



Exceptional service in the national interest

SAND2021-6320C

# NETL Well Integrity Workshop:

## Identifying well integrity research needs for subsurface energy infrastructure

**Session 4: What are unique concerns for well integrity in challenging environments?**

Moderated by Douglas Blankenship

May 25, 2021



## NETL Well Integrity Workshop:

Identifying well integrity research needs  
for subsurface energy infrastructure

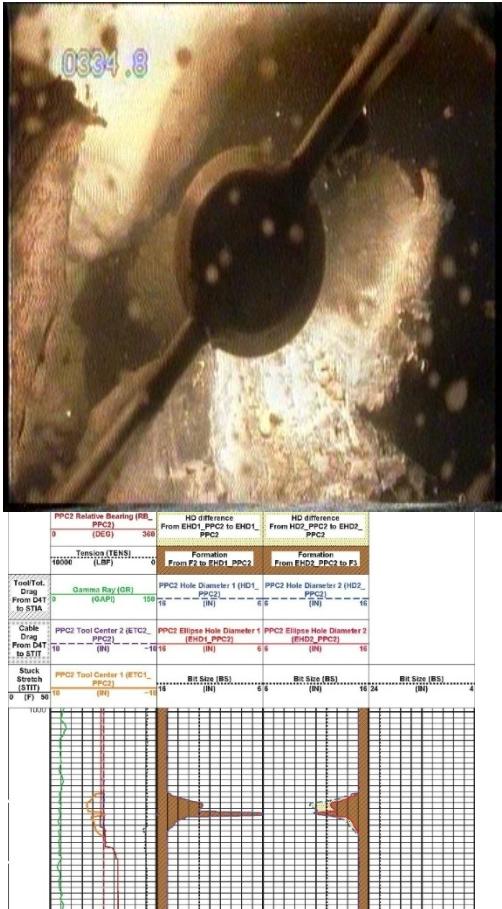
May 18, May 25, and June 1, 2021

---

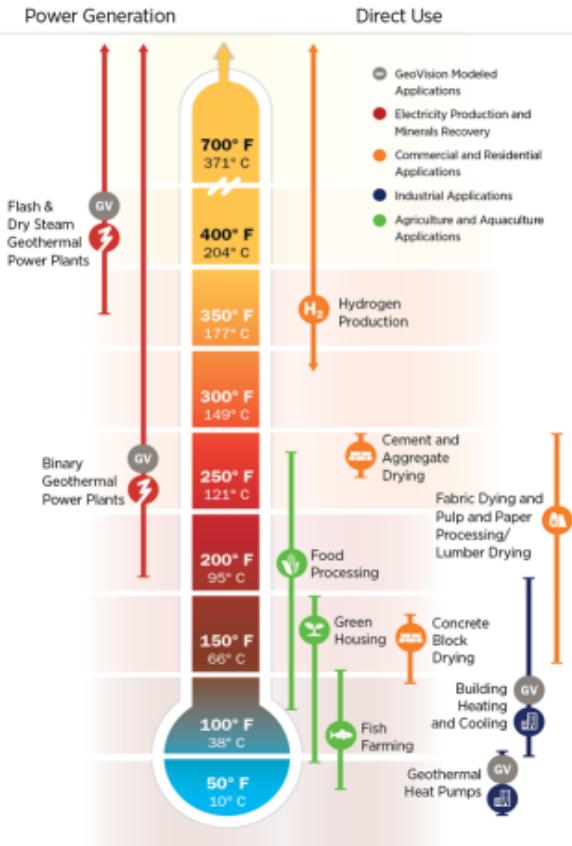
### AGENDA (all times Eastern Daylight Time or UTC-4)

12:10–14:10	Session 4: <i>What are unique concerns for well integrity in challenging environments?</i>	
12:10–12:20	Introduction and Session Charge	Doug Blankenship (US DOE/GTO)
12:20–12:35	Cementitious Materials for High-Temperature Geothermal Wells – Recent Advances and Future Challenges	Tatiana Pyatina (BNL)
12:35–12:50	Hydrogen Storage in Offshore Sandstone Reservoirs – SINTEF's HyStorm Project	Pierre Cerasi (SINTEF)
12:50–13:05	Casing Deformation at the Big Hill SPR Site	Barry Roberts (SNL)
13:05–13:25	Session 4: Q&A	Doug Blankenship (US DOE/GTO)
13:25–14:10	Guided Breakout Discussions	
14:10–14:20	Closing Remarks	Bob Dilmore (NETL)

# Geothermal

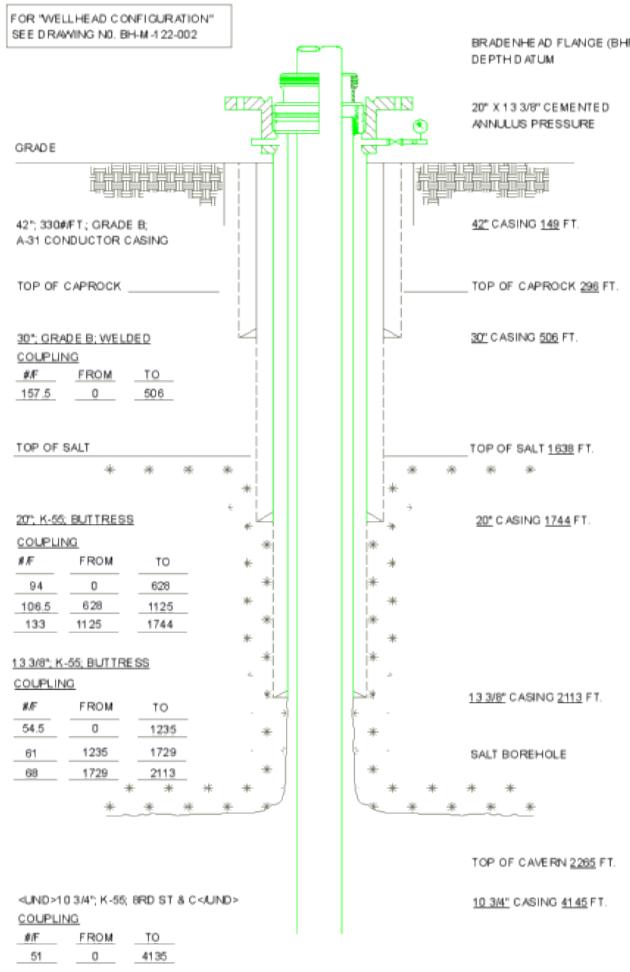


- Applications across temperature ranges and applications
- Temperature derating of casing
- Cement tolerance to temperature and chemistry
- Thermal Cycling
- Corrosive fluids – exotic materials
- All casing cemented to Surface
- Large diameters



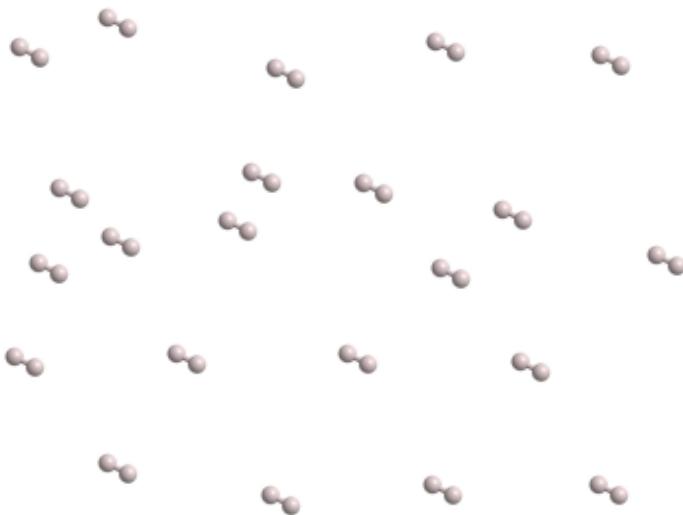
Courtesy of  
Steve Pye

# Hydrocarbon Storage



- Gas storage in salt beds/domes & depleted reservoirs/aquifer
  - ~400 facilities across in US, 80% in depleted reservoirs. Majority use repurposing of old wells ~80% constructed before 1980.
  - Post Aliso Canyon, there was a renewed emphasis on system integrity
    - Interagency Task Force on Natural Gas Storage Safety provided recommendations (to deal with the unique nature of reservoir storage operations)
- Liquid Storage largely in salt beds/domes –
  - SPR – USG ~700MMbbl, Private capacity, much on the surface, ~500MMbbl.
  - LOOP ~60MMbbl
  - Many failed efforts in mined HR caverns

# Hydrogen?



## Salt Cavern Storage

- Commercial today
  - A couple site for underground storage in US salt domes
  - Salt cavern storage in UK

## Reservoir

- Some pilot studies in sedimentary systems
- Look forward to hearing about the issues

- **Speculation of some issues**
  - Containment
  - Chemical - highly reactive & flammable
  - Biology
  - Compression costs/BTU
  - Casing materials

# Well Integrity Affects All

