Presentation:

How Should Regulations Address Frac Hits

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LSU Law

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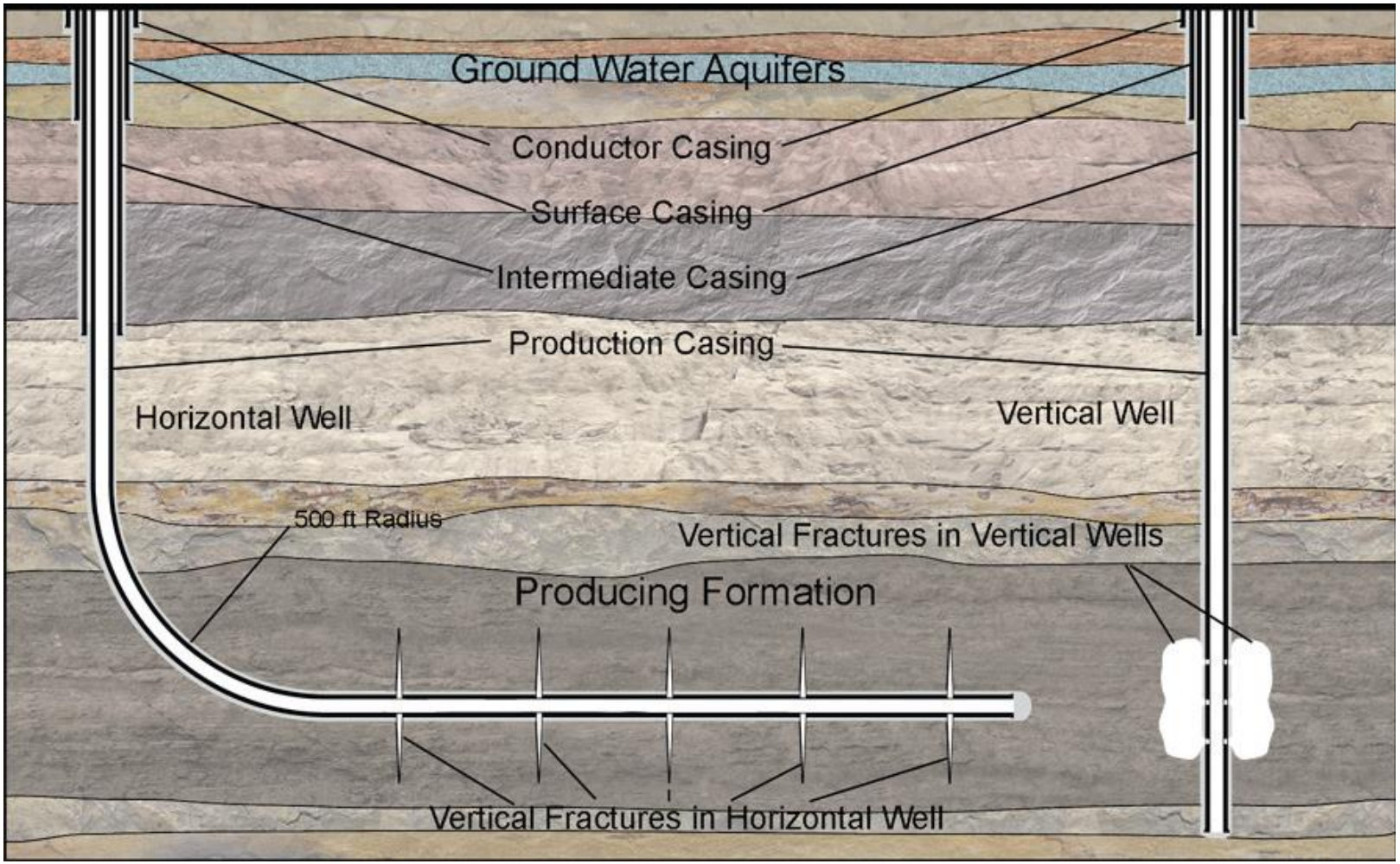
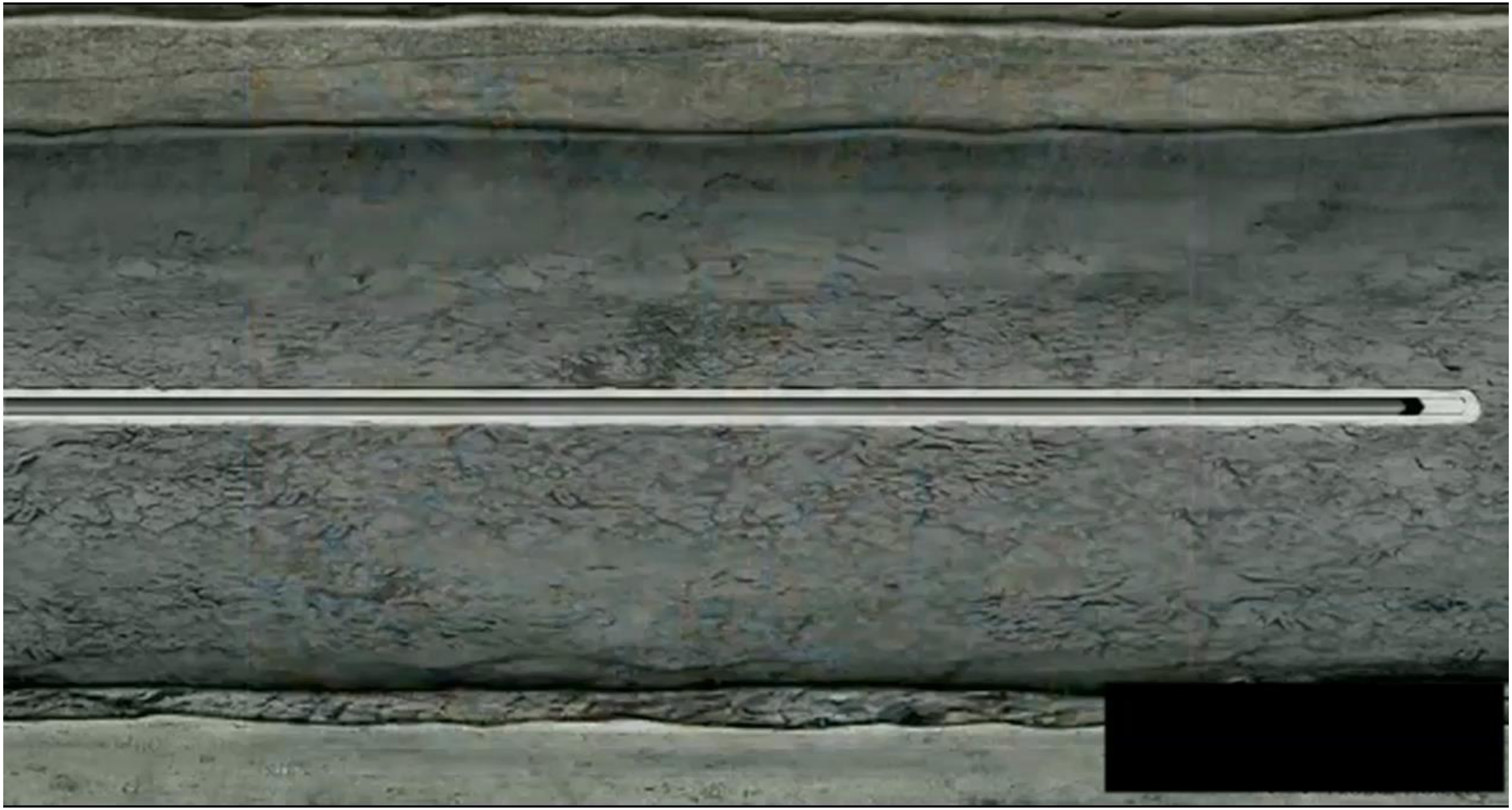
Fracturing in Horizontal Wells



Multi-Stage Fracturing in Horizontal Wells

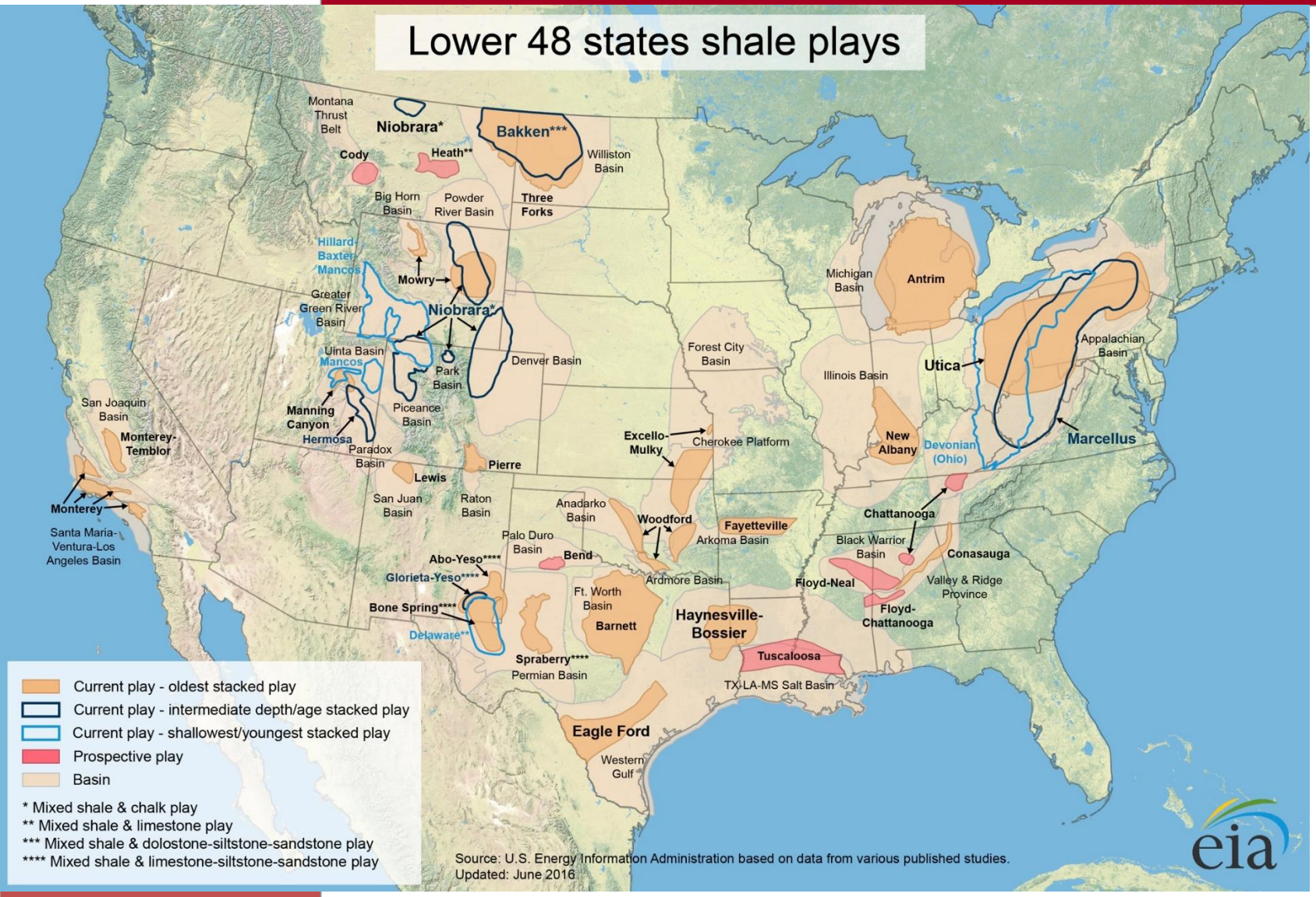


Average Completion Intensity Metrics for Horizontal Shale Wells

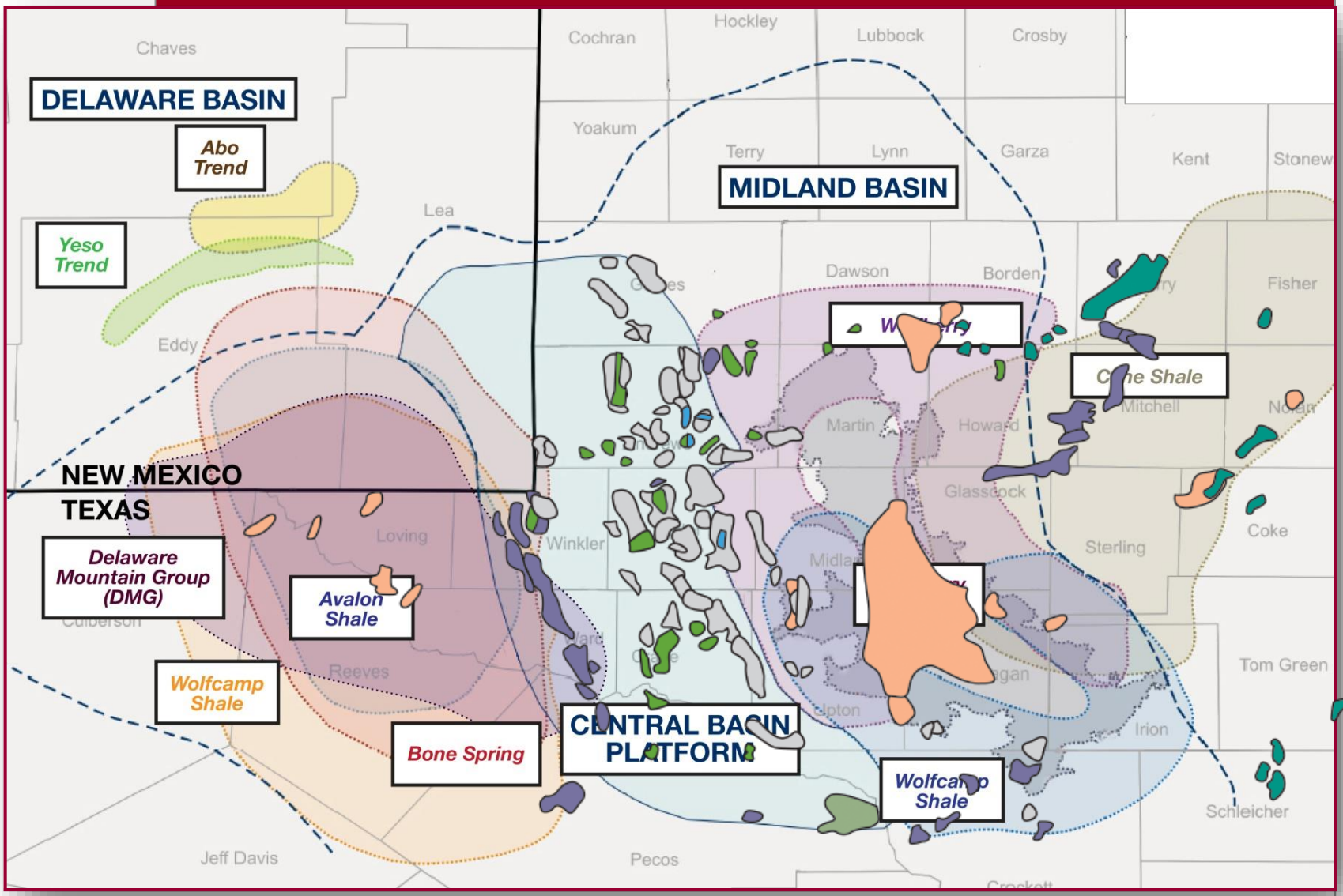
	Permian Basin			Rest of US Shale Oil		
	2014 Q1	2017 Q1	CAGR	2014 Q1	2017 Q1	CAGR
Perforated lateral (ft)	5,913	7,551	8%	6,396	7,705	6%
Proppant per well (thousand lbs)	6,285	14,553	32%	5,046	10,261	27%
Frack Fluid per well (thousands of gallons)	6,888	16,422	24%	5,082	9,114	22%
Proppant intensity (lbs/ft)	1,063	1,927	22%	789	1,332	19%
Fluid Intensity (bbl/ft)	28	52	23%	19	28	14%

Oil & Gas Financial Journal (June 2017)

Major Shale Formations in Lower 48 States

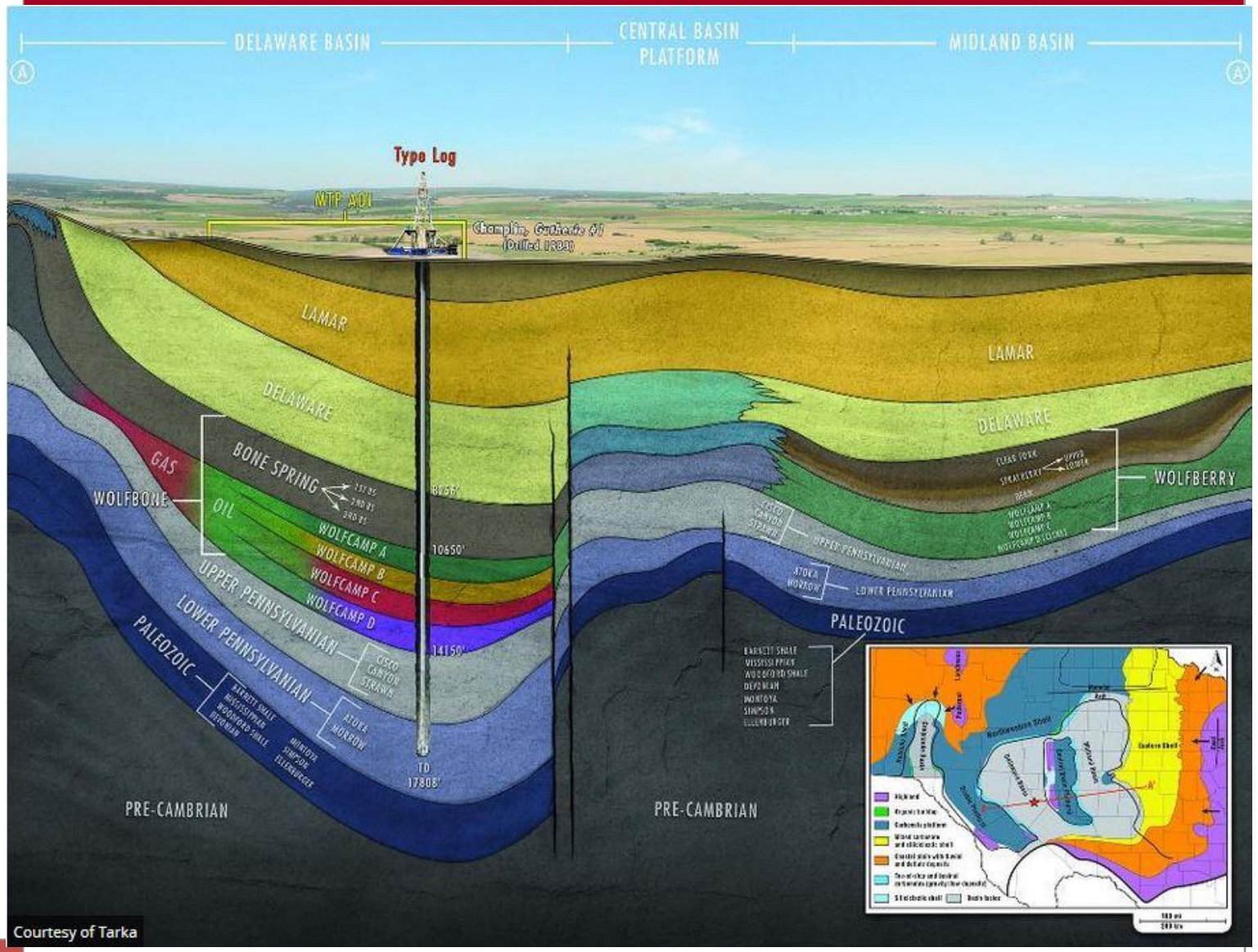


Permian: Historic Conventional Formation and the Underlying Shale Formations



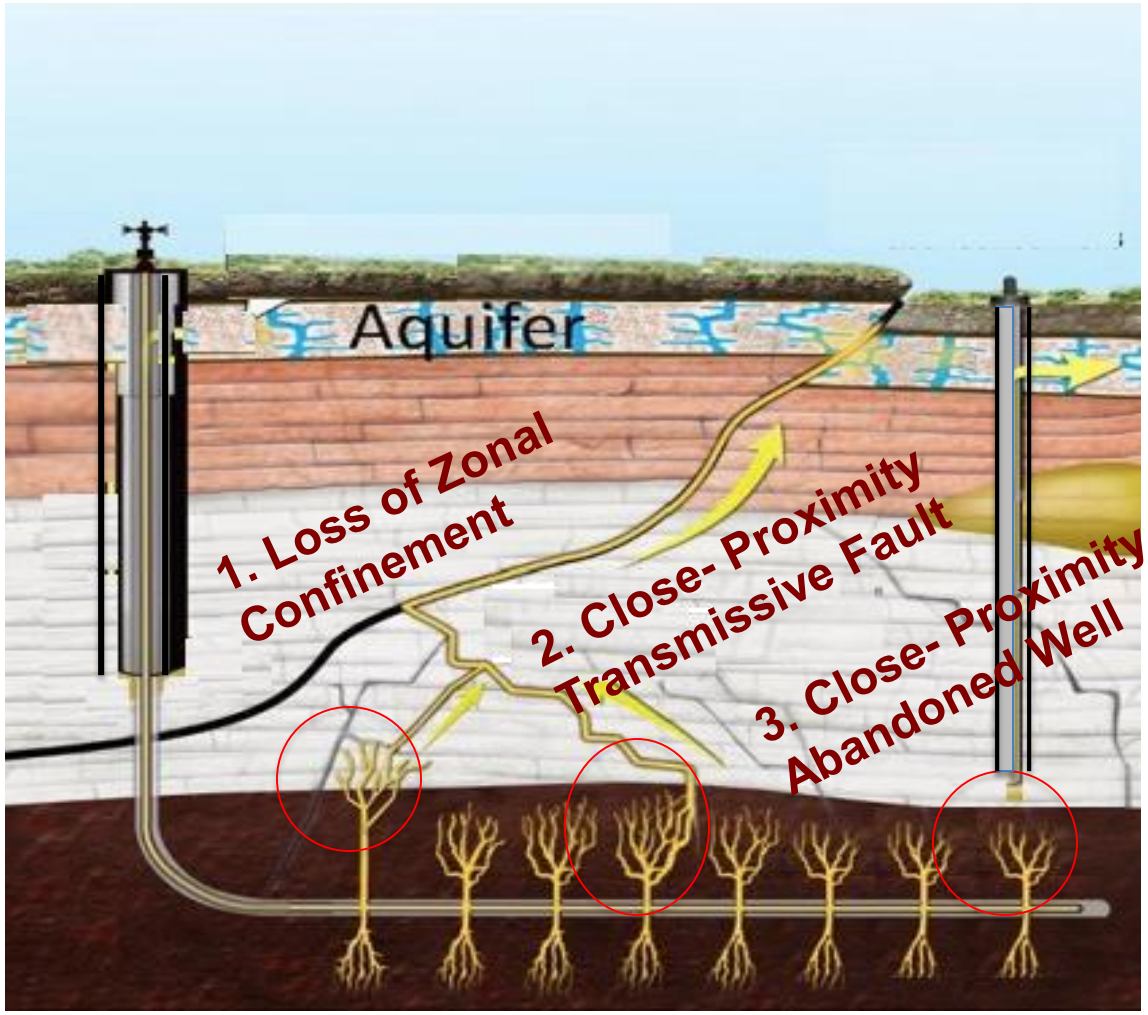
Economides Petroleum Technology, Inc.

Permian:
Multiple Stacked Shale Formations



Courtesy of Tarka

Confinement Risks

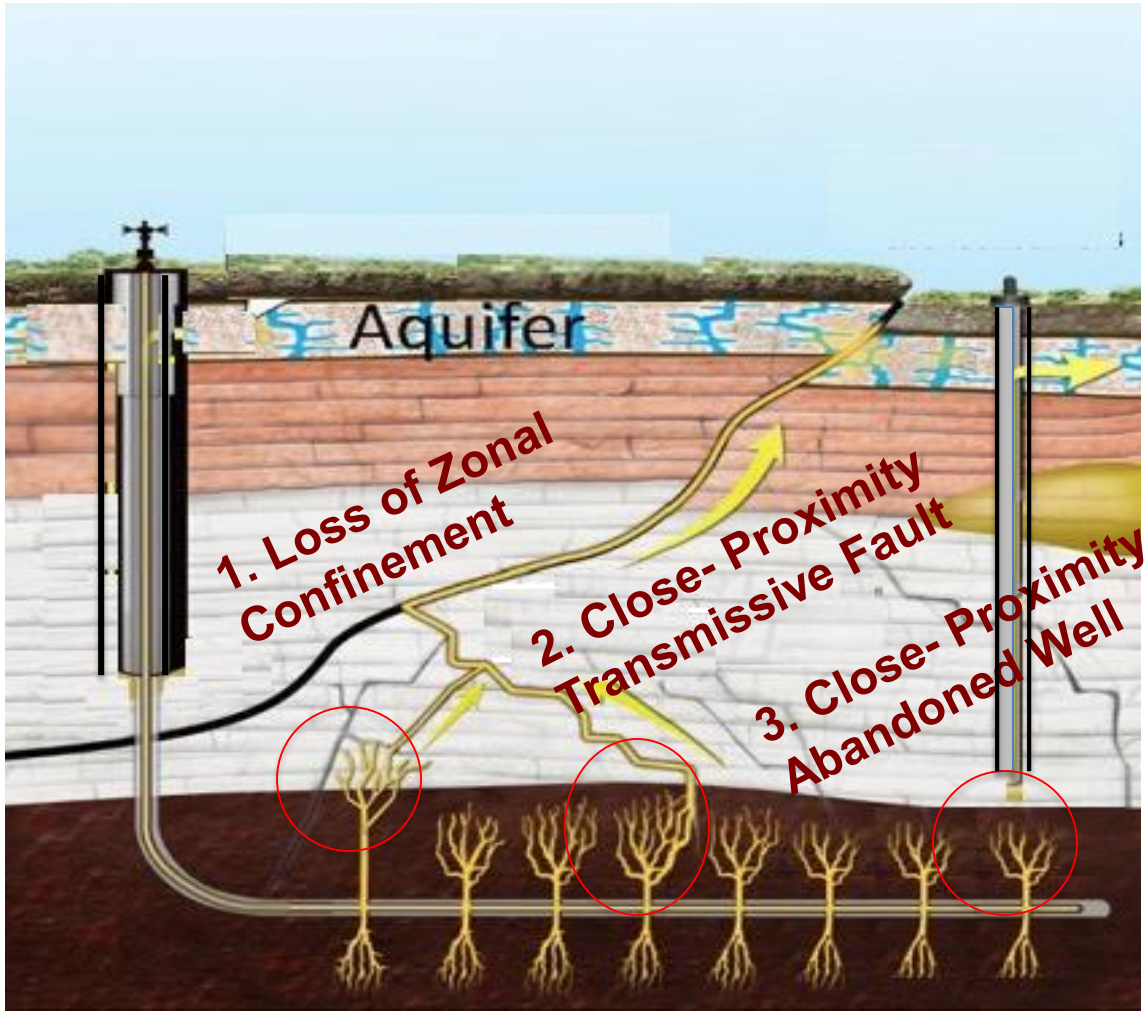


Concerns:

1. Fracture Extends beyond zone of interest
2. Fracture network intersects a naturally occurring fault.
3. Fracture network intersects the drainage radius of a close proximity abandoned well.

Risk: Fluids migrate from zone of interest to acquifers or to the surface to create contamination.

Existing Regulatory Responses



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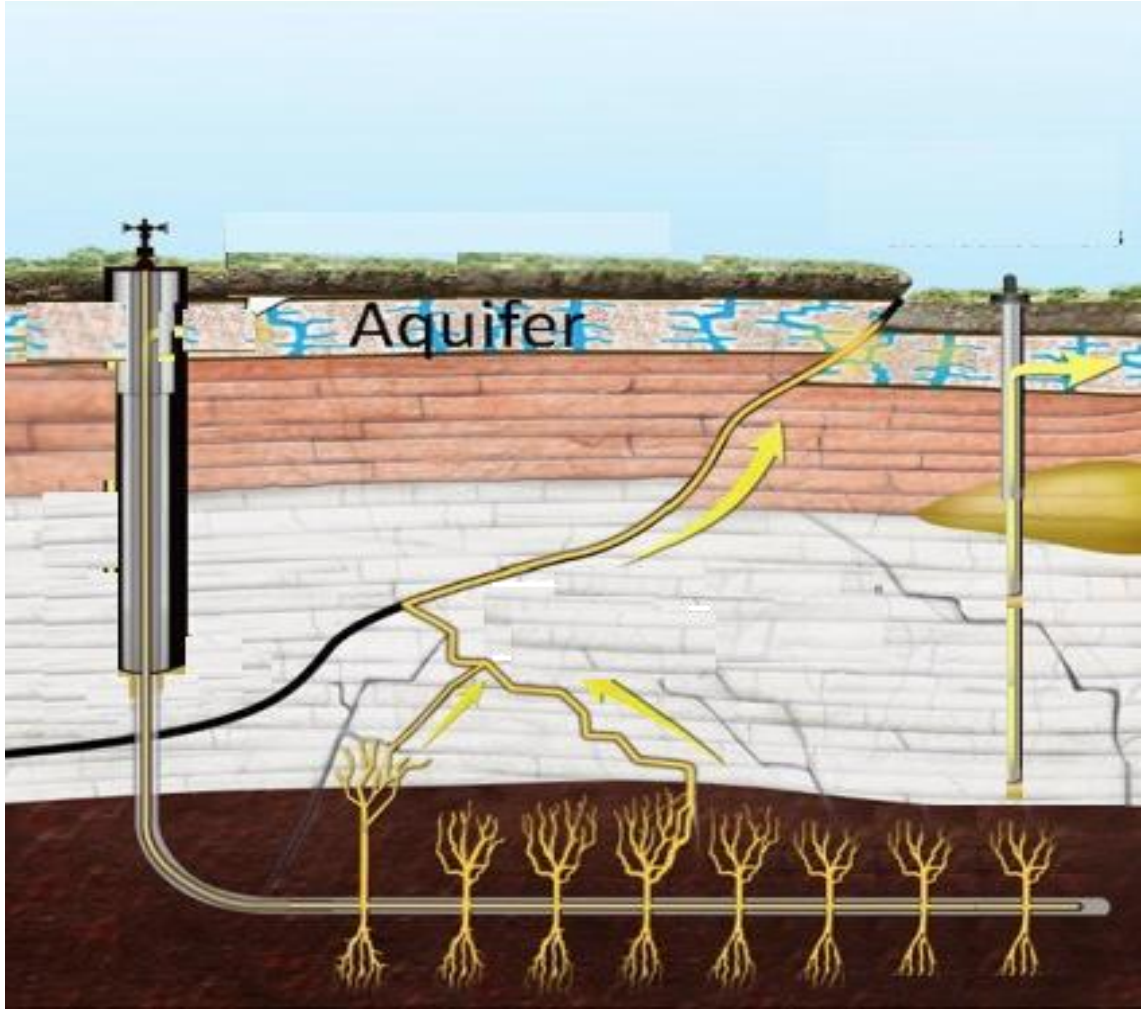
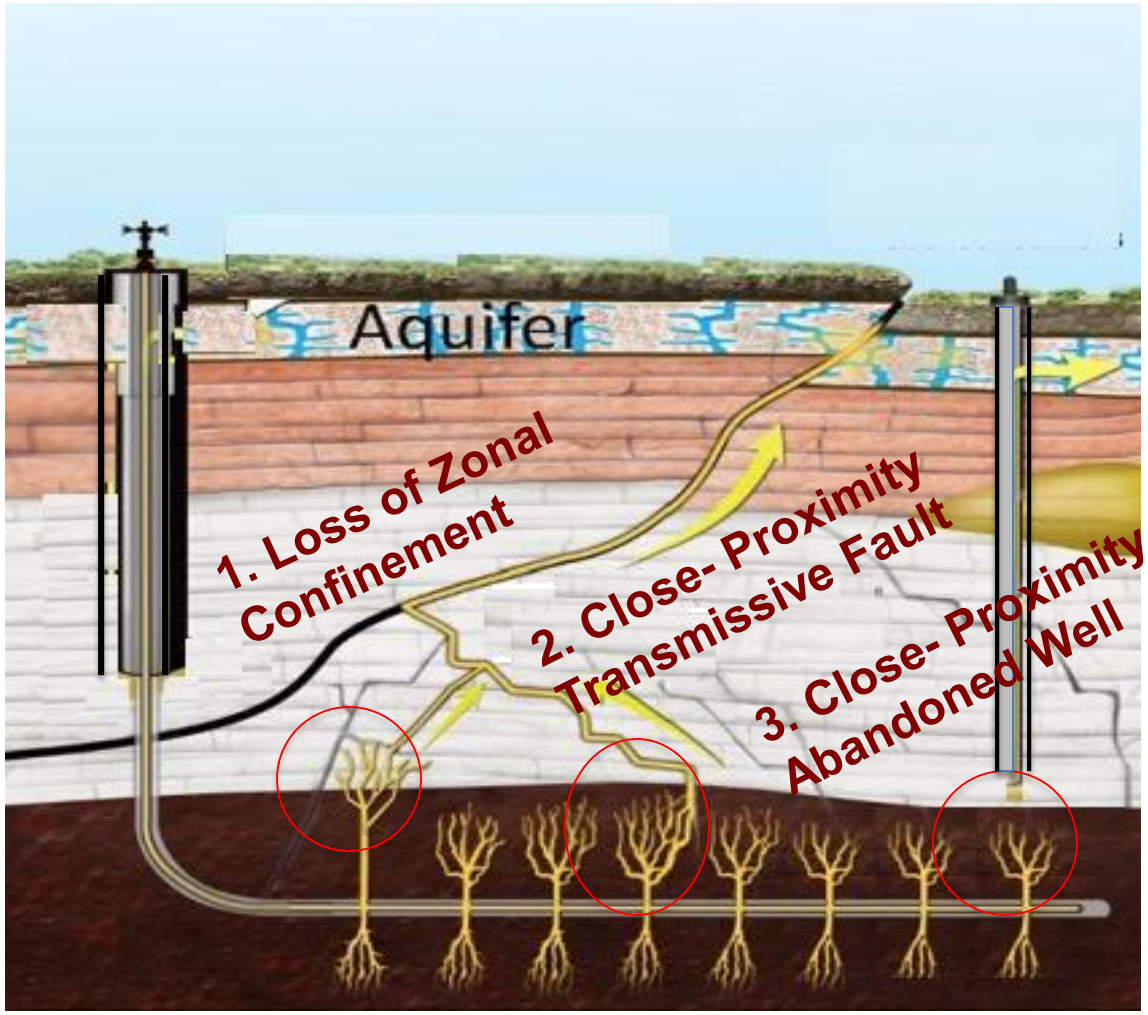
Existing Post-Event Remedies



1. Permit shields
2. Surface estate owner claims
3. Tort claims by third parties
4. Regulatory claims
   * RCRA/CERCLA
   * Discharges to water
   * Air emissions
   * Impacts on species and Protected resources

API Response



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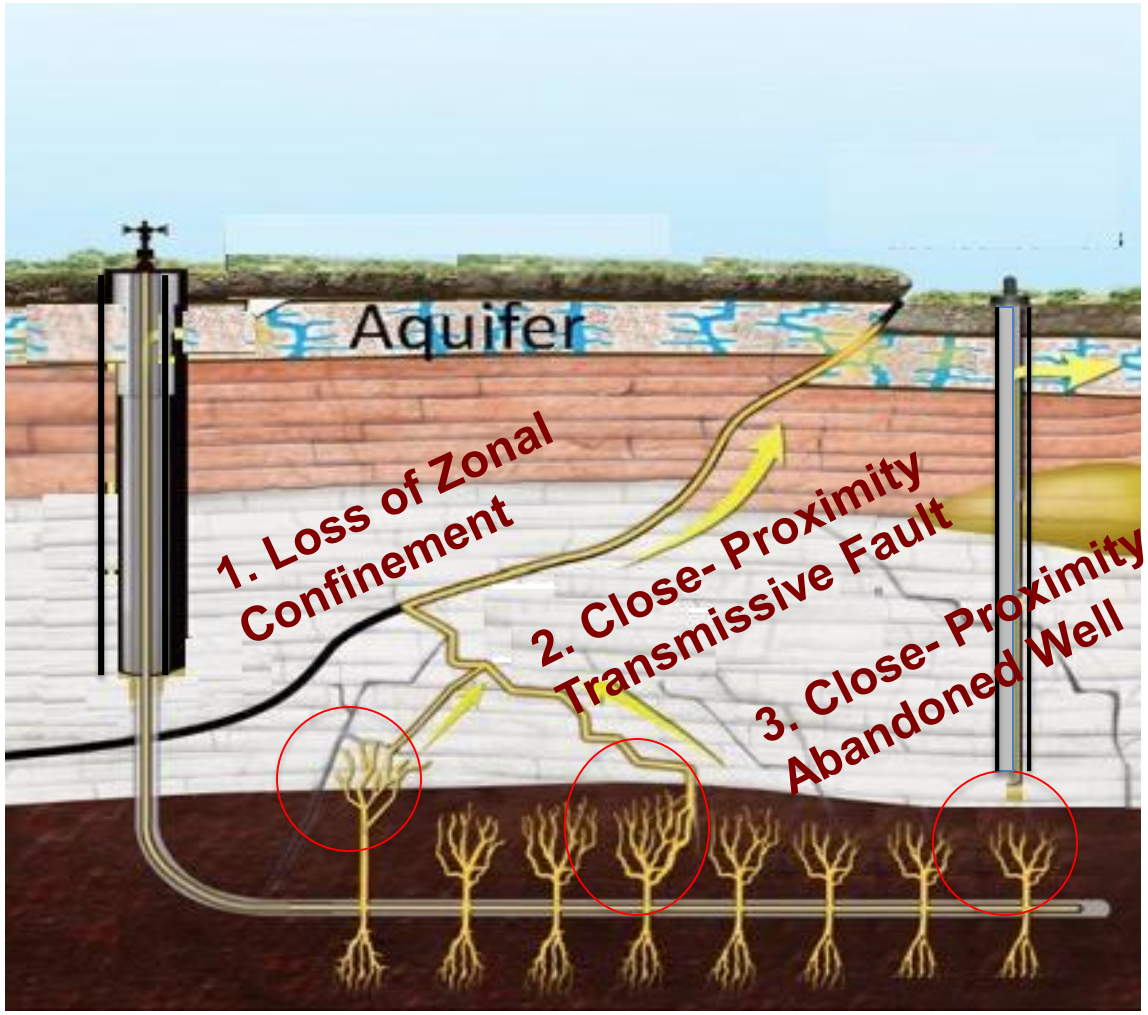
EDF Model Regulatory Framework



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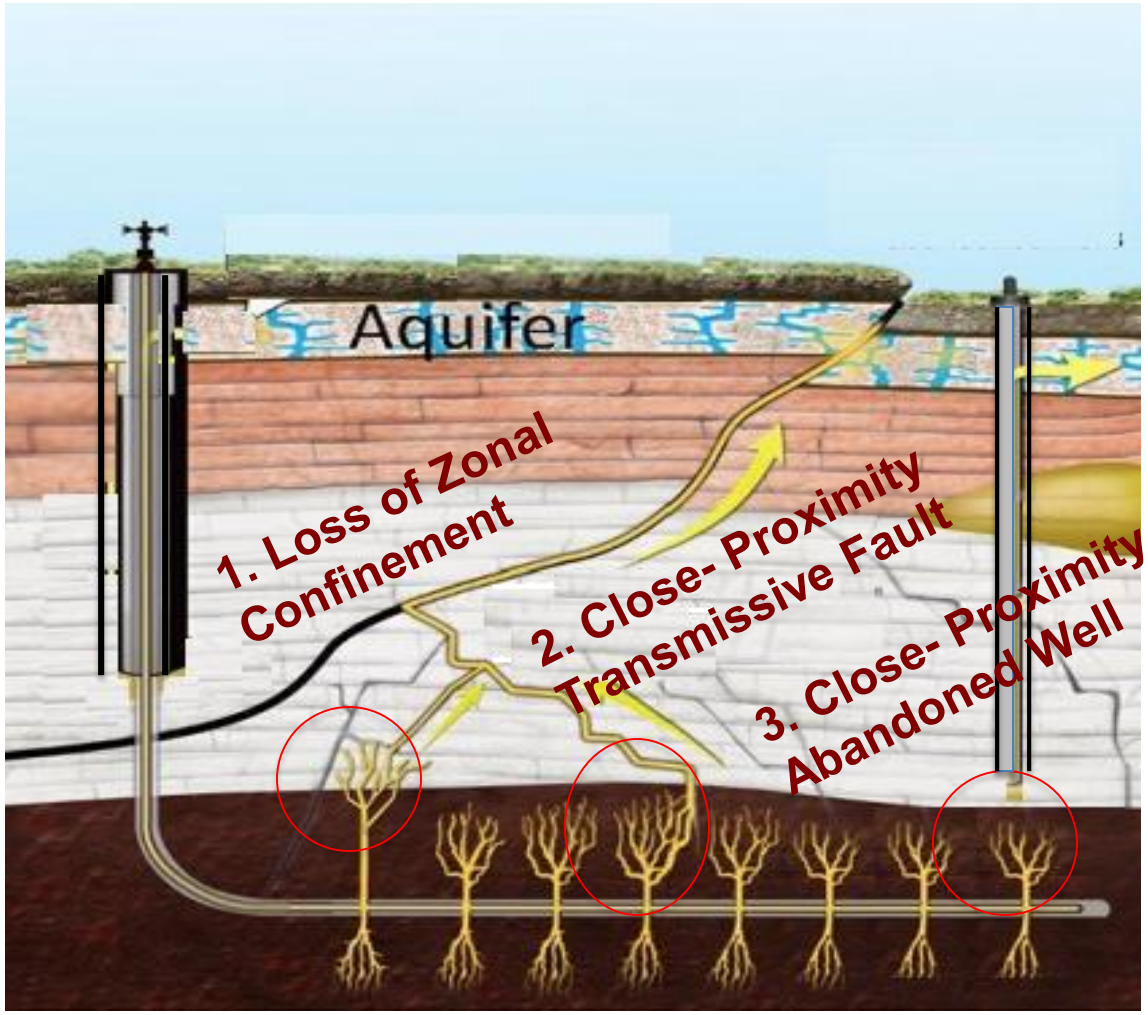
Further Proposed Response



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