COCKFIELD AQUIFER SUMMARY

BASELINE MONITORING PROGRAM, FY 2005

APPENDIX 9

OF THE

TRIENNIAL SUMMARY REPORT

FOR THE

WATER QUALITY ASSESSMENT DIVISION

OF THE

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PARTIAL FUNDING PROVIDED THROUGH CWA

COCKFIELD 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 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 Triennial Summary Report for the Baseline Monitoring Program.

Figure 9-1 shows the geographic locations of the Cockfield aquifer and the associated wells, whereas Table 9-2 lists the wells in the aquifer along with their total depths and the use made of produced waters and date sampled.

In February and March of 2005, thirteen wells were sampled which produce from the Cockfield aquifer. Nine of the wells are classified as public supply wells, three are classified as domestic wells, and one is classified as an irrigation well. The wells are located in ten parishes located from northeast and north-central to western 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 Cockfield aquifer is within the Eocene Cockfield formation of the Claiborne Group, which consists of sands, silts, clays, and some lignite. The aquifer units consist of fine sand with interbedded silt, clay, and lignite, becoming more massive and containing less silt and clay with depth. Beneath the Ouachita River, the Cockfield aquifer has been eroded by the ancestral Ouachita River and replaced by alluvial sands and gravels. The regional confining clays of the overlying Vicksburg and Jackson Groups confine the Cockfield.

HYDROGEOLOGY

In the Mississippi River valley, the Cockfield is overlain by and hydraulically connected to the alluvial aquifers. Recharge to the Cockfield aquifer occurs primarily by the direct infiltration of rainfall in interstream, upland outcrop-subcrop areas, the movement of water through the alluvial and terrace deposits, and vertical leakage from the underlying Sparta aquifer. The Cockfield contains fresh water in north-central and northeast Louisiana in a narrowing diagonal band extending toward Sabine Parish. Saltwater ridges under the Red River valley and the eastern Ouachita River valley divide areas containing fresh water in the Cockfield aquifer. The hydraulic conductivity varies between 25-100 feet/day.

The maximum depths of occurrence of freshwater in the Cockfield range from 200 feet above sea level, to 2,150 feet below sea level. The range of thickness of the fresh water interval in the Cockfield is 50 to 600 feet. The depths of the Cockfield wells that were monitored in conjunction with the BMP range from 80 to 445 feet.

INTERPRETATION OF DATA

FIELD, WATER QUALITY, AND NUTRIENTS PARAMETERS

Table 9-3 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 9-5 lists the minimum, maximum, and average results for the field data, water quality data, and nutrients data for the Cockfield 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 9-3 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 9-3 show that the following secondary MCLs (SMCL) were exceeded:

pH – SMCL > 8.5 or <6.5 Standard Units (SU)
UN-167 – 6.47 SU

Color – SMCL = 15 Platinum-Cobalt Units (PCU)
CA-35 – 22 PCU
SA-BYRD – 50 PCU
W-192 – 21 PCU
W-198 – 50

Total Dissolved Solids (TDS) – SMCL = 500 parts per million (ppm)
NA-5614Z – 608 ppm
SA-BYRD – 794 ppm
W-192 – 551 ppm
WC-187 – 598 ppm
WC-487 – 558 ppm

Comparison To Historical Data

Table 9-7 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). A comparison of these averages show that pH, specific conductivity, salinity, alkalinity, chloride, TDS, and nitrite-nitrate have increased; color and turbidity have decreased; temperature, hardness, TKN, and sulfate have remained consistent; while total phosphorus, ammonia and TSS have fluctuated over the nine year monitoring period.

INORGANIC PARAMETERS

Table 9-4 shows the inorganic (total metals) parameters that were sampled and the analytical results for those parameters for each well. Table 9-6 lists the minimum, maximum, and average results for the inorganic data for the Cockfield aquifer.

Federal Primary Drinking Water Standards

A review of the analyses listed on Table 9-4 shows that no Primary Drinking Water Standard (MCL) was exceeded for inorganics.

Federal Secondary Drinking Water Standards

Laboratory data contained in Table 9-4 show that the following secondary SMCL was exceeded:

Iron – SMCL = 300 ppb
CA-35 – 6,600 ppb
MO-479 – 2,150 ppb, duplicate – 2,200 ppb
UN-167 – 2,830 ppb
EC-233 – 635 ppb
NA-5614Z – 395 ppb

Comparison To Historical Data

Table 9-8 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 of these averages shows that the barium average has increased, while copper, iron and zinc averages have decreased over the nine year monitoring period. All other averages have remained near or below detection limits.

VOLATILE ORGANIC COMPOUNDS

Table 9-9 shows the volatile organic compounds (VOC) 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.

Only one well reported detections of VOCs, for which no primary or secondary MCLs exist, for this monitoring period of the Cockfield aquifer. Public supply well EC-233 reported low levels of typical chlorination by-products as follows: Chloroform – 14.5 ppb; Bromodichloromethane – 6.6 ppb; Dibromochloromethane – 3.6 ppb.

No other VOCs were detected during the 2005 sampling of the Cockfield aquifer.

SEMIVOLATILE ORGANIC COMPOUNDS

Table 9-10 shows the semivolatile organic compounds (SVOC) 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 an SVOC would be discussed in this section.

No SVOC was detected during the 2005 sampling of the Cockfield aquifer.

PESTICIDES AND PCBS

Table 9-11 shows the pesticide and PCB parameters for which samples were collected and analyzed. Due to the 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.

No pesticide or PCB was detected during the 2005 sampling of the Cockfield aquifer.

COMMON WATER CHARACTERISTICS

Table 9-1 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 Cockfield aquifer for pH, TDS, hardness, chloride, iron, and nitrite-nitrate are listed in the table. Figures 9-2, 9-3, 9-4, and 9-5 respectively, represent the contoured data for pH, TDS, chloride, and iron. The data average for hardness shows that the ground water produced from this aquifer is moderately hard[1].

Table 9-1 Common Water Characteristics

Fiscal Year 2005

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
pH (SU)	5.28	8.80	7.46
TDS (ppm)	128	794	437.75
Hardness (ppm)	<5	432	139.92
Chloride (ppm)	2.7	169	52.49
Iron (ppb)	24.1	6,600	1,084.13
Nitrite-Nitrate (ppm)	<0.05	7.48	0.50

[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 Cockfield aquifer is moderately hard, that no Primary MCL was exceeded, and that this aquifer is of fair quality when considering taste, odor, or appearance guidelines. A comparison of present and historical BMP data show that the averages for pH, specific conductivity, salinity, alkalinity, chloride, TDS, nitrite-nitrate, and barium have increased. It also shows that the averages for color, turbidity, copper, iron and zinc have decreased, while the remaining average reported concentrations have fluctuated or remained consistent over the nine year monitoring period of the Cockfield aquifer.

It is recommended that the wells assigned to the Cockfield aquifer be re-sampled 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 9-2 List of Wells Sampled

DOTD Well Name	PARISH	SAMPLE DATE	Owner	Depth (in feet)	Well Use
CA-35	CALDWELL	3/14/2005	CITY OF COLUMBIA	298	PUBLIC SUPPLY
EC-233	E CARROLL	2/22/2005	TOWN OF LAKE PROVIDENCE	371	PUBLIC SUPPLY
MO-479	MOREHOUSE	2/21/2005	BAYOU BONNE IDEE WATER SYSTEM	258	PUBLIC SUPPLY
NA-5614Z	NATCHITOCHES	3/15/2005	PRIVATE OWNER	176	DOMESTIC
OU-FRITH	OUACHITA	3/14/2005	PRIVATE OWNER	80	DOMESTIC
RI-127	RICHLAND	2/21/2005	DELHI WATER WORKS	416	PUBLIC SUPPLY
RI-450	RICHLAND	2/21/2005	RIVER ROAD WATERWORKS	283	PUBLIC SUPPLY
SA-BYRD	SABINE	3/15/2005	PRIVATE OWNER	150	DOMESTIC
UN-167	UNION	3/14/2005	PRIVATE OWNER	110	IRRIGATION
W-192	WINN	3/15/2005	RED HILL WATER SYSTEM	210	PUBLIC SUPPLY
W-198	WINN	3/15/2005	ATLANTA WATER SYSTEM	445	PUBLIC SUPPLY
WC-187	W CARROLL	2/22/2005	NEW CARROLL WTR. ASSN.	110	PUBLIC SUPPLY
WC-487	W CARROLL	2/22/2005	TOWN OF OAK GROVE	396	PUBLIC SUPPLY

Table 9-3 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												
CA-35	6.54	0.15	0.31	0.20	19.97	88.2	0.14	18.5	22	104	<0.05	0.3	0.49	319	40.8	241	<4	1.4
EC-233	7.24	0.36	0.73	0.47	19.28	375	<0.1	33	<5	188	<0.05	<0.1	0.21	769	5.7	450	<4	4.5
MO-479	7.09	0.28	0.58	0.37	20.38	322	0.28	35.7	<5	323	<0.05	0.29	0.14	690	9.8	390	4.7	25
MO-479*	7.09	0.28	0.58	0.37	20.38	321	0.27	35.8	<5	324	<0.05	0.35	0.14	692	9.8	386	4	25
NA-5614Z	7.45	0.47	0.94	0.61	17.09	185	0.84	79.9	<5	8.5	<0.05	0.99	0.55	961	149	608	<4	2.1
OU-FRITH	8.12	0.28	0.57	0.37	18.48	319	0.49	2.7	<5	39.5	<0.05	0.55	0.07	561	<1.25	340	<4	<1
OU-FRITH*	8.12	0.28	0.57	0.37	18.48	321	0.5	2.8	<5	37.4	<0.05	0.5	0.07	559	<1.25	342	<4	<1
RI-127	7.86	0.41	0.84	0.54	22.00	377	0.83	64.8	5	7.8	<0.05	1.01	0.23	867	<1.3	500	<4	<1
RI-450	7.11	0.22	0.44	0.29	20.28	256	<0.1	5.8	<5	205	<0.05	0.22	0.14	471	<1.25	260	<4	7.6
SA-BYRD	8.28	0.61	1.23	0.80	22.11	591	1	35	50	43.1	<0.05	1.44	0.21	1237	53.2	794	<4	1
UN-167	5.28	0.07	0.15	0.10	19.25	6.3	<0.1	13.2	<5	40	7.48	<0.1	<0.05	163	12	128	5.3	7.7
W-192	8.80	0.44	0.88	0.57	19.60	335	0.6	66.6	21	<5	<0.05	0.72	0.38	907	36.3	551	<4	1.3
W-198	8.49	0.18	0.38	0.24	21.96	200	0.23	11	50	<5	<0.05	0.23	1.74	399	<1.3	260	<4	<1
WC-187	7.17	0.53	1.05	0.68	18.96	324	0.14	169	<5	423	0.08	0.19	0.12	1124	12.7	598	<4	4.8
WC-487	7.51	0.47	0.94	0.61	20.24	365	<0.1	100	<5	58.4	0.14	0.3	0.12	976	<1.3	558	<4	<1

* Denotes duplicate sample.

Table 9-4 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	100	1	1	5	10	20	10	0.05	5	5	10	5	20
CA-35	<10	<10	151	<1	<1	<5	<10	6600	<10	<0.05	<5	<5	<10	<5	<20
EC-233	<10	<10	429	<1	<1	<5	<10	635	<10	<0.05	<5	<5	<10	<5	<20
MO-479	<10	<10	357	<1	<1	<5	<10	2150	<10	<0.05	<5	<5	<10	<5	<20
MO-479*	<10	<10	367	<1	<1	<5	<10	2200	<10	<0.05	<5	<5	<10	<5	<20
NA-5614Z	<10	<10	35.7	<1	<1	<5	17.5	395	<10	<0.05	<5	<5	<10	<5	<20
OU-FRITH	<10	<10	119	<1	<1	<5	40	108	<10	<0.05	<5	<5	<10	<5	<20
OU-FRITH*	<10	<10	129	<1	<1	<5	<10	88.3	<10	<0.05	<5	<5	<10	<5	<20
RI-127	<10	<10	37.4	<1	<1	<5	<10	42.3	<10	<0.05	<5	<5	<10	<5	<20
RI-450	<10	<10	170	<1	<1	<5	<10	789	<10	<0.05	<5	<5	<10	<5	<20
SA-BYRD	<10	<10	65.9	<1	<1	<5	<10	65.1	<10	<0.05	<5	<5	<10	<5	<20
UN-167	<10	<10	398	<1	<1	<5	<10	2830	<10	0.1	<5	<5	<10	<5	<20
W-192	<10	<10	13.5	<1	<1	<5	13.4	24.1	<10	<0.05	<5	<5	<10	<5	<20
W-198	<10	<10	6.1	<1	<1	<5	<10	78.3	<10	<0.05	<5	<5	<10	<5	<20
WC-187	<10	<10	186	<1	<1	<5	<10	593	<10	<0.05	<5	<5	<10	<5	<20
WC-487	<10	<10	108	<1	<1	<5	<10	171	<10	0.23	<5	<5	<10	<5	<20

* Denotes duplicate sample

Table 9-5 Water Quality Statistics

Fiscal Year 2005

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	Temperature (^{O}C)	17.09	22.11	19.82
	pH (SU)	5.28	8.8	7.46
	Specific Conductance (mmhos/cm)	0.15	1.23	0.70
	Salinity (ppt)	0.07	0.61	0.35
	TDS (g/L)	0.1	0.8	0.46
LABORATORY	Alkalinity (ppm)	6.3	591	293.66
	Chloride (ppm)	2.7	169	52.49
	Color (PCU)	<5	50	10.97
	Specific Conductance (umhos/cm)	163	1237	736.88
	Sulfate (ppm)	<1.25	149	21.88
	TDS (ppm)	128	794	437.75
	TSS (ppm)	<4	5.3	<4
	Turbidity (NTU)	<1	25	5.44
	Ammonia, as N (ppm)	<0.1	1	0.36
	Hardness (ppm)	<5	432	139.92
	Nitrate - Nitrite, as N (ppm)	<0.05	7.48	0.50
	TKN (ppm)	<0.1	1.44	0.47
	Total Phosphorous (ppm)	<0.05	1.74	0.30

Table 9-6 Inorganic Statistics

Fiscal Year 2005

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (ppb)	<10	<10	<10
Arsenic (ppb)	<10	<10	<10
Barium (ppb)	6.1	429	161.88
Beryllium (ppb)	<1	<1	<1
Cadmium (ppb)	<1	<1	<1
Chromium (ppb)	<5	<5	<5
Copper (ppb)	<10	40	8.34
Iron (ppb)	24.1	6,600	1,084.13
Lead (ppb)	<10	<10	<10
Mercury (ppb)	<0.05	0.23	<0.05
Nickel (ppb)	<5	<5	<5
Selenium (ppb)	<5	<5	<5
Silver (ppb)	<1	10	4.72
Thallium (ppb)	<5	<5	<5
Zinc (ppb)	<20	<20	<20

Table 9-7 Three-year Water Quality Statistics

	PARAMETER	FY 1996 AVERAGE	FY 1999 AVERAGE	FY 2002 AVERAGE	FY 2005 AVERAGE
FIELD	Temperature (^{O}C)	19.91	19.76	20.30	19.82
	pH (SU)	6.77	6.99	7.39	7.46
	Specific Conductance (mmhos/cm)	0.564	0.613	0.647	0.70
	Field Salinity (ppt)	0.27	0.30	0.32	0.35
LABORATORY	Alkalinity (ppm)	219.2	223.9	262.4	293.66
	Chloride (ppm)	35.9	52.0	42.2	52.49
	Color (ppm)	37.5	11.8	11.9	10.97
	Specific Conductance (umhos/cm)	560.7	618.8	642.8	736.88
	Sulfate (ppm)	33.36	35.51	98.92	21.88
	TDS (ppm)	320.3	429.7	396.0	437.75
	TSS (ppm)	5.3	<4	<4	<4
	Turbidity (NTU)	7.14	9.74	4.71	5.44
	Ammonia, as N (ppm)	0.66	0.50	0.62	0.36
	Hardness (ppm)	115.3	79.3	89.9	139.92
	Nitrate - Nitrite, as N (ppm)	0.11	0.08	0.30	0.50
	TKN (ppm)	0.80	0.71	0.94	0.47
	Total Phosphorous (ppm)	0.32	0.59	0.30	0.30

Table 9-8 Three-year Inorganic Statistics

PARAMETER	FY 1996 AVERAGE	FY 1999 AVERAGE	FY 2002 AVERAGE	FY 2005 AVERAGE
Antimony (ppb)	<5	<5	<5	<10
Arsenic (ppb)	5.43	<5	<5	<10
Barium (ppb)	121.30	124.47	140.90	161.88
Beryllium (ppb)	<5	<5	<5	<1
Cadmium (ppb)	<5	<5	<5	<1
Chromium (ppb)	<5	<5	<5	<5
Copper (ppb)	39.62	5.86	11.77	8.34
Iron (ppb)	1,835.77	1,623.16	1,319.52	1,084.13
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	<5
Silver (ppb)	<5	<5	<5	4.72
Thallium (ppb)	<5	<5	<5	<5
Zinc (ppb)	117.49	34.08	30.67	<20

Table 9-9 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

Table 9-10 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 9-10 (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

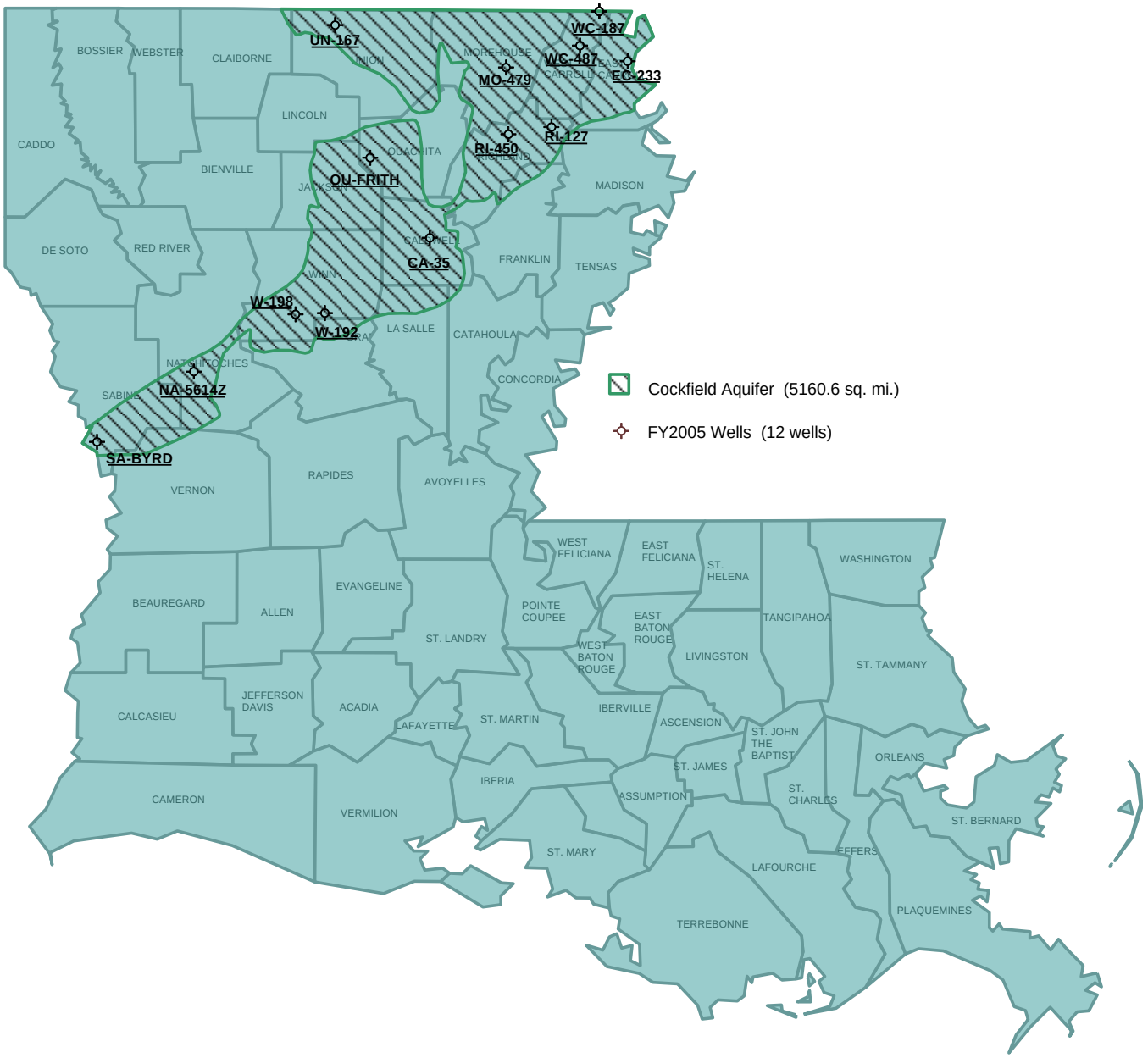
Table 9-11 List of Pesticide and PCB Analytical Parameters

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 COCKFIELD 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 9-1 Location Plat, Cockfield Aquifer and Wells

COCKFIELD AQUIFER - pH

Baseline Monitoring Program - FY 2005

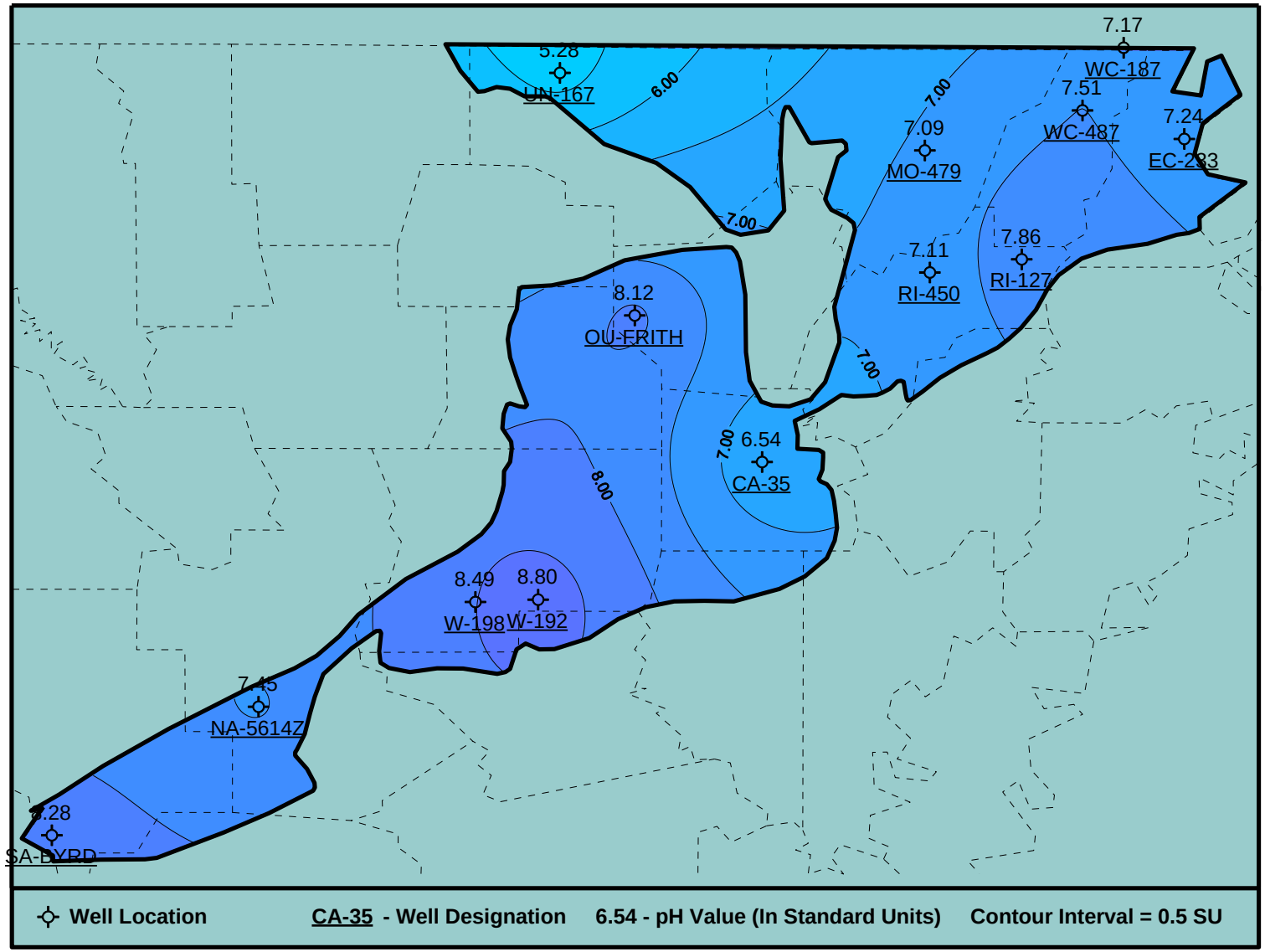


Figure 9-2 Map of pH Data

COCKFIELD AQUIFER - Total Dissolved Solids

Baseline Monitoring Program - FY 2005

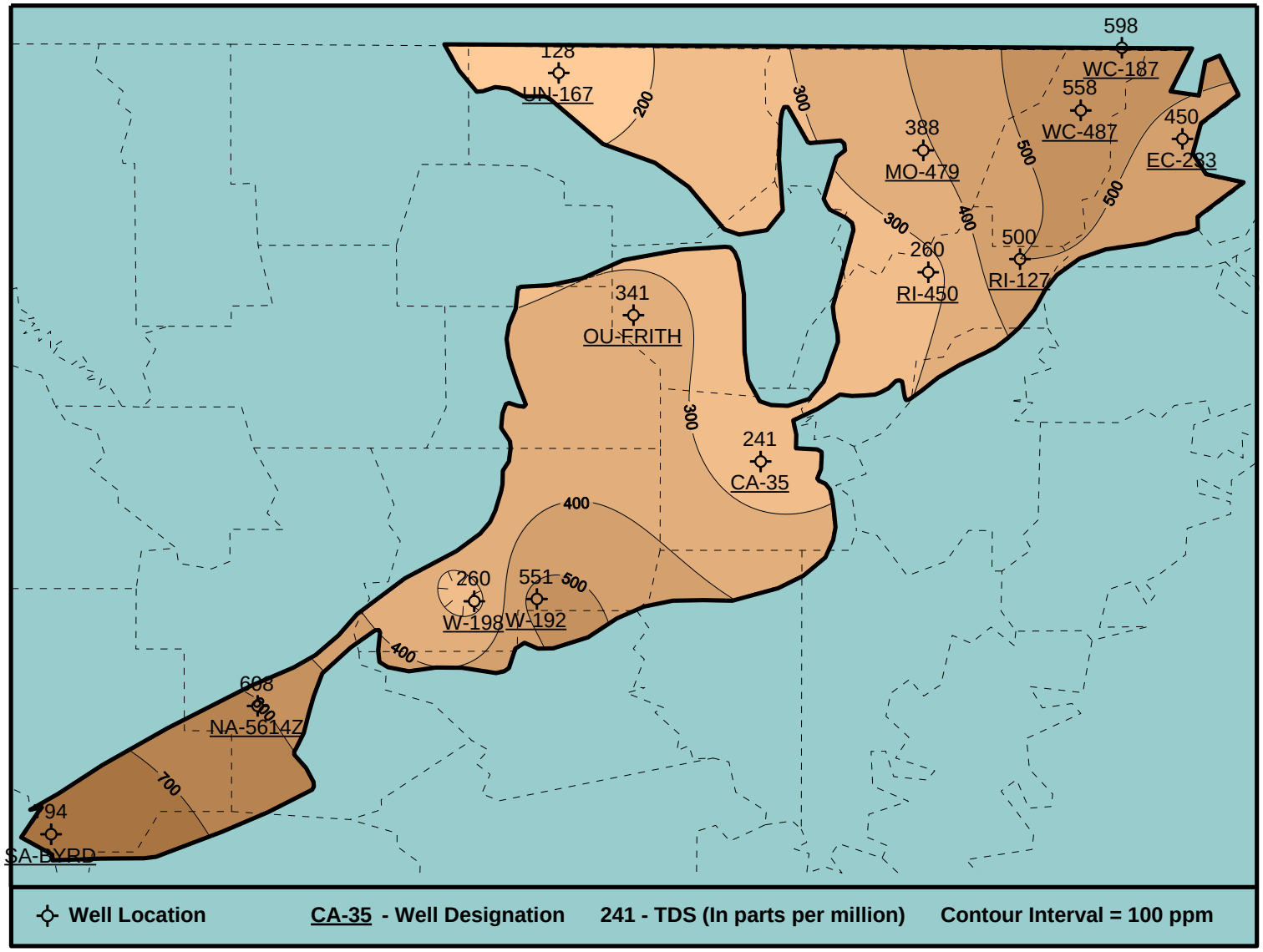


Figure 9-3 Map of TDS Data

COCKFIELD AQUIFER - Chloride

Baseline Monitoring Program - FY 2005

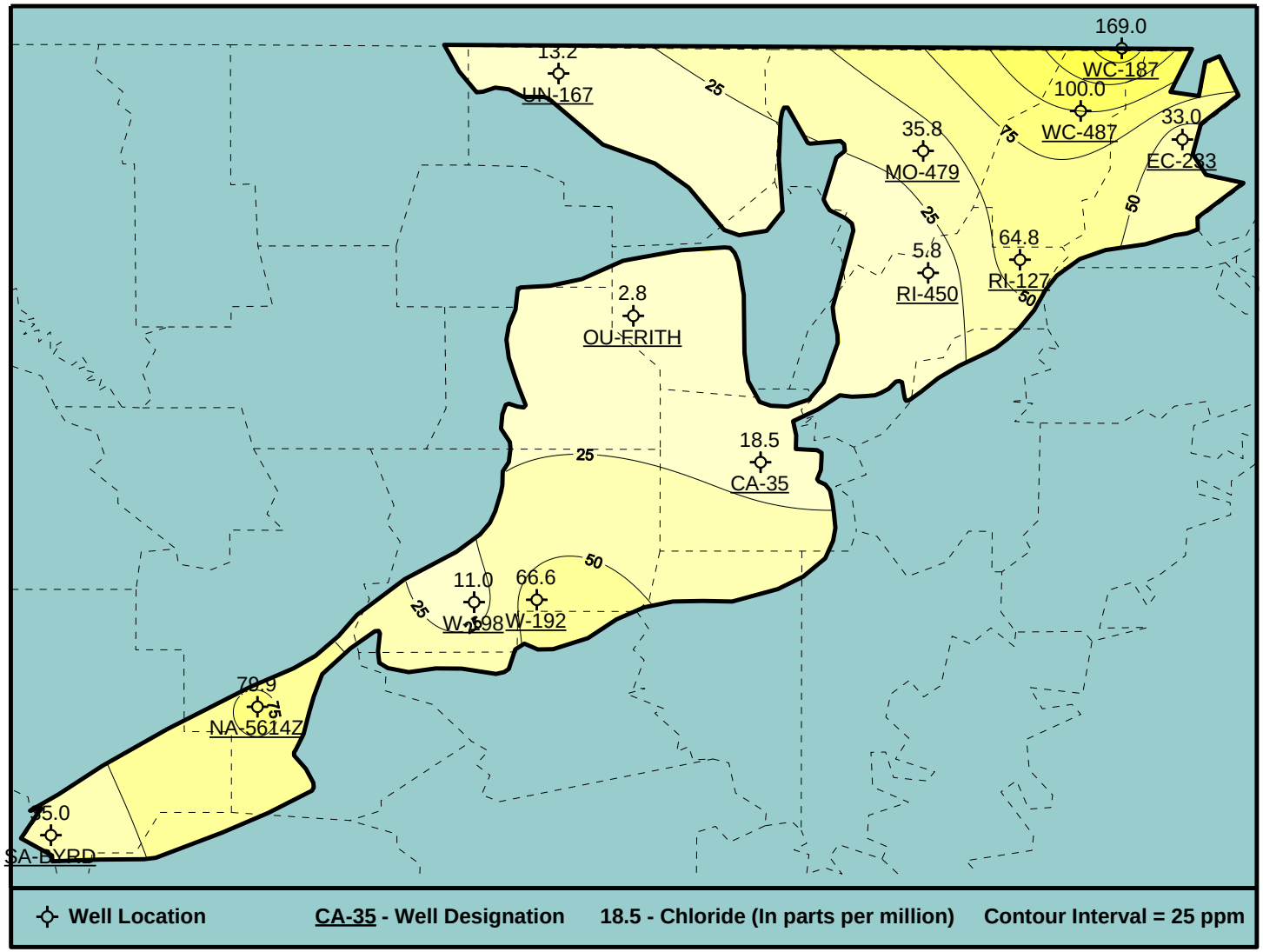


Figure 9-4 Map of Chloride Data

COCKFIELD AQUIFER - Iron

Baseline Monitoring Program - FY 2005

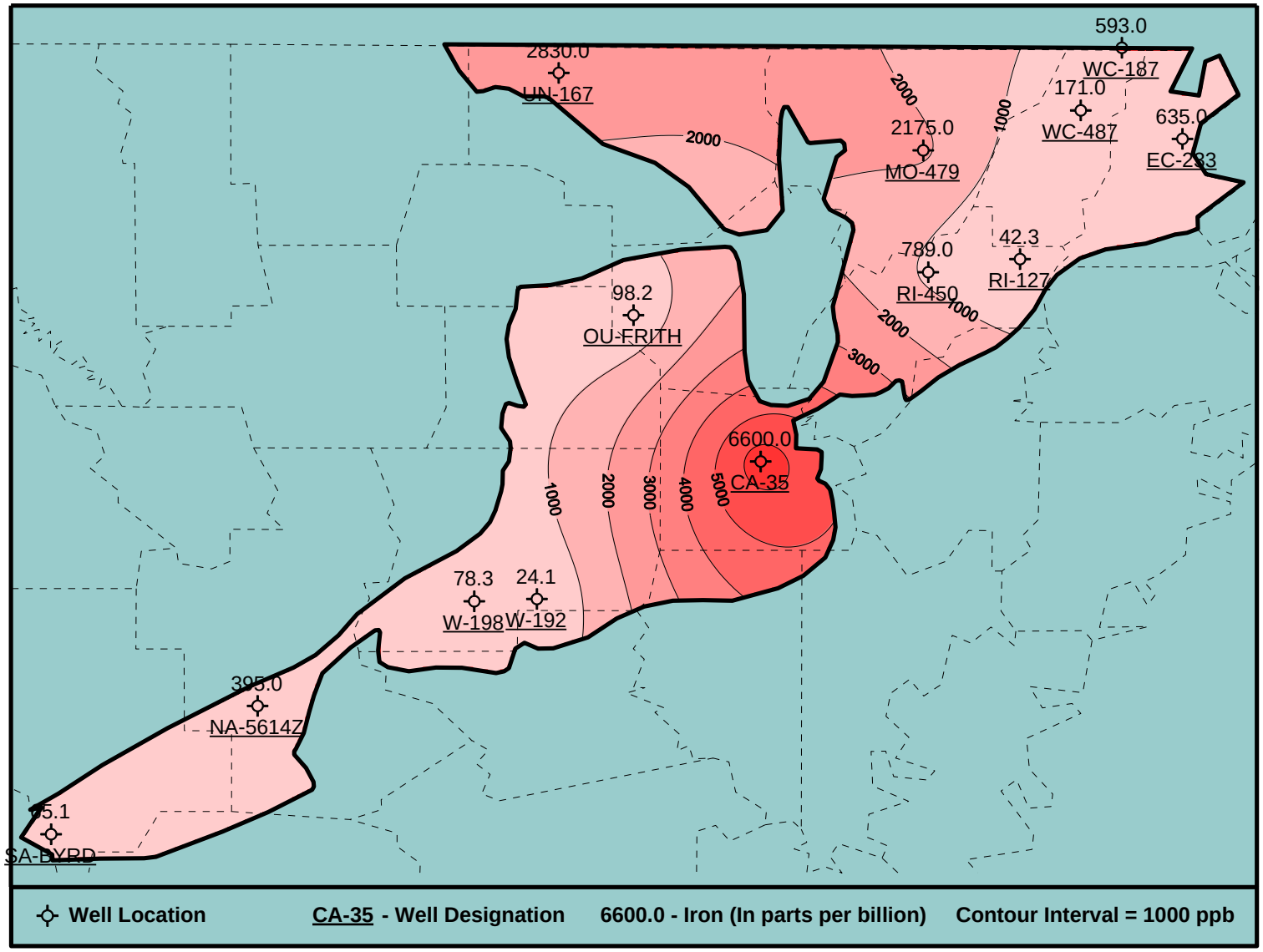


Figure 9-5 Map of Iron Data