

EPA Actions on Induced Seismicity

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The U.S. Environmental Protection Agency - Region 6
Water Quality Protection Division



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Induced Seismicity Presentation

- EPA's Authority
- Our History of Involvement
- EPA National Technical Workgroup
- Summary Points



EPA's Authority



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Safe Drinking Water Act

- Authorizes the Federal Underground Injection Control (UIC) program
- Requires protection of Underground Sources of Drinking Water
- Requires development of UIC regulations
- Establishes options for state UIC program delegation



UIC Injection Well Classes

- I. Industrial or municipal deep wells
 - o Non-hazardous & hazardous
- II. Oil and gas related deep wells
- III. In-situ mining wells
- IV. Shallow hazardous waste wells (banned)
- V. Wells not included in Classes I-IV
 - o Geothermal, experimental, and other wells
- VI. Geosequestration wells

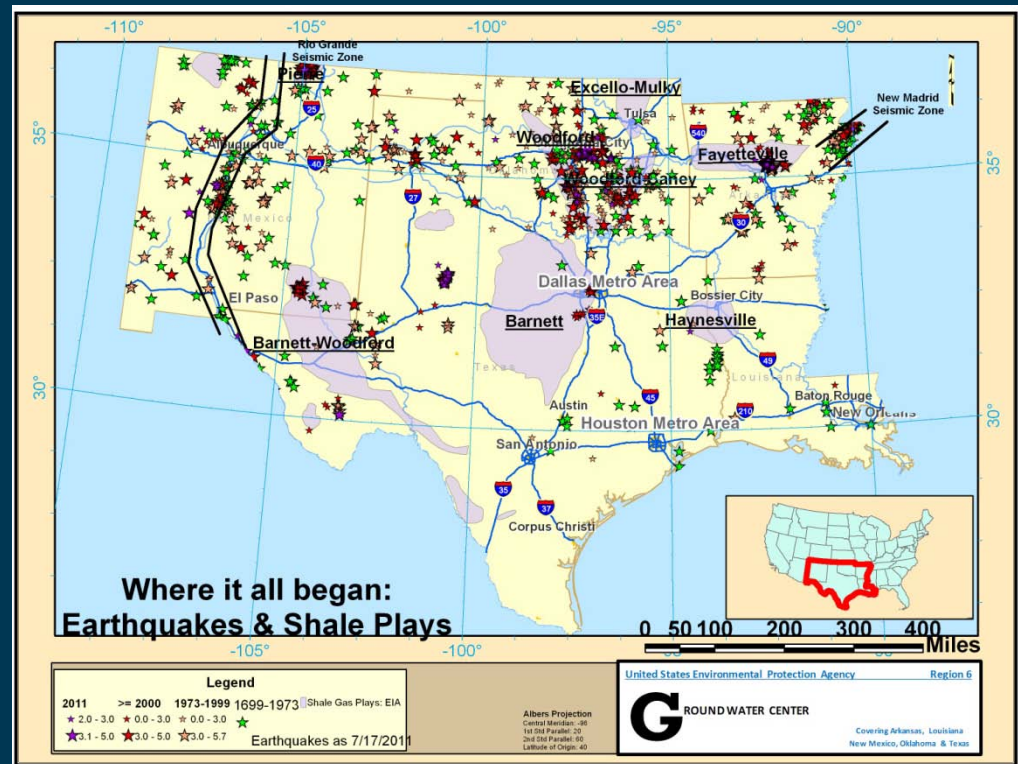
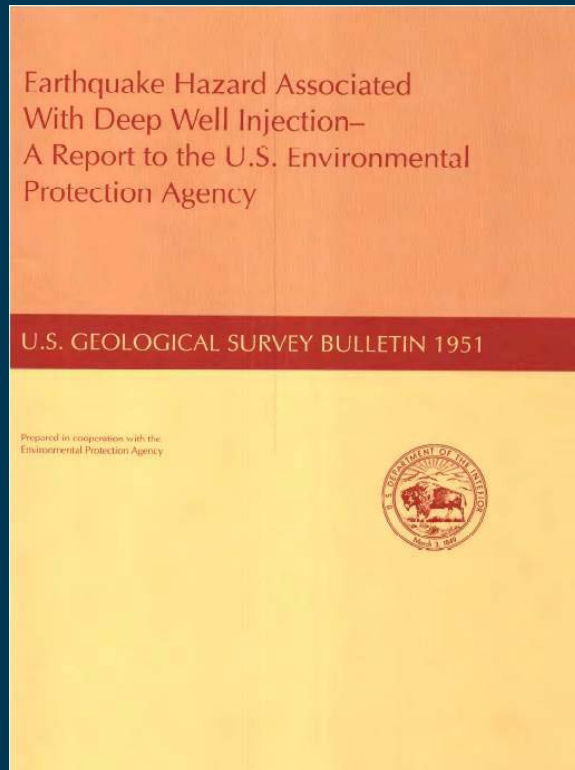


UIC Seismicity Related Regulations

- Siting & testing requirements
 - Class I Hazardous
 - Class VI Geosequestration
- All classes: Director discretion
- Class V Geothermal – no specific rules
 - DOE guidelines in-progress



EPA's History of Involvement



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EPA Involvement – Induced Seismicity

- 1990 USGS report in cooperation with EPA
- Tracking seismicity events & State responses
 - North Texas & Arkansas
- Response to citizen complaints
- EPA/ORD National Hydraulic Fracturing (HF) Study excludes seismicity
 - HF generally yields microseismicity; -2 to +1 mag.
- Established project under national workgroup



EPA National Technical Workgroup

UIC NATIONAL TECHNICAL WORKGROUP PROJECT TOPIC: #2011-3

Technical Recommendations to Address the Risk of Class II Disposal Induced Seismicity

Background

Recent reports of injection-induced seismicity have served as a reminder that the UIC Program can and should implement requirements to protect against significant seismic events that could ultimately result in USDW contamination. The UIC Program's Class I hazardous and Class VI siting provisions require rigorous evaluations for seismicity risks. The other well classes, in contrast, allow the UIC Director the flexibility to decide if and when such evaluations are needed. In light of the recent earthquake events in Arkansas and Texas, the UIC National Technical Workgroup (NTW) will develop technical recommendations to inform and enhance strategies for avoiding significant seismicity events related to Class II disposal wells.

Project Objectives

The UIC NTW will analyze existing technical reports, data and other relevant information on case studies, site characterization and reservoir behavior to answer the following questions:



EPA Induced Seismicity Workgroup

- **Task: Develop technical options to assist regulators in managing seismic risks**
 - Timeframe: June to December 2011
 - Region 6 assigned lead
 - Workgroup representatives from EPA HQ, various EPA Regional offices and State agencies



EPA Induced Seismicity Workgroup

- Final product by end of 2011
- Limited to Class II disposal wells
- Established six part strategy



Seismicity Workgroup Strategy

- 1) Literature review
- 2) Three case studies
 - North Texas; Central Arkansas; & Braxton Co., West Virginia
 - Engage researchers
 - Request specific information from operators

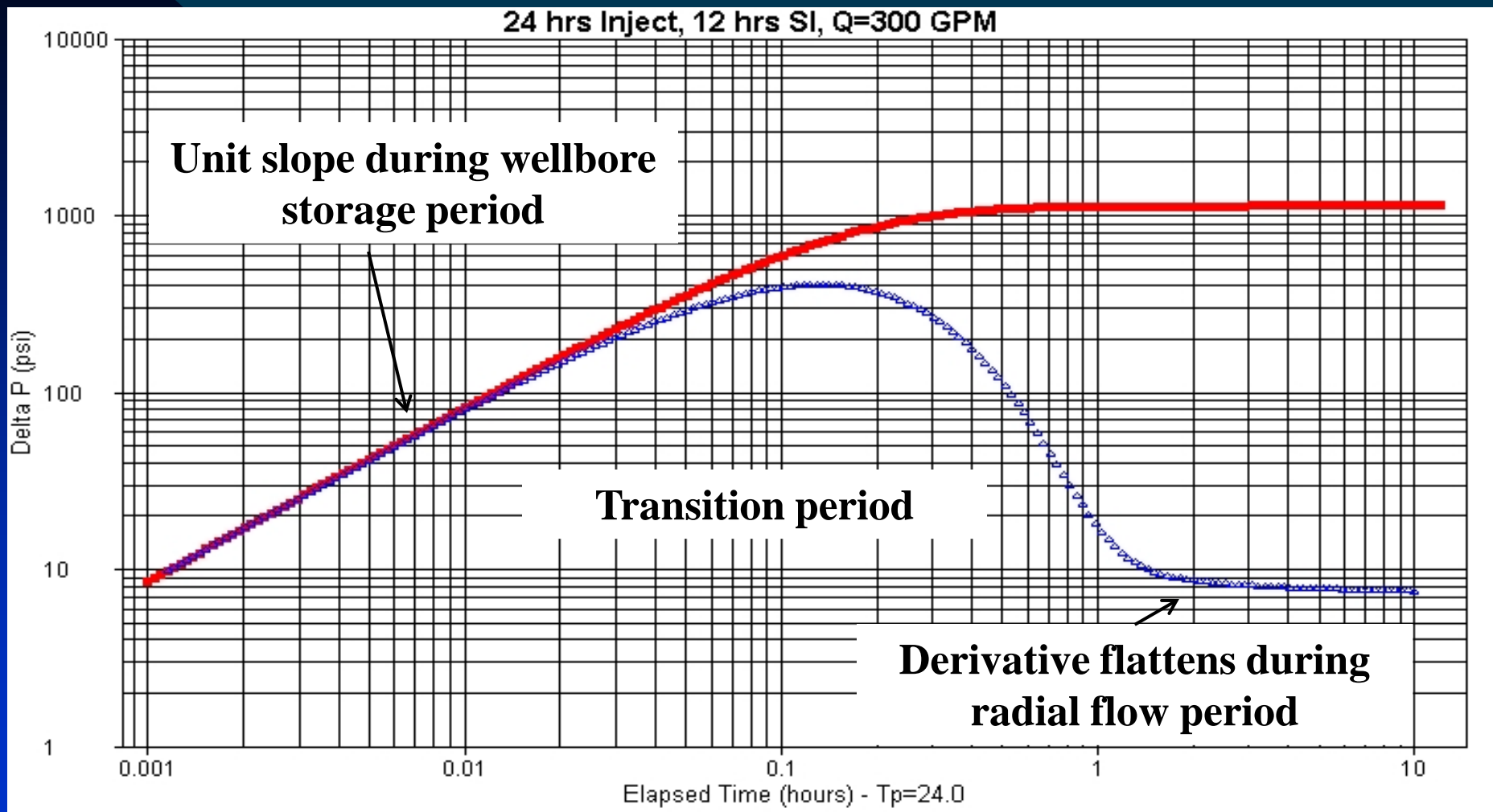


Seismicity Workgroup Strategy

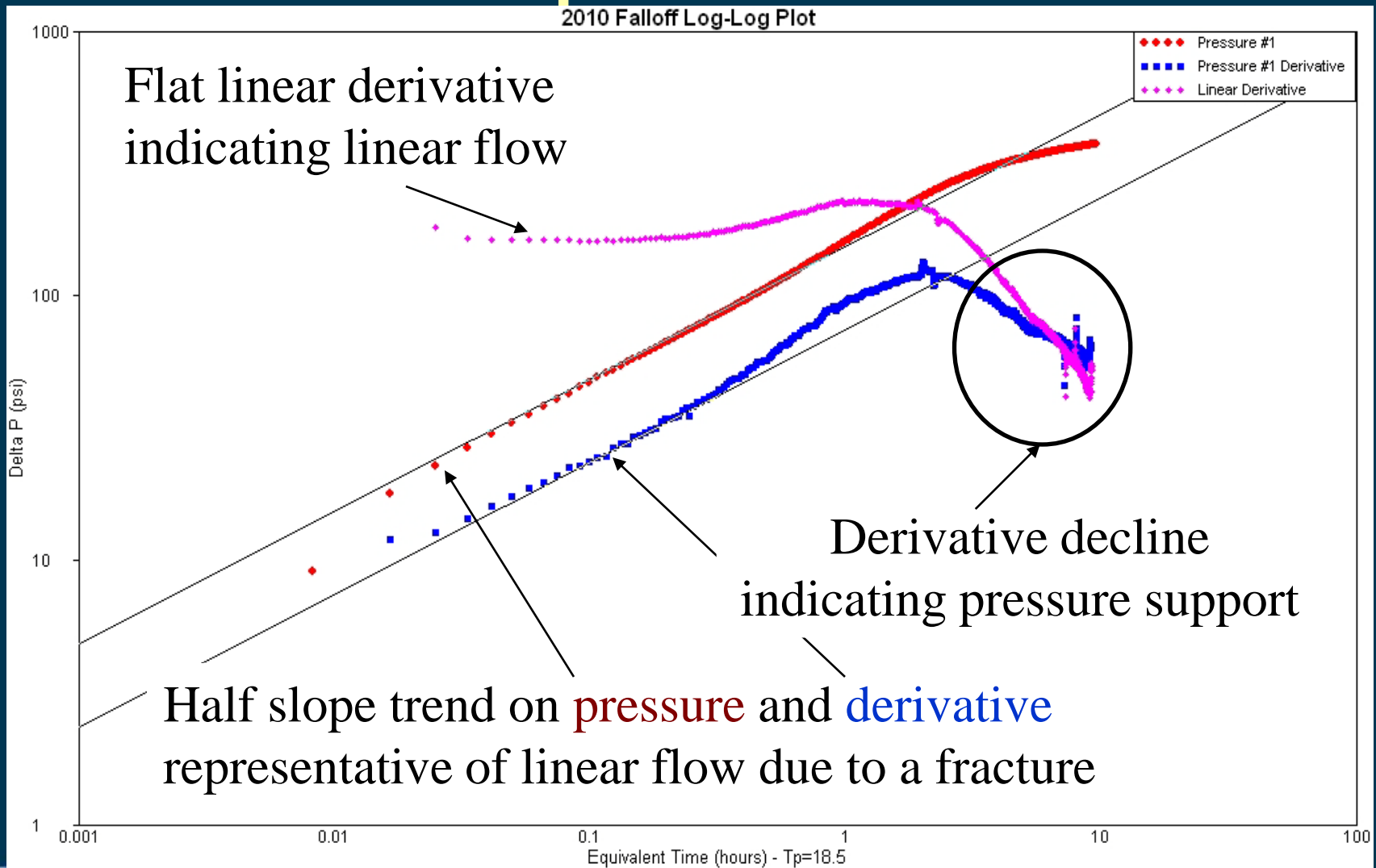
- 3) Explore reservoir engineering approaches
 - Industry & regulatory experience
 - Pressure transient test analysis
 - Operational injection data evaluation



Log-Log Plot of a Disposal Well Exhibiting Radial Flow



Falloff Test from Suspect DFW Area Disposal Well



Seismicity Workgroup Strategy

- 4) Partner with USGS seismologists
- 5) Develop decision tree
 - Practical application
 - Investigate potential regulatory tools
 - Provide rational approach with options
- 6) Solicit peer review

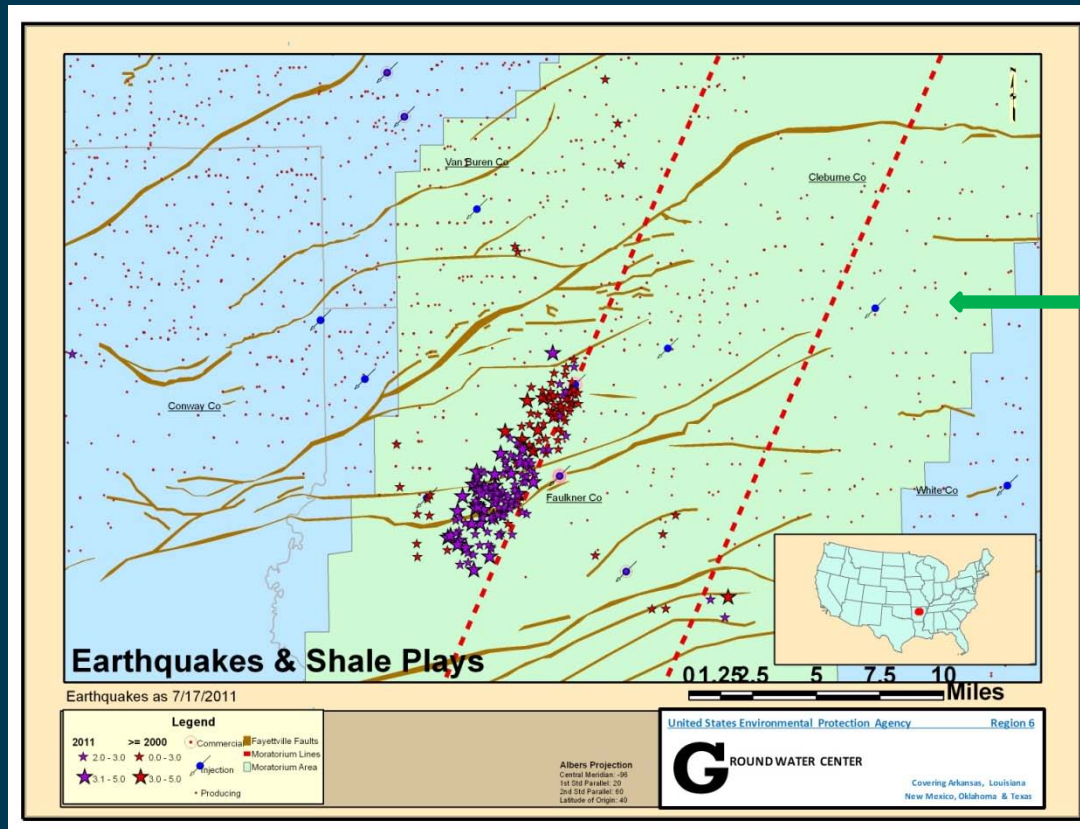


UIC Seismicity Summary

- Existing UIC authority to address risks
- EPA developing a strategy with options for UIC programs to manage seismic risks
 - Risk assessment of seismic events
 - Based on actual injection details
 - Coupled with geologic interpretation
- Product based on existing knowledge level



Induced Seismicity Summary Points



Arkansas
Moratorium
area



Questions?



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