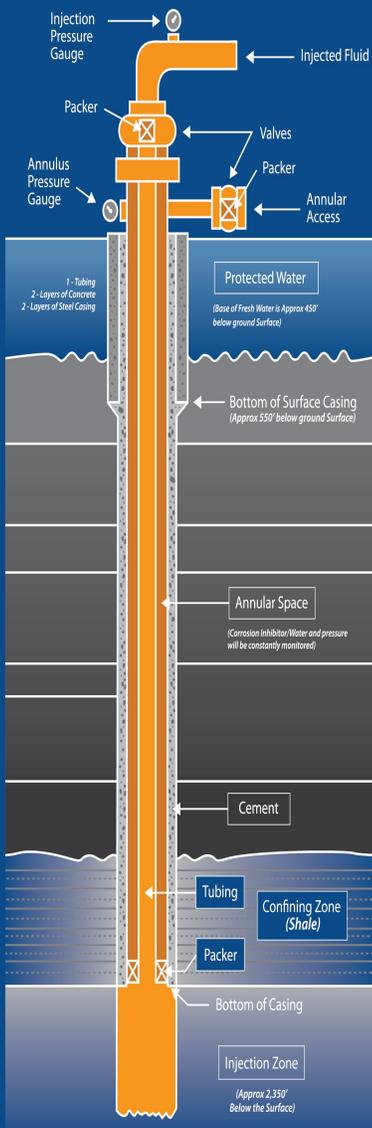


## Class IID Underground Injection Control (UIC) Wells

### What Should Pennsylvanians know?

#### CLASS II INJECTION WELL

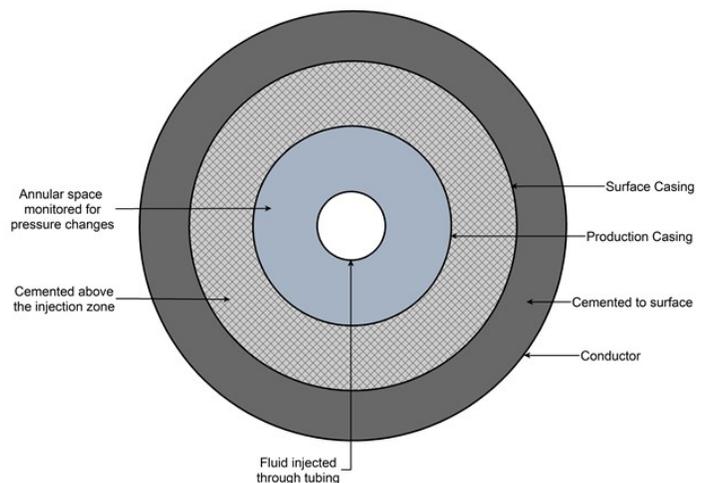


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#### What is a Class IID UIC Injection Well?

- It is a well that is designed, constructed, permitted and operated in accordance with US EPA (United States Environmental Protection Agency) regulations (Pursuant to the Safe Drinking Water Act). Injection wells are also known as “saltwater disposal wells” and “brine disposal wells.”
- Injection wells are deep wells that are constructed for the disposal of fluids well below any fresh water aquifers.
- UIC Class IID wells are used in conjunction with water treatment methods to manage oil and gas produced and development wastewaters.
- Class IID wells are used for the disposal of salt water (brines) and other fluids associated with oil and gas exploration and production.
- Class IID well depths typically range between approximately 2,000 feet to 8,000 feet deep.
- In some cases, depleted oil or gas production wells are converted to injection wells.
- Strict well monitoring protocols are required by EPA for operating these wells. Injection pressures and fluid volumes are some of the routine monitoring requirements during well use.

#### Plan View of UIC Class II Well



### What is being injected? What type of Rock formation is used for waste disposal?

- Brines and other fluids associated with oil and gas production.
- State and Federal regulations do not allow any fluids classified as hazardous waste to be disposed in Class IID wells.
- Injection zones are typically certain sandstone units with a demonstrated porosity to accept fluids.
- Formations chosen for injection zones are covered by low permeable beds or cap rock, like shales, that confine liquids injected into the porous beds.
- Host rock formations selected for injection have very high naturally occurring saline fluids, concentrations that exceed 10,000 mg/L Total Dissolved Solids (TDS), which exceed drinking water standards for TDS.

### How are Fresh Water Aquifers Protected?

- Class IID wells require at least four layers of protective steel casing and cement through the fresh water aquifer zones, which isolate waste fluids from drinking water aquifers.
- Injection zones are always below a layer of low permeable bedrock units (cap rock), intended to keep the fluids trapped deep in the porous formations below.
- Routine monitoring and compliance reporting is required. Both the US EPA, and the Pennsylvania Department of Environmental Protection (PADEP) have the enforcement authority to assure corrective action is implemented if warranted.

### Why do Oil and Gas Companies use Injection Wells? Why do some use Injection Wells as opposed to recycling and reuse?

- The US EPA and state regulatory authorities identify underground injection as the most environmentally sound method for disposal of water generated from oil and gas well drilling, completions and production.
- Treatment plant operators have certain criteria for treatment of incoming water.
- Not all waste water meets the requirements and is more suitable for injection well disposal.
- Recycling is only effective while rig activity is high and the reuse water can be returned to a well site for a new completions activity.
- Injection wells are an economical method of disposal for waste water resulting from oil and gas production and have proven to be a safe alternative for managing drilling and production wastes for decades.

