

## EPA REGION III

### COTTONWOOD OPERATING CORPORATION UIC PERMIT

#### ADMINISTRATIVE RECORD INDEX

1. March 11, 2015 letter from Cottonwood Operating Corporation expressing intent to renew existing UIC Permit.
2. March 25, 2015 EPA letter requesting submission of updated facility and operational information.
3. July 17, 2015 Cottonwood response to request for updated information including a Comprehensive Topographic Map with facility location, list of property owners within ½ mile, and list of all wells penetrating the injection zone within ¼ mile.
4. September 4, 2015 EPA request for additional information including updated list of associated production wells, Plugging and Abandonment Plan with cost estimate, and injection fluid analysis and injection formation and related reservoir pressures.
5. September 25, 2015 Cottonwood correspondence responding to request for additional information.
6. Region 3 Framework for Evaluating Seismic Potential Associated with UIC Class II Permit.
7. Seismic Maps of Pennsylvania (US Geological Survey and PA Department of Conservation and Natural Resources).
8. National Academy of Sciences, *Induced Seismicity Potential in Energy Technologies*, National Academy Press (final), 2014, in particular Chapters 2 and 3.
9. *A White Paper Summarizing a Special Session on Induced Seismicity*, Ground Water Research & Education Foundation, February 2013.
10. *Preliminary Report on the Northstar1 Class II Injection Well and the Seismic Events in Youngstown, Ohio Area*, Ohio Department of Natural Resources, March 2012.
11. Charles Scharnberg, *Earthquake Hazard in Pennsylvania*, Pennsylvania Geological Survey, 2003.

12. Horton, *Disposal of Hydrofracking Fluid by Injection into Subsurface Aquifers Triggers Earthquake Swarm in Central Arkansas with Potential for Damaging Earthquake*, Seismological Research Letters, Vol 83 March/April 2012, 250-260 pp.
13. Frohlich, *Two-Year Survey Comparing Earthquake Activity and Injection-Well Locations in the Barnett Shale, Texas*, Proceedings of the National Academy of Science Early Edition, 2012.
14. K. Keranen *et al*, *Potentially Induced Earthquakes in Oklahoma, USA: Links between Wastewater Injection and the 2001 Mw 5.7 Earthquake Sequence*, Geology, June 2013, vol. 41, no.6, pp. 699-702.
15. U.S. EPA UIC Technical Workgroup, *Minimizing and Maximizing Potential Impacts of Induced-Seismicity from Class II Disposal Wells: A Practical Approach*, Feb. 5, 2015.
16. US EPA Office of Drinking Water, *Final Injection Well Construction Practices and Technology*, October 1982.
17. *New Case of Earthquakes Related to an Injection Well in WV?*, Marcellus Drilling News, August 2, 2013.
18. *Managing the seismic risk posed by wastewater disposal*, Earth, April 17, 2012.
19. *Earthquakes in Pennsylvania*, website, Pennsylvania Department of Conservation and Natural Resources.
20. *Where are the Fault Lines in the United States East of the Rockies*, website, United States Geological Survey, Earthquake Hazard Program.
21. General Geology Open File Report 05-01.0: Basement Depth and Related Geospatial Data for Pennsylvania, Pennsylvania Geologic Survey, <http://www.dcnr.state.pa.us/topogeo/publications/pgspub/openfile/basementmap/index.htm>.
22. R. Kerr, *Learning How to NOT Make Your own Earthquake*, Science, Vol. 335, Mar. 23, 2012, pp. 1436-37.
23. Seismic maps of Pennsylvania.
24. Environmental Justice determination.
25. Endangered species determination.
26. Halliburton Services Cementing Tables, 1980.

27. American Petroleum Institute Website ([www.api.org](http://www.api.org))

**CERTIFICATION OF ADMINISTRATIVE RECORD**

I, Mark Nelson, Hydrologist, for the Underground Injection Control (UIC) Program, and permit writer in the Ground Water and Enforcement Branch of the Water Protection Division of the U.S. Environmental Protection Agency, Region III, certify that the administrative record for the final decision on the Cottonwood Operating Corporation UIC permit was final on \_\_\_\_\_, 2016. The administrative record includes, to the best of my knowledge, all of the documents required pursuant to 40 C.F.R. Section 124.18. This Administrative Record Index references all of the documents in the administrative record for this permit decision.

\_\_\_\_\_

\_\_\_\_\_ Date