WILLIAMSON CREEK AQUIFER SUMMARY

BASELINE MONITORING PROJECT, FY 2003

APPENDIX 11

OF THE

TRIENNIAL SUMMARY REPORT, 2003

FOR THE

ENVIRONMENTAL EVALUATION DIVISION

OF

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PARTIAL FUNDING PROVIDED THROUGH 106 CWA

WILLIAMSON CREEK AQUIFER SUMMARY

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 11-1 shows the geographic locations of the Williamson Creek aquifer and the associated Project wells, whereas Table 11-2 lists the wells in the aquifer along with their total depths and the use made of produced waters and date sampled.

In July and August of 2002, seven wells were sampled which produce from the Williamson Creek aquifer. Three of the wells are classified as public supply wells, two are industrial wells, and two are domestic wells. The wells are located in four parishes, in central and 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 Williamson Creek member consists of sands, silts, silty clays, and some gravel. The Williamson Creek member, along with the Carnahan Bayou and Dough Hills, is grouped into the Jasper aquifer. The aquifer unit consists of fine to coarse sand, which may grade laterally and vertically to silt and clay.

HYDROGEOLOGY

Recharge takes place primarily as a result of the direct infiltration of rainfall in interstream, upland outcrop areas, movement of water through overlying terrace deposits, and leakage from other aquifers. The hydraulic conductivity of the Williamson Creek varies between 20-260 feet/day.

The maximum depths of occurrence of freshwater in the Williamson Creek range from 175 feet above sea level, to 2,450 feet below sea level. The range of thickness of the fresh water interval in the Williamson Creek is 50 to 1,250 feet. The depths of the Williamson Creek wells that were monitored in conjunction with the BMP range from 248 to 1,657 feet.

INTERPRETATION OF DATA

FIELD, WATER QUALITY, AND NUTRIENTS PARAMETERS

Table 11-3 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 11-5 lists the minimum, maximum, and average results for the field data, water quality data, and nutrients data for the Williamson Creek 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 11-3 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 11-3 show that the following secondary MCLs (SMCL)s were exceeded.

pH – SMCL = 6.5 – 8.5 S.U.

BE-407 – 8.60 S.U.

Comparison To Historical Data

Table 11-7 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). For the most part the averages are consistent with color steadily decreasing and turbidity fluctuating slightly.

INORGANIC PARAMETERS

Table 11-4 shows the inorganic (total metals) parameters that are sampled for and the analytical results for those parameters for each well. Table 11-6 lists the minimum, maximum, and average results for the inorganic data for the Williamson Creek aquifer.

Federal Primary Drinking Water Standards

Mercury was detected in the laboratory analyses of the samples taken from well V-420 at a concentration of 0.09 ppb, which is below mercury's primary MCL of 2 ppb. However, since mercury had never been detected in this well before, and since it is a public supply well, the well was resampled. Mercury was not detected in the initial resample, but it was detected in the duplicate resample at 0.05

ppb, a concentration that is equal to the detection level for mercury. Because mercury was only found in the duplicate resample at a concentration right at mercury's detection level, the well was resampled again for mercury using "clean metal" methodology. A review of the analytical results from this "clean metal" resample revealed mercury at concentrations of 0.00043 ppb in the initial resample and 0.00045 ppb in the duplicate resample. Mercury was also detected in the field blank at a concentration of 0.00018 ppb. It is the opinion of this office that the results from the "clean metal" resample is a more accurate measure of the amount of mercury. These concentrations are at trace levels and are well below mercury's MCL of 2 ppb. Close attention will be paid to the mercury results during the next regularly scheduled sampling of the well.

A further review of the analyses listed on Table 11-4 shows that no primary MCL was exceeded for inorganic parameters.

Federal Secondary Drinking Water Standards

Laboratory data contained in Table 11-4 show that the following secondary SMCL was exceeded.

Iron – SMCL = 300 ppb

R-867 – 411 ppb, duplicate – 386 ppb V-420 – 470 ppb

Comparison To Historical Data

Table 11-8 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 the barium and iron averages have fluctuated slightly. The copper and nickel averages decreased to below their respective detection levels between FY 1996 and FY 2000 and have stayed below them. Also, the zinc average has decreased steadily. All other averages were consistently below detection levels.

VOLATILE ORGANIC COMPOUNDS

Table 11-9 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.

No VOC was detected during the FY 2003 sampling of the Williamson Creek Aquifer.

SEMIVOLATILE ORGANIC COMPOUNDS

Table 11-10 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.

Laboratory data show that three of the Williamson Creek 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 Williamson Creek 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 Williamson Creek aquifer.

PESTICIDES AND PCBS

Table 11-11 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.

4,4-DDT was detected at a concentration of 0.240 ppb and Aroclor-1254 was detected at 1.90 ppb in project well CO-163. However, these analytes were not detected in the subsequent resampling of the well, therefore it is the opinion of this office that the initial concentrations were due to laboratory or field contamination, not contamination of the well.

Taking into consideration the invalid detections discussed above, no pesticide or PCB was detected during the 2003 sampling of the Williamson Creek aquifer.

COMMON WATER CHARACTERISTICS

Table 11-1 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 Williamson Creek aquifer for pH, TDS, hardness, chloride, iron, and nitrite-nitrate are listed in the table. Figures 11-2, 11-3, 11-4, and 11-5 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 11-1 Common Water Characteristics
Fiscal Year 2002

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
PH (SU)	6.50	8.60	7.54
TDS (ppm)	150.0	328.0	235.7
Hardness (ppm)	<10	141.0	34.9
Chloride (ppm)	5.4	94.6	32.3
Iron (ppb)	<20	1,080.00	380.01
Nitrite-Nitrate (ppm)	<0.05	0.21	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 Williamson Creek aquifer is soft and that no primary MCL was exceeded. However, mercury was detected in the laboratory analyses of the samples taken from well V-420 at a concentration of 0.09 ppb, which is below mercury's primary MCL of 2 ppb. Since mercury had never been detected in this well before, and since it is a public supply well, the well was resampled. Mercury was not detected in the initial resample, but it was detected in the duplicate resample at 0.05 ppb, a concentration that is equal to the detection level for mercury. Because mercury was only found in the duplicate resample at a concentration right at mercury's detection level, the well was resampled again for mercury using "clean metal" methodology. A review of the analytical results from this "clean metal" resample revealed mercury at concentrations of 0.00043 ppb in the initial resample and 0.00045 ppb in the duplicate resample. Mercury was also detected in the field blank at a concentration of 0.00018 ppb. It is the opinion of this office that the results from the "clean metal" resample is a more accurate measure of the amount of mercury. These concentrations are at trace levels and are well below mercury's MCL of 2 ppb. Close attention will be paid to the mercury results during the next regularly scheduled sampling of the well. Furthermore, this aquifer is of good quality when considering taste, odor, or appearance guidelines. Also, a comparison of present and historical BMP data averages shows that for the most part the data averages are consistent, with color and zinc steadily decreasing and turbidity, barium, and iron fluctuating slightly. The copper and nickel averages decreased to below their respective detection levels between FY 1996 and FY 2000 and have stayed below them.

It is recommended that the Project wells assigned to the Williamson Creek 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 11-2 List of Project Wells Sampled

PROJECT NUMBER	PARISH	WELL NUMBER	DATE SAMPLED	OWNER	DEPTH (FEET)	WELL USE
199614	BEAUREGARD	BE-407	07/15/2002	BOISE CASCADE	1657	INDUSTRIAL
199326	CONCORDIA	CO-163	07/16/2002	U. S. ARMY CORPS OF ENG.	513	PUBLIC SUPPLY
199111	RAPIDES	R-867	08/27/2002	INTERNATIONAL PAPER CO.	385	INDUSTRIAL
198813	RAPIDES	R-932	07/16/2002	CITY OF ALEXANDRIA	466	PUBLIC SUPPLY
198620	VERNON	V-420	07/15/2002	U.S. ARMY/FORT POLK	920	PUBLIC SUPPLY
199615	VERNON	V-5858Z	07/15/2002	PRIVATE OWNER	248	DOMESTIC
200207	VERNON	V-8681Z	07/15/2002	PRIVATE OWNER	190	DOMESTIC

Table 11-3 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*				
BE-407	0.435	8.6	0.21	31.26	201.0	6.30	<5.0	400.0	8.40	258.0	<4.0	<1.0	0.40	<10.0	<0.05	0.51	0.16
CO-163	0.604	7.64	0.29	21.16	155.0	94.60	5.0	577.0	<1.25	328.0	<4.0	2.3	0.49	23.6	<0.05	0.55	0.20
R-867	0.325	6.5	0.15	21.80	102.0	36.20	5.0	324.0	10.10	199.0	<4.0	<1.0	0.24	18.1	<0.05	0.42	0.07
R-867*	0.325	6.5	0.15	21.80	103.0	37.10	5.0	324.0	10.20	197.0	<4.0	1.0	0.24	17.2	<0.05	0.25	0.06
R-932	0.426	7.92	0.20	22.31	211.0	9.30	<5.0	425.0	<1.25	254.0	<4.0	1.0	<0.10	21.3	<0.05	<0.10	0.07
R-932*	0.426	7.92	0.20	22.31	213.0	9.50	<5.0	434.0	1.60	258.0	<4.0	1.2	<0.10	19.5	<0.05	<0.10	0.07
V-420	0.259	7.4	0.12	25.83	95.3	18.60	<5.0	243.0	4.80	203.0	<4.0	1.0	0.28	15.1	<0.05	0.42	0.19
V-5858Z	0.49	7.61	0.24	23.62	152.0	55.90	<5.0	471.0	3.10	258.0	<4.0	1.7	0.15	141.0	0.21	0.29	0.07
V-8681Z	0.15	7.14	0.07	22.00	61.0	5.40	5.0	146.0	4.60	150.0	<4.0	1.6	0.17	20.5	<0.05	0.47	0.47

* Denotes duplicate sample.

Table 11-4 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
BE-407	<5.0	<5.0	36.5	<1.0	<1.0	<5.0	<5.0	<20.0	<10.0	<0.05	<5.0	<5.0	<1.0	<2.0	<10.0
CO-163	<5.0	<5.0	89.8	<1.0	<1.0	<5.0	<5.0	201.0	<10.0	<0.05	<5.0	<5.0	<1.0	<2.0	925.0
R-867	<5.0	<5.0	45.9	<1.0	<1.0	<5.0	<5.0	411.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
R-867*	<5.0	<5.0	46.9	<1.0	<1.0	<5.0	<5.0	386.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
R-932	<5.0	<5.0	112.0	<1.0	<1.0	<5.0	6.1	<20.0	<10.0	<0.05	<5.0	<5.0	<1.0	<2.0	<10.0
R-932*	<5.0	<5.0	99.9	<1.0	<1.0	<5.0	5.5	<20.0	<10.0	<0.05	<5.0	<5.0	<1.0	<2.0	<10.0
V-420	<5.0	<5.0	49.8	<1.0	<1.0	<5.0	<5.0	470.0	<10.0	0.09	<5.0	<5.0	<1.0	<2.0	<10.0
V-420**	<5.0	<5.0	50.5	<1.0	<1.0	<5.0	<5.0	1,020.0	<10.0	<0.05	<5.0	<5.0	<1.0	<5.0	<10.0
V-420***	<5.0	<5.0	50.1	<1.0	<1.0	<5.0	<5.0	1,080.0	<10.0	0.05	<5.0	<5.0	<1.0	<5.0	<10.0
V-5858Z	<5.0	<5.0	329.0	<1.0	<1.0	<5.0	<5.0	182.0	<10.0	<0.05	<5.0	<5.0	<1.0	<2.0	<10.0
V-8681Z	<5.0	<5.0	42.5	<1.0	<1.0	<5.0	<5.0	36.1	<10.0	<0.05	<5.0	<5.0	<1.0	<2.0	<10.0

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

Table 11-5 Water Quality Statistics

Fiscal Year 2003

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
PH (SU)	6.50	8.60	7.54
Temperature ^{O}C	21.16	31.26	24.00
Sp. Conductivity (mmhos/cm) (Field)	0.150	0.604	0.384
Salinity (ppt)	0.07	0.29	0.18
TSS (ppm)	<4	<4	<4
TDS (ppm)	150.0	328.0	235.7
Alkalinity (ppm)	61.0	211.0	139.6
Hardness (ppm)	<10.0	141.0	34.9
Turbidity (NTU)	<1	2.30	1.23
Sp. Conductivity (umhos/cm) (Lab)	146.0	577.0	369.4
Color (PCU)	<5	5.0	<5
Chloride (ppm)	5.4	94.6	32.3
Sulfate (ppm)	<1.25	10.10	4.61
Nitrite-Nitrate, as N (ppm)	<0.05	0.21	0.05
Phosphorus (ppm)	0.07	0.47	0.18
TKN (ppm)	<0.1	0.55	0.39
Ammonia (ppm)	<0.1	0.49	0.25

Table 11-6 Inorganic Statistics

Fiscal Year 2003

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (ppb)	<5	<5	<5
Arsenic (ppb)	<5	<5	<5
Barium (ppb)	36.50	329.00	89.57
Beryllium (ppb)	<1	<1	<1
Cadmium (ppb)	<1	<1	<1
Chromium (ppb)	<5	<5	<5
Copper (ppb)	<5	6.10	<5
Iron (ppb)	<20	1,080.00	380.01
Lead (ppb)	<10	<10	<10
Mercury (ppb)	<0.05	0.09	<0.05
Nickel (ppb)	<5	<5	<5
Selenium (ppb)	<5	<5	<5
Silver (ppb)	<1	<1	<1
Thallium (ppb)	<2	<5	<5
Zinc (ppb)	<10	925.00	107.22

Table 11-7 Three-year Water Quality Statistics

PARAMETER	FY 1996 AVERAGE	FY 2000 AVERAGE	FY 2003 AVERAGE
PH (SU)	6.86	7.83	7.54
Temperature ^{O}C	23.82	23.12	24.00
Sp. Conductivity (mmhos/cm) (Field)	0.369	0.424	0.384
Salinity (ppt)	0.18	0.20	0.18
TSS (ppm)	<4	<4	<4
TDS (ppm)	211.3	272.7	235.7
Alkalinity (ppm)	136.1	150.3	139.6
Hardness (ppm)	30.8	39.5	34.9
Turbidity (NTU)	1.25	6.03	1.23
Sp. Conductivity (umhos/cm) (Lab)	385.7	398.8	369.4
Color (PCU)	12.1	5.0	<5
Chloride (ppm)	38.7	37.0	32.3
Sulfate (ppm)	7.15	4.61	4.61
Nitrite-Nitrate, as N (ppm)	<0.05	0.15	0.05
Phosphorus (ppm)	0.30	0.20	0.18
TKN (ppm)	0.32	0.40	0.39
Ammonia (ppm)	0.36	0.19	0.25

Table 11-8 Three-year Inorganic Statistics

PARAMETER	FY 1996 AVERAGE	FY 2000 AVERAGE	FY 2003 AVERAGE
Antimony (ppb)	<5	<5	<5
Arsenic (ppb)	<5	<5	<5
Barium (ppb)	48.21	112.50	89.57
Beryllium (ppb)	<1	<1	<1
Cadmium (ppb)	<1	<1	<1
Chromium (ppb)	<5	<5	<5
Copper (ppb)	9.70	<5	<5
Iron (ppb)	466.00	115.28	380.1
Lead (ppb)	<10	<10	<10
Mercury (ppb)	<0.05	<0.05	<0.05
Nickel (ppb)	9.25	<5	<5
Selenium (ppb)	<5	<5	<5
Silver (ppb)	<1	<1	<1
Thallium (ppb)	<5	<5	<5
Zinc (ppb)	298.00	245.22	107.22

Table 11-9 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 11-10 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 11-10 (Cont'd)
Semivolatile Parameters

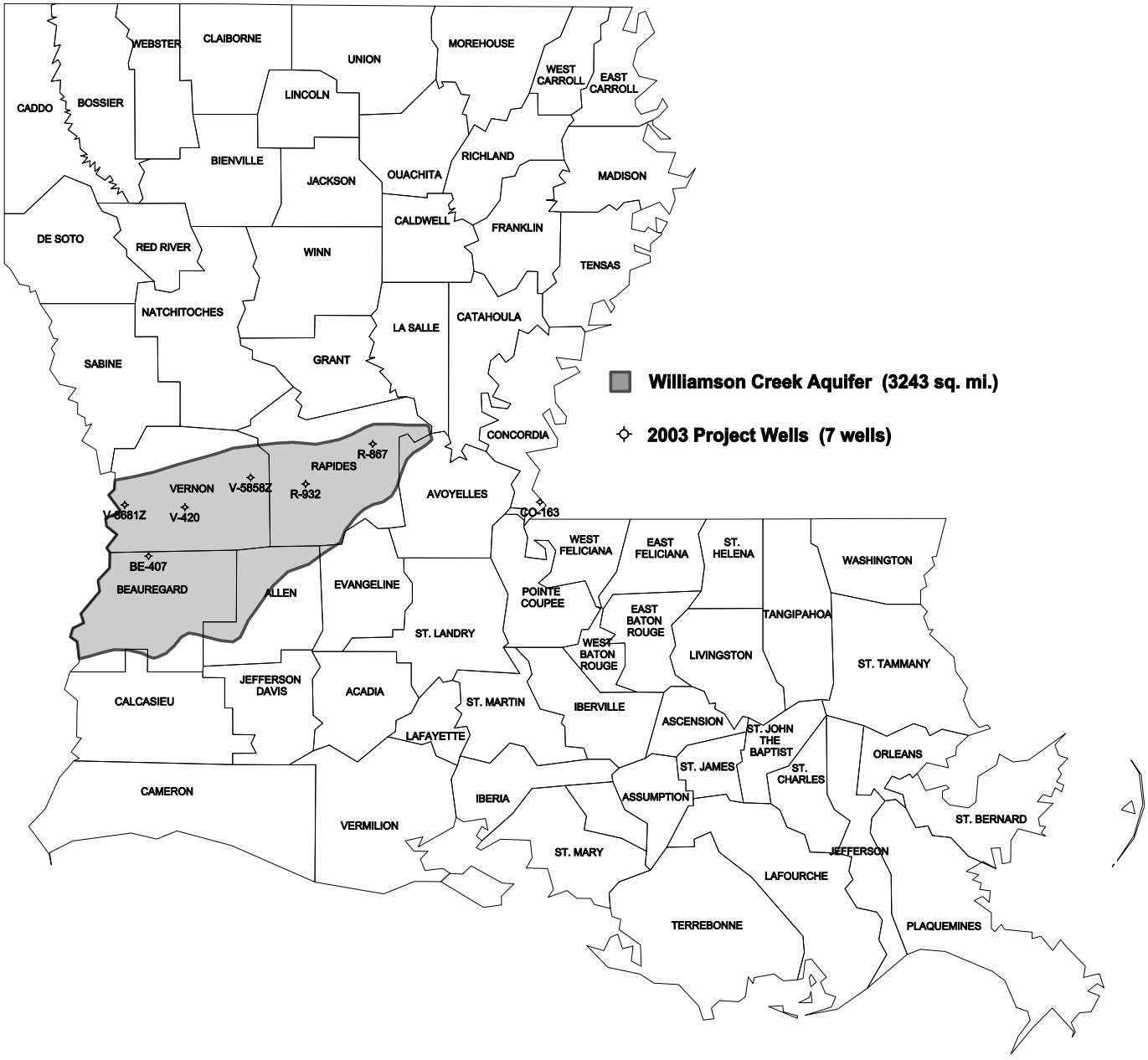
COMPOUND	PQL (ppb)
Hexachlorocyclopentadiene	10
Hexachloroethane	10
Indeno(1,2,3-cd)pyrene	10
Isophorone	10
Naphthalene	20
Nitrobenzene	10
2-Nitrophenol (o-Nitrophenol)	10
4-Nitrophenol (p-Nitrophenol)	25
N-Nitrosodiphenylamine	10
N-Nitroso-di-n-propylamine	10
N-Nitrosodiphenylamine (Diphenylamine)	10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

Table 11-11 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 WILLIAMSON CREEK 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 11-1 Location Plat, Williamson Creek Aquifer

Williamson Creek Aquifer - pH (SU)

Baseline Monitoring Project, FY 2003

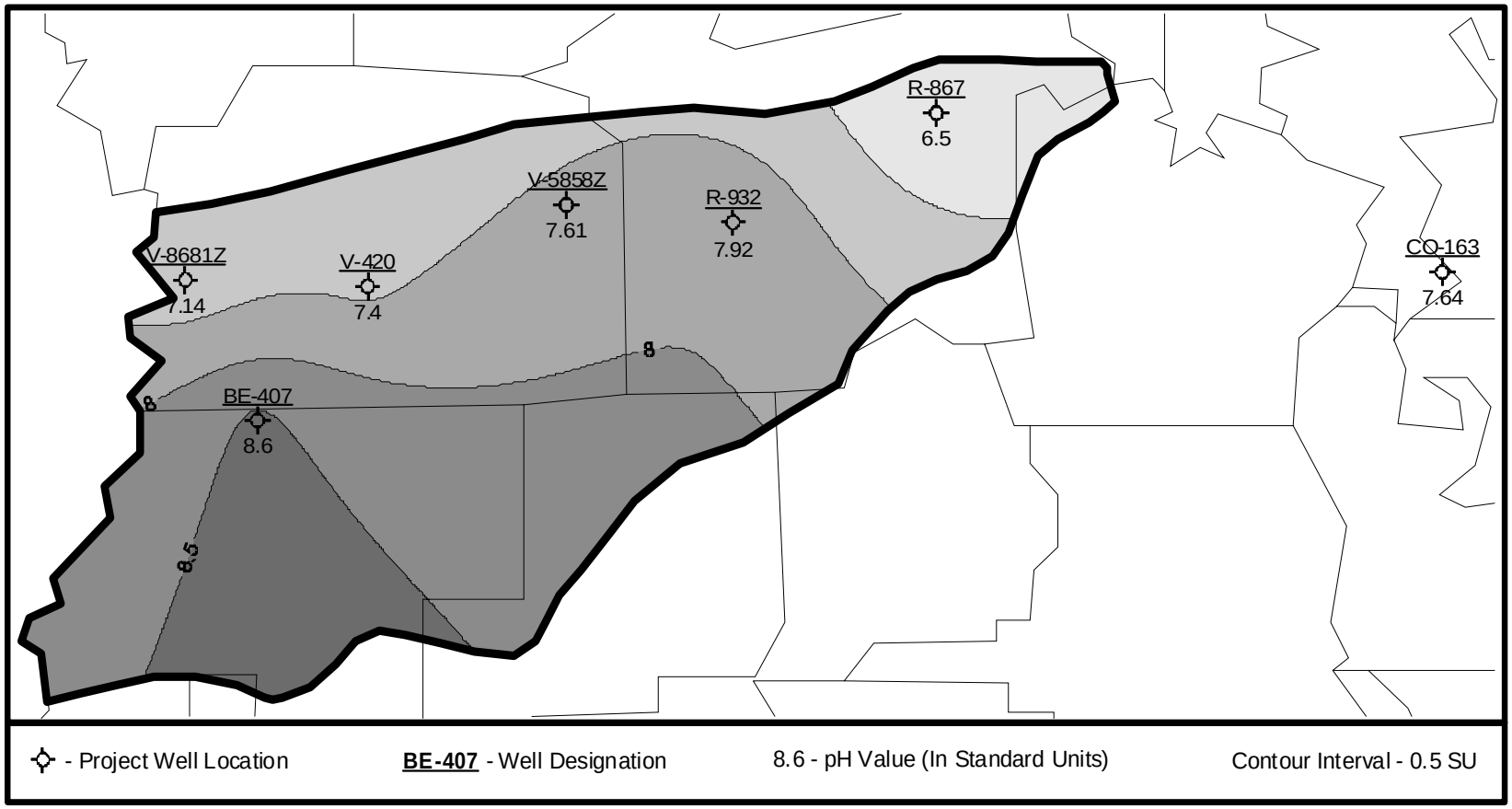


Figure 11-2 Map of pH Data

Williamson Creek Aquifer - TDS (PPM)

Baseline Monitoring Project, FY 2003

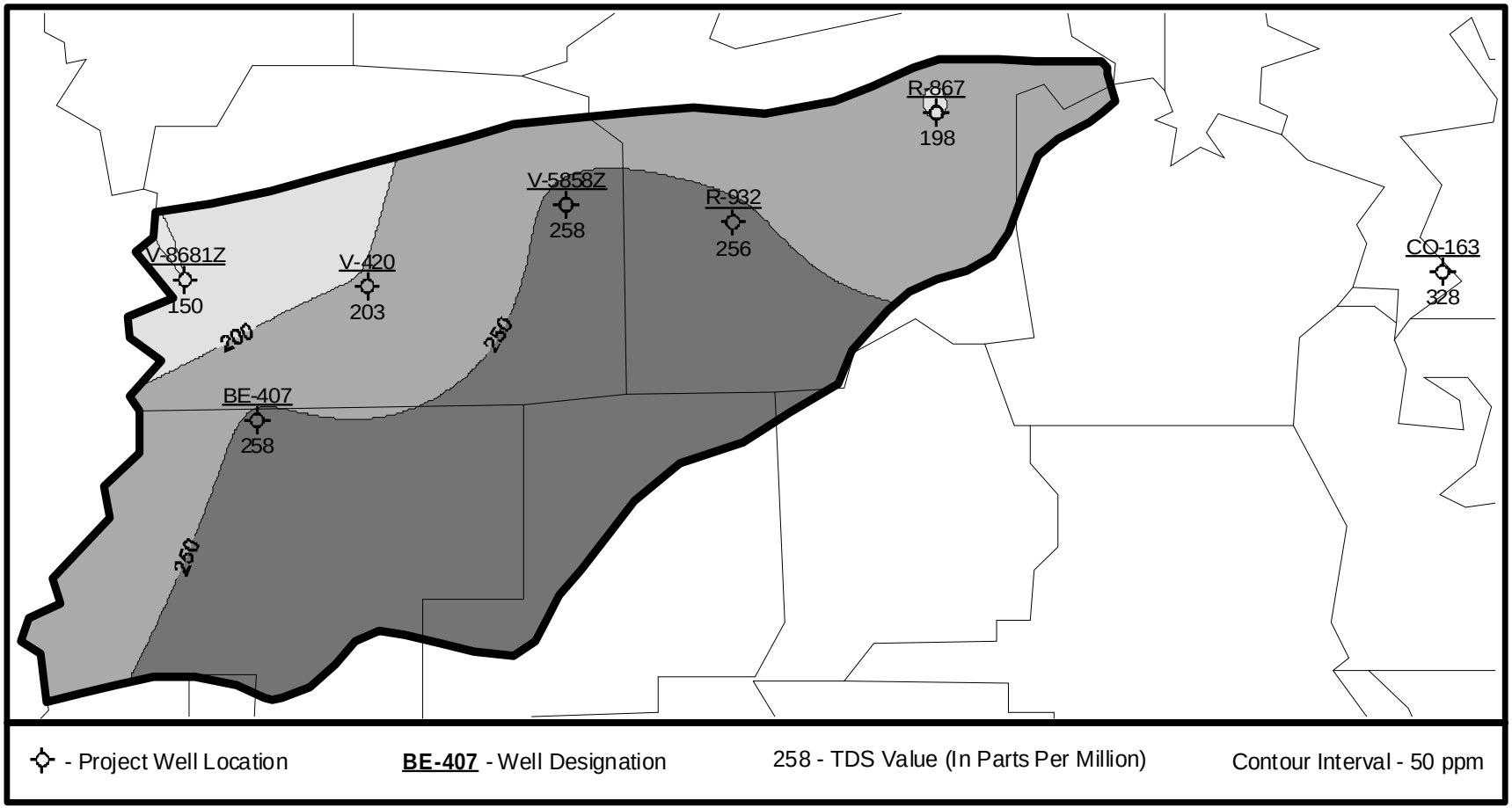


Figure 11-3 Map of TDS Data

Williamson Creek Aquifer - Chloride (PPM)

Baseline Monitoring Project, FY 2003

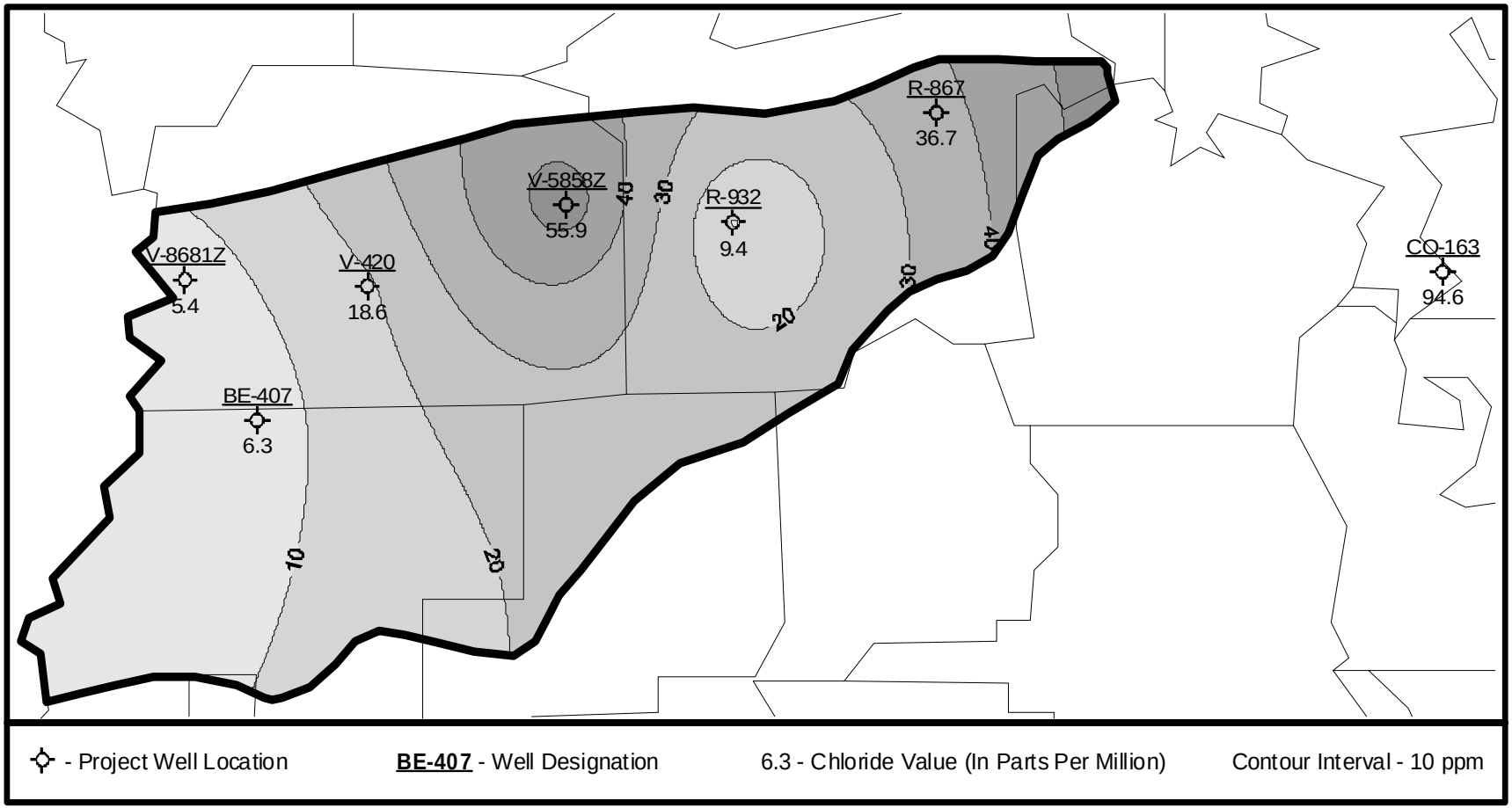


Figure 11-4 Map of Chloride Data

Williamson Creek Aquifer - Iron (PPB)

Baseline Monitoring Project, FY 2003

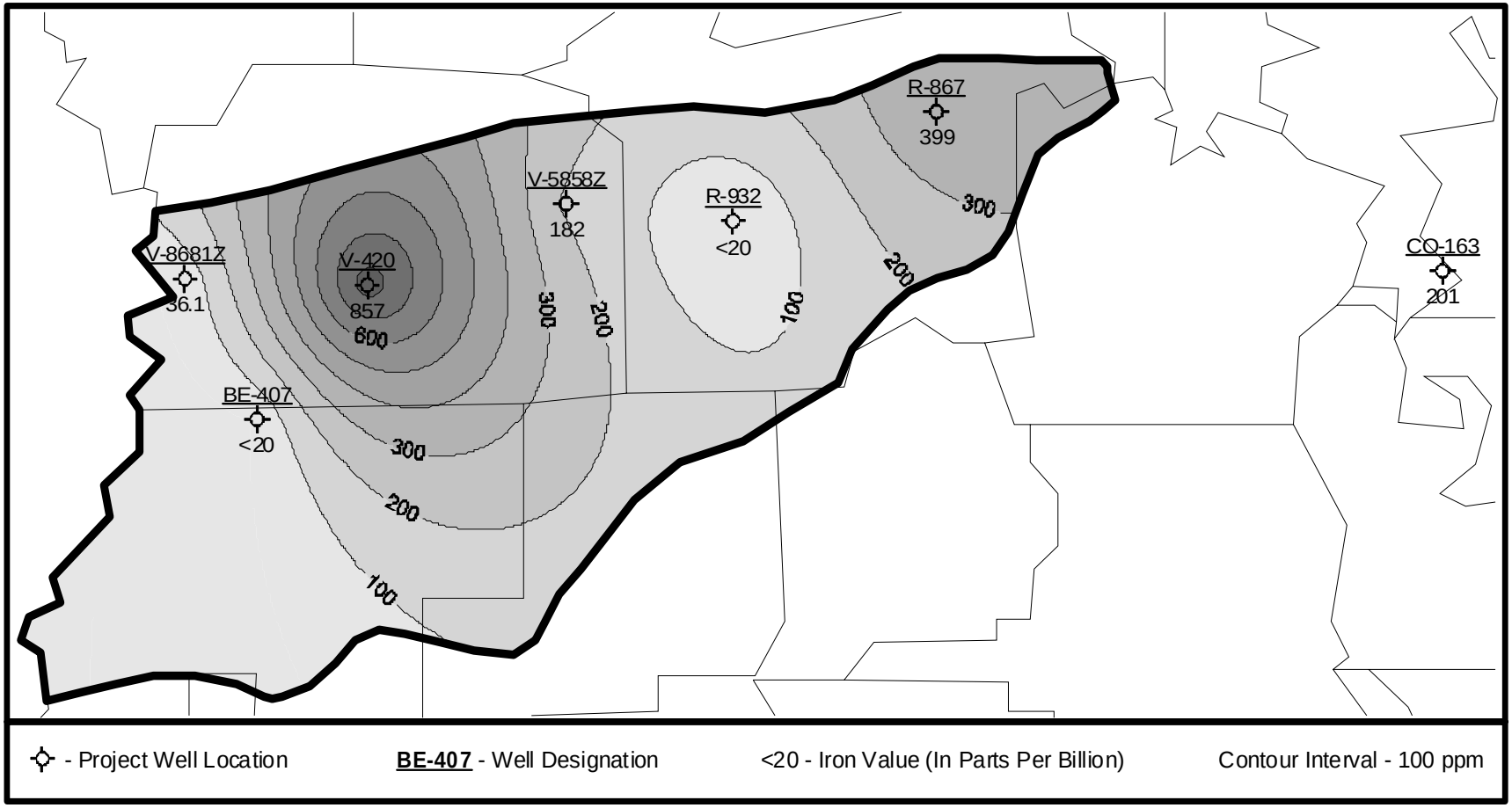


Figure 11-5 Map of Iron Data