



Saltwater Disposal and Other “Hot Issues” in Urban Drilling

by Robert C. Grable

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ATTORNEYS AT LAW



Concentration

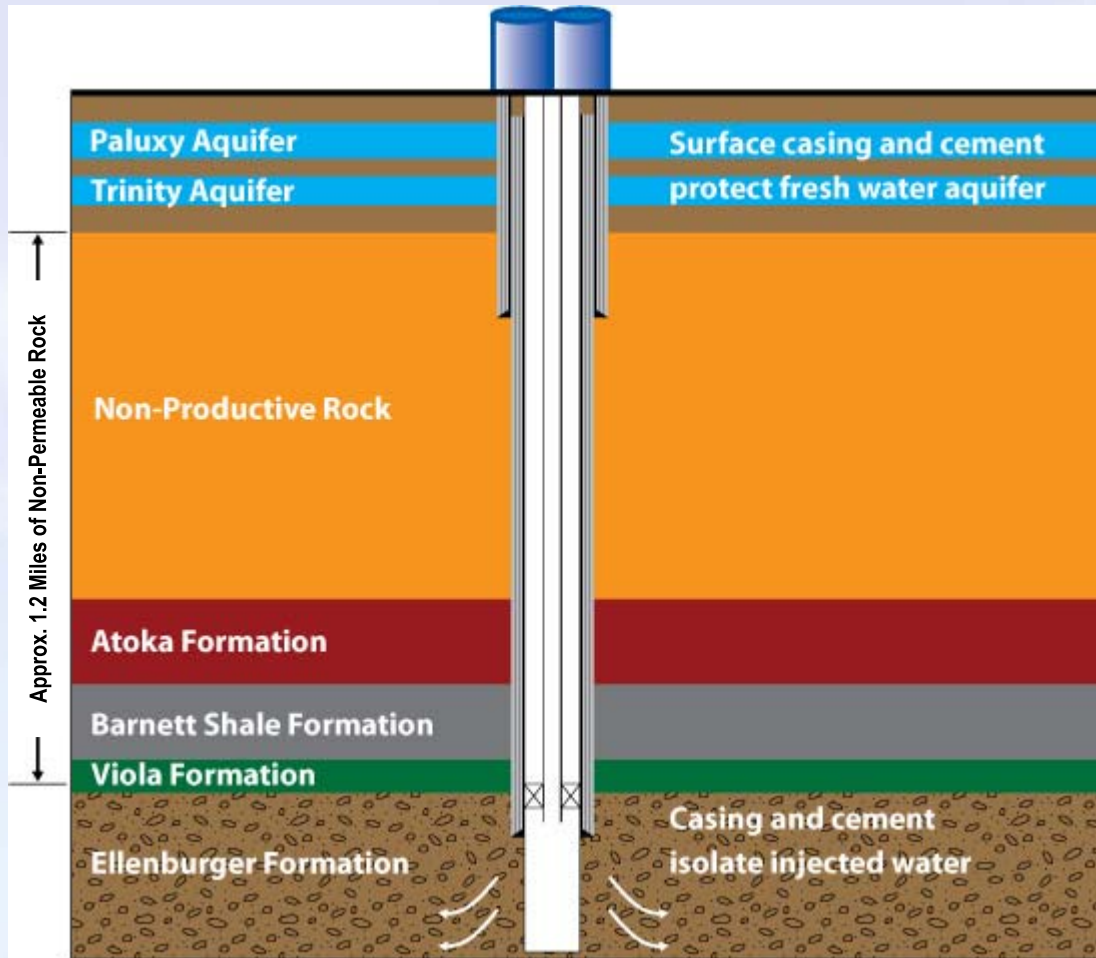
Expressed in Parts Per Million (PPM)

	CHLORIDES	TDS
❖ FRAC FLOWBACK WATER/SEAWATER	20-30,000	40-50,000
❖ PRODUCED WATER	70,000	150,000

Alternatives

- ❖ Water disposal needed for water produced with natural gas
- ❖ Only viable method today is underground injection
- ❖ Recycling not an option
 - Can handle only flowback of frac water (5% of stream)
 - Technology does not exist for produced water from Barnett (140,000+ ppm TDS)
 - All recycling requires disposal of concentrated brine byproduct

SWD Well Schematic



Texas Railroad Commission Monitoring & Testing

- Drilling & Completion
 - Casing
 - Cementing
 - Tubing
 - Packer
- Testing Prior to Service
 - Cement Bond Log
 - Pressure Testing
- Operations
 - Continuous Monitoring
 - Annual Integrity Testing
- Reporting
 - Prior to Placing in Service
 - Monthly
 - Injection Date
 - Pressure
 - Volume

Safety - Wellbore

- ❖ Surface casing run 250' below all groundwater sands as required by TCEQ water board letter
- ❖ Surface casing cemented back to surface
- ❖ Production casing cemented back to surface in three stages (TRRC: 600' above shoe or 600' above top of shallowest productive horizon)
- ❖ Over 1.2 miles of non-permeable rock between the groundwater sands and the Ellenberger formation
- ❖ Injection limited into the Ellenberger formation at approximately 7,600' sub-surface
- ❖ Packer located at just above Ellenberger top (TRRC: less than 100' from formation top)
- ❖ Internally coated tubing to prevent corrosion
- ❖ Mechanical integrity testing annually (TRRC: 5 years)
- ❖ Pressure monitored continuously (TRRC: monthly)

Safety - Pipelines

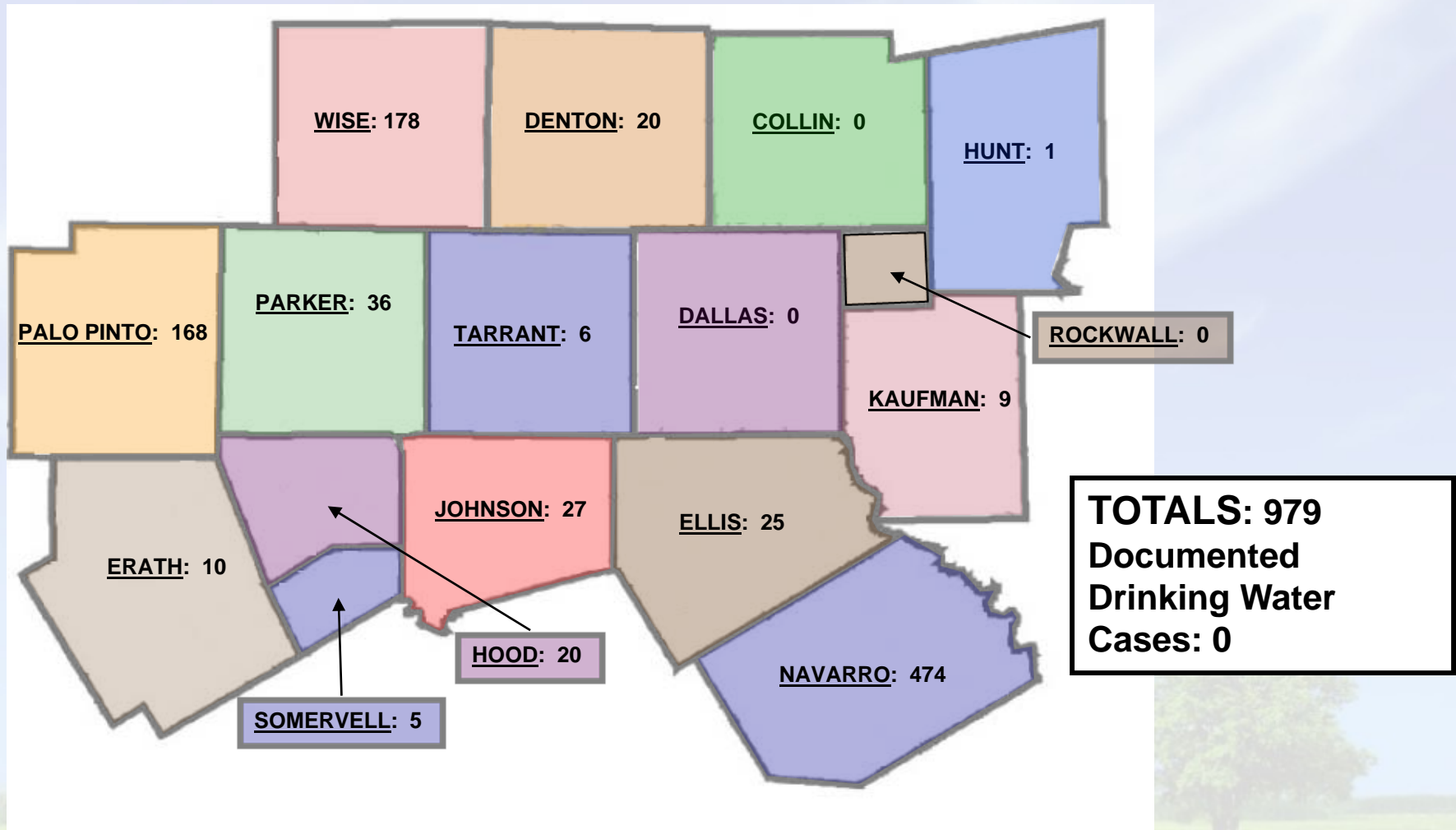
- ❖ Transporting produced water via pipelines will reduce truck traffic
- ❖ Corrosion resistant construction (basalt lined polyethylene pipe)
- ❖ Pipe rated for 300 psi, typical operating pressure of 100 psi
- ❖ Buried at least three feet underground
- ❖ Frequent check valves for isolation
- ❖ Monitor flow with mass-balance calculations (leak detection)
(volume out = volume in)
- ❖ State-of-the-art controls to monitor and detect pressure (leak detection)
- ❖ Annual pressure testing of system
- ❖ Monthly calibration and service of flow meters

Injection and Disposal Wells in Texas

"Texas is the nation's number one oil and gas producer with more than 216,000 active oil and gas wells statewide. Injection and saltwater disposal wells are also located statewide to safely dispose of the produced water and frac fluid from these oil and gas wells. Texas has more than 50,000 permitted oil and gas injection and disposal wells."

Documented drinking water issues: **0**

Injection and Disposal Wells in Surrounding Area



Injection and Disposal Wells in Municipalities

	Injection and Disposal Wells	Producing Wells	Related Groundwater Issues?
Oklahoma City, OK	123	5,855	No
Houston, TX	46	3,178	No
Long Beach, CA	891	5,050	No
18 Other Texas municipalities	506	11,016	No

Justification

- ❖ Reduce number of total truck miles on FW city streets by 75%
- ❖ Reduce emissions from truck traffic by 75%
- ❖ Reduce truck traffic congestion
- ❖ Reduce road repairs
- ❖ By reducing total truck miles, improve the safety of city and improve air quality

Street Damage from Trucks Already a Problem

BARNETT SHALE

City not collecting for road damage

Fort Worth hasn't taken action to collect for repairs, saying in part it would be too difficult to prove which company was responsible.

By MIKE LEE
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The western stretch of Old Weatherford Road in Parker County is marked with signs reading "Use Caution. Trucks Damaging Roadway."

There are dozens of natural gas wells along Old Weatherford Road, and each one requires dozens of trucks. The traffic has caused the shoulders of the road to crumble in places, pocked the surface with potholes and left stretches coated with caliche mud from drill pads.

Parker County Commissioner Jim Webster recently billed three gas companies a total of \$265,000 for the damage.

The road "looked like it'd been hit by a bomb," Webster said.

No one has tried to collect for damage on the eastern side

More on ROADS on 5B



A sign warns drivers of road damage from heavy trucks on Farm Road 3325 in the Azle area.

STAR-TELEGRAM/RODGER MALLISON