

# InterAct

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September, 2016

CSLC Prevention First

Well Integrity and  
Zonal Isolation

an **ACTEON** company



## ***Well Integrity and Zonal Isolation***

- ***Downhole Equipment Design***
  - Well Construction
  - Reservoir Characterization
- ***Update, Assess, Monitor***
  - Update Well Diagram
  - Utilize Diagnostic Tools as Needed to Assess
  - Monitor Well
- ***Contingency Plan***
  - Chain of Command
  - Options for Remedial Work
  - Regular Planning Meetings
- ***Equipment Maintenance and Personnel Training***

## ***Existing Regulations on Well Integrity:***

- ***DOGGR Regulations in Title 14***
- ***API Standard 65-2, “Isolating Potential Flow Zones”***

***Existing Regulations may be influenced by events which have already changed regulations for Gas Storage Fields and OCS Operations***



**Bureau of Safety and Environmental Enforcement**

Promoting Safety, Protecting the Environment and Conserving Offshore Resources

***Definition of well integrity: Norsok D-010***

***“ Application of technical, operational and organizational solutions to reduce risk of uncontrolled release of formation fluids throughout the life cycle of a well.”***

There are various facets to well integrity, including accountability/responsibility, well operating processes, well service processes, tubing/annulus integrity, tree/wellhead integrity and testing of safety systems.

Source: Wikipedia

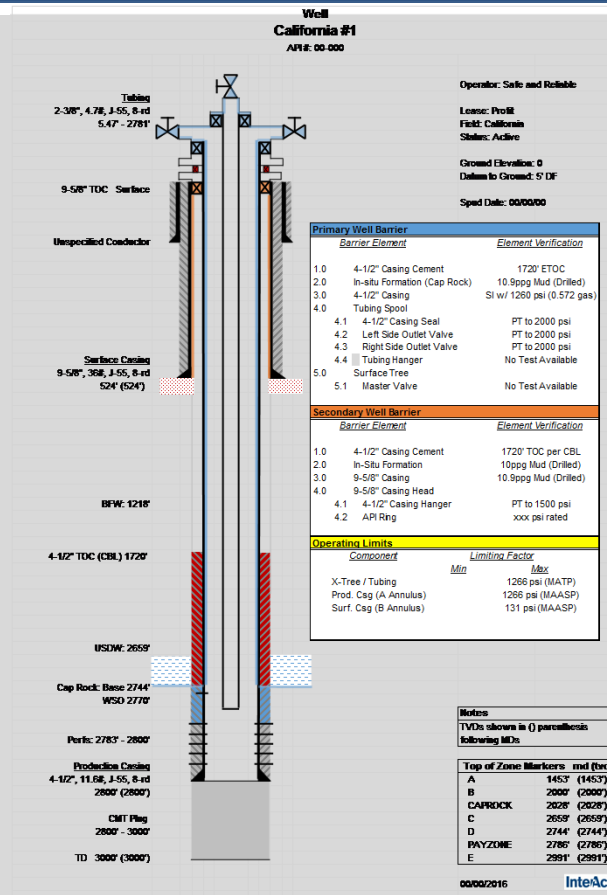
# Wellbore Construction: Barrier Diagrams

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Barriers change depending on the phase of well life:

- Drilling
- Primary Production
- Various Artificial Lift Methods
- Secondary or Enhanced Recovery
- Workovers
- Abandonment

The diagram should be updated any time a material change is made in the wellbore.

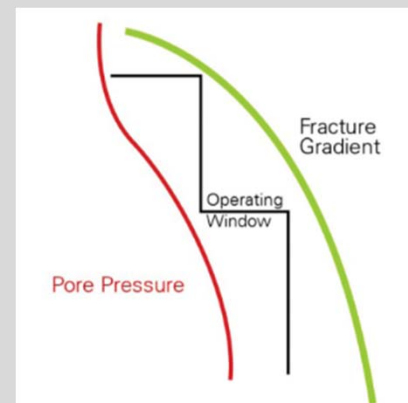
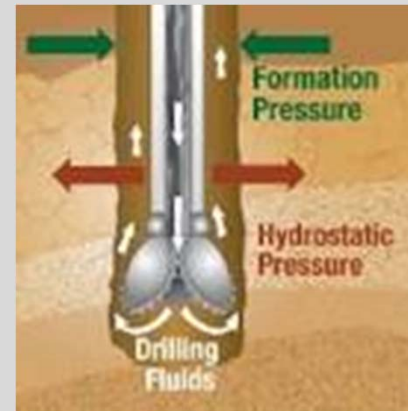


# Reservoir Characterization

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Pore Pressure from EMW, DST or pressure build up analysis-ensure casing can withstand burst or collapse

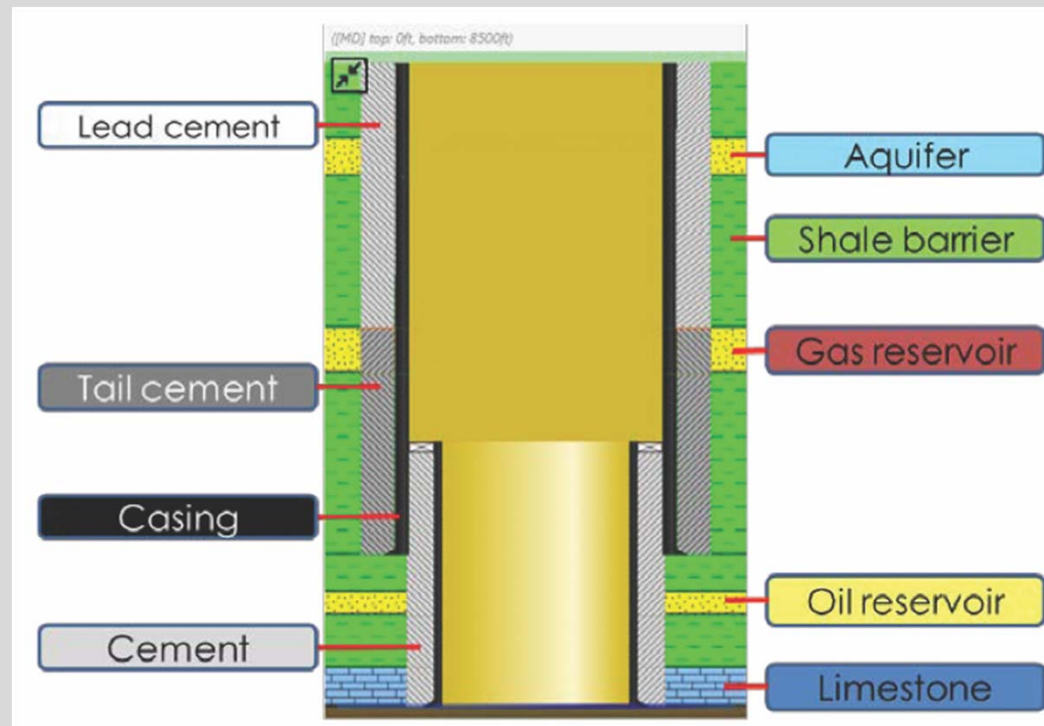
Fracture Pressure from leak off test, or step rate test-ensure formation can withstand pressure



# Equipment Design: Ex 1

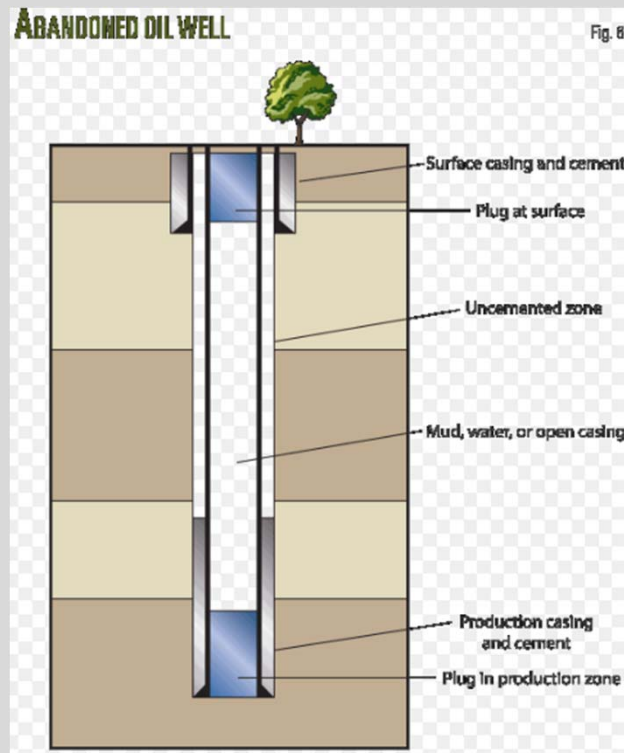
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Are You Worried?



# Equipment Design: Ex 2 InterAct

Are You Worried?





## Start with an updated Well Diagram

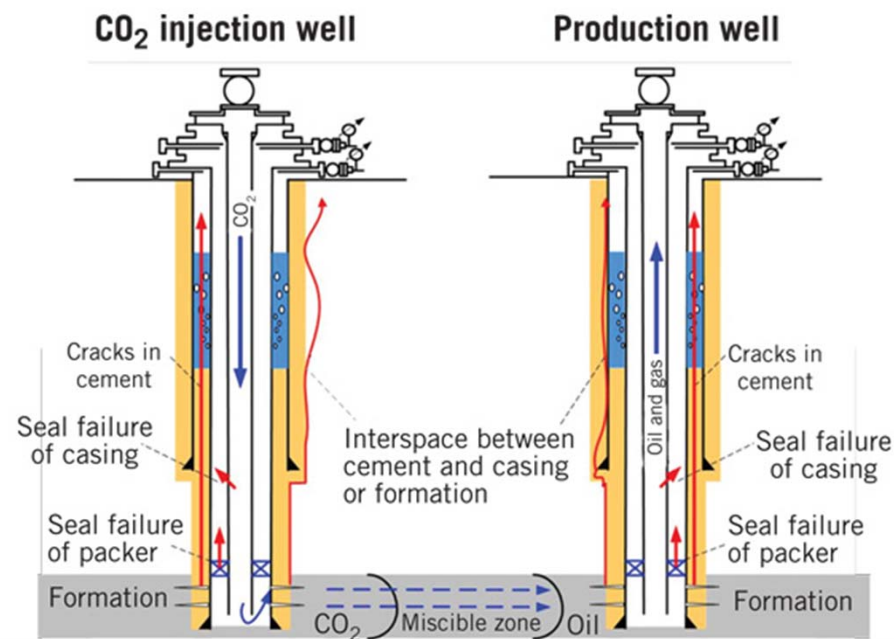
### Diagnostic Tools

- Cased Hole Well Logs:
  - Cement Bond, may include casing condition
  - Casing Condition (Magnetic Flux, Caliper),
  - Noise-Temperature: casing leaks or fluid movement behind pipe
- Downhole Video vs. Camera: Fiber Optic vs. Electric Cable
- Pressure Tests: Areas of potential compromise

What monitoring could you do to detect these leaks?

## POSSIBLE GAS MIGRATION PATHS

FIG. 1



## Case History 1

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### Macondo



[BP Deepwater Horizon Accident Investigation Report2.mp4](#)

Start at 12:30

## Case History 2

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### Aliso Canyon



[Well Inspection Process at Aliso Canyon Storage Facility.mp4](#)

- It's important to update well information each time well is pulled
- Obtain diagnostic information as appropriate, document findings, and make someone accountable to review and react to results
- Design a reliable monitoring program and make someone accountable to review and react to results
- Have a contingency plan in place for emergencies
- Maintain equipment and train personnel

Questions?

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