

Education and Work History – Kelley Montgomery

Kelley Albrecht Montgomery

BS Mechanical Engineering – Texas A&M University 1991

Registered Professional Engineer in Texas

22 years in the Oil and Gas Industry

Work History

1991-1995 – Production Engineer (5 years)

1995 – 2011 – Environmental Engineer – Oil & Gas (16 years)

2011 – 2012 – Production Engineer (1 year)

Oct. 2012 – Present – Regulatory Consultant (7 months)

Tax Incentive: Legal Description of Project Area Location

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM

Section 33: SE/4 SE/4

Section 34: SW/4 & W/2NW/4*

TOWNSHIP 19 SOUTH, RANGE 38 EAST, NMPM

Section 3, 4, and 5: All

Section 6: N/2 and SE/4

Section 8: N/2NW/4, E/2NE/4 & N/2SE/4*

Section 9: N/2, N/2 SW/4, and SE/4

Section 10: All

Section 11: SW/4 SW/4

Section 14: W/2 NW/4

Section 15: All

Section 16: NE/4 NE/4

*Note that Order R-4934-E incorrectly describes the acreage within the South Hobbs Project Area in these particular sections.



Tax Incentive: South Hobbs Unit Project Data

Total acres in the Project Area: *4920 acres, more or less*

Subject Pool and formation:

*Hobbs Grayburg-San Andres Pool (31920)
Grayburg and San Andres Formations*

Project:

*South Hobbs Grayburg-San Andres Pressure Maintenance Project
Order R-4934 (issued December 1974) and R-4934-E (issued May
1984)
Governing Rules Amended by R-4934-E, issued May 21, 1984*

Current Operation: *Waterflood*

Proposed Operation:

A tertiary recovery process involving the application of a carbon dioxide miscible fluid displacement mechanism. Fluids to be injected include produced water, carbon dioxide, and produced gases including methane, natural gas liquids and H₂S.



Tax Incentive: Project Description

Capital cost of additional facilities: *\$246 million*

Total Project Capital Costs: *\$312 million*

Estimated total value of the additional production that will be recovered as a result of this tertiary recovery project:

An additional 33.25 mmbbls of oil at a gross revenue estimated at \$2.8 billion over the life of the project (approximately 40 years)

Anticipated date of commencement of injection: *September 2015*

The type of fluid to be injected and the anticipated volumes:

*Maximum water injection rate of 115,000 BWPD;
Maximum CO2 injection rate of 45 MMCFD; and
Maximum rejection of CO2 and produced gases of 75 MMCFD*

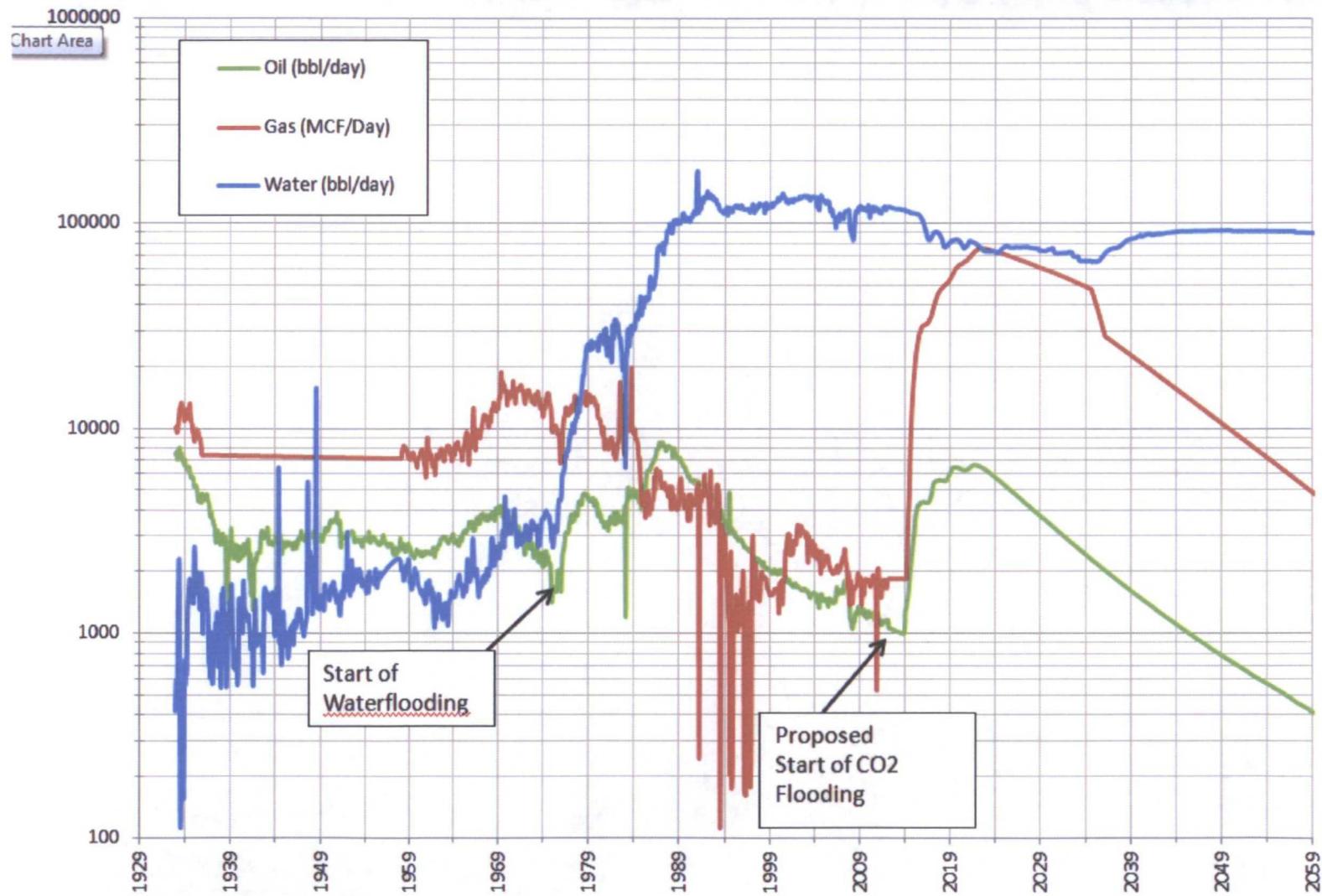


Tax Incentive: List of Current Injection and Production Wells

See Section III of Oxy's C-108 Application.



Tax Incentive: South Hobbs Unit Production – Historical and Forecast



C-108 Proposed 53 Injectors

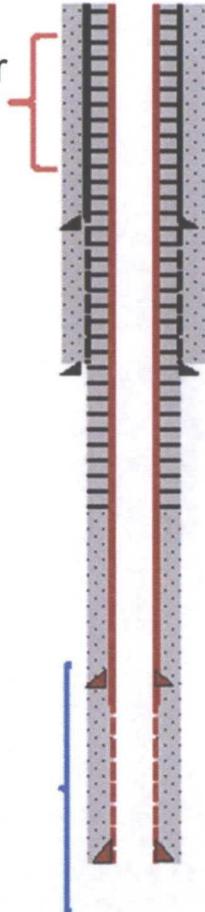
30 Existing Wells to Convert to CO2 Injection:

- All have Surface and/or Intermediate Casing Cemented to Surface
- 26 Wells are constructed with Surface and Production Casing:
 - 23 wells have Production Casing Cemented to Surface
 - 3 remaining wells have at least 600 ft of cement above injection interval.
- 3 Wells are constructed with Surface, Intermediate, Production Casing and a Full Liner:
 - All wells have at least 720 ft. of cement above injection interval
- 1 Well is constructed with Surface, Intermediate, Production Casing and Partial Liner:
 - Well has at least 1470 ft. of cement above injection interval



Existing Injectors with Surface and Production Casing (26 Wells)

Protectable Water
40' to approx.
200' – 250'



Surface Csg Set Between 302' and 1670'
Cement Circulated to Surface

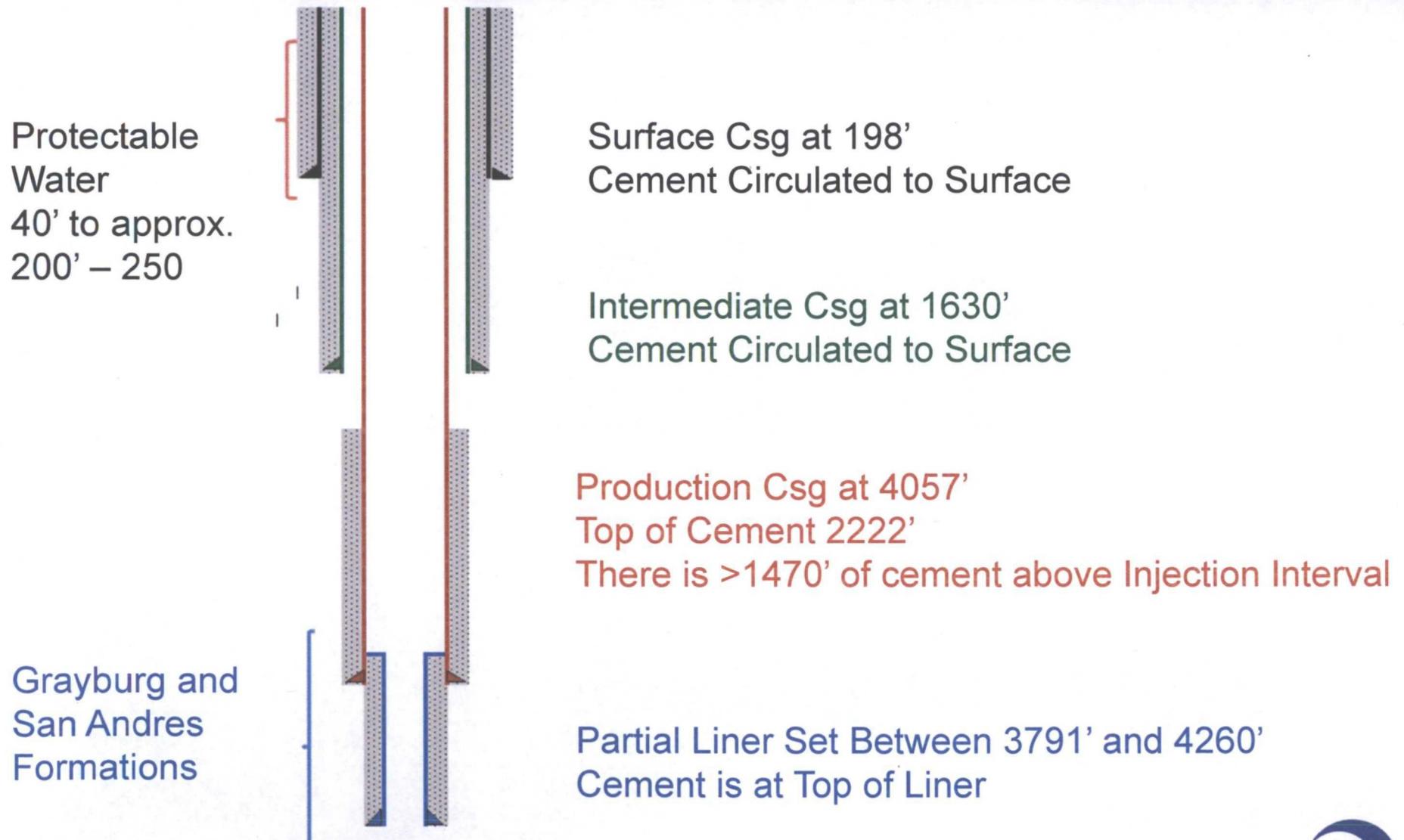
Production Csg. Set Between 4114' and 4498'

23 wells have Prod Csg Cemented to Surface

3 remaining wells have >600' of cement above Injection Interval

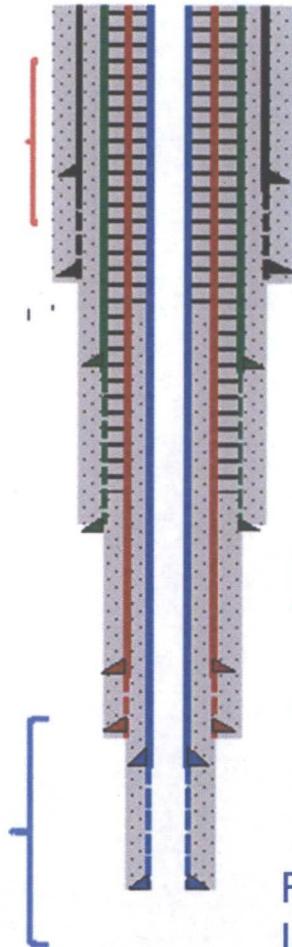
Grayburg and
San Andres
Formations

Existing Injector with Surface, Intermediate, Production Casing and Partial Liner (1 Well)



Existing Injectors with Surface, Intermediate, Production Casing and Full Liner (3 Wells)

Protectable Water
40' to approx.
200' – 250'



Surface Csg Set Between 144' and 250'
Cement Circulated to Surface

Intermediate Csg Set Between 1653' and 2768'
Cement Circulated to Surface

Production Csg. Set Between 4038' and 4147'
Top of Cement from 2975' to Surface

There is >720' of cement above Injection Interval

Full Liner Set Between 4159' and 4202'
Liner TOC from 994' to Surface

Grayburg and
San Andres
Formations



C-108 Proposed 53 Injectors

23 Wells are Proposed New Drills:

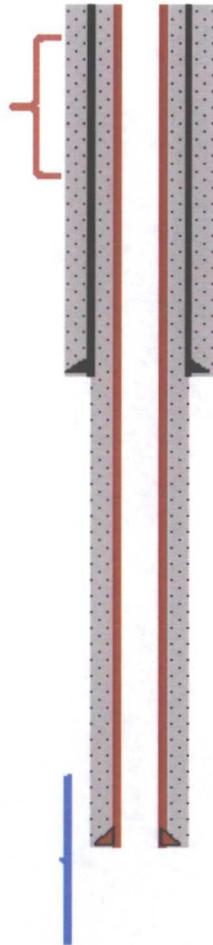
- 6 Proposed Vertical Wellbores
- 17 Proposed Directional Wellbores
- Proposed Surface Casing Set at 1550' and Cemented to Surface
- Proposed Production Casing Set at 4500' and Cemented to Surface



Proposed New Drill Injectors (23 Wells)

**Proposed 6 Vertical Wellbores
and 17 Directional Wellbores**

Protectable Water
40' to approx.
200' – 250'



Proposed Surface Csg Set at 1550"
Cement Circulated to Surface

Proposed Production Csg. Set at 4500"
Cement Circulated to Surface

Grayburg and
San Andres
Formations



Area of Review Analysis

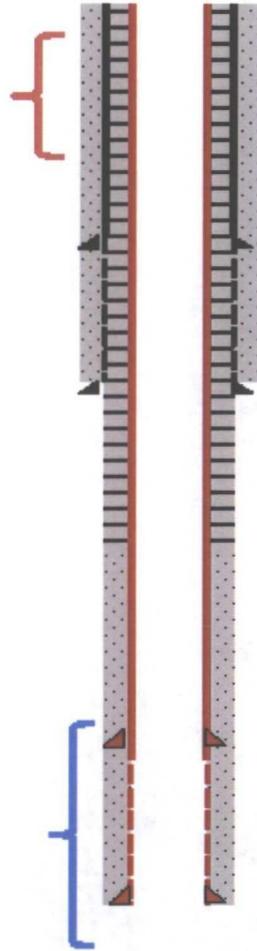
See Section VI of Oxy's C-108 Application



Area of Review

Example Wellbore Schematic (Group 4 – 166 Wells)

Protectable
Water
40'– 250'



Surface Csg Set Between 281' and 1718'
Cement Circulated to Surface by initial
cement or remedial cementing

Production Csg. Set Between 3983' and 5370'
Top of Cement ranges from 3225' to Surface

There is >470' of cement above Grayburg and
San Andres Formations

Area of Review Potential Problem Well

30-025-35933

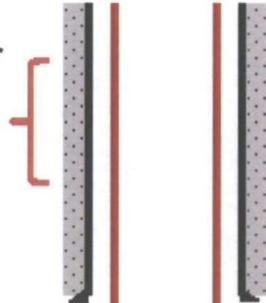
Chesapeake Operating Co (Recently
Sold to Chevron)

Well No. 3

Drilled Jul. 2002

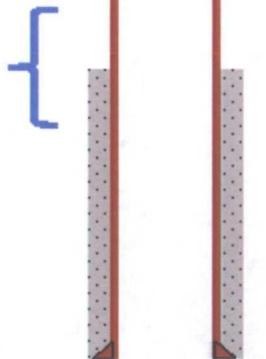
(Located in Southwest Corner of SHU)

Protectable Water
40' – 250'



Surface Csg Set at 1723"
Cement Circulated to Surface

Grayburg and
San Andres
Formations



Production Csg. Set at 7787'
Top of Cement 4454' (Calc)



Updating Area of Review on Future Injection Wells

Proposal: For proposed injectors that don't start injection >5 years from now, require OXY to revalidate the AOR information and update only if changed

Why?

- SHU Project will be phased in over many years beginning 2015
- AOR done for this project covers the entire South Hobbs Unit
- Concept was adopted in NHU Project to streamline Oxy and NMOCD process and has worked very well
- In current AOR, only four wells drilled in last 10 years. Two were drilled by Oxy.
- Very few operators in AOR other than Oxy



MIT Frequency for Temporarily Abandoned Wells and Injection Wells

19.15.25.12 APPROVED TEMPORARY ABANDONMENT:

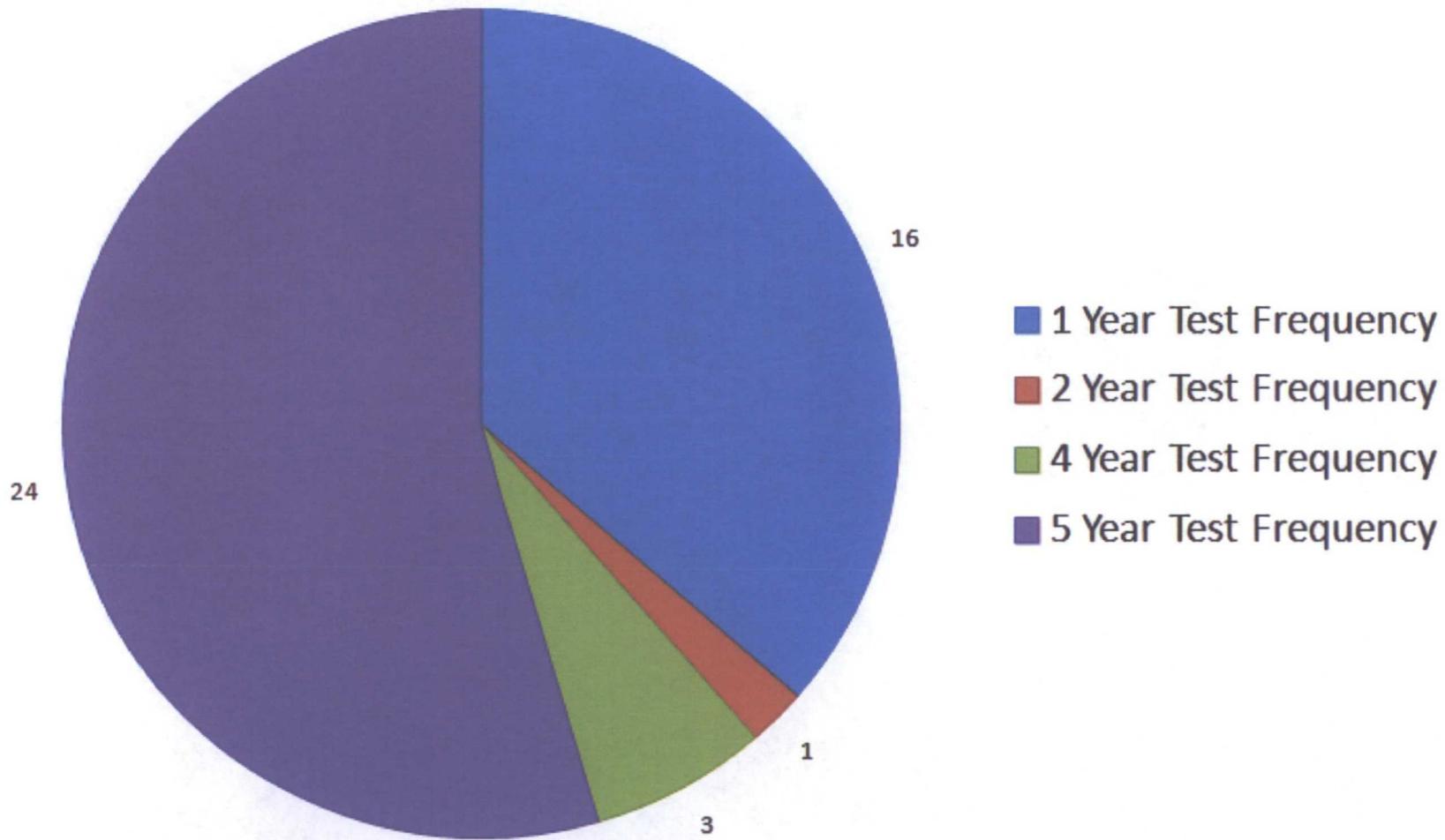
“The division may place a well in approved temporary abandonment for a **period of up to five years**. Prior to the expiration of an approved temporary abandonment the operator shall return the well to beneficial use under a plan the division approves, permanently plug and abandon the well and restore and remediate the location or apply for a new approval to temporarily abandon the well.”

19.15.26.11.A.(2) TESTING, ... (Injectors)

“(2) At least **once every five years** thereafter, the operator shall test an injection well to assure its continued mechanical integrity.”



Summary of Current MIT Program for TA'd Wells in SHU per NMOCD District Office



Proposed Changes to MIT Program for TA'd Wells

Oxy performs an MIT as per NMOCD requirements when well is initially TA'd

Where Oxy installs a pressure sensing device on a TA'd well:

- Oxy will inform NMOCD District Office of installation

- Oxy will monitor device with SCADA system

- Data will be available to NMOCD upon request

Oxy will perform an MIT as per **19.15.25.14** every 5 years

Oxy will continue annual bradenhead testing requirement



MIT Program for Injection Wells

Oxy performs an MIT as per NMOCD requirements before injection is commenced

Oxy installs a pressure sensing device on the tubing/casing annulus:

Oxy will inform NMOCD District Office before commencing injection

Oxy will monitor device with SCADA system

Data will be available to NMOCD upon request

Oxy will perform an MIT as per **19.15.25.14** at a frequency required by NMOCD

Oxy will continue annual bradenhead testing requirement



Bradenhead Testing Program

Bradenhead is annular space between surface casing and production casing

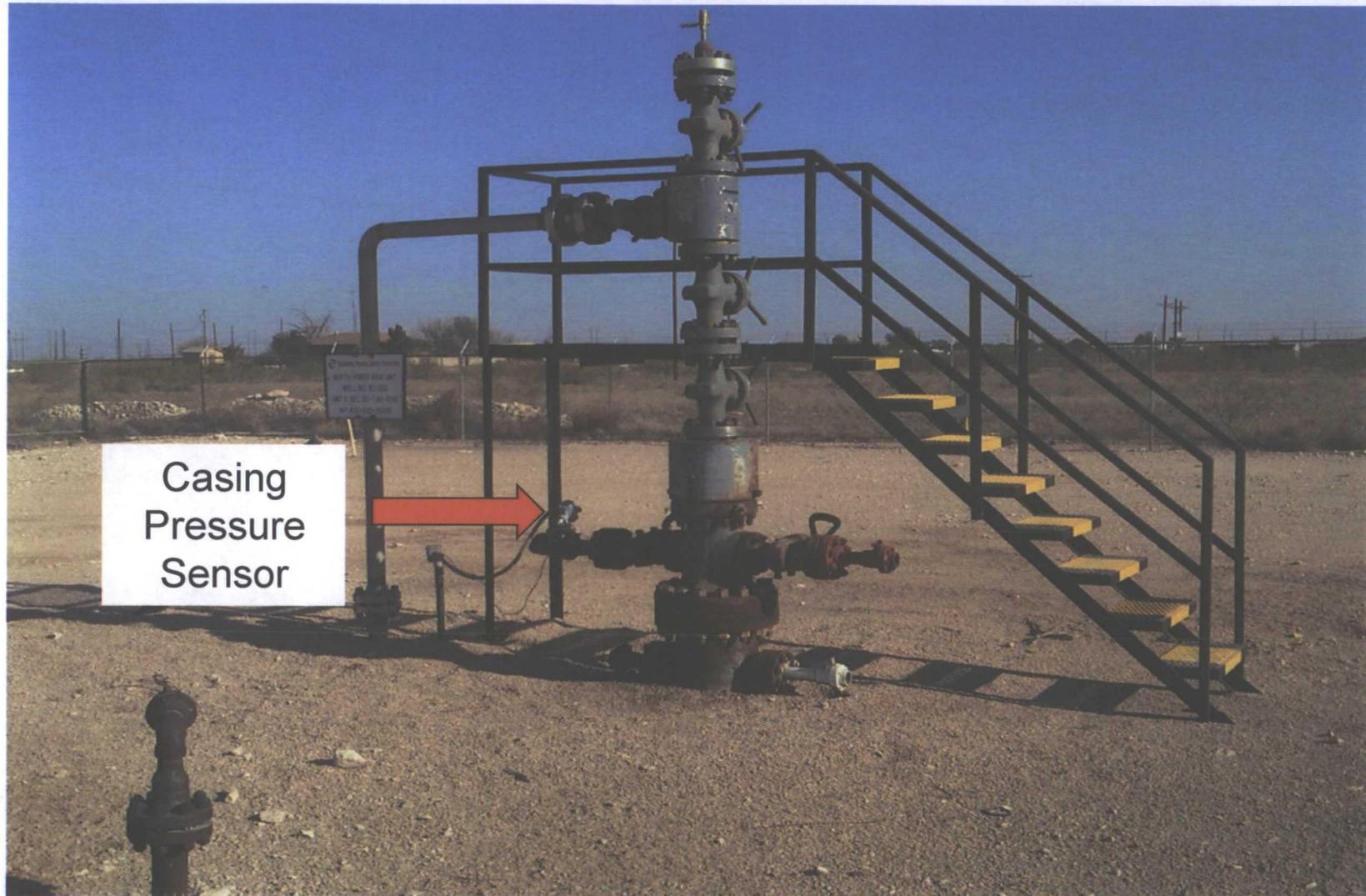
Test designed to indicate casing integrity between the surface and production casing

All injectors and TA'd wells have annual Bradenhead Testing

Results submitted to NMOCD District Office



Injection Well



Casing
Pressure
Sensor

South Hobbs Injection Order 4934-E (Cement Bond Logs)

~~RULE 15. Prior to placing any well on injection, a cement bond log shall be run on said well; also at any time the rods and/or tubing are pulled from any producing well in the Project, a cement bond log shall be run on said well. Copies of all cement bond logs shall be sent to the Hobbs district office of the Commission. If any well is found to have an inadequate casing-cement bond, such measures as may be necessary to prevent leakage or migration of fluids within the wellbore shall be taken before placing the well on injection or restoring it to production.~~

