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
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 07º20’52” W – 6889.41’ TO LOCATION.

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.
OPERATOR: JOE BALL, LLC

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
Checked by: JSB
Drawing No.
12-0001-01

Scale: 1” = 1000'
AS DRILLED
WELL LOCATION PLAT
OPERATOR: JOE BALL, LLC
WELL NAME: SALTWATER DISPOSAL WELL No.1, SN 888888

LEGEND
- = EXISTING WELL
○ = WATER WELL
● = LOCATION STAKE
★ = P & A WELL

NOTE: THERE ARE NO DWELLINGS OR STRUCTURES LOCATED WITHIN 500' RADIUS OF ABOVE LOCATION.
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

![Diagram of Township Layout]

A township is a rectangular land unit, usually square or nearly so, in the United States, and is six miles on a side. Township lines are marked by ranges. Range lines are described east or west of a Principal Meridian and township lines are described north or south of a base line. Each township is divided further into sections, one mile square. These 36 sections of a township are numbered as shown in Figure 12. One mile is equivalent to 160 acres.

<table>
<thead>
<tr>
<th>Township Line</th>
<th>36</th>
<th>31</th>
<th>32</th>
<th>33</th>
<th>34</th>
<th>35</th>
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Challenges Due to Irregular Sections (Continued)

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<td>36</td>
<td>31</td>
</tr>
</tbody>
</table>

**IS THERE A GRID PATTERN?**

**WHERE IS SECTION 83?**
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 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

LEGEND

Injctn Wll/Injctn Well location

Injctn Wll/Injctn Well location

Sems, Inc.

SECTION 4, T 12 N, R 8 E LOUISIANA MERIDIAN

GILBERT, FRANKLIN PARISH, LOUISIANA

U.F. LICHEY ESTATE PROPERTY

March 25, 2011

1" = 100'

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

FOR REVIEW

WEBB & WEBB LA 100 33557

Injection Well/Member Well 1 is located in Section 4, T 12 N, R 8 E Louisiana Parish, Franklin Parish, Louisiana and is a 3 9/16" 270 000' from national Geographic Survey Coordinate System, R 247 RESET 1982, which has Lo. North Zone State Plane Lambert coordinates x = 2615760.99, y = 3966040.18. R 247 RESET 1982 is a steel banded well with a drilled survey marker that was surveyed and reported by LAS497 in 1986.

Injection Well/Member Well 2 is located in Section 4, T 12 N, R 8 E Louisiana Parish, Franklin Parish, Louisiana, and is S 79°47'27" W 214 001' from National Geographic Survey Coordinate System, R 247 RESET 1982, which has Lo. North Zone State Plane Lambert coordinates x = 2615760.99, y = 3966040.18. R 247 RESET 1982 is a steel banded well with a drilled survey marker that was surveyed and reported by LAS497 in 1986.

Injection Well/Member Well 3 is located in Section 4, T 12 N, R 8 E Louisiana Parish, Franklin Parish, Louisiana, and is S 79°47'27" W 214 001' from National Geographic Survey Coordinate System, R 247 RESET 1982, which has Lo. North Zone State Plane Lambert coordinates x = 2615760.99, y = 3966040.18. R 247 RESET 1982 is a steel banded well with a drilled survey marker that was surveyed and reported by LAS497 in 1986.

Injection Well/Member Well 4 is located in Section 4, T 12 N, R 8 E Louisiana Parish, Franklin Parish, Louisiana, and is S 79°47'27" W 214 001' from National Geographic Survey Coordinate System, R 247 RESET 1982, which has Lo. North Zone State Plane Lambert coordinates x = 2615760.99, y = 3966040.18. R 247 RESET 1982 is a steel banded well with a drilled survey marker that was surveyed and reported by LAS497 in 1986.

Injection Well/Member Well 5 is located in Section 4, T 12 N, R 8 E Louisiana Parish, Franklin Parish, Louisiana, and is S 79°47'27" W 214 001' from National Geographic Survey Coordinate System, R 247 RESET 1982, which has Lo. North Zone State Plane Lambert coordinates x = 2615760.99, y = 3966040.18. R 247 RESET 1982 is a steel banded well with a drilled survey marker that was surveyed and reported by LAS497 in 1986.

Injection Well/Member Well 6 is located in Section 4, T 12 N, R 8 E Louisiana Parish, Franklin Parish, Louisiana, and is S 79°47'27" W 214 001' from National Geographic Survey Coordinate System, R 247 RESET 1982, which has Lo. North Zone State Plane Lambert coordinates x = 2615760.99, y = 3966040.18. R 247 RESET 1982 is a steel banded well with a drilled survey marker that was surveyed and reported by LAS497 in 1986.

 injection Well/Member Well 7 is located in Section 4, T 12 N, R 8 E Louisiana Parish, Franklin Parish, Louisiana, and is S 79°47'27" W 214 001' from National Geographic Survey Coordinate System, R 247 RESET 1982, which has Lo. North Zone State Plane Lambert coordinates x = 2615760.99, y = 3966040.18. R 247 RESET 1982 is a steel banded well with a drilled survey marker that was surveyed and reported by LAS497 in 1986.
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
Directional & Horizontal Wells
Surface and Bottom Hole Locations
What is wrong with this plat?
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 \( \frac{1}{4} \) 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**

<table>
<thead>
<tr>
<th>OPERATOR CODE</th>
<th>WELL NAME &amp; NO.</th>
<th>SERIAL NUMBER</th>
<th>WELL STATUS</th>
<th>TOTAL DEPTH (FT.)</th>
<th>PERFORATED OR COMPLETED INTERVAL (FT.)</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td>TO</td>
</tr>
</tbody>
</table>
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

**WELCOME TO SONRIS - STRATEGIC ONLINE NATURAL RESOURCES INFORMATION SYSTEM**

A free web based interactive experience by the Louisiana Department of Natural Resources,

Featuring:

- **Data Access**
  Oil & gas information and more at your finger tips.
  - **Lite**
    HTML-based for those who are on the run or do not have broadband available
  - **Java based**
    For a rich content experience through broadband (needs JAVA, click download)

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- **Document Access**
  Millions of documents in various formats readily available for view and print

- **GIS**
  Oil & gas information and more at your finger tips, click for tutorial

- **GIS (NEW)**
  This is under development SONRISNG site, click for tutorial and please provide feedback

- **Hurricane Reports**
  Helpful reports for hurricane season. For use of Reports on Demand, view the tutorial.
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**

**LDNR Office Of Conservation**

**Well Information**

Enter The Well Serial Number: 175437

Submit Query
Scroll down to **WELL SURFACE COORDINATES** & Locate the **Lambert X, Lambert Y, Zone, and Datum** fields.
AOR Detailed Report
Generating the Detailed Report
Return to **SONRIS** and Select **Data Access (NEW)** from Left Menu

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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.

---

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Standard</th>
<th>Lite</th>
<th>Report</th>
<th>ROD</th>
<th>PDF</th>
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</thead>
<tbody>
<tr>
<td>Class I Manifest</td>
<td>Standard</td>
<td>Lite</td>
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<tr>
<td>Class I Quarterly Reports</td>
<td>Standard</td>
<td>Lite</td>
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<tr>
<td>Class II SWD Wells Annual Volumes All Fields by Year</td>
<td>Standard</td>
<td>Lite</td>
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<td>Standard</td>
<td>Lite</td>
<td>Report</td>
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<td>Class II SWD Wells By Field</td>
<td>Standard</td>
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<td>Class II SWD Wells By Org ID</td>
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<td>E&amp;P Waste After-Hours Disposal Permits</td>
<td>Standard</td>
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<tr>
<td>E&amp;P Waste Refusal Notifications</td>
<td>Standard</td>
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<td>Injection Wells Annual Disposal/Injection Report</td>
<td>Standard</td>
<td></td>
<td>Report</td>
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<tr>
<td>Injection Wells By Operator By Field</td>
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<tr>
<td>Injection Wells By Operator</td>
<td>Standard</td>
<td>Lite</td>
<td></td>
<td></td>
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<tr>
<td>Injection Wells By Parish</td>
<td>Standard</td>
<td>Lite</td>
<td>Report</td>
<td></td>
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<tr>
<td>Injection Wells By Parish, S/T/R, Status or Type</td>
<td>Standard</td>
<td>Lite</td>
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<tr>
<td>Injection Wells Test/Inspection Information</td>
<td>Standard</td>
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<tr>
<td>Injection Wells USDW/Official MASIP</td>
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<tr>
<td>Salt Dome Cavern Well Sonar/MIT By Serial Number</td>
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<tr>
<td><strong>UIC Appl: Detailed Report of Wells in a Defined AOR</strong></td>
<td>Standard</td>
<td></td>
<td>Report</td>
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<td></td>
</tr>
</tbody>
</table>
Enter the location’s X/Y Coordinates, Datum (NAD 1927), modify the default Radius (if necessary), & enter the Zone. Select Submit Query.
The *Distance Between* value is "0" because the information is for the proposed well.

<table>
<thead>
<tr>
<th>Casing</th>
<th>Casing Date</th>
<th>Casing Size</th>
<th>Wellbore Size</th>
<th>Casing Weight</th>
<th>Upper Set Depth</th>
<th>Lower Set Depth</th>
<th>Sacks Of Cement</th>
<th>Casing Pull</th>
<th>CTOC</th>
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</thead>
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<tr>
<td>07/04/1981</td>
<td>4.5</td>
<td>7.875</td>
<td>9.5</td>
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<td>200</td>
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<table>
<thead>
<tr>
<th>Tubings</th>
<th>Tubing Size</th>
<th>Upper Depth</th>
<th>Lower Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/04/1981</td>
<td>2</td>
<td>0</td>
<td>3030</td>
</tr>
</tbody>
</table>

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

### USDW: 860 feet
- **Injection Zone:** 1,570–2,470 feet

**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?**

<table>
<thead>
<tr>
<th>Casing</th>
<th>Completion Date</th>
<th>Casing Size</th>
<th>Wellbore Size</th>
<th>Casing Weight</th>
<th>Upper Set Depth</th>
<th>Lower Set Depth</th>
<th>Sacks Of Cement</th>
<th>Casing Pulled</th>
</tr>
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<td>0</td>
<td>200</td>
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**Tubing**
- **Completion Date:** 07/04/1981
- **Completion Date:** 10/10/2000
- **Completion Date:** 10/10/2000

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<th>Cement Plugs</th>
<th>Plug Type</th>
<th>Sacks Of Cement</th>
<th>Slurry Weight</th>
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**Surface Coordinates**
- **Received Date:** 10/07/2003
- **05**
- **01**
- **2260324**
- **632600**

**Oil & Gas Perforations**
- **Completion Date:** 07/04/1981
- **Upper Perforation:** 2998
- **Lower Perforation:** 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.
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

Subject Well
Offset Well

Surface Casing
Base of the USDW
Shale
Injection Perforations
Injection Casing (Long String)

Top of Zone
Bottom of Zone
Insufficient Cement Isolation of USDW

Offset well in the ¼-mile Area of Review

- **SUBJECT WELL**
  - **SURFACE CASING**
  - **SHALE**
  - **INJECTION PERFORATIONS**
  - **INJECTION CASING (LONG STRING)**

- **OFFSET WELL**
  - **TOP OF ZONE**
  - **BOTTOM OF ZONE**
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?