

# Class V Wells



Underground Injection  
Control Program



June 5, 2018  
Denver, CO

# Outline

- Groundwater Vulnerability
- Class V Well Defined
- Managing Class V Wells
- Class V Rule
- Assessing Endangerment



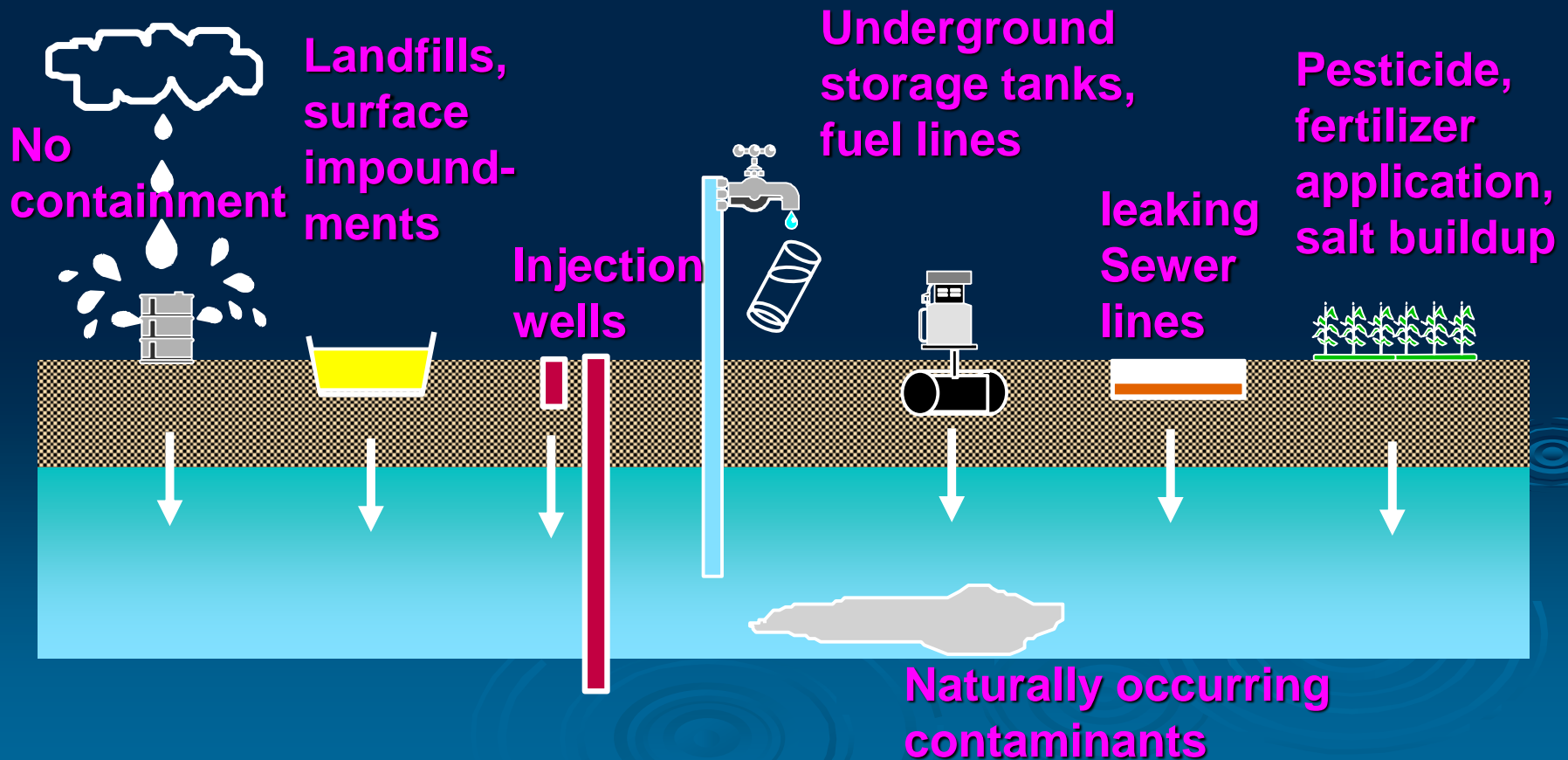
# Groundwater Use



Groundwater provides a source of drinking water to 37% of the public water systems in the United States and > 98% of rural residents.

(USGS, 2010)

# Pathways for Ground Water Contamination

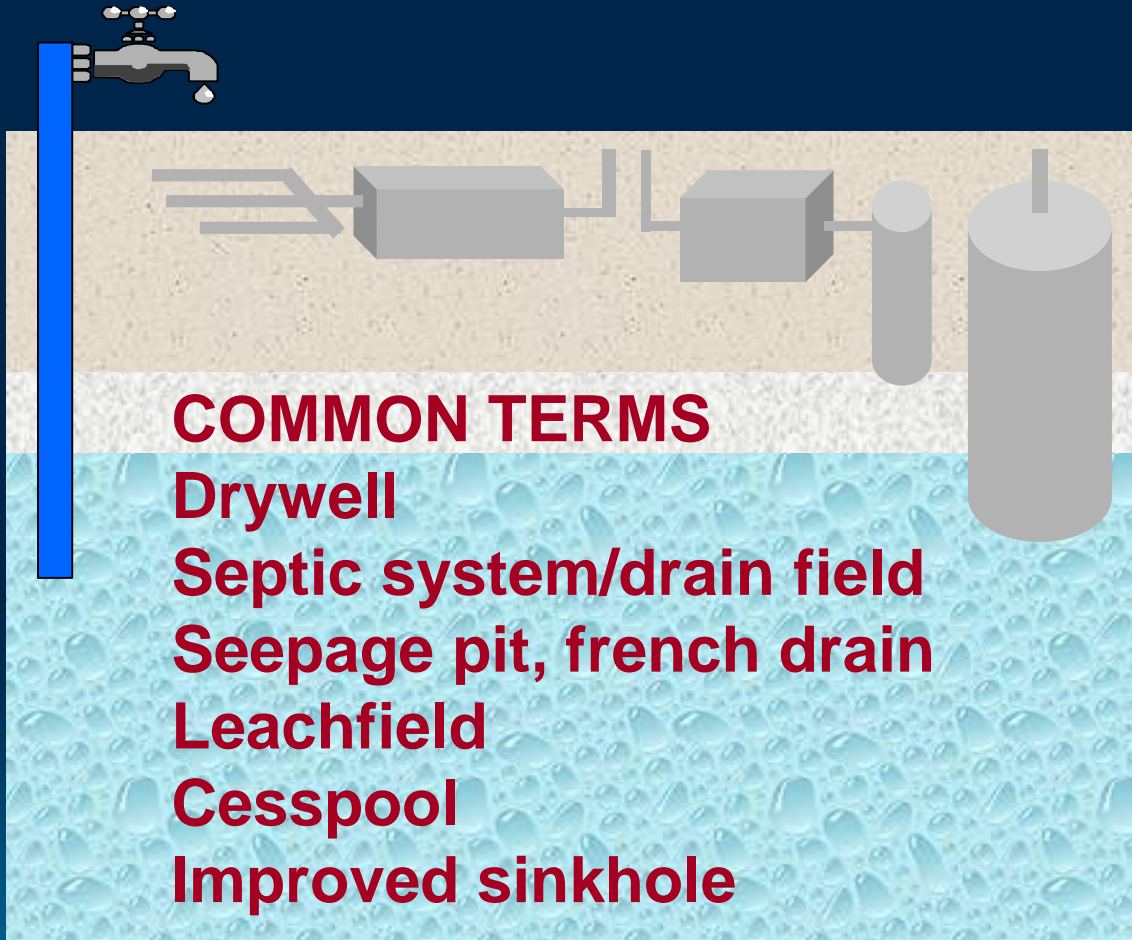




# WHAT ARE CLASS V INJECTION WELLS?

- **Class V:** Injection wells that are not Class I-IV or VI
- **Well:** A bored, drilled, or driven shaft, or a dug well or dug hole where the depth is greater than the largest surface dimension; or an improved sinkhole; or a subsurface distribution system
- **Well injection:** Subsurface emplacement of fluids through a well
- 2017 National Class V inventory: 520,000 wells

# Shallow Injection Wells



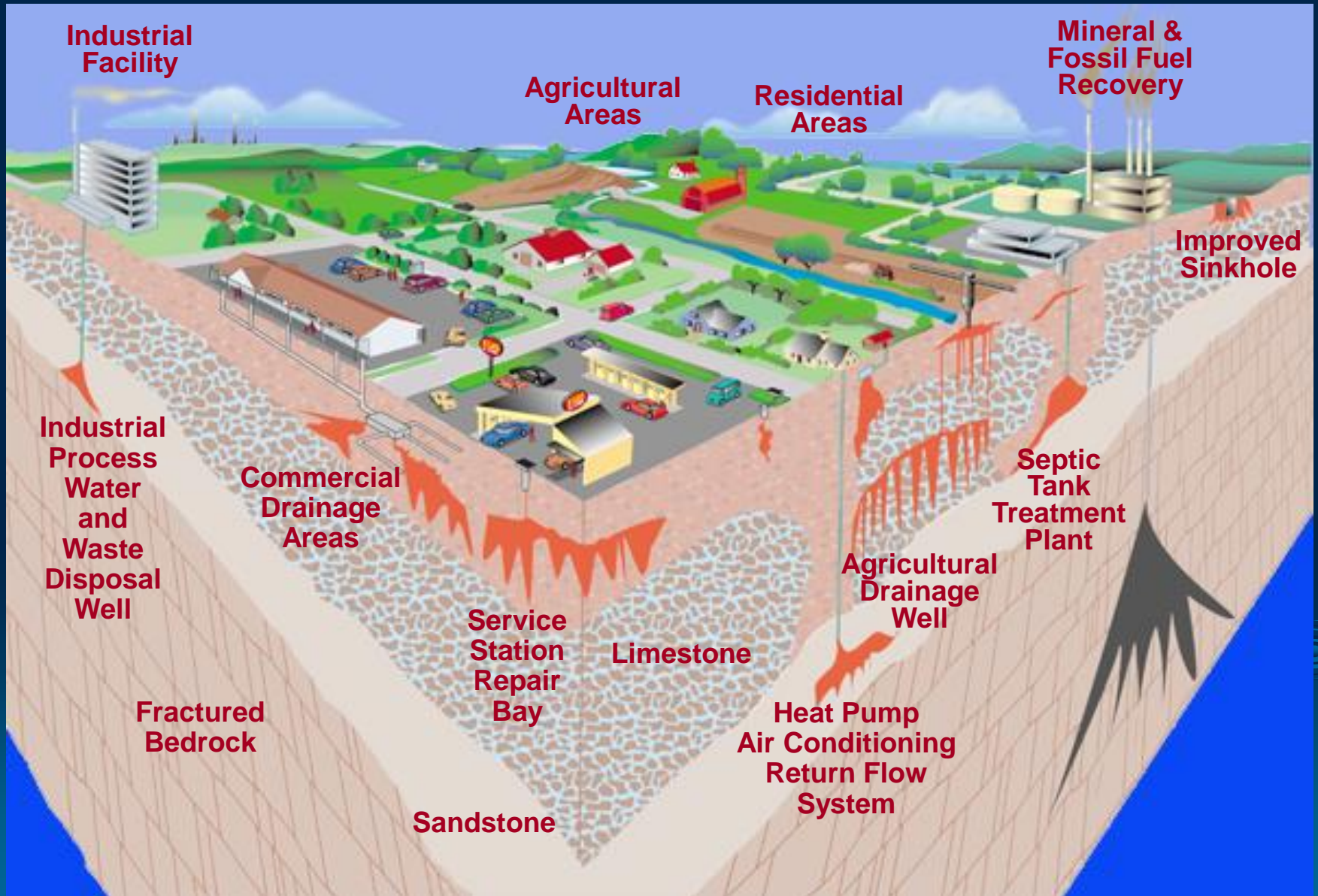
- Usually occur in unsewered areas
- Intended to allow fluid to percolate into or above shallow groundwater.

# Types of Injection Wells

- 5A19 cooling water return (specify contact or non-contact)
- 5A5 geothermal reinjectate
- 5A6 geothermal heat source
- 5A7 heat pump/AC return flow
- 5A8 geothermal aquaculture
- 5B22 Saline Barrier/Intrusion Barrier
- 5D2 Stormwater drainage (precipitation, exterior wash only)
- 5D3 improved sinkhole
- 5D4 Stormwater combined with industrial or commercial process fluids
- 5F1 Agricultural drainage
- 5G30 Special drainage (define)
- 5N24 radioactive waste disposal wells
- 5R21 Aquifer Recharge, drinking water storage
- 5S23 Subsidence control
- 5W9 Septage disposal wells
- 5W10 Cesspools **BANNED**
- 5W11 Septic System
- 5W12 Wastewater Treatment Plant Effluent
- 5W20 Combined sewage/ industrial waste discharging to cesspool or septic system
- 5W31 septic system with seepage pit/drywell disposal
- 5W32 Community leachfields, lagoons, or other effluent dispersal methods
- 5X13 Mining Backfill Well
- 5X14 Solution Mining Well
- 5X15 In-situ Fossil Fuel Recovery
- 5X16 Brine Return Flow
- 5X17 Air Scrubber Waste
- 5X18 Water Softener regeneration
- 5X25 Experimental Technology
- 5X26 Aquifer Remediation
- 5X27 Other (define)
- 5X28 Motor Vehicle Waste disposal **BANNED**
- 5X29 Abandoned drinking water wells used for disposal

- Drainage Wells
- Geothermal Reinjection Wells
- Domestic Wastewater Disposal Wells
- Mineral and Fossil Fuel Recovery Related Wells
- Industrial/Commercial/Utility Disposal Wells
- Recharge Wells
- Miscellaneous Wells

# Class V Wells





# Dry Well



# Drain Field





# Infiltration Gallery



# “Shallow” is not the same as Class V

- Not all Shallow Injection Wells are Class V Wells
  - Class IV wells are usually shallow, inject hazardous waste, and are prohibited unless part of an approved remediation activity
- Not all Class V Injection Wells are Shallow
  - Geothermal energy production wells are one example of “deep” Class V wells



# How to Identify a Class V Well

- Where are the waste fluids going?

Class V: septic, dry wells, cesspools, french drains

Not Class V: city sewer, lake, stream, ponds, lagoons

- What type of waste fluids is being disposed?

Class V: agricultural or industrial fluids, storm water, washwater

Not Class V: sanitary waste only (unless LCSS)

# Class V Wells ?



# What's in the Waste?

## Waste types

- Sewage or sanitary waste
- Animal waste
- Industrial or automotive waste
- Agricultural waste
- Storm water runoff

## Potential contaminants

- Pathogens, nitrate, phosphorus
- Pathogens, medicines, insecticides, nitrate
- Fuel, waste oil, solvents, metals
- Pesticides, fertilizers (NO<sub>3</sub>), pathogens, fuel
- A little bit of everything it touches

# Facilities With Class V Wells

- Automotive
- Manufacturing
- Service



- Groundwater remediation wells
- Earth Coupled heat pumps
- Large septic systems ( $\geq 20$  persons)

# MANAGING SHALLOW WELLS

- 40 CFR 144.12 Prohibition to Endanger  
Does not allow the movement of fluid containing any contaminant into USDWs, if the presence of that contaminant may cause a violation of any primary drinking water regulation or adversely affect public health.



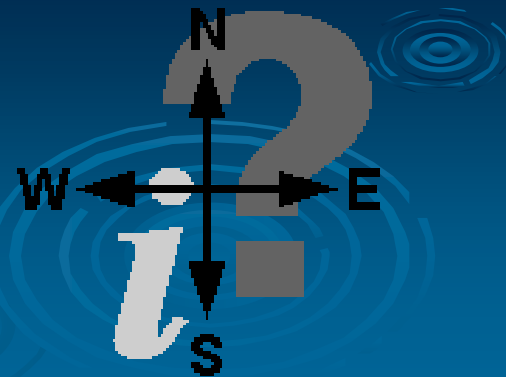
# MANAGING SHALLOW WELLS

- All wells are subject to the non-endangerment standard
- All wells must submit basic inventory data
- Authorization by Rule: permit not required if comply with basic requirements
- Permit: EPA may require permit or order action to prevent endangerment
- Well Closure: Potential Endangerment/Compliance Evaluation
- Enforcement EPA can require additional information to determine compliance



# Requiring Other Information

- EPA can require additional information to determine compliance
  - Water Supply Monitoring
  - Injection fluid characterization
  - Other
    - Septic Pumping Records, Waste Manifest, Sewer Bills, etc...



# Authorization by Rule

- **Shallow injection wells are in compliance with UIC regulations if:**
- **They have fulfilled inventory requirement**

And



- **They have determined their discharge is nonendangering**



# Permitting

- A permit may be required:
  - Director's discretion
  - Compel Compliance
  
- Types:
  - Individual permit
  - Area permit



# Permit Requirements for Shallow Injection Wells

- Fluids must meet the MCL at the point of injection
- Facility must follow BMPs
- Facility must monitor to ensure compliance of injectate and sludge with the MCLs



# Class V Exclusions

- Individual or single-family residential waste disposal systems (cesspools or septic systems)
- Non-residential cesspools or septic systems if receive only sanitary waste and serve fewer than 20 people per day or 2000 gallon/day
- Dug holes not used for subsurface fluid emplacement

# Class V Ban (Dec 7, 1999)

## ➤ Large Capacity Cesspools (LCCs)

**Definition:** typically dry wells that receive sanitary waste from multiple dwellings and community or regional establishments.

## ➤ Motor Vehicle Waste Disposal Wells (MVWD wells)

**Definition:** receive or have received fluids from vehicular repairs or maintenance activities, such as auto body repair, automotive repair, car dealerships, or other vehicular repair work.

# Class V Ban (Dec 7, 1999)

- Ban new motor vehicle waste disposal wells and new and existing large capacity cesspools nationwide.

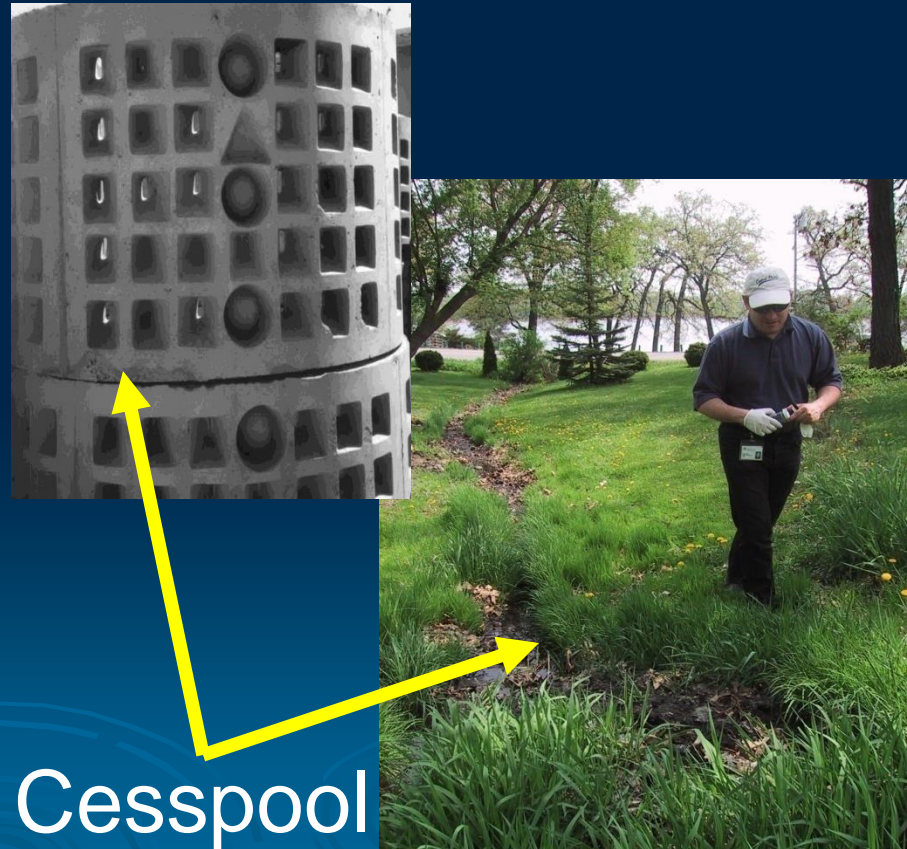
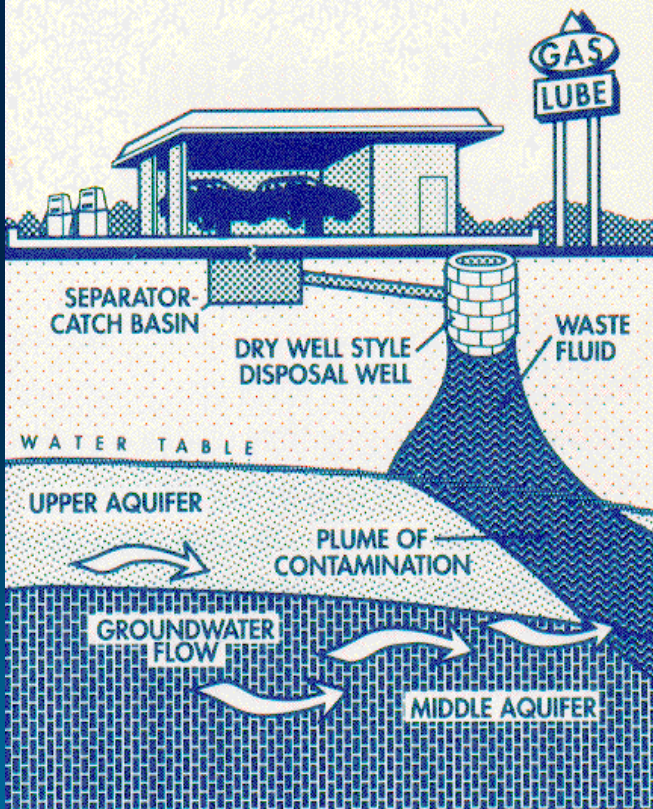
# Large Capacity Cesspools

- New Large Capacity Cesspools BANNED effective April 5, 2000
- Existing Large Capacity Cesspools closed by April 5, 2005
- There are no extensions available to well owners and operators.
- Pre-closure notification: owners or operators must notify EPA 30 days prior to closing



# Banned Shallow Injection Wells

Does your facility generate automotive service wastes?



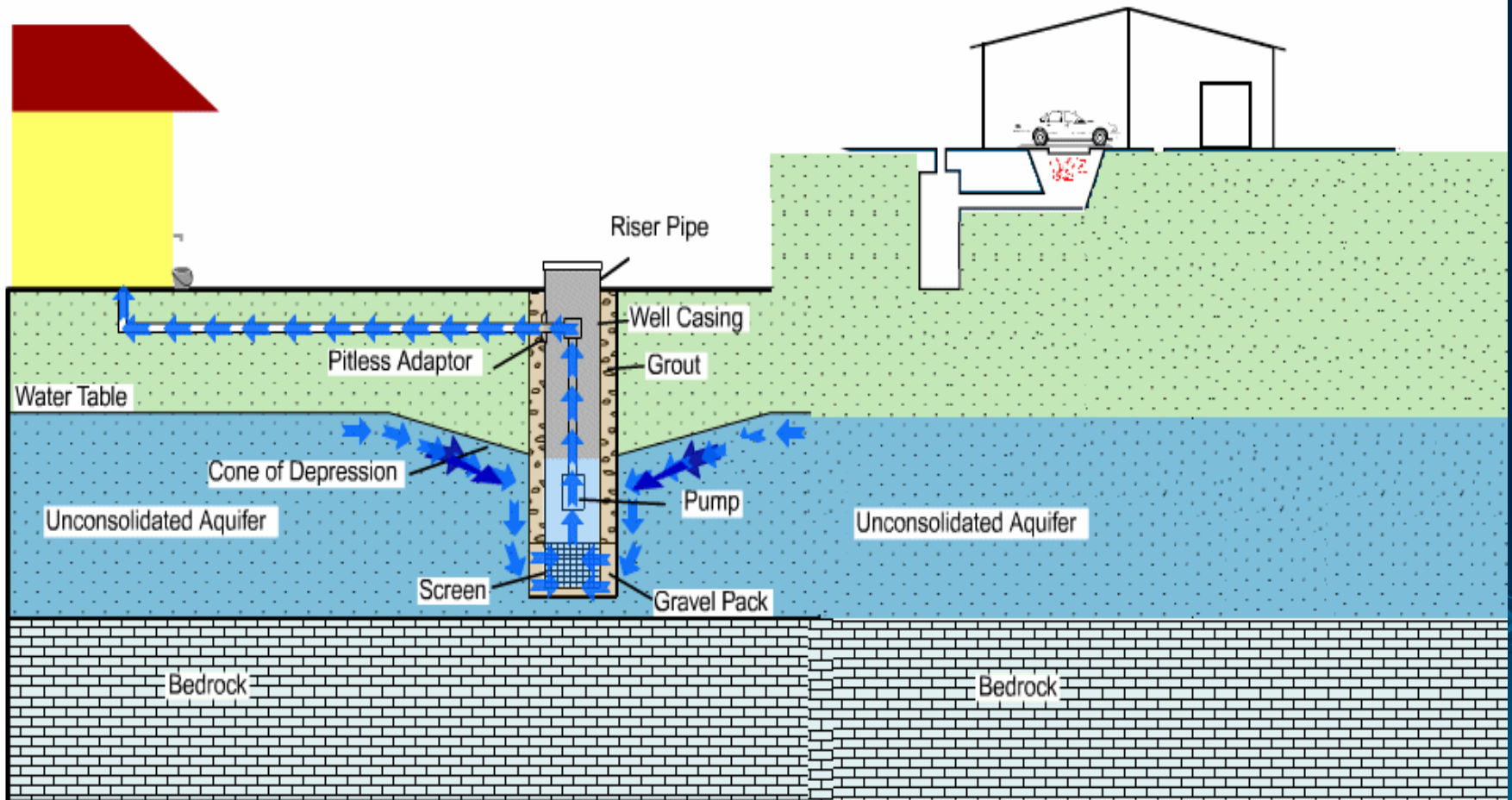
Cesspool

# Motor Vehicle Waste Disposal Well

- New MVWD wells are BANNED nationwide, effective April 5, 2000.
- Existing MVWD in ground water protection areas and other sensitive ground water areas allowed to seek a waiver from the ban and obtain a permit by January 1, 2007
- Pre-closure notification: owners or operators must notify EPA 30 days prior to closing.

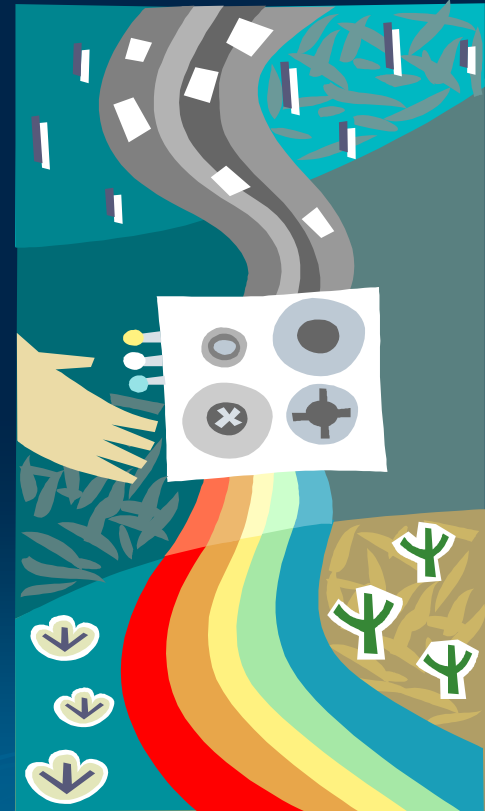


# Endangering Shallow Well



# What Happens to Waste on the Way Down the Drain?

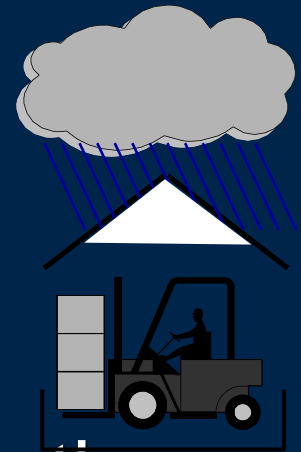
- Mixing
- Dilution
- Physical treatment
- Biological treatment
- Chemical treatment



# Risk Considerations

## (Endangerment Potential)

- What is in the injectate (toxicity, concentration, volume)
- Site practices
- Depth to ground water
- Groundwater protection areas and other sensitive ground water areas
- Soil type and interaction with injectate
- Proximity of drinking water wells
- Determination about rule authorization may change if site conditions change



# Key Provisions

- Groundwater is a vital source of public and private drinking water supplies.
- Groundwater is highly vulnerable to surface sources of contamination.
- UIC Role: Groundwater / Human Health Protection
- Preventative Program
- Minimize Endangerment



# Questions?

