



# UIC Program & Natural Gas Storage

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# Disclaimers

- This presentation represents the personal views of the presenter and does not represent the views of any Bryan Cave LLP client or any organization represented by the presenter.
- The information contained in this presentation is not intended to provide legal advice or to reflect conclusions of law based on a complete analysis of the statutes and regulations of the underground injection control program.
- This presentation was prompted by informal discussions at previous GWPC conferences indicating that state agencies have taken varying approaches to the regulation of underground injection associated with natural gas storage.

# Underground Injection Associated with Natural Gas Storage

- Under the Safe Drinking Water Act (SDWA) underground injection “means the subsurface emplacement of fluids by well injection.” 42 USC § 300h(d)(1)(A)
- The SDWA excludes the underground injection of natural gas for purposes of storage from the definition of underground injection. 42 USC § 300h(d)(1)(B)(i)
- Yet other types of underground injection associated with underground natural gas storage may fall under the Underground Injection Control (UIC) Program.
- This presentation addresses the other types of injection.

# Potential Scenarios for Injection Wells Associated with Cavern Storage

- Storage cavern creation (typically in salt domes or beds)
- Disposal of solution from storage cavern creation by injection into geologic formations
- Injection of brine fluid into storage cavern for
  - Pressure maintenance during production and storage cycling
  - Stabilization during abandonment
- Fluids injected for pressure maintenance or stabilization could be sourced from:
  - Storage cavern creation
  - Produced water from natural gas removed from storage
  - Natural brines from other sources

# Potential Scenarios for Injection Wells Associated with Porosity Storage

- Reinjection of fluids brought to the surface during normal gas recovery operations from porosity storage in depleted oil and gas reservoirs for:
  - Disposal in geologic formations
  - Pressure maintenance during storage and recovery cycling
  - Stabilization during abandonment
- Reinjection of fluids brought to the surface during normal gas recovery operations from porosity storage in non-hydrocarbon reservoirs for:
  - Disposal in geologic formations
  - Pressure maintenance during storage and recovery cycling
  - Stabilization during abandonment

# Potential Injection Well Classes

- Class I - disposal wells which inject fluids beneath the lowermost formation containing a USDW
- Class II - wells which inject fluids brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters
- Class III - wells which inject for extraction of minerals including solution mining of salts
- Class V – injection wells not included in another class

40 CFR § 146.6

# Criteria for Exempted Aquifers

Aquifer which cannot now and will not in the future serve as a source of drinking water because:

- It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.
- It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical.

40 CFR § 146.5

# Storage Cavern Creation

## Injection into salt formation to create a storage cavern

- If the salt produced from such an operation is sold, then an injection well used in such an operation is most likely to be permitted as a Class III solution mining well.
- If solutions from such operations are disposed or stored for future storage and recovery recycling operations and the injection well is used for the natural gas storage project, then the well could be considered to be exempt from the UIC program and the cavern creation process considered part of construction meaning that no UIC permit would be required
- Alternatively, such wells could be permitted as Class III wells during cavern creation and then converted to natural gas storage not subject to UIC program regulation

# Fluid Injection in Storage Caverns

- If fluid injection into storage caverns for pressure maintenance during storage and recovery cycling or for stabilization during closure and abandonment is done through the same wells used for natural gas storage and recovery, the wells may not be subject to regulation under the UIC program because they are considered to be natural gas storage wells.
- Alternatively, those wells – and any other wells used for such purposes – could be permitted as Class II wells used to inject fluids brought to the surface in conjunction with natural gas production (i.e., the recovery operation).

# Fluid Injection in NG Porosity Storage

- If fluid injection into storage reservoirs for pressure maintenance during storage and recovery cycling or for stabilization during closure and abandonment is done through the same wells used for natural gas storage and recovery, the wells may not be subject to regulation under the UIC program because they are considered to be natural gas storage wells.
- Alternatively, those wells – and any other wells used for such purposes – could be permitted as Class II wells used to inject fluids brought to the surface in conjunction with natural gas production (i.e., the recovery operation).

# Injection of Buffering Fluids for NG Storage

- Wells used to inject fluids from natural gas storage operations for future use for pressure maintenance or other purposes will most likely be permitted as Class II wells because the fluids are produced water from a natural gas storage operation involving gas recovery
- Alternatively, such wells may be permitted under Class V if the permitting authorities do not consider natural gas storage to be a production operation,
- It would be most sensible to have such wells under the same regulatory authority that permits natural gas storage at the state level, especially where the state has UIC primacy for Class II wells

# Disposal of Fluids from NG Storage

- In most cases, wells used for disposal of any fluids from natural gas storage operations are permitted as Class II, regardless of whether the fluids were used for cavern creation or for other purposes such as pressure maintenance. The fluid is considered to be produced water equivalent for regulatory purposes to produced water from other oil and gas operations.
- Some states have chosen to regulate such wells as Class I industrial disposal wells.
- Alternatively, such wells could be permitted as Class V wells, providing greater flexibility to tailor project permits.

# Summary and Conclusions

- Different states have taken different approaches to the permitting and regulation of injection wells associated with natural gas storage.
- Approaches have primarily been within the UIC program, but some limited approaches have been outside.
- It would be useful to conduct a comprehensive survey, especially as state programs for permitting and regulation of wells used directly for storage of natural gas are being updated.
- Primary focus should be on maintaining well integrity and natural gas containment.