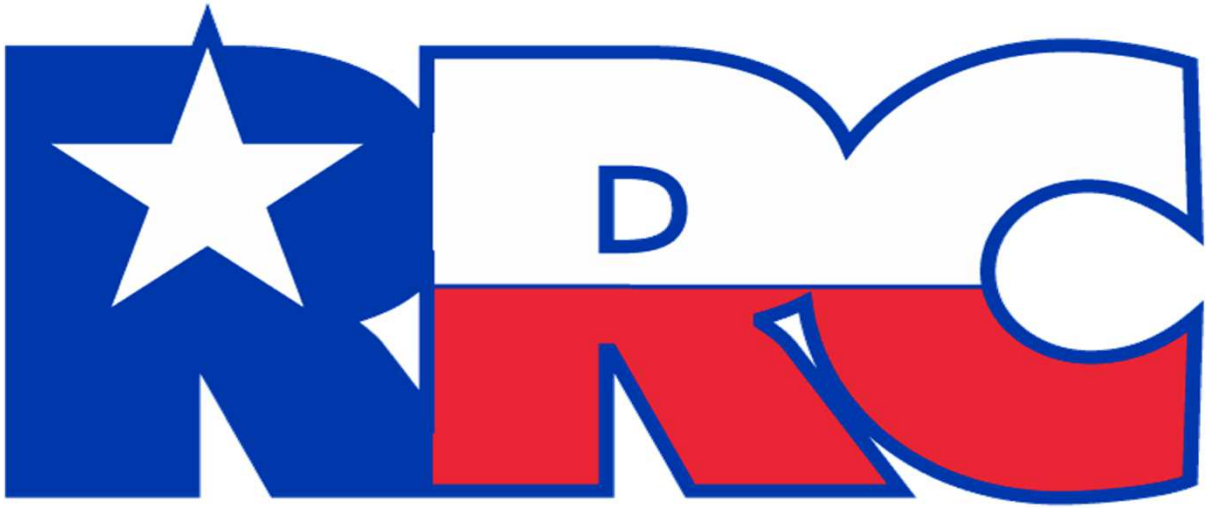


RAILROAD COMMISSION OF TEXAS

# Disposal/Injection Well Pressure Test Report (H-5)

**Lauryn McFarland**
**Engineering Technician**

# Summary

- Purpose of Mechanical Integrity Test (MIT)
- When MIT is required
- How to file MIT
- How to perform MIT
  - Standard test
  - Two-part test
  - Test without tubing and/or packer
- Inconclusive and Failed tests
- MIT Hints
- Cancellation and Suspension

# Purpose of Mechanical Integrity Test (MIT)

- Ensure that the tubing, packer, & casing have NO LEAKS that would allow any fluids to migrate:
  - outside the permitted injection interval
  - into the tubing-casing annulus
  - onto the ground surface.
- Show, on the H-5 Form, that the well is constructed in accordance with the permit i.e. casing, tubing & packer, perforations, etc.

# When Are MITs Required?

- Prior to beginning injection
- At least every 5 years by Statewide Rules 9 & 46
- More frequently by Permit Special Conditions (e.g. Annually for wells with short surface casing)
- After a workover
- Whenever mechanical integrity is in question

# Test Schedule

- Computer search each calendar year quarter
  - January, April, July, October

- Check for good pressure test within:
  - 5 years - for all wells
  - 12 months - for annual tests
  - Any - for recently converted wells

# Schedule Letters

- RRC Computer Mails the Operator a “Friendly Reminder” Letter:
  - Six months before a Five Year Test is due
  - Three months before an Annual Test is due

- RRC Computer Mails the Operator a Delinquency Notice:
  - Mailed out 60 days after the test due date if no test has been received.

# Certified Letters

- Certified Letter "Notice of Intent to Cancel P-4 Certificate of Compliance":

- Mailed 30 days after the Delinquency Notice stating:
  - Lease will be Severed or well will be Sealed 30 days from the date of the Certified Letter if a test is not received.

# Notification & Filing of the H-5 Test

- Schedule test with District Office a minimum of 48 hours in advance.
- If test is not witnessed by the RRC, submit the Original Pressure Recording Chart, Form H-5, and a copy of each to the District Office.
- If test is witnessed, a Pressure Recording Chart is not required but may be requested.
- File within 30 days of the test.

# District Office

- Official date stamp
- Check that notification was given
- Supply RRC Witness Report
- Forward test to Austin
- Tests sent directly to Austin are not evaluated
  - Re-routed to District Office

# Form H-5 (Top Half)

**Form H-5**
06/03/85

**RAILROAD COMMISSION OF TEXAS**
**Oil and Gas Division**

READ INSTRUCTIONS ON BACK

PLEASE TYPE OR PRINT

Disposal/Injection Well
Pressure Test Report

UIC CONTROL NO. _____

Type _____

FOR RRC USE ONLY

| | |
|---|---|
| 1. OPERATOR'S NAME: Operator Petroleum UIC# 000123456 | 2. RRC OPERATOR NO.: 123456 |
| 3. ADDRESS: 123 Main Street<br>Midland, TX 12345 | 4. RRC DISTRICT NO.: 08<br>5. COUNTY: Howard |
| 6. FIELD NAME (Exactly as shown on proration schedule): Spraberry (Trend Area) | 7. FIELD NO.: 85280300<br>8. API NO.: 42-227-00000 |
| 9. LEASE NAME: Lease Name | 10a. OIL LEASE NO.: 12345<br>10b. GAS ID NO.:<br>11. WELL NO.: 1W |

12. REASON FOR TEST
- ☐ Initial Test Prior to Injection
- ☐ After Workover
- ☐ Annual Test Required By Permit
- ☒ Five-Year Test Required By Rule
- ☐ Other (Specify) _____

13. DATE OF TEST: 07/16/2015

14. RETEST? ☒ YES ☐ NO
If YES, see Instruction No. 5

15. WELL COMPLETION

| | size | depth set |
|---|---|---|
| Surface Casing | 12" | 500 |
| Long String Casing | 8 3/8" | 5000 |
| Tubing | 5 ½" | 3000 |

16a. PACKER MAKE AND MODEL: Baker ABC CIBP

16b. DEPTH SET: 2990'

17. AUTHORIZED INJECTION PRESSURE (PSIG): 1500

18a. PERMITTED INJECTION INTERVAL
Top 3000' Bottom 5000'

18b. COMPLETED INJECTION INTERVAL
Top 3500' Bottom 4500'

Be sure to fill in all the Blanks!

# Form H-5 (Bottom Half)

Form H-5

19. TEST PRESSURE (PSIG) [see Instructions 4(c) and 4(d)]

| TIME | TUBING | CASING | SURFACE CSG. | TIME | TUBING | CASING | SURFACE CSG. |
|---|---|---|---|---|---|---|---|
| Initial | 0 | 500 | | | | | |
| 15 min. | 0 | 500 | | | | | |
| 30 min. | 0 | 500 | | | | | |
| | | | | | | | |
| | | | | | | | |

20. CHARACTERISTICS OF INJECTION FLUID [see Instruction 4(e)]

Produced Water

21. CHARACTERISTICS OF ANNULUS FLUID [see Instructions 4 (e) and 4(f)]

Packer Fluid

22. TEST WITNESSED BY RRC? ☒ YES ☐ NO

If NO, see Instruction 4(a)

If YES, Name of RRC Representative Full Name

23. WERE OTHER TESTS/SURVEYS PERFORMED AT THIS TIME? ☐ YES ☒ NO. If YES, List:

24. OPERATOR COMMENTS ON TEST (attach separate sheet if necessary)

Previous test dated 07/16/2015, reset packer

25. WELL STATUS: ☒ Active ☐ Temporarily Abandoned ☐ Other (Specify)

CERTIFICATE:

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated herein are true, correct, and complete, to the best of my knowledge.

Original Signature
Signature

Print Your Name — Regulatory Technician
Name of Person (type or print) — Title

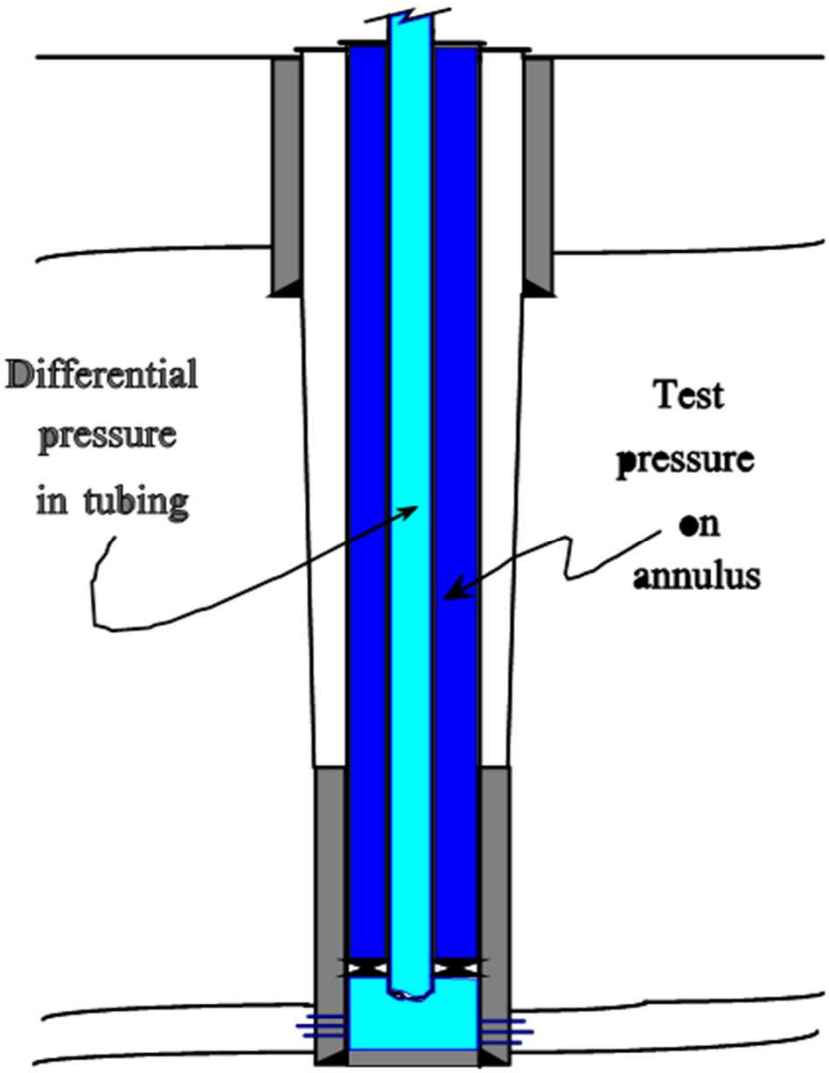
Telephone No. ( ) Phone # Date 07/17/2015

# Test Pressure Requirements

- If permitted pressure is 200 psig or less:
  - Test at 200 psig (minimum)
- If permit pressure between 200 & 500 psig:
  - Test at permitted pressure (minimum)
- If permitted pressure is 500 psig or more:
  - Test at 500 psig (minimum)
- If injection through casing (no tubing/packer)
  - Test at maximum permitted pressure

# Standard Pressure Test

- To help visualize:
  - The Test Pressure in Dark Blue
  - The Tubing Pressure in Light Blue/Green



# Test Pressure Requirements

- At least 200 psi pressure differential:
  - Test pressure 200 psi higher or lower than tubing

| | Tubing Pressure, psi | Casing Pressure, psi |
|---|---|---|
| Good | 0 | 500 |
| Good | 300 | 500 |
| Good | 700 | 500 |
| Not Good | 700 | 550 |
| Not Good | 400 | 500 |

# Two Part Test

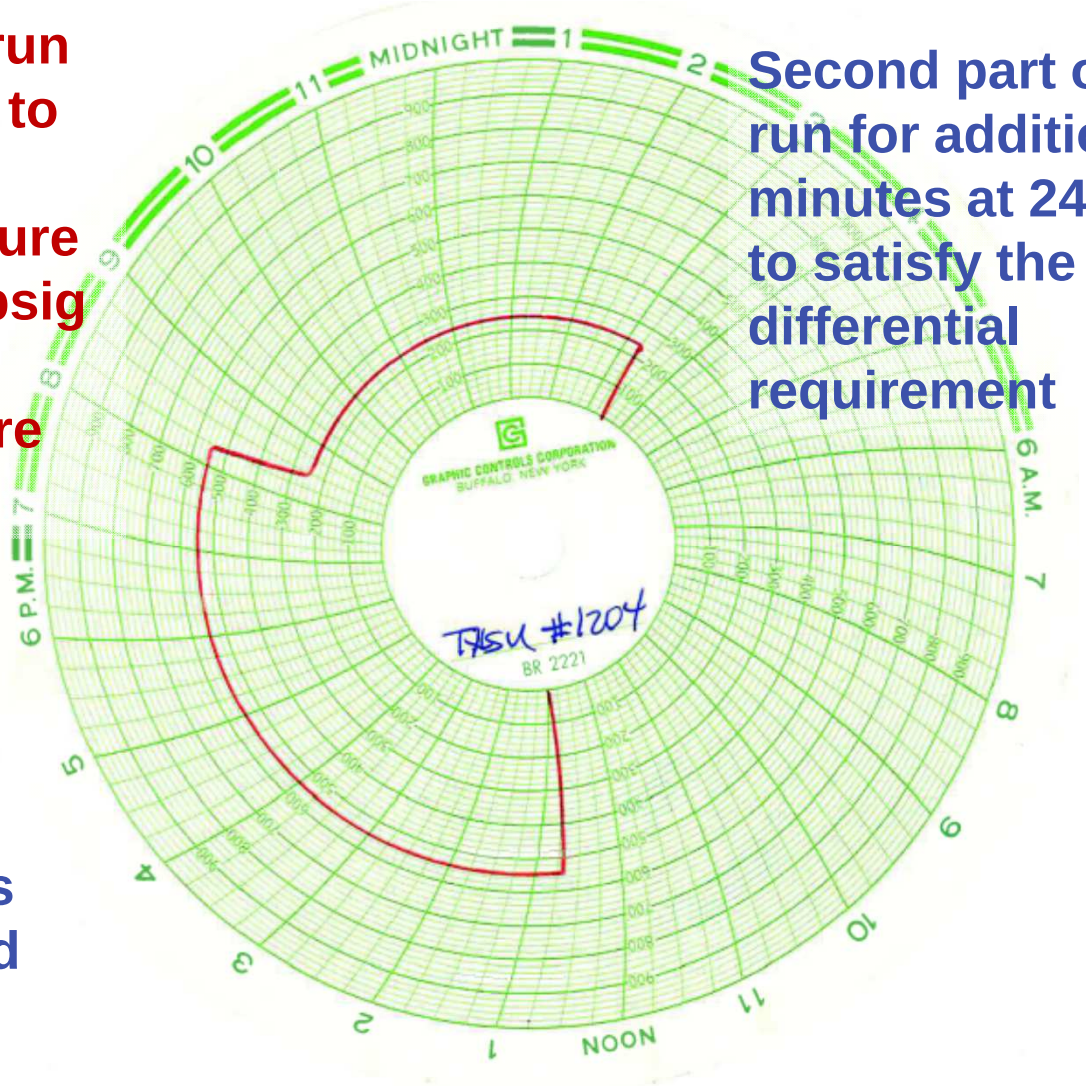
Example: If tubing pressure is close to the required test pressure:

- Run first part of test at the required pressure
- Run second part at a pressure either 200 psi higher or 200 psi lower than the tubing pressure

| | Tubing Pressure, psi | Casing Pressure, psi |
|---|---|---|
| Part 1 | 400 | 500 |
| Part 2 | 400 | 200 |

# Example of Two Part Test

**To avoid having to run the test at 700 psig to satisfy both the minimum test pressure requirement of 500 psig and the 200 psi differential pressure requirement**

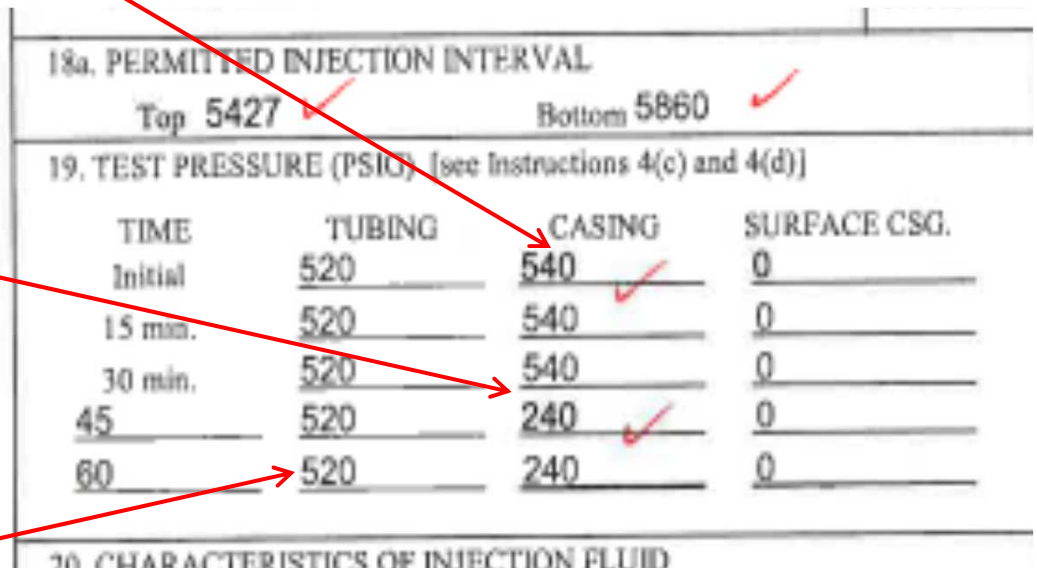



**Second part of test run for additional 30 minutes at 240 psig to satisfy the 200 psi differential requirement**

**First part of test run for 30 minutes at 540 psig instead of 700 psig**

# Indicating Two Part Test Pressures

- The initial test pressure was at 540 psig for 30 minutes. This satisfied the 500 psig minimum test pressure.
- Pressure was then bled off to 240 psig for another 30 minutes. This satisfied the 200 psi between the 520 psig tubing pressure and the casing test pressure.



18a. PERMITTED INJECTION INTERVAL

Top 5427 Bottom 5860

19. TEST PRESSURE (PSIG) [see Instructions 4(c) and 4(d)]

| TIME | TUBING | CASING | SURFACE CSG. |
|---|---|---|---|
| Initial | 520 | 540 | 0 |
| 15 min. | 520 | 540 | 0 |
| 30 min. | 520 | 540 | 0 |
| 45 | 520 | 240 | 0 |
| 60 | 520 | 240 | 0 |

20. CHARACTERISTICS OF INJECTION FLUID

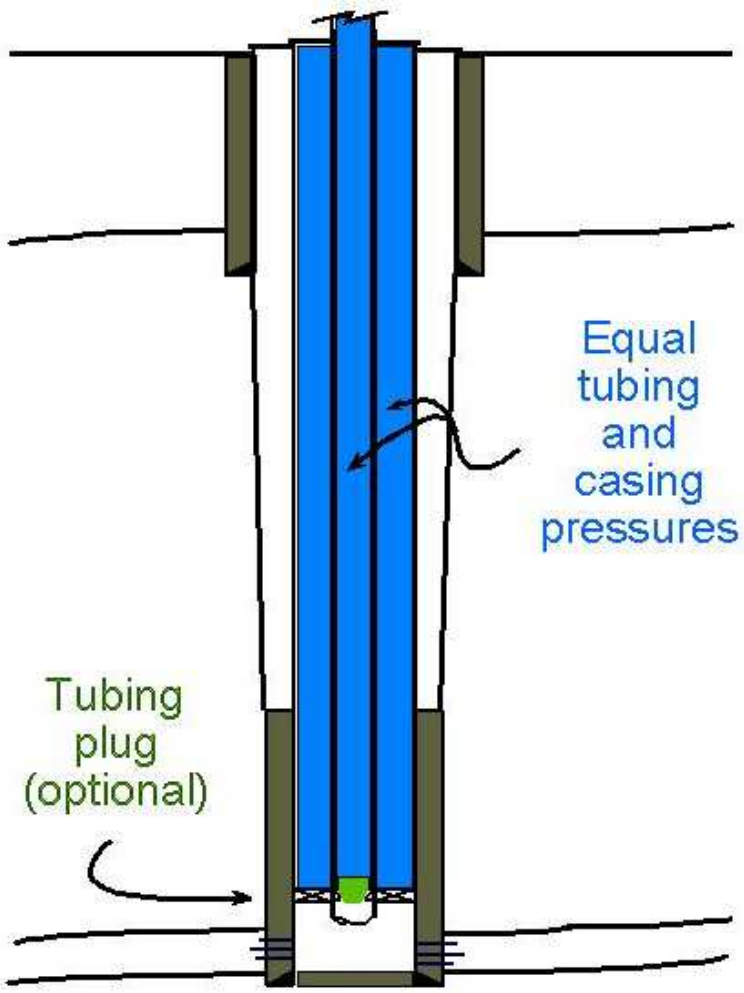
# Two-Part Test with Gas Lift Valves

## Part One

**Needs prior approval from UIC in Austin**

**Set a plug in the tubing & pressure up on the gas-filled annulus.**

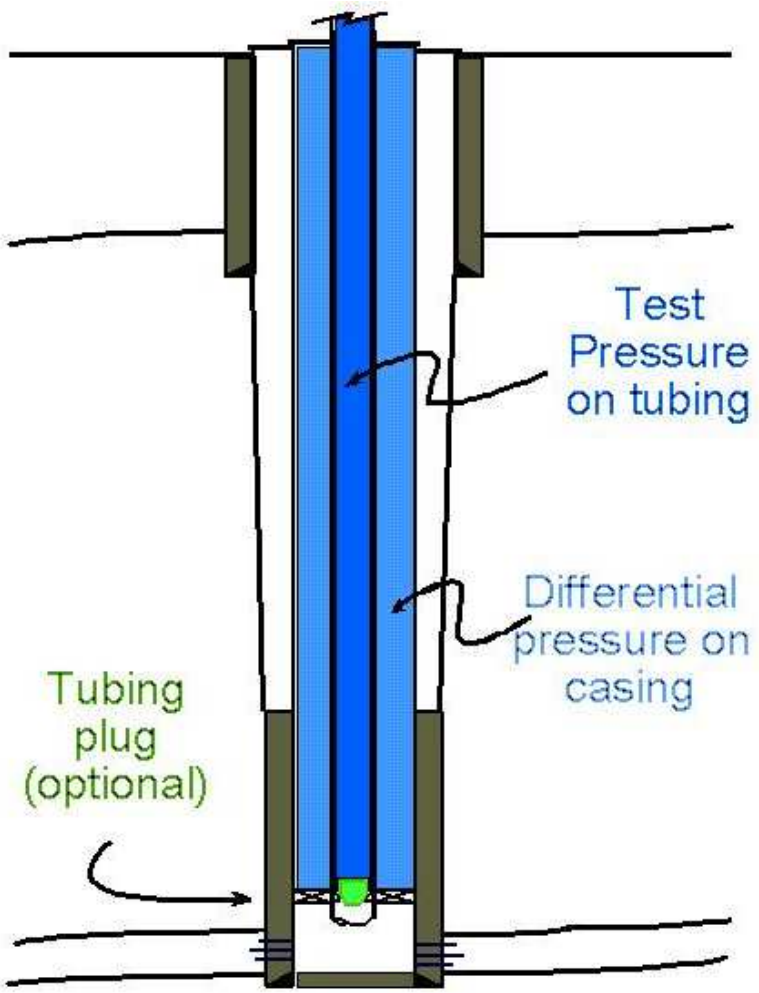
**Allow pressure to bleed thru the gas lift valves into the tubing & stabilize for a 30 minute test.**



# Two-Part Test with Gas Lift Valves

**Bleed annulus pressure down to 200 psi less than the tubing pressure & test for another 30 minutes.**

**Fluid or gas does not escape from the tubing through the gas-lift valves**



# Shut In/Temporarily Abandoned Wells and Tubingless Completions

- Can be tested without tubing & packer if Status is not Active

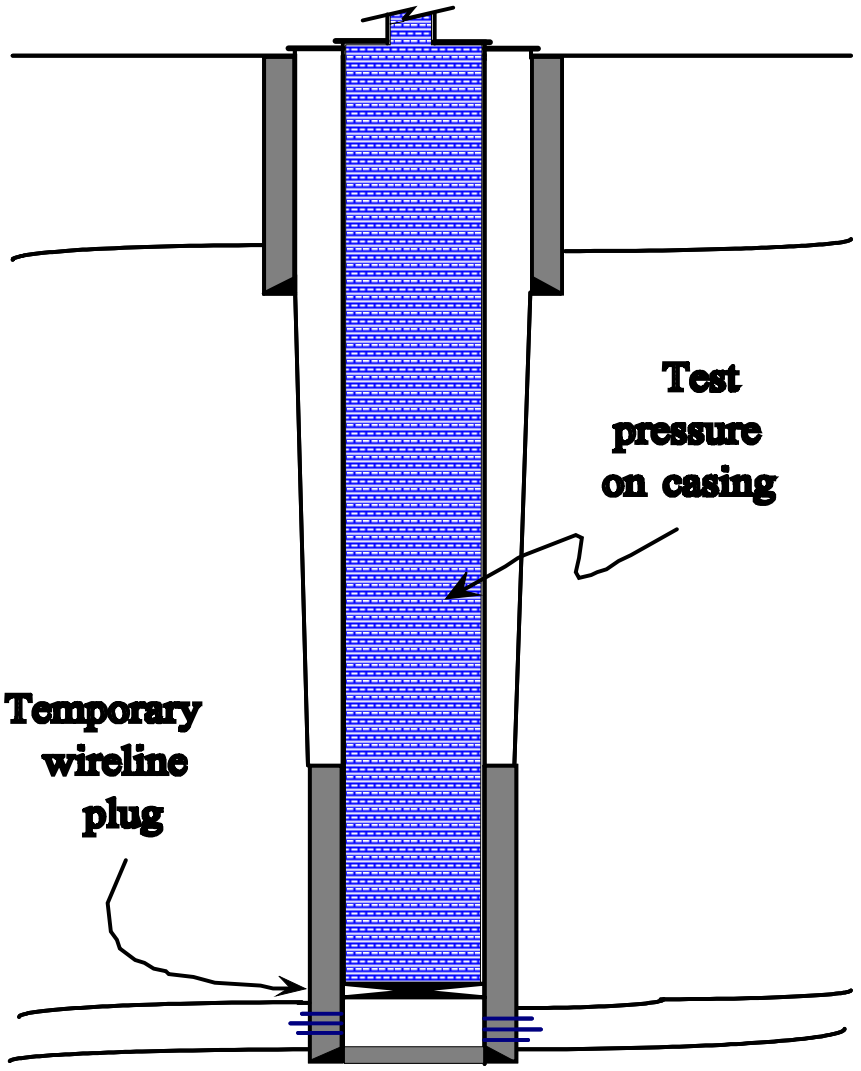
- Pressure test against temporary plug/packer

# Pressure Testing the Casing String Without Tubing & Packer

**Well Status: Shut-in or TA'd**

- **Pressure up on a retrievable bridge plug set within 100 feet of the Permitted Injection Interval to test the integrity of the casing**

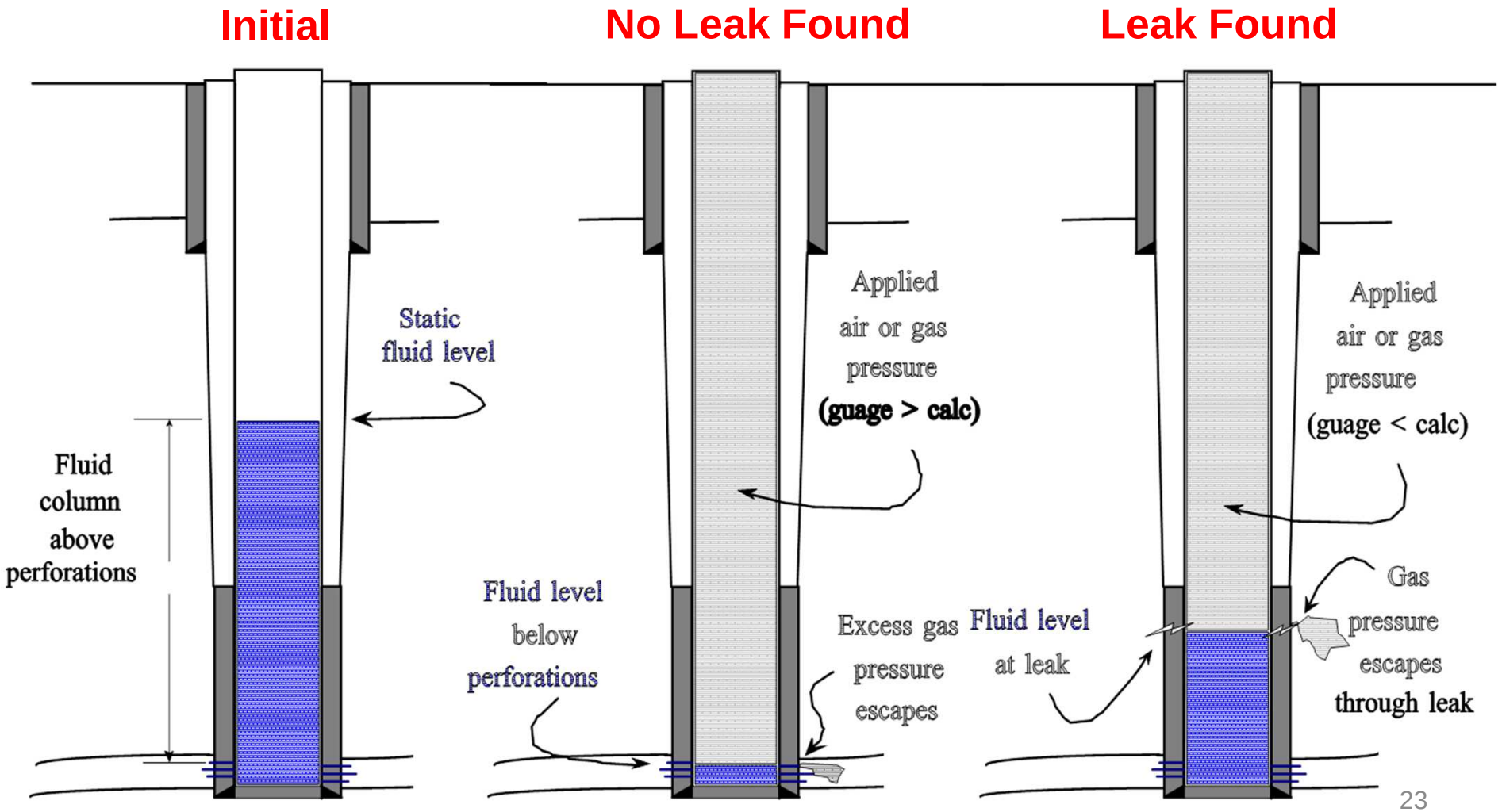
- **If the well is re-equipped with tubing & packer in preparation for injection, it must be retested**



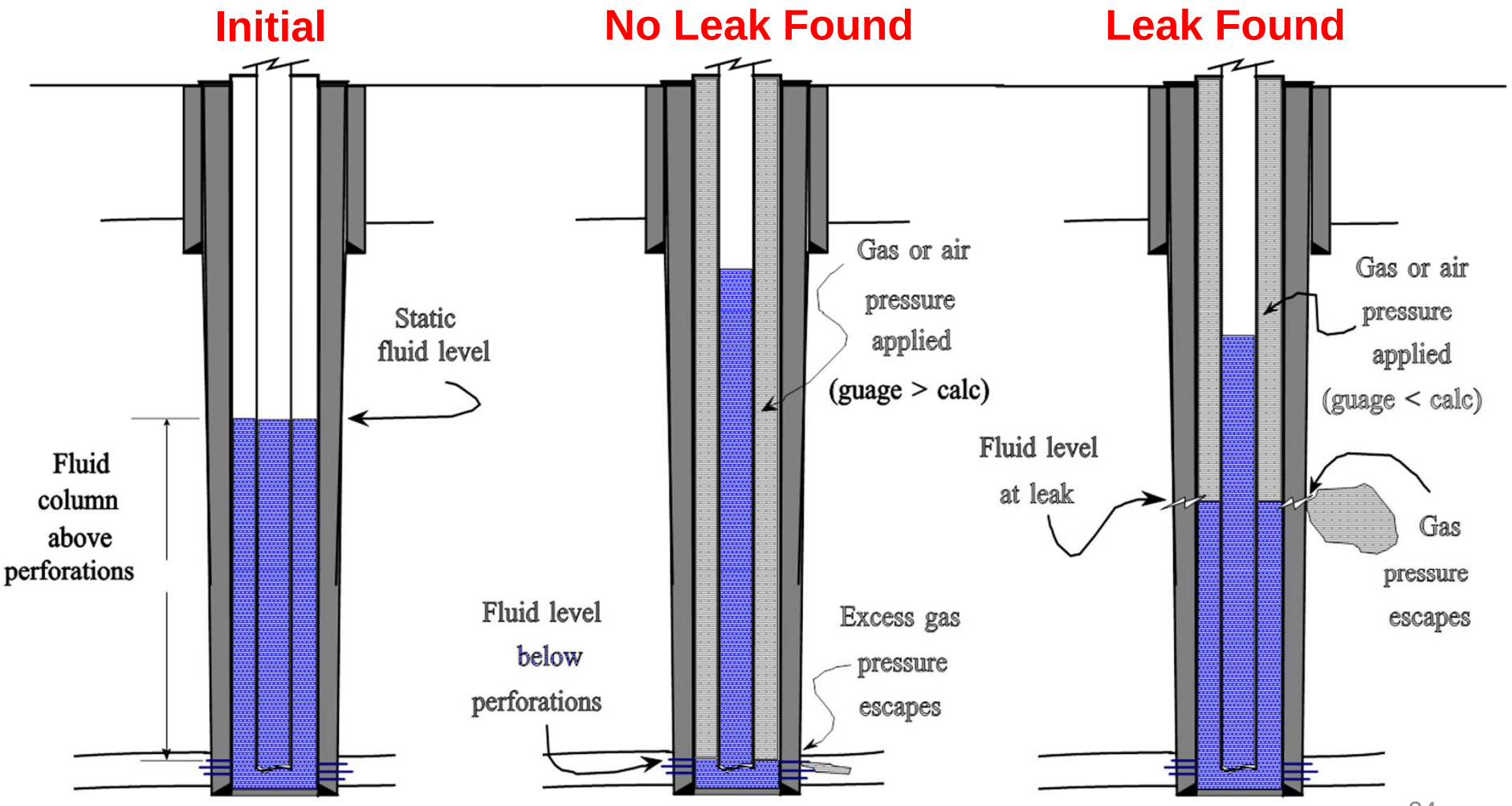
# Shut In/ Temporarily Abandoned Wells and Tubingless Completions

- Alternate testing methods require prior approval (unless required by permit):
  - Radioactive Tracer survey
  - Differential Temperature survey
  - Ada pressure test

# Ada Pressure Test:
# No Tubing, No Packer



# Ada Pressure Test:
# Tubing, No Packer

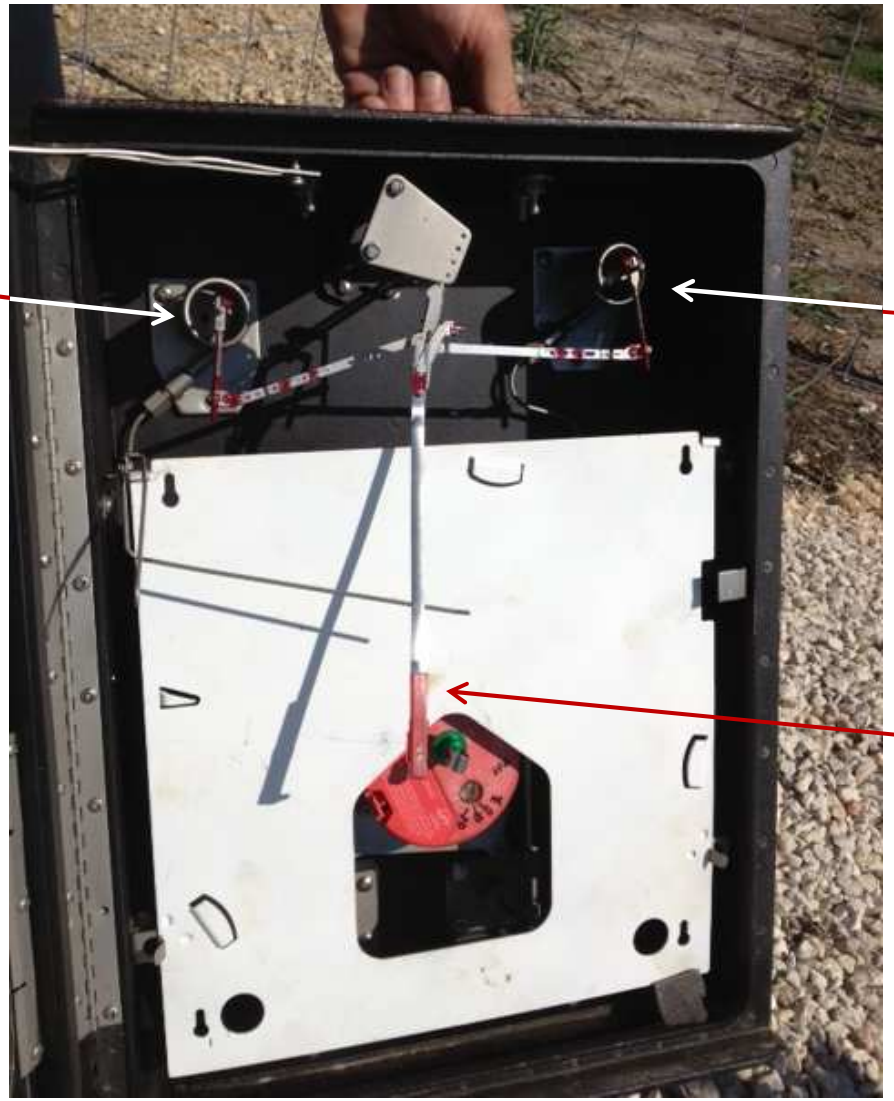


# Test Equipment Requirements

## Instruction 4(a)

- One-pen recorder for casing test pressure.
- Pressure must fall within 30-70% of the chart scale.
  - 20-80% accepted with 1000 psi spring and 0 – 1000 psi scale chart.
- Clock rotation not to exceed 24 hours per revolution.
  - Most common: 1 hour per revolution
- Chart signed by operator's field representative

# Typical Pressure Recorder



**1000 psi "spring" produces a 0 to 1000 psi scale**

**This is preferred when possible**

**1500 psi "spring" produces a 0 to 1500 psi scale**

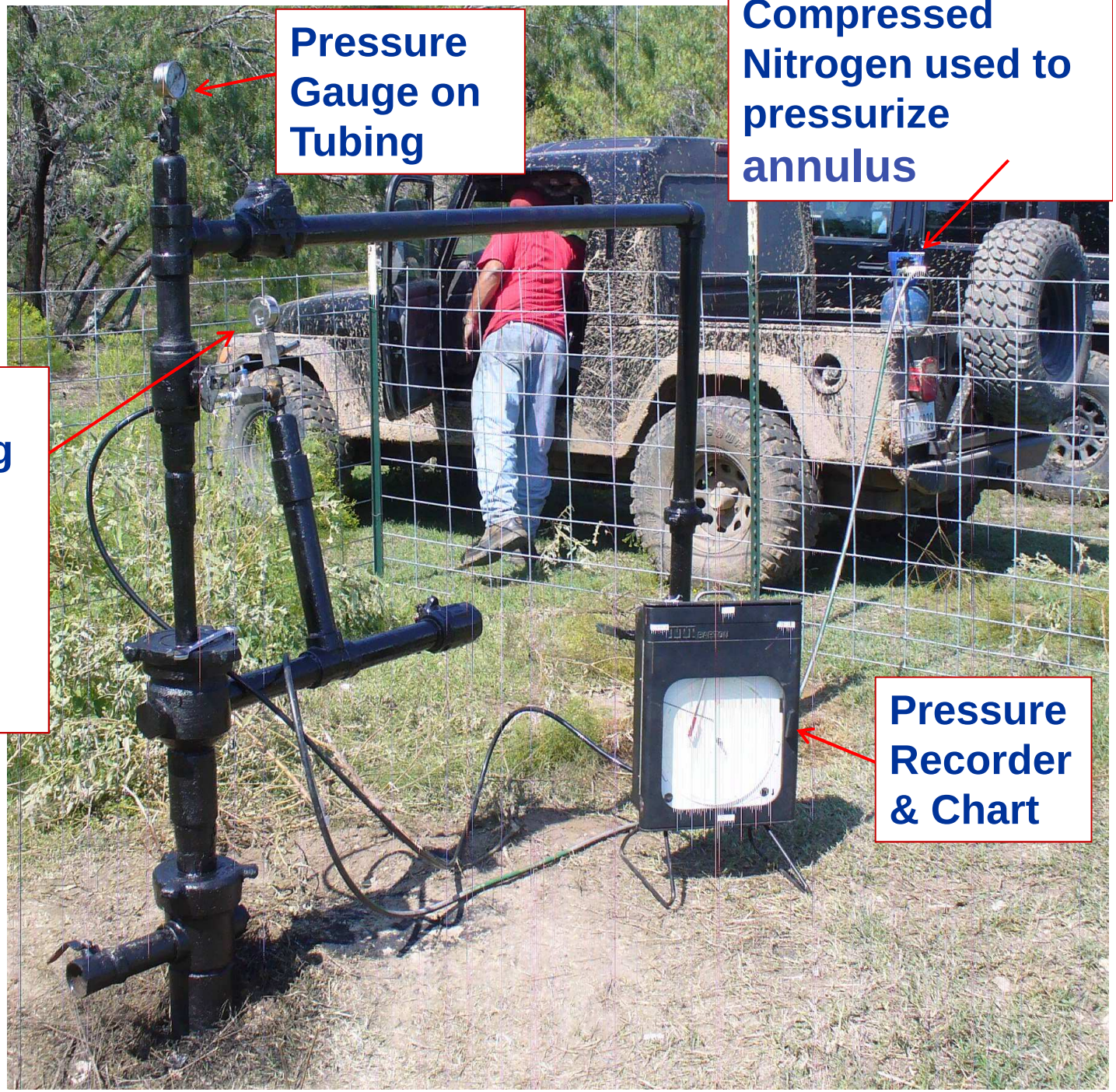
**Pressure Recording pen**

# Test Equipment Requirements:

**Instruction 4(b)**

- Gauges required on tubing and on each casing annulus (unless an exception has been granted)
- Gauges verify chart recorder calibration
- Test pressure must fall within 30-70% of the gauge.
- Enter gauge readings on Item 19
- Gauge marked in 5% increments of test pressure
  - 200 psi test: 10 psi “tick marks”
  - 500 psi test: 25 psi “tick marks”

# H-5 TEST IN PROGRESS



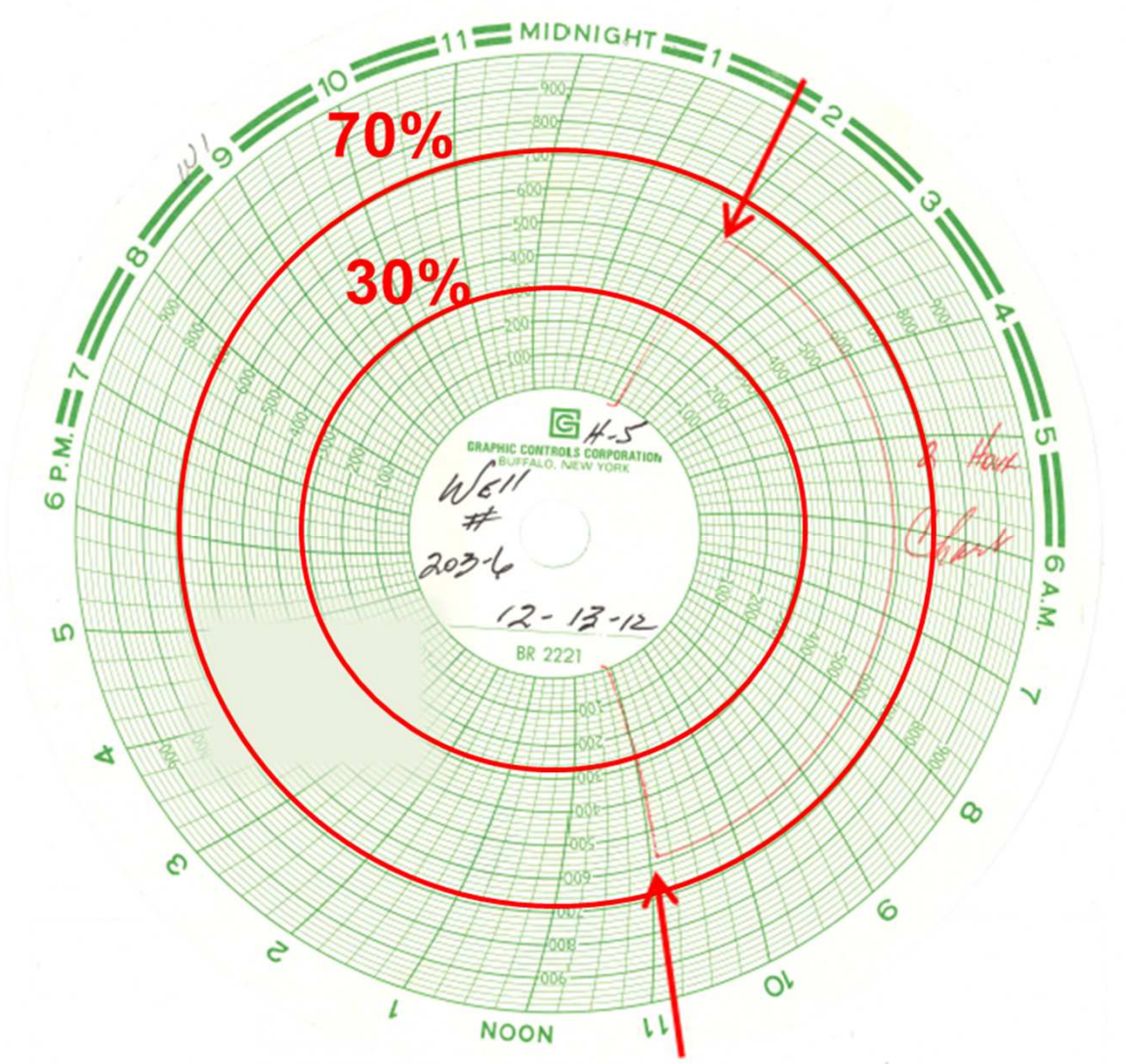
# Test Equipment Requirements:

## Instruction 4(d)

- Wells that inject only gas and have a gas-filled annulus must be tested for 60 minutes.
- Water injectors must be tested with a liquid-filled annulus for 30 minutes.
- Compressed gas can be used to pressurize the gas or liquid-filled annulus.
- Successful test:
  - Stabilize within 10% of test pressure
  - Remain stabilized for 30 (or 60) minutes
- Use of high viscosity packer fluids is prohibited.

# Example of Good Test

- Red recorder line is stable on the 580 psig line of the chart.
- Test Date, Clock Rotation, and Well ID written on the chart.

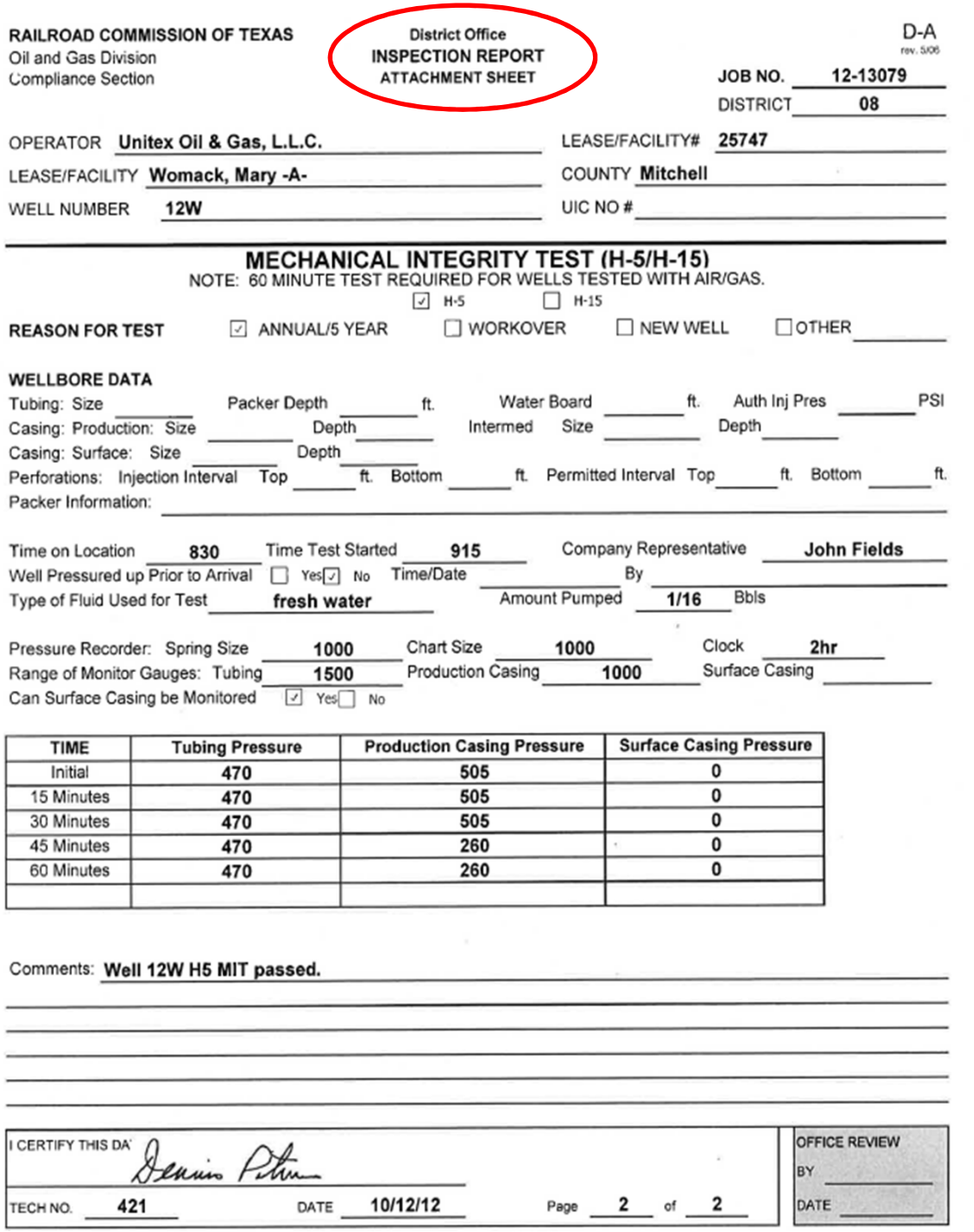


# WITNESSING AN H-5 TEST

**The RRC has the option to send a representative to witness the test.**

# INSPECTION REPORT

- **Also called the "Witness Report".**
- **Completed by the RRC Representative who witnessed the H-5 pressure test.**
- **When the District receives the Form H-5, the Witness Report is attached and sent to Austin for review.**



RAILROAD COMMISSION OF TEXAS
Oil and Gas Division
Compliance Section

District Office
INSPECTION REPORT
ATTACHMENT SHEET

D-A
rev. 5/06

JOB NO. 12-13079
DISTRICT 08

OPERATOR Unitex Oil & Gas, L.L.C. LEASE/FACILITY# 25747
LEASE/FACILITY Womack, Mary -A- COUNTY Mitchell
WELL NUMBER 12W UIC NO #

**MECHANICAL INTEGRITY TEST (H-5/H-15)**
NOTE: 60 MINUTE TEST REQUIRED FOR WELLS TESTED WITH AIR/GAS.
☑ H-5 ☐ H-15

REASON FOR TEST ☑ ANNUAL/5 YEAR ☐ WORKOVER ☐ NEW WELL ☐ OTHER

WELLBORE DATA
Tubing: Size Packer Depth ft. Water Board ft. Auth Inj Pres PSI
Casing: Production: Size Depth Intermed Size Depth
Casing: Surface: Size Depth
Perforations: Injection Interval Top ft. Bottom ft. Permitted Interval Top ft. Bottom ft.
Packer Information:

Time on Location 830 Time Test Started 915 Company Representative John Fields
Well Pressured up Prior to Arrival ☐ Yes ☑ No Time/Date By
Type of Fluid Used for Test fresh water Amount Pumped 1/16 Bbls

Pressure Recorder: Spring Size 1000 Chart Size 1000 Clock 2hr
Range of Monitor Gauges: Tubing 1500 Production Casing 1000 Surface Casing
Can Surface Casing be Monitored ☑ Yes ☐ No

| TIME | Tubing Pressure | Production Casing Pressure | Surface Casing Pressure |
|---|---|---|---|
| Initial | 470 | 505 | 0 |
| 15 Minutes | 470 | 505 | 0 |
| 30 Minutes | 470 | 505 | 0 |
| 45 Minutes | 470 | 260 | 0 |
| 60 Minutes | 470 | 260 | 0 |
| | | | |

Comments: Well 12W H5 MIT passed.

I CERTIFY THIS DA
TECH NO. 421 DATE 10/12/12 Page 2 of 2

OFFICE REVIEW
BY
DATE

# Common Causes of Inconclusive Test

- Re-test required: Reschedule
  - Pressure stayed within 10% but did not stabilize
  - Test pressure below minimum
  - Pressure differential less than 200 psi
  - Test duration too short
  - Pressure outside 30-70% (or 20-80%) of range
  - District not notified 48 hours in advance

# Common Causes of Inconclusive Test

- Correction required: Re-submit
  - Blank or Incorrect items on the H-5
  - No original chart

- Packer depth is shallower than permitted:
  - Move packer down to the permitted depth and re-test.
  - Amend injection interval to within 100 feet of the packer.

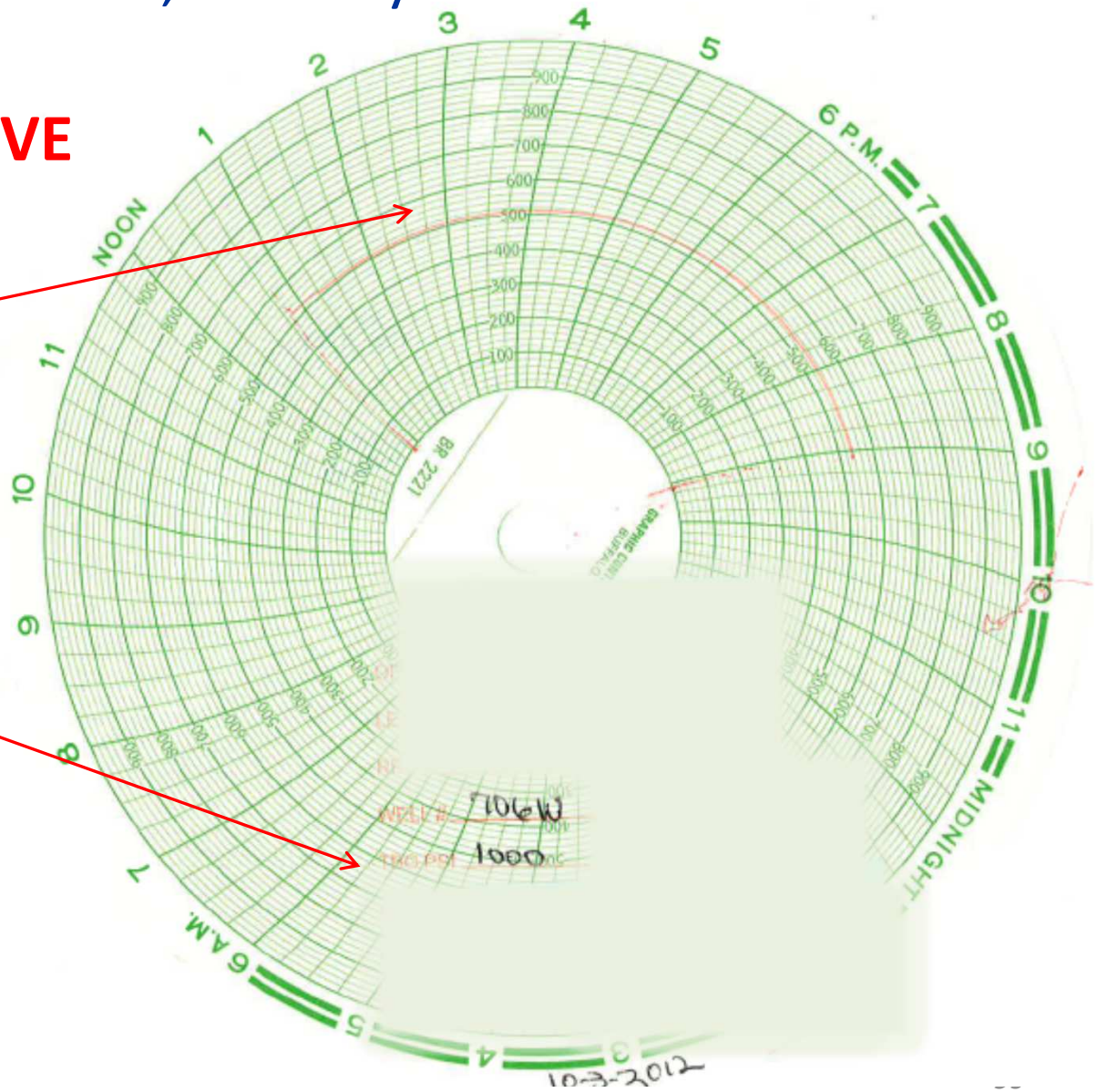
# Example: Inconclusive Test

Pressure failed to stabilize, but stayed within 10% of initial.

**Result: INCONCLUSIVE**

Pressure increased 30 psi (6%)

Low or high tubing pressure



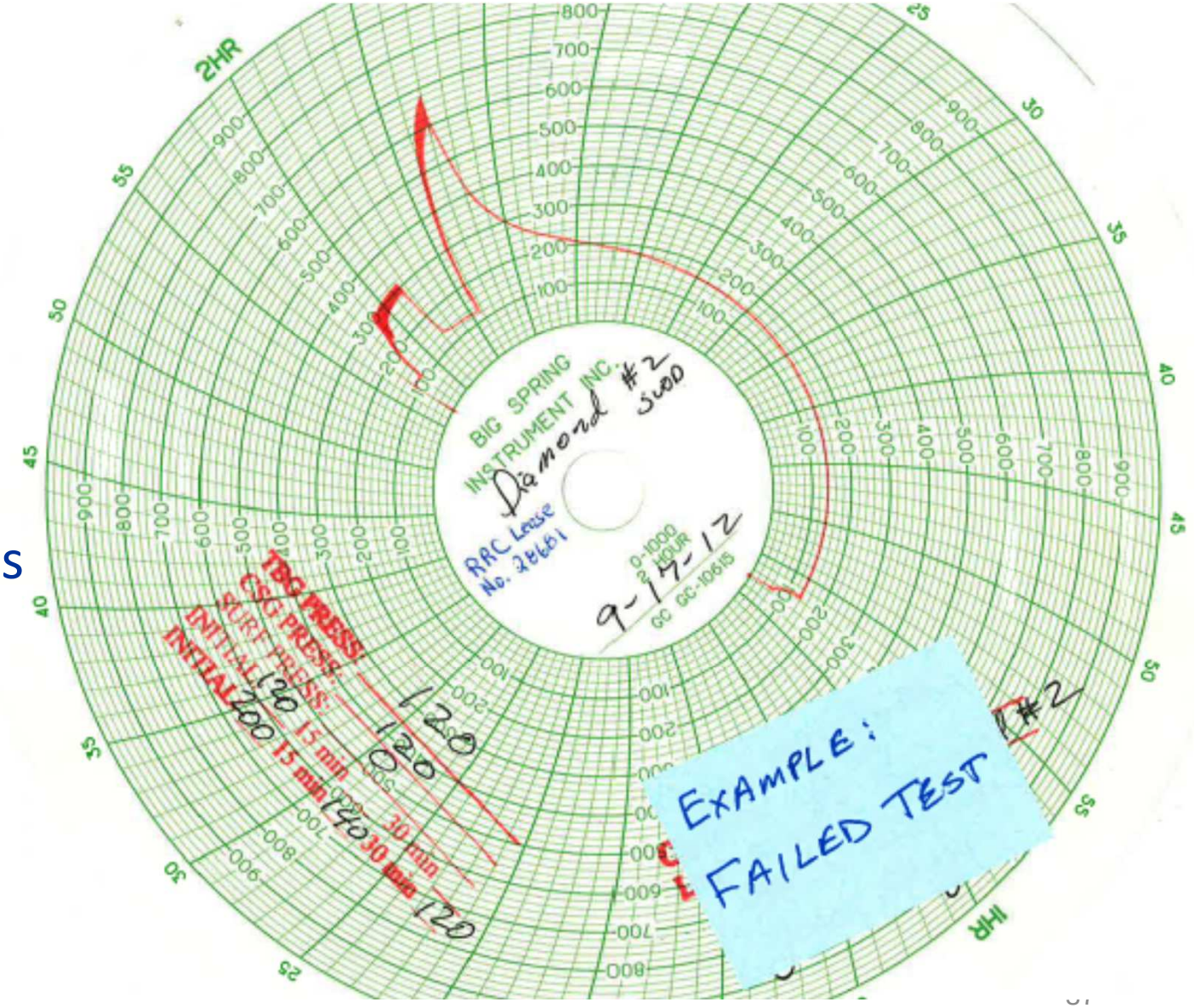
# Failed Test

If the test pressure rises or drops more than 10% of the original test pressure, the pressure test is given a FAIL result.

# Example of Failed Test

Two attempts to pressure up on casing failed.

Note final test pressure equal to the tubing pressure, suggests a hole in tubing.



# Failed Test

If the test fails

- Required to file H-5 for all tests, not just good ones (see instructions 1 and 2)
- Cease injection, shut in well, repair, and retest
- OR plug the well & submit W-3 (not W-3A).

If no compliance within 60 days:

- Operator receives a Certified Letter stating that in 30 days, lease will be Severed or well will be Sealed.

# Helpful Hints for Form H-5

Refer to the well's current W-2/G-1 for:

- API No., Well No., Oil Lease No.
- Well Completion data
- Packer make and model, & depth set
- Completed injection interval

Refer to the Injection/Disposal Permit for:

- Authorized injection pressure
- Permitted injection interval

# Helpful Hints for Form H-5

- Repair any wellhead and test equipment leaks prior to the test.
- Keep Pressure Recorder in shade to prevent it from heating up and increasing the pressure.
- Top up the fluid in annulus well before the test to ensure temperature equalization.
- Test at a pressure above minimum in case pressure drops slightly before stabilizing.

# Remedy Casing Leak

- Amend Injection Interval to include the casing leak
- Repair leak with cement squeeze
- Cement new string from shoe to ground surface
  - Tubing and packer are required inside the new string
  - Verify production casing cement before cementing new string
  - Must reset packer at required depth

# Exclusion from Testing

- Once converted, MIT always required for life of permit
  - Even if well is shut in
  - Even if well is actively producing

- To be exempt from MIT
  - Must Suspend or Cancel permit
  - AND remove classification: Active Injection
  - Re-classify as Shut-In, Producing, Temp Abandoned, Water Supply, etc.

# Cancellation and Suspension

- Permit may be Suspended
  - Written request
  - Most recent MIT passed within **6 months**
  - Permit may be reinstated
  - Non-Commercial wells only

- All injection related testing, monitoring, and reporting requirements are suspended during this time

# Cancellation and Suspension

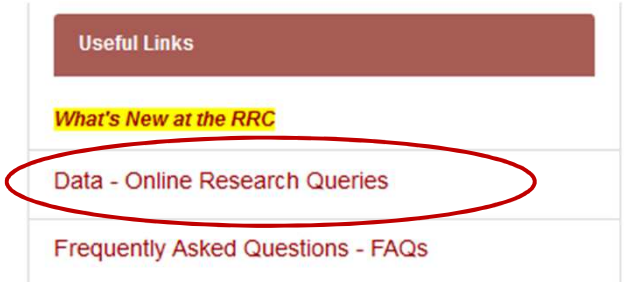
- Permit may be Cancelled
  - Written request
  - Most recent MIT passed within **12 months**
  - Permit will not be reinstated
  - Apply for new permit

- All injection related testing, monitoring, and reporting requirements are cancelled

# REVIEW FORM H-5

Form H-5, Pressure Chart & Witness Report (if applicable) are scanned into the RRC website at and are VISIBLE TO THE PUBLIC.

RRC Home Page




1


2


3

# TESTING MANUAL

Home / Oil & Gas / Publications and Notices / Manuals / Injection/Disposal Well Manual /

## Summary of Testing Requirements

General Testing Requirements

Discusses mechanical integrity testing requirements

Scheduling of Mechanical Integrity Tests

Discusses the implementation of testing for various types of wells

Test Methods

Discusses the various type of mechanical integrity tests and their application

Test Evaluation

Discusses the evaluation of mechanical integrity tests and subsequent actions

Test Exclusions

Discusses the various categories of wells that may be excluded from testing

Non-Compliance and Enforcement

Discusses handling of delinquent and non-compliant wells

Form H-5 Completion

An Item by Item discussion of Form H-5.

Form H-5 Instructions

An Item by Item discussion of the instructions on the back of Form H-5.

*Last Updated: 4/1/2014 9:40:26 PM*

# Testing Hydrocarbon Storage Wells

- Hydrocarbon Storage Rules 95, 96, & 97
- These types of Injection Wells are special cases that require the operator to contact:
  - Michael Sims, Primary

    Michael.Sims@rrc.state.tx.us
  - David Hill, Secondary

    David.Hill@rrc.state.tx.us

# Contact Information

- Underground Injection Control H-5 Testing Staff
  - General Inquiries:
    - **Julie Requejo:** 512-463-3616 julie.requejo@rrc.texas.gov
  - Technical Inquiries:
    - **Steven Schmidt:** 512-463-6767 steven.schmidt@rrc.texas.gov
    - **Lauryn McFarland:** 512-463-6454 lauryn.mcfarland@rrc.texas.gov
    - **Claire Zolkoski:** 512-463-2259 claire.zolkoski@rrc.texas.gov

# Questions?
# THANK YOU!