Location Plats
Area of Reviews
Migration Potentials

UIC TRAINING WORKSHOP | Injection and Mining Division

Presented by
Teresa Rougon
Luzma Mata de Leder
Angela Howard

March 6-7, 2012

Location Plats

Policy No. IMD-GS-10

Location Plat Requirements for Injection & Mining Permits

- **Purpose and Intent**
  - Improve the accuracy
  - Increase the effectiveness
  - Address potential environmental threats
  - Improve the reliability of location descriptions and coordinates
- **Copy of Policy**
  - www.dnr.louisiana.gov >>
  - Conservation (TOP MENU) >>
  - Divisions (LEFT MENU) >>
  - Injection & Mining (LEFT MENU) >>
  - Injection & Mining Policy Statements (SCROLL DOWN) >>
  - IMD-GS-10 (CLICK)

Application Requirements

- **NEW Location Plats Required**
  - Applies to most applications for **New Drill** and **Re-Drill** wells
  - Can apply to some **Permitted** IMD wells
- **EXISTING Location Plats Accepted**
  - Applies to most applications for **Conversion** wells, as long as the following is met:
    - If the proposed well was surveyed **BEFORE** November 1, 2010:
      - An existing Location Plat must have been previously accepted by the Office of Conservation, and
      - The correct X/Y Coordinates must be available in the SONRIS database.
    - If the proposed well was surveyed **AFTER** November 1, 2010:
      - An existing Location Plat must have been previously accepted by the Office of Conservation, and
      - The Location Plat meets the survey and location plat requirements of this policy.

Survey Requirements

Minimum Requirements for Surveys Conducted in the Field

- **Field Investigation**
  - Performed by a Professional Land Surveyor (or under their supervision)
  - Marked with steady marker
    - At least 1/2 inch width/diameter
    - At least 18 inches in length
    - Marker must be distinguishable from surroundings
- **Location Determination**
  - Section Lines
  - Historical or Government Surveyed Monuments
  - Protracted Section Plat
- **Global Positioning System (GPS)**

Location Plat Requirements

Minimum Requirements for Location Plats

- **Dimensions of 8.5 x 10.5 inches**
- **Scaled to 1,000 feet to an inch**

  A smaller scale may be used as long as the applicable features are represented
- **Required Format**

  Legend, North Arrow, Bar Scale, Well Name, Operator Name, etc.
- **Legal Description**
- **Geographic Coordinates**
- **Required Features**

  Section Lines, Property Lines, Water Bodies, (when applicable, Oil & Gas Wells), etc.
- **Seals, Signatures, and Certifications**

WELL LOCATION PLAT

MAP OF SURVEY SHOWING PROPOSED LOCATION OF JOE BALL SWD WELL NO. 001,
SITUATED IN SECTION 43, T 18 N, R 4 E, OUACHITA PARISH LOUISINA.

PARISH

SECTION, TOWNSHIP, RANGE

National Geodetic Survey Monument
Designation – 37V22
PID – CQ3428
Louisiana / Ouachita
NAVD 88 =69.59'

MONUMENT DESCRIPTION

DESCRIPTION

I CERTIFY THAT THE PROPOSED LOCATION OF THE JOE BALL SWD WELL No. 001 WAS FROM N.G.S. MONUMENT DESIGNATED 37V22 IN SECTION 43, T18 N, R 4 E, OUACHITA PARISH, LOUISIANA AS FOLLOWS: BEGINNING AT NGS MONUMENT 37V22, THENCE, PROCEED S 07°20'52" W – 6889.41' TO LOCATION

LOCATION DESCRIPTION

NORTH ARROW AND SCALE

SCALE : 1"=1000'

Proposed location of
JOE BALL SWD WELL NO. 001

WELL NAME

NAD 1983
N = 740681.7506
E = 3410311.9046
LATITUDE NORTH = 32°32'07.5619"
LONGITUDE WEST = 92°04'47.5566"

GEOGRAPHIC COORDINATES IN LAT/LONG & X/Y, NAD 1983 & 1927

N.G. ELEV. = 81.10' (NAVD 88)

ELEVATION & REFERENCE

NAD 1927
N = 679976.023
E = 2129522.698
LATITUDE NORTH = 32°32'07.0472"
LONGITUDE WEST = 92°04'47.0763"

BEARING & DISTANCE

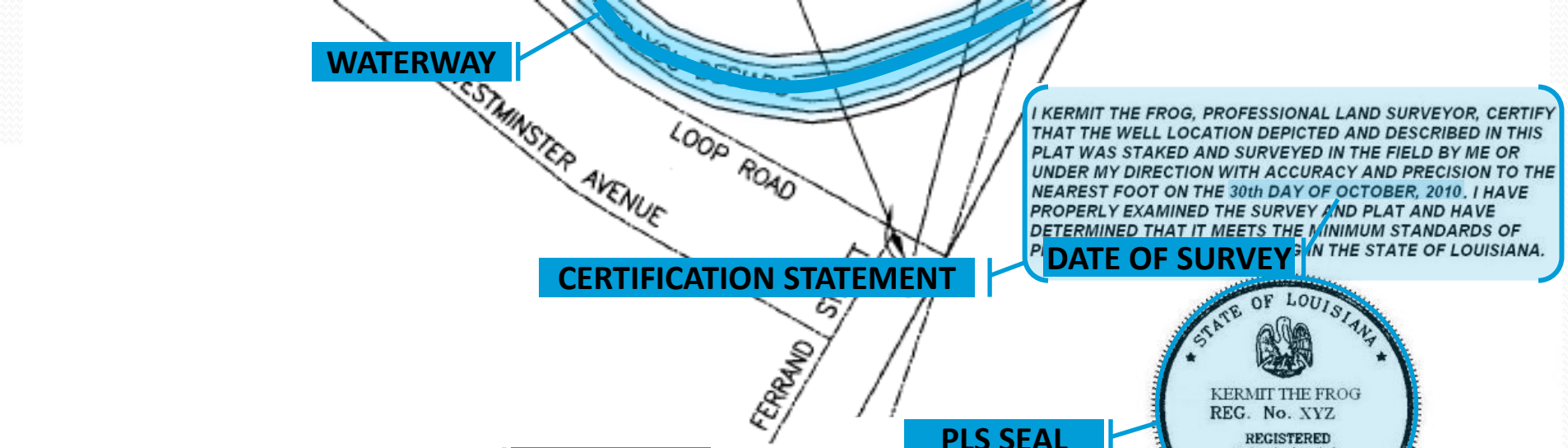
S07°20'52"W – 6889.41'

U.S. Highway 165

ROADWAY

RAILROAD

WATER BODY



I KERMIT THE FROG, PROFESSIONAL LAND SURVEYOR, CERTIFY THAT THE WELL LOCATION DEPICTED AND DESCRIBED IN THIS PLAT WAS STAKED AND SURVEYED IN THE FIELD BY ME OR UNDER MY DIRECTION WITH ACCURACY AND PRECISION TO THE NEAREST FOOT ON THE 30th DAY OF OCTOBER, 2010. I HAVE PROPERLY EXAMINED THE SURVEY AND PLAT AND HAVE DETERMINED THAT IT MEETS THE MINIMUM STANDARDS OF PRACTICE IN THE STATE OF LOUISIANA.

DATE OF SURVEY

CERTIFICATION STATEMENT

STATE OF LOUISIANA
KERMIT THE FROG
REG. No. XYZ
REGISTERED PROFESSIONAL
LAND SURVEYOR

PLS SEAL

BAR SCALE

500 0 500 1000
SCALE IN FEET

ORIGINAL SIGNATURE AND DATE IN CONTRASTING INK

11-09-2010

Kermit the Frog P.L.S. # XYZ

SURVEY NOTES

1) LEGEND:
- ◉ – WELL LOCATION
- ◉ – NATIONAL GEODETIC SURVEY MONUMENT
- ○ – SURVEY POINT NOT MONUMENTED

LEGEND

2) DATUM = NAD 83 LOUISIANA NOTH ZONE 1701
= NAVD 88 (VERTICLE)

3) THIS MAP IS FOR PERMITTING PURPOSES ONLY AND DOES NOT REPRESENT A PROPERTY BOUNDARY SURVEY AS STIPULATED BY LAC 46 SS 2905

4) No Title Research was performed for the Existing Rights-of-Way, Easements and/or Servitudes of Record that may affect th

DRAWING DATE

OPERATOR'S NAME

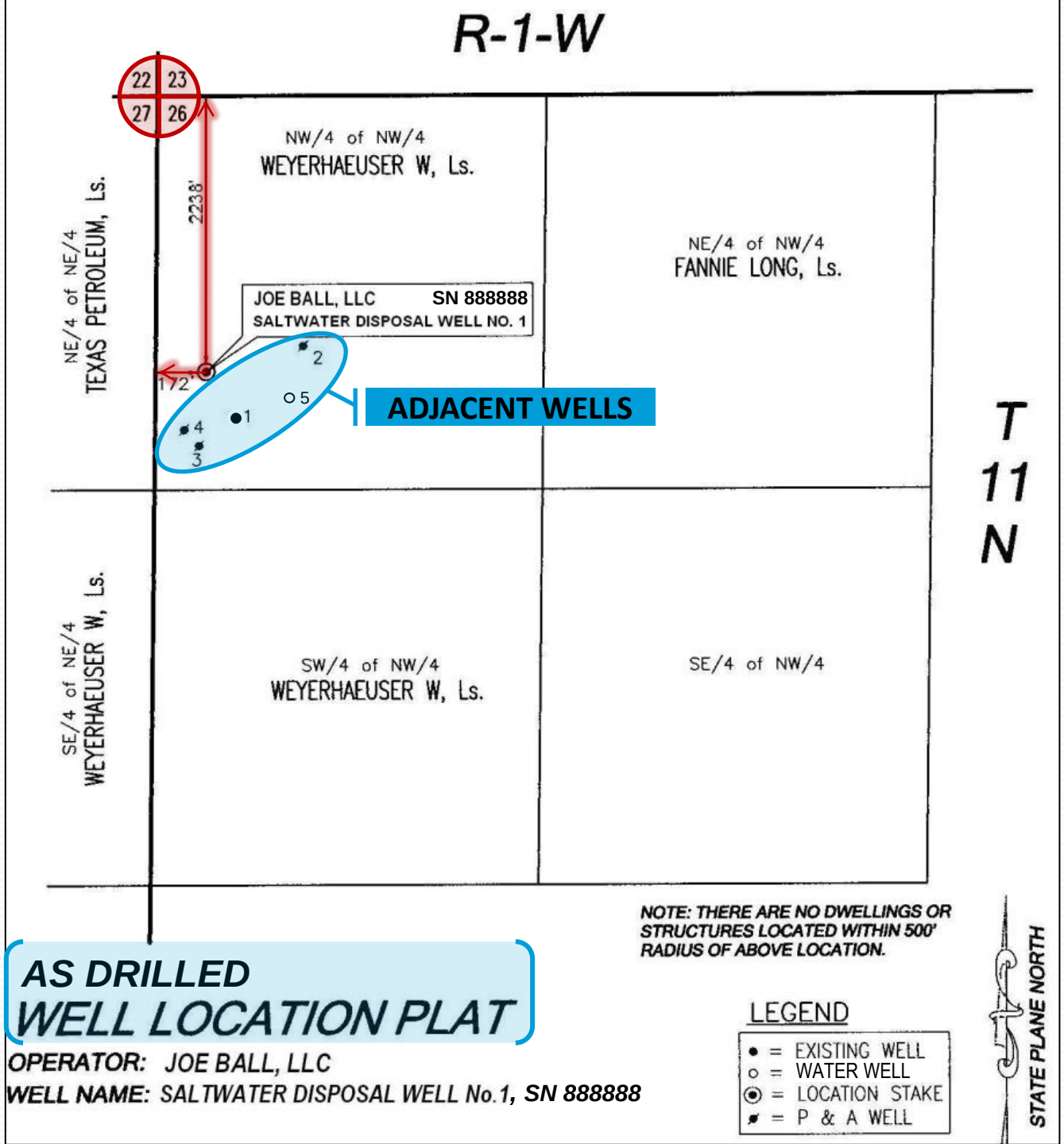
OPERATOR: JOE BALL, LLC

WELL NAME

JOE BALL SWD WELL NO. 001
Situated in
Section 43, T18N, R4E
Ouachita Parish, Louisiana

Kermit & Associates, LTD
Consulting Engineers & Land Surveyors
P.O. Box 10001
Monroe, LA 71211 (71201)

Date: 12/19/2011	Drawn by: KMG	Drawing No. 12-0001-01
Scale: 1" = 1000'	Checked by: JSB	


R-1-W
22
23
27
26
NW/4 of NW/4
WEYERHAEUSER W, Ls.
NE/4 of NW/4
FANNIE LONG, Ls.
NE/4 of NE/4
TEXAS PETROLEUM, Ls.
2238'
172'
JOE BALL, LLC
SN 888888
SALTWATER DISPOSAL WELL NO. 1
ADJACENT WELLS
1
2
3
4
5
T
11
N
SE/4 of NE/4
WEYERHAEUSER W, Ls.
SW/4 of NW/4
WEYERHAEUSER W, Ls.
SE/4 of NW/4
NOTE: THERE ARE NO DWELLINGS OR STRUCTURES LOCATED WITHIN 500' RADIUS OF ABOVE LOCATION.
LEGEND
= EXISTING WELL
= WATER WELL
= LOCATION STAKE
= P & A WELL
STATE PLANE NORTH
AS DRILLED
WELL LOCATION PLAT
OPERATOR: JOE BALL, LLC
WELL NAME: SALTWATER DISPOSAL WELL No.1, SN 888888

Location Plat Requirements

Legal Description

- **Description must include:**
  - Field measured distances to the section lines, OR
  - Distance and bearing to a historical or governmental monument, OR
  - Footages on a protracted section plat.
- **If the description is not based on the most recent survey, then the plat must include a statement phrased as follows:**

  "This description is based on the survey and plat made by [insert licensee's name], Professional Land Surveyor, dated [insert date]."

Location Plat Requirements

Geographic Coordinates

- **Latitude and Longitude**
  - In Degrees, Minutes, Seconds
  - Minimum accuracy and precision of two decimals of a second
  - Provide coordinate referenced from NAD 1927 and 1983
  - Will NOT accept values scaled from a map
  - If GPS is used to determine coordinates, then the GPS data must meet the policy
- **State Plane X,Y Coordinates**
  - Provide coordinate referenced from NAD 1927 and 1983
  - Lambert Zone (North or South)

Location Plat Requirements

Seal, Signatures, and Certifications

- **Seal**
  - Of the licensed Professional Land Surveyor who assumes responsibility for survey and plat
  - Rubber Stamp or Computer Generated seals
  - Computer generated seals must be signed and dated
- **Signatures**
  - Licensee's original, handwritten, pen to paper, signature and date
  - Contrasting ink

Location Plat Requirements

Seal, Signatures, and Certifications (Continued)

- **Certification Statement**

  The following statement is acceptable:

  " I [insert licensee's name], Professional Land Surveyor, certify that the well location depicted and described in this plat was [staked or located] and surveyed in the field by me or under by direction with accuracy and precision to the nearest foot. I have properly examined ***the survey and plat and have determined that it meets the minimum standards of practice for land surveying in the State of Louisiana.***"

Applying the Location Plat Policy to the Following Wells

Class V Wells

Area Permits for Class III Wells

Horizontal and Directional Drilled Wells

Challenges Due to Irregular Sections

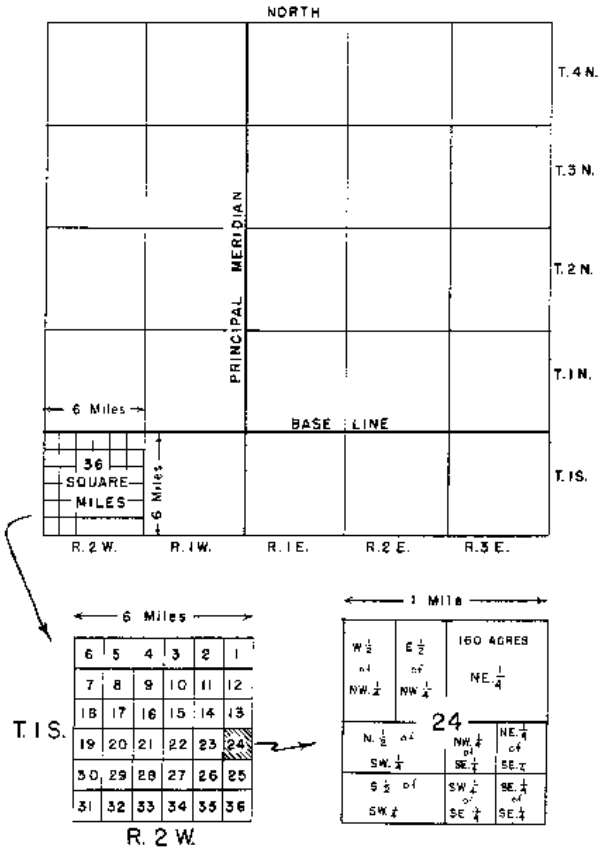


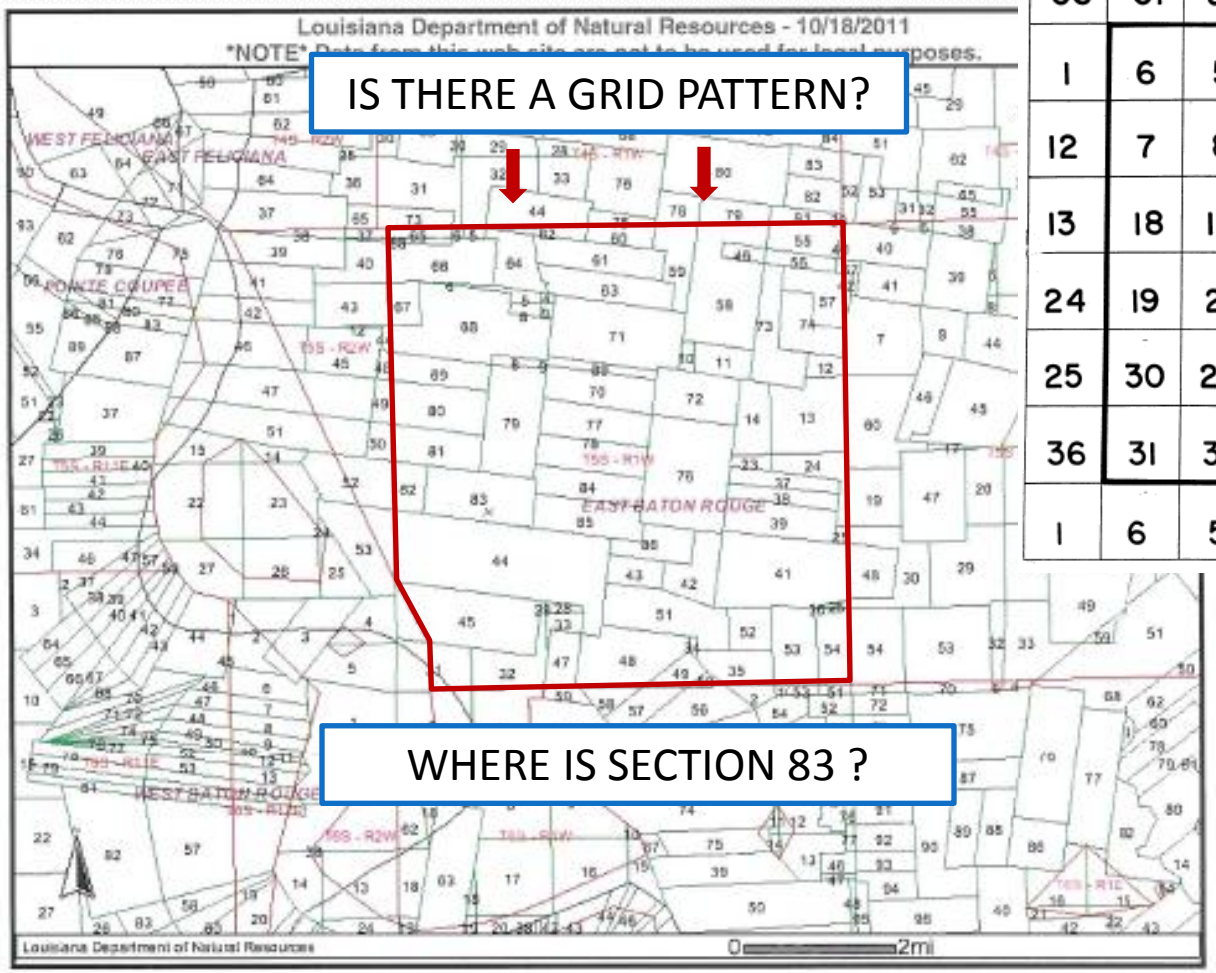
Figure 12. Standard land divisions.

LAND DIVISIONS

Most states have been surveyed into rectangular land units called townships. A township is usually square and is six miles on a side. North-south lines marking township boundaries are range lines; and east-west lines are township lines. Range lines are measured east or west of a principal meridian; and township lines are measured north or south of some base line. Each township is further divided into sections one mile square. These 36 sections of a township are numbered as shown in Figure 12. One section is equivalent to 640 acres.

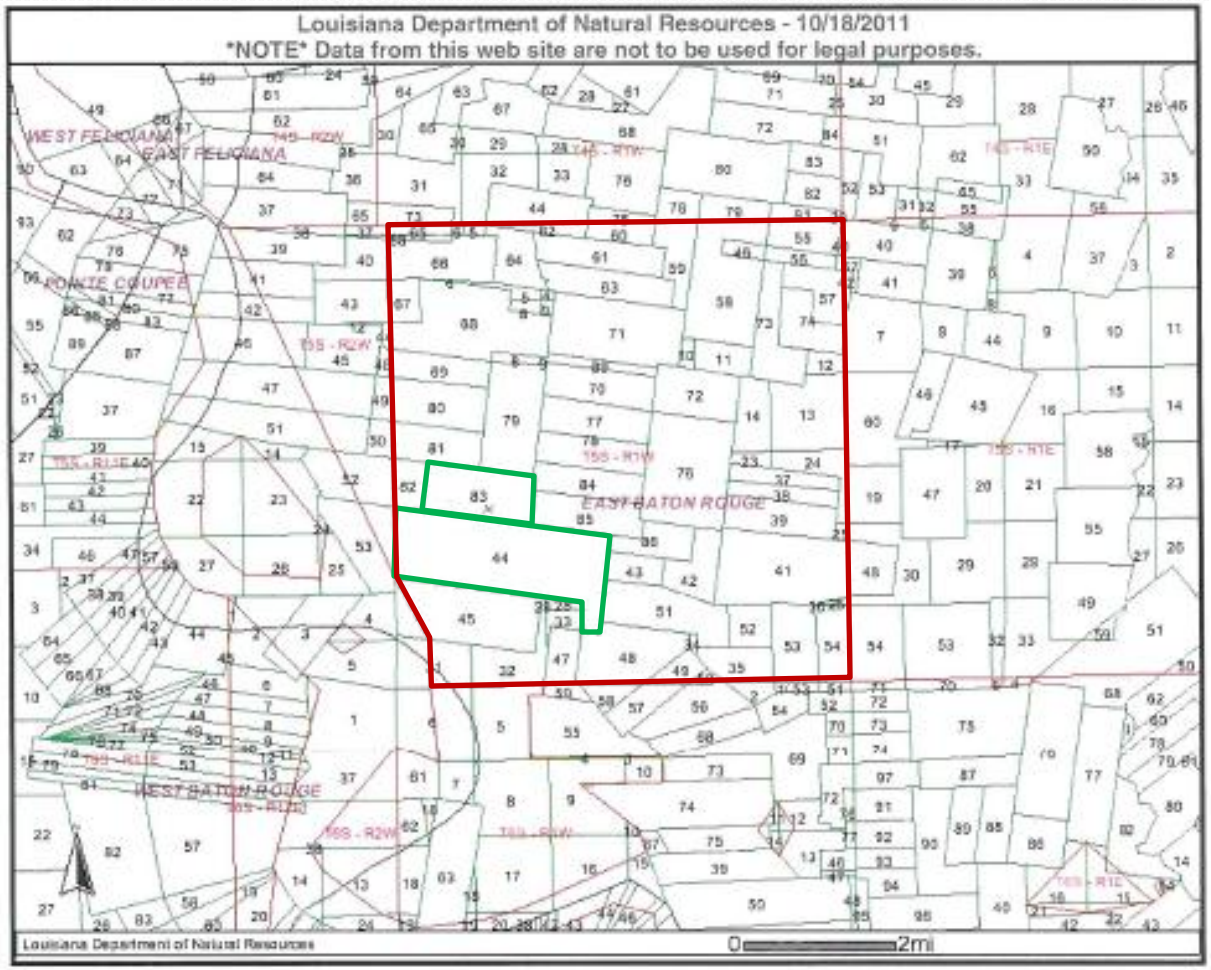
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

Challenges Due to Irregular Sections (Continued)



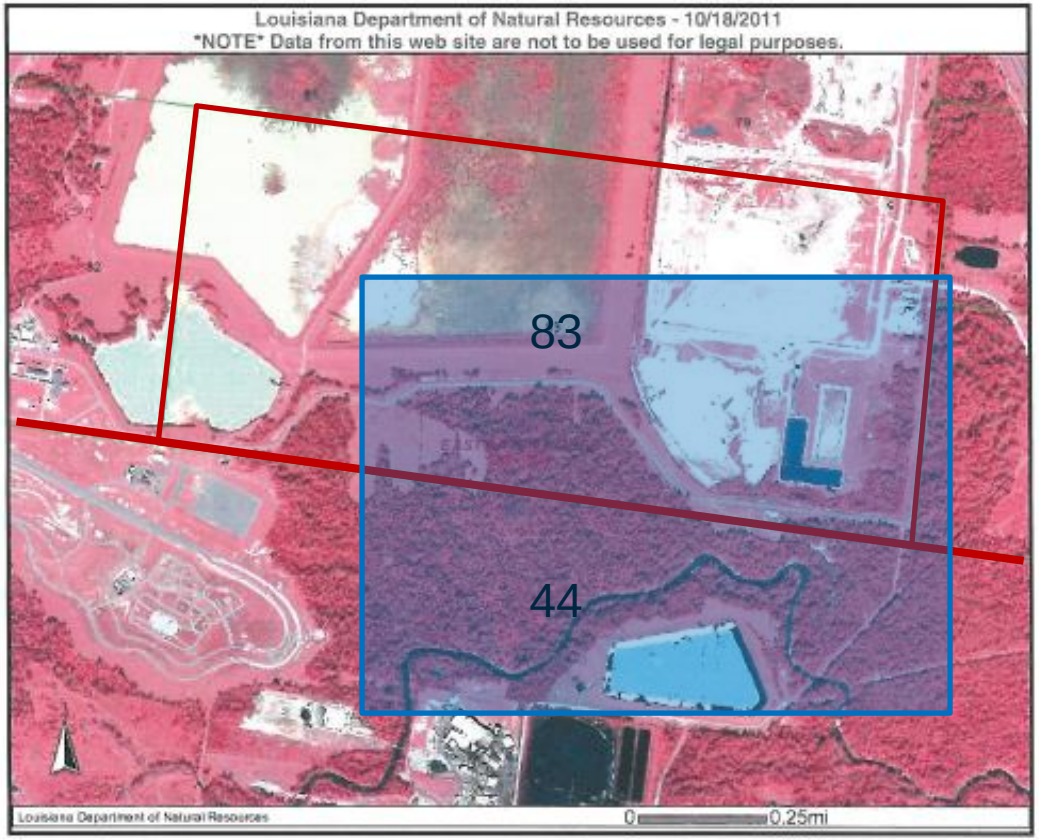
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

Challenges Due to Irregular Sections (Continued)



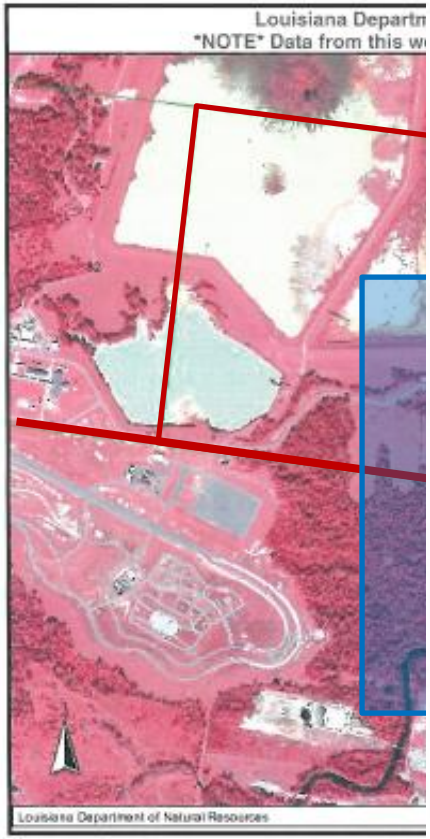
Class V Wells

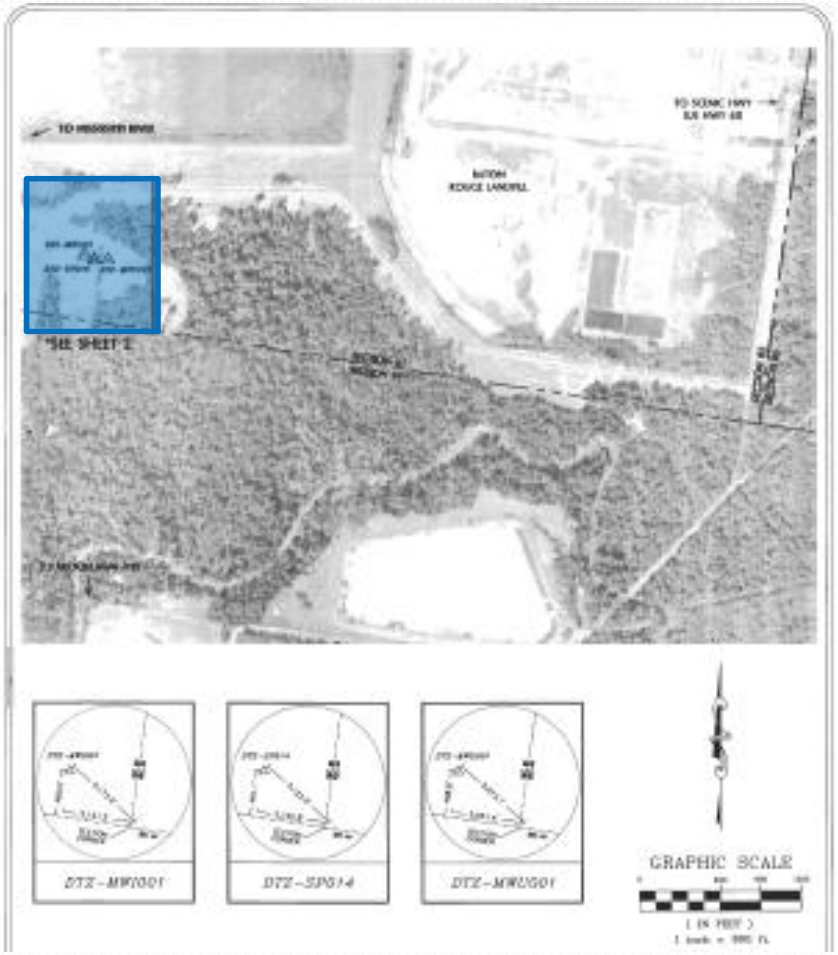
Challenges Due to Irregular Sections (Continued)



Class V Wells

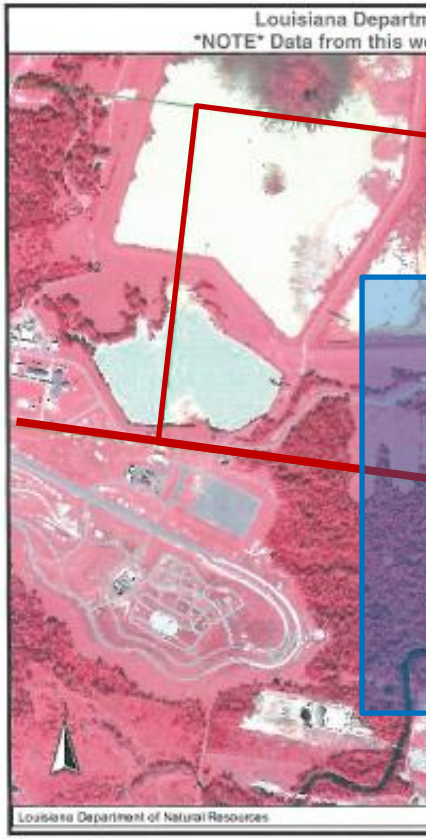
Challenges Due to Irregular Sections (Continued)

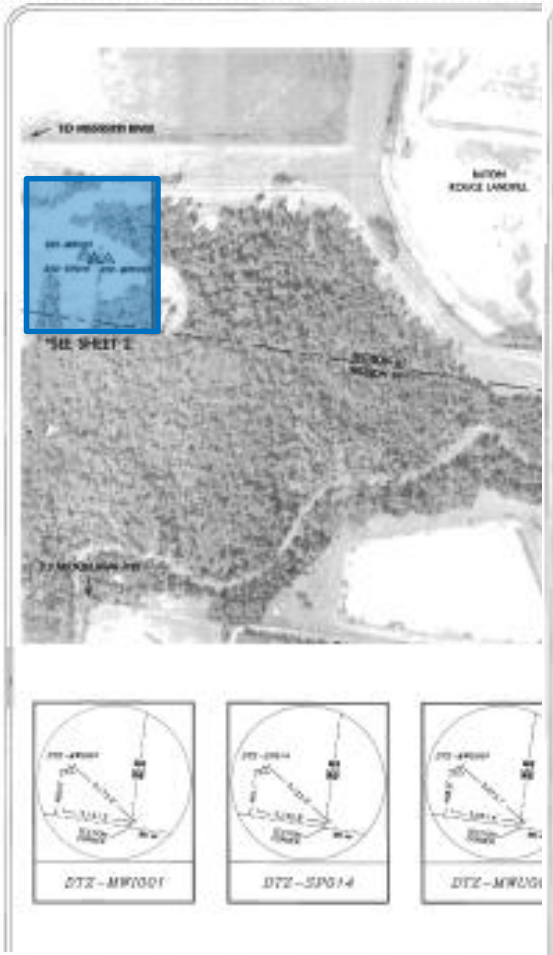


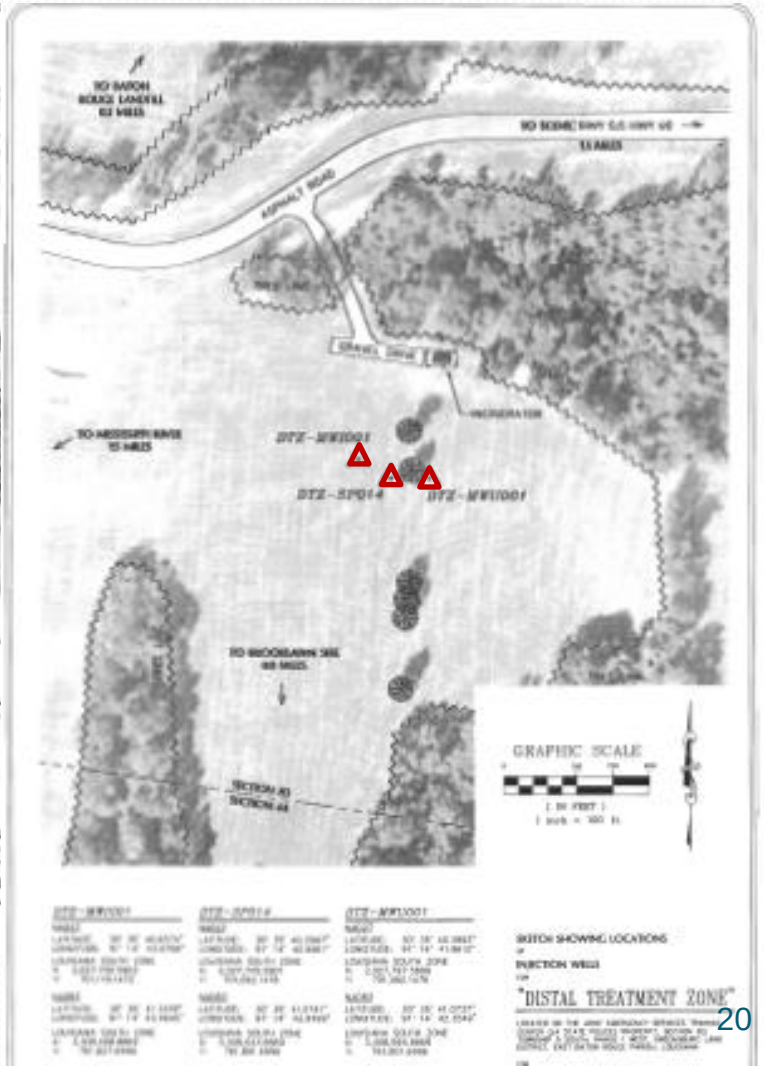


Class V Wells

Challenges Due to Irregular Sections (Continued)

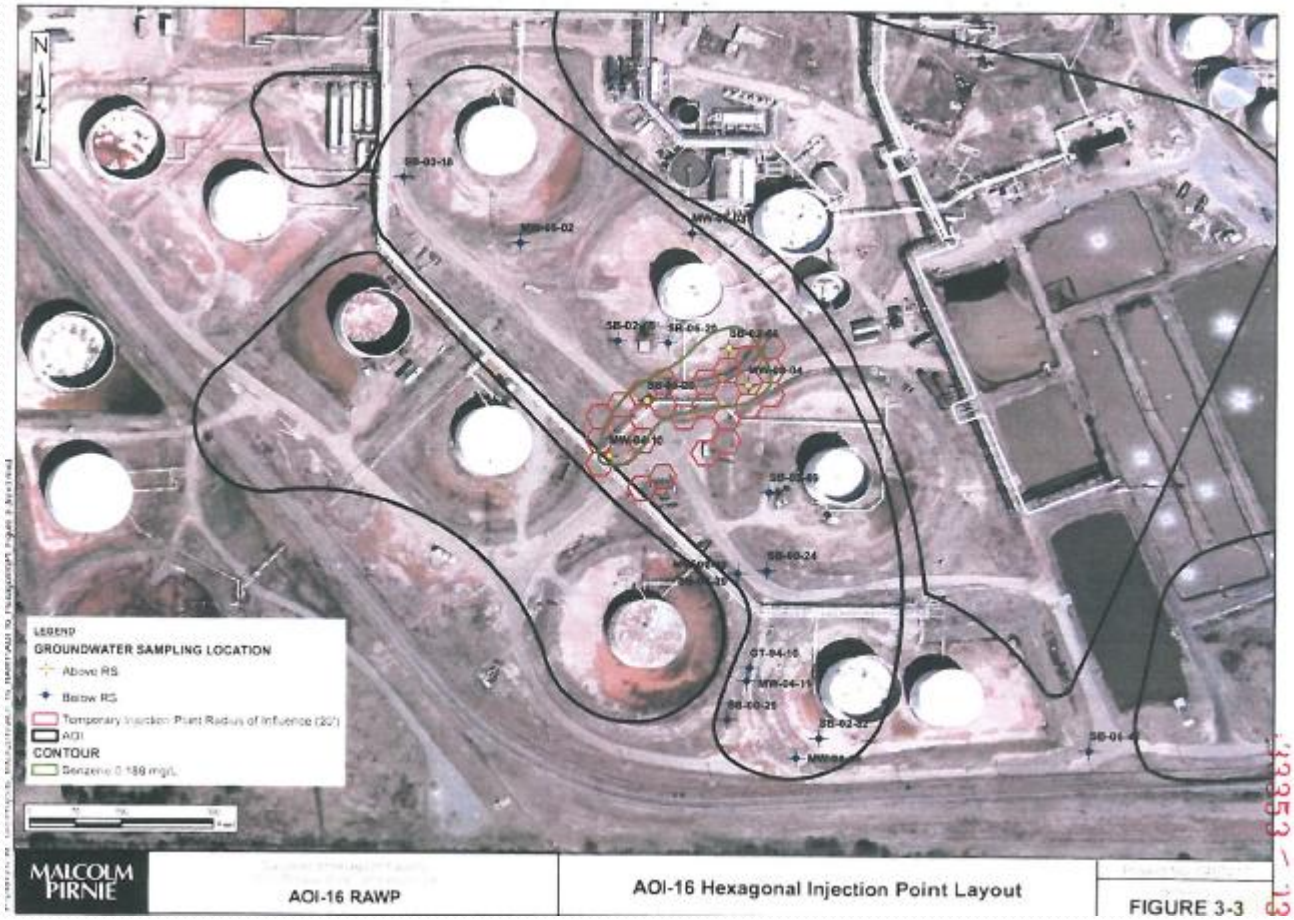






Class V Wells

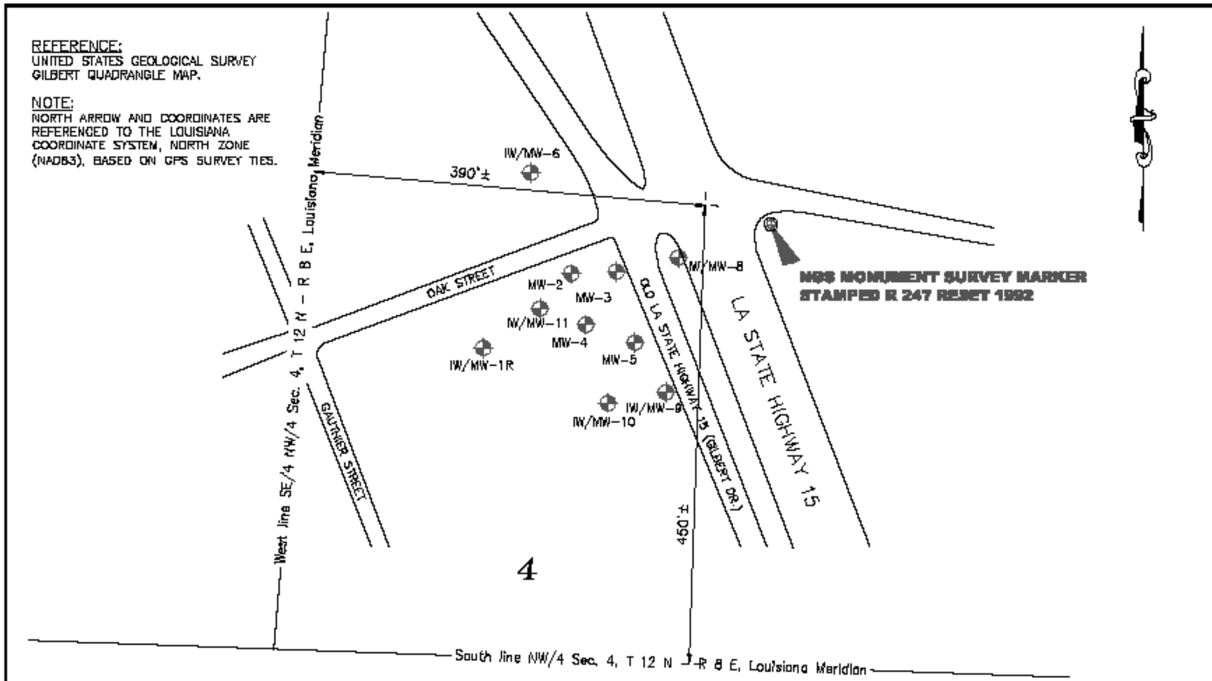
Class V Wells Installed to Monitor or Remediate Sites



Class V wells are typically installed in tight clusters and in close proximity to industrial structures, which makes conducting the field survey difficult.

Class V Wells

Example of a Location Plat for six Class V wells



NAME	STATE PLANE NAD27 NORTHING	STATE PLANE NAD27 EASTING	STATE PLANE NAD83 NORTHING	STATE PLANE NAD83 EASTING	GEOGRAPHIC NAD27 LATITUDE	GEOGRAPHIC NAD27 LONGITUDE	GEOGRAPHIC NAD83 LATITUDE	GEOGRAPHIC NAD83 LONGITUDE	TOP OF CASING ELEV. NAVD88
IW/MW-1R	304624.55	[illegible]	[illegible]	3541221.41	[illegible]	[illegible]	[illegible]	[illegible]	73.81
MW-2	304697.04	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	73.75
MW-5	[illegible]	[illegible]	565402.60	3541358.57	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MW-4	[illegible]	[illegible]	[illegible]	3541323.36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MW-3	304676.46	[illegible]	565334.04	3541371.36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
IW/MW-6	304796.16	2250475.46	565500.76	3541269.34	[illegible]	[illegible]	[illegible]	[illegible]	72.59
IW/MW-8	304712.61	[illegible]	[illegible]	3541415.16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
IW/MW-9	304360.90	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
IW/MW-10	[illegible]	[illegible]	[illegible]	3541345.18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
IW/MW-11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LEGEND

IW/MW-X Injection Well/Monitor Well location

MW-X Monitor Well location

I, JAMES R. WEBB, PROFESSIONAL LAND SURVEYOR, CERTIFY THAT THE WELL LOCATIONS DEPICTED AND DESCRIBED IN THIS PLAT WERE LOCATED AND SURVEYED IN THE FIELD BY ME, ON 03/26/2011, WITH ACCURACY AND PRECISION TO THE NEAREST FOOT. I HAVE PROPERLY EXAMINED THIS PLAT AND HAVE DETERMINED THAT IT COMPLIES WITH EXISTING LOCAL LOUISIANA CODES, AND HAS BEEN PROPERLY SITE ADAPTED TO USE IN THIS AREA.

FOR REVIEW

JAMES R. WEBB, LA. REG. NO. 04582

Sems, Inc.

SECTION 4, T 12 N, R 8 E LOUISIANA MERIDIAN
GILBERT, FRANKLIN PARISH, LOUISIANA
U.P. LACHNEY ESTATE PROPERTY

March 26, 2011 1" = 100'

WEBB SURVEYING 337-439-1463 LAKE CHARLES, LA.

100 0 100 200
SCALE IN FEET

Injection Well/Monitor Well 1R, is located in Section 4, T 12 N, R 8 E Louisiana Meridian, Franklin Parish, Louisiana and is S 86°59'56" W 310.30' from National Geodetic Survey Government Monument R 247 RESET 1992 which has La. North Zone State Plane Lambert coordinates X= 3541507.05, Y= 565450.18. R 247 RESET 1992 is a stainless steel rod with a stamped survey marker that was surveyed and reported by LADOTD in 1992.

Injection Well/Monitor Well 6, is located in Section 4, T 12 N, R 8 E Louisiana Meridian, Franklin Parish, Louisiana and is N 78°02'17" W 244.01' from National Geodetic Survey Government Monument R 247 RESET 1992 which has La. North Zone State Plane Lambert coordinates X= 3541507.05, Y= 565450.18. R 247 RESET 1992 is a stainless steel rod with a stamped survey marker that was surveyed and reported by LADOTD in 1992.

Injection Well/Monitor Well 8, is located in Section 4, T 12 N, R 8 E Louisiana Meridian, Franklin Parish, Louisiana and is S 70°21'33" W 97.57' from National Geodetic Survey Government Monument R 247 RESET 1992 which has La. North Zone State Plane Lambert coordinates X= 3541507.05, Y= 565450.18. R 247 RESET 1992 is a stainless steel rod with a stamped survey marker that was surveyed and reported by LADOTD in 1992.

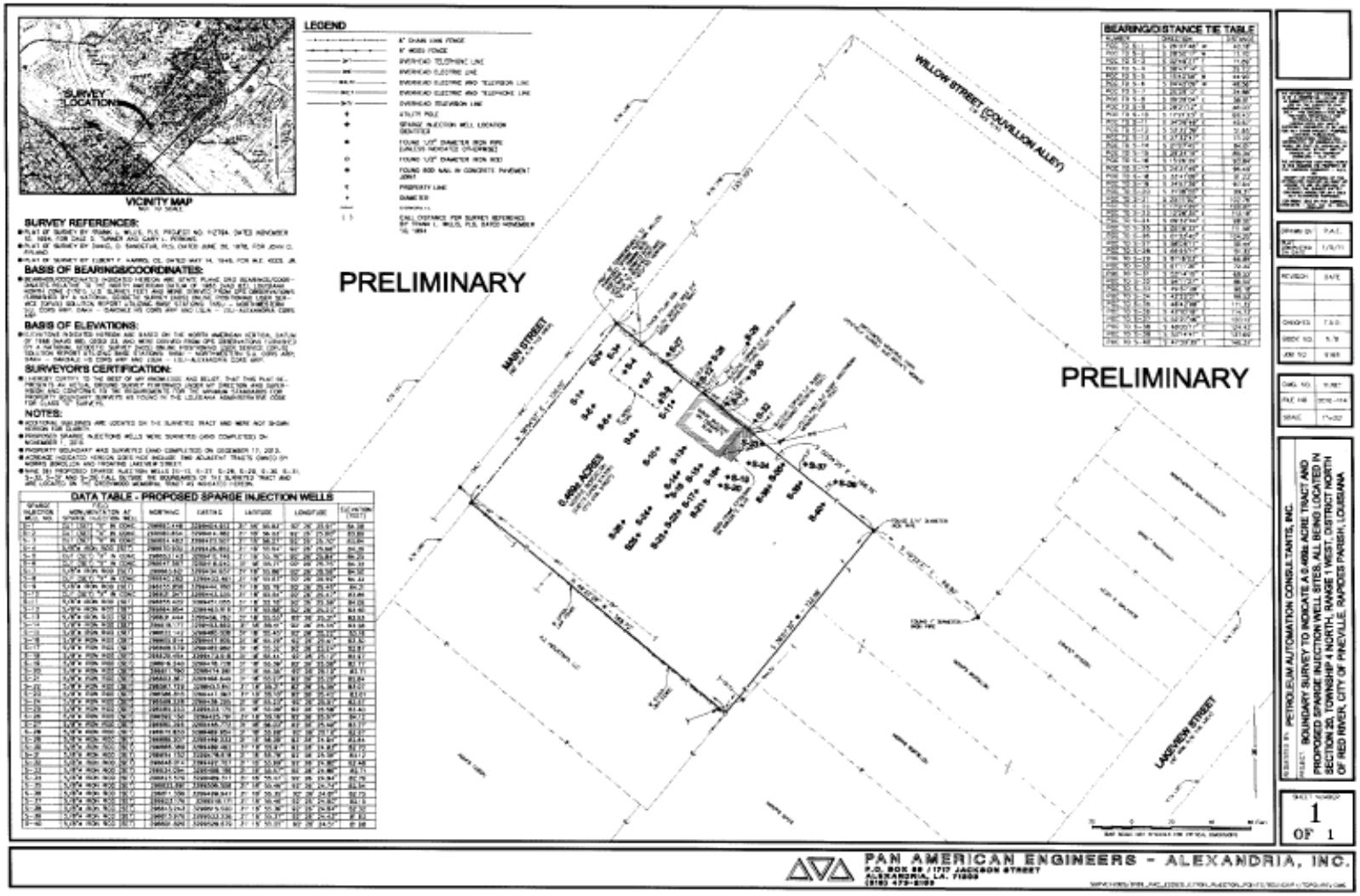
Injection Well/Monitor Well 9, is located in Section 4, T 12 N, R 8 E Louisiana Meridian, Franklin Parish, Louisiana and is S 32°22'16" W 195.01' from National Geodetic Survey Government Monument R 247 RESET 1992 which has La. North Zone State Plane Lambert coordinates X= 3541507.05, Y= 565450.18. R 247 RESET 1992 is a stainless steel rod with a stamped survey marker that was surveyed and reported by LADOTD in 1992.

Injection Well/Monitor Well 10, is located in Section 4, T 12 N, R 8 E Louisiana Meridian, Franklin Parish, Louisiana and is S 42°42'55" W 236.61' from National Geodetic Survey Government Monument R 247 RESET 1992 which has La. North Zone State Plane Lambert coordinates X= 3541507.05, Y= 565450.18. R 247 RESET 1992 is a stainless steel rod with a stamped survey marker that was surveyed and reported by LADOTD in 1992.

Injection Well/Monitor Well 11, is located in Section 4, T 12 N, R 8 E Louisiana Meridian, Franklin Parish, Louisiana and is S 70°08'58" W 243.93' from National Geodetic Survey Government Monument R 247 RESET 1992 which has La. North Zone State Plane Lambert coordinates X= 3541507.05, Y= 565450.18. R 247 RESET 1992 is a stainless steel rod with a stamped survey marker that was surveyed and reported by LADOTD in 1992.

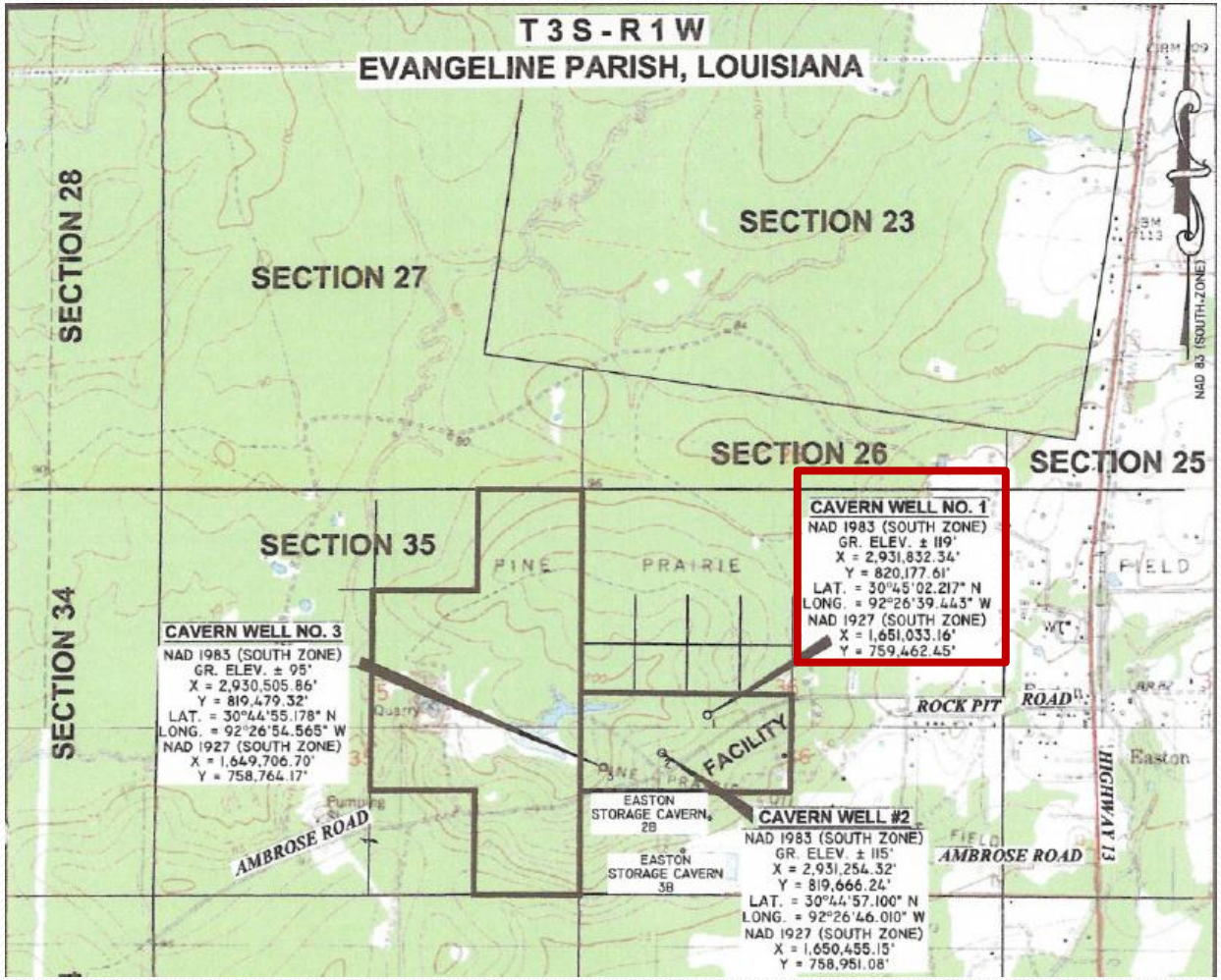
Class V Wells

Another example of a Location Plat for multiple Class V wells



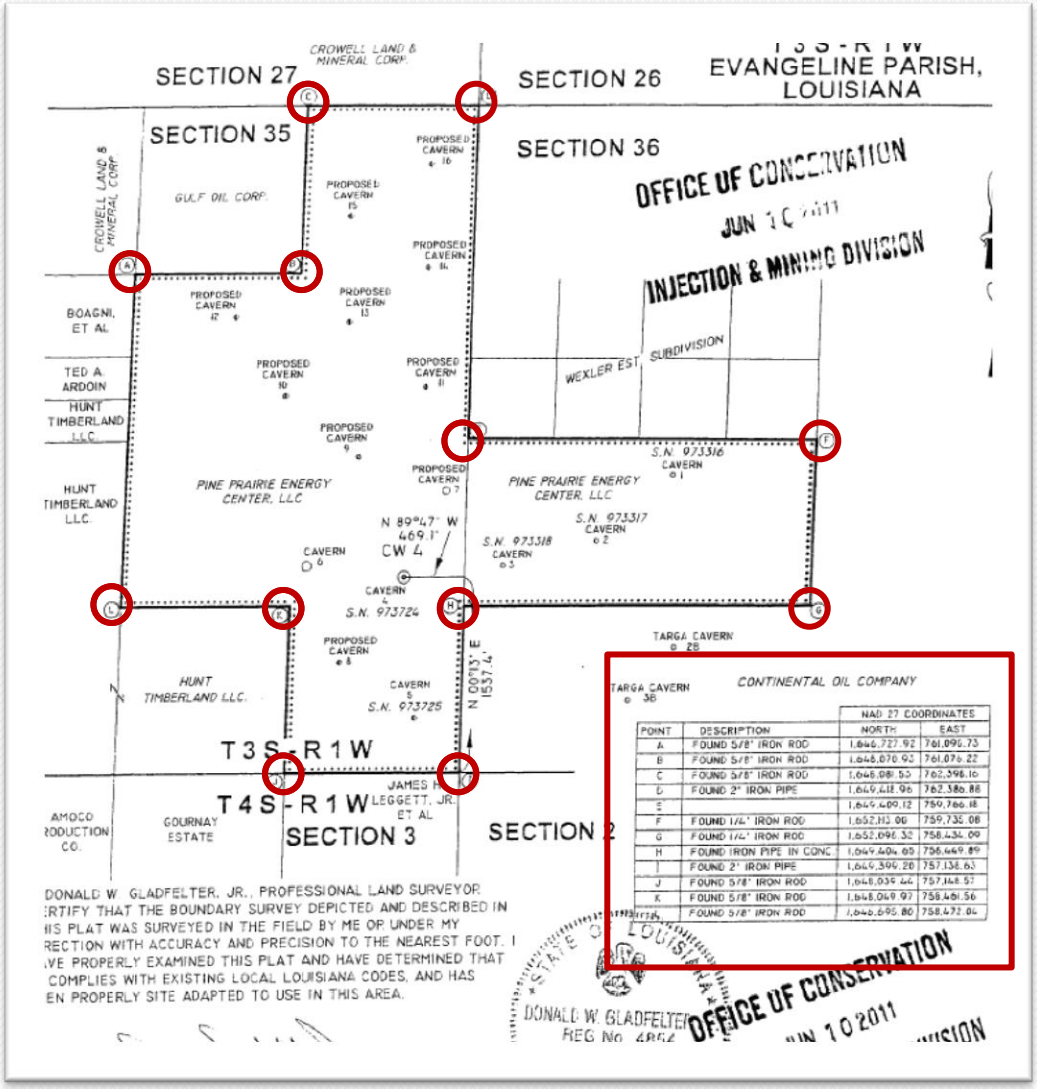
Single Class III Well within an Area Permit

Survey of Individual Wells within Area Permit Boundary



Area Permits for Class III Wells

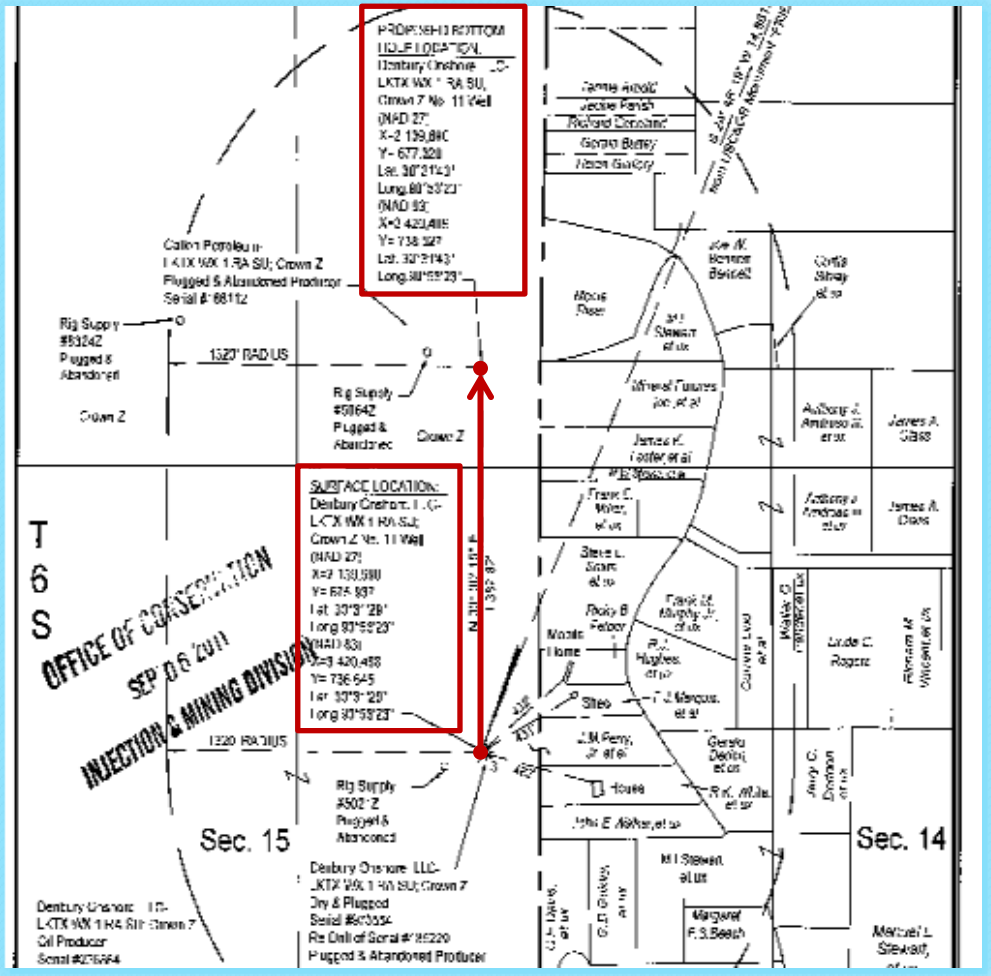
Survey Includes Multiple Points that Define the Area

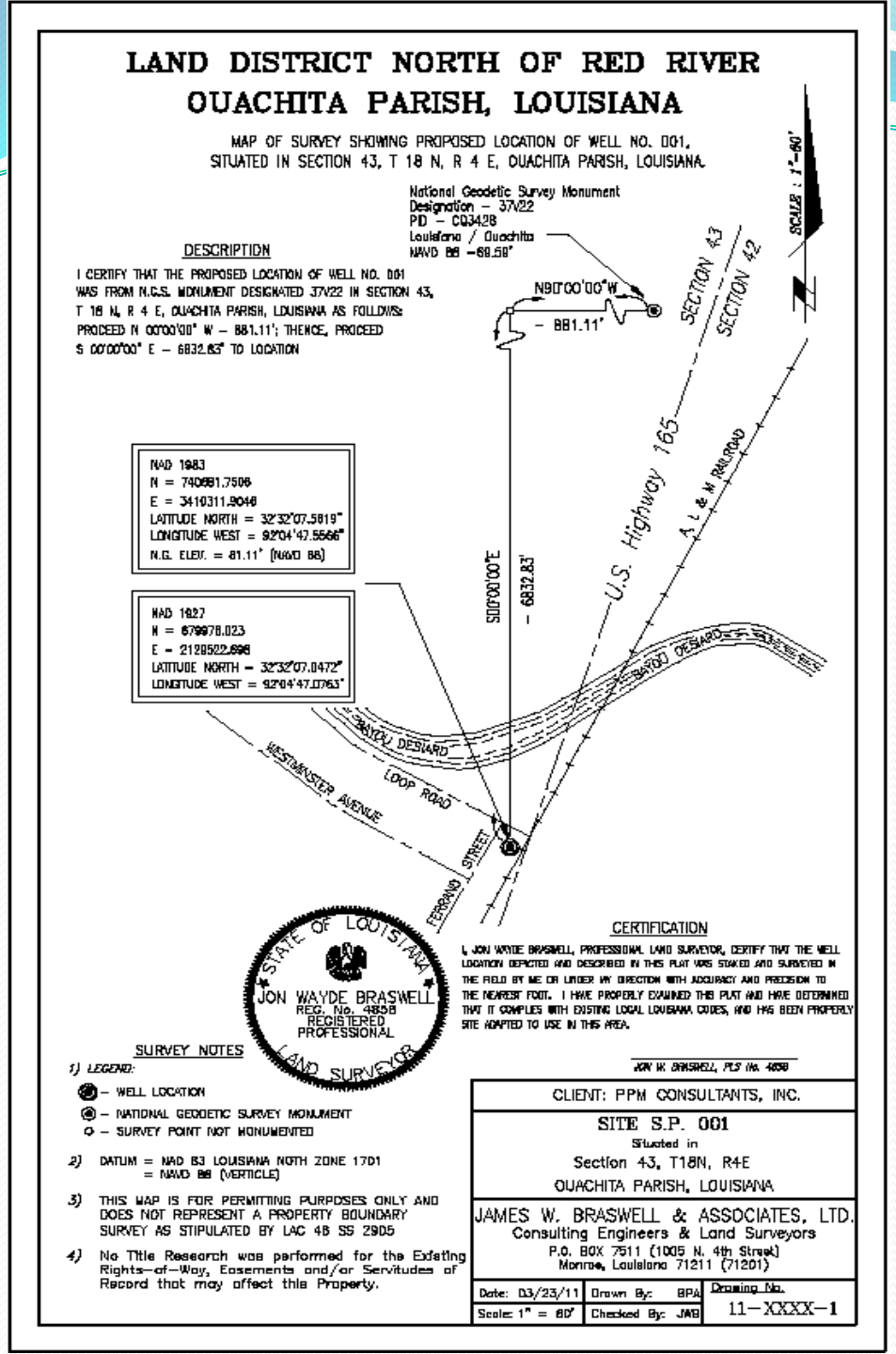


POINT	DESCRIPTION	NAD 27 COORDINATES NORTH	EAST
A	FOUND 5/8" IRON ROD	1,646,727.92	761,095.73
B	FOUND 5/8" IRON ROD	1,648,070.93	761,076.22
C	FOUND 5/8" IRON ROD	1,648,081.55	762,396.10
D	FOUND 2" IRON PIPE	1,649,418.96	762,386.88
E		1,649,409.12	759,766.18
F	FOUND 1/2" IRON ROD	1,652,110.00	759,735.08
G	FOUND 1/2" IRON ROD	1,652,096.32	758,434.09
H	FOUND IRON PIPE IN CONC.	1,649,404.00	756,449.89
I	FOUND 2" IRON PIPE	1,649,396.20	757,138.63
J	FOUND 5/8" IRON ROD	1,648,039.44	757,148.57
K	FOUND 5/8" IRON ROD	1,648,049.97	758,461.56
L	FOUND 5/8" IRON ROD	1,646,695.80	758,472.04

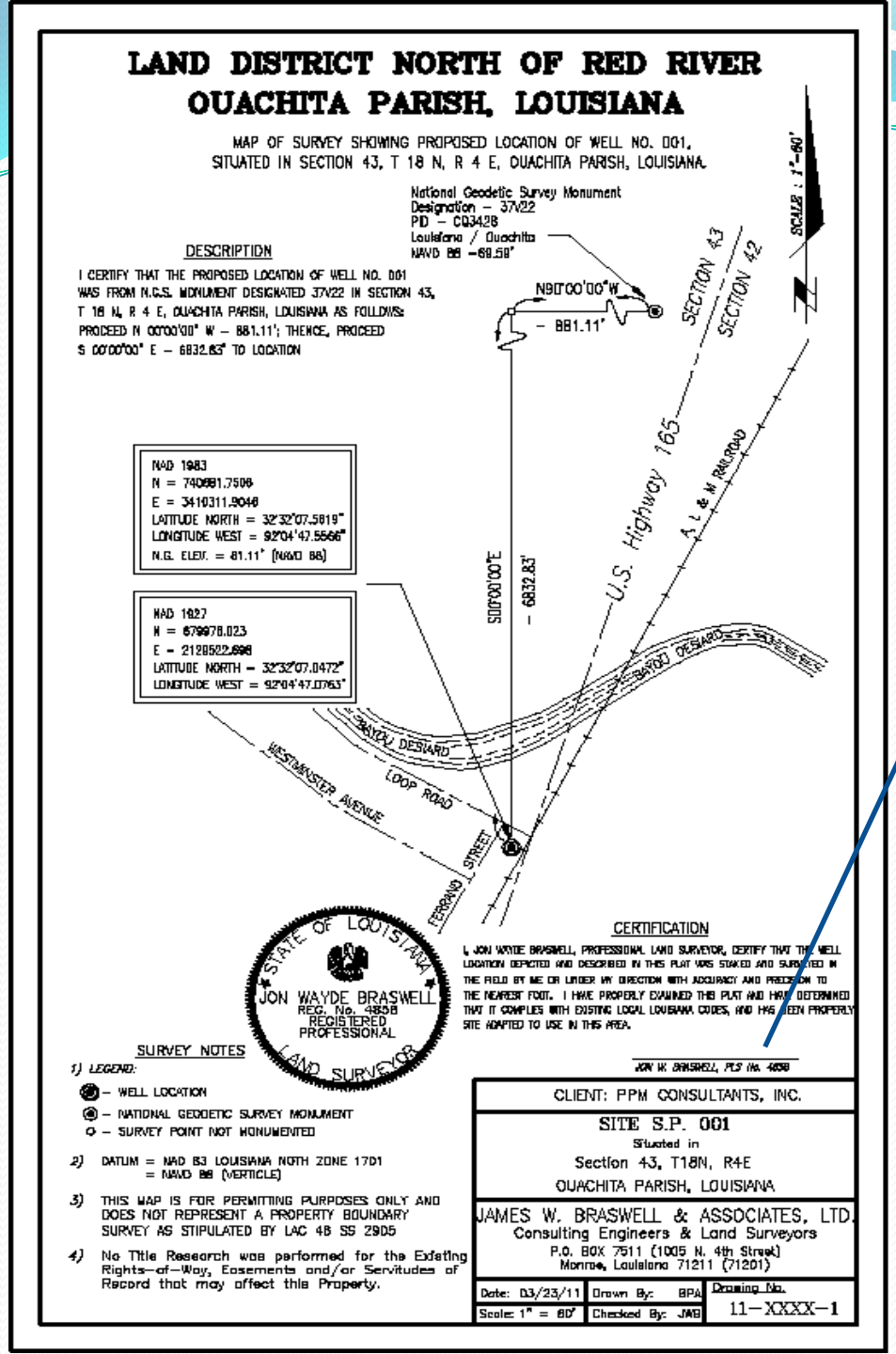
Directional & Horizontal Wells

Surface and Bottom Hole Locations





What is wrong with this plat?



NO SIGNATURE

Area of Review (AOR)

Area of Review (AOR)

Conducting a Search of the AOR

- **For Class II applications, the AOR is evaluated for wells within a ¼ mile radius of the well to be permitted.**
- **The AOR search must include:**
  - Searching SONRIS for wells in the DNR database; **AND**
  - Researching field maps and company files.
- **Applicants must complete the AOR Well List that is included in the Form UIC-2 SWD Application package. This Attachment must be labeled Attachment 6B.**

Area of Review Well List

Attachment 6B

ATTACHMENT 6B - AREA OF REVIEW WELL LIST

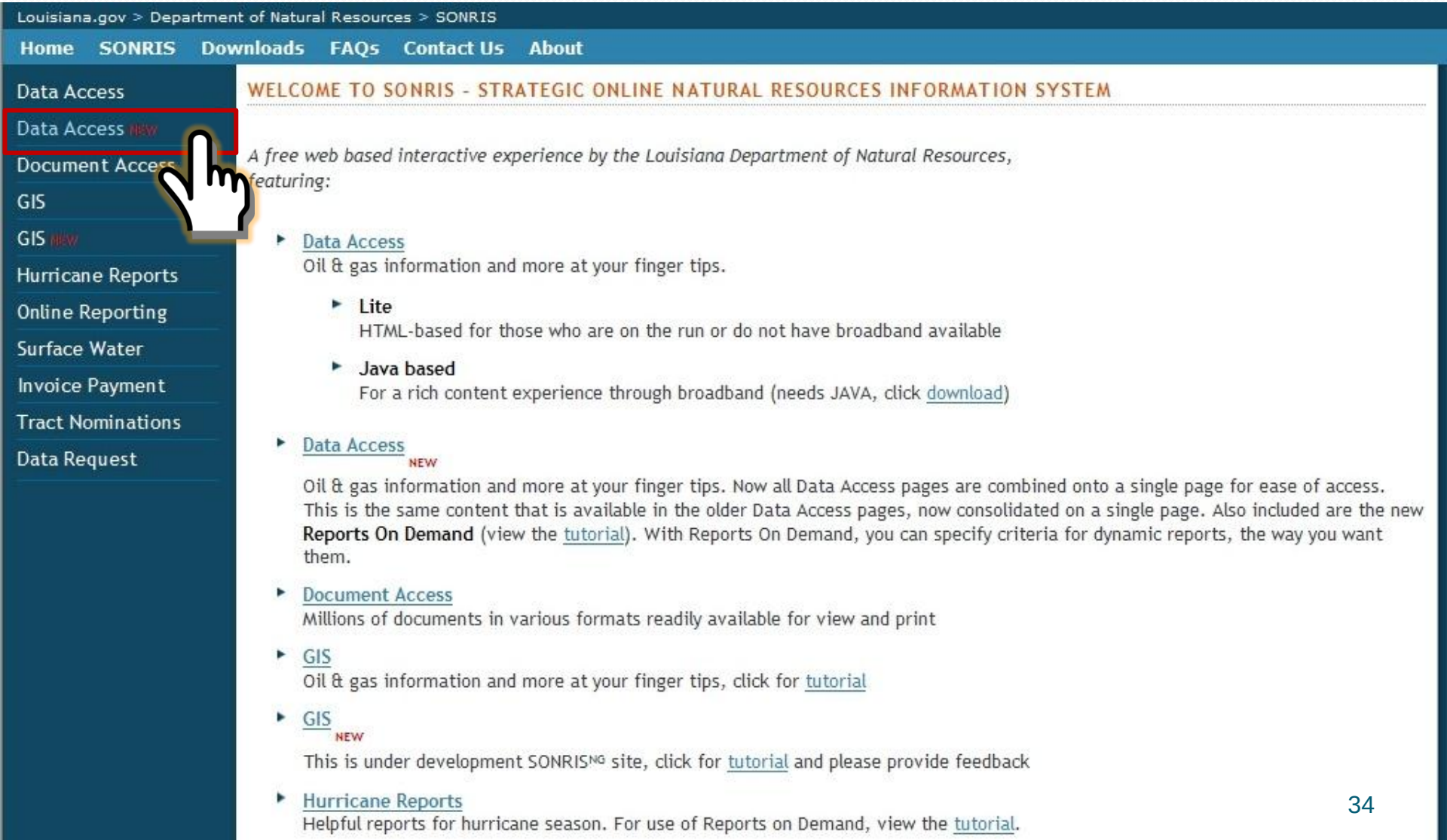
OPERATOR CODE	WELL NAME & NO.	SERIAL NUMBER	WELL STATUS	TOTAL DEPTH (FT.)	PERFORATED OR COMPLETED INTERVAL (FT).		
						TO	
						TO	
						TO	
						TO	
						TO	
						TO	
						TO	
						TO	
						TO	

AOR Detailed Report

Identifying an Existing Well's Lambert Coordinates

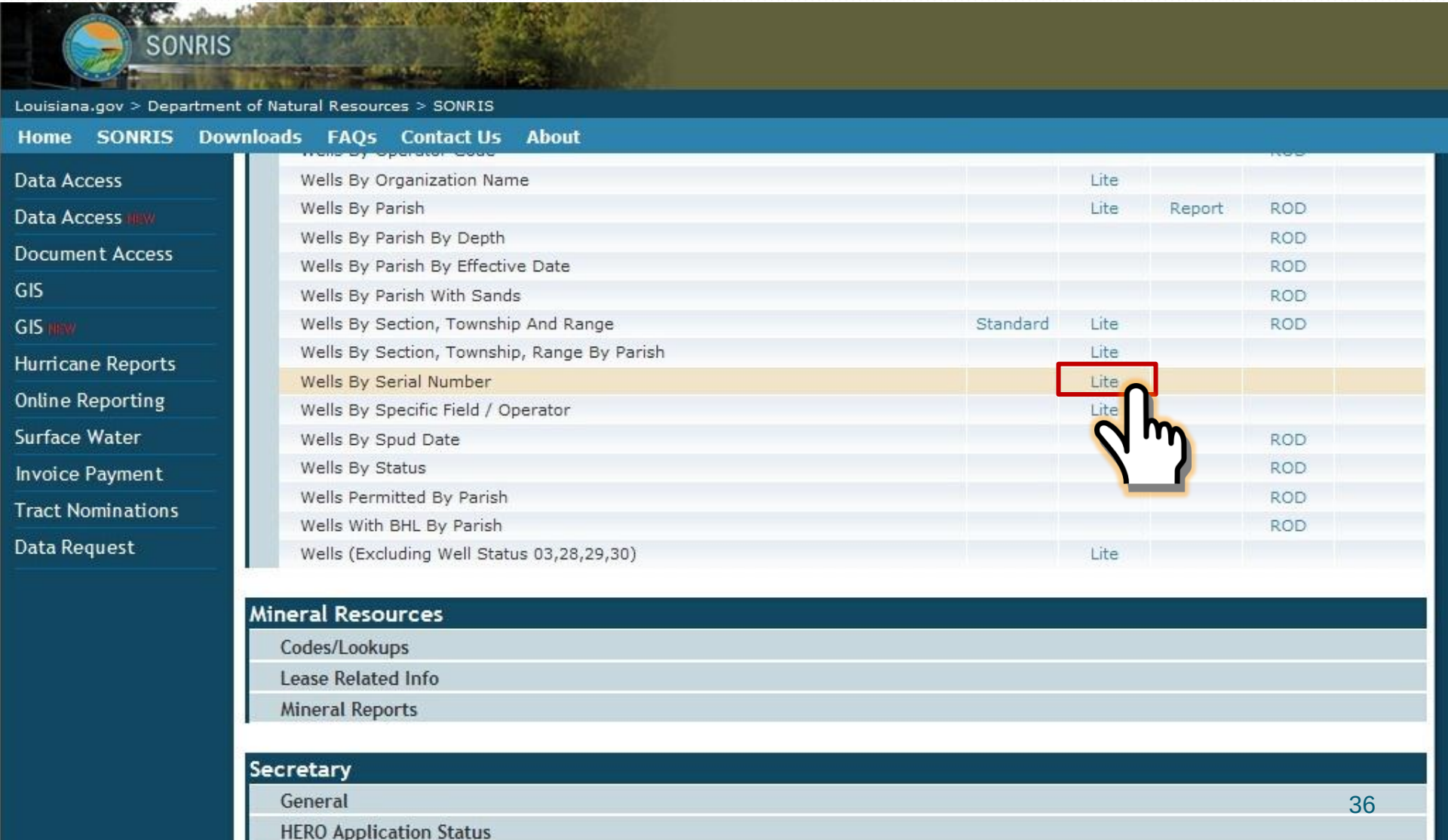
Go to www.dnr.louisiana.gov & click on the SONRIS logo

Select Data Access (NEW) from Left Menu

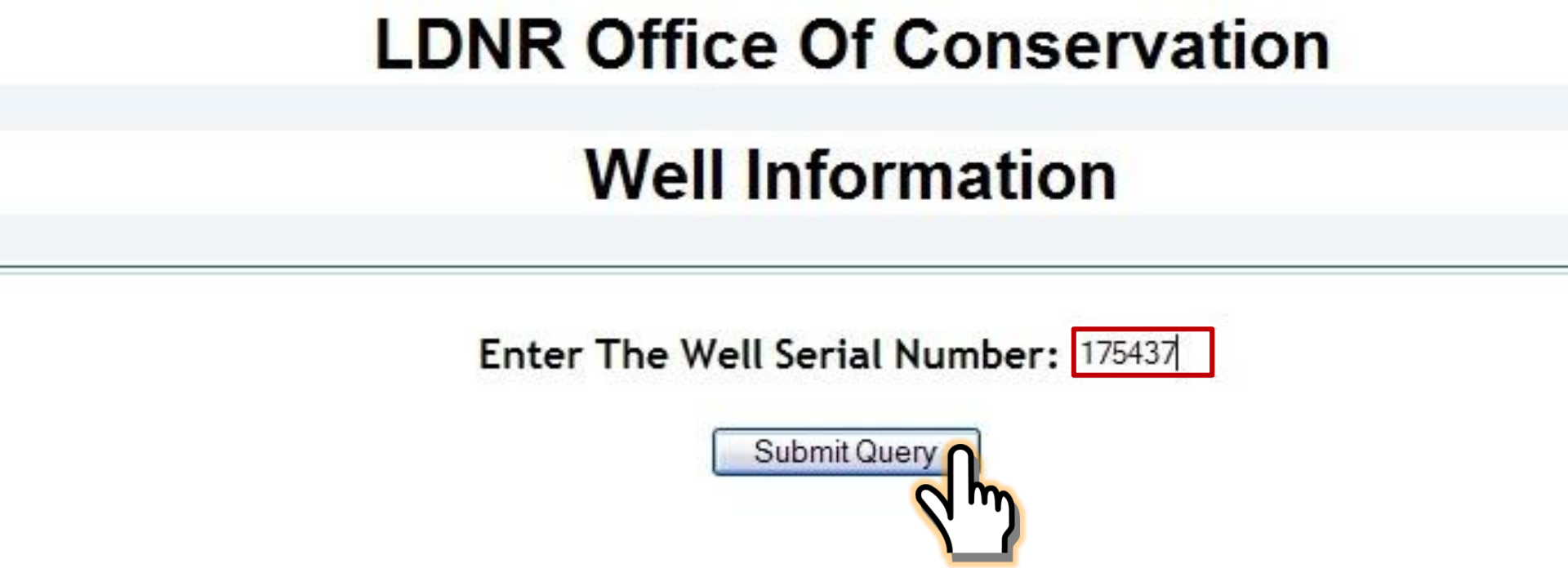


Scroll down to Conservation and select Well Information

Scroll down to **Wells by Serial Number** and select the **Lite** link



Enter the Serial Number of the well & click Submit Query



Scroll down to WELL SURFACE COORDINATES & Locate the Lambert X, Lambert Y, Zone, and Datum fields

Well Information

Review Well Information

WELLS

SERIAL	WELL NAME	WELL NUM	ORG ID	FIELD	PARISH	PROD TYPE	SEC	TWN	RGE	EFFECTIVE DATE	API NUM
175437	PARKER	001	T240	1488	42	10	004	16N	08E	07/11/2011	17083205240000

PRMT DATE	SPUD DATE	STAT DATE	ST CD
05/21/1981	05/22/1981	07/11/2011	33

WELL SURFACE COORDINATES

Surface Longitude	Surface Latitude	Lambert X	Lambert Y	Ground Elevation	Zone	Datum
0-0-0	0-0-0	2260924	632600	78	N	NAD-27

WELL SURFACE COORDINATES GENERATED BY DNR

UTMX 83	UTMY 83	LONGITUDE 83	LATITUDE 83
626514.21702206	3585914.08133878	-91.65472617	32.40310343

BOTTOM HOLE COORD

EFFECTIVE DATE	END DATE	PLUGBACK TOTAL DEPTH	TRUE VERTICAL DEPTH	MEASURED DEPTH	LAT DEG	LAT MIN	LAT SEC	LONG DEG	LONG MIN	LONG SEC	COORDINATE SOURCE	LAM
05/01/1981	07/01/1981		0	0							03	0
07/01/1981	04/01/1983		0	3102							03	0

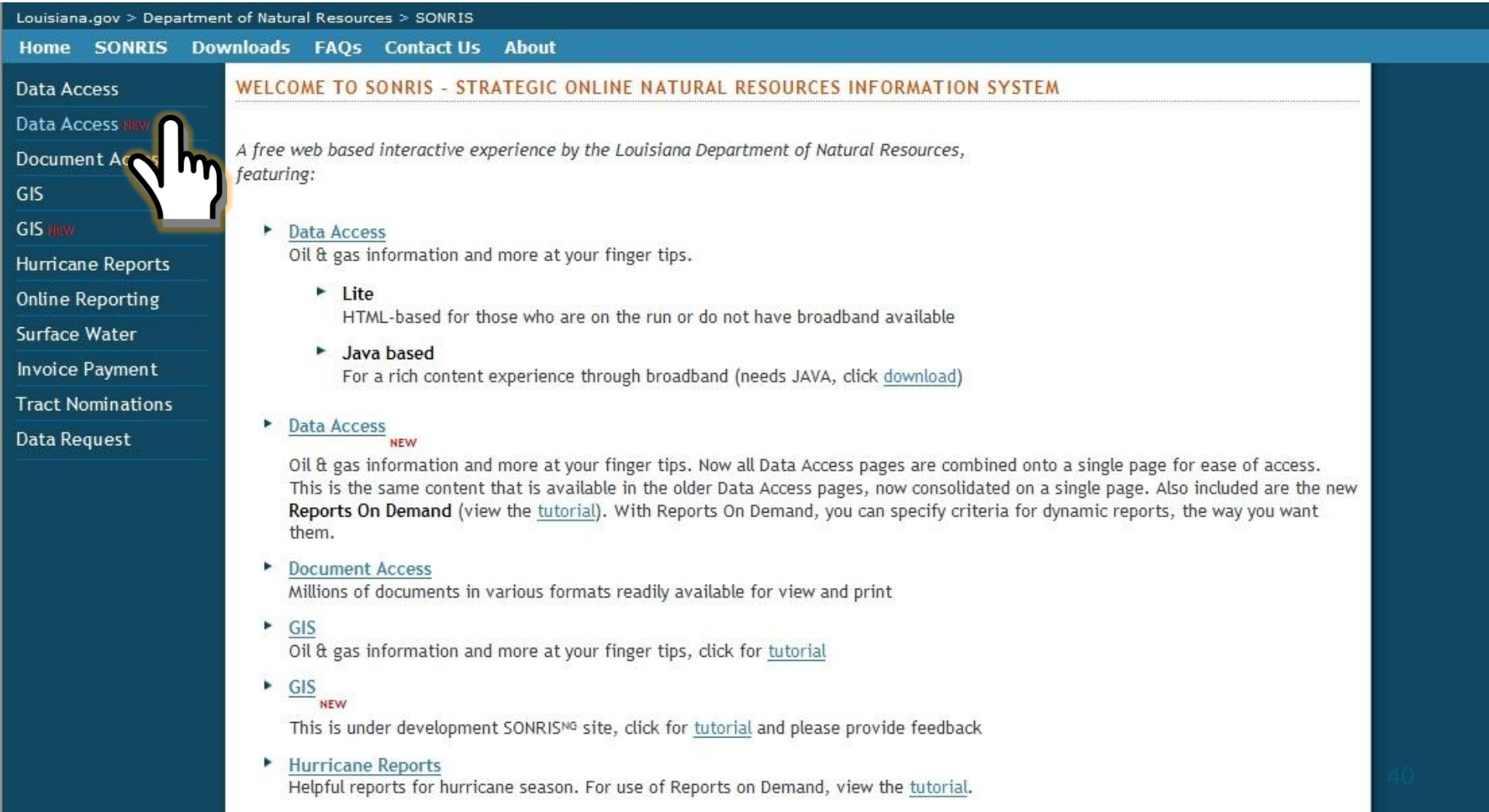
WELL HISTORY

SERIAL	WELL NAME	WELL NUM	ORG ID	FIELD	ST CD	PT	WELL CLASS	EFF DATE	END DATE	STAT DATE
175437	PARKER	001	T240	1488	33	10		07/11/2011		07/11/2011
175437	PARKER	001	T148	1488	23	00		11/20/2010	07/10/2011	11/20/2010
175437	PARKER	001	T148	1488	30	00		10/10/2000	11/19/2010	10/10/2000
175437	PARKER	001	T148	1488	20	10		10/01/1997	10/09/2000	05/30/1988

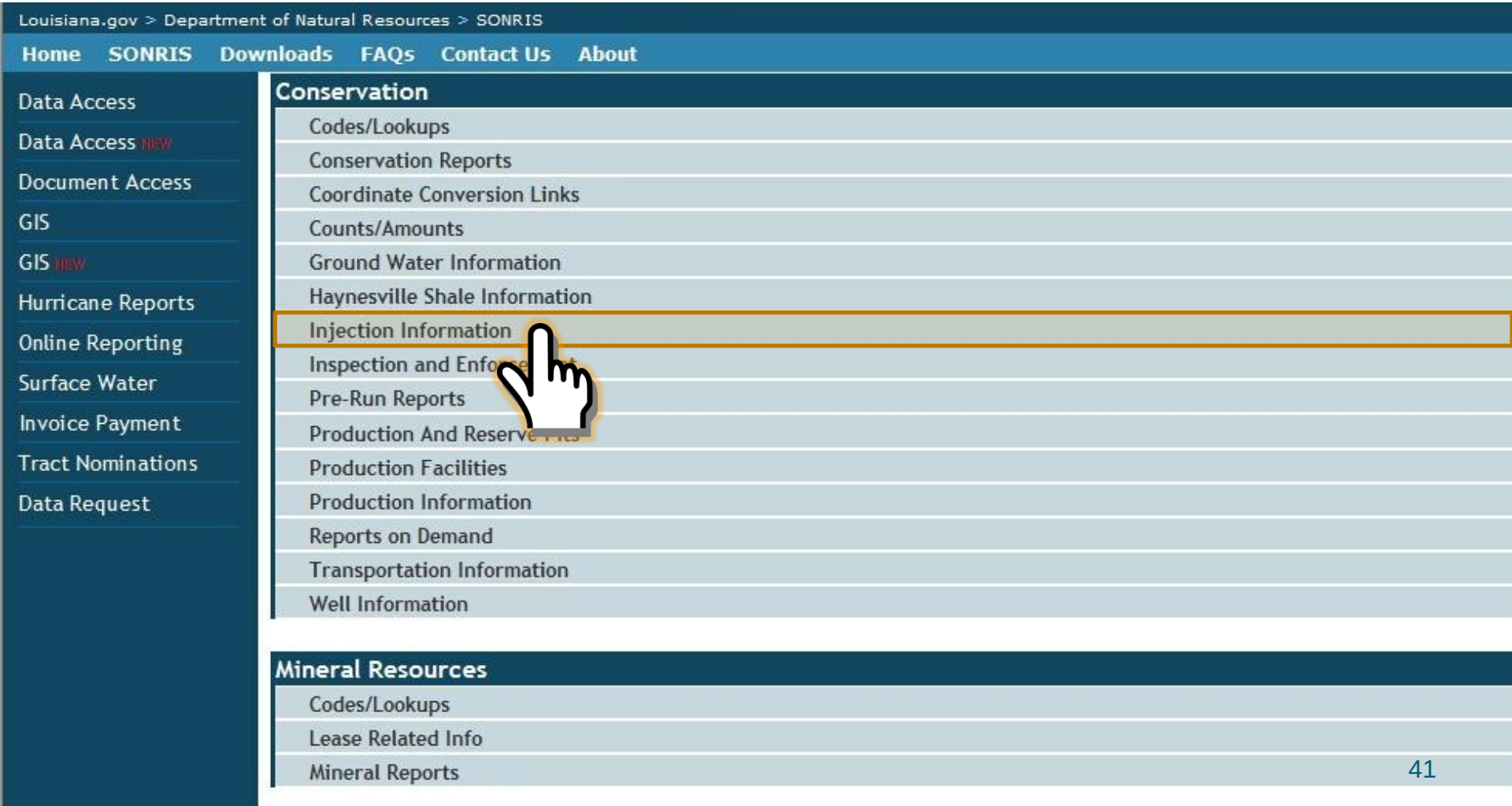
AOR Detailed Report

Generating the Detailed Report

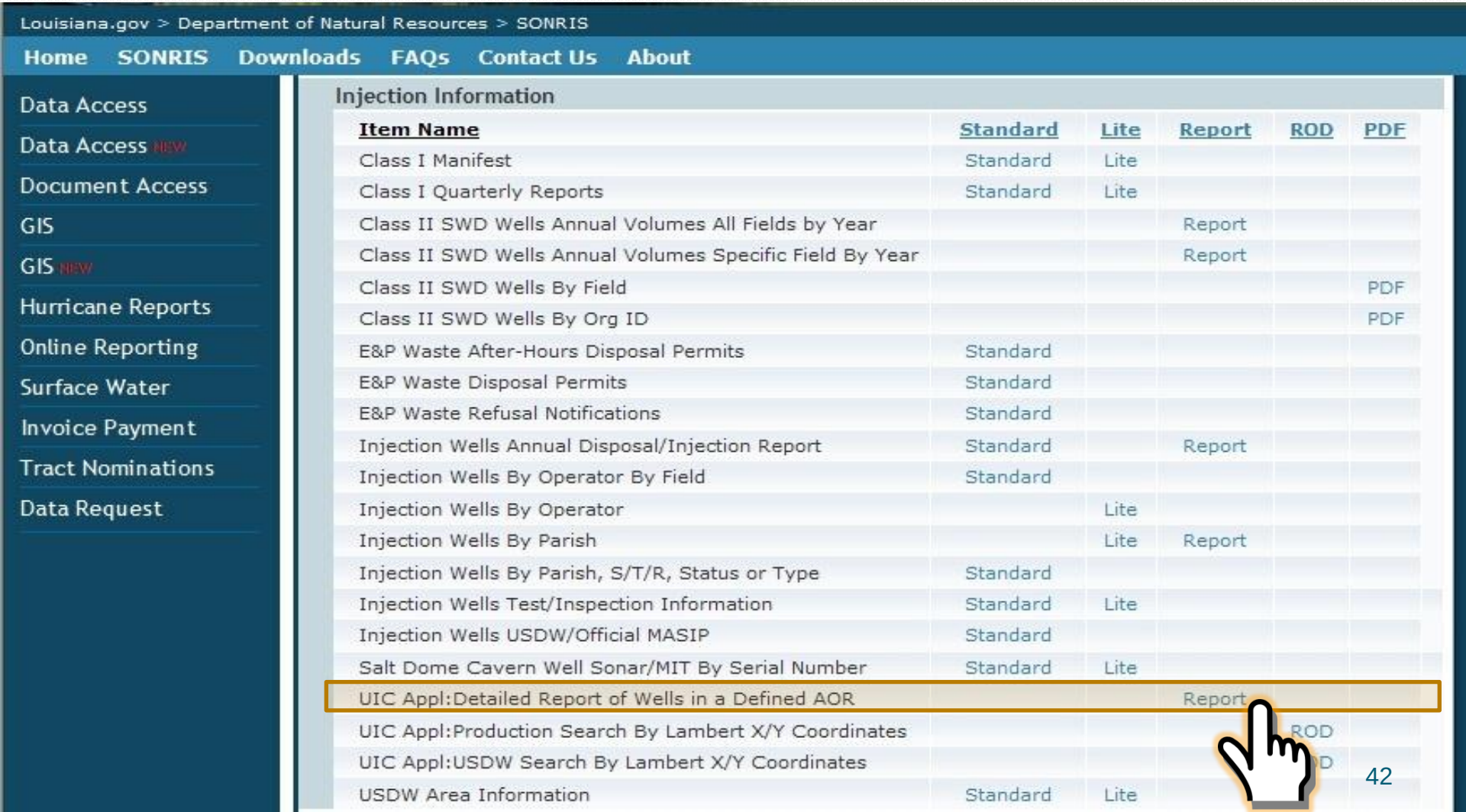
Return to SONRIS and Select Data Access (NEW) from Left Menu



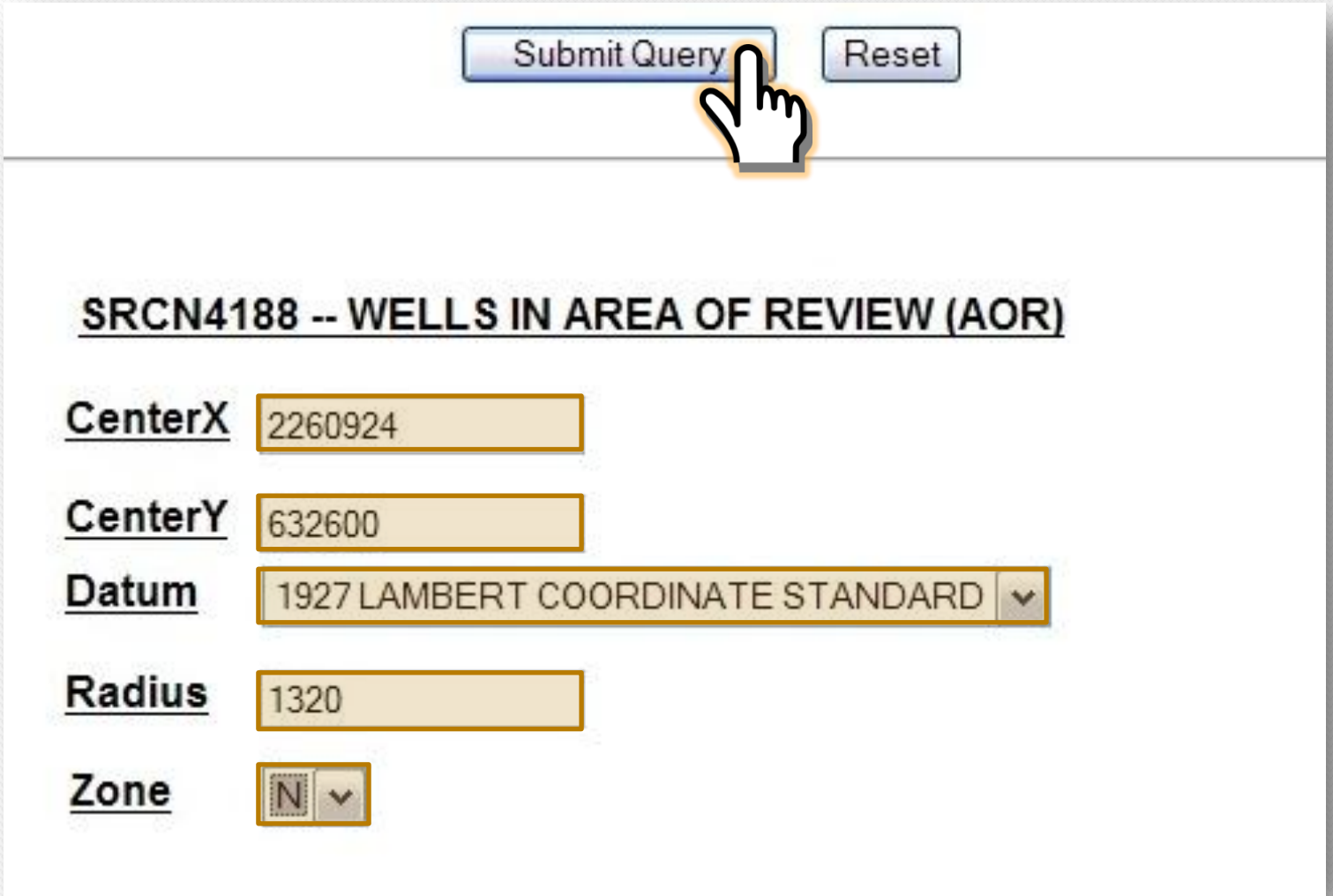
Scroll down to Conservation and select Injection Information



Scroll down to UIC Appl: Detailed Report Of Wells in a Defined AOR and select the Report link



Enter the location's X/Y Coordinates, Datum (NAD 1927), modify the default Radius (if necessary), & enter the Zone. Select Submit Query



Louisiana Department of Natural Resources (DNR)

SONRIS/2000

SRCN4188_WELLS - - WELLS IN AREA OF REVIEW (AOR)

Report run on: Dec 14, 2011 2:48 PM

The ***Distance Between*** value is "0" because the information is for the proposed well.

Well Serial Num : ***175437***

Well Name : ***PARKER*** ***Well Num :*** ***001***

Well Status : ***33*** ***SHUT- IN PRODUCTIVE - FUTURE UTILITY***

Classification : ***Class Type :***

Distance Between: **0 ft**

Casing

Completion Date	Casing Size	Wellbore Size	Casing Weight	Upper Set Depth	Lower Set Depth	Sacks Of Cement	Casing Pulled	CTOC
07/04/1981	4.5	7.875	9.5	0	3095	200		2404
07/04/1981	8.625	11	24	0	318	275		-533

Tubings

Completion Date : ***07/04/1981*** ***Tubing Size :*** ***2*** ***Upper Depth :*** ***0*** ***Lower Depth :*** ***3030***

Cement Plugs

	Plug Type	Sacks Of Cement	Slurry Weight	Upper Plug Depth	Lower Plug Depth
Completion Date : ***10/10/2000***	C	10	0	2950	3050
Completion Date : ***10/10/2000***	C	10	0	350	450
Completion Date : ***10/10/2000***	C	5	0	3	35

Surface Coordinates

Received Date	Coordinate Source Code	Coordinate System Code	Lambert X	Lambert Y	Zone	Ground Elevation	Latitude Degrees	Latitude Minutes	Latitude Seconds	Longitude Degrees	Longitude Minutes	Longitude Seconds
10/07/2003	05	01	2260924	632600	N	78						

Oil & Gas Perforations

Completion Date	Upper Perforation	Lower Perforation
07/04/1981	2998	3002

Note: Wellbore sizes with an asterisk symbol (*) next to it are assumed values based on the casing size and these assumed values have been substituted in place of a null (or zero) value everywhere a null (or zero) value previously existed as the wellbore size.

Identifying Deficient Wells in an AOR

Cement Isolation in Offset Wells

Cement Isolation

Determining Cement Isolation in an Offset Well

- **Adequate cement isolation in an offset well in the AOR is defined as:**
  - Top of cement (calculated or CBL) located between the base of the USDW and the top of the proposed injection zone behind each string of casing which penetrates the proposed injection zone; **OR**
  - An open-hole plug set between the base of the USDW and the proposed injection zone.

Louisiana Department of Natural Resources (DNR)

SONRIS/2000

SRCN4188_WELLS - - WELLS IN AREA OF REVIEW (AOR)

Report run on: Dec 14, 2011 2:48 PM

USD

Let's practice applying the criteria on the information for the well itself.

Well Serial Num : 175437

Well Name : PARKER *Well Num : 001*

Well S
Classi

Distance Between: ft

Is the calculated top of cement of the long string above the proposed injection zone?

Is the surface casing set and cemented through the base of the USDW?

Casing

Completion Date	Casing Size	Wellbore Size	Casing Weight	Upper Set Depth	Lower Set Depth	Sacks Of Cement	Casing Pulled	CTOC
07/04/1981	4.5	7.875	9.5	0	3095	200	X	2404
07/04/1981	8.625	11	24	0	318	275	X	-533

Tubings

Completion Date : 07/04/1981 ***Tubing Size : 2*** ***Upper Depth : 0*** ***Lower Depth : 3030***

Cement Plugs	Plug Type	Sacks Of Cement	Slurry Weight	Upper Plug Depth	Lower Plug Depth
Completion Date : 10/10/2000	C	10	0	2950	3050
Completion Date : 10/10/2000	C	10	0	350	450
Completion Date : 10/10/2000	C	5	0	3	35

Surface Coordinates

Received Date	Coordinate Source Code	Coordinate System Code	Lambert X	Lambert Y	Zone	Ground Elevation	Latitude Degrees	Latitude Minutes	Latitude Seconds	Longitude Degrees	Longitude Minutes	Longitude Seconds
10/07/2003	05	01	2260924	632600	N	78						

Oil & Gas Perforations

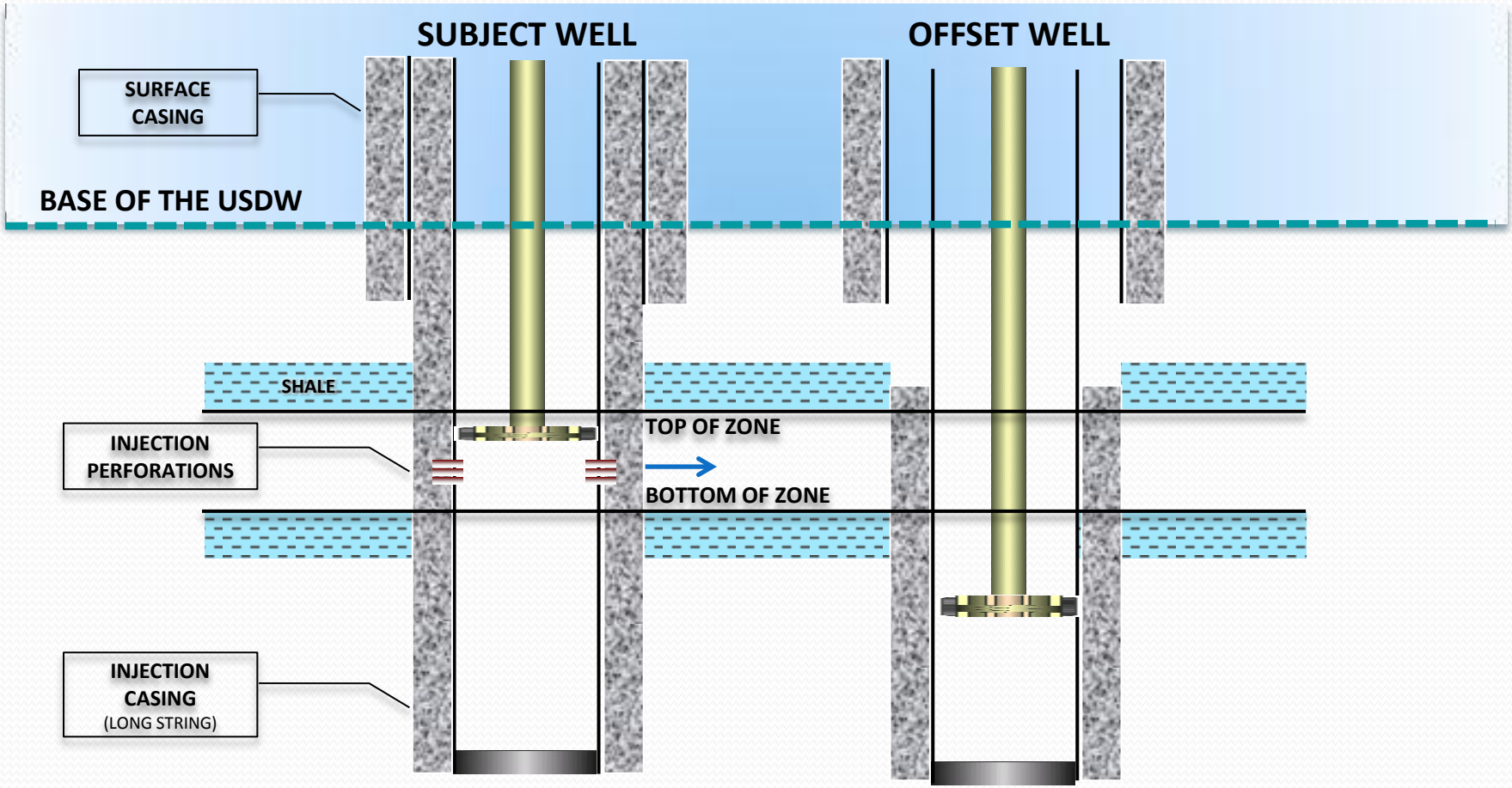
Completion Date	Upper Perforation	Lower Perforation
07/04/1981	2998	3002

Is there an open-hole plug set between the base of the USDW and the proposed injection zone ?

Note: Wellbore sizes with an asterisk symbol (*) next to it are assumed values based on the casing size and these assumed values have been substituted in place of a null (or zero) value everywhere a null (or zero) value previously existed as the wellbore size.

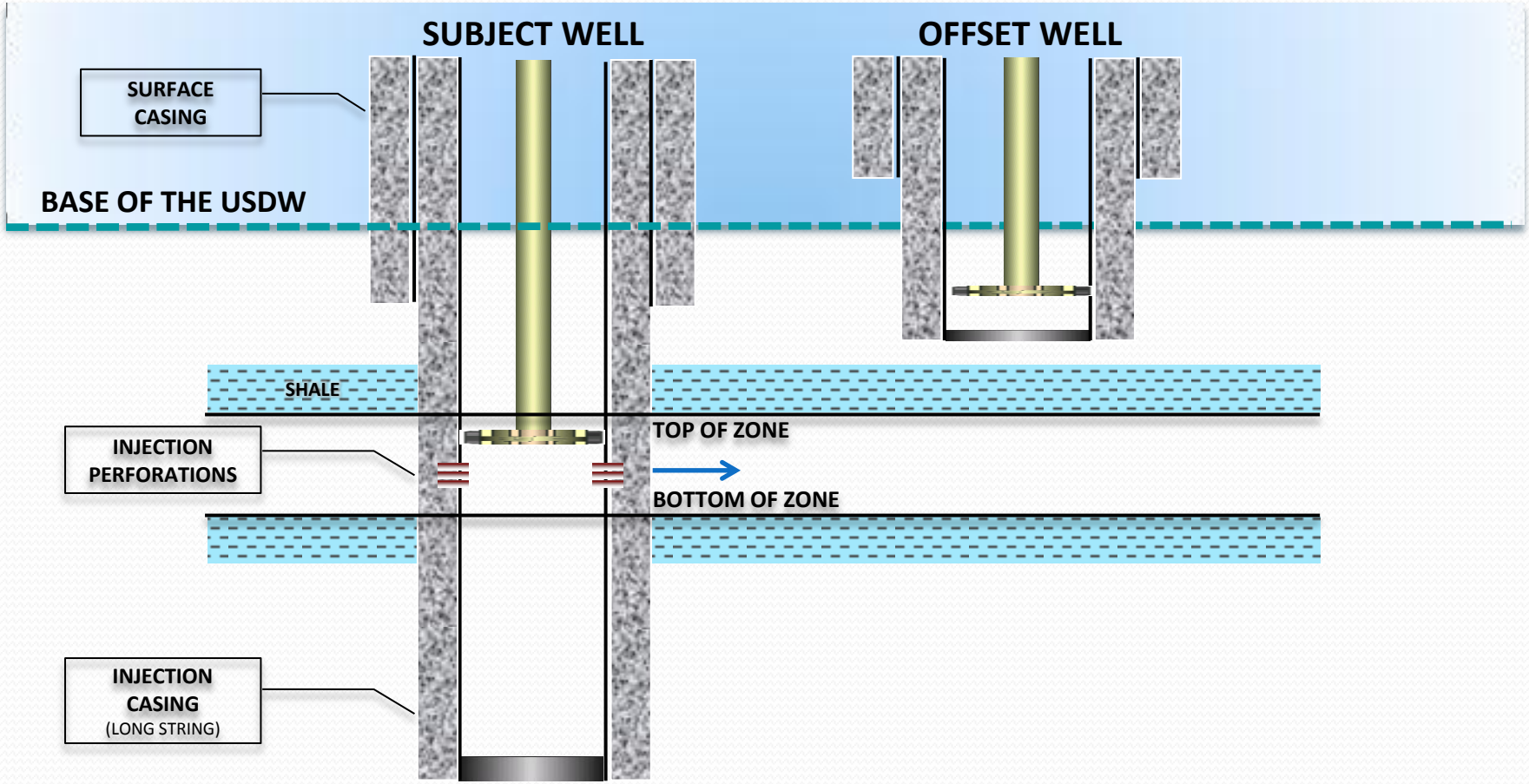
Sufficient Cement Isolation of USDW

Offset well that penetrates the USDW and ZONE



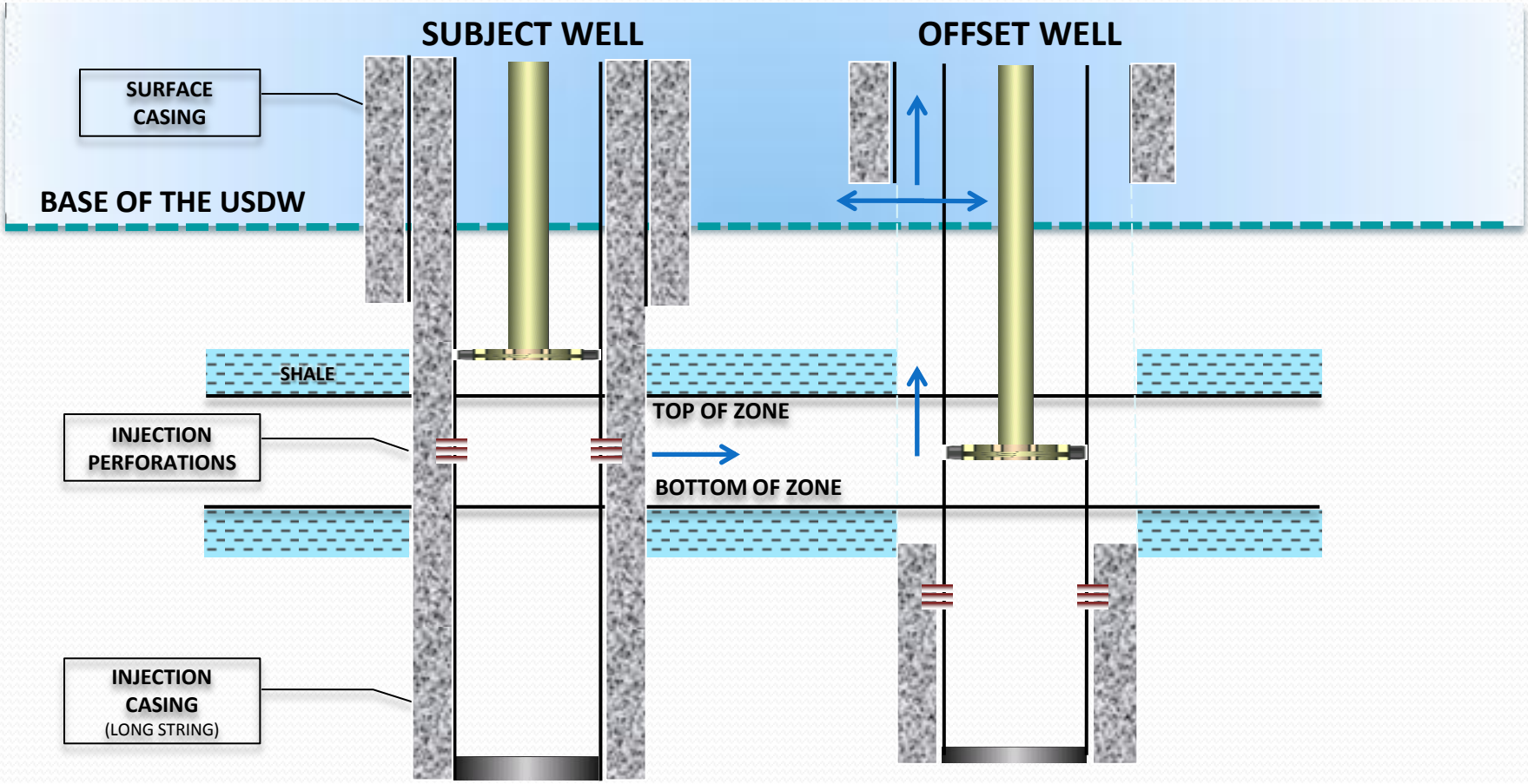
Sufficient Cement Isolation of USDW

Offset well that does NOT penetrate the ZONE



Insufficient Cement Isolation of USDW

Offset well in the ¼-mile Area of Review



AOR Exercise

- **Identify the Deficient Wells in the ¼ mile AOR using the following information:**
  - 1. SN 175437 is the Proposed SWD well.
  - 2. The Base of the USDW was identified at 860 feet.
  - 3. The Proposed Injection Zone is from 1,570 – 2,470 feet.
- **Remember, to verify sufficient cement isolation in the offset wells, the following must exist:**
  - Top of cement (calculated or CBL) located between the base of the USDW and the top of the proposed injection zone behind each string of casing which penetrates the proposed injection zone; OR
  - An open-hole plug set between the base of the USDW and the proposed injection zone.

Migration Potential Determination (MIGPOT)

Determining the Potential for Fluids to Migrate from an Injection Zone to a Deficient Offset Well

Migration Potential

Theory and Determination of Potential

- **Theory**
  - When a pathway exists, the potential for flow into the USDW exists regardless of the distance from the disposal well to another well. This is even true if no fluid (or no additional fluid) is injected into the disposal well.
- **Factors for Consideration**
  - Are there deficient wells in the AOR of the proposed injection well?
  - How far away is the nearest deficient wellbore?
  - Will proposed injection interval induce sufficient pressure to cause flow into USDW?
- **Determination**
  - If a deficient wells is located within the ¼ mile AOR, corrective action is required to be performed in order for the well to be permitted. This is to ensure that injected fluid will not migrate from the injection zone into the USDW by way of channels which may be present in the deficient well bores.

Corrective Actions

Provide Documentation

- Provide additional documentation which shows that sufficient cement isolation of the USDW from the injection zone exists in each of the offset deficient wells. This proof may consist of logs, documents from the Office of Conservation District Office files, or other records acceptable to the Commissioner; or

Re-enter for Isolation

- Re-enter the offset wells and isolate the injection zone from the USDW with a cement squeeze or plug. All remedial work must be properly permitted by the District Office; or

Migration Potential Calculation (MIGPOT)

- Provide the Injection and Mining Division with data necessary to perform a MIGPOT. If it can be shown that injection will not cause fluid migration in the offset wells, the proposed disposal well may be permitted without further corrective action required on the offset wells. If you wish to have a MIGPOT calculation performed, a signed letter must be submitted to the Injection and Mining Division stating such.

Calculating the MIGPOT

Fluid and Formation Properties Needed for Calculation

- **A signed letter must be submitted to the IMD if the corrective action is to request a MIGPOT calculation be performed. A sample MIGPOT letter can be found in your handout.**
  - Daily Injection Rate (bbls/Day)
  - Injection Fluid Density (ppg)
  - Injection Fluid Viscosity (cp)
  - Formation Permeability (millidarcies)
  - Formation Porosity (%)
  - Static Fluid Level (To be measured after receiving “Approval to Construct” letter)

Monitoring the Migration Potential

Annual Static Fluid Level Measurement and MIGPOT Calculation

- Static fluid level of the subject well must be obtained annually and witnessed by a Conservation Enforcement Specialist.
- The well cannot be on a vacuum at the time of the test.
- The CES will report the static fluid level to IMD and an Engineer will recalculate the MIGPOT.

Questions?