<0.05	<5	<30	<10	<50	<20
LF-572	<10	<10	223	<1	<1	<5	<10	198	<10	<0.05	<5	<30	<10	<50	<20
R-5428Z	<10	<10	26.7	<1	<1	<5	85.4	<20	<10	<0.05	<5	<10	<10	<5	31.2
SL-392	<10	<10	272	<1	<1	<5	<10	12229	<10	<0.05	<5	<10	<10	<5	<20
SMN-109	<10	<10	763	<1	<1	<5	<10	1211	<10	<0.05	<5	<10	<10	<5	4331
V-535	<10	<10	30	<1	<1	<5	511	271	14.7	<0.05	<5	<10	<10	<50	482
VE-650	<10	<10	162	<1	<1	<5	<10	5061	<10	<0.05	<5	<10	<10	<5	1928
VE-862	<10	<10	1047	<1	<1	<5	<10	1022	<10	<0.05	<5	<30	<10	<5	<20
VE-882	<10	<10	590	<1	<1	<5	<10	383	<10	<0.05	<5	<30	<10	<50	<20

* Denotes Duplicate Sample

Table 10-5 Water Quality Statistics
Fiscal Year 2005

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	Temperature (^{O}C)	18.39	24.59	22.38
	pH (SU)	5.68	8.05	7.22
	Specific Conductance (mmhos/cm)	0.02	1.754	0.54
	Salinity (ppt)	0.01	0.89	0.27
	TDS (g/L)	0.01	1.14	0.35
LABORATORY	Alkalinity (ppm)	5.8	475	190.31
	Chloride (ppm)	2.6	377	59.73
	Color (PCU)	<5	140	12.69
	Specific Conductance (umhos/cm)	24.2	1,735	539.21
	Sulfate (ppm)	<1.25	8.9	1.99
	TDS (ppm)	20.7	934	321.47
	TSS (ppm)	<4	378	17.90
	Turbidity (NTU)	<1	150	16.17
	Ammonia, as N (ppm)	<0.1	1.83	0.32
	Hardness (ppm)	<5	408	133.16
	Nitrate - Nitrite, as N (ppm)	<0.05	0.1	<0.05
	TKN (ppm)	<0.1	2.18	0.50
	Total Phosphorous (ppm)	<0.05	0.97	0.23

Table 10-6 Inorganic Statistics
Fiscal Year 2005

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (ppb)	<10	<10	<10
Arsenic (ppb)	<10	<10	<10
Barium (ppb)	12.6	1,047	359
Beryllium (ppb)	<1	<1	<1
Cadmium (ppb)	<1	<1	<1
Chromium (ppb)	<5	8.4	<5
Copper (ppb)	<10	511	42.2
Iron (ppb)	<20	33,101	3,073.6
Lead (ppb)	,10	33	<10
Mercury (ppb)	<0.05	<0.05	<0.05
Nickel (ppb)	<5	23.9	<5
Selenium (ppb)	<10	33.6	<10
Silver (ppb)	<10	<10	<10
Thallium (ppb)	<5	50	12.21
Zinc (ppb)	<20	9,639	620.7

Table 10-7 Three-year Water Quality Statistics

	PARAMETER	FY 1996 AVERAGE	FY 1999 AVERAGE	FY 2002 AVERAGE	FY 2005 AVERAGE
FIELD	Temperature (^{O}C)	22.68	23.20	21.85	22.38
	pH (SU)	7.08	7.01	7.03	7.22
	Specific Conductance (mmhos/cm)	0.534	0.650	0.523	0.54
	Field Salinity (ppt)	0.26	0.33	0.25	0.27
LABORATORY	Alkalinity (ppm)	199.8	188.7	193.4	190.3
	Chloride (ppm)	67.5	59.6	51.6	59.73
	Color (ppm)	22.5	13.0	13.5	12.7
	Specific Conductance (umhos/cm)	593.9	552.5	501.6	539.2
	Sulfate (ppm)	2.09	2.78	1.48	1.99
	TDS (ppm)	369.1	351.9	302.0	321.5
	TSS (ppm)	19.5	5.4	4.0	17.9
	Turbidity (NTU)	13.80	14.63	13.78	16.17
	Ammonia, as N (ppm)	0.36	0.35	0.41	0.32
	Hardness (ppm)	129.9	122.8	127.0	133.2
	Nitrate - Nitrite, as N (ppm)	<0.05	<0.05	<0.05	<0.05
	TKN (ppm)	0.35	0.67	0.58	0.50
	Total Phosphorous (ppm)	0.24	0.25	0.13	0.23

Table 10-8 Three-year Inorganic Statistics

PARAMETER	FY 1996 AVERAGE	FY 1999 AVERAGE	FY 2002 AVERAGE	FY 2005 AVERAGE
Antimony (ppb)	<5	<5	<5	<5
Arsenic (ppb)	<5	<5	<5	<5
Barium (ppb)	277.61	311.96	297.00	359.03
Beryllium (ppb)	<5	<5	<1	<1
Cadmium (ppb)	<5	<5	<1	<1
Chromium (ppb)	<5	<5	<5	<5
Copper (ppb)	14.38	35.83	25.69	42.24
Iron (ppb)	1,823.53	1,970.59	1,794.94	3073.60
Lead (ppb)	<10	<10	<10	<10
Mercury (ppb)	<0.05	<0.05	<0.05	<0.05
Nickel (ppb)	<5	<5	<5	<5
Selenium (ppb)	<5	<5	<5	<10
Silver (ppb)	<5	<5	<1	<5
Thallium (ppb)	<5	<5	<5	<50
Zinc (ppb)	346.69	152.28	123.47	620.71

Table 10-9 List of VOC Analytical Parameters

BASELINE MONITORING PROGRAM
VOLATILE ORGANICS BY EPA METHOD 624

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

ppb = parts per billion

Table 10-10 List of Semi-volatile Analytical Parameters

BASELINE MONITORING PROGRAM

SEMIVOLATILE ORGANICS BY EPA METHOD 625

COMPOUND	DETECTION LIMIT (ppb)
1,2-Dichlorobenzene	10
1,2,3-Trichlorobenzene	10
1,2,3,4-Tetrachlorobenzene	10
1,2,4-Trichlorobenzene	10
1,2,4,5-Tetrachlorobenzene	10
1,3-Dichlorobenzene	10
1,3,5-Trichlorobenzene	10
1,4-Dichlorobenzene	10
2-Chloronaphthalene	10
2-Chlorophenol	20
2-Methyl-4,6-dinitrophenol	20
2-Nitrophenol	20
2,4-Dichlorophenol	20
2,4-Dimethylphenol	20
2,4-Dinitrophenol	20
2,4-Dinitrotoluene	10
2,4,6-Trichlorophenol	20
2,6-Dinitrotoluene	10
3,3'-Dichlorobenzidine	10
4-Bromophenyl phenyl ether	10
4-Chloro-3-methylphenol	20
4-Chlorophenyl phenyl ether	10
4-Nitrophenol	20
Acenaphthene	10
Acenaphthylene	10
Anthracene	10
Benzidine	20
Benzo[a]pyrene	10
Benzo[k]fluoranthene	10
Benzo[a]anthracene	10
Benzo[b]fluoranthene	10
Benzo[g,h,i]perylene	10
Bis(2-chloroethoxy)methane	10
Bis(2-ethylhexyl)phthalate	10
Bis(2-chloroethyl)ether	10
Bis(2-chloroethyl)ether	10
Bis(2-chloroisopropyl)ether	10
Butylbenzylphthalate	10
Chrysene	10

Table 10-10 (Cont'd)
Semivolatile Parameters

COMPOUND	DETECTION LIMIT (ppb)
Dibenzo[a,h]anthracene	10
Diethylphthalate	10
Dimethylphthalate	10
Di-n-butylphthalate	10
Di-n-octylphthalate	10
Fluoranthene	10
Fluorene	10
Hexachlorobenzene	10
Hexachlorobutadiene	10
Hexachlorocyclopentadiene	10
Hexachloroethane	10
Indeno[1,2,3-cd]pyrene	10
Isophorone	10
Naphthalene	10
Nitrobenzene	10
N-Nitrosodimethylamine	10
N-Nitrosodiphenylamine	10
N-nitroso-di-n-propylamine	10
Pentachlorobenzene	10
Pentachlorophenol	20
Phenanthrene	10
Phenol	20
Pyrene	10

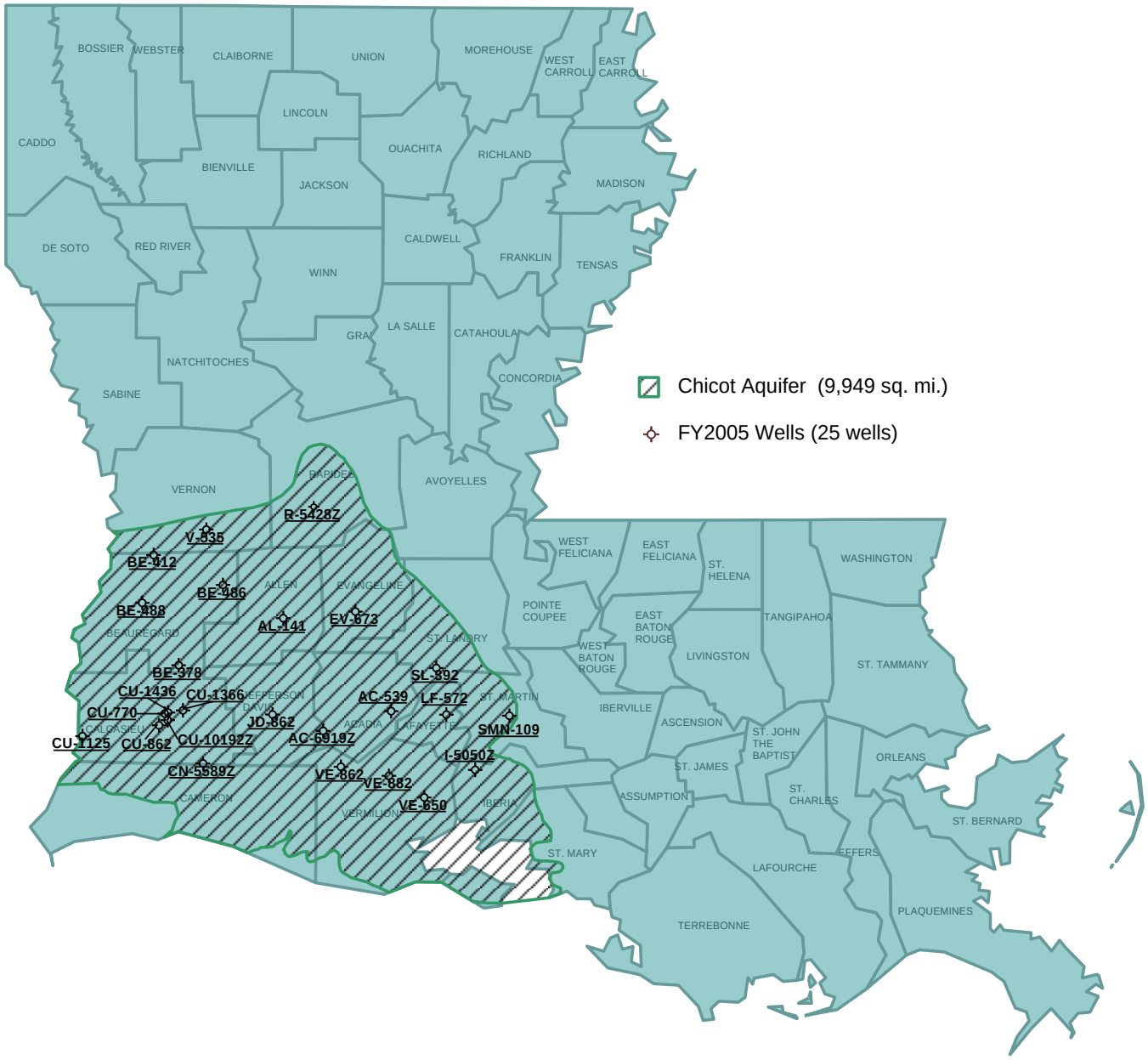
Table 10-11 List of Pesticide and PCB Analytical Parameters

BASELINE MONITORING PROGRAM

SEMIVOLATILE ORGANICS BY EPA METHOD 8081/8082

COMPOUND	DETECTION LIMIT (ppb)
4,4'-DDD	0.1
4,4'-DDE	0.1
4,4'-DDT	0.1
Aldrin	0.05
alpha-BHC	0.05
beta-BHC	0.05
delta-BHC	0.05
gamma-BHC (Lindane)	0.05
Chlordane	0.5
Dieldrin	0.1
Endosulfan I	0.05
Endosulfan II	0.1
Endosulfan sulfate	0.1
Endrin	0.1
Endrin aldehyde	0.1
Endrin ketone	0.1
Heptachlor	0.05
Heptachlor epoxide	0.05
Methoxychlor	0.5
Toxaphene	5
Aroclor-1016	1
Aroclor-1221	1
Aroclor-1232	1
Aroclor-1242	1
Aroclor-1248	1
Aroclor-1254	1
Aroclor-1260	1

BASELINE MONITORING PROGRAM
WELLS OF THE CHICOT AQUIFER



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 10-1 Location Plat, Chicot Aquifer

CHICOT AQUIFER - pH (SU)

Baseline Monitoring Program, FY 2005

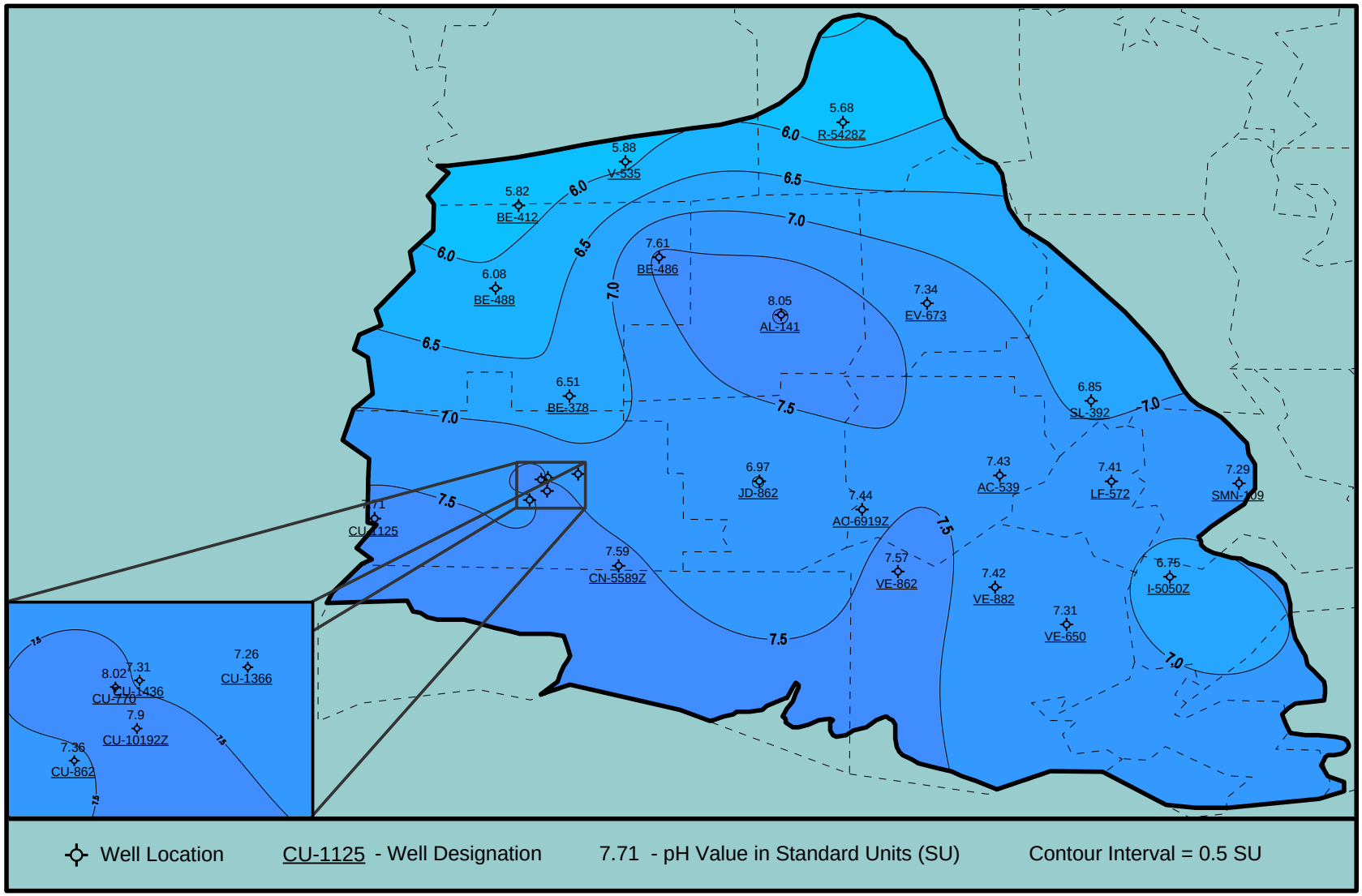


Figure 10-2 Map of pH Data

CHICOT AQUIFER - TOTAL DISSOLVED SOLIDS

Baseline Monitoring Program, FY 2005

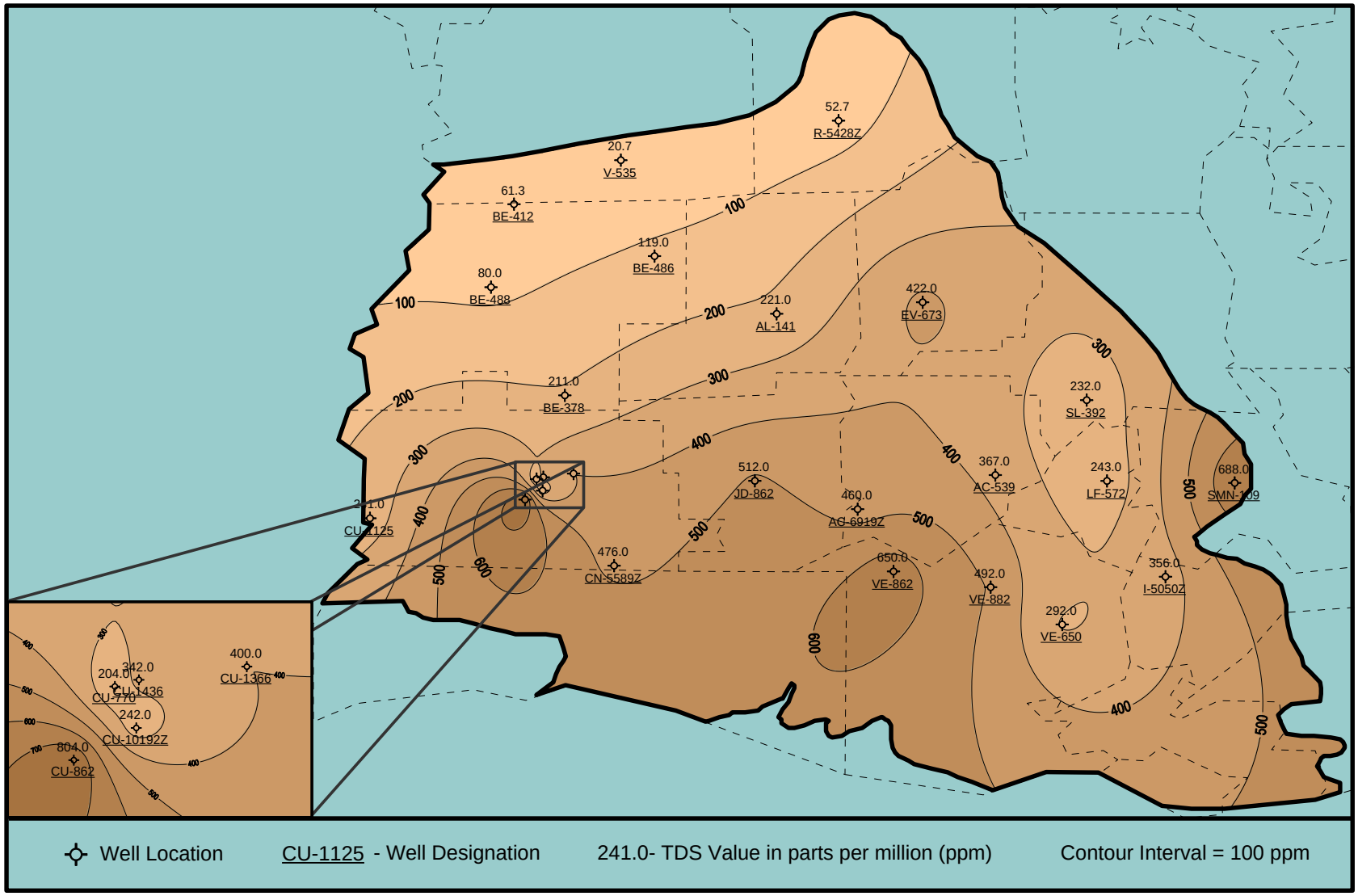


Figure 10-3 Map of TDS Data

CHICOT AQUIFER - TOTAL DISSOLVED SOLIDS

Baseline Monitoring Program, FY 2005

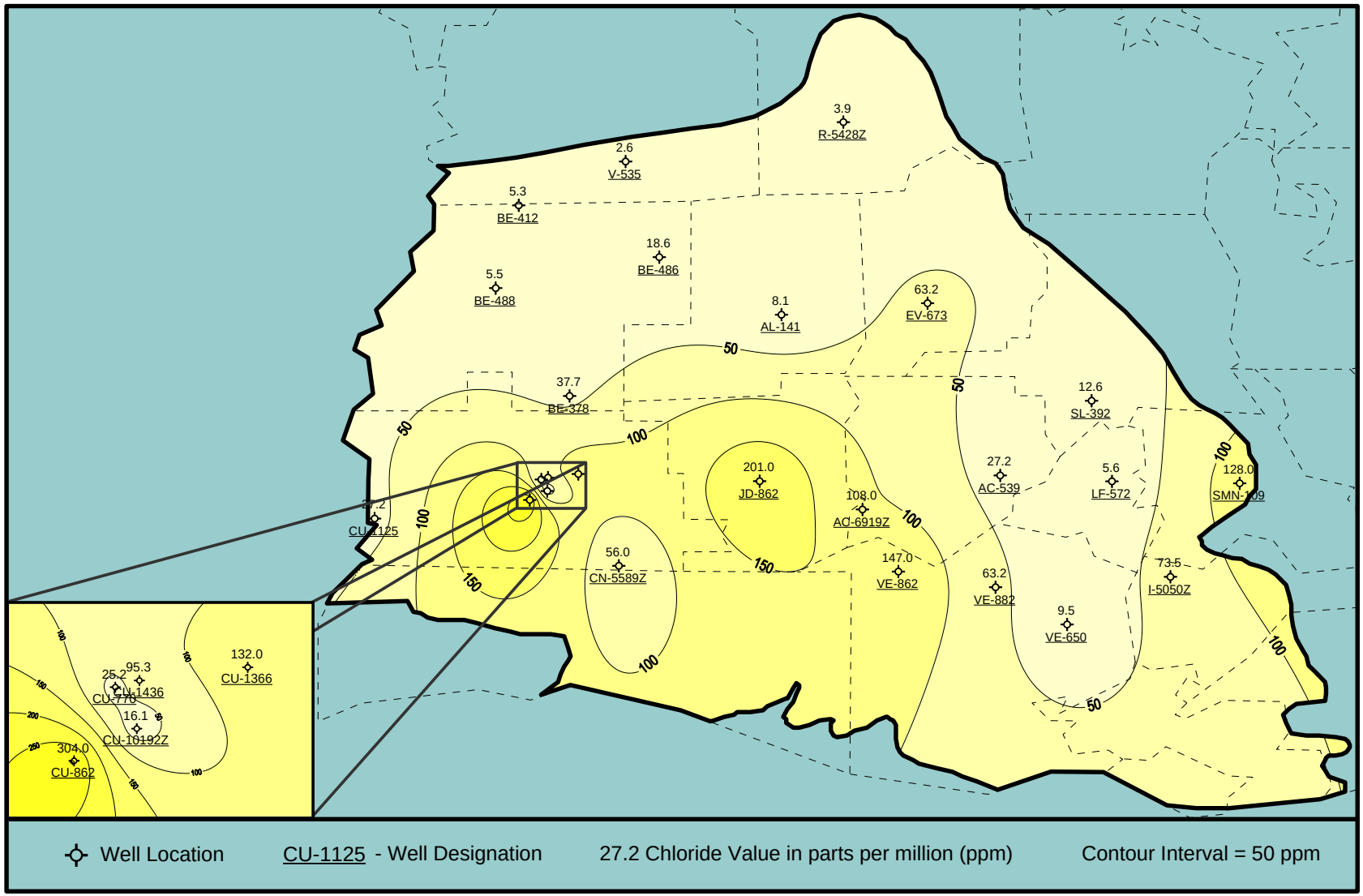


Figure 10-4 Map of Chloride Data

CHICOT AQUIFER - IRON

Baseline Monitoring Program, FY 2005

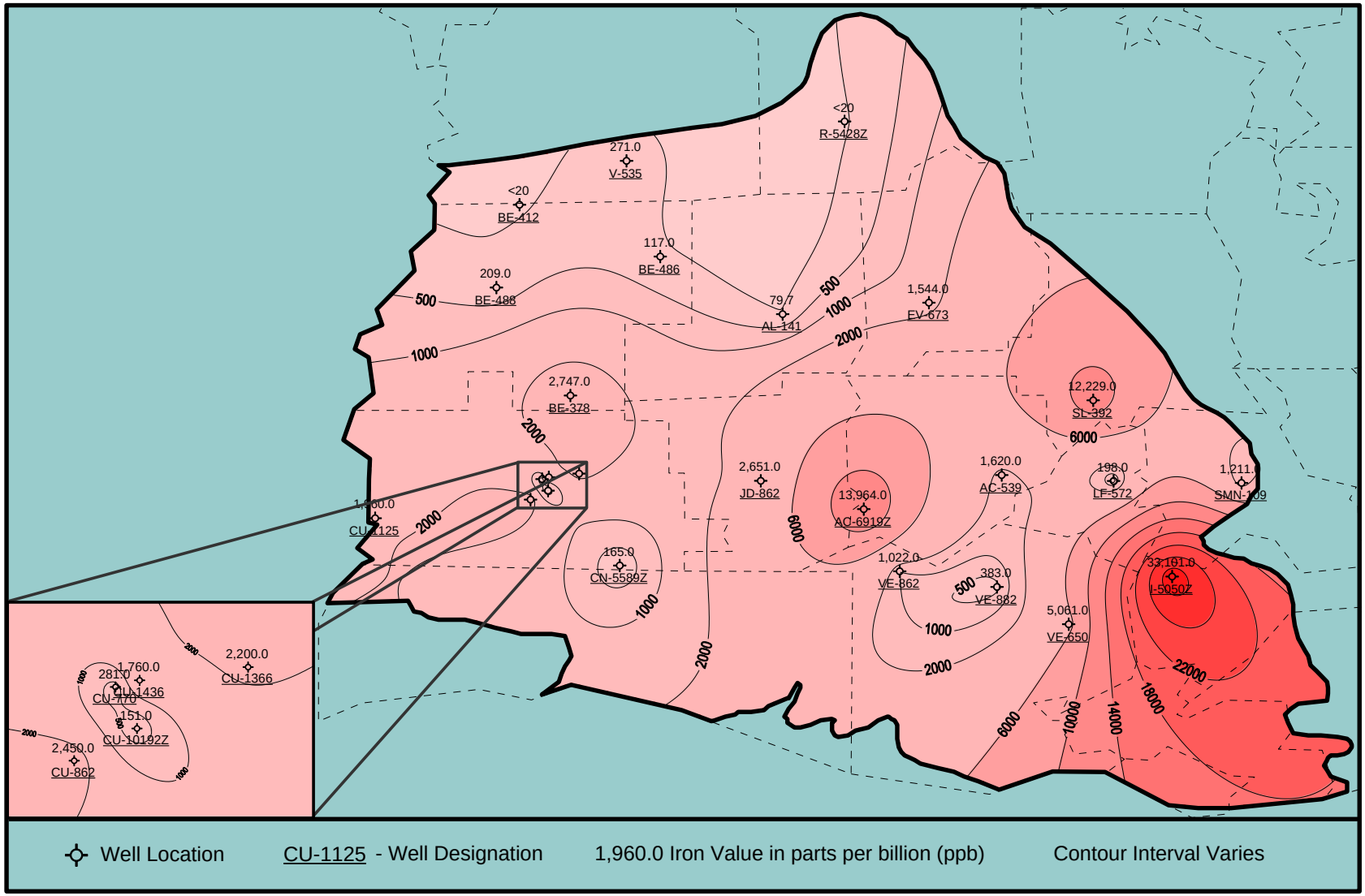


Figure 10-5 Map of Iron Data