



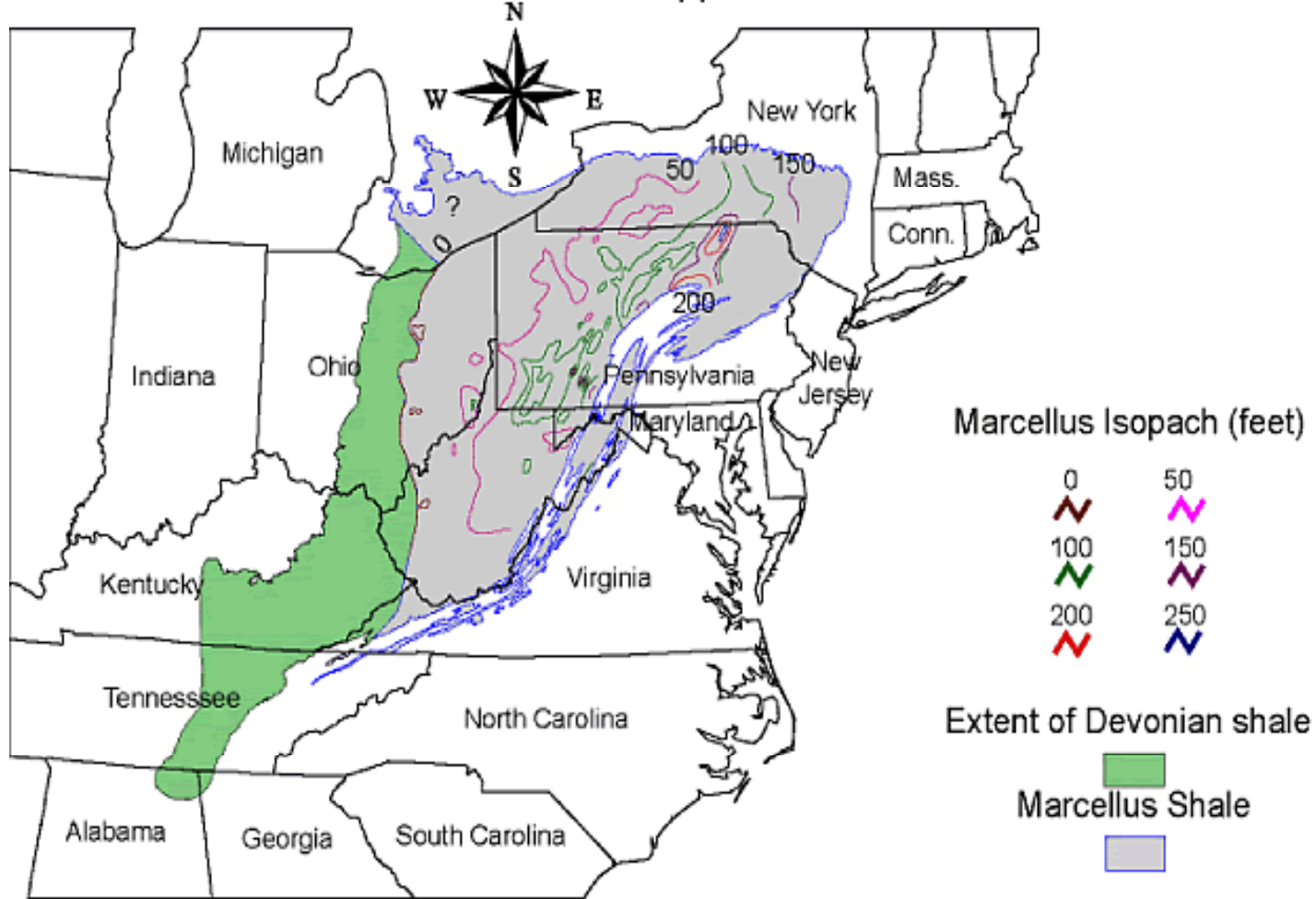
The Marcellus Shale

Drilling and Water Resource Impacts

S. Stephen Platt

EPA Underground Injection Control National Expert

Distribution of Marcellus Shale in Appalachian Basin



Milici, 2005

Major Issues: Marcellus Shale Development

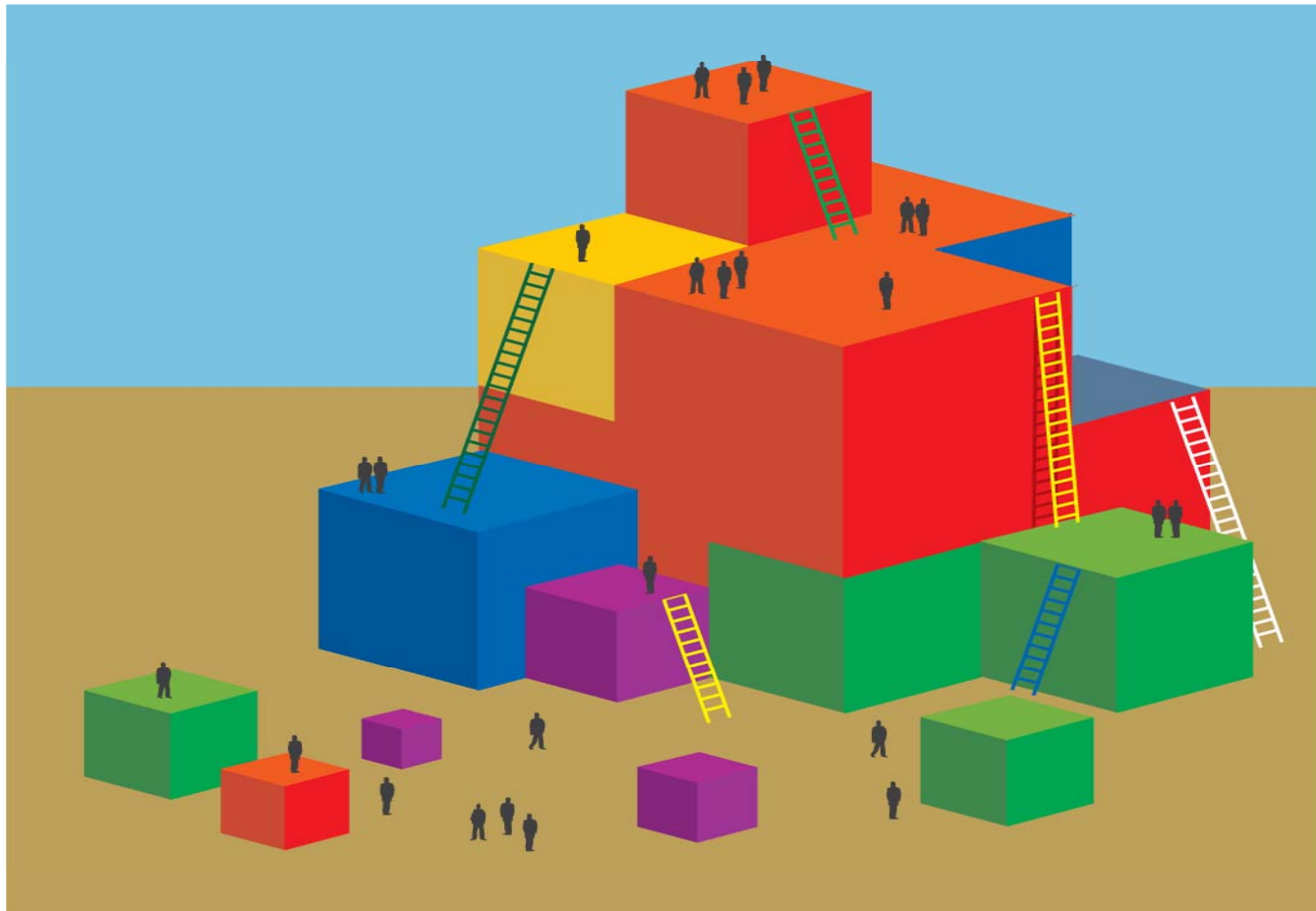
1. Regulatory

2. Water Management

3. Research

“Everything’s Connected To Everything Else”

Barry Commoner



Regulatory Issues

- Basin Commissions
- State
- Local
- EPA
- Others

Water Management Issues

- **Drilling and Well Development**

Water withdrawal, where and how much? Will it effect wildlife habitat?

- **Water Discharge**

Are treatment plants the answer? Downstream WQ?

- **Treatment and Reuse of Frac Water**

Where will the solids go? What's in the residual waste?

- **Disposal**

Is underground injection the answer?

Research Issues

- Water Chemistry
- Water Reuse and Treatment
- Saline Reservoirs
- Reservoir Capacity
- Who will Conduct/Cost?

Where Will EPA Be Investing A Significant Amount Of Its Time?

1. Coordination

2. Underground Injection Control Program

- Regulates the subsurface disposal of fluids
- Protects underground sources of drinking water

UIC Program History

- Regulations authorized under the Safe Drinking Water Act
- National concerns regarding unregulated injection
- Protects USDWs from all types of injection
- UIC program regulations promulgated in July, 1980
- EPA Region III begins direct implementation of Pennsylvania program June, 1985

EPA UIC Permitting

- Mandate to protect underground sources of drinking water (USDWs)
- USDWS defined as having less than 10,000 mg/l Total Dissolved Solids
- Current and future use protected

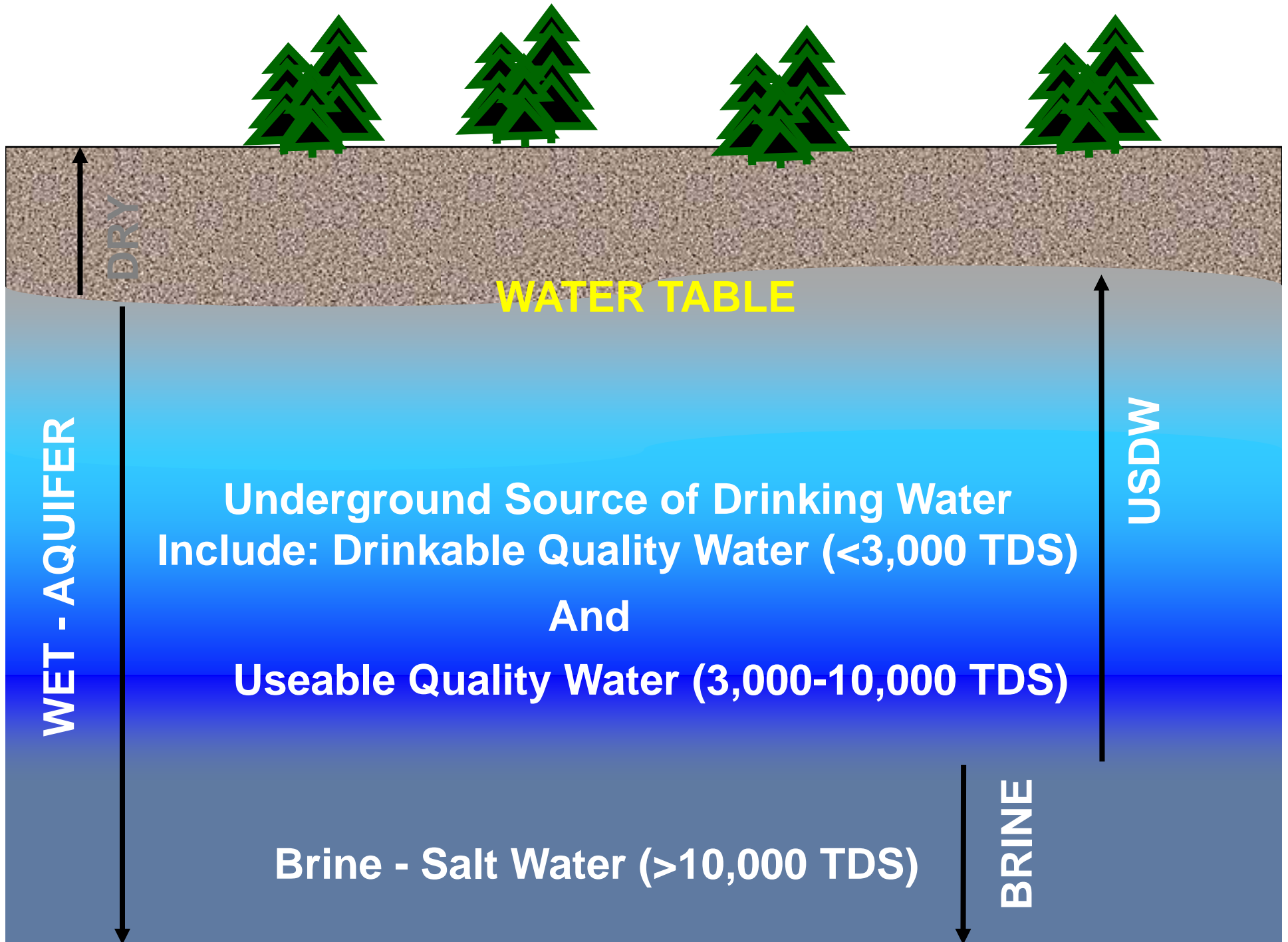
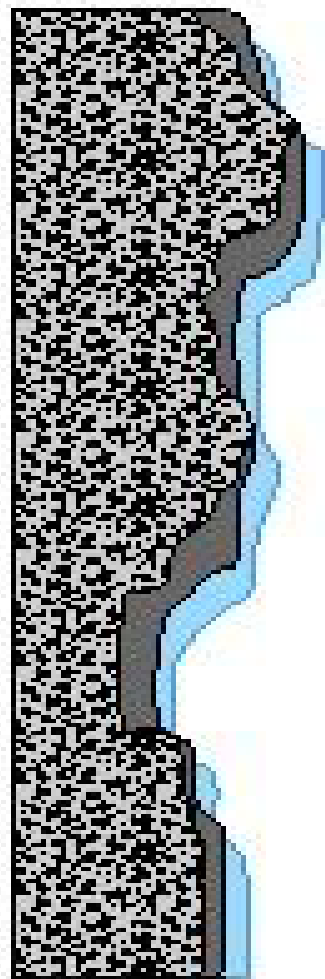
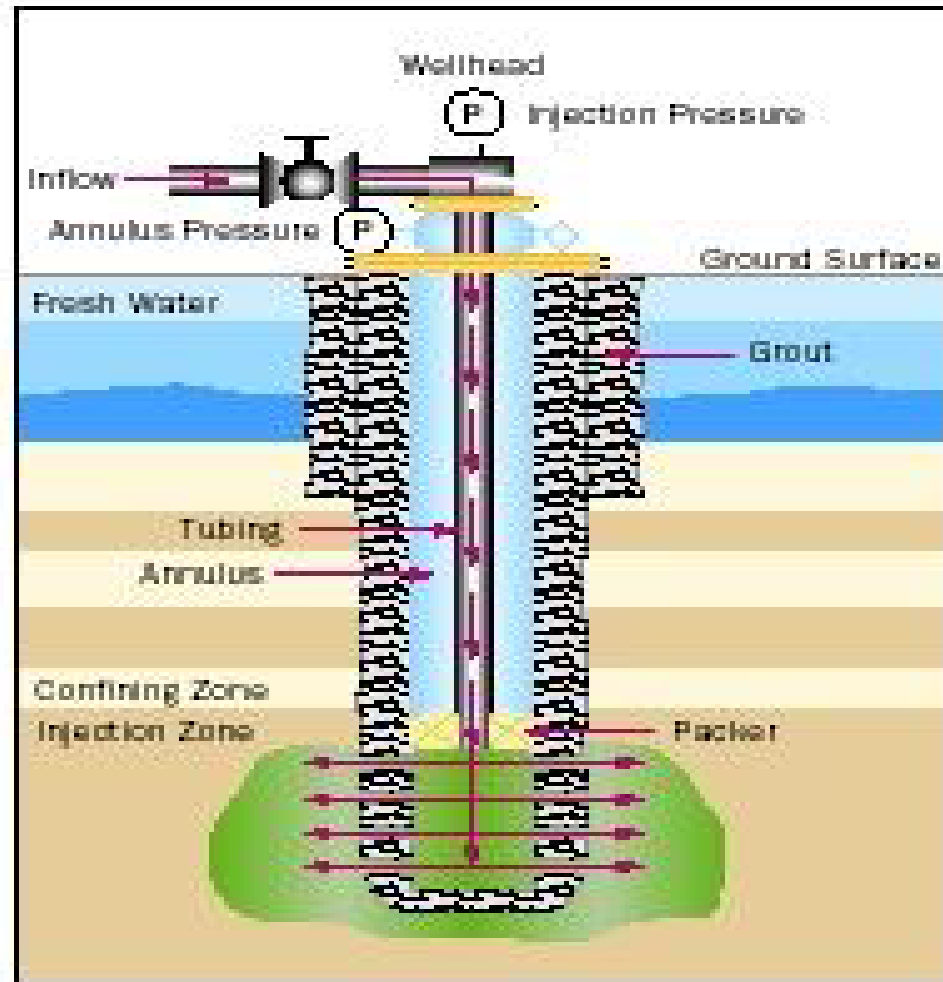


DIAGRAM OF INJECTION WELL



Typical Injection Well



SOURCE: Adapted from the National Energy Technology Laboratory.

Brine Disposal in Pennsylvania

| • | <u>Facility Name</u> | <u>County</u> | <u>Injection Formation</u> | <u>Injection Pressure</u> | <u>Injection Volume (Bbls/M)</u> |
|----------|-----------------------------|----------------------|-----------------------------------|----------------------------------|---|
| • | Columbia Gas | Beaver | Huntersville/Oriskany | 1300 | 21,000 |
| • | EXCO-North Coast | Clearfield | Oriskany | 3240 | 4260 |
| • | CNX Gas | Greene | Mine Void | 0 | 150,000 |
| • | Great Lakes Energy* | Erie | Gatesburg | 1570 | 20,000 |
| • | Linn Operating | Indiana | Balltown | 1930 | 3600 |
| • | Cottonwood | Somerset | Oriskany | 3250 | 27,000 |
| • | EXCO-North Coast | Clearfield | Oriskany | 1450 | 4200 |
| • | Dominion | Somerset | Huntersville/Oriskany | 3218 | 30,000 |

* Only commercial facility

Questions?

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