
LOCATION PLATS, AREA OF REVIEWS, & MIGRATION POTENTIALS

*(This discussion is provided as a companion to the **Location Plats, Area of Reviews, and Migration Potentials** PowerPoint slide presentation.)*

LOCATION PLATS

POLICY NO. IMD-GS-10

(SLIDE NO. 3)

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

(SLIDE NO. 4)

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

(SLIDE NO. 5)

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

FEATURES

(SLIDE NO. 6)

Minimum Requirements for Location Plats (See Policy for Detailed List)

- Dimensions (8.5 x 10.5 inches)
- Scale (A smaller scale may be used as long as the applicable features are represented)
- Required Format
- Legal Description
- Geographic Coordinates
- Required Features
- Seals, Signatures, and Certifications

LOCATION PLAT EXAMPLE NO. 1

(SLIDE NOS. 7-8)

LOCATION PLAT EXAMPLE NO. 2

(SLIDE NO. 9)

LEGAL DESCRIPTION

(SLIDE NO. 10)

- 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].”

GEOGRAPHIC COORDINATES

(SLIDE NO. 11)

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)

SEAL, SIGNATURES, AND CERTIFICATIONS

(SLIDE NOS. 12-13)

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

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

CHALLENGES DUE TO IRREGULAR SECTIONS

(SLIDE NOS. 15-21)

SINGLE CLASS III WELL WITHIN AN AREA PERMIT

(SLIDE NOS. 22-23)

Survey of Individual Wells within Area Permit Boundary

DIRECTIONAL & HORIZONTAL WELLS

(SLIDE NO. 24)

Surface and Bottom-Hole Locations

AREA OF REVIEW (AOR)

CONDUCTING A SEARCH OF THE AOR

(SLIDE NO. 28-29)

- 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. The AOR Well List must be labeled Attachment 6B.

AOR DETAILED REPORT

IDENTIFYING THE X,Y COORDINATES OF AN EXISTING WELL

(SLIDE NOS. 30-36)

- 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 and click Submit Query
- Scroll down to WELL SURFACE COORDINATES
- Locate the values in Lambert X, Lambert Y, Zone, and Datum fields

DETAILED REPORTS OF WELLS IN A DEFINED AOR

(SLIDE NOS. 37-42)

- 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, NAD 1927, & Zone and select Submit Query
- Modify default Radius if necessary
- Click Submit Query

CEMENT ISOLATION

(SLIDE NOS. 43-49)

DETERMINING CEMENT ISOLATION IN AN OFFSET WELL

- Adequate cement in an offset well 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 that penetrates the proposed injection zone; OR
 - ▶ An open-hole plug set between the base of the USDW and the proposed injection zone.

AOR EXERCISE

- Identify the deficient wells in the ¼-mile AOR using the following information:
 1. SN 175437 is the proposed 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 that penetrates the proposed injection zone; OR
 - ▶ An open-hole plug set between the base of the USDW and the proposed injection zone.

MIGRATION POTENTIAL (MIGPOT)

THEORY AND DETERMINATION OF POTENTIAL

(SLIDE NOS. 50-52)

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 not fluid (or not 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 the proposed injection interval induce sufficient pressure to cause flow into USDW?

DETERMINATION

If a deficient well is located within the ¼-mile AOR, corrective action is required to be performed in order for the proposed 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 wellbore.

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 well(s) 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 well(s), the proposed disposal well may be permitted without further corrective action required on the offset well(s). 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

(SLIDE NO. 53)

- **Fluid and Formation Properties Needed for Calculation**

A signed letter must be submitted to the Injection and Mining Division if the corrective action is to request a MIGPOT calculation to be performed. A sample MIGPOT letter can be found in the handout.

-
- ▶ Daily Injection Rate (bbls/Day)
 - ▶ Injection Fluid Density (ppg)
 - ▶ Injection Fluid Viscosity (cp)
 - ▶ Formation Permeability (millidarcies)
 - ▶ Formation Porosity
 - ▶ Static Fluid Level of the Injection Well (To be measured after receiving an “Approval to Construct” letter)

MONITORING THE MIGRATION POTENTIAL

(SLIDE NO. 54)

- **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

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Example Location Plat

Features and Format that are Compliant with Policy IMD-GS-10

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, LOUISIANA.

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

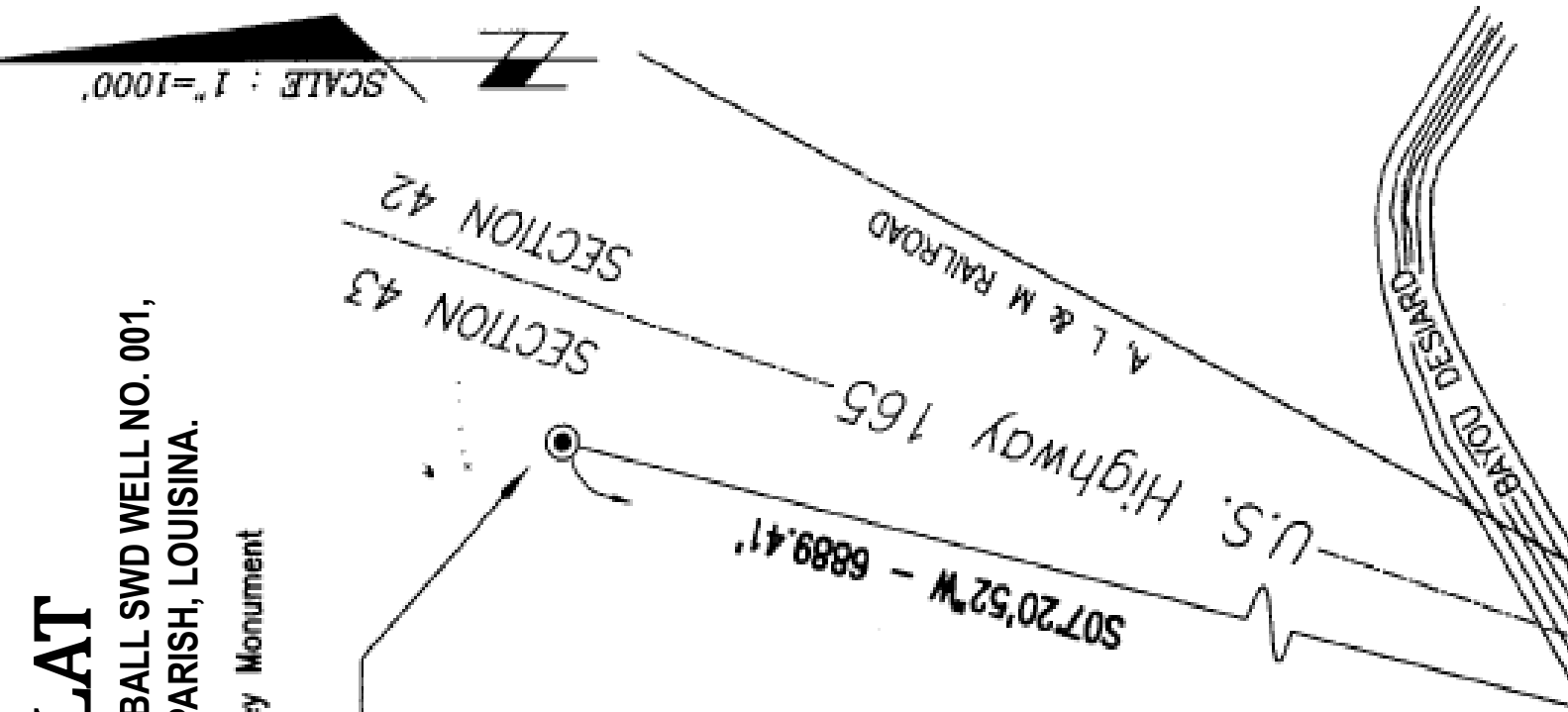
DESCRIPTION

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

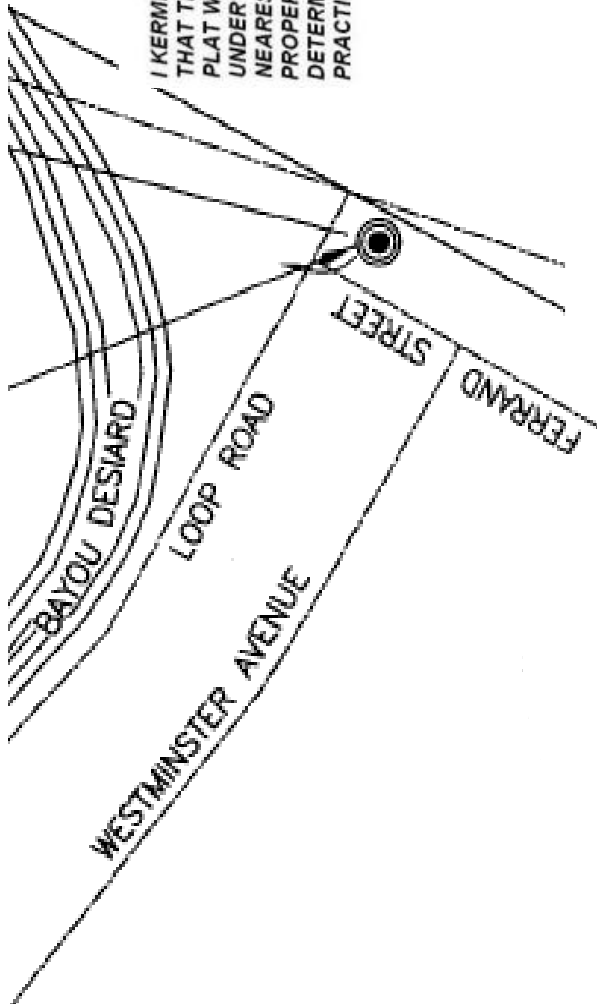
Proposed location of
 JOE BALL SWD WELL NO. 001

NAD 1983
N = 740681.7506
E = 3410311.9046
LATITUDE NORTH = 32°32'07.5619"
LONGITUDE WEST = 92°04'47.5566"
N.G. ELEV. = 81.10' (NAVD 88)

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



SCALE : 1" = 1000'



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 FOR LAND SURVEYING IN THE STATE OF LOUISIANA.



[Signature] 11-09-2010

Kermit the Frog P.L.S. # XYZ

SURVEY NOTES

- 1) **LEGEND:**
 - - WELL LOCATION
 - ⊙ - NATIONAL GEODETIC SURVEY MONUMENT
 - - SURVEY POINT NOT MONUMENTED
- 2) DATUM = NAD 83 LOUISIANA NORTH 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 this Property.

OPERATOR: JOE BALL, LLC	
JOE BALL SWD WELL NO. 001	
Situating 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
Scale: 1" = 1000'	Checked by: JSB
	Drawing No. 12-0001-01

AOR Exercise

Identify the Deficient Wells in the AOR using the following information:

[1] SN 175438 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 to 2,470 feet.



40

Well Serial Num : 175437

Well Num : 001

Well Name : PARKER

Well Status : 33 SHUT-IN PRODUCTIVE - FUTURE UTILITY

Classification : Class Type :

Distance Between: 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			Upper Plug Depth	Lower Plug Depth
Completion Date : 10/10/2000	C	10	2950	3050
Completion Date : 10/10/2000	C	10	350	450
Completion Date : 10/10/2000	C	5	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.



Well Serial Num : 211080

Well Num : 003

Well Name : PARKER
 Well Status : 10 ACTIVE - PRODUCING
 Classification : Class Type :

Distance Between: 80 ft

Completion Date	Casing Size	Wellbore Size	Casing Weight	Upper Set Depth	Lower Set Depth	Sacks Of Cement	Casing Pulled	CTOC
02/02/1990	4.5	7.875	10.5	0	3061	175		2457
02/02/1990	8.625	9.5	20	0	330	175		-1262

Tubings

Completion Date : 02/02/1990 Tubing Size : 2.375 Upper Depth : 0 Lower Depth : 2944

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
01/01/1990	03	01	2260967	632668	N		32	24	11.322	91	39	16.064

Oil & Gas Perforations

Completion Date	Upper Perforation	Lower Perforation
02/02/1990	2984	2990

41 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.



Well Serial Num : 176505

Well Num : 002

Well Name : PARKER

Well Status : 30 PLUGGED AND ABANDONED

Classification : Class Type :

Distance Between: 659 ft

Casing	Completion Date	Casing Size	Wellbore Size	Casing Weight	Upper Set Depth	Lower Set Depth	Sacks Of Cement	Casing Pulled	CTOC
	10/05/1981	8.625	12.25	24	0	300	250		-177
	10/05/1981	4.5	7.875	9.5	0	3100	200		2409

Tubings	Completion Date : 10/05/1981	Tubing Size : 2.375	Upper Depth : 0	Lower Depth : 2800
Cement Plugs			Upper Plug Depth	Lower Plug Depth
Completion Date : 10/10/2000	C	10	2900	3000
Completion Date : 10/10/2000	C	10	350	450
Completion Date : 10/10/2000	C	5	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	2260915	633259	N	79.9						

Oil & Gas Perforations	Completion Date	Upper Perforation	Lower Perforation
	10/05/1981	2921	2959
	10/05/1981	2955	2959

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.



Strategic Online Natural Resources Information System
 SONRIS/2000
 ...Continued on the reverse of this 23rd Casing Form (Rev. 11/03/1987)
 Louisiana Department of Natural Resources

Well Serial Num : 207070

Well Num : 004

Well Name : PARKER

Well Status : 31 SHUT-IN DRY HOLE - FUTURE UTILITY

Classification : Class Type :

Distance Between: 667 ft

Casing	Completion Date	Casing Size	Wellbore Size	Casing Weight	Upper Set Depth	Lower Set Depth	Sacks Of Cement	Casing Pulled	CTOC
	11/03/1987	8.625	12.25	20	0	305	250		-172
	11/03/1987	4.5	7.875	9.5	0	3116	200		2425

Tubings

Completion Date : 11/03/1987 **Tubing Size :** 2.375 **Upper Depth :** 0 **Lower Depth :** 3108

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
11/01/1987	03	01	2260739	633241	N		32	24	17.01	91	39	18.672

43 **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.

Well Serial Num : 194171

Well Num : 001

Well Name : COBB
 Well Status : 29 DRY AND PLUGGED
 Classification : Class Type :

Distance Between: 1,195 ft

Casing	Completion Date	Casing Size	Wellbore Size	Casing Weight	Upper Set Depth	Lower Set Depth	Sacks Of Cement	Casing Pulled	CTOC
	06/16/1988	4.5	7.875	9.5	0	3090	175		2486
	06/16/1988	8.625	12.25	20	0	300	125		62
	06/16/1988	4.5						1305	0
	06/16/1988	0						0	0
	06/16/1988	8.625						0	0
	06/16/1988	0						0	0

Tubings

Completion Date : 06/16/1988	Tubing Size : 0	Upper Depth : 0	Lower Depth : 0
Cement Plugs	Plug Type	Upper Plug Depth	Lower Plug Depth
Completion Date : 06/16/1988	35	460	560
Completion Date : 06/16/1988	5	5	30
Completion Date : 06/16/1988	15	2525	2700
Completion Date : 06/16/1988	35	200	300

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
08/01/1984	03	01	2261900	633290	N		32	24	17.405	91	39	5.126

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.



Well Name : R E LOWERY **Well Serial Num :** 159126 **Well Num :** 001
Well Status : 29 **DRY AND PLUGGED**
Classification : **Class Type :** **Distance Between: 1,216 ft**

Casing Completion Date	Casing Size	Wellbore Size	Casing Weight	Upper Set Depth	Lower Set Depth	Sacks Of Cement	Casing Pulled	CTOC
06/29/1979	8.625	12.25	23	0	110	125		-128
06/29/1979	4.5	7.875	0	0	3480	250	0	2617
06/29/1979	8.625						0	0
06/29/1979	0						0	0
06/29/1979	0						1100	0

Tubings
Completion Date : 06/29/1979 **Tubing Size :** 0 **Upper Depth :** 0 **Lower Depth :** 0
Cement Plugs
Completion Date : 06/29/1979 **Plug Type** **Sacks Of Cement** **Slurry Weight** **Upper Plug Depth** **Lower Plug Depth**
Completion Date : 06/29/1979 35 1000 1100
Completion Date : 06/29/1979 10 5 30
Completion Date : 06/29/1979 25 264 364

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
04/01/1978	03	01	2261970	631980	N		32	24	4,439	91	39	4,428

⚠ 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.

Example of MIPOT Request Letter

Date

Office of Conservation
Injection and Mining Division
P.O. Box 94275
Baton Rouge, Louisiana 70804-9275

RE: **Operator Name (Operator Number)**
Well Name & Number
Application Number
Serial No.
Field Name
Parish, Louisiana

Dear Sir or Madam:

As required by Injection and Mining Division, **(Operator Name)** would like to request a Migration Potential Determination (MIGPOT) on the above listed well and permit application. Please find below the data necessary to perform the MIGPOT calculation which will determine whether or not injection into the proposed interval will induce sufficient pressure to cause flow into the Underground Source of Drinking Water (USDW):

1. Daily Injection Rate = **XXXX** barrels per day
2. Formation fluid density (ppg) = **XXXX**
3. Formation fluid viscosity (Cp) = **XXXX**
4. Formation permeability (millidarcies) = **XXXX**
5. Formation porosity = **XX%**
6. Depth of USDW = **XXXX** ft
7. Static Fluid Level (To Be Determined after the Approval to Construct has been issued)

After we receive the approval to construct, we will obtain an static fluid level witnessed by a Conservation Enforcement Specialist (CES). To ensure an accurate fluid level measurement, the well will not be on a vacuum at the time of the test. In order to prove that fluids have not migrated into deficient well bore(s), the static fluid level of the subject well will be obtained annually and witnessed by a CES.

If any additional information is required, or you have any questions, please feel free to contact me at **(XXX)XXX-XXXX**.

Sincerely,

Mr. John Doe

(INTENTIONALLY LEFT BLANK)