

APPENDIX 1

NORTH LOUISIANA TERRACE AQUIFER SUMMARY

BASELINE MONITORING PROJECT, EPA FY'98

(July 1997 Through June 1998)

PART VI

OF

TRIENNIAL SUMMARY REPORT

FOR THE

WATER QUALITY MANAGEMENT DIVISION

OF

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PARTIAL FUNDING PROVIDED THROUGH CWA 106 GRANT

NORTH LOUISIANA TERRACE AQUIFER SUMMARY

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BACKGROUND

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 project wells producing from a common aquifer in a narrow time frame. Also, to more conveniently and economically promulgate those data collected, these aquifer summaries will make up the project Triennial Summary Report.

Figure VI-1 shows the geographic locations of the North Louisiana Terrace Aquifer and the associated project wells, whereas Table VI-1 lists the wells in the aquifer along with their total depths and the use made of produced waters and the date sampled.

These data show that in March and April of 1998, eleven project wells were sampled which produce from the North Louisiana Terrace Aquifer. Of these eleven wells, six are classified as Public Supply, three are classified as Industrial, and two are Domestic. The wells are located in seven parishes from the central to the north part of the state.

PROJECT FIELD AND ANALYTICAL PARAMETERS

The field parameters that are checked at each sampling site and the list of water quality parameters that are analyzed in the laboratory are shown in Table VI-2. Those project inorganic (total metals) parameters analyzed in the laboratory are listed in Table VI-3. These tables also show the field and analytical results determined for each analyte.

In addition to the analytical parameters mentioned above, a list of project analytical parameters that include three other categories of compounds (Volatiles, Semi-volatiles, and Pesticides/PCB's) is included. Due to the large number of analytes in these three categories, tables were not prepared for each well. However, in order for the reader to be aware of the total list of analytes, Tables VI-4, VI-5, and VI-6 were included in this summary. The tables list the project analytes along with their Practical Quantitation Limits (PQLs) used during processing.

DISCUSSION OF WATER QUALITY DATA

FEDERAL PRIMARY DRINKING WATER STANDARDS: Laboratory data show that one project water well in the North Louisiana Terrace Aquifer that is used as a domestic well exceeded the Federal Maximum Contaminant Level (MCL) for Bis(2-ethylhexyl)phthalate (BEHP). A concentration of 14 ppb for BEHP (MCL for BEHP = 6ppb) was reported for Bienville Parish well number BI-208. However, duplicate samples were taken immediately following the original sample and BEHP was not detected during this sampling event. Taking this into consideration, and based on information obtained from the EPA guidance document "Guidance For Data Usability In Risk Assessment, EPA 1992," it is the opinion of this Office that the BEHP concentration above the MCL for that contaminant is due to field/laboratory contamination. It will therefore be considered a false positive.

Laboratory data also show that one project water well in the North Louisiana Terrace Aquifer that is used as a public supply well exceeded the MCL for Cadmium. A concentration of 5.1 ppb for Cadmium (MCL for Cadmium = 5 ppb) was reported for Bossier Parish well number BO-340. It is believed that this concentration is due to field contamination, however a final determination will be made pending further analyses.

Those project wells reporting Turbidity levels of >1 NTU, do not exceed the MCL of 1.0, as this primary standard applies to surface water systems only.

FEDERAL SECONDARY DRINKING WATER STANDARDS: Secondary standards are defined as non-enforceable taste, odor or appearance guidelines. Field and laboratory data contained in Tables VI-2 and VI-3 show that three of the wells sampled in the North Louisiana Terrace Aquifer exceeded the Secondary Maximum Contaminant Levels (SMCL) for Iron and one of the wells exceeded the SMCL for Total Dissolved Solids, and one exceed the SMCL for Sulfate, which are all in this category.

IRON (SMCL=300 ppb):

RR-254 exceeded this secondary standard with a reported concentration of 340 ppb.

MO-364 exceeded this secondary standard with a reported concentration of 454 ppb.

OU-184 exceeded this secondary standard with a reported concentration of 15,260 ppb.

TDS (SMCL=500 ppm):

MO-364 exceeded this secondary standard with a reported concentration of 816 ppm.

Sulfate (SMCL=250 ppm):

MO-364 exceeded this secondary standard with a reported concentration of 390.0 ppm.

FEDERAL LEAD ACTION LEVEL: Under the Federal Safe Drinking Water Act, EPA has established an Action Level of 15 ppb for Lead to ensure that this contaminant does not pose either a short-term or long-term health risk in drinking water. Laboratory data contained in Table VI-3 show that four of the wells sampled in the North Louisiana Terrace Aquifer exceeded the Action Level

for Lead. A final determination as to the occurrence of these exceedances will be made pending further analyses.

RR-254 exceeded this action level with a reported concentration of 103.7 ppb.

BI-208 exceeded this action level with a reported concentration of 545 ppb.

BO-434 exceeded this action level with a reported concentration of 279 ppb.

BO-340 exceeded this action level with a reported concentration of 17.4 ppb.

METHYL TERTIARY-BUTYL ETHER: Methyl Tertiary-Butyl Ether (MtBE) was detected in the laboratory analysis of the sample from one project water well in the North Louisiana Terrace Aquifer that is used as a public supply well. A concentration of 16 ppb was observed in the analysis of the sample taken from well number MO-364 on March 10, 1998. A subsequent resample and its duplicate sample both revealed a concentration of 13 ppb. MtBE is a volatile, organic chemical that is used as an octane enhancer in gasoline. No MCL has currently been established for MtBE. However, an EPA drinking water advisory fact sheet entitled "Consumer Acceptability Advice and Health Effects Analysis on Methyl Tertiary-Butyl Ether (MtBE)" explained that it is believed that keeping the concentrations in the range of 20 to 40 ppb or below will likely avert unpleasant taste and odor effects, although some people may detect the chemical below this. Concentrations in this range are about 20,000 to 100,000 (or more) times lower than the range of exposure levels in which cancer or noncancer effects were observed in rodent tests. This margin of exposure is in the range of margins of exposure typically provided to protect against cancer effects by the National Primary Drinking Water Standards under the Federal Safe Drinking Water Act. The concentrations found in the samples from MO-364 were below this range.

QUANTIFIABLE CADMIUM AND LEAD VALUES: Table VI-3 shows that seven quantifiable values for Cadmium and five quantifiable values for Lead were found in the laboratory analyses. These values are shaded in Table VI-3. It is believed that these values are due to the grade of acid that was used to preserve the samples. Resampling has been done using a higher grade of acid so that a determination may be made on this matter.

SELECTED WATER QUALITY MAPS

For the reader's convenience, maps showing the contoured values for pH, TDS, Chloride, and Iron are included in this summary report in Figures VI-2 through VI-5.

SUMMARY AND RECOMMENDATIONS

In summary, the analytical data show the ground water from this aquifer to be of good quality, with the exception of the unconfirmed exceedances discussed previously. A final determination as to the occurrence of these exceedances will be made pending further analyses.

It is recommended that the several project wells assigned to the North Louisiana Terrace Aquifer be resampled as planned, in approximately three years. In addition, several wells should be added to those currently sampled to increase the well density for this aquifer.

TABLE VI-1 List of Project Wells Sampled

NORTH LA. TERRACE AQUIFER PROJECT WELLS							
PROJECT NUMBER	PARISH	WELL NUMBER	DATE SAMPLED	WELL OWNER	DEPTH (feet)	WELL USE	AQUIFER
9512	BIENVILLE	BI-208	04/13/1998	MS. A. L. THORNTON	100	DOMESTIC	N. LA TERRACE
9213	BOSSIER	BO-340	04/14/1998	VILLAGE WATER SYSTEM	91	PUBLIC	N. LA TERRACE
9302	BOSSIER	BO-434	04/13/1998	RED CHUTE UTILITIES	94	PUBLIC	N. LA TERRACE
9513	BOSSIER	BO-5382Z	04/13/1998	MR. M. MACHAVER	95	DOMESTIC	N. LA TERRACE
9112	GRANT	G-342	03/09/1998	FARMLAND IND., INC.	49	INDUSTRIAL	N. LA TERRACE
8611	GRANT	G-432	03/09/1998	CENTRAL GRANT WATER	158	PUBLIC	N. LA TERRACE
9510	LA SALLE	LS-264	03/09/1998	CITY OF JENA	105	PUBLIC	N. LA TERRACE
9511	MOREHOUSE	MO-124	03/10/1998	TEXAS GAS	133	INDUSTRIAL	N. LA TERRACE
8810	MOREHOUSE	MO-364	03/10/1998	PEOPLES WATER SYSTEM	154	PUBLIC	N. LA TERRACE
9211	OUACHITA	OU-184	03/10/1998	COLUMBIAN CHEMICALS	105	INDUSTRIAL	N. LA TERRACE
9214	RED RIVER	RR-254	04/13/1998	EAST CROSS WATER SYSTEM	93	PUBLIC	N. LA TERRACE

TABLE VI-2 Summary of Water Quality Data

NORTH LA. TERRACE AQUIFER WATER QUALITY PARAMETERS																		
FIELD PARAMETERS																		
WELL NUMBER	TEMP. OC	pH SU	COND. mmhos/cm	SAL. ppt	TSS ppm	TDS ppm	ALK. ppm	HARD. ppm	TURB. NTU	COND. umhos/cm	COLOR PCU	Cl ppm	SO4 ppm	NITRITE-NITRATE (as N) ppm	TOT. P ppm	TKN ppm	TOC ppm	NH3 (as N) ppm
BI-208	19.42	5.41	0.078	0.04	<4.0	108.0	13.9	13.8	<1.0	77.3	5.0	9.8	1.50	1.51	0.08	0.12	<2.00	0.25
BI-208*	19.42	5.41	0.078	0.04	<4.0	104.0	14.3	13.8	<1.0	79.8	5.0	9.7	1.40	1.52	0.05	0.40	<2.00	0.25
BO-340	19.43	7.13	0.538	0.26	<4.0	340.0	234.0	135.0	5.8	552.0	10.0	37.6	<1.25	<0.02	0.21	0.48	<2.00	0.51
BO-434	19.01	5.91	0.181	0.09	<4.0	148.0	75.1	63.2	<1.0	184.0	5.0	8.7	3.60	0.38	0.32	0.33	<2.00	0.44
BO-5382Z	19.58	6.59	0.542	0.26	<4.0	344.0	198.0	59.4	1.1	541.0	5.0	30.9	35.60	<0.02	0.06	1.09	<2.00	0.72
G-342	18.84	4.98	0.101	0.05	<4.0	58.0	8.3	12.8	0.7	97.4	5.0	13.6	2.00	3.61	0.02	0.37	<2.00	<0.10
G-432	18.78	5.05	0.042	0.02	<4.0	46.0	12.7	5.0	<0.5	45.6	5.0	3.5	0.90	0.50	0.07	0.21	3.00	<0.10
G-432*	18.78	5.05	0.042	0.02	<4.0	34.0	13.3	5.0	<0.5	42.2	5.0	3.4	1.00	0.46	0.08	0.21	2.80	<0.10
LS-264	18.60	5.85	0.102	0.05	<4.0	74.0	22.5	18.2	<0.5	98.6	10.0	12.6	4.00	5.34	0.04	0.17	3.00	<0.10
MO-124	19.25	6.35	0.247	0.12	<4.0	162.0	84.4	74.0	0.8	244.0	5.0	24.7	0.60	0.63	0.05	0.52	<2.00	<0.10
MO-364	19.92	5.64	1.095	0.55	<4.0	816.0	92.2	445.0	<0.5	1124.0	10.0	83.9	390.00	1.44	0.08	0.34	3.10	<0.10
OU-184	16.65	5.81	0.128	0.06	16.0	84.0	30.7	19.7	120.0	128.0	10.0	21.6	2.0	0.08	0.58	0.19	3.50	<0.1
RR-254	19.73	5.94	0.184	0.09	<4.0	154.0	<0.1	20.5	1.4	184.0	5.0	24.8	9.80	0.12	0.08	0.23	<2.00	0.76

* Denotes Duplicate Sample

TABLE VI-3 Summary of Inorganic Data

NORTH LA. TERRACE AQUIFER INORGANIC (TOTAL METALS) PARAMETERS															
WELL NUMBER	ARSENIC ppb	SILVER ppb	BARIUM ppb	BERYLLIUM ppb	CADMIUM ppb	CHROMIUM ppb	COPPER Ppb	IRON ppb	MERCURY ppb	NICKEL ppb	ANTIMONY ppb	SELENIUM ppb	LEAD ppb	THALLIUM ppb	ZINC ppb
BI-208	<5.0	<1.0	50.0	2.4	1.5	<5.0	<5.0	25.5	<0.05	6.4	<5.0	<5.0	<10.0	<5.0	<10.0
BI-208*	<10.0	<1.0	49.1	<1.0	2.4	<5.0	<5.0	109.0	<0.05	<5.0	<5.0	<5.0	545.0	<5.0	20.8
BO-340	<5.0	<1.0	501.0	<1.0	5.1	<5.0	88.9	169.0	<0.05	6.8	<5.0	<5.0	17.4	<5.0	110.0
BO-434	<5.0	2.0	50.0	<1.0	2.3	<5.0	<1.0	122.0	<0.05	<5.0	<5.0	<5.0	279.0	<5.0	22.0
BO-5382Z	<5.0	<1.0	76.7	<1.0	1.6	<5.0	<5.0	269.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	28.4
G-342	<5.0	<2.0	115.2	<1.0	<2.0	<5.0	<5.0	<2.0	<0.05	5.1	<5.0	<5.0	<10.0	<5.0	333.0
G-432	<5.0	<2.0	39.6	<1.0	<2.0	<5.0	6.7	<20.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	<10.0
G-432*	<5.0	<2.0	43.2	<1.0	<2.0	<5.0	6.6	<20.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	<10.0
LS-264	<5.0	<2.0	47.8	<1.0	<2.0	<5.0	<5.0	<20.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	<10.0
MO-124	<5.0	<2.0	10.9	<1.0	<2.0	<5.0	<5.0	148.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	<10.0
MO-364	<5.0	<2.0	114.0	<1.0	<2.0	<5.0	6.4	454.0	<0.05	<5.0	<5.0	<5.0	<10.0	<5.0	14.0
OU-184	<5.0	<2.0	60.3	<1.0	3.7	<5.0	372.0	15,260.0	<0.05	<5.0	<5.0	<5.0	10.7	<5.0	40.3
RR-254	<5.0	<1.0	50.0	<1.0	2.2	<5.0	302.0	340.0	<0.05	<5.0	<5.0	<5.0	103.7	<5.0	28.3

* Denotes Duplicate Sample

Shaded values for Cadmium and Lead are discussed previously in this summary.

**Table VI-4 List of VOC Analytical Parameters
BASELINE MONITORING PROJECT**

VOLATILE ORGANICS BY EPA METHOD 8260

COMPOUNDS	PQL (ppb)
DICHLOROFLUOROMETHANE	5
CHLOROMETHANE	5
VINYL CHLORIDE	5
BROMOMETHANE	5
CHLOROETHANE	5
TRICHLOROFLUOROMETHANE	5
1,1-DICHLOROETHENE	5
METHYLENE CHLORIDE	5
TRANS-1,2-DICHLOROETHENE	5
1,1-DICHLOROETHANE	5
2,2 DICHLOROPROPANE	5
CIS-1,2 DICHLOROETHENE	5
BROMOCHLOROMETHANE	5
CHLOROFORM	5
1,1,1-TRICHLOROETHANE	5
1,1 DICHLOROPROPENE	5
CARBON TETRACHLORIDE	5
BENZENE	5
1,2-DICHLOROETHANE	5
TRICHLOROETHENE	5
1,2-DICHLOROPROPANE	5
BROMODICHLOROMETHANE	5
DIBROMOMETHANE	5
CIS-1,3-DICHLOROPROPENE	5
TOLUENE	5
TRANS-1,3-DICHLOROPROPENE	5
1,1,2-TRICHLOROETHANE	5
1,3--DICHLOROPROPANE	5
TETRACHLOROETHENE	5
1,2-DIBROMOETHANE	5
DIBROMOCHLOROMETHANE	5
CHLOROBENZENE	5
ETHYLBENZENE	5
1,1,1,2-TETRACHLOROETHANE	5
P&M XYLENE	10
O-XYLENE	5
STYRENE	5
BROMOFORM	5
ISOPROPYLBENZENE	5

Table VI-4 (Cont'd)
 Volatile Organic (VOC) Parameters

COMPOUNDS	PQL (ppb)
1,1,2,2-TETRACHLOROMETHANE	5
1,2,3,-TRICHLOROPROPANE	5
BROMOBENZENE	5
n-PROPYLBENZENE	5
2-CHLOROTOLUENE	5
4-CHLOROTOLUENE	5
1,3,5-TRIMETHYLBENZENE	5
TERT-BUTYLBENZENE	5
1,2,4-TRIMETHYLBENZENE	5
SEC-BUTYLBENZENE	5
P-ISOPRPLYLTOLUENE	5
1,3-DICHLOROBENZENE	5
1,4-DICHLOROBENZENE	5
n-BUTYLBENZENE	5
1,2-DIBROMO-3-CHLOROPROPANE	5
NAPHTHALENE	5
1,2,4-TRICHLOROBENZENE	5
HEXACHLOROBUTADIENE	5
1,2-DICHLOROBENZENE	5
1,2,3-TRICHLOROBENZENE	5

PQL = Practical Quantitation Limit
 ppb = parts per billion

Table VI-5 List of Semi-volatile Analytical Parameters
BASELINE MONITORING PROJECT

SEMIVOLATILE ORGANICS BY EPA METHOD 8270

COMPOUNDS	PQL (ppb)
N-Nitrosodimethylamine	10
2-Picoline	10
Methyl methanasulfonate	10
Ethyl methanesulfonate	20
Phenol	10
Aniline	10
Bis(2-chloroethyl)ether	10
2-Chlorophenol	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Benzyl alcohol	10
1,2-Dichlorobenzene	10
2-Methylphenol	10
Bis(2-chloroisopropyl)ether	10
4-Methylphenol	10
N-Nitroso-di-n-propylamine	10
Hexachloroethane	20
Acetophenone	10
Nitrobenzene	10
N-Nitrosopiperidine	20
Isophorone	10
2,4-Dimethylphenol	10
2-Nitrophenol	10
Benzoic acid	50
Bis(2-chloroethoxy)methane	10
2,4-Dichlorophenol	10
a,a-Dimethylphenethylamine	10
1,2,4-trichlorobenzene	10
Benzidine	50
Pyrene	10
p-Dimethylaminoazobenzene	10
Butylbenzylphthalate	10
Bis(2-ethylhexyl)phthalate	10

Table VI-5 (Cont'd)
Semivolatile Parameters

COMPOUNDS	PQL (ppb)
3,3'-Dichlorobenzidine	20
Benzo(a)anthracene	10
Chrysene	10
Di-n-octylphthalate	10
7,12-Dimethylbenz(a)anthracene	10
Benzo(b)fluoranthene	10
Benzo(k)fluoranthene	10
Benzo(a)pyrene	10
3-Methylcholanthrene	10
Dibenz(a,j)acridine	10
Indeno(1,2,3-cd)pyrene	10
Dibenz(a,h)anthracene	10
Benzo(g,h,i)perylene	10
Napthalene	10
4-Chloroaniline	10
2,6-Dichlorophenol	10
Hexachlorobutadiene	10
N-Nitrose-di-n-butylamine	10
4-Chloro-3-methylphenol	20
2-Methylnapthalene	10
Hexachlorocyclopentadiene	10
1,2,4,5-Tetrachlorobenzene	10
2,4,6-Trichlorophenol	10
2,4,5-Trichlorophenol	10
2-Chloronapthalene	10
1-Chloronapthalene	10
2-Nitroaniline	50
Dimethylphthalate	10
2,6-Dinitrotoluene	10
Acenaphthylene	10
3-Nitroaniline	50
4-Nitrophenol	50
2,4-Dinitrophenol	50
Acenaphthene	10

Table VI-5 (Cont'd)
Semivolatile Parameters

COMPOUNDS	PQL (ppb)
2,4-Dinitrotoluene	10
Pentachlorobenzene	10
Dibenzofuran	10
1-Naphthylamine	10
Diethylphthalate	10
2,3,4,6-Tetrachlorophenol	10
2-Naphthylamine	10
4-Chlorophenyl phenyl ether	10
4-Nitroaniline	50
Fluorene	10
4,6-Dinitro-2-methylphenol	50
4-Aminobiphenyl	20
1,2-Diphenylhydrazine	10
Phenacetin	20
4-Bromophenyl phenyl ether	10
Hexachlorobenzene	10
Pronamide	10
N-Nitrosodiphenylamine/Diphenylamine	10
Pentachlorophenol	50
Pentachloronitrobenzene	20
Phenathrene	10
Anthracene	10
Di-n-butylphthalate	10
Fluoranthene	10

**Table VI-6 List of Pesticide and PCB Analytical Parameters
BASELINE MONITORING PROJECT**

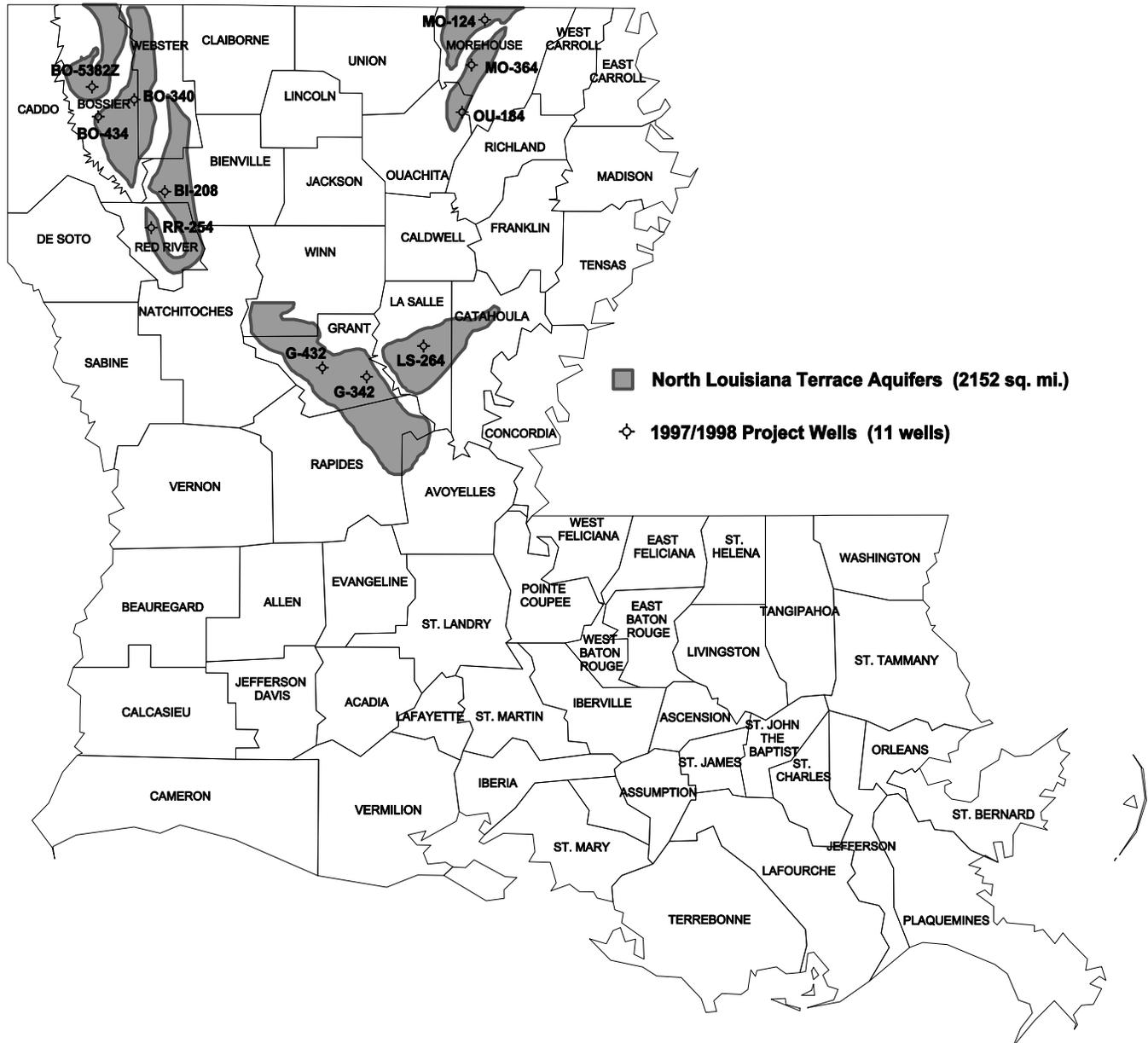
SEMIVOLATILE ORGANICS BY EPA METHOD 8270

COMPOUNDS	PQL (ppb)
Alpha BHC	2
Beta BHC	2
Gamma BHC	2
Delta BHC	2
Heptachlor	2
Aldrin	2
Heptachlor epoxide	2
Chlordane	2
Endosulfan I	2
4,4'-DDE	2
Dieldrin	2
4,4'DDD	2
Endrin	2
Toxaphene	75
Endosulfan II	2
Endrin Aldehyde	2
4,4'DDT	2
Endosulfan Sulfate	2
Methoxychlor	2
Endrin Ketone	2

SEMIVOLATILE ORGANICS BY EPA METHOD 8270

COMPOUNDS	PQL (ppb)
PCB 1221/ PCB 1232	10
PCB 1016/ PCB 1242	10
PCB 1254	10
PCB 1248	10
PCB 1260	10

BASELINE MONITORING PROJECT WELLS OF THE NORTH LOUISIANA TERRACE AQUIFERS



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 VI-1 Location Plat, North Louisiana Terrace Aquifer

NORTH LA. TERRACE AQUIFER - pH (SU)

Baseline Monitoring Project, FY97-98

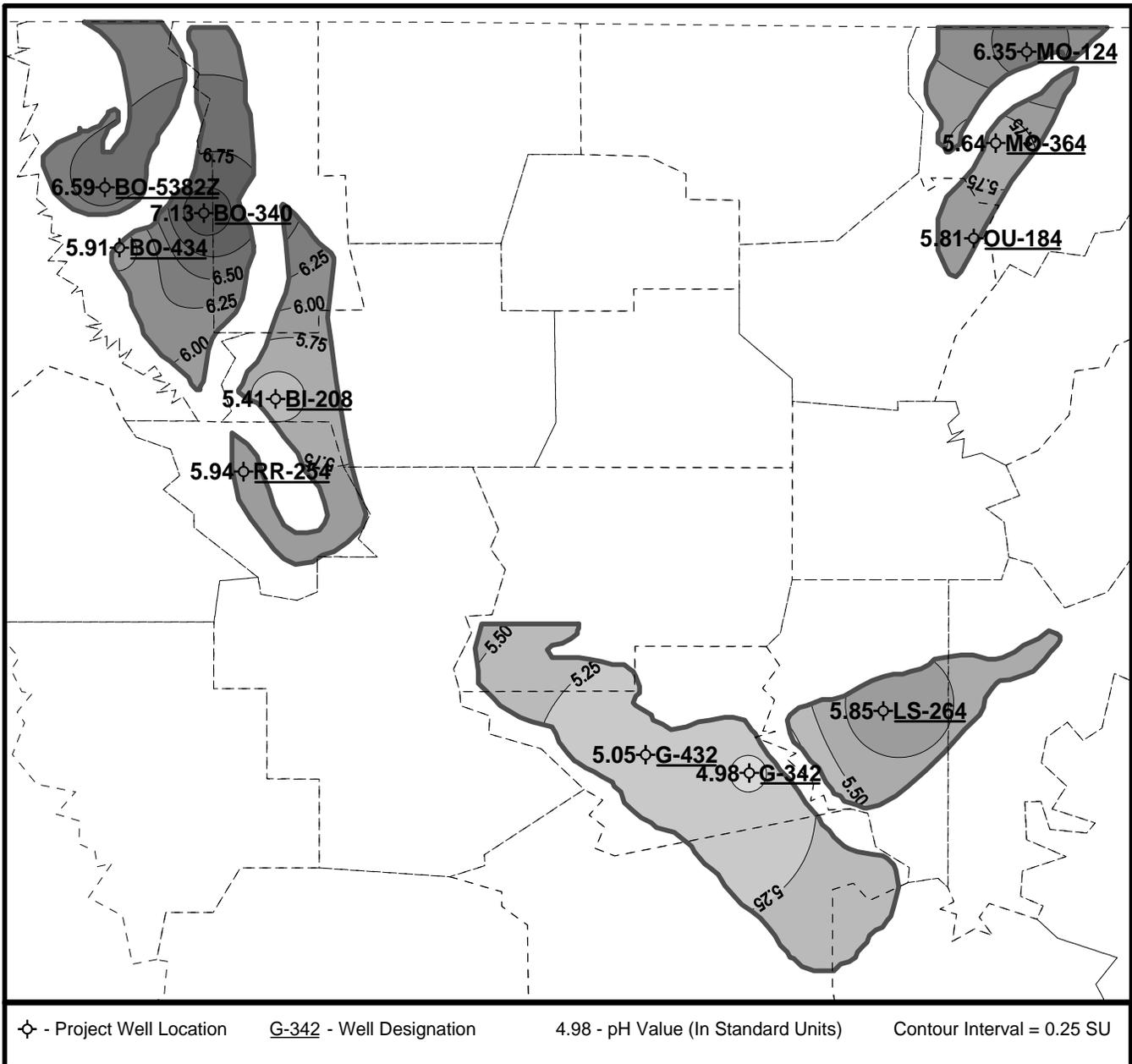


Figure VI-2 Map of pH Data

NORTH LA. TERRACE AQUIFER - TDS (ppm)

Baseline Monitoring Project, FY97-98

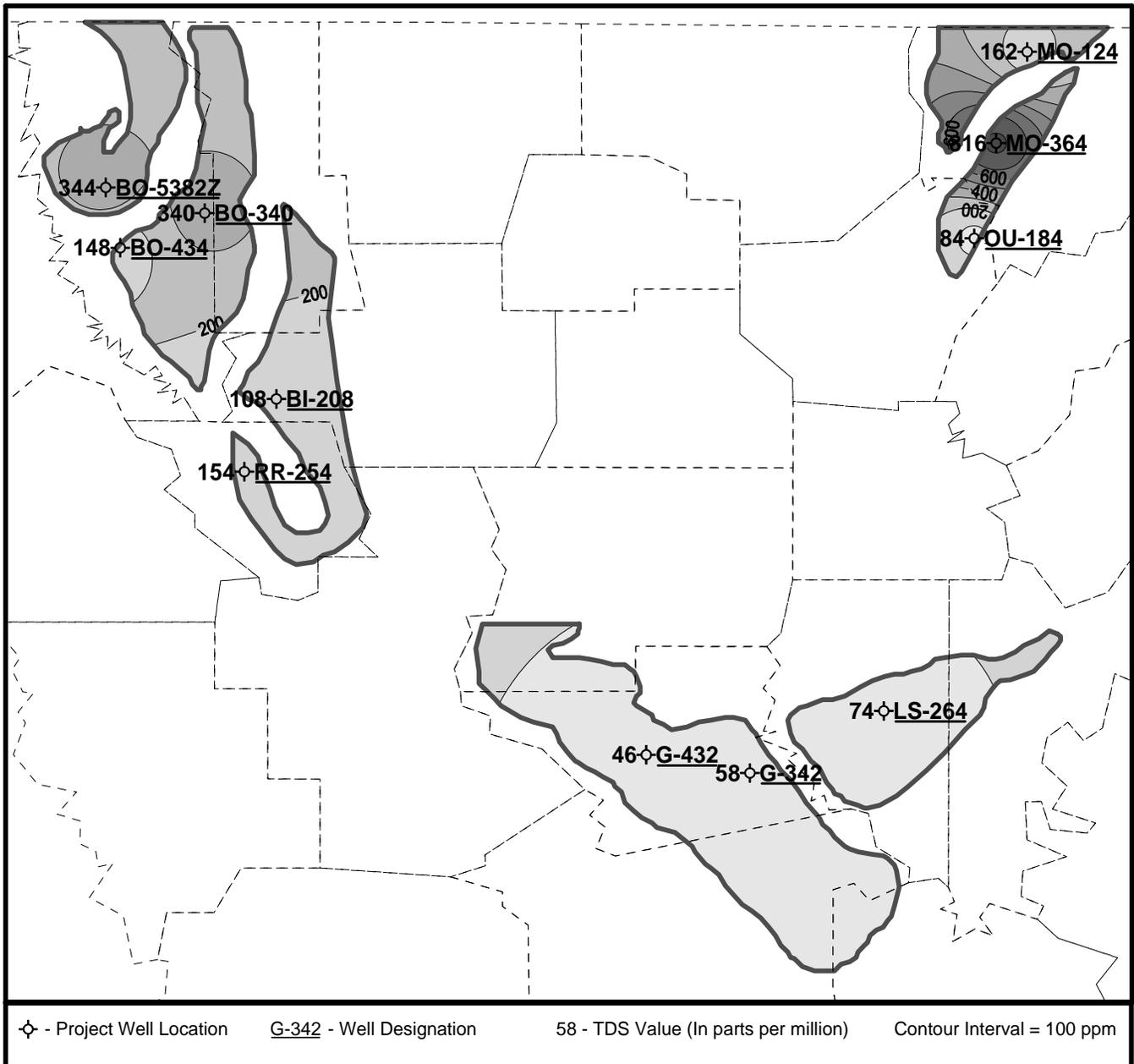


Figure VI-3 Map of TDS Data

NORTH LA. TERRACE AQUIFER - CHLORIDE (ppm)

Baseline Monitoring Project, FY97-98

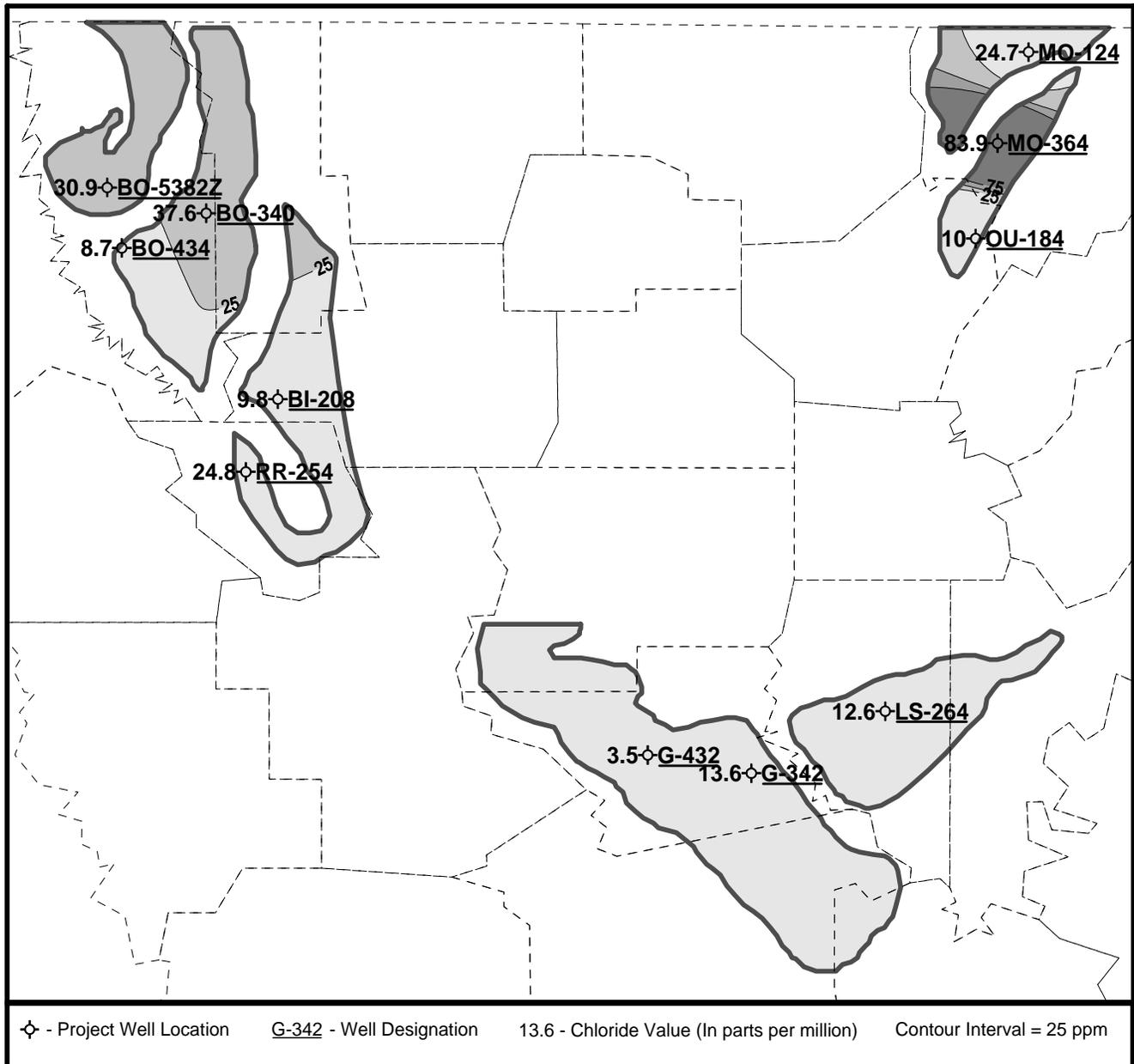


Figure VI-4 Map of Chloride Data

NORTH LA. TERRACE AQUIFER - IRON (ppm)

Baseline Monitoring Project, FY97-98

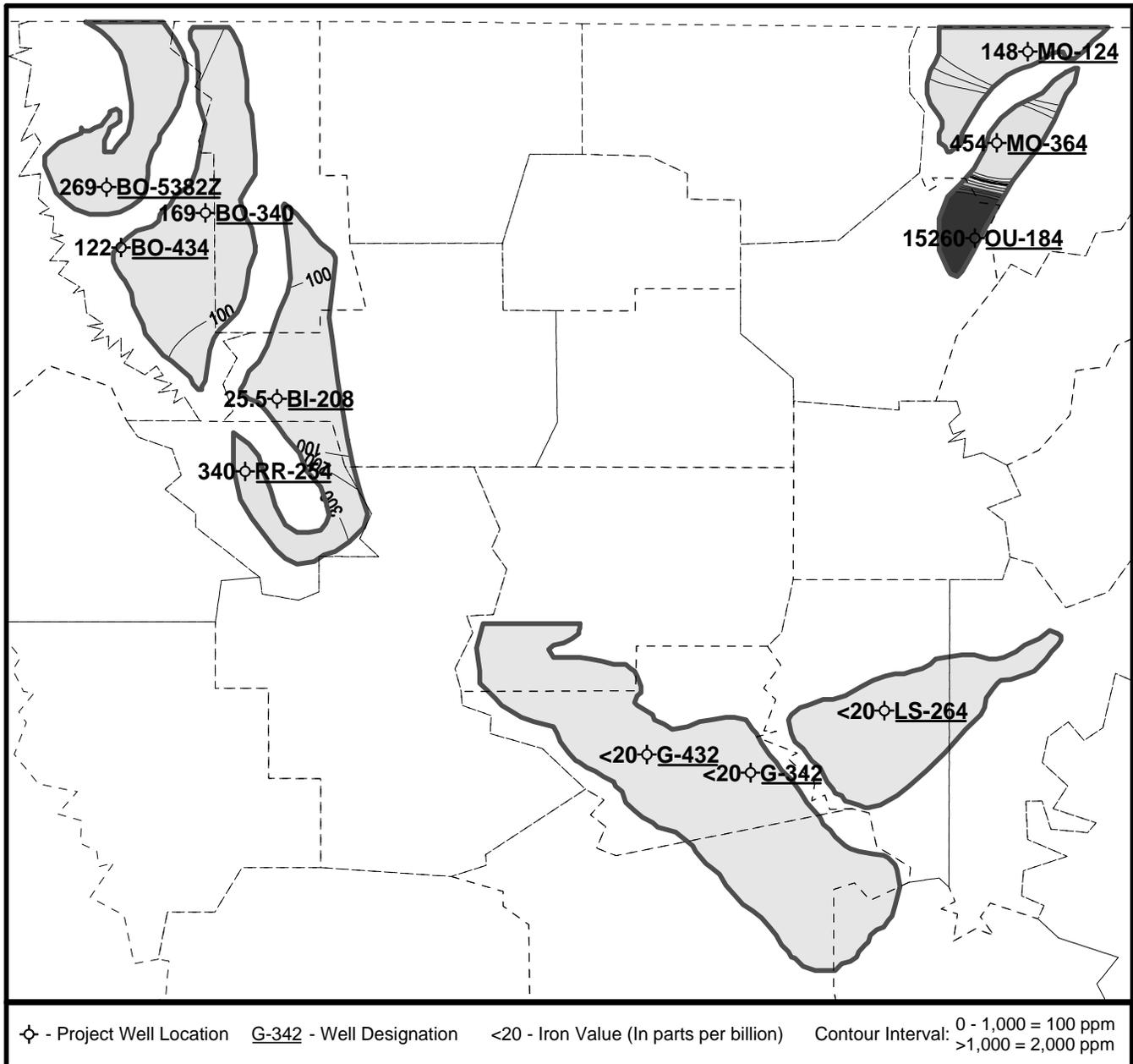


Figure VI-5 Map of Iron Data