

What Do We Need to Know to Manage Induced Seismicity?

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Summary

Over the last decade, concerns with injection induced seismicity have increased. In specific regions, anomalous seismicity has been linked to both water disposal and hydraulic fracturing, leading to regulations and operational protocols to manage risk. The Ground Water Protection Council and Interstate Oil and Gas Compact Commission recently published a comprehensive document on the subject “Potential Induced Seismicity Guide: A Resource of Technical and Regulatory Considerations Associated with Fluid Injection” based on input from subject matter experts from academia, industry, federal agencies and environmental groups. This guide along with other public documents outline a framework for managing anomalous seismicity.

Key steps to manage induced seismicity for specific operations include:

- Assessing the potential for induced seismicity
- Assessing risk (possible consequences) if induced seismicity occurs
- Pre-planning to mitigate risk
- Implementing a reaction plan if anomalous seismicity is encountered

Key factors to consider include:

- Mapping faults of concern and identifying their seismogenic potential
- Assessing historical seismicity catalogs and understanding sensitivity and accuracy limitations
- Assessing various potential mechanisms of induced seismicity using accurate injection details
- Designing a seismic monitoring plan
- Understanding location conditions controlling ground motion
- Understanding interaction of operations with local anomalous seismicity and mechanisms for activation
- Identifying roles and responsibilities and associated lines of communication
- Evaluating various mitigation options

References

Ground Water Protection Council and Interstate Oil and Gas Compact Commission, 2021. Potential Induced Seismicity Guide: A Resource of Technical and Regulatory Considerations Associated with Fluid Injection (https://www.gwpc.org/sites/gwpc/uploads/documents/publications/FINAL_Induced_Seismicity_2021_Guide_33021.pdf)